DOES MONETARY POLICY INFLUENCE ECONOMIC GROWTH IN NIGERIA?

Ismail O. Fasanya

Department of Economics, University of Ibadan, Ibadan, Nigeria

Adegbemi B.O Onakoya

Department of Economics, Tai Solarin University of Education, Ijagun, Nigeria

Mariam A. Agboluaje

Department of Economics and Financial Studies, Fountain University, Osogbo, Osun State, Nigeria

ABSTRACT

This study examines the impact of monetary policy on economic growth in Nigeria.The study uses time-series data covering the range of 1975 to 2010.The effects of stochastic shocks of each of the endogenous variables are explored using Error Correction Model (ECM). The study shows that Long run relationship exists among the variables. Also, the core finding of this study shows that inflation rate, exchange rate and external reserve are significant monetary policy instruments that drive growth in Nigeria.It is therefore recommended that the establishment of primary and secondary government bond markets that can also increase the efficiency of monetary policy and reduce the government's need to rely on the central bank for direct financing.

INTRODUCTION

Since its establishment in 1959, the Central Bank of Nigeria (CBN) 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. This role is anchored on the use of monetary policy that is usually targeted towards the achievement of full-employment equilibrium, rapid economic growth, price stability, and external balance. Over the years, the major goals of monetary policy have often been the two later objectives. Thus, inflation targeting and exchange rate policy have dominated CBN's monetary policy focus based on assumption that these are essential tools of achieving macroeconomic stability(Ajayi, 1999).

Folawewo and Osinubi (2006) describes monetary policy as a combination of measures designed to regulate the value, supply and cost of money in an economy, in consonance with the expected level of economic activity. For most economies, the objectives of monetary policy include price stability, maintenance of balance of payments equilibrium, promotion of employment and output growth, and sustainable development. These objectives are necessary for the attainment of internal and external balance, and the promotion of long-run economic growth. Evidence in the Nigerian economy has shown that since the 1980's some relationship exist between the stock of money and economic growth or economic activity. Over the years, Nigeria has been controlling her economy through variation in her stock of money. Consequent upon the effect of the collapse of oil price in 1981 and the B.O.P deficit experienced during this period, various methods of stabilization ranging from fiscal to monetary policies were used. Interest rates were fixed and these were said to be beneficial to big borrower farmers (Ojo, 1989). Ikhide and Alawode (1993) while evaluating the effect of Structural Adjustment Programme (SAP) concluded that reducing money stock through increased interest rates would lower gross National product. Thus, the notion that stock of money varies with economic activities applies to the Nigerian economy (Laidler, 1993).

Tradable economic activities are "special" in developing countries. These activities suffer disproportionately from the institutional and market failures that keep countries poor. Sustained real exchange rate depreciations increase the relative profitability of investing in tradable, and act in second-best fashion to alleviate the economic cost of these distortions. That is why episodes of undervaluation are strongly associated with higher economic growth. There exist a unique long-run relationship between interest rates and economic growth. Thus, interest rate is an important determinant of economic growth in Nigeria. However, the deregulation of interest rates in Nigeria may not optimally achieve its goals, if those other factors which negatively effects investment in the country, as suggested by Guseh and Oritsejafor (2007), are not tackled. The main thrust of this study is to evaluate the effectiveness of the CBN's monetary policy over the years. This would go a long way in assessing the extent to which the monetary policies have impacted on the growth process of Nigeria using the major objectives of monetary policy as yardstick. The remainder of the paper is organized as follows. Section two deals with the literature review. In Section three, the methodological framework of the study is pursued while the empirical results are discussed in section four. Section five concludes the paper.

LITERATURE REVIEW

For middle-income economies, the empirical literature shows that monetary policy shocks have some modest effects on economic parameters. Ganev et al. (2002) for example, studied the effects of monetary shocks in ten Central and Eastern European (CEE) countries and find no evidence that suggests that changes in interest rates affect output, but find some indication that changes in the exchange rate does. In the same spirit, Starr (2005) using an SVAR model with orthogonalized identification find little evidence of real effects of monetary policy in five Commonwealth of

Independent States (CIS) with the notable exception that interest rate have a significant impact on output in Russia.

The evidence that is inconsistent with theoretical expectations returned from different investigations in different countries is what economist usually refers to as "puzzles". The three most common puzzles identified in the literature are; the liquidity puzzle, the price puzzle and the exchange rate puzzle. The liquidity puzzle is a finding that an increase in monetary aggregates is accompanied by an increase (rather than a decrease) in interest rates. While the price puzzle is the finding that contractionary monetary policy through positive innovations in the interest rate seems to lead to an increase (rather than a decrease) in prices. And yet, the most common in open economies is the exchange rate puzzle, which is a finding that an increase in interest rate is associated with depreciation (rather than appreciation) of the local currency. In contemporary studies, researchers have devised convenient ways of eradicating these puzzles. Most of them now follow the framework set by Lucas (1972) who recommended the incorporation of rational expectations in the studies of the effects of monetary policy. Some recent investigations that follow this approach include: Kahn *et al.* (2002);Berument and Dincer (2008);Cochrane (1998); and Zhang (2009).

In developed economies, such as the United States (U.S) and some core European countries, there is substantial evidence of the effectiveness of monetary policy innovations on real economic parameters (see also,Mishkin (2002);Christiano *et al.* (1999);Rafiq and Mallick (2008) and Bernanke *et al.* (2005). However, for developing countries like Nigeria, the evidence is weak and full of "puzzles". For example,Balogun (2007) used simultaneous equation models to test the hypothesis of monetary policy ineffectiveness in Nigeria and find that, rather than promote growth; erstwhile domestic monetary policy was the source of stagnation and persistent inflation. Similar evidence was also found for The Gambia, Guinea, Ghana and Sierra Leone using the same models.

Ajisafe and Folorunso (2002) examined the relative effectiveness of monetary and fiscal policy on economic activity in Nigeria using co-integration and error correction modelling techniques and annual series for the period 1970 to 1998. The study revealed that monetary rather than fiscal policy exerts a greater impact on economic activity in Nigeria and concluded that emphasis on fiscal action by the government has led to greater distortion in the Nigerian economy.Adebiyi (2006) investigated financial sector reforms, interest rate policy and the manufacturing sub-sector in Nigeria, using vector auto-regression and error correction mechanism (ECM) technique with quarterly time series spanning 1986:1 to 2002:4. Unit root and co-integration test were also performed. The study revealed that the real deposit rate and inflation rate are significant for the growth of the manufacturing sub-sector in Nigeria. In addition, the study revealed that the predominant sources of fluctuation in the index of manufacturing production are due largely to own shock and to a lesser extent, to real deposit rate. The study also showed that in the long run the index of manufacturing production is insensitive to inflation rate, commercial banks' credit to the

manufacturing sector, interest rate spread and exchange rate.Folawewo and Osinubi (2006) examined the efficacy of monetary policy in controlling inflation rate and exchange instability. The analysis performed was based on a rational expectation framework that incorporates the fiscal role of exchange rate. Using quarterly data spanning over 1980:1 to 2000:4 and applying times series test on the data used, the study showed that the effects of monetary policy at influencing the finance of government fiscal deficit through the determination of the inflation-tax rate affects both the rate of inflation and exchange rate, thereby causing volatility in their rates. The study revealed that inflation affects volatility in its own rate, as well as the rate of real exchange.Bogunjoko (1997) analyzed the efficacy of monetary policy as a stabilization tool, using modified St. Louis model to take account of the peculiarity of the Nigeria economy. Using an error correction model and data covering the period 1970 to 1993; the study found that money matters in Nigeria economy and the appropriate monetary target is the domestic credit of the banking sector.

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-integrating result of the study showed that the variables used in the model exhibited no long run relationship among each other. Nevertheless money supply was seen to granger cause both output and inflation. The result of the study suggested that monetary stability can contribute towards price stability in the Nigerian economy since the variation in price level is mainly caused by money supply and concluded that inflation in Nigeria is to an extent a monetary phenomenon. The Error Correction Mechanism and Cointegration technique was employed by Adefeso and Mobolaji (2010) estimate the relative effectiveness of fiscal and monetary policy on economic growth in Nigeria using annual data from 1970-2007. The empirical result showed that the effect of monetary policy is stronger than fiscal policy and the exclusion of the degree of openness did not weak this conclusion. Amassoma *et al.* (2011) examined the effect of monetary policy on macroeconomic variables in Nigeria for the period 1986 to 2009 by adopting a simplified Ordinary Least Squared technique found that that monetary policy had a significant effect on exchange rate and money supply while monetary policy was observed to have an insignificant influence on price instability.Onyeiwu (2012) examines the impact of monetary policy on the Nigerian economy using the Ordinary Least Squares Method (OLS) to analyse data between 1981 and 2008. The result of the analysis shows that monetary policy presented by money supply exerts a positive impact on GDP growth and Balance of Payment but negative impact on rate of inflation.. Furthermore, the findings of the study support the money-prices-output hypothesis for Nigerian economy. Obviously, the empirical studies on monetary policy and real output growth in Nigeria is still scanty.

METHODOLOGY AND DATA

The Keynesian IS-LM function serves as a platform on which the empirical model is formulated as follows. Following McCallum (1991) , the following equation is then derived;

$RGDP_t = \alpha_o + \alpha_1 M2_t + \alpha_2 IR_t + \alpha_3 Inf_t + \alpha_4 REER_t + \alpha_5 ER_t + e_t$........................ (2)

Where;

RGDP refers to Real Gross Domestic Product; M2 is Money Supply; IR is Interest Rate; INF is inflation rate; REER is Real Exchange Rate; ER is External Reserve; e is the Error Term.

In order to develop strong, robust and reliable models that capture the relationship between monetary policy variables and economic growth, the research work adopts the econometric techniques of the Error Correction Term (ECT) as the estimation technique. The method of ECT is extensively used in regression analysis primarily because it is initiatively appealing and mathematically much simpler than any other econometric technique(Gujarati, 2003). The error correction term indicates the speed of the adjustment which restores equilibrium in the dynamic model.

$$\Delta RGDP_t = \alpha_0 + \sum_{i=1}^{j} \alpha_{1i} \Delta RGDP_{t-i} + \sum_{i=1}^{j} \alpha_{2i} \Delta M2_{t-i} + \sum_{i=1}^{j} \alpha_{3i} \Delta IR_{t-i} + \sum_{i=1}^{j} \alpha_{4i} \Delta INF_{t-i}$$

$$+ \sum_{i=1}^{j} \alpha_{5i} \Delta REER_{t-i} + \sum_{i=1}^{j} \alpha_{6i} \Delta ER_{t-i} + \alpha_{7i} ECM_{t-1}$$

$$+ U_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

As this study involves time series data, the ordinary least square (OLS) method cannot be applied unless it is established that the variables concerned are stationary. For this paper, we have applied unit root test to check the stationarity of the variables under study. Specifically, the Augmented Dickey-Fuller (ADF) and Phillip-Perron test (PP) are used; the ADF and PP are used to avoid spurious regression thereby subjecting each of the variables used to unit root test so as to determine their orders of integration since unit root problem is a common feature of most time series data.

In order to test the implications of our model, we collected an aggregate data on variables of interest on Nigeria. The entire data set of Nigeria for which all relevant variables are reported over the 1975–2010 period. The data used are obtained from the Central Bank of Nigeria. (2010).

EMPIRICAL RESULT

Descriptive Statistics

The summary of the statistics used in this empirical study is presented in Table 1 below. As may be observed from the Table, IR has the lowest mean value of -1.423335 and the mean value of external reserve (ER) has the highest mean value of 1160568 whereas the mean values of INF, M2, exchange rate (REER), and RGDP are 20.66944, 1414050, 46.86461, and 304661.1 respectively. The analysis was also fortified by the values of the skewness and kurtosis of all the variables involved in the models. The skewness is a measure of the symmetry of the histogram while the kurtosis is a measure of the tail shape of the histogram. The bench mark for symmetrical

distribution i.e. for the skewness is how close the variable is to zero while in the case of kurtosis, when it is three is called mesokurtic but values lower than that is called platykurtic and above is referred to as leptokurtic. The result of the Jarque-Bera also confirms the normality distribution assumption of the model.

Table-1. Summary Statistics of the variables used in the regression analysis

	ER	INF	IR	M2	REER	RGDP
Mean	1160568.	20.66944	-1.423335	1414050.	46.86461	304661.1
Median	37643.15	13.85000	-3.433636	138225.5	19.59225	273099.4
Maximum	7025728.	72.80000	25.13001	11034941	150.2900	778671.8
Minimum	781.7000	5.400000	-32.05731	3031.330	0.546400	27172.02
Std. Dev.	2119945.	16.79006	12.86315	2754794.	57.02579	203316.5
Skewness	1.754522	1.491833	-0.052254	2.371737	0.740520	0.660017
Kurtosis	4.493267	4.463272	2.928822	7.638679	1.725189	2.783933
Jarque-Bera	21.81486	16.56515	0.023982	66.02683	5.727936	2.683758
Probability	0.000018	0.000253	0.988081	0.000000	0.057042	0.261354
Observations	36	36	36	36	36	36

SOURCE: Authors' Computation, 2012

Table-2. Augmented-Dickey Fuller (ADF) Test

Variables	ADF Values	Mackinnon Critical Values	Order of Integration
RGDP	-5.0684*	-3.6394	I(1)
M2	-8.5592*	-3.6463	I(2)
IR	-4.7782*	-3.6329	1(0)
INF	-3.0159**	-2.9484	I(0)
REER	-5.4396*	-3.6394	I(1)
ER	-3.0267**	-2.9810	I(0)

Source: Computed by the Authors', 2012

Note: One, two and three asterisk denotes rejection of the null hypothesis at 1%, 5% and10% respectively based on Mackinnon critical values.

The above results i.e. ADF test shows that real GDP and exchange rate variables are stationary at first difference and inflation, interest rate and external reserve are stationary at levels except for money supply that was stationary at second difference. This means all the variables are integrated of order 0 and 1.

Table-3. Phillip-Perron Test (PP)

Variables/Coefficients	PP Values	Mackinnon Critical Values	Order of Integration
RGDP	-5.0647*	-3.6394	I(1)
M2	-8.9644*	-3.6463	I(2)
IR	-4.7566*	-3.6329	I(0)
INF	-3.0822**	-2.9484	I(0)
REER	-5.4387*	-3.6394	I(1)
ER	-4.1411*	-3.6394	I(1)

Source: Computed by the Authors', 2012

Note: One, two and three asterisk denotes rejection of the null hypothesis at 1%, 5% and10% respectively based on Mackinnon critical values

The above results i.e. Phillip-Perron test shows that interest rate and inflation are stationary at levels and real GDP, exchange rate and external reserve are stationary at first difference except for money supply that is stationary at second difference.

Co integration Analysis Result and Interpretation

In determining the number of cointegrating vectors, trace test and maximum eigenvalue test using the more recent critical values of MacKinnon *et al.* (1999) was applied. The assumption of no deterministic trend and restricted constant was for all the variables. The choice was tested using (AIC) and Schwartz Information Criterion (SIC). The result for both trace test and maximum eigenvalue for unrestricted cointegration rank test are presented in Table 4.

Table-4. Johansen-Juselius Cointegration Test Results

Hypothesized No. of CE(s)	Eigen value	Max-Eigen value	Critical value	Trace statistic	Critical Value
			5 percent		5 percent
None	0.906137	80.44125*	40.07	196.2915*	95.75
At most 1	0.767217	49.56007*	33.87	115.8502*	69.81
At most 2	0.659370	36.61662*	27.58	66.29013*	47.85
At most 3	0.457218	20.77562	21.13	29.67352	29.79
At most 4	0.192329	7.262419	14.26	8.897894	15.49
At most 5	0.046964	1.635474	3.84	1.635474	3.84

Source: Computed by the Authors', 2012

*(*) denotes rejection of the hypothesis at the 5 % (0.05) level

From Table 4 above, it is observed that both Trace test statistic and the Max-Eigenvalue test indicates three cointegrating equation at 5% level of significance. Based on the evidence above, we can safely reject the null hypothesis (H_0) which says that there are no cointegrating vectors and conveniently accept the alternative hypothesis of the presence of cointegrating vectors. Thus, we can conclude that a long run relationship exists among the variables. This result means that in Nigeria's case, the hypothesis of no cointegration among the variables should be rejected.

Model Estimation Issues and Discussion of Result

The result of the cointegration test reveals that more than one cointegrating vectors exist among the variables of interest. This means that we can estimate the Error Correction Model. An Error Correction Model is designed for use with non-stationary series that are known to be cointegrated. The ECM has cointegration relations built into the specification so that it restricts the long-run behavior of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics. The use of the methodology of cointegration and ECM add more quality, flexibility and versatility to the econometric modeling of dynamic systems

and the integration of short-run dynamics with the long-run equilibrium. The Error Correction Models were evaluated using the conventional diagnostic tests and the Akaike Information Criterion (AIC) was adopted in choosing the appropriate lag length. The model with the lowest (AIC) was adopted. The results are of the cointegrating relationship amongst the variables within the ECM framework are presented in Table 5 below:

Table-5. Parsimonious Error Correction Estimates

Dependent Variable: D(LOG(RGDP)				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG(RGDP(-1)))	0.290213	0.221697	1.309050	0.2047
D(LOG(RGDP(-2)))	0.536475	0.224863	2.385791*	0.0145
D(LOG(M2(-2)))	-0.259121	0.336113	-0.770934	0.4493
D(IR(-1))	-0.004496	0.004885	-0.920426	0.3678
D(IR(-2))	-0.001595	0.005116	-0.311660	0.7584
D(INF(-1))	0.011361	0.005179	2.193713**	0.0396
D(INF(-2))	0.003184	0.004364	0.729591	0.4737
D(LOG(REER(-1)))	-0.255454	0.187875	-1.359705	0.1883
D(LOG(REER(-2)))	-0.371610	0.230463	-1.612451***	0.1018
D(LOG(ER(-1)))	0.420007	0.125403	3.349270*	0.0030
D(LOG(ER(-2)))	0.379324	0.118384	3.204173*	0.0043
ECM(-1)	-0.594604	0.210949	-2.818715*	0.0103
R-squared	0.435358			
Adjusted R-squared	0.139592			
Durbin-Watson stat	2.046864			

Source: Computed by the Authors', 2012

Note: *One, two and three asterisk denotes rejection of the null hypothesis at 1%, 5% and 10% respectively.*

Given the results of the cointegration test which revealed the existence of cointegration among variables in the economic growth models, dynamic error correction model (ECM) is considered appropriate for the analysis. This analysis on the effect of monetary policy on economic growth is presented in the table above. The result obtained from the dynamic model indicates that the overall coefficient of determination (R^2) shows that 43.53 percent of growth rate of RGDP is explained by the variables in the equation. As the adjusted (R^2) tends to purge the influence of the number of included explanatory variables, the adjusted R^2 of 0.1395 shows that having removed the influence of the explanatory variables, the dependent variable is still explained by the equation with 13.95 percent. The Durbin Watson (D.W) statistics of 2.04 was not substantially farther away from the traditional benchmark of 2.0 in the mode, the study can conclude that there is no of sign auto-correlation or serial correlation in the model specification; hence the assumption of linearity is not violated.

In terms of the signs and magnitude of the coefficients which signify the effect of monetary policy on economic growth, it was observed from the model that interest rate (IR), external reserve (ER)

and exchange rate (REER) had their expected signs while money supply (M2) and inflation rate (INF) had signs contrary to a' priori theoretical expectation. In addition to the above, the coefficient of individual variables is examined to determine the nature of the relationship between monetary policy and other macroeconomic variables. The co-efficient of external reserve was observed to be positive and significant while the coefficient of interest rate and exchange rate was observed to be negative and significant.

From the table, a unit change in previous RGDP brings about 53.6 percent growth increases in present RGDP at 1% significance level. Also, a unit change in inflation brings about 1 percent increase in output level at 5% significance level which showed a positive impact on economic growth but does not conform to the theoretical expectation. A unit change in exchange rate brings about 37.1 percent decrease in economic growth and it is significant at 10% while a unit change in external reserve brings about an increase in real GDP at a significant level of 1%.

Contrary to the above, the coefficients of both money supply and inflation rate were observed to be insignificant. The significant relationship between interest rate, exchange rate and external reserve reflect the potency of the variables as an important conduct in transmitting monetary policy impulses to the aggregate economy. In contrast, the insignificant relationship between money supply and inflation in Nigeria, suggest that monetary policy as a policy option had been inactive in influencing these macroeconomic variables. This could step from the dominance of fiscal measures especially government expenditures in stimulating such macroeconomic variables. More so, the insignificant relationship between these variables could be explained by the underdeveloped nature of the financial institutions in transmitting monetary policy to the ultimate variables in the economy which is usually economic growth and price stability. The insignificant effect of inflation is a consequence of the autonomy that is granted monetary authority in the management of price instability in Nigeria and also the various policy initiatives that have been adopted (such as financial regulation, interest rate and exchange rate deregulation and inflation targeting) to mitigate price instability in Nigeria.

The results confirm that growth of RGDP in Nigeria has an automatic mechanism and that RGDP growth in Nigeria responds to deviations from equilibrium in a balancing manner. A value of (-0.5946) for the ECM coefficients suggests that a fast speed of adjustment strategy of roughly 59.46%.Empirical analysis result also supports growing evidence that monetary policy exerts significant effect on interest rate, exchange rate, external reserve according to the confirmed result earlier by Asogu (1998) and Ubogu (1985), making the assumption that the Central Bank cannot observe unexpected changes in output level within the same period.

CONCLUSION

It has been established in this study that monetary policies implemented in Nigeria depended on major policy instrument such as interest rates, exchange rate, external reserve, and monetary base. This study also evaluates the impact of monetary policy variables within the institutional framework and basic theoretical model on economic growth.

Overall, the study found evidence that monetary policy innovations have both real and nominal effects on economic parameter depending on the policy variable selected. The study notes that monetary policy implementation in a developing country like Nigeria faces additional challenges that are not present in developed economies; such has fiscal dominance and the treat of currency substitution.

This study conclude therefore that the inability of monetary policies to effectively maximize its policy objective most times is as a result of the shortcomings of the policy instruments used in Nigeria as such limits its contribution to growth even though monetary policies had brought impressive contribution over the years.

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