Impact of Monetary Policy Instruments on Economic Growth in Nigeria

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Abstract:- In Nigeria context, the economy is faced with unemployment, low investment, high interest rate and high rate of inflation. The purpose of this paper was to ascertain the impact of monetary policy instruments on economic growth in Nigeria. The study spanned from 1970 – 2011. It has been postulated that if monetary policy instruments are effective, the economy will grow well. A stationary test was carried out using Augmented Dickey-Fuller (ADF) and Phillip-Perron Test (PP) and stationary found at first difference at 5% level of significance. The Johansen-Juselius co-integration technique employed in this study proved to be superior to the Engle and Granger (1987) approach in assessing the co-integrating properties of variables, especially in a multivariate context. The result of the test indicates 1 cointegration equation at 5 percent level of significance. The study also applied Vector Error Correlation Model (VECM) to determine the short run relationship between monetary policy instruments and economic growth in Nigeria. The result of our analysis shows that monetary policy instruments significantly influence the rate of economic growth in Nigeria. The study also found that long-run relationship exists between monetary policy instruments and economic growth in Nigeria. we therefore recommend that, having seen that there exist a long-run relationship between GDP and explanatory variables (M2, INRATE and EXRATE) through the use of co-integration test, it implies that government can adopt contractionary money policy as this will help the monetary authorities to reduce money supply in order to force up interest rate and thereby curtailing inflation; government should sustain the current economic reform and maintain sound fiscal and monetary policy so that 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; and monetary policy instruments should be used to fight against high rate of inflation in Nigeria.

Keywords: Monetary Policy Instruments, Economic Growth, Money Supply, Stationarity Test, Co-integration, Error Correction Model.

I. INTRODUCTION

Developing countries growth policies are better delivered as full packages since fiscal and monetary policies are inextricable, except in terms of the instruments and implementing authorities. However, monetary policy appears more potent in correcting short term macroeconomic maladjustment because of the frequency in applying and altering the policy tools, relative ease to its decision process and sheer nature of the sector which propagate its effect to the real economy-the financial system.

The main object of monetary policy in Nigeria is to ensure price and monetary stability. This is mainly achieved by causing saver to avail investor of surplus funds for investment through appropriate interest rate structure; stemming wide fluctuation in the exchange rate of the naira; proper supervision of banks and related institutions to ensure financial sector soundness; maintenance of efficient payment system; applying deliberate policies to expand the scope of the financial system so t hat inferior economies, which are largely informal, are financially included. Financial inclusion is particularly important in the sense that the large it is, the large is the interest rate sensitivity of production and aggregate demand and so the more effective monetary policy is (Omoke, 2010).

Until about 1993, when OMO was introduced, the CBN relied almost exclusively on varying combinations of direct instruments of monetary control from time to time. These instrument include; credit ceilings, sectoral credit allocation, interest rate controls, imposition of special deposits, moral suasion, movement of government deposits, stabilization securities and exchange controls, etc. As the financial markets deepened over time as a consequence of the economy-wide macroeconomic reforms that commenced mid-1980s, the CBN started the process of shifting from the use of direct investments to market-based instruments (CBN, 2009).

The most significant move in the new direction came in June 1993, when the Bank introduces OMO. The market-based tools include in addition to OMO, reserve requirements which specifies the proportion of a bank's tool deposit liabilities that should be kept with the central bank; and discount window operations under which the central bank reforms the role of lender of last resort to the deposit money banks. Open market operation may be undertaken through outright transactions or through repurchase transactions. Where a party purchases securities and gives out cash with agreement to sell the securities back at a later date with some financial consideration a repo agreement is in place. On the other hand, if securities have been sold to a party and cash taken with agreement to purchase the securities at a later date with some interest, a reverse repo transaction is deemed to be in place. Currently, OMO is the major instrument of monetary policy at the CBN. Other supporting instruments are discount window operations, moral suasion, forex sales and the standing facility introduced in December 2006 (CBN, 2012).

Fiduciary or paper money is issued by the Central Bank on the basis of computation of estimated demand for cash. Monetary policy guides the Central Bank's supply of money in order to achieve the objectives of price stability (or low inflation rate), full employment, and growth in aggregate income. This necessary because money is a medium of exchange and changes in its demand relative to supply, necessitate spending adjustments. To conduct monetary policy, some monetary variables which the Central bank controls are adjusted a monetary aggregate, an interest rate or the exchange rate-in ordedr to affect the goals which it does not control. The instruments of monetary policy used by the Central Bank depend on the level of development of the economy, especially its financial sector. The commonly used monetary policy instruments are Reserve Requirement, Open Market Operations, Lending by Central Bank, Interest Rate, Direct Credit Control, Moral Suasion, Prudential Guidelnes, Exchange Rate and Broad Money Supply, Moral suasion and prudential guidelines are direct supervision or qualitative instruments. The others are quantitative instruments because they have numerical benchmarks (CBN, 2011).

The aim of this paper is to empirically examine the impact of monetary policy instruments on economic growth in Nigeria. This paper is organized as follows; section one is the introduction while section two reviews the empirical and theoretical literature on monetary policy instruments; section three discusses the models and methodology wile section four provides data and empirical evidence and the final section which is section five provides summary, conclusion and recommendations of the study.

II. REVIEW OF RELATED LITERATURE

There have been extensive theoretical and empirical examining the relationship between monetary policy instruments and economic growth both in the context of developed and developing countries. The section presents a brief review.

Ajayi (1974) used ordinary least square (OLS) technique to examine the relationship between monetary policy and fiscal policy. He found out that in developing economy in which Nigeria is a typical example that monetary policy influence are much larger and more predictable than fiscal policy influence. The result was confirmed with the use of beta coefficients that changes in monetary policy upon were greater than that of fiscal policy action.

Elliot (1975) used St. Louis equation to examine the relative importance of money supply changes compared to government expenditure changes in explaining fluctuations nominal GNP. He found out that fluctuations nominal GNP. He found out that fluctuations in nominal GNP are more important attached to monetary policy movements than movements in federal government expenditure.

Bogunjoko (1997) used modified St. Louis model to investigate the efficiency of monetary policy as a stabilization

tool covering the period of 1970-1993. The study found out that monetary policy matters in Nigerian economy and the appropriate monetary target is the domestic credit of the banking sector.

Geneve (2002) used structural vector autoregressive (SVAR) to determine the effect of monetary shock in ten central and Eastern European (CEE) countries. He found some indications that changes in the exchange rate affect output.

Starr (2005) used SVAR model to orthogonized identification to examine the effects of monetary policy on output and price. The study found little evidence of real effects on monetary policy in five common wealth of independent states (CIS) with notable exception that changes in interest rate have a significant impact on output.

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

Chuku (2009) used structural vector autoregressive (SVAR) approach to measure the effect of monetary innovations in Nigeria. He found out that innovation 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 neutral and fleeting effects on output.

Chimobi and Uche (2010) used cointegration test and granger causality test to examine the relationship between money, inflation and output in Nigeria. The cointegration result of the stud showed that the variable used in the model exhibited to long run relationship among each other and money supply was seen to granger cause both output and inflation.

Ogiji (201 I) used vector error correction model to determine the impact of monetary policy management on economic growth in Nigerian. He found out that Exchange Rate (EXR); Inflation (INEL); Liquidity Ratio (LR) are important for

monetary policies effectiveness in Nigeria especially for indicator targeting and that money supply (M2) is not dependable target variable for policy purpose because it is highly volatile.

Theoretical Framework

The theoretical framework for this study is the Classical monetary theory, Quantity theory of money, Keynesian theory and monetarist theory. Monetary theory has undergone a vast and complex evolution since the study of the economic phenomenon first came into limelight. It has drawn the attention of many researchers with different views on the role and dimensions of money in attaining macro-economic objectives.

The Classical Monetary Theory

The classical school evolved through concerted efforts and contribution of economists like Jean Baptist says, Adam Smith, David Ricardo, Pigou and others who shared the same beliefs. The classical model attempts to explain the determinants of such economic variables as consumption, savings and investments with respect to money.

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

The classical economists did not introduce the role of money in their model, in terms of its demand and supply. Instead they introduced money by using the quantity theory. In short, they related the level of economic 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 formulation or the equation of exchange and the cash-balance formulation or the Cambridge equation.

Keynesian and Monetary Policy

The Keynesian model assumes a close economy and a perfect competitive market with fairly price-interest aggregate supply function. The economy is also assumed not to exist at full employment equilibrium and also that it works only in the short run because as Keynes apity puts it "in the long run, we also will be dead". In this analysis, money supply is said to be exogenously determined if wealth holders only have one choice between holding bonds. The Keynesian theory is rooted on the notion **of** price rigidity and possibility of an economy setting at a less than full employment level of output, income and employment. The Keynesian macro economy brought into focus the issue of output rather than prices as being responsible for changing economic conditions. In other records, they were not interested in the quantity theory parse.

From the Keynesian transmission mechanism, monetary policy works by influencing interest rate which influence investment decisions and consequently, output and income via the multiplies process (Amacher and Ulbrich, 2007).

The Monetarist Theory

The monetarist are essentially, quantity theorist who adopted Fisher's equation of exchange to illustrate their theory, as a theory of demand for money and not a theory of output prices and money income by making a functional relationship between the quantity of real balances demanded a limited number of variables (Essia, 2008).

III. ECONOMETRIC METHODOLOGY

Following the lead of Bogunjoko (1997), Chimobi and Uche (2010) and Ogiji (2011), thestudy employs three econometric models to achieve the empirical results. The first econometric model examines the stationarity of the variable by applying Augmented Dickey-Fuller (ADF) test due to Dickey and Fuller (1979, 1981), and the Phillip-Perron (PP) due to Phillips (1987) and Phillips and Perron (1988), second econometric model examines the existence of long-run relationship between real GDP and monetary policy instruments by applying the Johansen (1988) co-integration test and the third application of the Vector Error Correction Model (VECM) to determine the direction of errors between dependent and independent variables.

3.1 Model Specification

The primary model showing the relationship between Economic Growth and Monetary Policy Instruments is specified thus:

$$\text{RGDP} = f \quad (M_2, \quad \text{INRATE}, \quad \text{EXRATE})\ldots\ldots \quad (1)$$
$$\text{RGDP}_t = \alpha_0 + a_1 M_2 + \alpha_2 \text{INRATE} + \alpha_3 \text{EXRATE} + \mu \ldots\ldots (2)$$

Where

RGDP is Real Gross Domestic Product as a proxy for Economic Growth

M2 is the Broad Money Supply, INRATE is the Interest Rate, EXRATE is the Exchange Rate, α_0 is the constant term, 't' is the time trend, and 'pt' is the random error term.

3.2 Data Description and Sources

To capture the impact of monetary policy instruments, on economic growth in Nigeria was proxied by the M_2, Interest Rate, Exchange Rate and the Real GDP at 1990 constant price was used as a proxy for Economic Growth. The data covers the period from 1970 to 2011. All the variables are taken on annual basis from various issues of the Central Bank of Nigeria (CBN) Statistical Bulletin.

3.3 Estimation Technique

3.3.1 Unit Root Test

The first step involves testing the order of integration of the individual variables under consideration. Researchers have developed several procedures for the test of order of integration. The most popular ones are Augmented Dickey-Fuller (ADF) test due to Dickey and Fuller (1979, 1981), and the Phillip-Perron (PP) due to Phillips (1987) and Phillips and Perron (1988). Augmented Dickey-Fuller test relies on rejecting a null hypothesis of unit root test (the variables are non-stationary) in favor of the alternative hypotheses of stationarity. The tests are conducted with and without a deterministic trend **(t)** for each of the variables.

3.3.2 The Cointegration Test

The second step is the testing of the presence or otherwise of cointegration between the variables of the same order of integration through forming a cointegration equation. The basic idea behind cointegration is that if, in the long-run, two or more variables move closely together, even though the variables themselves are trended, the difference between them is constant. It is possible to regard these variables as defining a long—run equilibrium relationship, as the difference between them is stationary (Hall and Henry, 1989). A lack of cointegration suggests that such variables have no long-run relationship: *n* principal they can wander arbitrarily far away from each other (Dickey et. al., 1991). We employ the maximum-likelihood test procedure established by Johansen and Juselius (1990) and Johansen (1991) in testing.

IV. DATA AND EMPIRICAL RESULTS

4.1 Unit Root Test

This involves testing **for** the stationarity of the individual variables using both the Augmented Dickey Fuller (ADF) and Phillips Perron (PP) tests to find the existence of unit root in each of the time series variables. The results of both the ADF and PP tests are reported in 'I'ables 4. I (Levels) and 4.2 below (First Difference).

Table 4.1 ADF Unit Root Test for Stationarity

Variables	T. statistics	Critical levels: 1%	5%	10%	Decision
RGDP	-1.700	-4.356	-3.595	-3.233	1(1)
M2	-1.799	-4.356	-3.595	-3.233	1(1)
INRATE	-2.267	-4.374	-3.603	-3.238	1(1)
EXRATE	-2.0154	-4.356	-3.595	-3.233	1(1)

TABLES 4.2 PP Unit root test for stationary

Variation	T. statistics	Critical levels 1%	5%	10%	Decision
RGDP	-1.730	-4.356	-3.595	-3.233	1(1)
M2	-1.799	-4.356	-3.595	-3.233	1(1)
INRATE	-2.059	-4.374	-3.603	-3.238	1(1)
EXRATE	-2.561	-4.356	-3.595	-3.233	1(1)

All the variables were hot found stationary in levels but at first differencing. This can be a seen by comparing the observed values (in absolute terms) of both the Augmented Dickey Fuller (ADF) and Philips- perron (PP) test statistics with the critical values (also in absolute terms) of the test /, and 10% level of significance. Result from table 4.1 provides strong evidence of non stationarity in level. Therefore, the null hypothesis is accepted and it is sufficient to conclude that there is a presence of unit root in the variables at levels.

As a result of the above result, all the variables were differenced once and both the Augmented Dickey Fuller (ADF) and Phillips -Perron (PP) test were conducted on them as shown in table 4.2. The coefficients compared with the critical values (1%, 5% and 10%) reveals that all the variables were stationary at first difference and on the basis of this, the null hypothesis of non-stationary is rejected and it is safe to conclude that the variables are stationary. This implies that the variables are integrated of order one, i.e. 1(1).

4.2 Cointegration test result and Analysis

The result of the cointegration condition (that is the existence of a long term linear relation) is presented in Table 4.3 (Trace Statistics) below and 4.4 (Maximum Eigenvalue) using methodology proposed by Johansen and Juselius (1990): Table 4.3 Cointegration test results**.**

Trace Result

Hypotheses	Eigen value	T. statistics	0.05 Critical Value	Probability
None*	0.764310	85.78639	47.85613	0.000
At most 1	0.4 10223	27.97695	29.79707	0.000
At most 2	0.144071	6.856530	15.49471	0.0023
Al most 3	0.0 15721	0.633332	3.84 1466	0.0196

**(*) denotes rejection of the hypothesis at 5% significance level.

Max-Eigen Statistic Result

Hypotheses	Eigen value	Max-E. statistic	0.05 Critical Value	Probability
None*	0.764310	57.80944	27.58434	0.000
At most 1	o.410223	27.97695	29.70707	0.000
At most 2	0.144071	6.22269S	14.26460	0.0023
Alniost3	0.015721	0.633832	3.841466	0.0196

**(*) denotes rejection of the hypothesis at 5% significance level.

In the Cointegration_tables, both trace statistic and maximum Eigen value statistic indicates I cointegration equation at the 5 percent level of significance, suggesting that there is cointegration (or long run) relationship between monetary policy instruments and economic growth in Nigeria. Sincethe null hypothesis as there is need t further subjectthevariables tovector error correction test which has lead us to examine the errors that exist between monetary policy instruments and economic growth in Nigeria.

4.3 Vector Error Correction Model Analysis Results

As a cointegration relationship has been established among the variables then error-correction model can be estimated to determine the dynamic behavior of monetary policy instruments with respect to its determinants. With the help of econometric view (c-view) package, the VECM is run and present below.

TABLE 4.4: VECTOR ERROR CORRECTION ESTIMATES

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.81458	2.641862	4.093544	0.0002
LOG(M2)	0.3I5404	0.236998	1.330828	0.0002
LOG(INRATE)	-4.474711	1.085816	-4.121060	0.0002
LOG(EXRATE)	1.790744	0.598230	2.993403	0.0048
ECM(- 1)	-0.961247	0.224071	-4.028326	0.0003

R- squared	0.985467	Mean dependent var	6.914854
Adjusted R-square	0.948654	S.D dependent var	5.722499
S.E of regression	2.469012	Akaike info criterion	4.735906
Sum squared resid	231.6487	Schwarz criterion	4.901398
Log likelihood	-95.45402	Hannan- Quinn criter	4.796565
F-statistic	60.74884	Durbin- Watson stat	1.647324
Prob (F- statistic)	0.000000		

Source: E-view 7.0

The Vector Error Correction Mechanism was used for this exercise. The result indicates that Broad money supply (M2) and Exchange Rate have significant positive impact on Economic Growth in Nigeria, while Interest Rate has negative impact on Economic Growth in Nigeria.

The figure from the ECM is 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. This shows exactly what is needed to be done in order to absolve the

short-run dynamics of the relationships. The significance of ECM holds that a negative and statistical 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 sati one condition while the fact that 0.985467 is different from zero satisfies the second condition of statistical significance. The coefficient reveals that the speed of adjustment between the short-run realities of the cointegrating equations is 96.12% every year.

4.4 Model Adequacy

We have made use of the following parameters to ascertain the adequacy of our model;

(i) R^2 and adjusted R^2
(ii) Akaike and Schwarz information criteria

R^2 and adjusted R^2: The **R^2** ofthe model is 0.985467 while the adjusted **R2** is 0.948654 which is the coefficient of multiple determinations indicates that ourmodel satisfies the requirement for goodness of fit. The value shows that 98.55% and 94.87% of the total variation in theeconomic growth (GDP) are adequately expknec1 by changes in Broad Money Supply **"(**M2), Interest Rate (IN RATE) and Exchange Rate (EXRATE).

Akaike and Schwarz: The values of 4.735906 and 4.90 1398 for the Akaikeand Schwarz fall within the acceptable region of 0.05 and therefore confirms the adequatecy of the chosen model. This means that the variables forms a good lit for the model. Finally, the results of the study do Instruments have a significant effect on the growth of Nigerian economy (Gross Domestic Product) hence, acting as a blood vain to the enhancement of economic growth in Nigeria.

V. FINDINGS

This paper sought to examine the impact of monetary policy instruments on the growth of Nigerian economy from 1970-2011. The monetary policy instruments were captured using Broad Money Supply (M2), Interest Rate (INRATE) and Exchange Rate (EXRATE) while economic growth was captured using Real Gross Domestic Product (RGDP). On the application of advanced econometric techniques (Augmented Dickey Fuller (ADF) and Phillips Perron (PP) unit roots, Johansen Co-integration Test and Vector Error Correction Mechanism), the following surfaced; none of the variables was stationary at zero level. This means that they all have unit roots. That is, they were all differenced before stationarity was achieved. The essence is to avoidspurious result. The four variables became stationary at first difference by ADF and PP application.

There exist a long- run Equilibrium relationship between monetary policy instruments and economic growth. This was achieved through the use of co-integration test. Broad Money Supply and Exchange Rate (M2 and EXRATE) were

positively correlated with RGDP by 0.3 15404 and 1 .790744 respectively while Interest Rate (INRATE) was negatively correlated with RGDP by -4.474711 based on the long-run test. The joint influence of the explanatory variables is statistically significant. This was very echoed by the F-statistics gotten as - 60.74884 which test the entire regression plane. The short run dynamics adjust to the long-run equilibrium at rate of 94.87% per annum.

VI. CONCLUSION

Based on the research findings, monetary policy instruments is vital for economic growth in Nigeria. In the era of an ever changing global 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 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. 1-lowever, 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 pokey instruments have contributed significantly to economic growth in Nigeria.

VII. RECOMMENDATIONS

From the finding of this study, the following recommendations were made to improve the use and level of reliance of impact of monetary policy instruments on economic growth in Nigeria.

1. Having seen that there exist a long-run relationship between GDP and explanatory variables (M2, IN RATE and EXRATE) through the use of co-integration test, it implies that government can adopt as this will help the monetary to force up interest rate and thereby curtailing inflation.
2. Central Bank of Nigeria (CBN) should exercise influence that would affect the behavior of monetary aggregates namely money supply, interest rate and exchange rate in the overall Liquidity of the economy.
3. There is need for a suitable interest rate policy should engage in direct regulation of interest rates in Nigeria. This is because the existence of high interest rate acts as an obstacle to the growth of both private and public investment in an underdeveloped economy especially in Nigeria. A low interest rate is therefore essential for encouraging private investment in agricultural sector.
4. Government should sustain the current economic reform and maintain sound fiscal and monetary

policy so that inflation trends to single digit on a stain basis, interest rate will inevitably come down to single digit as has happened in some developed economies in the world.

5. Monetary policy instruments should be used to fight against high rate of inflation in Nigeria.

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