

# EMPIRICAL ANALYSIS OF THE IMPACT OF MONETARY POLICY ON INFLATION IN NIGERIA (1984-2014)

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## Abstract

*This study investigates the impact of monetary policy on inflation in Nigeria from 1984- 2014 using annual time series data sourced from World Bank World Development Indicators, 2015. The study employed the use of descriptive statistics, ADF unit root test technique, co-integration, Vector Error Correction Mechanism test, Breusch-Godfrey Serial Correlation LM Test, : Heteroskedasticity Test and Ordinary Least Squares (OLS) multiple linear regression. The Johansen Co-integration test result revealed that there exist a long-run relationship among Inflation Rate, Broad Money Supply, Exchange Rate and Interest. The Vector Error Correction Mechanism test result revealed that for about 5.17% of short-run disequilibria or error is being corrected for annually. Ultimately, the OLS regression result revealed that Broad Money Supply and Interest Rate has negative impact on Inflation Rate while Exchange Rate had had positive impact on Inflation Rate in Nigeria during the period reviewed. Since it is established that Exchange Rate is a driving force in influencing Inflation rate in Nigeria, policy makers are therefore advised to make policy plans which will ensure a significant stabilization in exchange rate in the country to curb the menace of inflationary pressure on consumer good by discouraging import and encouraging export of merchandise which can help reduce the excessive demand for dollar by Nigerians which normally makes Naira to depreciate against dollar.*

**Key words:** Inflation, Monetary Policy, Exchange Rate, Interest Rate, Broad Money Supply, Nigeria.

## Introduction

Monetary policy has always been seen as a fundamental instrument over the years for the attainment of macroeconomic stability, often viewed as prerequisite to achieving sustainable output growth. Thus, in the pursuit of macroeconomic stability, the managers of monetary policy have often set targets on intermediate variables which include the short term interest rate, growth of money supply and exchange rate. Among these intermediate variables of monetary policy, the exchange rate is argued to have a greater influence on the economy through its effect on the value of domestic currency, domestic inflation, the external sector, capital flows and financial stability. Increased exchange rate directly affects the prices of imported commodities and an increase in the price of imported goods and services contributes directly to increase in inflation (CBN, 2008).

The adverse consequence of inflationary pressure from exchange rate depreciation have been a serious concern for the monetary authorities, economists and policy analyst, given that these variables (exchange rate and inflation rate) are the key barometers of economic performance. Consequently assessing the nexus among monetary policy, and inflation rate is pertinent because an understanding of the nexus between these variables is prerequisite for the successful conducting and adoption of inflation targeting, which the Nigerian government has also made prime objective in the attainment of its macroeconomic objective. Under inflation

targeting, monetary policy stance (through changes in short term interest) affects inflation through a large set of variables including exchange rate (Mukherjee & Bhattacharya, 2011).

In the Nigerian economy, inflation trend has been on the increase (positive) over the last decade in spite of considerable and commendable efforts towards controlling money supply so as to reduce inflationary pressure in the economy by the monetary authorities. For instance, the inflation rates for the periods 2008, 2009, 2010, 2011, 2012, 2013, 2014 and 2015 are 11.58, 11.54, 13.72, 10.84, 2.22, 8.48, 8.06 and 9.02 respectively. It can be observed that, in 2008, the inflation rate was 11.58, where in 2012 (four years in-between) it went down by 0.04 (11.54). This minute or small fall in inflation rate may have been as a result of the contractionary monetary policy measures embarked upon by the monetary authorities in Nigeria during the period. However, in 2015, the inflation rate still went down to 9.02 which show the persistence of the effort of the monetary authorities to control inflation in the Nigerian economy. Similarly, the trend of real interest rate for the same periods is 4.19048370, 23.71, 42.31, 5.94, 6.88, 10.25, 11.36 and 12.06 respectively. It can also be observed that, in 2008, the interest rate was 4.19 where in 2012, it went up to 6.88, This is also correlated with the contractionary monetary policy measures embarked upon by the monetary authorities and the Central Bank of Nigeria such as the well-known 25 billion naira capital base or cash reserve requirement policy pronounced by the Central Bank of Nigeria during Sanusi Lamido Sanusi's administration as the Central Bank Governor between in 2008/2009 which succeeded in cutting down cash balances at the disposal of commercial banks, this made the commercial banks to keep on rising the lending rate rates perpetually in order to cut down demand for bank loans by the customers. The 12.06 increase in interest rate in 2015 from the 6.88 in 2012 show how consistent has been the effort of the monetary authorities following the persistent rises in the general prices of goods and services in the economy during the period at a glance to control inflation. In the same vein, the trend of official exchange rate from 2008 to 2015 was 118.55, 148.90, 150.30, 153.86, 157.50, 157.31, 158.55 and 199 respectively. It is conspicuous that, in 2008, the exchange rate was 118.55, where in 2012, it rose up to 157.50. This is also not uncorrelated with the extreme rise in demand for dollars and other countries' currencies from which Nigeria use to import merchandise which made the Nigerian Naira to fall in value. the 2015 rise in exchange rate from 157.50 in 2012 to 199 naira per dollar is evidenced by Nigeria's perpetual high dependence on import over the last decades that seem to pose a great challenge to the development of infant industries in the economy which made the Nigerian Naira to continue losing its value. Ultimately, the trend of the volume of money supply in Nigeria between 2008 and 2015 was 28.05877761, 37.76613451, 43.26613356, 21.02586695, 20.68483133, 21.20013126, and 21.3644895 respectively. It is also clear that, from 28.05877761 in 2008, money supply increased to 20.68483133 in 2012, and in 2015, it still went up 199. These rises in the volume of money supply in the economy is informed by the increases in government and private expenditure (investment and or consumption expenditure) which seemed to inject more money into the economy. This was experienced because since the inception of the democratic dispensation in 1999; Nigerian government has been making considerable effort to seeing that economic development is achieved through the execution of series of developmental projects across the country which led to the increases experienced in the volume of money supply in the economy (World Development Indicators, 2011).

Despite the fact that many researchers have tried to establish a clear cut relationship that exists between inflation and monetary policy but have not come to a consensus as regard a specific and stable type of relationship between the two variables because others found the

relationship to be positive while others found it to be negative. Pasaogullari and Berument (2003), Rusitara (2004), Ann and Sun (2008) and Khan (2008) investigated the impact of monetary policy on inflation rate and found it to be positive. Mete and Michael (2005), Folawewo and Oshinubi (2006), Okhira and Saliu (2008), Omotor (2008), Chuku (2009) and Chimobi and Uche (2010) have investigated the impact of individual effect of monetary policy on exchange rate and inflation rate and found monetary policy to impact negatively on both exchange rate and inflation rate. It was also discovered from the reviewed literatures that most of the researchers did not check the causal relationship between monetary policy and inflation rate in Nigeria. Hence, this research spearheads to examine the level relationship between monetary policy and inflation as well as the causal linkage between monetary policy and inflation in Nigeria between the periods 1984 to 2015 in Nigeria using descriptive statistics, correlation matrix, trend and Granger causality techniques to analyze the data which was not used by any of the previous researchers in their work while trying to establish the relationship there in existence between inflation and monetary policy.

Owing to the research objective stated, this paper seeks to answer the following research questions; what is the type of relationship that exists between monetary policy and inflation? What is the trend and pattern of monetary policy in Nigeria from 1984 to 2015? Is there any causal linkage between monetary policy and inflation rate in Nigeria? This paper also aims at testing the following hypotheses as the case may be;  $H_0$ : monetary policy does not have any relationship with inflation.  $H_1$ : monetary policy does not cause inflation rate in Nigeria.

This paper would contribute to knowledge to a large extent as it will reveal how the monetary policy adopted and promoted by the monetary authorities over the years correlates with inflation rate which will be good for adjustment or sustenance of the existing macroeconomic policies for the betterment of the economy so as to maintain a single digit inflation rate in Nigeria.

Following this introduction, the rest of this paper is organized as follows; section two- literature review covers conceptual clarification, theoretical literature review, Empirical Literature review, Gap in literature vis-à-vis theoretical framework. Section three- the methodology focuses on sources and type of data, model specification, and estimation technique. Section four- results and discussion deals with data presentation, interpretation and discussion as Section five- conclusion and recommendation focuses on conclusion and recommendations as the case may be.

## **2.0 Literature Review**

Monetary policy is a deliberate action of the monetary authorities to influence the quantity, cost and availability of money credit in order to achieve desired macroeconomic objectives of internal and external balances (Central Bank of Nigeria (CBN), 2011). Sani, Amusa and Agbeyangi (2012) defined monetary policy as the combination of measures taken by monetary authorities (e.g. the CBN and the ministry of finance) to influence directly or indirectly both the supply of money and credit to the economy and the structure of interest rate for economic growth, price stability and balance of payment equilibrium. The action is carried out through changing money supply and/or interest rates with the aim of managing the quantity of money in the economy. The importance of money in economic life has made policy makers and other relevant stakeholders to accord special recognition to the conduct of monetary policy.

By definition, inflation is a persistent and appreciable rise in the general level of prices. However, not every rise in the price level is termed inflation. Therefore, for a rise in the general price level to be considered inflation, such a rise must be constant, enduring and sustained. The

rise in the price should affect almost every commodity and should not be temporal (Jhingan, 2002).

### **Expansionary Monetary Policy**

This type of monetary policy is embraced in the face of the existence of contractionary gap in the level of economic performance such as recession periods as a good example of contractionary gap. At such a time, the monetary authorities will try to employ monetary policy instruments like Open Market Operation (OMO) by buying financial securities from the money market e.g. bonds from the private sector of the economy thereby injecting money into the economy. The monetary authorities may also decide to use the instrumentality of Bank rate by pegging it down so that individuals/investors will be motivated to go the banks to seek for loan (Jhingan, 2002).

### **Contractionary Monetary Policy**

In event where expansionary gap or inflation is in existence in an economy, the monetary authorities makes use of the same instruments (OMO, CRR, Bank Rates etc.) to control inflationary pressure and expansionary gap in the economy. In this case, the instruments are used in opposite direction as compared to when the economy is experiencing contractionary gap in her performance level. The monetary authorities may decide to use OMO by selling her securities to private individuals, companies etc. at high interest rate which attracts buyers and by that, curtails the volume of money supply in the economy thereby controlling inflation and restoring the economy back to full potential level. By pegging up Bank Rate and CRR among other instruments of monetary policy, the monetary authorities will succeed in reducing the number of borrowers coming to banks to borrow on loan bases due to high interest rate, and the Banks would have less reserve in their vaults to loan out. These acts reduce the amount of money in circulation in the economy which also controls inflation and expansionary gap as the case may be (Jhingan, 2002).

### **Instruments of Monetary Policy**

Fabian and Eke (2014) opined that the instruments of monetary policy are of two types: first, quantitative, general or indirect; and second, qualitative, selective or direct. They affect the level of aggregate demand through the supply of money, cost of money and availability of credit. Of the two types of instruments, the first category includes bank rate variations, open market operations and changing reserve requirements. They are meant to regulate the overall level of credit in the economy through commercial banks. The selective credit controls aim at controlling specific types of credit. They include changing margin requirements and regulation of consumer credit. We discuss them as under as cited in (Fabian & Eke, 2014):

### **Empirical Literature Review**

Philip and Isiaq (2012) examined the relationship there in existence between monetary policy, inflation and exchange rate in Nigeria for the period spanning 1986 to 2010. The study employed a Co-integration and Multi-Variate Vector Error Correction Model approach to examine both the long run and the short run nexus among monetary policy, exchange rate and inflation rate. Based on this approach, the paper found that there exist at least a co-integrating vector among the variables and the VECM estimate showed that a uni-directional causation exist from exchange rate and inflation rate to short term interest rate (measure of monetary policy) while bi-directional causality exist from inflation rate to exchange rate. No evidence of causality was observed running from short term interest rate to exchange rate and from interest

rate to inflation rate. The theoretical transmission nexus deduced from the VECM estimate further revealed that changes in macroeconomic variables such as exchange rate and inflation rate granger caused a change in monetary policy stance and not otherwise. Based on these findings, this study recommends appropriate control and management of both the exchange rate and inflation rate.

Chimobi and Uche (2010) examined the relationship between money, inflation and output in Nigeria covering the period of 1970 to 2005. Using co-integration and granger-causality test analysis, the study revealed no existence of a co-integrating vector in the series used. Money supply was seen to granger cause both output and inflation. The study also found empirical support in context to the money-prices-output hypothesis for Nigerian economy, M2 have a strong causal effect on the real output as well as on prices. This suggests that monetary stability can contribute towards price stability in the Nigerian economy since the variation in price level is mainly caused by money supply; the study concluded that inflation in Nigeria is to a much extent a monetary phenomenon.

Omotor (2008) examined the impact of price response to exchange rate changes in Nigeria using time series data covering the period of 1970 to 2003 and using the vector error correction model (VEC) and slope-dummy methodology. The study showed that exchange rate and money supply aggravated inflation in Nigeria and suggested that a stable, consistent and complementary policy on money supply and exchange rate is required for price stability; the domestic output expansion is needed to meet the ever-growing food demand in Nigeria.

Folawewo and Oshinubi (2006) examined the efficacy of monetary policy in controlling inflation and exchange rate instability in Nigeria covering the period of 1980 to 2000 and employing the rational expectation framework and time series analysis. The study observed that the effort 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 the real exchange rate, thereby causing volatility in their rates. The study found that inflation affects volatility of its own rate as well as the rate of real exchange.

Mete and Michael (2005) examined whether monetary aggregates have useful information for forecasting inflation in the case of Nigeria other than that provided by inflation itself using a sample data spanning from 1990 to 1998. The study adopted two approaches; mean absolute percentage errors (MAPEs) and auto regression model. The study revealed that the Treasury bill rate, domestic debt and M2 (broad money) provide the most important information about price movements. Treasury bill rate provided the best information, since it has the lowest MAPE. Conversely, the least important variables were the deposit rate; dollar exchange rate and M1 (narrow money). M2 provides more information about inflation than M1 in the sample period. They also estimated an inflation equation and determined alternately whether M2 enter the equation significantly and they found that M2 is not significant. Exchange rate levels, and contemporaneous value of the domestic debt, are significant in the model. The results obtained were robust across the two methods used and they concluded that although the monetary variables contained some information about inflation, exchange rate and domestic debt may be more useful in predicting inflation in Nigeria.

### **Theoretical Framework**

There are a number of monetary and inflation theories in literature put forward by different schools of thought. However, the quantity theory of money is chosen by the researcher the theoretical framework for this research paper because the theory emphasize that inflation is a

function of money supply or total money in circulation within an economy. The theory fits economic situations in the Nigeria economy because since the inception of the democratic dispensation in 1999, the economy, the volume of money supply has been skyrocketing which has led to inflationary pressures on consumer goods across the country. The Quantity theory of money is detailed below showing in explicit terms how money supply impacts on inflation.

According to Totonchi (2011), the quantity theory of money is the oldest surviving economic doctrine which associated the general level of prices to changes in quantity of money in circulation. This means that the level of money supply determines the inflationary or non-inflationary level of an economy. The classicalists and some neo-classicalists viewed the analysis of inflation on this theory.

David Hume has between 1711 and 1776 provided the first dynamic process of how the impact of monetary changes spread from one sector of the economy to another and in the process changing relative prices and quantities. David Ricardo postulates that inflation in Britain was as a result of Bank of England irresponsibility over the issue of money and discouraged the idea on the possibility of output and employment increases that could result from the injection of money in the economy. Fisher brought out the famous equation of exchange ( $MV = PT$ ). Fisher and Author Cecil Pigeon (1877 - 1959) and the neoclassical economists of the Cambridge school demonstrated that monetary control could be achieved in a fractional reserve banking regime through control of exogenously determined stock of high powered money (Totonchi, 2011).

**Methodology**

**Sources and type of Data**

The sources of data for this research work are secondary which are obtained from CBN statistical bulletin 2015 and World Bank development indicators 2015.

**Model Specification**

In order to determine the relationship between monetary policy and inflation rate in Nigeria, Ordinary Least Square (OLS) linear regression model will be employed. It is a model that usually examines the impact of independent variable (s) on the dependent variable. The functional relationship of the model for this research is expressed as:

$$INF_t = f (BMS_t, EXR_t, IR_t) \dots \dots \dots (1)$$

While the linear relationship is expressed as:

$$INF_t = \alpha_0 + \alpha_1 BMS_t + \alpha_2 EXR_t + \alpha_3 IR_t + U_t \dots \dots \dots (2)$$

Where:.

BMS<sub>t</sub> = Broad Money Supply

INF<sub>t</sub> = inflation Rate

EXR<sub>t</sub> = Exchange Rate

IR<sub>t</sub> = Interest Rate

U<sub>t</sub> = the disturbance term

α<sub>0</sub> = the constant term

α<sub>1</sub> and α<sub>2</sub> and α<sub>3</sub> = the coefficient of the explanatory variables

The apriory expectations are also clearly stated below:

$$\alpha_1 > 0, \alpha_2 > 0, \alpha_3 > 0,$$

it is expected that broad money supply, exchange rate and interest rate would have a positive or direct relationship with inflation due to the fact that existing theories of economics in

relation to the working of monetary policy holds that expansionary monetary leads to increase of money supply in an economy whose multiplier effect would in a way result in inflation if not accompanied by increase in productivity and vice versa.

### Estimation Techniques

The techniques of estimation in this research work will be the descriptive statistics, Augmented Dickey-Fuller unit root test, co-integration in the case the time series data appears to be non-stationary at level, vector error correction mechanism test and Ordinary Least Square (OLS) Multiple Regression Techniques.

### Results and Discussion

#### Descriptive Statistics Test

This test was conducted in order to determine the mean, maximum and minimum values of Inflation Rate, Broad Money Supply, Real Exchange Rate and Interest Rate over the period under review as well as their respective standard deviations, the result is seen in table 4.1.

*Table 4.1 Descriptive Statistics Test Result*

Date: 08/24/16 Time: 20:16				
Sample: 1984 2014				
	INF	BMS	EXR	IR
Mean	20.29909	3.85E+12	74.37839	-0.555217
Median	12.21701	7.00E+11	92.33810	2.767927
Maximum	72.83550	1.82E+13	158.5526	25.28227
Minimum	5.382224	2.12E+10	0.766527	-43.57266
Std. Dev.	18.84564	5.77E+12	63.02072	17.60895
Skewness	1.511909	1.410286	0.059281	-0.855965
Kurtosis	3.874851	3.495256	1.214668	3.386406
Jarque-Bera	12.79891	10.59284	4.135231	3.978354
Probability	0.001662	0.005009	0.126487	0.136808
Sum	629.2719	1.19E+14	2305.730	-17.21173
Sum Sq. Dev.	10654.75	9.98E+26	119148.3	9302.255

<b>Observations</b>	31	31	31	31
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**Source: Authors' computation using E-view 8.0, 2016.**

From table 4.1, the descriptive statistics test result revealed that, the maximum, minimum, mean as well as the standard deviation values of Inflation Rate over the period under review (1984 to 2104) were 72.83550, 5.382224, 20.29909 and 18.84564 respectively.

Similarly, the descriptive statistics test result further revealed that, the maximum, minimum, mean as well as the standard deviation values of Exchange Rate during the period under review (1984 to 2014) were 158.5526, 0.766527, 74.37839 and 63.02072 respectively. The descriptive statistics test result also revealed that, the maximum, minimum, mean as well as the standard deviation values of Broad Money Supply were 1.82E13, 2.12E+10, 3.85E+12 and 5.77E+12 respectively. Moreover, the descriptive statistics test result revealed that, the maximum, minimum, mean as well as the standard deviation values of Interest Rate were 25.28227, -43.57266, -0.55217 and 17.60895 respectively.

### Unit Root Analysis

This Test was conducted to determine the stationary condition of the time series used in this study with the help of Augmented Dickey-Fuller unit root test technique. The result is summarized in table 4.2.

**Table 4.2 ADF Unit Root Test Result**

ADF Statistics				Critical Value AT 5% level of significance			
Variable	Level	1 <sup>st</sup> diff.	2 <sup>nd</sup> diff.	Level	1 <sup>st</sup> diff.	2 <sup>nd</sup> diff.	Order of integration
INF	-4.380936	-4.768496	-3.294688	-3.622033	-3.574244	-3.294688	I(0)
BMS	-1.090925	3.222014	1.571372	-3.587527	-3.632896	-3.644963	I(2)
EXR	-2.099269	-5.083035	-8.753154	-3.568379	-3.574244	-3.580623	I(1)
IR	-5.901627	-6.506164	-4.623906	-3.568379	-3.580623	-3.632896	I(0)

**Source: Authors' computation using E-view 8.0, 2016**

Table 4.2 shows that the Inflation Rate (INF) and Interest Rate (IR) are stationary at level while Exchange Rate (EXR) is stationary at 1<sup>st</sup> difference and Inflation Rate (INF) is stationary at 2<sup>nd</sup> difference. Inflation Rate (INF) is stationary at level because the computed critical value (-3.622033) at 5% is greater than the ADF Test statistics (-4.380936). Thus, Inflation Rate (INF) is integrated of order zero (I[0]). Broad Money Supply (BMS) is non-stationary at level, at first

difference and at second difference so we just assume it to be stationary at 2<sup>nd</sup> difference. So, Broad Money Supply is integrated of order two (I [2]).

Exchange Rate (EXR) is non-stationary at level and became stationary and 1<sup>st</sup> difference because the computed value (-3.574244) at 5% is greater than the ADF Test statistics (-5.083035). Thus, Real Exchange Rate (REXR) is integrated of order one (I [1]). Ultimately, Interest Rate (IR) is stationary at level because the computed value (-3.580623) at 5% is greater than the ADF Test statistics (-5.901627). Thus, Interest Rate (IR) is integrated of order zero I (0).

### Co-integration Analysis

This test was conducted in order to check if there exist a long-run relationship among Inflation Rate, Broad Money Supply, Exchange Rate and Interest Rate for the period under review 1984 to 2014 using Johansen Co-integration test. The result can be observed in table 4.3.

**Table 4.3: Johansen Co-integration Test Result**

Date: 08/24/16 Time: 20:19				
Sample (adjusted): 1986 2014				
Included observations: 29 after adjustments				
Trend assumption: Linear deterministic trend				
Series: INF BMS REXR IR				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.700055	59.24232	47.85613	0.0030
At most 1	0.484941	24.32183	29.79707	0.1872
At most 2	0.150413	5.081083	15.49471	0.8001
At most 3	0.012131	0.353945	3.841466	0.5519
Trace test indicates 1 cointegratingeqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.700055	34.92049	27.58434	0.0048
At most 1	0.484941	19.24075	21.13162	0.0901
At most 2	0.150413	4.727138	14.26460	0.7758
At most 3	0.012131	0.353945	3.841466	0.5519

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

**Source: Authors' computation using E-view 8.0, 2016.**

From table 4.3, the Johansen co-integration test result revealed that there long-run relationship among Inflation Rate, Broad Money Supply, Real Exchange Rate and Interest Rate because the trace test and maximum eigenvalue indicated the presence of one co-integrating vectors at 5% level of significance. This implies that, there is an evidence of the existence of error correction mechanism.

### Vector Error Correction Mechanism Test

This test was conducted because of the existence of error correction mechanism in the model developed for this research as revealed by Johansen co-integration test. The test is necessary because there is need to check how many percentage of the short disequilibrium can be corrected and to determine whether the Inflation Rate, Broad Money Supply, Real Exchange Rate and Interest rate converges or diverges away from long-run equilibrium path. The result of the test can be observed in table 4.4.

**Table 4.4: Vector Error Correction Mechanism Test Result**

Error Correction:	D(INF)	D(BMS)	D(REXR)	D(IR)

CointEq1	-0.511659	-2.66E+09	0.105016	-0.116247
S.E	(0.04929)	(1.6E+09)	(0.03879)	(0.04800)
t-stat.	[-3.04808]	[-1.62935]	[2.70722]	[-2.42198]

**Source: Authors' computation using E-view 8.0, 2016.**

From table 4.4, the Vector Error Correction Mechanism (VECM) test revealed that, about 51.17% short-run disequilibria in the previous period is being corrected for in the current period. This is because, Inflation Rate is properly signed and is statistically significant and denotes that, it converges towards long-run equilibrium path through Broad Money Supply, Real Exchange Rate and Interest Rate. Similarly, Broad Monet Supply is properly signed though it is highly statistically insignificant at 5% level of significance which indicates that it converges towards converges towards long-run equilibrium path though at a very slow speed.

Real Exchange Rate is not properly signed though it is highly statistically significant and denotes that, it diverges away from long-run equilibrium at high speed while Interest Rate is properly signed though it is highly statistically insignificant and denotes that, it converges towards long-run equilibrium path though at a very slow speed.

**Table 4.5: Breusch-Godfrey Serial Correlation LM Test on the residuals**

F-statistic	1.993244	Prob. F(2,32)	0.1528
Obs*R-squared	4.763425	Prob. Chi-Square(2)	0.0924

**Source: Authors' computation using E-view 8.0, 2106.**

From table 4.5, the Breusch-Godfrey Serial Correlation LM Test result revealed that, there is no serial correlation in the system because the probability value of the observed R-squared is about 9.24% which greater than 5%.

**Table 4.6: Heteroskedasticity Test: ARCH**

F-statistic	0.000592	Prob. F(1,40)	0.9807
Obs*R-squared	0.000621	Prob. Chi-Square(1)	0.9801

**Source: Authors' computation using E-view 8.0, 2106.**

***H<sub>0</sub>***: there is no ARCH effect in the residuals

***H<sub>1</sub>***: there is ARCH effect in the residuals

From the result obtained after running the Auto Regressive Conditional Heteroskedasticity test as evidenced by the result in table 4.6, it was discovered that the probability value of the observed R-squared suggests that we cannot reject the null hypothesis meaning that there is no ARCH effect in the system.

### OLS Regression Result

This test was run in order to determine the impact of monetary policy on inflation rate in Nigeria from the period 1984 to 2104. The result can be observed in table 4.7

**Table 4.7: OLS Regression Result**

Dependent Variable:LINF				
Method: Least Squares				
Date: 08/24/16 Time: 20:32				
Sample (adjusted): 1985 2014				
Included observations: 17 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.038788	3.482790	2.021020	0.0644
LBMS	-0.202430	0.152023	-1.331572	0.2059
EXR	0.293792	0.224781	1.307016	0.2139
IR	-0.057561	0.182089	-0.316113	0.7569
R-squared	0.128163	Mean dependent var		2.407337
Adjusted R-squared	-0.073030	S.D. dependent var		0.531963
S.E. of regression	0.551045	Akaike info criterion		1.848324
Sum squared resid	3.947458	Schwarz criterion		2.044374
Log likelihood	-11.71075	Hannan-Quinn criter.		1.867812
F-statistic	0.637016	Durbin-Watson stat		0.817642
Prob(F-statistic)	0.604402			

**Source: Authors' computation using E-view 8.0, 2106.**

From Table 4.7, the OLS result revealed that, Real Exchange Rate is in line with the a priori expectation while Broad Money Supply are not in consonance with the a priori expectation stated in chapter three.

The OLS result also reveals that there is a negative but insignificant impact of Log of Broad Money Supply (BMS) on Log of Inflation Rate (INF). This implies that percentage increase in BMS will yield a decrease in INF by 20%. This might have been so because aggregate demand has been falling even with the increase in money supply in conjunction with the fact that it is just a few part of the economy's population (politicians) that holds the greater proportion of the money who mostly spends this money abroad thereby making the impact of such increases in money supply not to have attendant effect in the country or that the increase in money supply is accompanied by a proportional increase in economic activities which has the potential of clearing off the expected rise in aggregate demand that can put inflationary pressure on the general prices of goods and services in the economy.

Moreover, the same OLS results reveals that Log Exchange Rate (EXR) has a positive co-efficient of 0.293792, which implies that a percentage increase in Exchange Rate, will result to an increase in INF by 29%. This might have been so because as the dollar continues to appreciate due to excessive demand of it by Nigerian importers, it will lead to rise in the prices of goods and services in the economy. It is in line with what is currently happening in Nigeria. Furthermore, the OLS result reveals that Log Interest Rate (IR) has a negative coefficient of -0.057561, which implies that a unit change in IR will result to decrease in INF by 5.7%. This is in consonance with economic theory because increasing interest rate decreases the money supply which in turn leads to decreases in inflation because it is the increase in quantity of money in circulation that leads to inflation in an economy according the view of monetarists' school of thought.

R-Squared ( $R^2$ ) which measures the overall goodness of fit of the entire regression, shows that the value as 0.128163 i.e. 13%. By implication BMS, EXR and IR explains for about 13% of the variation INF while the remaining 77% is explained by the disturbance term ( $U_t$ ).

The t-statistics test is carried out in order to look for the individual significance of the variables by observing the values of probability as well as the t-statistics of co-efficient of the regression line. The results revealed that Broad Money Supply (BMS) is a statistically insignificant determinant of Inflation Rate (INF) because the t-statistics value of the variables revealed a figure less than two or probability value greater than 5% level significant. Whereas, Exchange Rate (EXR) and Interest Rate (IR) are also not statistically significant determinant of Inflation Rate (INF), this is because the t-statistics values for each of them revealed a figure less than two or probability value greater 5% level degree of freedom.

The Durbin-Watson (DW) statistics which measures the presence or absence of serial autocorrelation among the disturbance terms revealed a value of 0.817642 which indicate evidence of the presence of positive first order serial autocorrelation among the disturbance term.

From the OLS result obtained, the null hypothesis which states that monetary policy does not have positive and significant impact on Inflation in Nigeria is accepted while the alternative hypothesis is rejected.

## **Conclusion and Recommendations**

### **Conclusion**

This research work was undertaken in order to assess the impacts of monetary policy on Inflation in Nigerian economy from the period of 1984 to 2014, secondary data was utilized, collected with respect to Inflation Rate (INF), Broad Money Supply (BMS), Exchange Rate (EXR) and Interest Rate (IR) sourced from World Development Indicator 2015 and CBN Statistical Bulletin 2015. Trend Analysis test technique, descriptive statistics analysis, ADF Unit root test, Co-integration, Vector Error Correction Mechanism as well as Ordinary least square were employed as tools for data analysis or scrutiny. The findings revealed conspicuously that monetary policy plays a significant role in determining the height or level of inflation in Nigeria as a dynamic and economically complex economy. This is because it was found that broad money supply and interest rate have had negative impacts on inflation rate in Nigeria during the periods reviewed while Exchange Rate had positive impact on Inflation Rate in Nigeria for the same period.

### **Policy Recommendations**

Based on the findings of this research work, the researcher recommends the followings:

- i. It recommended that since Exchange Rate has positive impact on Inflation rate, Nigerian government and her policy makers are hereby advised rationally to embark upon policies that would discourage over dependence on imports such as rising tariffs on imports that cannot be adequately produced in the country to satisfy aggregate demand and granting subsidies to infant industries which can help them grow and develop faster.
- ii. The Monetary authorities are advised to embark upon contractionary monetary policy measures like decreasing the volume of Money Supply through the sales of government bonds to the public with a promise of high interest in return so as to mop out surpluses from the economy to make inflation rate optimal (single digit).
- iii. It is also recommended that the government and her policy makers (monetary authorities) should try their best to ensure that optimum interest rate is attained in the economy which according to Keynesian school of thought is the best rate as it has the potential of inducing savings and investment in an economy which in both cases can reduce inflationary pressure on the prices of goods and services to a barest minimum.

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