

## Monetary Policy and Inflation Targeting in Nigeria

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### **Abstract**

*This study examined the efficacy of monetary policy in curbing inflation in Nigeria. Time series data between 1986 and 2015 were used and the Vector Error Correction Model was employed to give empirical content to the stated objectives. The study found out that monetary policy is significant in curbing inflation threshold in Nigeria, however the effect of monetary policy variables are weak in controlling inflation. This is as a result of the large proportion of informal sector which culminates into a high currency outside bank economy that is largely not affected by monetary policy tools. Also, non-popularity of monetary policy tools as a result of financial illiteracy accounts for its ineffectiveness. The Monetary Policy Rate (MPR) is not statistically significant which has also affected its transmission mechanism to commercial banks interest rate. This is as a result of commercial banks' excess reserves which downplay the efficacy of the MPR in affecting interest rate and money supply. The study recommends amongst others that; first, the CBN should narrow the asymmetric corridor around the MPR to check commercial banks excess reserves. Required cash ratio and liquidity ratios should be adjusted regularly to curtail banks excess reserves; second, the CBN should embark on enlightenment campaigns in financial literacy to buttress popularity of monetary policy tools. Finally, commercial banks should expand their coverage to reduce the number of un-banked and under banked persons in the economy in order to reduce the dominance of the informal sector.*

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**Keywords:** Monetary Policy, Inflation, Money Supply, Interest Rate, Structuralist theory

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### **I. Introduction**

What has nearly gone uncontrolled over time is the problem of almost continuous increase in the general price level – termed inflation especially during the post war period. A continuous rise in the general price level over a long period of time has been the most common feature of both developed and the developing economies. According to Dwivedi (2008), persistent inflation is perhaps the second most serious macroeconomic problem confronting the world economy today – second only to hunger and poverty in the ‘third world’. Economists seem to agree that inflation is a ‘persistent’ and ‘appreciable’ increase in the general level of prices. The term ‘appreciable’ is ambiguous as it does not specify as to what rate of increase in the price level is considered as ‘appreciable’ and ‘considerable’. This varies from country to country and from time to time. What then is the desirable rate of inflation?

There is no precise or unique answer to this question. However, based on the past experience (Shapiro, 1994), it is sometimes suggested that 1 – 2% inflation in developed countries and 4 – 6% in Less Developed Countries (LDCs) is the appropriate and desirable limit of inflation. The Central Bank of Nigeria (CBN) targets single-digit inflation rates as the desirable limit of inflation. In the last decade, the CBN were able to achieve single digit inflation rates of 8.5%, 6.6%, 8.0%, 8.0% and 9.55% in 2006, 2007, 2013, 2014, and 2015

respectively (CBN, 2015). However, the rate of inflation has increased appreciably between 2013 and 2015. Inflation has maintained an upward trend from end January 2016 till date. Inflation (year-on-year) rose again in August to 17.6 per cent, from 17.1 per cent in July 2016, from 16.48 per cent in June 2016, from 15.58 per cent in May; 13.72 per cent in April, 12.77 per cent in March and 11.38 per cent in February 2016 (CBN, 2016).

The economic effects of inflation are all pervasive. A high rate of inflation is called economic evil because it affects an economy in various ways and to different extents. Its effects may be favourable or unfavourable. Inflation targeting has dominated CBN's monetary policy focus in recent times based on assumption that it is an essential tool of achieving macroeconomic stability (Aliyu & Englama, 2009). According to Okwori & Abu (2015) the CBN over the years has instituted various monetary policies to regulate and develop the financial system in order to achieve major macroeconomic objectives which often conflict and result to distortion in the economy. The consensus in the literature is that of all the objectives of macroeconomic policy, ensuring low and stable inflation, that is, price stability, is the most desirable and feasible for monetary policy to undertake (Mishkin, 2007).

Masson, Savastano, & Sharna (1997) identify two major prerequisites for adopting Inflation Targeting (IT) as a framework for monetary policy. The first is that the central bank of the country must be in a position to conduct its monetary policy with a strong degree of instrument independence. Towards this end, there should be no symptoms of fiscal dominance which may make the country susceptible to inflationary pressure generated by inappropriate fiscal policy. The second prerequisite is that the country must not be committed to targeting the level or path of any other nominal variable. In other words, the monetary authorities must be strongly committed to price stability as the primary goal of monetary policy. In particular, the authorities must avoid making any strong commitment to any particular level of the nominal exchange rate. When these two prerequisites are met, the third precondition is that the monetary authorities should possess the technical and institutional capacities to design and operate the IT framework (Ojo, 2013). A fourth prerequisite is the need for important changes in the decision-making processes of the country.

These pre-requisites have largely not being met by the Nigerian Central Bank. The country is still characterised by fiscal dominance, weak technical and institutional capacities, and multiplicity of goals. This therefore necessitates this study to investigate the potency of monetary policy tools in curbing inflation threshold in Nigeria. Specifically, the study seeks to; first, examine the trend of monetary policy instruments and inflation in Nigeria; second, evaluate the empirical relationship between monetary policy instruments and inflation in Nigeria; and third, investigate the effectiveness of monetary policy tools in controlling inflation in Nigeria. The rest of the paper is structured as follows. Section two presents the review of related literature on the theoretical underpinning and empirical studies. Section three presents the methodology of the research while section four analyses results of the data. Section five concludes the paper and attempts some policy recommendations.

## II. Review of Related Literature

### 2.1 Theoretical Framework: The Structuralist View of Inflation

Inflation has a long history and so is the case with the theories of inflation which seeks to explain what causes inflation. The classical economists analysed the roots of inflation through the *quantity theory of money*. In their opinion, the general level of prices rises in proportion of to the increase in money supply, real output remaining the same. Thus, the classical theory emphasizes the role of money and ignores the real or non-monetary factors causing inflation and is therefore considered one-sided and incomplete (Friedman, 1968). Keynes attributed inflation to excess aggregate demand at full employment level or the level of potential output – which is called *inflationary gap*. Keynes emphasised the role of a

non-monetary factor, i.e. the aggregate demand in real terms and ignored the influence of monetary expansion on the price level. His theory too does not fully explain the phenomenon of inflation. The modern monetarists tried to revive the classical monetarism in a modified form, again emphasising the role of money vis-a-vis inflation (Dornbusch & Fischer, 1994). Modern theories of inflation on the other hand recognise the role of both *demand-side* and *supply-side* factors on the price level (explaining its causation in the general equilibrium framework).

These theories of inflation are based on the characteristics and experience of the western developed countries. It is often argued that inflation theories based on the economic characteristics of the developed countries can hardly be applied to explain the nature of inflation in the developing countries and are, therefore, of little consequence as far as formulations of anti-inflationary policies in Less Developed Countries (LDCs) is concerned (Dwivedi, 2008). The reason is that the characteristics and the institutional set-up of the developed countries do not exist in the LDCs. Besides, in the framework of the orthodox theories, inflation takes place only when the economy is in a state of full employment with 'natural rate of unemployment', if any. In contrast, in the less developed economies, inflation and large scale unemployment go hand in hand. This has been the experience of most developing countries especially Nigeria trying to achieve a high rate of growth through public sector investments.

As regards the institutional factors, the LDCs are characterised by highly fragmented markets, market imperfections, immobility of factors, wage rigidities, disguised unemployment and underemployment, 'low equilibrium trap' and sectoral imbalances with surplus in some sectors and scarcity in others (Myrdal, 1968). Furthermore, inflation in the LDCs has generally been a consequence of their growth efforts. For these reasons, inflation theories built on the experience and in the background of the developed countries have little relevance to LDCs. Economists like Myrdal and Streeten argue strongly against straightaway application of the so called modern theories of inflation to LDCs. Their effort to find an appropriate explanation to inflation in LDCs has led to the emergence of a new school of economists called '**structuralists**' and a new class of inflation theories known as **structuralist theories of inflation** (Kirkpatrick & Nixon, 1976). According to the structuralist view, inflation in LDCs is an unavoidable result of their ambitious development programmes and is caused mainly by the structural imbalances in such economies. The structural imbalances in LDCs are:

- a. Food Scarcity: the imbalance between demand for and supply of food.
- b. Input Imbalance: shortage of capital and surplus labour, shortage of fuel and oil.
- c. Foreign exchange bottleneck: imbalance between exports and imports and balance of payments deficits
- d. Infrastructural Bottlenecks: inadequate supply of electricity, transport and communication, and telecommunication and
- e. Social and Political Constraints

In Nigeria, inflation is caused by an admixture of factors including 'the latent factors' built up in the early years of planning, increase in money supply, international factors, 'dislocation of infrastructural facilities such as power, transport and port facilities', continued deficit financing, depletion of foreign exchange reserves, droughts and floods causing poor performance of the agricultural sector, heavy indirect taxation, administered prices etc. This alongside demand-pull and cost-push inflation is a major problem for the Nigerian economy. This study thus examines the efficacy of monetary policy in curbing inflation in Nigeria.

### 2.3 Empirical Review

Riti & Kamah (2015) carried out a study titled "Inflation Targeting and Economic

Growth in Nigeria: A Vector Auto Regressive (VAR) Approach”. The study examines the achievement of sustainable growth through inflation targeting in Nigeria using the VAR model. Annual time series data were used covering a span of 1981 – 2010. The variables used include; Consumer Price Index (CPI), Gross Domestic Product (GDP), Exchange Rate (EXR), US Consumer Price Index (CPI, as a proxy for foreign price), Money Supply ( $M_2$ ), and Interest Rate (INTR). The study found out that exchange rate contributes significantly to inflationary pressures in Nigeria – which is a reflection of the import dependent nature of the Nigerian economy. The study recommends amongst others that the objective of monetary policy should be made clear thereby improving planning in the private and public sectors. Also, the CBN should critically and carefully evaluate policy options before implementing them.

Okwori & Abu (2015) evaluated the determinants of money supply in Nigeria. The paper analysed monetary policy investigating its potency in management of liquidity in Nigeria covering a twenty-eight year period of 1986 to 2013. The study adopted the Ordinary Least Square (OLS) method using multiple regression analysis. The variables used are Broad Money Supply (BRM), Cash Ratio (CR), Liquidity Ratio (LR), Monetary Policy Rate (MPR), Interest Rate (INR), and Treasury Bill Rate (TBR). The study found out that monetary policy has not significantly influenced liquidity management in Nigeria within the study period. The study recommended that, the Central Bank should maintain a flexible monetary policy rate so as to prevent commercial banks from liquidity surfeit. Also, the government should complement the monetary authority by providing a good regulatory environment rather than being a liability to the CBN.

Bassey & Essien (2014) analysed the issues, problems, and prospects of inflation targeting framework for monetary policy in Nigeria. According to them, recent policy indication shows that the Central Bank of Nigeria (CBN) may have soft-pedalled in the pursuit of full-fledged Inflation Targeting for the country. The paper thus attempted to critically analyze the basic issues, problems and prospects germane to the adoption of Inflation Targeting as a monetary policy framework for Nigeria. They examined the basic features and performances of inflation targeting countries globally and adduced that Inflation Targeting is not “a cure-all medicine” and that it may not significantly reduce the real costs of disinflation in Nigeria in terms of a decline in output and an increase in unemployment. They recommended that for Nigeria, the extent of the success of Inflation Targeting, if and when adopted, will crucially depend on the availability of executive capacity, quality and timely data and the political will and commitment to the success of the programme on the part of monetary authorities.

Maku & Adelowokan (2013) examined the dynamics of inflation in Nigeria using an Auto Regressive framework. The main objective of the paper is to examine the determinants of inflation rate, amidst macroeconomic fluctuations in Nigeria between a decade after independence (1970) and 2011. The study revealed that fiscal deficit and interest rate exerts decelerating pressure on inflation dynamics in Nigeria. Other macroeconomic indicators such as real output growth rate, broad money supply growth rate, and previous level of inflation rate further exert increasing pressure on inflation rate in Nigeria. The study thus concludes that there is significant adjustment process of the dynamics of inflation rate in Nigeria, while real output growth rate and fiscal deficit are significant determinants of inflation rate in Nigeria. The study recommends amongst others that there is a strong need to ensure that monetary policy and fiscal policy are effectively harmonized and their objectives synchronized. A strict monetary policy aimed at curtailing inflation would be meaningless when fiscal policy is expansionary.

Danjuma, Jibrin & Blessing (2012) assessed the effectiveness of monetary policy in combating inflation pressure on the Nigerian economy. They examined the impact of

monetary policy instruments in Nigeria during the period 1980 – 2010 by evaluating the magnitude and direction of the impact of broad money supply, interest rate, cash reserve ratio of the commercial banks, liquidity ratio and exchange rate on inflation. The framework for the analysis hinged on the estimation of inflation function derived from the monetary theory of inflation. The study employed classical least squares method which was augmented by the granger causality, stationarity test and correlogram test. The results of the analysis show that the liquidity ratio and interest rate turn out to be the leading monetary policy instruments that can be employed to combat inflation in Nigeria. It was also revealed that, unethical banking practices by Nigerian commercial banks has rendered cash reserve ratio, broad money supply and exchange rate impotent resulting to ineffective monetary policy in Nigerian economy. They recommended that a proper management of liquidity ratio and interest rate variables will help to control inflation rate, this will bring increase in economic growth of Nigeria via increase in the value of the purchasing power of Nigeria currency.

Chinaemerem & Akujuobi (2012) in their study Inflation Targeting and Monetary Policy Instruments examined whether or not one of the preconditions for a successful inflation targeting framework is present in Nigeria and Ghana. Three Vector Auto Regressive (VAR) Models were built in achieving the stated objectives. The VAR two variable model including money supply and prices show that inflation is an inertial phenomenon in Nigeria and Ghana. It also shows that money innovations are not strong and statistically important in determining prices when compared with price shocks themselves. In the short run, innovations in prices are mostly explained by their own shocks, and the monetary policy instruments have little or no effect on prices. The study concludes that policy linkage between inflation and monetary policy instruments in Nigeria and Ghana is not strong in the short run and thus, these countries are not yet candidates for inflation targeting. The study recommends amongst others that the monetary authorities must reduce the influences of inflationary expectations by pursuing more transparent policies. This should be done by frequently informing the public about the changes in monetary policy and explaining the reasons for those changes.

Odior (2012) in his study “Inflation Targeting in an Emerging Market: VAR and Impulse Response Function (IRF) Approach” examined inflation targeting in developing countries using Nigeria as a case study. The VAR and IRF were used to estimate the data collected on consumer price index, broad money supply, exchange rate, gross domestic product and government expenditure over the period 1970 – 2010. The model ascertained the extent in which policy target of these macroeconomics variables does lead to changes in inflation. The results show that, money supply and past level of inflation have the potentials of causing significant changes in inflation in Nigeria. The study therefore recommended that more policy attention be given to these variables in order to have stable inflation rate in Nigeria.

### III. Methodology

#### 3.1 Model Specification

This study took a cue from the work of Okwori & Abu (2015) to specify the empirical relationship between monetary policy and inflation threshold in Nigeria. The definitional equation is modified as follows;

$$INF = f (M_2, CR, LR, MRR, INR, TBR)$$

The stochastic form of the equation is given as;

$$INF = \beta_0 + \beta_1 M_2 + \beta_2 MPR + \beta_3 INR + \beta_4 CR + \beta_5 LR + \beta_6 TBR + \mu$$

Where; INF = Inflation Rate

M<sub>2</sub> = Money Supply Growth Rate

CR = Cash Ratio

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LR	=	Liquidity Ratio
MRR	=	Minimum Rediscount Rate
INR	=	Interest Rate
TBR	=	Treasury Bills Rate
$\mu$	=	the error term
$\beta_0 - \beta_6$		are parameters to be estimated

The variables used in the model proxy the channels through which monetary policy tools affect the rate of inflation in Nigeria.

Based on a priori expectation, it is expected that the coefficients of  $\beta_1$ ,  $\beta_5$ , and  $\beta_6$  are expected to have a positive relationship with inflation. This implies that an increase in either will cause inflation to increase. On the other hand the coefficients of  $\beta_2$ ,  $\beta_3$ , and  $\beta_4$  are expected to have negative relationships with inflation implying that an increase in either will cause inflation to decrease. In general it is expected that monetary policy tools should have a significant effect in curbing inflation in Nigeria.

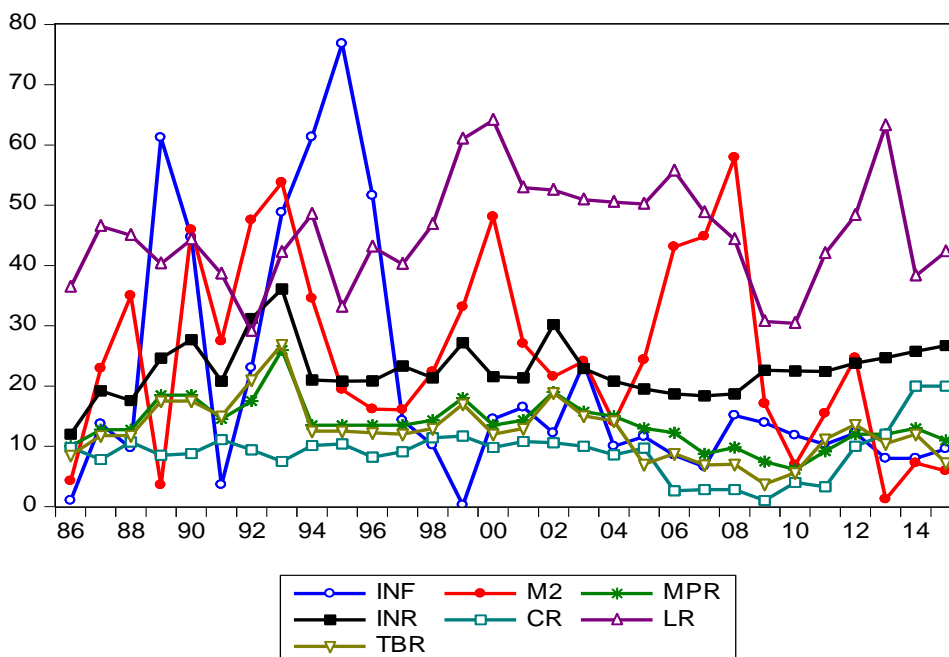
### 3.2 Method of Study

The Vector Error Correction (VEC) Mechanism is used to estimate the efficacy of monetary policy on inflation threshold in Nigeria. The VECM is employed under the framework of the VAR model. Diagnostic tests are also used to examine the stability of the sample estimates. The model is estimated using data gotten from 1986 – 2015. The VECM is used to measure the cause-effect relationship of the data series, to obtain plausible numerical estimates of the parameters, and to give empirical content to the estimated function. This data is sourced from CBN Statistical Bulletin and the Annual Abstract of Statistics from National Bureau of Statistics (NBS).

## IV. Results and Discussion

### 4.1 Trend of Monetary Policy and Inflation Threshold in Nigeria

The graph below shows the trend of monetary policy variables and inflation threshold in Nigeria between 1986 and 2015. This period marks the SAP era, post SAP era, and both military and democratic regimes in Nigeria, within which these variables have undergone different rhythms. Inflation threshold has been volatile within the study period averaging 20.2% with the lowest rate recorded in 1999 as 0.2% and the highest in 1995 as 76.8%. The trend of inflation has been wobbling which is axiomatic in the quest for price stability in Nigeria. In 1986, inflation rate was 1%, it jumped to 13.7% in the following year, reduced to 9.7% in 1988 and sharply increased to 61.2% in 1989 – a span of 3 years. The CBN were able to curb inflation from 44.7% in 1990 to 3.6% in 1991. This however was short lived as inflation rose persistently to 76.8% in 1995 (a difference of 73.2%). This also became a downturn as the rate of inflation declined year-on-year to 0.2% in 1999. In 2006 and 2007, the CBN were able to maintain single digit rates of inflation of 8.5% and 6.6% respectively. This is also similar to the period 2012 – 2015 which recorded inflation rates of 8.0%, 8.0% and 9.55% respectively.



**Figure 1: Graph showing the trend of monetary policy variables and inflation in Nigeria**  
Source: Eviews8 output, 2017

From the period 1990 – 2012, the trend shows that the CBN has been unable to control the growth of Broad Money Supply in Nigeria – ranging from 14.02% to 57.88% within the period. Apart from 1986 (4.23%), 1989 (3.54%), 2010 (6.91%), 2013 (1.20%), 2014 (7.20%) and 2015 (5.90%), the rest of the period records growth rate of money supply of more than 14% which is a major factor spurring inflation threshold in Nigeria. Money supply averaged 25.2% within the study period. Liquidity ratio and cash ratio are tinkered side by side by the CBN to control the excess reserves of commercial banks while giving allowance for liquidity concerns. The trend shows that both liquidity ratio and cash ratio have been quite stable within the study period.

Liquidity ratio averaged 45.34% while cash ratio averaged 9.08% within the study period. The highest liquidity ratio was 64.1% in 2000 while the lowest was 29.1% in 1992. On the other hand, the lowest cash ratio was 1.0% in 2001 and its highest was 20.0% in 2014 and 2015. The Treasury Bill Rate (TBR) is a money market instrument used by the CBN to execute its expansionary or contractionary stance of money supply. When the CBN wants to contract money supply, they lower the TBR, however, when it wants to expand money supply, they increase the TBR. Within the period under review, the highest TBR recorded was 26.9% in 1993. The year 1992 also recorded a TBR of 21%, contrarily; the remaining years were below 20% with the lowest TBR being 3.72% in 2009. The average Treasury bill rate recorded was 12.52% within the study period.

CBN's Monetary Policy Rate (MPR) is a significant tool which signals the direction and movement of money market interest rates. It is also a major instrument in reducing or increasing the rate of money supply which affects the rate inflation. The trend of MPR has little fluctuations within the study period with a margin of 19.87% between its highest and lowest rate. The highest MPR was 26% in 1993 (then Minimum Rediscount Ratio, MRR) and the lowest MPR recorded was 6.13% in 2010. This period recorded an average of 13.63% in the MPR which is fairly stable.

The trend also shows that the MPR has not exerted so much influence on the interest rate which within the study period is high and unfruitful for borrowing. Only the periods 1986 – 1988 and 2005 – 2008 records interest rates of less than 20% - with the lowest being 12% in 1986. The remaining period records interest rates of more than 20%. The year 1993

records the highest rate of interest charged by commercial banks to the tune of 36.09%. This is quite high and paradoxical because in spite of these high rates, inflation is still on the rampage. A major reason for this is the possession of excess reserves by commercial banks which downplays the MPR.

#### 4.2 Data Analysis

In order to avoid nonsensical regression estimates which may lead to spurious results, the data is subjected to unit root test to examine the stationarity of the data series. The result of the Augmented Dickey-Fuller (ADF) test is presented below:

**Table 1: Stationarity Test**

Variable	ADF Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value	Prob.	Order of Integration
INF	-5.06	-3.69	-2.97	-2.63	0.0003	I(1)
M <sub>2</sub>	-7.13	-3.69	-2.97	-2.63	0.0000	I(1)
MPR	-5.61	-3.70	-2.98	-2.63	0.0001	I(1)
INR	-5.94	-3.70	-2.98	-2.63	0.0000	I(1)
CR	-5.55	-3.69	-2.97	-2.63	0.0001	I(1)
LR	-6.30	-3.69	-2.97	-2.63	0.0000	I(1)
TBR	-6.23	-3.69	-2.97	-2.63	0.0000	I(1)

Source: Eviews8 Output, 2017.

The ADF statistic values for INF, M<sub>2</sub>, MPR, INR, CR, LR and TBR are -5.06, -7.13, -5.61, -5.94, -5.55, -6.30, and -6.23 respectively. The associated one sided p-values (for 30 observations) are less than 0.05. The result also shows that the statistic  $t_{\alpha}$  value is greater than the critical values at 1%, 5%, and 10% for all the variables, so we reject the null hypothesis at the conventional test size. Thus, the variables are stationary at first difference series.

The finding that the macro time series contains a unit root has spurred the non-stationary time series analysis. Engle and Granger (1987) pointed out that a linear combination of two or more non stationary time series may be stationary. If such a stationary linear combination exists, the non-stationary time series is said to be cointegrated. The stationary linear combination may be interpreted as a long run equilibrium relationship between the variables. The Johansen system framework is employed to test for the presence of cointegrating relationships among the non-stationary variables. The result is presented below:

**Table 2: Co integration Test**

Null Hypothesis	Trace Statistic	0.05 Critical Value	Null Hypothesis	Max-Eigen Statistic	0.05 Critical Value
$r = 0^*$	142.45	125.61	$r = 0^*$	51.19	46.23
$r \leq 1^*$	91.26	95.75	$r \leq 1$	37.75	40.08
$r \leq 2$	53.50	69.82	$r \leq 2$	20.55	33.87
$r \leq 3$	32.96	47.86	$r \leq 3$	15.92	27.58
$r \leq 4$	17.04	29.80	$r \leq 4$	13.43	21.13
$r \leq 5$	3.61	15.49	$r \leq 5$	3.48	14.26
$r \leq 6$	0.12	3.84	$r \leq 6$	0.12	3.84

Source: Eviews8 Output, 2017.

Note:  $r$  represents number of co integrating vectors. Both Trace statistic and Max-Eigen statistic indicates 1 co integrating equation each. \* denotes rejection of the hypothesis at the 0.05 level



The Trace test and Max-Eigen value test shows a long run equilibrium relationship between the variables. Thus, the null hypothesis of no co integrating equation is rejected since their statistics are greater than their respective critical values for the co integrating equations at 5% significance level. This implies a stationary linear combination, as such the non-stationary time series are co integrated.

### VAR Lag Order Selection Criteria

An optimal lag of 1 is chosen for the empirical model based on Schwarz Information Criterion, Akaike Information Criterion, Sequential Modified LR Test Statistic, Final Prediction Error and Hannan-Quinn Information Criterion.

**Table 3: Lag Order Selection Criteria**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-607.8546	NA	2.79e+10	43.91819	44.25124*	44.02000
1	-544.8016	90.07577*	1.15e+10*	42.91440*	45.57881	43.72894*
2	-496.0651	45.25529	2.50e+10	42.93322	47.92899	44.46048

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Source: Eviews8 Output, 2017.

#### 4.2.1 Effect of Monetary Policy on Inflation Threshold in Nigeria

Since the stationarity test has purported the validity of our results giving rise to the use of the VECM, we proceed to analyse the effect of monetary policy on inflation threshold in Nigeria. The long run relationship and its accompanying short run relationship is presented below:

The estimated model is given as;

$$INF = \beta_0 + \beta_1 M_2 + \beta_2 MPR + \beta_3 INR + \beta_4 CR + \beta_5 LR + \beta_6 TBR + \mu$$

The numerical values of the theoretical parameters are given below:

**Table 4: Long Run and Short Model**

Variable	Coefficient	Standard Error	T statistics
<b>Long Run Model</b>			
M <sub>2</sub>	-1.81	0.29	-6.22
MPR	-4.54	2.86	-1.39
INR	4.17	1.05	3.97
CR	-5.63	1.57	-3.58
LR	2.46	0.40	6.19
TBR	3.88	2.44	1.55
C	-119.81		
<b>Short Run Model</b>			
ECM	-0.55	0.14	-3.90
D(INF(-1))	0.34	0.19	1.83

<b>D(M<sub>2</sub> (-1))</b>	-0.69	0.25	-2.79
<b>D(MPR(-1))</b>	-3.09	2.43	-1.27
<b>D(INR(-1))</b>	0.79	1.14	0.69
<b>D(CR(-1))</b>	1.16	1.18	0.98
<b>D(LR(-1))</b>	1.37	0.48	2.48
<b>D(TBR(-1))</b>	2.88	1.83	1.57
<b>C</b>	-1.10	3.02	-0.36

$R^2 = 0.48$ , Adjusted  $R^2 = 0.26$ , F statistics = 4.21,  $F_{0.05} = 2.55$

**Source: Eviews8 Output, 2017**

The results show that in the long run MPR, CR, LR and TBR conform to a priori expectation. This implies that an increase in MPR and CR helps in reducing inflation threshold in Nigeria. Also, as LR and TBR increases, the likelihood of an increase in inflation threshold also increases. Contrarily, M<sub>2</sub> and INR do not conform to a priori expectation. In the short run, MPR, LR and TBR conform to a priori expectation while M<sub>2</sub>, INR and CR do not. The results also reveal that M<sub>2</sub>, INR, CR, LR which are core monetary policy tools are statistically significant in the long run (i.e.  ${}^1_2b_i > S.E.$ ). However, the coefficients of MPR and TBR are not statistically significant in the long run ( ${}^1_2b_i < S.E.$ ). In the short run, M<sub>2</sub> and LR are statistically significant while MPR, INR, CR and TBR are not.

Specifically, the coefficient of M<sub>2</sub> suggests that a 1% change in money supply will cause inflation to drop by 1.81% in the long run. Also, a 1% change in M<sub>2</sub> in the previous year will decrease inflation by 0.69% of that unit change, in the short run. Furthermore, a 1% increase in MPR will reduce inflation by 4.54% and 3.09% of that unit change in the long run and short run respectively. In addition, a 1% change in CR reduces inflation by 5.63% of that unit change in the long run; however it spurs inflation in the short run by 1.16%. The coefficient of INR suggests that a 1% increase in INR will engender a simultaneous increase (4.17%) in inflation threshold in the long run and 0.79% in the short run. Similarly, a 1% change in LR and TBR will spur inflation by 2.46% and 3.88% respectively in the long run and by 1.37% and 2.88% respectively in the short run. The result also shows that even if M<sub>2</sub>, MPR, INR, CR, LR and TBR are held constant, the level of inflation will still reduce by 119.81% in the long run and 1.10% in the short run.

The adjusted R<sup>2</sup> value of 0.24 means that about 24% of the variations in inflation is explained by M<sub>2</sub>, MPR, INR, CR, LR and TBR. This is low considering that the maximum value of R<sup>2</sup> can at most be 1. The coefficient of about 0.24 shows that money supply, monetary policy rate, interest rate, liquidity ratio, cash ratio, Treasury bill rate and inflation are weakly positively correlated. The study also finds out that M<sub>2</sub>, MPR, INR, CR, LR and TBR are jointly significant. The F statistic shows the overall significance of the estimated regression line and validates the result of the R<sup>2</sup>. The result reveals that the p value of obtaining an F value of as much as 4.21 or greater is simultaneously equal to zero, leading to the rejection of the hypothesis that together M<sub>2</sub>, MPR, INR, CR, LR and TBR have no effect on inflation threshold in Nigeria. The error correction parameter conforms to a priori expectation and is statistically significant. The magnitude of the co integration term indicates that if there is any deviation, the long run equilibrium is adjusted moderately where about 55% of the disequilibrium may be removed in each period. This shows that the speed of adjustment to where inflation will equilibrate even when there is initial disequilibrium is at the rate of 55%.

## V. Summary of Findings and Recommendations

The study concludes that monetary policy is significant in curbing inflation threshold in Nigeria, however the effectiveness of monetary policy variables are weak in controlling inflation in Nigeria. This is similar to the findings of Okwori & Abu (2015) and Maku &

Adelowokan (2013). This is as a result of the large proportion of informal sector which culminates into a high currency outside bank economy that is largely not affected by monetary policy tools. Also, non-popularity of monetary policy tools as a result of financial illiteracy accounts for its ineffectiveness in curbing inflation. The Monetary Policy Rate (MPR) is not statistically significant which has also affected its transmission mechanism to commercial banks interest rate. This is as a result of commercial banks' excess reserves which downplay the efficacy of the MPR in affecting interest rates and money supply to curb inflation threshold in the country. On the basis of these findings, and in order to curb inflation threshold in Nigeria, the study recommends that:

1. The CBN should narrow the asymmetric corridor around the MPR to check commercial banks excess reserves. Required cash ratio and liquidity ratios should be adjusted regularly to curtail banks excess reserves.
2. The CBN should embark on enlightenment campaigns in financial literacy to buttress popularity of monetary policy tools. This can be done by partnering with institutions, schools and organisations.
3. The commercial banks should expand their coverage to reduce the number of un-banked and under banked persons in the economy in order to reduce the dominance of the informal sector.

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