

THE IMPACT OF MONETARY POLICY ON NIGERIA'S MACROECONOMIC STABILITY (1970 - 2009)

Nenbee, S. G.

*Department of Economics, Faculty of Social Sciences
University of Port Harcourt, Port Harcourt, Rivers State, Nigeria
E-mail: gbimoie@gmail.com

Madume, J. V.

*Department of Banking and Finance
School of Management Sciences
Rivers State College of Arts and Science, Port Harcourt*

ABSTRACT

The objective of this study was to investigate empirically the impact of monetary policy on Nigeria's macroeconomic stability between 1970 and 2009. The study differs from others by viewing macroeconomic stability in terms of price stability. In order to reduce the problem of stationarity usually associated with time series data, we adopted the Co-integration and Error Correction Modeling (ECM) techniques. The results revealed that only 47 percent of the total variations in the model are caused by the monetary policy variables-Money Supply (MOS), Minimum Rediscount Rate (MRR) and Treasury Bills (TRB) at the long-run. The coefficient of the ECM is rightly signed and impacts on inflation in Nigeria while the current and past (lag 2) MOS is wrongly signed as well as not impacting inflation. Again, Past (lag 2) MRR impacts on inflation while current and past (lag 1) TRB do not. The policy implication arising from the findings is that the monetary policy tools showed a mix result in terms of their impact on inflation in Nigeria. Therefore, it is suggested that Nigeria should adopt macroeconomic mix of monetary, fiscal and exchange rate policies in managing inflation thereby promoting price stability which ultimately leads to macroeconomic stability.

Keywords: *Monetary policy, Inflation and Macroeconomic Stability*

INTRODUCTION

Monetary policy is one of the macroeconomic instruments with which nations (including Nigeria) do manage their economies. It entails those actions initiated by the Central Bank which aim at influencing the cost and availability of credits (Horwitz, 1969; Nwankwo, 1991 and Wrightsman 1976). It covers gamut of measures or combination of packages intended to influence or regulate the volume, prices as well as direction of money in the economy. Specifically, it permeates all the debonair efforts by the monetary authorities to control the money supply and credits conditions for the purpose of achieving diverse macroeconomic objectives, Ajie and Nenbee (2010). Chamberlin and Yueh (2006) adds that monetary policy - the act of controlling the supply or price of money - may exert a powerful influence over the economy. According to Nnanna (2006), generally, macroeconomic policies in developing countries are designed to stabilize the economy, stimulate growth and reduce poverty.

In Nigeria, the achievements of this objective are predicated on the stance of fiscal and monetary policies. Monetary policy formulation is based on the duo of money supply and credit availability in the economy. In ensuring monetary stability, the Central Bank through the deposit money banks implements policies that guarantee the orderly development of the economy through appropriate changes in the level of money supply. The reserves of the banks are influenced by the Central Bank through its various instruments of monetary policy. These instruments include the cash reserve requirement, liquidity ratio, open market operations and primary operations to influence the movement of reserves (Ajie and Nenbee, 2010 and Masha et al., 2004).

Sequel to our discussions so far, one could be induced to conclude that the use of monetary policy in Nigeria seems not to attract the desired level of economic stability. This conclusion follows the dismal performance of the economy in recent years. Little wonder Donli (2004) writes that the last two decades witnessed series of reforms aimed at the revitalization of the Nigerian economy owing to series of crises that influence the growth of the economy during this period. The problems were seen to be a direct derivative of structural imbalances in our economic system. The imbalances started right from colonial era, nurtured by inappropriate policies after independence in 1960, and reinforced by the wind fall gains from petroleum in the 1970s.

Donli (2004) further contends that these structural defects consisted of undiversified monolithic and monoculture production bases, undue reliance on agricultural products from 1960s and a total shift to exclusive reliance on petroleum after 1973. The outcome of these events was that the growth process relied heavily on external factors instead of the internal ones. However, of all the dependences, the exclusive reliance on petroleum turned out to be the most devastating to the economy. The dismal economic outlook in Nigeria above desires investigation into whether or not monetary policy as claimed by the monetarists impact on Nigeria's economic stability. Thus, the objective of this study is to investigate empirically the impact of monetary policy on Nigeria's macroeconomic stability between 1970 and 2009.

THE CONCEPT OF MACROECONOMIC INSTABILITY

The concept of macroeconomic instability had over the year's generated voluminous literature. Scholars have not precisely tied it to one economic situation. However, for the purpose of this study, we adopt the explanations offered by Omojimate and Tom (2006). In their view, from the perspective of a Less Developed Countries (LDC), instability may take various forms; market demand, inflation, fiscal/deficit, foreign exchange rate, interest rate, macroeconomic reform and political climate instability. The level of the instability in the LDCs including Nigeria may have been aggravated by three main phenomena. First, the largely imperfect market environment in the LDCs renders price signals ineffective and unreliable. This has created the attitude to 'wait' in investment. Investors in such uncertain environment would have

to exercise an option - the option to wait for new information. This could be regarded as part of the opportunity cost of investment which is often overlooked in the calculation of the Marshallian Net Value (MNV). Second, in a LDC where the structure of production is heavily dependent on imported inputs, external shocks may create instability in the domestic economy. Such shocks may arise from unfavourable terms of trade, high rate of inflation in countries that are partners in foreign trade, rigidities and bottlenecks on the supply side in the domestic economy and incessant fiscal deficits in the domestic economy. Third, the macroeconomic reform measures introduced to address such international and external shocks have been found to further induce uncertainty in the domestic economy (Olaniyan, 2000). Accordingly, this study adopts macroeconomic stability in terms of price stability.

PRICE STABILITY AND MONETARY POLICY

Price stability is usually the primary focus of monetary policy (Uchendu, 2009 and Orubu, 2009). Orubu (2009) opines that price stability does not mean that an economy necessarily records zero growth in the general level of prices of goods and services over time. Indeed, some degree of price inflation is regarded as a normal development in a growing economy- so long as such price increases remain within the range of low single digits (Minhkin and Schmidt-Hebbel, 2001; Batin, 2004; Burdekin and Siklos, 2004; Owoye, 2007). Given lower range single digit percentage increases in the general price level, price stability obtains, when economic agents (households and firms) no longer significantly take into account the expected change in the general price level in their current economic decision making. The attainment of price stability in an economy is however not an easy enterprise (Orubu, 2009).

In contemporary economies, the Central Bank is the authority with the mandate of manipulating monetary policy; through monetary policy tools, towards achieving desired macroeconomic objectives which includes: the achievement of price stability with respect to both domestic and external prices. In the same vein, it uses inflation rate to track movement in ensuring external stability thereby enhancing export performance in the economy. Emeka (2009) opines that the pursuit of price stability invariably implies the indirect pursuit of other objectives such as economic growth, which can only take place under condition of price stability and allocative efficiency of the financial markets, since inflation is generally considered as purely a monetary phenomenon, with significant cost to the economy. The primary goal of monetary policy to him is to ensure that money supply is at a level that is consistent with the growth rate. Without mincing words, the literatures stipulate that the pursuit of price stability therefore encompasses all main areas in macroeconomic environment of the country. Impulsive evidence is the one from the financial press in Nigeria as reported by Christopher (2006) that investors generally believe that monetary policy and macroeconomic events have a large influence on the unpredictability of the stock price, which further implies that macroeconomic variables could exert shocks on share returns and thereafter influence investors' investment decision. Literature

abounds on the relative effectiveness of monetary policy in curtailing macroeconomic instability in recent years. However, there have been constructive opinions on which of the monetary policy tools exert greater influence on economic activity. Accordingly, our concern in this segment is not to take side in either of the groups but adopt middle-way approach to examine the nature of relationship between monetary policy and Nigeria's macroeconomic instability for the period 1970 to 2009

Bogunjoko (1997) investigates 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 Nigerian economy and the appropriate monetary target is the domestic credit of the banking sector. Ajisafe and Folorunso (2002) test the relative effectiveness of monetary and fiscal policy on economic activity in Nigeria using co-integration and error correction modeling technique 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.

Folawemo and Osinubi (2006) examine the efficacy of monetary policy in controlling inflation and exchange rates 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, the study showed that the effects of monetary policy at influencing the finance of government fiscal deficit through the determination of the inflation and tax rates affects both the rate of inflation and exchange rate, thereby causing volatility in their rates.

Saibu and Nwosu (2011) examine the effect of monetary policy on sectoral output growth in Nigeria over the period 1986 to 2008. The study utilized an Auto Regressive Distributed Lag (ARDL) model and the findings showed that manufacturing sector is not sensitive to any of the monetary policy variables. In sharp contrast with manufacturing sector, agricultural sector is responsive to exchange rate. Furthermore, interest rate and exchange rate are the major determinants of mining output growth while building/construction sector is more responsive to changes in exchange rate and bank credit. In general, exchange rate is the most important factor that influences monetary policy measure in Nigeria. The study concludes that monetary policy will be more effective if the inherent differences in these sectors are factors in the design of policies in Nigeria.

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 granger cause 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. Chuku (2009) in his paper carried out a controlled experiment using a structural vector auto regression (SVAR) model to

trace the effects of monetary policy shocks on output and prices in Nigeria. He conducted the experiment using three alternative policy instruments; board money M2, Minimum Rediscount Rate (MRR) and the real effective exchange rate (RER). They found out that M2 is the most influential instrument for monetary policy implementation.

METHODOLOGY

The impact of monetary policy on Nigeria's macro-economic instability is tested based on time series data for the period 1970 and 2009. Primarily, the data were sourced from the Central Bank of Nigeria (CBN) and National Bureau of Statistics (NBS). The analytical model in this work follows the works of Husnan and Astiyah (2005) and Sanusi (2002). These authors have shown that both in Indonesia and Nigeria, macroeconomic stability could be achieved through a transmission mechanism of the monetary policy. The following tools were adopted for the study.

Inflation Rate (INF): Inflation entails a situation where there exist a persistent general increase in the prices of goods and services in all the sectors of the economy for a longer time. Thus, the study adopts INF as a dependent variable in the model.

Money Supply (MOS): This is defined as currency outside banks plus demand deposits. Theoretically, increase in MOS is expected to fuel inflation and vice versa. It serves as a regressor in all the models.

Treasury Bills (TRB): This is an instrument used as a monetary policy tool by the CBN to manage liquidity in the banking system through the Open Market Operation (OMO), Ibeabuch et al. (2004). Accordingly, increase in TRB will increase the rate of inflation in Nigeria and serves as an independent variable in the model.

Minimum Rediscount Rate (MRR): The MRR is one of the monetary policy instruments (tools) that are used in Nigeria. It is usually used to influence the intermediate target. Thus, if the MRR is increased, it implies that volume of money in circulation will be reduced and serves as an independent variable in the model.

Arising from the above, the functional relationship between the dependent and independent variables are structured as:

$$\text{Where: } \begin{array}{l} \text{INF} = f(\text{MOS, MRR, TRB}) \dots\dots\dots 1 \\ \text{INF} = \text{Inflation Rate,} \\ \text{MOS} = \text{Money Supply,} \\ \text{MRR} = \text{Minimum Rediscount Rate} \\ \text{TRB} = \text{Treasury Bills} \end{array}$$

A close look at equation 1 points to the fact that not all the determinants of INF were captured. This observation is in line with conventional economic reasoning. However, econometricians have resort to holding some variables constant. This is usually called the error term by econometricians. It is thus also necessary to incorporate stochastic elements. Incorporating the stochastic elements, the

econometric forms of the model will be:

$$INF_t = b_0 + b_1MOS_t + b_2MRR_t + b_3TRB_t + U_{1t} \dots\dots\dots 2$$

Where: a_i , b_i and λ_i are parameter estimates ($i = 1, 2 \dots$) while U_{1t} = Error term.

By and large, equation 3 shall be to be tried at levels and log-linear (natural logarithms) forms. The essence is to be able to see the one that offers a better explanation of the model. Thereafter, we accept such as the basis of our analysis and policy recommendations.

RESULTS AND DISCUSSION

Table 1: Short-run Regression Results (Static Regression Analysis)

| Variable | Coefficient | t-value | Probability |
|--------------------|-------------|-----------|-------------|
| C | 2.805286 | 3.203692 | 0.0028 |
| LOG(MOS) | -0.096812 | -0.951215 | 0.3478 |
| LOG(MRR) | 0.894735 | 2.788626 | 0.0084 |
| LOG(TRB) | -0.140782 | -1.728034 | 0.0926 |
| R ² | = 0.190737 | | |
| Adj R ² | = 0.123298 | | |
| DW | = 1.394355, | | |
| Akaike Info. Crit | = 2.238073, | | |
| Schwarz criterion | = 2.406961 | | |
| F-stat | = 2.828307 | | |

Source: Authors' Computation

Table 1 shows that the calculated R² is 0.191. This implies that about 19% of the total variation in the inflation model is caused by the regressors. The remaining 81% are caused by factors outside the model but buffed by the error term. Also, the overall model is not significant and harbours a high level of serial autocorrelation. More so, except MRR, none of the proxies impacted as the pace of inflation, hence, informed the testing for long-run relationship in the model. We proceed by conducting the unit root test for the stationarity on the variables.

Table 2: ADF Stationary Test Result on the Variables (Dynamic Regression Analysis)

| Variables | At level | Order of integration | First Difference | Order of integration |
|-----------|-----------|----------------------|------------------|----------------------|
| Log(INF) | -4.075830 | 1(1) | | |
| LOG(MOS) | 0.206457 | 1(0) | -3.387297 | 1(1) |
| LOG(MRR) | -1.444913 | 1(0) | -5.883559 | 1(1) |
| LOG(TRB) | -2.042489 | 1(0) | -8.029466 | 1(1) |

Note: 5% ADF critical value for the test is -2.9422

Source: Authors' Computation

Table 2 shows that except inflation rate, all the variables were not of stationary at levels. However, when the first difference operations were performed, they became stationary (integrated of order 1). We now conduct the co-integration test in order to

ascertain long-run relationship amongst the variables.

Table 3: Johansen Co-integration Test

| Eignvalue | Likelihood Ratio | 5% Critical Value | 1% Critical Value | Hypothesized no. of CE(s) |
|-----------|------------------|-------------------|-------------------|---------------------------|
| 0.933606 | 245.9306 | 47.21 | 54.46 | None ** |
| 0.906493 | 153.7174 | 29.68 | 35.65 | At most 1 ** |
| 0.772011 | 73.14684 | 15.41 | 20.04 | At most 2 ** |
| 0.489783 | 22.87923 | 3.76 | 6.65 | At most 3 ** |

*(**) denotes rejection of the hypothesis at 5% (1%) significance level L.R. test indicates 4 cointegrating equation(s) at 5% significance level.

Source: Authors' Computation.

On table 3, all the computed likelihood ratio values are greater than the 5 percent critical values. That is, the likelihood ratio test shows that "At most 3" cointegrating equations are rejected at 5% level of significance. The hypothesis rejecting "At most 4" is not statistically significant; hence, it was dropped from the table. If "At most 4" is not rejected, it implies that 4 cointegrating equations subsist. This confirms the existence of long-run relationship between monetary policy tools and inflation rate in Nigeria.

Table 4: Parsimonious Error Correction Model for INF

Dependent Variable: D(LOG(INF))

Method: Least Squares

Sample(adjusted): 1973 2008

Included observations: 36 after adjusting endpoints

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|--------------------|-------------|-----------------------|-------------|----------|
| C | 0.325146 | 0.249723 | 1.302028 | 0.2043 |
| D(LOG(INF(-1))) | 0.534190 | 0.165474 | 3.228251 | 0.0034 |
| D(LOG(MOS)) | -0.543518 | 0.755595 | -0.719325 | 0.4784 |
| D(LOG(MOS(-2))) | -0.619707 | 1.071647 | -0.578275 | 0.5681 |
| D(LOG(MRR)) | -0.909642 | 0.586206 | -1.551744 | 0.1328 |
| D(LOG(MRR(-1))) | -1.712025 | 0.734403 | -2.331180 | 0.0278 |
| D(LOG(MRR(-2))) | -0.590460 | 0.651270 | -0.906628 | 0.3729 |
| D(LOG(TRB)) | -0.050399 | 0.062935 | -0.800804 | 0.4305 |
| D(LOG(TRB(-1))) | 0.081215 | 0.067922 | 1.195704 | 0.2426 |
| ECM(-1) | -1.064183 | 0.191630 | -5.553330 | 0.0000 |
| R-squared | 0.608066 | Mean dependent var | | 0.033006 |
| Adjusted R-squared | 0.472397 | S.D. dependent var | | 0.780469 |
| S.E. of regression | 0.566904 | Akaike info criterion | | 1.932880 |
| Sum squared resid | 8.355885 | Schwarz criterion | | 2.372746 |
| Log likelihood | -24.79184 | F-statistic | | 4.481968 |
| Durbin-Watson stat | 2.051177 | Prob(F-statistic) | | 0.001259 |

Table 4 shows that about 47 percent total changes in inflation is caused by the proxies. On the other hand, the remaining 53 percent are due largely to factors exogenous to the model but accounted for by the error term. Also, the entire mode

is significant at 5 percent level of significance with seemingly zero serial autocorrelation. Furthermore, the coefficient of the ECM is rightly signed and impacts on inflation in Nigeria. Precisely, it means that the speed of convergence is 1.06 in every year. Also, the current and past (lag 2) MOS is wrongly signed as well as not impacting on inflation for the period under review. This observation is negation of the views of Friedman (1956) and Masha (1999). These authors agreed that in the literature, the traditional approach to the study of inflation, stresses the significance of the relationship between money supply and inflation.

The relationship between MRR and INF shows a mix results. It shows that current and past (lag 1 and 2) MRR are rightly signed and theoretically congruent. However, the t-value calculated for the past (lag 2) MRR impacts on inflation while that of current and past (lag 2) do not. Moreso, current TRB is rightly signed with inflation while past (lag 1) TRB does not. However, their t-values calculated are less than the critical value of 1.69. By extension, we can say there is no significant relationship between inflation and treasury bills at the long run.

CONCLUSION

The objective of this study is to investigate empirically the impact of monetary policy on Nigeria's macroeconomic stability between 1970 and 2009. It differs from others by viewing macroeconomic stability in terms of price stability. The result of the model estimated shows that only 47 percent of the total variations in the model are caused by the monetary policy variables-Money Supply (MOS), Minimum Rediscount Rate (MRR) and Treasury Bills (TRB). The overall model is significant at 5% confidence level with seemingly zero serial autocorrelation at the long-run while the coefficient of the ECM is rightly signed and impacts on inflation in Nigeria. Also, the current and past (lag 2) MOS is wrongly signed as well as not impacting inflation. This is a negation of the findings of Friedman (1956) and Masha (1999) that inflation is always a monetary phenomenon. Furthermore, Past (lag 2) MRR impacts on inflation while current and past (lag 1) TRB do not. The policy implication arising from the findings is that the monetary policy tools showed a mix result in terms of their impact on inflation in Nigeria. Nigeria should adopt macroeconomic mix of monetary, fiscal and exchange rate policies in managing inflation thereby promoting price stability which ultimately leads to macroeconomic stability.

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