EFFECTS OF MONETARY POLICY ON INFLATION IN NIGERIA

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Abstract
This study examined the effects of monetary policy in combating inflation in Nigeria. The main objective of this study was to assess the effect of monetary policy instruments in curbing inflation in Nigeria. The study used annual time series data from 1986-2019 which were sourced from Central Bank of Nigeria Statistical Bulletin. It used inflation rate as the dependent variable while money supply, monetary policy rate, exchange rate and government expenditure were used as the explanatory variables. The study employed Autoregressive Distributed Lag (ARDL) model for its analysis. The findings indicated that interest rate and exchange rate exerted a positive and significant effect on inflation in Nigeria both in the short run and long-run . However, monetary policy rate was not significant in influencing inflation rate in the long-run but was found to be significant in the short-run. It was therefore concluded that while interest rate and exchange rate are potent tools of controlling inflation, monetary policy rate is not very effective in controlling inflationary pressure in Nigeria. Based on these findings, the study recommended that the Central Bank in collaboration with commercial banks should control inflation by keeping the interest rate at reasonable level in order to control inflation.
Key words: Monetary Policy, Money Supply, Inflation, Monetary Policy Rate

Introduction

Monetary policy refers to deliberate use of monetary instruments by the monetary authorities such as central bank in order to achieve macroeconomic in order to achieve specific goals such as a desirable level of inflation, a stable exchange rate, and economic growth. It deals with the control of money supply in order to influence macro-economic variables such as inflation, employment, balance of payment and aggregate output in the economy. According to Ubi, Effiom and Eyo (2012) monetary policy is a major economic stabilization weapon used to achieve some specified macroeconomic policy objectives and to counter undesirable trends in the economy such as unemployment, inflationary pressures, sluggish economic growth and external sector instability. Monetary policy is a package of actions carefully designed to manage the growth, value and cost of money with the broad objective of regulating economic conditions and activities during a given period (Okwori & Abu 2017).

The policy objectives of monetary policy in Nigeria include; controlling inflation rate, promoting economic growth, reducing pressure on the external sector, stabilizing the naira exchange rate and balance of payments equilibrium. According to Chukwuemeka (2018), the ultimate targets of monetary policy are: price stability, full employment, sustained economic growth and balance of payment equilibrium.

To achieve single digit inflation rate in Nigeria, the central bank has introduced various instruments; direct and indirect monetary control. During the period of direct monetary control (1974-August, 1993), the CBN imposes different credit controls and quantity restrictions on interest rates. Similarly in September 1993, the CBN embarked on indirect monetary control by using market-based instruments to regulate the economy and achieve low inflation rate. The main instrument of CBN was the Open Market Operations (OMO) complemented by cash reserve requirements and Discount Windows. Meanwhile, in December, 2006 the CBN introduced Monetary Policy Rate (MPR) to replace Monetary Rediscount Rate (MRR).

Despite the efforts by successive Nigerian governments to reduce inflation rate, it is still very high probably due to poor implementation Statistics from CBN Statistical Bulletin (2019) have shown persistent inflationary trend. In Nigeria, inflation rate stood at 13.7% in 1986 and increased to 48.8% in 1992 and rose further to 76.8% in 1994. In 2001, it fell to 16.5% and rose to 23.8% in 2003 with a further decline to an average of 11%-13% through 2004-2015 but moved up to 18.55% in 2016 and by 2018 it declined to 11.40 and dropped further to 10.09% in 2019). In an attempt to combat inflation and maintain price stability, Nigeria has adopted direct monetary policy instruments such as Open Market Operations (OMO),Liquidity Ratio, Cash Reserve Requirement, Discount Window Operations, Monetary Policy Rate (MPR), selective credit control, special deposit, moral suasion , interest and exchange rates. Despite the concerted efforts of the monetary authority to combat inflation, the inflation rate is still high. This is actually what motivate the researcher to undertake this study with a view to identifying the effect of monetary policy on inflation rate in Nigeria. The research question that this study seeks to address is : to what extent has monetary policy been able to control inflation in Nigeria? The main objective of this study is to examine the effect of monetary policy in combating inflation in Nigeria, using annual time series data from 1986-2019.

Following the introductory part, the rest of the paper is structured as follows: section two deals with literature review. The third section deals with methodology and specification of the model to be empirically tested while the fourth section dwells on results and discussion. The last section concludes and provides policy recommendations.

Literature Review

Conceptual Clarifications

Monetary policy

According to Babatunde and Kehinde (2016), monetary policy is one of the macroeconomic instruments with which the central bank employed in the management of the economy to attain fundamental objectives of price stability, maintenance of balance of payments equilibrium, and promotion of employment, output growth and sustainable development. Generally speaking, monetary policy refers to the actions undertaken by a central bank to influence the availability and cost of money and credit with a view to achieving some macroeconomic objective such as generating employment, increasing output, keeping inflation low and ensuring exchange rate stability. It refers to a programme of action undertaken by the monetary authorities, generally the central bank, to control and regulate the supply of money with a view to achieving predetermined macroeconomic objectives such as full employment, price stability, economic growth, balance of payments equilibrium and equitable income redistribution.

Jhinghan (2010) broadly classified monetary policy into two, namely; contractionary and expansionary. Contractionary or restrictive monetary policy is used by the central bank to overcome inflationary gaps in an economy. When there is inflationary pressure in the economy, the central bank adopts restrictive monetary policy by raising interest rate and selling government securities through the open market operations, raising reserve requirements of banks and raising the discount rate. By such measures, the central bank increases the cost and availability of credit in the money market and this will lead to fall in aggregate demand, aggregate consumption and investment. Expansionary monetary policy on the other hand , is used to overcome economic depression or recession or a deflationary gap. When an economy is in depression, occasioned by fall in aggregate demand, the central bank purchases government securities in the open market, lowers the discount rate and encourages business credit thereby leading to increase in the supply of money, increase in aggregate demand, investment, savings, output and employment. An expansionary monetary policy leads to increase in the money supply which raises the demand for goods and services in the economy. When credit expands, it raises the money income of the borrowers which in turn, raises aggregate demand relative to supply, thereby leading to inflation.

Inflation

According to Chukwuemeka (2018), inflation is defined as a continuous and general rise in price level of goods and services in an economy over a given period of time. It refers to a condition of general and persistent rise in the general price level in an economy. A price increase by itself is not necessarily inflationary. The price increase must be general and wide-spread throughout the economy and the process must be continuous, for it to be called inflation. Inflation can be classified into two: creeping and hyper- inflation. Creeping inflation refers to a slow but persistent rise in the general price level in an economy over long periods of time. In other words, the condition of a general rise in price persists for a long time but at a moderate and fairly steady pace. It will rise slowly but persistently and continuously getting worse. Hyper-inflation otherwise called "runaway or galloping inflation" refers to inflation which is characterized by sudden and high increase in prices. Hyperinflation can lead to rapid deterioration in the value of a nation's currency and erode the confidence reposed in it by the general public. During hyperinflation, prices rise very fast at double or triple digit rates. Under this situation inflation rate becomes absolutely uncontrollable. Prices tend to rise very fast and doubles many times every day. Such a situation brings a total collapse of the monetary system because of the continuous fall in the purchasing power of money. However, unlike creeping inflation, hyper-inflation usually last for short periods of time.

Theoretical Framework

The theoretical framework for this study is anchored on the "quantity theory" of money and the liquidity preference theory. These theories are relevant in explaining the efficacy of monetary policy in combating inflation in Nigeria. The quantity theory of money was the earliest theory of monetary policy propounded by Irving Fisher in 1956. In this theory, the velocity of money and output are assumed to be constant. The theory posited that any rise in the supply of money will results in inflation. The Quantity theory of money postulates a direct and proportional relationship between money supply and the price level. That is, a change in the supply of money causes a proportional change in the price level. Algebraically,

$$MV = PY \quad \text{---------- [1]}$$

where: M stands for money supply, V is velocity of money in circulation, P denotes price level representing inflation and Y stands for output. Equation [1] is the quantity equation, linking the price level and the level of output to the money stock.

Keynes out-rightly disagreed with the quantity theory of money because of its unrealistic assumption of fixed output and fixed velocity of money in circulation. Based on the weaknesses associated with quantity theory of money, Keynes then reformulated a distinct theory called liquidity preference theory which was developed in 1936 in his famous book titled 'The general theory of Employment, Interest, and Money'. Keynes contended that prices are sticky at least in the short run and that money growth adjusts rapidly and that demand for money depends on income and interest rate . Keynes identified three main motives for holding cash balances: the transaction, precautionary, and speculative motives. Transaction motive is the willingness to hold cash balances for day-to-day transactions like payments for food, fuelling cars etc. The transactions demand for money varies directly with the level of income. The higher the level of income of an individual the greater the demand for transaction balance and vice versa. The precautionary motive is the desire to hold cash balances as a precaution against unforeseen contingencies such as sudden sickness, accidents and deaths. Speculative motive refers to desire to hold cash balances in order to make speculative dealings in bonds or securities. It is the desire to hold cash balances in order to avoid the risk inherent in fluctuations in prices of securities. Keynes argued that speculative demand for money varies indirectly with the rate of interest. The higher the rate of interest, the lower the demand for the speculative cash balances. Thus, there is an inverse relationship between the price of bond and interest rate. Therefore, if individuals anticipate that market interest rates are likely to increase in future ,they have an incentive to hold their wealth in the form of liquid assets in order to avoid the risk of capital loss. Therefore, liquidity preference and speculative demand for money are inversely related to the current level of interest rates (Jhingan, 2010).

Keynes posited that the demand for money is a function of income and interest rate expressed algebraically as depicted in Equation [2]

$M^d = f(Y, r)$ ----------[2]

where: M^d represents the demand for money, *Y* is the real income, and r is the interest rate. Demand for money is a function of interest rate(r)and income (y), that is: I = I (r) (Iy>0) Ir< 0 . This means that investment is decreasing in interest rate but increasing in income. Intuitively, (y>0) (r< 0). The policy relevance of this theory to Nigerian setting is that the central bank uses restrictive contractionary monetary policy to combat inflation. When the central bank increases interest rate, the cost of borrowing increases and this decreases investment. A rise in interest rate discourages borrowing thereby leading to reduction in the amount of money in circulation. Similarly, the higher the rate of interest, the lower the willingness to hold money in liquid form. This means that higher interest rate encourages people to save more of their income; people forgo current consumption for higher interest rate given that price level is stable overtime.

Empirical Review

Abille and Mpuure (2020) examined the impact of monetary policy in controlling inflation in Ghana, using data from 1983 to 2017. The study employed Autoregressive Distributed Lag (ARDL) model for analysis. The results indicated that money supply had positive and significant influence on inflation in Ghana in the long run but a significant negative effect in the short run.

Habibullah (2019) analyzed the long-run relationship between monetary policy and inflation in thirteen Asian developing countries, namely; Indonesia, Malaysia, the Philippines, Myanmar, Singapore, Thailand, India, South Korea, Pakistan, Sri Lanka, Taiwan, Nepal and Bangladesh using data from 1950-1999. Using Granger causality test and Error-Correction (ECM) model, the results revealed that money supply had positive and significant relationship with inflation.

Hossain (2017) examined the effect of monetary policy on inflation in Malaysia, using annual time series data from 1971–2012. The study employed vector error correction model (VECM) for the analysis. The result revealed that money supply had positive and significant relationship with inflation in Malaysia.

Bonga-Bonga (2017) assessed the effectiveness of monetary policy on inflation in South Africa over the period 1980-2015. They employed SVECM methodology and found that monetary policy shocks did not significantly influence inflation level. The implication of the finding was that any change in monetary policy would not have significant influence on inflation. Chaudhry, Ismail, Farooq and Murtaza.(2015) investigated the impact of money supply growth on the rate of inflation in Pakistan using annual time series data from 1973-2013. The study employed Autoregressive Distributed Lag (ARDL) model for its analysis . The results revealed that interest rate and money supply had positive and significant effect on inflation in Pakistan during the period of investigation.

In Nigeria, Folorunsho and Abiola (2020) assessed the impact of monetary policy on inflation from 1997 to 2019 using co-integration and error correction mechanism. The results revealed that exchange rate and money supply had positive and significant effect on inflation in Nigeria.

Emmanuel (2020) evaluated the impact of monetary policy on inflation in Nigeria from 2010 to 2019 using ordinary least squares (OLS) technique for the analysis. The results revealed that domestic credit, money supply, exchange rate and gross domestic product had positive and significant relationship with inflation in Nigeria.

Akindutire, Ogunyemi and Adodo (2019) examined the effectiveness of monetary policy in controlling inflation in Nigeria from 1970-2015. Using Johansen Co-integration and Error Correction Model (ECM), the results revealed that both money supply and interest rate were statistically significant in explaining variation in inflation rate while exchange rate was insignificant in explaining variation in inflation rate.

Okwori and Abu (2017) investigated the impact of monetary policy in curbing inflation in Nigeria. The study used annual time series data from 1986 to 2015. The study employed vector error correction model (VECM) for the analysis and findings revealed that money supply had a positive and significant effect on inflation in Nigeria.

Iya and Aminu (2014) investigated the determinants of inflation in Nigeria between 1980 and 2014 using the ordinary least squares method. The result revealed that money supply and interest rate influenced inflation positively, while government expenditure and exchange rate influenced inflation negatively. They suggested that for a good performance of the economy, price stability may be achieved by reducing money supply and interest rate and also increase government expenditure and exchange rate in the country.

Nwachukwu, Dibie and Ogudo (2014) examined the effectiveness of monetary policy in reducing inflation in Nigeria for the period 1970- 2012. The study employed co-integration and Error Correction technique for the analysis and the result indicated that exchange rate and broad money supply had positive and significant relationship with inflation.

Maku and Adelowokan (2013) analysed the determinants of inflation in Nigeria using annual data from 1970 to 2013 and used ordinary least squares estimation technique. The results indicated that fiscal deficit and interest rate exert significant effect on inflation rate in Nigeria. Dania (2013) studied the determinants of inflation in Nigeria using annual data from 1970 to 2013. The model was estimated using Cointegration and Error Correction Model (ECM) approach. Results indicated that expected inflation , measured by lagged term of inflation, money supply, significantly determine inflation, while trade openness, income level, exchange rate and interest rate were found not to be significant in the short run.

Danjuma, Jbrin and Success (2012) investigated the effectiveness of monetary policy in combating inflation in Nigeria. Using the classical least squares technique, they found liquidity ratio and interest rate to be leading monetary policy instruments that can be used in combating inflation in Nigeria. The study concluded that due to unethical practices by commercial banks in Nigeria, cash reserve ratio, broad money and exchange rate have lost their potency as effective monetary policy instruments in Nigeria. Chimobi and Uche (2010) examined the relationship between money, inflation and output in Nigeria over the period of 1970 to 2010. Co-integration and granger-causality test were used to analyze the data. The co-integration analysis revealed a significant long-run relationship between the series used. The granger causality test indicated that money supply granger-caused both output and inflation, suggesting that inflation is caused by increase in money supply.

From the literature reviewed, we noted some gaps. It is evident from the reviewed literature that very few studies have been carried out in respect of the efficacy of monetary policy in combating inflation in Nigeria. The few existing ones such as Chimobi and Uche (2010) , Dania (2013), Maku and Adelowokan (2013), Iya and Aminu (2014) examined the determinants of inflation. Other scholars such as Danjuma, Jbrin and Success (2012) and Emmanuel (2020) that examined the effectiveness of monetary policy on inflation employed ordinary least squares in their analysis. This present study is one of the very few studies that examined the efficacy of monetary policy in combating inflation in Nigeria. Its contribution to knowledge is in the areas of methodology used, variables used, scope and findings. This study employed Autoregressive Distributed lag (ARDL) and conduct some diagnostic measures to make the results robust for policy analysis.

Methodology

This study employed Autoregressive Distributed Lag (ARDL) model developed by Pesaran, Shin and Smith (2010) to assess the effectiveness of monetary policy in combating inflation in Nigeria. The study used annual time series data on variables such as inflation rate, interest rate, monetary policy rate, exchange rate and government expenditure. The data were sourced from Central Bank of Nigeria Statistical Bulletin, 2019.

Model Specification

The model for the study was adopted from the work of Emmanuel (2020) but with modifications in areas of variables used and methodology employed. This scholar employed ordinary least squares technique (OLS) to evaluate the impact of monetary policy on inflation in Nigeria . As a point of departure this present study used ARDL and incorporated some key variables into the model in order

to make the results robust. For the purpose of this study, inflation rate was used as the dependent variable while the explanatory variables include interest rate, monetary policy rate, exchange rate and government expenditure.

The functional form of the model is specified as in Equation [3]

INFL=f(INTR,MPR,EXR,GEXP) ……...……[3]

The ARDL model specification of the above functional form is specified as in Equation [4]

$$\Delta lnINFL_t = \alpha_0 + \sum_{j=1}^{p} \alpha_1 \Delta lnINTR_{t-j} + \sum_{j=1}^{p} \alpha_2 \Delta lnMPR_{t-j} + \sum_{j=1}^{p} \alpha_3 \Delta lnEXR_{t-j} + \sum_{j=1}^{p} \alpha_4 \Delta lnGEXP_{t-j} + u_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [4]$$

where: INFL is inflation rate, INTR represents interest rate, MPR is monetary policy rate, EXR denotes exchange rate, and GEXP stands for government expenditure. α_0 is intercept term, α_1 –α_4 are the parameters to be estimated and U_i represents the stochastic error term. All the variables in Equation [4] are estimated in their natural log denoted by ln in the model.

4. Results and Discussion

4.1 **Trend Analysis**

The data on inflation rate in Nigeria is presented in graphical form to show its behavioral pattern. The result of the trend analysis of inflation rate in Nigeria from 1986 to 2019 is presented in figure 1 below:

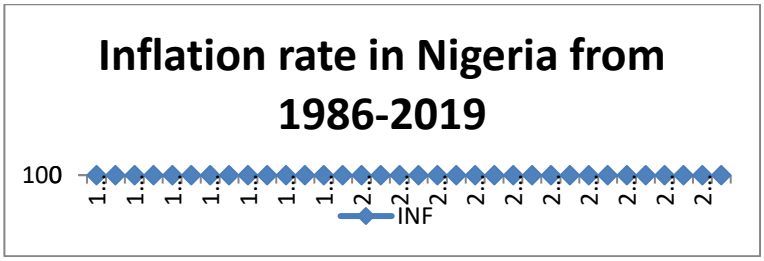

Figure 1: Stylized facts of inflation rate in Nigeria from 1986-2019
Source: Data from CBN Statistical Bulletin & Computation by Authors

Figure 1 shows the trend analysis of inflationary pressure in Nigeria within the study period 1986-2019. The trend analysis indicates that inflation rate in Nigeria was high during the late 1980s and early 1990s. It fell slightly in the late 1990s but revived in the late 2000s as a result of COVID-19 pandemic. The figure indicates that inflation rate in Nigeria stood at 5.4% in 1986 and rose to 10.2% in 1987 and 50% in 1989. It then dropped sharply to 7.5% in 1990 and rose to 13.0% in 1991. It further increased to 44.5% in 1992, 57.2% in 1993, 57% in 1994, 72.8% in 1995, 29.3% in 1996 and 6.6% in 1999. In 2000 inflation rate stood at 6.9% and increased to 18.9% in 2001, 14.0 % in 2003 and 17.9% in 2005. There was a sharp drop in the rate of inflation in 2014 to 8.1% but rises to 9.1% in 2015 with a sharp rise from 15.7 and 16.5% between 2016 and 2018 and fell marginally to 11.4% in 2019.

Test for Stationarity

The unit root test was conducted to determine the stationarity of the time series data. This is because estimating equation with non-stationary time series data is likely to produce spurious regression results. Therefore, to overcome such situation, this study employed the Augmented Dickey Fuller (ADF) unit root test to test for the stationarity of the time series data. The results of stationarity test are presented in table 2.

Table 2: Stationary test results

Table 1: Result of Stationarity Test for all Series

Variable	Levels		First Diff		Order of Integration
	ADF Stat.	5% Crit. Val.	ADF Stat.	5% Crit. Val.	
lnINFL	-4.391	-2.963	NA	NA	I(0)
$lnINTR$	-4.548	-2.963	NA	NA	I(0)
lnMPR	-0..837	-2.963	-6.100	-2.963	I(1)
$lnEXR$	-2.781	-2.967	-5.152	-2.967	I(1)
$lnGEXP$	-2.980	-2.967	NA	NA	I(0)

NA means Not Applicable
Source: Computed by the Authors (2021)

From the table above, inflation rate, interest rate, and government expenditure were stationary at level, that is I(0) while , monetary policy rate and exchange rate were stationary at first difference 1(1). Based on these results, we conclude that these variables have mixed order of integration, thereby lending support for the use of ARDL model for its analysis.

4.2 Bounds Test for Co-integration

To test whether there is a long run equilibrium relationship between the variables, the study employed bounds test. The results of the ARDL bounds test are presented in table 2.

Table 2. Results of the ARDL Bounds Test for Co-integration

Critical Bounds	5% level of Significance
Upper Bound	3.38
Lower Bound	2.39
F-Statistic	7.883854
F-Value	0.0000001
Decision:	**Co-integration exists**

Note: Upper bound and lower bound are obtained from Pesaran, Shin and Smith (2001)
Source: Computed by the Authors (2021)

The results of the analysis in table 2 indicate that the calculated F-statistic (7.883) is greater than the upper bound critical value of 3.38. Based on this result, we conclude that there is evidence of a long-run relationship among the variables in the model. Having established the co-integration relationship, we proceeded to estimate the ARDL model to show the short-run and the long- run dynamic effect.

Table 3: ARDL Long-run Estimation Results

Dependent variable is lnINFL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LnINTR	0.867312	0.150766	5.752686	0.0000
LnMPR	1.490260	0.699372	2.130856	0.0457
LnEXR	0.160767	0.063824	2.518908	0.0204
LnGEXP	0.153171	0.091051	1.682252	0.1073
C	61.466314	36.090667	1.703108	0.1026

R-squared	0.851847	F-statistic	10.45418
Adjusted R-squared	0.770364	Prob(F-statistic)	0.000005
Durbin-Watson sta	1.690787		

Source: Computed by the Authors (2021)

The long-run analysis in table 3 indicate that money supply exerts positive and significant effect on inflation rate . The coefficient of interest rate is 0.867312 with a probability value of 0.0000. This result implies that a unit increase in interest rate would bring about 0.86 unit increase in inflation rate. This result is in line with economic theory which argued that money supply influences inflation positively. The results of this analysis is also in agreement with the work of previous scholars such as Chimobi and Uche (2010) and Okwori and Abu (2017).

The coefficient of monetary policy rate is 1.490260 with a probability value of 0.0457, indicating that a unit increase in monetary policy rate will increase inflation rate by about 1.49 per cent. This means that monetary policy rate exerts positive and significant effect on inflation. The policy implication of this finding is that an increase in monetary policy rate will increase the cost of loanable funds which leads to fall in investment and consequently reduction in aggregate output. The reduction in aggregate output triggers-off inflation.

The results of the analysis also indicates that the relationship between exchange rate and inflation is positive and statistically significant at 5 per cent level as shown by the probability value of 0.0204. This result implies that an increase in exchange rate triggers-off inflation in Nigeria. This result is in line with the findings of Danjuma, Jibrin, and Blessing (2012). The coefficient of government expenditure is also found to be positively correlated with inflation in Nigeria, however the relationship is not statistically significant. The result indicates that for every one-unit increase in government expenditure, inflation rate will increase by about 0.22 per cent. This finding is in line with the findings of scholars such as Iya and Aminu (2014) who discovered a positive relationship between government expenditure and inflation rate in Nigeria.

The coefficient of determination (R-square) is 0.851847. This indicates a high explanatory power, meaning that about 85% systematic variation in the dependent variable is caused by changes in the explanatory variables, while the remaining 15% left unexplained is captured by the disturbance term (μ). This implies that , the regression model has a good fit. The F-statistic for the regression model is given as 10.454 with the corresponding probability value of 0.0000. This indicates that all the variables are jointly statistically significant at 5 per cent level. The Durbin-Watson statistic of 1.69 indicates absence of autocorrelation, thus it is robust for policy analysis.

Table 4: Dynamic Short-run Results

Dependent variable is *Ln(INFL)*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INTR(-1))	2.652676	0.558108	4.752978	0.0001
D(MPR(-1))	-0.049261	0.319418	-0.154221	0.8790
D(EXR(-1))	1.490260	0.699372	2.130856	0.0457
D(GEXP(-1))	0.081587	0.100622	0.810830	0.4261
ECM(-1)	-0.576110	0.105231	-5.474699	0.0000
R-squared	0.738128	F-statistic		16.02887
Adjusted R-squared	0.687768	Prob(F-statistic)		0.000005
Durbin-Watson stat	1.493559			

Source: Computed by the Authors (2021)

The results of the short-run dynamic effect in table 4 indicate that one year lag value of interest rate has positive and significant effect on inflation rate, implying that a unit increase in one year lag value of interest rate will bring about 2.65 unit increase in inflation rate. This finding is in line with studies conducted by Odumusor (2019) in Nigeria and Hossain (2017) in Malaysia. The implication of this finding is that for every unit increase in interest rate, inflation rate will also increase proportionally. This is in line with economic theory which postulates a direct and proportional relationship between interest rate and inflation. The result also indicates that the relationship between monetary policy rate and inflation is negative and statistically insignificant in the short-run. The

results further indicate that one year lag value of exchange rate has a positive and significant relationship with inflation rate, meaning that a unit increase in exchange rate will bring about 1.49 unit increase in inflation rate. The obtained result is in line with studies conducted by Nwachukwu. Dibie. and Ogudo (2014). The lagged value of government expenditure is also found to be positively correlated with inflation in Nigeria however the relationship is not statistically significant. This implies that for every one-unit increase in government expenditure, inflation rate will increase by about 0.081 per cent. The coefficient of the error correction term (ECM) is negative {-0.576110] and statistically significant, confirming the long run relationship among the variables. This indicates high speed of adjustment. It shows that about 57% of discrepancy in the previous year's shocks will converge back to the long-run equilibrium in the current year.

Post estimation test

Results of Serial Correlation Test

Test for autocorrelation was done using Breusch-Godfrey Serial Correlation LM test. The results are presented in table 6.

Table 6. Results of Breusch-Godfrey Serial Correlation LM test

F-statistic	0.319919	Prob. F(2,18)	0.7303
Obs*R-squared	1.098444	Prob. Chi-Square(2)	0.5774

Source: Computed by the Authors (2021)

The results of Breusch-Godfrey Lagrange Multiplier (LM) test for autocorrelation indicate that the F-statistic is given as (0.319) and observed R^2 (1.09) with probability values (0.73 and 0.57 respectively). These probability values are greater than 0.05. We therefore , conclude that there is absence of serial correlation.

Results of Normality Test

The Jarque-Bera normality test was carried out to ascertain the distribution of the residuals in the model using histogram-normality test. The results of the normality test are presented in figure 2.

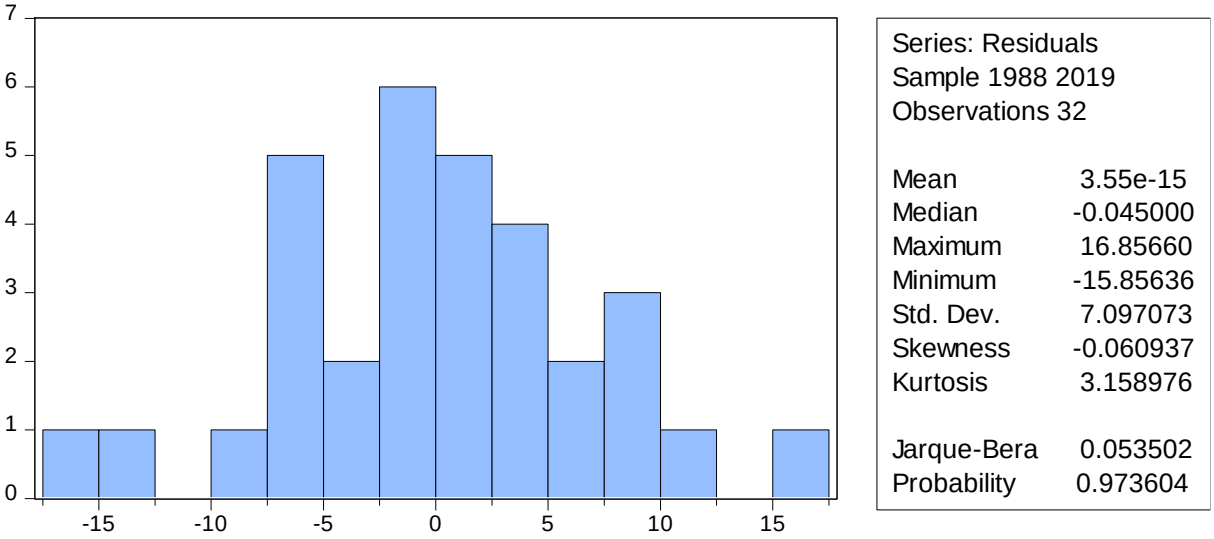

Figure 2**:**Results of Jacrque -Bera Normality Test

The result of the normality test shows a probability value of 0.973604 which is greater than 0.05. This result indicates that the residual is normally distributed.

Results of Stability Test

To determine the stability of the model, CUSUM and CUSUM of squares were used. The results of stability test are presented in figure 3a and 3b

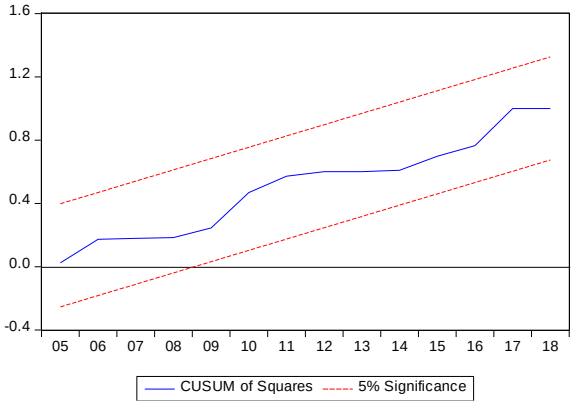

Figure 3a.Graph of CUSUM of Squares

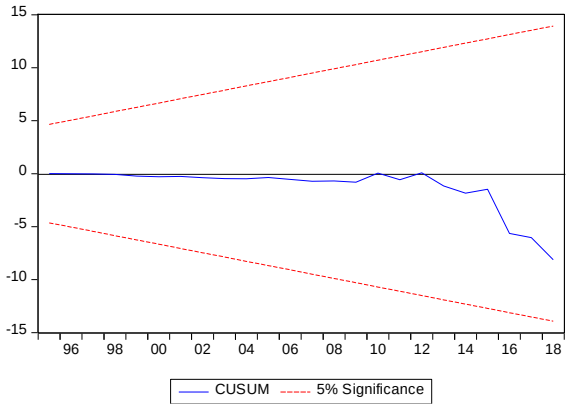

Figure 3b.Graph of CUSUM

From the analysis, both the graph of CUSUM and CUSUM of squares fall within the two critical bounds at 5 per cent level. We therefore conclude that the model passes the stability test.

Conclusion and Recommendations

This study assessed the effect of monetary policy on inflation in Nigeria using annual time series data for the period 1986-2019. The study employed autoregressive distributed lag approach (ARDL) for the analysis. The results of the analysis indicated that interest rate and exchange rate had positive and significant influence on inflation in Nigeria both in the short-run and long-run .However, monetary policy rate exerted positive and significant relationship with inflation in the short run but insignificant in the long-run. The study concluded that, while interest rate and exchange rate are very effective instruments in combating inflation both in the short-run and long-run, monetary policy rate was only significant in the short run and not long-run. The policy implication of the finding is that for every unit increase in interest rate , inflation rate will also increase proportionally, suggesting a direct and proportional relationship between interest rate and inflation. Based on the findings, the study recommended the following:

1. The Central Bank in collaboration with commercial banks should keep the interest rate at reasonable level in order to control inflation.
2. The Central Bank should maintain a robust and effective exchange rate regime in order to ensure exchange rate stability.
3. Government should also stimulate the productive capacity of the economy, especially the agricultural sector to increase aggregate supply of food products so as to reduce the rate of inflation.

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