MONETARY POLICY INSTRUMENTS AND ECONOMIC GROWTH: EVIDENCE FROM NIGERIA

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ABSTRACT  
This study examines monetary policy instruments and Economic growth: Evidences from Nigeria. The economy of Nigeria is faced with unemployment, low investment and high rate of inflation. Therefore, this study adopted time series econometrics analysis and descriptive statistics to determine the extent monetary policy instruments impact economic growth in Nigeria and ascertain the extent long-run equilibrium relationship exist between monetary policy instruments and economic growth in Nigeria. The empirical analysis that was carried out to achieve the objectives mentioned above, include the econometric tests such as unit root, co-integration, Error correction model and Grange causality test, in which changes in GDP was regressed on money supply, interest rate, exchange rate and credit to economy-using annual series data for the period 1980-2009, and the data was mainly from CBN statistical bulletin. The result of our analysis shows that monetary policy instruments significantly, influence the rate of growth of Nigeria economy. The study also found that- long-run relationship exists between monetary policy instruments and economic growth in Nigeria. Based on the findings above, the study recommends that monetary authorities should exercise influence that would affect the behaviour of monetary aggregates such as money supply interest rate; bank credit etc in the overall liquidity of the economy. The study equally recommends that-government should apply discretion in implementing some of their polices in order to favour some sectors especially the agricultural sector.

INTRODUCTION  
Monetary policy as a technique of economic management to bring about Sustainable economic growth and development has been the pursuit of nations and formal articulation of how money affects economic aggregates dates back the time of Adams Smith and later championed by the monetary economists. Since the expositions of the role of monetary policy in influencing macroeconomic objectives like economic growth, price stability, equilibrium in balance of payments and host of other objectives, monetary authorities are saddled the responsibility of using monetary policy to grow their economies. In Nigeria, monetary policy has been used since the Central bank of Nigeria was saddled the responsibility of formulating and implementing monetary policy by Central bank Act of 1958. This role has facilitated the emergence of active money market where treasury bills, a financial instrument used for open market operations and raising debt
for government has grown in volume and value becoming a prominent earning asset for investors and source of balancing liquidity in the market.

The economy of Nigeria is faced with unemployment, low investment and high inflation rate and these factors militate against the growth of the economy. Thus, adopting monetary policy in manipulating the fluctuations experienced so far in the economy, CBN undertakes both contractionary and expansionary measures in tackling the problems observed above. Therefore, the need is felt to research on monetary policy instruments and economic growth of Nigeria. Thus, the following research questions sharpen the focus of the problem.

- To what extent do monetary policy instruments impact economic growth in Nigeria?
- To what extent do long-run equilibrium relationship exist between monetary policy instruments and economic growth in Nigeria?

The general objective of this study is to examine the impact of monetary policy instruments on Nigeria’s economic growth. The specific objectives include:

- To determine the extent monetary policy instruments impact economic growth in Nigeria.
- To ascertain the extent long-run equilibrium relationship exist between monetary policy instruments and economic growth in Nigeria.

The study covers the impact of monetary policy instruments on Nigeria’s economic growth within the period 1980 to 2009. This period was chosen based on the available data, which would help us to known the extent at which monetary policy instrument are affect the growth of Nigerian economy. The variables used are Gross domestic product, money supply, interest rate, exchange rate, and credit to the economy.

REVIEW OF RELATED LITERATURE

THEORETICAL LITERATURE

Monetary theory has undergone a vast and complex evolution since the study of the economic phenomenon first came into limelight. In this chapter we will take a look at the different schools of thought, their views on the role of money in attaining policy objectives alongside a review of the necessary literature relating to this study.

THE CLASSICAL MONETARY THEORY

The classical model is based on Say’s law of markets which states that “supply creates its own demand.” Thus classical economists believe that the economy automatically tends towards full employment level by laying emphasis on price level and on how best to eliminate inflation (Amacher and Ulbrich, 1986).

THE QUANTITY THEORY OF MONEY, KEYNESIAN AND MONETARY POLICY

From the Keynesian transmission mechanism, monetary policy works by influencing interest rate which influences investment decisions and consequently, output and income via the multiplies process (Amacher and Ulbrich, 1986).

THE MONETARIST THEORY

Monetarists like Friedman (1963) emphasized money supply as the key factor affecting the wellbeing of the economy. Thus, in order to promote steady growth rate, the money supply should grow at a fixed rate, instead of being regulated and altered by the monetary authority (ies). Keynes on the other hand, maintained that monetary policy alone is ineffective in stimulating economic activity because it works through indirect interest rate mechanism.

THE MODERN APPROACH

The modern approach is the restatement of the quantity theory in modern terms. It resulted in a new and more sophisticated version of the quantity theory and in a manner amenable to empirical test.

Monetary policy
Monetary policy can also be seen as policy employing the Central Bank’s control of the money supply as an instrument for achieving the objectives of economic policy (Johnson, 1962). Similarly, from a synthesis of most of the literature and in the context of the Nigerian situation, Ubogu (1985) defines monetary policy as an attempt by the monetary authorities to influence the level of aggregate economic activities by controlling the quantity and direction of money and credit availability.

OBJECTIVES OF MONETARY POLICY
Asogu, (1998) defined monetary policy as a measure designed to influence the availability, cost and direction of money and credit in pursuit of specified economic goals. Monetary policy is art of the overall economic policy that regulates the level of money supply and credit in the economy in order to achieve some desired policy objectives.
By monetary policy objectives, we mean the ultimate objectives of macroeconomic policy. The objectives include:

TECHNIQUES OF MONETARY POLICY CONTROL
The techniques by which the stated objectives are pursued by the monetary authorities can be classified into two categories: - the Market Control Approach and the Portfolio Control Approach.
Market Control Approach: This is an indirect or traditional approach of monetary control. They include the manipulation of:- The Open Market Operation and The Central Bank’s Discount Rate.

Open Market Operations
Open market operations refer to the buying and selling of government and other approved securities by the Central Bank in the open market.

The Central Bank’s Discount Rate
Central Bank’s discount rate measures the price charged by the Central Bank for financial assistance made available to the banking sector in the events of perceived shortages of liquidity, (Chowdhry, 1986).

Portfolio Control Approach
Portfolio Control Approach is a direct or non-traditional approach of monetary control. It works through the instruments of portfolio constraints, namely: Reserve requirements, Special deposits with the Central Bank, Selective credit controls, Moral suasion, Direct Measures.

Reserve Requirements: Commercial banks are required to keep some reserves with the Central Bank. By increasing or decreasing the banks’ reserve requirement, the Central Bank affects the banks’ ability to lend.

Special Deposits with the Central Bank: Special deposits with the Central Bank are additional deposits over and above the minimum legal reserve requirement that the commercial banks are made to deposit with the Central Bank.

Selective Credit Control: This is a measure used by the Central Bank to control the flow of bank credits to different sectors of the economy. The Central Bank directs banks on the cost, volume and direction of credit to different sectors of the economy.

Moral Suasion: This involves the issuing of persuasive instructions to commercial banks to control the flow of their credits to the economy.

Direct Measures: The direct measurers involve the use of interest rate ceilings, lending ceilings and qualitative lending guidelines. The Central Bank may decide to place a limit on the rate of interest and in such a situation the rate of interest cannot fluctuate beyond that limit.

FACTORS INFLUENCING MONETARY POLICY
According to Anyanwu (2003) a number of variables or aggregates have tended to influence the monetary policy. These variables are:

Economic Stability: for the main thrust of monetary policy to be fully implementable, there should be macroeconomic stability otherwise a lot of distortions and lapses will make the targets unrealizable.

Financial Market Efficiency: A special ingredient for the monetary policy effectiveness is the money market segment.
Inflation: The scope or magnitude of the inflationary trends in the economy goes a long way to influence the monetary policy. With high inflation, any, rate the price stability exchange rate stability and balance of payments position, will not be fully realized.

**EMPIRICAL LITERATURE**

The soundness of any theory whether economic or otherwise, is tested by its behaviour when subjected to empirical analysis. Several attempts have been made to empirically investigate the effect of monetary policy on Nigerian economy. These studies include:

Adefeso and Mobolaji (2010), employed Jahnansen maximum likelihood co-integration procedure to show that there is a long run relationship between economic growth, degree of openness, government expenditure and M2.

Ajayi (1974) emphasized that in developing economy in which Nigeria is a typical example, the emphasis is always on fiscal policy rather than monetary policy in his works, he estimated the variables of monetary and fiscal policies using ordinary least Square (OLS) technique, and found out that monetary influence, are much larger and more predictable than fiscal influence. This result was confirmed with the use of beta coefficients that changes in monetary action were greater than that of fiscal action. In essence, greater reliance should be placed on monetary actions.

Ajisafe and Folunso (2002), observe that that monetary policy exerts significant impact on economic activity in Nigeria.

Bogunjoko (1997) investigated the efficiency of monetary policy as a stabilization tool, using modified St. Louise model and data covering the period of 1970 to 1993, the study found that money matters in Nigerian economy, and the appropriate monetary target is the domestic credit of the banking section.

Balugun (2007), used simultaneous equation models to test the hypothesis of monetary policy effectiveness in Nigeria, and found that rather than promoting growth, domestic monetary policy was a source of stagnation and persistent inflation.

Batini, (2004), stress that in the 1980s and 1990s monetary policy was often constrained by fiscal indiscipline. Monetary policies financed large fiscal deficit which averaged 5.6 percent of annual GDP and though the situation moderated in the later part of the 1990s it was short lived as Batini, described the monetary policy subsequently as too loose which resulted to poor inflation and exchange rates record.

Busari et-al (2002), state that monetary policy stabilizes the economy better under a flexible exchange rate system than a fixed exchange rate system and it stimulates growth better under a flexible rate regime but is accompanied by severe depreciation, which could destabilize the economy meaning that monetary policy would better stabilize the economy if it is used to target inflation directly than be used to directly stimulate growth. They advised that other policy measures and instruments are needed to complement monetary policy in macroeconomic stabilization. In the same stride,

Busari et al. (2006), examine the implications of the exchange rate regime on the ability of monetary policy to stabilize the economy. They found maintained that monetary policy stimulates growth better under a flexible rate regime but it is accompanied by severe depreciation, which could destabilize the economy. In other words, they opined that monetary policy would better stabilize the economy if it is used to target inflation directly than be used to directly stimulate growth. They suggested that other policy measures and instruments are required to complement monetary policy in macroeconomic stabilization.

Chuku (2009) using a structural Vector Autoregressive (SVAR) approach in measuring the effect of monetary innovations in Nigeria, found that innovations on quality based nominal anchor (m2) has modest effects on output and price with a very fast speed of adjustment, while innovations on price-based nominal anchors have central and fleeting effects on output.

A recent study by Chimobi and Uche (2010), examined the relationship between money, inflation and output in Nigeria. The study adopted co-integration and granger. Causality test analysis. The co-integration result of the study showed that the variable used in the model exhibited no long run relationship among each other. Nevertheless, money supply was seen to granger cause both output and inflation.

Elliot (1975) examined the relative importance of money supply changes compared to government expenditure money supply changes compared to government expenditure changes, in explaining fluctuations nominal GNP. He was of the opinion that this area of study had continuing capacity of provide debate among economists. He used St. Louis equation which after estimation, the result of his evaluation clearly supported the conclusion that fluctuations in nominal GNP are more importantly attached to monetary movements, than movement in federal government expenditure.

Feridun (2005), studied impact of monetary policy on economic instability in Turkey from 1983 – 2003 and based on quarterly data, the study affirmed that the efforts of the Turkey monetary policy at influencing the
finance of government fiscal deficit through the determination of the inflation-tax rate, affected to some extent, the rate of inflation and the real exchange rate thereby causing volatility in their rate. Folawemo and Osinubi (2006), investigates how monetary policy objective of controlling inflation rate and intervention in the financing of fiscal deficits affect the variability of inflation and real exchange rate. The analysis is done using a rational expectation framework that incorporates the fiscal role of exchange rate. The paper reflects that the effort of the monetary authority to influence the finance of government fiscal deficit through the determination of the inflation-tax rate affects both the rate of inflation and the real exchange rate, thereby causing volatility in their rates. Genev (2002), using a structural vector Autoregressive (SVAR) approach, studied the effect of monetary shock in ten central and Eastern European (CEE) countries, found some indications that changes in the exchange rate affect out put. Hsiao (2008) observes that the causes of high inflation may seem to be due to temporary domestic supply disruptions; in which case, central bankers could normally afford to hold their course and wait for the situation to return to normal. But the fact that higher inflation is now a worldwide phenomenon suggests something of a global nature is at work. Iyoha and Oriakhi (2002), opine that monetary policy should be such as to prevent inflation that is often a source of instability and which then leads to a reduction in investment. They argue that monetary and credit policy should be designed to bring about a low but positive real interest rate. A low positive interest rate will encourage capital accumulation. Financial repression should be eschewed and a deregulated financial environment embraced. They said that an important aim of monetary and credit policy should be a sound banking system kept in check with strong prudential regulation and supervision. Kogar (1995), examinee the relationship between financial innovations and monetary control and concludes that in a changing financial structure, Central Banks cannot realize efficient monetary policy without setting new procedures and instruments in the long-run, because profit seeking financial institutions change or create new instruments in order to evade regulations or respond to the economic conditions in the economy. Nnanna (2001), observe that though, the Monetary management in Nigeria has been relatively more successful during the period of financial sector reform which is characterized by the use of indirect rather than direct monetary policy tools yet, the effectiveness of monetary policy has been undermined by the effects of fiscal dominance, political interference and the legal environment in which the Central Bank operates. Okulegu, Ogbueghu and Oruta (2012), investigates the monetary policy instrument on Nigerian economic growth, the study adopted co-integration and granger Causality test analysis. The result shows that monetary policy instruments influence the growth rate of Nigerian economy. Nevertheless, longrun exists between monetary policy instruments and economic growth. Omotor (2010), estimated an endogenous structural break date. Using the Gregory and Hansen procedure, an endogenous break date of 1994 was estimated for the cointegrating equation of the demand for money. The study affirmed a stable money demand function for Nigeria and concluded that the Central Bank of Nigeria (CBN) has effectively used money supply as monetary policy instrument. Sanusi (2002). Observed that the primary goal of monetary policy in Nigeria has been the maintenance of domestic price and exchange rate stability since it is critical for the attainment of sustainable economic growth and external sector viability. Starr (2005) using SVAR model with orthogonazed identification, found little evidence of real effects of monetary policy in five common wealth of independent states (CIS) with notable exception that-changes in interest rate have a significant impact on output.

FINDINGS FROM EMPIRICAL LITERATURE REVIEWED
Based on the above empirical studies as reviewed, it is observed that some researchers tried seriously to examine the effectiveness of monetary policy on the economy of Nigeria, but non has shown an accurate long run effect of monetary policy instruments on the economy of Nigeria. Some of the studies reviewed did not test for unit root to ascertain the validity of the variables employed, while some others omitted some variables that are critical to the effectiveness of macroeconomic model designed to determine the efficacy of monetary policy such as intrest rate. Reason being because of their inability to either utilize all the necessary variables in their model or apply all the correct econometrics method in their test.

Therefore, this research work fills the gap that has been overlooked by the previous researchers on this topic, by incorporating all the necessary variables and econometric tests that have been ignored by the previous
researchers so as to ascertain the accurate long run effect of monetary policy instruments on Nigerian economic growth.

**METHODOLOGY**

**Research Design**

This chapter focuses on the research method that will be adopted. Regression analysis based on the classical linear regression model, otherwise known as Ordinary Least Square (OLS) technique is chosen by the researcher. Meanwhile, Augmented Dickey-Fuller, unit root test will be used to determine the stationary state of variables and Johansen Cointegration and Error Correction Model test for short run dynamic will be used to establish the relationship. The researcher’s choice of technique is based not only on its computational simplicity but also as a result of its optimal properties such as linearity, unbiasedness, minimum variance, zero mean value of the random terms, etc (Gujarati 2004).

**Model Specification**

In this study, hypothesis has been stated with the view of examining the impact of monetary policy on Nigeria’s economic growth. In capturing the study, these variables were used as proxy. Thus, the model is represented in a functional form. It is shown as below:

\[ GDP = F (MS, INT, EXCH, CE) \]

In a linear function, it is represented as follows,

\[ GDP = b_0 + b_1 MS + b_2 INT + b_3 EXCH + b_4 CE + U \]

To ensure more robust estimation results, we further transform this to log-linear equation as follows:

\[ LGDP = b_0 + b_1 LMS + b_2 LINT + b_3 LEXCH + b_4 LCE + U \]

Where \( b_0 \) represents the constant term, \( b_1 \) represents the regression coefficient of MS, \( b_2 \) represents the regression coefficient of INT, \( b_3 \) represents the regression coefficient of EXCH, \( b_4 \) represents the regression coefficient of CE, L represents logarithms, \( U \) represents the stochastic Error Term.

**Estimation Procedure**

At this level of research, using time series data, the researcher estimates the model with ordinary least square method. This method is preferred to others as it is best linear unbiased estimator, minimum variance, zero mean value of the random terms, etc (Koutsoyiannis 2003).

In the preliminary test, the following tests shall be conducted. They include:

- **Z-test.**
- **Unit root test**
- **Cointegration**
- **Casuality test**

**Z-test:** It is used to test for the statistical significance of individual estimated parameter. In this research, **Z-test** is chosen because, the population variance is unknown and the sample size is greater than 30.

**DECISION RULE**

If \( Z_{\text{cal}} > Z_{\text{tab}} \), reject the null hypothesis and conclude that the regression coefficient is statistically significant. Otherwise accept the null hypothesis.

**Unit root Test:** it is used to test for the stationarity of the time series data. Augmented Dickey fuller will be used in process. In considering the levels the data could be said to be integrated of, Augmented Dickey fuller (ADF) test statistics shall be compared with the critical values at 5% level of significance. A situation whereby the ADF test statistics is greater than the critical values with consideration on the absolute values, the data at the tested order will be said to be stationary. Augmented Dickey-Fuller test relies on rejecting a null hypothesis of unit root (the series are non-stationary) in favour of the alternative hypothesis of stationarity. The tests are conducted with and without a deterministic trend \( (t) \) for each of the series. The general form of ADF test is estimated by the following regression.

\[ \Delta y_t = a_0 + a_1 y_{t-1} + \sum_{i=1}^{n} a_i \Delta y_{t-i} + \epsilon_t \]

\[ \Delta y_t = a_0 + a_1 y_{t-1} + \sum_{i=1}^{n} a_i \Delta y_{t-i} + \delta t + \epsilon_t \]

Where:

- \( Y \) is a time series, it is a linear time trend, \( \Delta \) is the first difference operator, such that \( \Delta y_{t+1} = y_{t+1} - y_t \), \( a_0 \) is a constant, \( n \) is the optimum number of lags in the dependent variable and \( t \) is the random error term.

The null hypothesis is that \( a_1 = 0 \). If the null hypothesis \( a_1 = 1 \), then we conclude that the series under consideration \( \Delta (y_t) \) has a unit root and is therefore non-stationary.
If the ADF test fails to reject the test in levels but rejects the test in first differences, then the series contains one unit root and is of integrated order one \( I(1) \). If the test fails to reject the test in levels and first differences but rejects the test in second differences, then the series contains two unit roots and is of integrated order two \( I(2) \).

The Philip-Perron (PP) Unit Root test is implemented to justify the results ADF test. The equation is thus:

\[ \Delta y_t = a_0 + a_1 y_{t-1} + \ldots + \Delta \rho y_{t-p} + \epsilon_t \] \hspace{1cm} \text{6}

**Co-Integration Test:** It is used to test for the long run relationship between the variables. Johansen Co-integration Approach will be undertaken by the researcher in the course of the analysis. Hence, the use of Johansen Co-integrating Normalized coefficients to ascertain the nature of the long run relationship between the estimated variables. Engel and Granger (1987) pointed out that a linear combination of two or more non-stationary variables may be stationary. If such a stationary combination exists, then the non-stationary time series are said to be co-integrated. The VAR based co-integration test using the methodology developed in Johansen (1991, 1995).

Johansen’s methodology takes its starting point in the vector auto regression (VAR) of order \( P \) given by

\[ y_t = \mu + \Delta y_{t-1} + \ldots + \Delta p y_{t-p} + \epsilon_t \]

To determine the number of co-integration vectors, Johansen (1988, 1989) and Johansen and Juselius (1990) suggested two statistic test, the first one is the trace test (\( \lambda \) trace). It tests the null hypothesis that the number of distinct co-integrating vector is less than or equal to \( q \) against a general unrestricted alternatives \( q = r \) the test calculated as follows:

\[ \lambda \text{ trace } (r) = -T \ln (1 - \lambda r) \]

Where

\[ T \] is the number of usable observations, and the \( \lambda_1, \ldots, \lambda_r \) are the estimated eigenvalue from the matrix.

The second statistical test is the maximum eigenvalue test (\( \lambda \) max) that is calculated according to the following formula.

\[ \lambda \text{ max } (r, r+1) = -T \ln (1 - \lambda_{r+1}) = T \ln (1 - \lambda r + 1) \]

The test concerns a test of the null hypothesis that there is \( r \) of co-integrating vectors against the alternative that \( r + 1 \) co-integrating vector.

**Error Correction Mechanism (ECM):** The purpose of the error correction model is to indicate the speed of adjustment from the short-run equilibrium to the long-run equilibrium state. The greater the co-efficient of the parameter, the higher the speed of adjustment of the model from the short-run to the long-run equilibrium.

The ECM (\( p \)) form is written as:

\[ \Delta y_t = \delta + p y_{t-1} + c \Delta y_{t-1} + \epsilon_t \]

where \( \Delta \) is the differencing operator, such that \( \Delta y_{t-1} = y_t - y_{t-1} \).

**Causality test:** It is used to determine the direction of event. In this work, Granger causality test will be employed to determined whether GDP granger cause money supply or otherwise. That is, (MS GDP) or (GDP MS)

The arrow shows the direction of the causality.

The test involves estimating the following pair of regression.

\[ \text{GDP}_t = \sum_{i=1}^{n} \sum_{j=1}^{n} \beta_{ij} \text{GDP}_{t-j} + \text{U}_1t \]

\[ \text{M}_t = \sum_{i=1}^{n} \sum_{j=1}^{n} \delta_{ij} \text{GDP}_{t-j} + \text{U}_2t \]

Where \( M \) = money supply

\( \text{GDP} \) = Gross Domestic Product

\( U_1t \) and \( U_2t \) are correlated.

**Sources of Data**

The data for this research project are obtained from the following sources:
RESULTS
UNIT ROOT TEST
The Augmented Dickey-Fuller (ADF) and Philip Perron (PP) tests were employed to test for stationarity or the existence of unit roots in the data. The test results are as presented below:

Table 1. UNIT ROOT RESULT
Augmented Dickey Fuller Unit Root Test

<table>
<thead>
<tr>
<th>Series</th>
<th>ADF Statistic</th>
<th>Test</th>
<th>5% critical values</th>
<th>10% critical values</th>
<th>Order</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>-5.823710</td>
<td>-3.5312</td>
<td>-3.1968</td>
<td>1(1)</td>
<td>Stationary</td>
<td></td>
</tr>
<tr>
<td>MS</td>
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<td>-3.5312</td>
<td>-3.1968</td>
<td>1(1)</td>
<td>Stationary</td>
<td></td>
</tr>
<tr>
<td>EXR</td>
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<td>-3.5312</td>
<td>-3.1968</td>
<td>1(1)</td>
<td>Stationary</td>
<td></td>
</tr>
<tr>
<td>CTE</td>
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<td>-3.5312</td>
<td>-3.1968</td>
<td>1(1)</td>
<td>Stationary</td>
<td></td>
</tr>
</tbody>
</table>

Source: e-view 4.1

Table 2. Phillips-Perron Unit Root Test

<table>
<thead>
<tr>
<th>Series</th>
<th>ADF Statistic</th>
<th>Test</th>
<th>5% critical values</th>
<th>10% critical values</th>
<th>Order</th>
<th>Remarks</th>
</tr>
</thead>
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<td>-3.1968</td>
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<td>MS</td>
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<td>1(1)</td>
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<tr>
<td>EXR</td>
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<td>CTE</td>
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<td>1(1)</td>
<td>Stationary</td>
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</table>

Source: e-view 4.1

Table 3. AUGMENTED Dickey Fuller Unit Root TEST

<table>
<thead>
<tr>
<th>Series</th>
<th>ADF Statistic</th>
<th>Test</th>
<th>5% critical values</th>
<th>10% critical values</th>
<th>Order</th>
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</thead>
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<tr>
<td>GDP</td>
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<td>MS</td>
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<td>INT</td>
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Source: e-view 4.1

Table 4. Phillip-Perron Unit Root Test

<table>
<thead>
<tr>
<th>Series</th>
<th>ADF Statistic</th>
<th>Test</th>
<th>5% critical values</th>
<th>10% critical values</th>
<th>Order</th>
<th>Remarks</th>
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<td>EXR</td>
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<td>1(1)</td>
<td>Stationary</td>
<td></td>
</tr>
</tbody>
</table>

Source: e-view 4.1
The above empirical test shows that GDP, MS, INT, EXR and CTE are integrated of order one. They are integrated of the same order; 1(1). From the above tables (4.1a, b), it was found that both ADF and PP Test with trend and intercept, and ADF and PP with intercept indicated that time series are integrated of the same order. Considering the ADF and PP test statistics at 5% and 10% critical values, it is observed that test statistics are greater than the critical values. Thus, the series are said to be stationary at that level.

CO-INTEGRATION TEST

It is used to test for the long run relationship between the variables. From the table below (4.2), there is a long run relationship between the GDP and the explanatory variables (MS, INT, EXR and CTE) in Nigeria within the period under study 1970-2009. Firstly, the summary of the Johansen Co-integration Test is shown in the Table below. The model with lag 1 was chosen with the linear deterministic test assumption.

Johansen co-integration test for the series; GDP, MS, INT, EXR and CTE

Table 5. CO-INTEGRATION RESULT

<table>
<thead>
<tr>
<th>Eigenvalue</th>
<th>Likelihood Ratio</th>
<th>5 percent critical value</th>
<th>1 percent critical value</th>
<th>Hypothesized No. of CE(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.867492</td>
<td>222.3074</td>
<td>68.52</td>
<td>76.07</td>
<td>None **</td>
</tr>
<tr>
<td>0.822929</td>
<td>149.5472</td>
<td>47.21</td>
<td>54.46</td>
<td>At most 1 **</td>
</tr>
<tr>
<td>0.678965</td>
<td>87.22391</td>
<td>29.68</td>
<td>35.65</td>
<td>At most 2 **</td>
</tr>
<tr>
<td>0.605471</td>
<td>46.32053</td>
<td>15.41</td>
<td>20.04</td>
<td>At most 3 **</td>
</tr>
<tr>
<td>0.29961</td>
<td>12.83830</td>
<td>3.76</td>
<td>6.65</td>
<td>At most 4 **</td>
</tr>
</tbody>
</table>

Source: e-view 4.1
*(**) denotes rejection of the hypothesis at 5% significance Level
L.R test indicates 5 cointegrating equation(s) at 5% significance.
Normalized Cointegrating Coefficients: 1 cointegrating Equation(s)

<table>
<thead>
<tr>
<th>D(GDP,1)</th>
<th>D(MS,1)</th>
<th>D(INT,1)</th>
<th>D(EXR,1)</th>
<th>D(CTE)</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.000000</td>
<td>-0.745020</td>
<td>-818.5509</td>
<td>2602.965</td>
<td>0.740021</td>
<td>-3338.591</td>
</tr>
<tr>
<td>(0.15719)</td>
<td>(2219.32)</td>
<td>(781.659)</td>
<td>(0.15834)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Under the Johansen Co-integration Test, it is observed that there are five cointegrated equations. In Johansen’s Method, the eigenvalue statistic is used to determine whether cointegrated variables exist. Cointegration is said to exist if the values of computed statistics are significantly different from zero. The Likelihood Ratio is higher than 5% critical value and the eigenvalues are found as (0.867492, 0.822929, 0.678965, 0.605471 and 0.29961). The Likelihood Ratio of GDP, MS, INT, EXR and CTE are greater than the critical values at both 5% and 1% level of significance. Also, the Eigenvalues of GDP, MS, INT, EXR and CTE are significantly greater than zero. In other words, the null hypothesis of no cointegration among the variables is rejected in at least five equations. The test result shows the existence of a long-run equilibrium relationship in five cointegrating equations at 5% significance level.

The Nigeria’s economic growth is affected by monetary policy instruments. Therefore, Money Supply with other specified variables in the model, changes the real GDP value and the propensity to grow.

The normalized cointegrating coefficients( Appendix vii) for one cointegrating equation given by the long-run relationship is

GDP = -3338.59 - 0.7450 MS -818.55 INT +2602.965 EXR + 0.7400 CTE
(0.15719) (2219.32) (781.659) (0.15834)

where GDP is the dependent variable, -3338.59 is constant, -0.745020 is the coefficient of money supply (MS), -818.55 is the coefficient of Interest Rate (INT), 2602.97 is the coefficient of Exchange Rate (EXR) and 0.74 is the coefficient of Credit to the Economy (CTE).

The figures in parenthesis under the estimated coefficients (Appendix vii) are the asymptotic standard errors. The values in this relationship were extracted from the Johansen’s Cointegration Test under the “Normalized Cointegration Coefficients: 1 Cointegrating Equation” sub-section. They are coefficients showing the direction and strength of the relationship between the explanatory variables and dependent variable in the long-run.
From the above equation, the constant value is -3338.591 indicating that the average level in the Gross Domestic Product (GDP) in Nigeria is approximately -3339 units when other variables are zero. The sign of the constant value is negative which means that the proportion in the Gross Domestic Product (GDP) in Nigeria tends to decrease, keeping other variables constant in the long-run. It is found that a unit increase in Money Supply (MS) and Interest Rate (INT), on the average, will lead to decrease by 0.74 units and 818.55 in GDP respectively while a unit increase in Exchange Rate (EXR) and Credit to the Economy (CTE) on the average will lead to a decrease by 2602.97 units and 0.74 units in the Gross Domestic Product (GDP) respectively.

Worthy of note is the signs borne by the coefficient estimate of Money Supply. Regarding determinants of Money Supply, the supply of money is determined by the behaviour of three economic factors

(i) The behaviour of banks concerning the amount of reserves that they decide to keep at any point in time.

(ii) The behaviour of the non-bank public in dividing their money assets between currency and demand deposits. The larger the non-bank public’s marginal currency-deposit ratio, the smaller will be the expansion of deposits.

(iii) The monetary authorities in their decision to change the size of high-powered money (money base and also the right of the authorities to set the legal reserve ratio.

The decrease in the money supply could be attributed to the policy adopted by the CBN to curb high inflation in the economy. The control of demand-pull inflation with respect to decrease in money supply implies reduction in government expenditure, increase in personal and company taxes and regulation of money supply and credit creation by commercial banks. Increase in Money supply and credit creation by commercial banks has the effect of increasing the quantity of money in circulation leading to excess demand and consequently increase in prices of goods and services.

Another note to be taken is the high value of the coefficient of Interest Rate (INT) and its negative sign. A good monetary policy will oppose the activities on the increase in interest rates. Increase in interest rates means increase in the cost of borrowing i.e. increase in the cost of capital. Such increase in the cost of capital increase the total cost of production and lead to increase in the prices of final products.

**ERROR CORRECTION MODEL (ECM)**

The existence of a long-run cointegrating equilibrium, provides for short-term fluctuations. In order to straighten out or absolve these fluctuations, an attempt was made to apply the Error Correction Model (ECM).

As noted, the ECM is meant to tie the short-run dynamics of the cointegrating equations to their long-run static dispositions. Below is the ECM test for the given data:

| Table 6. ERROR CORRECTION MODEL (ECM) RESULT |
|-------------------|-----------------|----------------|-----------------|-----------------|
| Dependent Variable: LOG(GDP) |
| Method: Least Squares |
| Date: 09/01/13  Time: 04:47 |
| Sample(adjusted): 1980 2010 |
| Included observations: 30 after adjusting endpoints |

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>1.079598</td>
<td>1.041830</td>
<td>1.036252</td>
<td>0.3079</td>
</tr>
<tr>
<td>LOG(MS)</td>
<td>0.011654</td>
<td>0.213800</td>
<td>0.054510</td>
<td>0.9569</td>
</tr>
<tr>
<td>LOG(INT)</td>
<td>1.620645</td>
<td>0.268455</td>
<td>6.036942</td>
<td>0.0000</td>
</tr>
<tr>
<td>LOG(EXR)</td>
<td>-0.663056</td>
<td>0.121695</td>
<td>-5.448519</td>
<td>0.0000</td>
</tr>
<tr>
<td>LOG(CTE)</td>
<td>0.713720</td>
<td>0.199877</td>
<td>3.570802</td>
<td>0.0011</td>
</tr>
<tr>
<td>ECM(-1)</td>
<td>-0.961247</td>
<td>0.224071</td>
<td>-4.028326</td>
<td>0.0003</td>
</tr>
</tbody>
</table>

| R-squared | 0.904301 | Mean dependent var | 11.99239 |
| Adjusted R-squared | 0.889348 | S.D. dependent var | 1.318795 |
| S.E. of regression | 0.438689 | Akaike info criterion | 1.333888 |
| Sum squared resid | 6.158342 | Schwarz criterion | 1.592454 |
| Log likelihood | -19.34387 | F-statistic | 60.47635 |
| Durbin-Watson stat | 1.941626 | Prob(F-statistic) | 0.000000 |
The figures from the ECM are quite revealing. That is, the coefficient estimates of the constant and explanatory variables have alternated their signs as against the long-run relationship found in the normalized cointegrating equation 1 (appendix ix). This shows exactly what is needed to be done in order to absolve the short-run dynamics of the relationships. Again, the significance of ECM holds that a negative and statistically significant error correction coefficient is a necessary condition for the variables to be cointegrated. In this case, the error correction coefficient is -0.961247. The negative sign of the coefficient satisfies one condition while the fact that 0.904301 is different from zero satisfies the second condition of statistical significance. The coefficient reveals that the speed of adjustment between the short-run and long-run realities of the cointegrating equations is 96.13% every year. Also, the computed $R^2$ value of 0.904301 which is the coefficient of multiple determination indicates that our model satisfies the requirements for goodness of fit. The value shows that 90.43% of the total variations in the economic growth (GDP) are adequately explained by changes in Money Supply (MS), Interest Rate (INT), Exchange Rate (EXR) and Credit to the Economy (CTE).

Furthermore, the joint influence of the explanatory variables on the dependent variable is statistically significant. This is also confirmed by the F-probability which is statistically zero. Equally, the Durbin Watson is 1.94 approximately. Using 5% level of significance, 4 explanatory variables and 30 observations, the tabulated Durbin Watson statistics for lower and upper limit are 1.261 and 1.722 (appendix ix) respectively. Since the calculated Durbin Watson statistics is greater than the upper limit, there is no evidence of the presence of first order serial correlation or autocorrelation in the model. Finally, the results of the study do provide support for the hypotheses that Monetary Policy Instruments have a significant effect on the growth of Gross Domestic Product hence, acting as a blood vein to the enhancement of economic growth.

**GRANGER CAUSALITY TEST**

Considering the output of Granger Causality and using 4 and 33 degrees of freedom, the F-tabulated value is 2.65 at 5% level of significance. It is observed from the pair-wise relationship between MS and GDP that the F-statistics is 3.87 while the value for GDP and MS is 0.19. The estimate shows that 3.87 is greater than 2.65 while 0.19 is less than 2.65 hence, the rejection that MS does not granger cause GDP. This implies that there is one-way causation between MS and GDP. It means that Money Supply granger cause GDP but GDP does not Granger Cause MS.

It is observed from the test also that there existed neither one-way nor two-way causation among the variables; INT and GDP, CTE and GDP, INT and MS, EXR and MS, EXR and MS, EXR and INT and CTE and INT.

However, there is two-way causation among CTE and MS. It implies that CTE granger cause MS and MS granger CTE.

**TEST OF HYPOTHESES**

The general aim of the researcher concerning this research work, is to examine the impact of monetary policy instruments on economic growth in Nigeria. With respect to this, the two hypotheses are stated as follows.

1. $H_0$: Monetary Policy instruments do not have significant impact on Nigeria’s economic growth.
2. $H_0$: There is no significant long-run equilibrium relationship between monetary policy instruments and economic growth.

In testing the above hypothesis, F-statistics is employed, because, it helps to ascertain the joint influence of the independent variables on the dependent variable. Using 5% level of significance at 4 degrees of freedom (K-1) and 33 observations, tabulated F-statistics becomes 2.65. (appendix viii). However, the calculated F-statistics is 60.48 (Table 4.3). Since F-calculated value is greater than F-tabulated value, we reject the null ($H_0$) and accept the alternative ($H_1$), on the proposition that monetary policy instruments have significant impact on Nigeria’s economy.

2. $H_0$: There is no significant long-run equilibrium relationship between monetary policy instruments and economic growth in Nigeria.
The above hypothesis is tested with co-integration result. Judging from the likelihood Ratio test (LR, Table 4.2), there existed co-integrating equations at 5% level of significant. This implies that the five variables are integrated of the same order, and since their values (222.3074, 149.5472, 87.22391, 46.32053, 12.83830) are greater than the 5% critical values (68.52, 47.21, 29.68, 15.41, 3.76), we reject the null ($H_0$) and accept the alternative ($H_1$), on the notion that there is significant long-run equilibrium relationship between monetary policy instruments and economic growth in Nigeria.

CONCLUSION AND POLICY RECOMMENDATIONS

CONCLUSION

Having considered the impact of monetary policy instruments on Nigeria’s economy for the period 1970-2009, monetary policy instruments is vital for Nigeria’s economic growth.

In the era of an ever-changing global economic environment, especially now that the current economic approach of most countries is gearing towards transforming their system for rapid and sustained economic growth, Nigeria cannot be left out.

Considering some other macroeconomic variables like interest rate, credit to the economy and exchange rate that can be tackled with monetary policy instruments their manipulations are very important to our economic growth. Monetary policy instruments are used to induce investments through changes in money supply and interest rate. However, the failure of monetary policy instruments in achieving its target could not be used as a ground to judge against the use of monetary policies rather, those limitations and constraints should be dealt with.

Conclusively, monetary policy instruments have contributed significantly to economic growth in Nigeria.

POLICY IMPLICATION AND RECOMMENDATIONS

Having seen that there exist a long run relationship between GDP and explanatory variables (MS, INT, EXCH, CE) through the use of co-integration test, it implies that government can adopt contractionary monetary policy as this will help the monetary authorities to reduce money supply in order to force up interest rate and there by curtailing inflation.

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

- CBN should exercise influence that would affect the behaviour of monetary aggregates namely money supply, interest rate, bank credit etc in the overall liquidity of the economy.
- In the bid to achieve economic growth, monetary authority in Nigeria should apply discretion in implementing some of their policies in order to favour some sectors especially the agricultural sector.
- There is need for a suitable interest rate policy through minimum rediscount rate. The CBN should engage in direct regulation of interest rates. The existence of high interest rate acts as an obstacle to the growth of both private and public investment in an underdeveloped economy especially Nigeria. A low interest rate is therefore essential for encouraging private investment in agriculture and industry.
- Monetary policy instruments should be used to fight against high rate of inflation in the country.
- Government should strive to strengthen the financial system for easy implementation of monetary policy.
- CBN should endeavor to improve on the deteriorating value of Naira in the international market.
- Sustain the current economic reform and maintain sound fiscal and monetary policy so that as inflation trends to single digit on a sustain basis, interest rates will inevitably come down to single digit as has happened in some developed economies in the world.
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