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An Assessment of the Impact of Monetary Policy on General Price Stability in Nigeria

[1*]Onehi Damian Haruna, [1]Patrick K. Adigwe [2]Terungwa P. J. Jato

[1]Department of Banking and Finance, Faculty of Management Sciences, Nnamdi Azikiwe University, Awka.

[2]Department of Business Administration, Joseph Sarwuan Tarka University, Makurdi.

[*] Corresponding: onehiharuna2015@gmail.com

Abstract

This study examined the effect of monetary policy on price stability in Nigeria using a data-rich framework spanning from 1986-2020 with the interest in exploring which of monetary policy has been effective in propelling price stability and how inflation responds to the monetary policy implementation. The main problem with the macro-economic policies that prompted this study was the fact that despite the series of the CBN Monetary Policy Committee decisions there is apparently no useful effect on inflation (price stability). The study employed Auto-regression Distributed Lag (ARDL) Bound Test for Co-integration of data analysis and Error Correction Model (ECM) estimation. The ADF test revealed that, inflation (INF), exchange rate (EXR) and broad money supply (M_2) were stationary at first difference 1(1); while monetary policy rate (MPR) and real interest rate (RIR) were stationary at level 1(0). The results of the ARDL bounds revealed that the null hypothesis of no long-run relationship were all rejected implying that a long-run effect exists among monetary policy variables and price stability. ECM coefficient of -0.0151 conforms with expectation. Durbin-Watson statistic of 2.2381 revealed that the model seems not to have any case of autocorrelation. The result of our analysis shows that EXR, M_2, and MPR have negative and insignificant on price stability, while RIR has negative and significant on price stability. The study concluded that monetary policy in Nigeria is does has insignificant impact on general piece stability. We, therefore, recommended that, for monetary policy to be more effective in ensuring price stability in Nigeria, the Central Bank of Nigeria should promote policies for greater financial inclusion.

INTRODUCTION

The Nigerian economy has been classified as one of the most unstable economies in the world greatly due to its high dependence on oil revenue and on foreign economies. Economic instability is witnessed yearly through rising inflation, massive unemployment, low output and dwindling foreign reserves. This results to unstable exchange rates especially during periods of continues oil price fall and continuous contract of Nigeria's GDP with adverse effect on either unemployment or

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underemployment. During such periods, the goal of monetary policy strategy is aimed at ensuring that markets remain confident in the solvency of the policy account.

The primary objective of monetary policy is the achievement of price stability (Sanusi, 2012). This include stability in the price of naira in relation to other currencies (i.e., exchange rate, which could be nominal or real effective), price of capital/reward for accumulating financial asset (i.e., interest rate which could be deposit or lending rate) or the price of goods and services in the country (i.e., general price level, which could be core or non-core inflation). Whichever price the CBN seeks to stabilize, there is no doubt, monetary policy is employed to limit the growth of money supply to a level that is consistent with the desired level of output and prices. However, there seems to be no unanimity among economists as regards to the impact of monetary policy on these prices as well as how they respond to innovations in monetary policy over time (Soludo, 2009).

Inflation is very difficult to tackle largely because any meaningful attempt to curb it entails a trade-off among other important macroeconomic and social safety nets in the short run (Abubakar, 2012). As a monetary phenomenon, inflation cannot be sustained without accommodating increase in monetary supply but if money supply rises beyond the absorptive capacity of the economy, domestic prices will increase (Soludo, 2009). Happenings such as the decision of the CBN to tighten its monetary policy, austerity measures, and the devaluation of the Naira has contributed to imported inflation trends in the country (Chinweoke 2014). Also, increased pre-election and election campaign spending do flood the market with a systematic liquidity that has increased the supply of money in circulation. This increase in the supply of money naturally do give birth to inflation in line with regular dynamics of how demand and supply influence the price of goods and services. Other factors include fiscal largesse of government excessive deficit financing beyond outputs create inflationary gap. The combination of liquidity surprises with the ability of the federal government to finance large budget deficit by borrowing freely from the CBN at below market-clearing interest rates has severely impaired the CBN in its conduct of short-run and long run strategy during the past decades has indeed been a major driver of of the unstable evolution of inflation since 1980 (Emefiele, 2018).

An analysis of external and fiscal dominance in the Nigerian economy shows that government pursuit of low inflation rate (prices stability) in the last twenty years or so has not achieved any measure of

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success and that none of the applied strategies has been effective enough. The CBN, it seems, have been adopting a long-term to stabilize prices but this has not yielded the needed results (Shuaib, Ekeria & Ogendegbe, 2015). Thus, despite all the measures, the real effect of monetary policy on the economy, via price stability, seems not to be clear. This is why this research work has been primarily focused to examine the effect of monetary policy on price stability in Nigeria.

2. REVIEW OF RELATED LITERATURE

2.1 Theoretical Framework

The theory on which the study is anchored is the famous quantity theory of money propounded by Fisher in 1911; which in in its simplest form posits that changes in the stock of money supply will be translated into equi-proportionate change in the general price level. This is based on the assumption that at full employment, the level of transaction (national output) and velocity money in circulation is constant or at least change slowly. Thus, implying that, price levels will be directly proportionate with the quantity of money stock. That is, there is a direct proportional relationship between the general price level and the growth rate of money supply, where velocity and output are constant. The proportionality relationships imply that a permanent increase in money growth leads to an equal increase in the general price level. An increase in money supply leads to an increase in price level, the rate of interest, and the level of real economic activity remain unaffected, when the economy is always full employment.

2.2 Empirical Review

Price instability is one of the most important economic ills that distorts economic activities of any country. Empirical works on the relationship between monetary policy measure and price stability have yielded conflicting results. Few of these researches are considered relevant to this work, hence reviewed here under. Adigwe, Echekoba & Justus (2015) are among those whose study revealed that the adoption of various monetary policy measures by the CBN has no significant impact on the inflation rate in the country. To them, the problem of inflation in Nigeria is not a monetary phenomenon but is rather attributed to the structural rigidity in the country. Chinedu (2014) found a partial impact of monetary policy on inflation with exchange rate found not to have statistical significance in explaining variation in inflation. Idoko, Seyi and Rotimi (2017) examines the monetary policy and price stability

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in Nigeria. From the findings, they discovered that, money supply has no significant relationship with price level in Nigeria. This, they believe may be due to influence of the large informal financial sector which control a very significant fraction of money in circulation. Kromtit (2019) examines the effectiveness of monetary policy in controlling inflation. The findings showed that monetary policy rate has an insignificant positive impact on inflation; and broad money supply impacted negatively on inflation. This signified that monetary policy is not effective in stabilizing prices in Nigeria. Ejire (2020), in his study, found that monetary policy rate, treasury rate and cash reserve ratio, have in-significant impact on price stability expressed in terms of inflation.

While exploring the effectiveness of monetary policy in controlling inflation, Ngerebo (2016) found that monetary policy rate, maximum lending rate, prime lending rate, net domestic credit and treasury bill rate were not statistically significant, while growth of the broad money supply, credit to private sector, growth of narrow money supply, and savings rate were statistically significant in explaining inflation in Nigeria. Findings also indicate that some monetary policy instruments in Nigeria are effective while others are not effective in managing inflation.

Among the studies that found monetary policy as being viable in stabilizing prices is that by Folorunsho and Abiola (2000). They examined the long-run determination of inflation in Nigeria between 1970 and 1998. Their result revealed that inflation in Nigeria could be caused by the level of income, money supply and public sector balance. The results also indicated that in the long-run, exchange rate, money supply, income and fiscal balance determine the inflation spiral in Nigeria. Ahmed and Ibitoye (2016) also examined the impact of monetary policy on price stability in Nigeria from 1970-2014 and found that that exchange rate and money supply actually influenced price stability in Nigeria both in the short-run and long-run. Equally, Sulaiman (2015) found from his study, which examined the effect of Nigeria monetary policy on price stability from 1981-2012, that monetary policy has played prominent role in ensuring price stability in Nigeria. Treasury bill rate (TBR), interest rate, exchange rate, and liquidity ratio were found to be significant factors in tackling price instability. The study by Abubakar (2012) discovered that of inflation, interest rate, and exchange rate respond to changes in monetary policy (captured by MPR). Cheng (2007) examined the impact of a monetary policy shock on output, prices and the nominal effective exchange rate for Kenya using quarterly data from 1997-2005 with economic

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variables: real GDP and prices, money stock, short-term interest rates and the nominal effective exchange rate. Based on the vector auto-regression technique, the main results suggested that an exogenous increase in the short-term interest rate tends to be followed by a decline in prices and appreciation in the nominal exchange rate, but had insignificant impact on output. His key finding showed that, variation in the short-term interest rates accounted for significant fluctuations in the nominal exchange rate and prices, while accounting little for output fluctuation. The study by Iyaji et al. (2012) investigated the effectiveness of monetary policy in combating inflation in Nigeria. Using the classical least square technique. They found liquidity ratio and interest rate to be leading monetary policy instruments that can be used in combating inflation in Nigeria. They however, claimed that, due to unethical practices by commercial banks in Nigeria, cash reserve ratio, broad money and exchange rate has lost their potency as effective monetary policy instruments in Nigeria.

3. METHOD

3.1 Research Design

The study adopts the ex-post facto research method, a commonly used and ideal method in business and social sciences research. It is mostly used where variables are drawn from already concluded events and there is no possibility for data manipulation. For this study too, the observed effect of monetary policy on price stability in Nigeria have already taken place and the reported figures not susceptible to manipulation.

3.2 Model Specifications

The model adopted is similar to that used by Bodunrin (2016), Abubakar (2012) Yakubu, Barfour and Shehu (2013) Akinjaru, Babajide and Okafor (2016), Ajisafe and Folorunso (2002), Adigweetal (2015), and Ezinne (2020). The slight difference is the removal of variables of cash reserve rates, surplus/deficit budget, handling rate, and deposit rate, which some of them had included in their model; and the inclusion of interest rate, which none of them had.

The modified model, which follows the Classical Linear Regression Model (CLRM) is as stated below:

$$INF = f(M_2, MPR, IR, EXR) \quad (1)$$

Explicitly, the relation is given as:

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$$INF = \alpha + \beta_1 M_2 + \beta_2 MPR + \beta_3 IR + \beta_4 EXR_t + u \quad (2)$$

where the variables are as explained below with α as intercept and β_1, β_2, β_3, and β_4 as coefficients of predictors of monetary policy.

Table 1: The study variables, acronyms, measurements, and sources of data

Variable	Acronyms	Measurement	Source
Dependent			
Inflation Rate	INF	This is captured by the rate of change in the basic consumer price index (CPI) as measured by the CBN. it represents a key projector of the level of price stability.	CBN (2020)
Independent			
Monetary Policy Rate	MPR	This is captured as the rate by which the monetary authority, typically the CBN or Currency Board, controls either the cost of very short-term borrowing or the monetary base.	CBN (2020)
Money Supply	M_2	This captures the total money in circulation (CIC) in the economy	CBN (2020)
Interest Rate	IR	This is captured as the price paid for borrowing money for a period of time	CBN (2020)
Exchange Rate	EXR	This is captured as the rate by which foreign currencies are converted by the domestic currency	CBN (2020)

Source: Authors' construction

3.3 Method of Data Analysis

A triangulation of techniques of analysis were employed. The multiple regression analysis was adopted to find the relationship between monetary policy and price stability (inflation, as proxy by consumer price index). The Unit Root Test (using the Augmented Dickey and Fuller (ADF) test developed by Augmented Dickey and Fuller 1981) and Co-integration Test (using Bounds Tests) were performed as pre-tests, while the Vector Error Correction Model (VECM), Lag Length Criteria Test, Impulse Response Test and Variable Decomposition (VDF) and Granger Causality Test were the main tests.

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The bounds testing approach involves estimating the following equation as postulated by Nwachukwu, Adebayo, Shettima, Anigwe and Udechukwu-Peterclaver (2016):

$$\Delta lnINF_t = \emptyset_0 + \emptyset_1 lnINF_t + \emptyset_2 lnM2_t + \emptyset_3 lnMPR_t + \emptyset_4 lnIR_t + \emptyset_5 lnEXR_t + \sum_{i=1}^{n} \beta_1 LNCPI_{t-i} + \sum_{i=1}^{n} \beta_2 M2_{t-i} + \sum_{i=1}^{n} \beta_3 MPR_{t-i} + \sum_{i=1}^{n} \beta_4 RIR_{t-i} + \sum_{i=1}^{n} \beta_5 EXR_{t-i} + +\mu_t \quad (3)$$

After estimating obtaining the presence of long-run relationship from (3), Pesaran, Shin and Smith (2001) advocated that we obtain the short-run dynamic parameters by estimating an ARDL error correction model associated with the long-run estimates. This is specified as follows:

$$\Delta lnINF_t = \emptyset_0 + \sum_{i=1}^{n} \beta_1 lnINF_{t-1} + \sum_{i=1}^{n} \beta_2 lnM2_{t-i} + \sum_{i=1}^{n} \beta_3 lnMPR_{t-i} + \sum_{i=1}^{n} \beta_4 lnIR_{t-i} + \sum_{i=1}^{n} \beta_5 lnEXR_{t-i} + \omega ECT + \mu_t \quad (4)$$

where, *ECT is* error correction term derived from equation, and *ω* is the speed of adjustment.

Post estimation tests included Jarque-Bera (JB) test of normality, Durbin-Watson test for serial correlation, and the homoscedasticity test.

4. RESULTS AND DISCUSSION

4.1 Data Presentation

This section presents the estimation results and the analysis of the equations specified in the previous one.

4.1.1 Descriptive Statistics

From Table 2, all the variables have the same numbers of observations, 34. This gives a balanced nature of the time series data used in the analysis. Additionally, the information in the table shows that the

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means of INF was 70.378, EXR 112.446, M_2 was N20.060 billion, MPR was 13.765%, and RIR was 2.464%.

Table 2: Descriptive statistics

	CPI	EXR	M_2	MPR	IR
Mean	0.378	112.446	20.060	13.765	2.464
Median	42.505	119.768	18.833	13.500	5.104
Maximum	267.512	361.518	44.075	26.000	18.180
Minimum	0.869	2.021	9.184	6.000	(31.453)
Std. Dev.	74.123	102.014	7.734	3.836	10.236
Skewness	1.150	1.004	1.230	0.722	(1.155)
Kurtosis	3.385	3.544	4.731	4.897	4.913
Jarque-Bera	7.701	6.126	12.821	8.053	12.746
Probability	0.021	0.047	0.002	0.018	0.002
Sum	2,392.836	3,823.176	682.043	468.000	83.778
Sum Sq. Dev.	181,309.600	343,424.000	1,974.043	485.618	3,457.701
Observations	34	34	34	34	34

Source: Authors' computation using EViews

The standard deviation information implies that exchange, with standard deviation of 102.014, exhibited more volatility than all the other variables included in the study.

4.1.2 Trend Analysis of the Variables of the Study

The trend analysis between inflation and exchange rate (see figure 1) reveals that there is a positive relationship existing between the series. The positive relationship means that we should expect a positive coefficient in the model that will be estimated.

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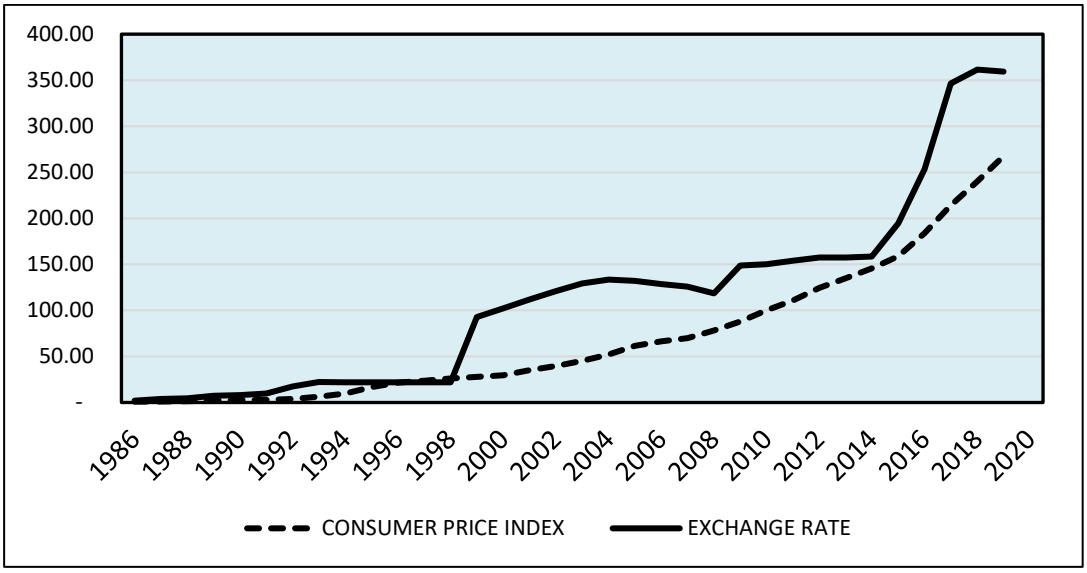
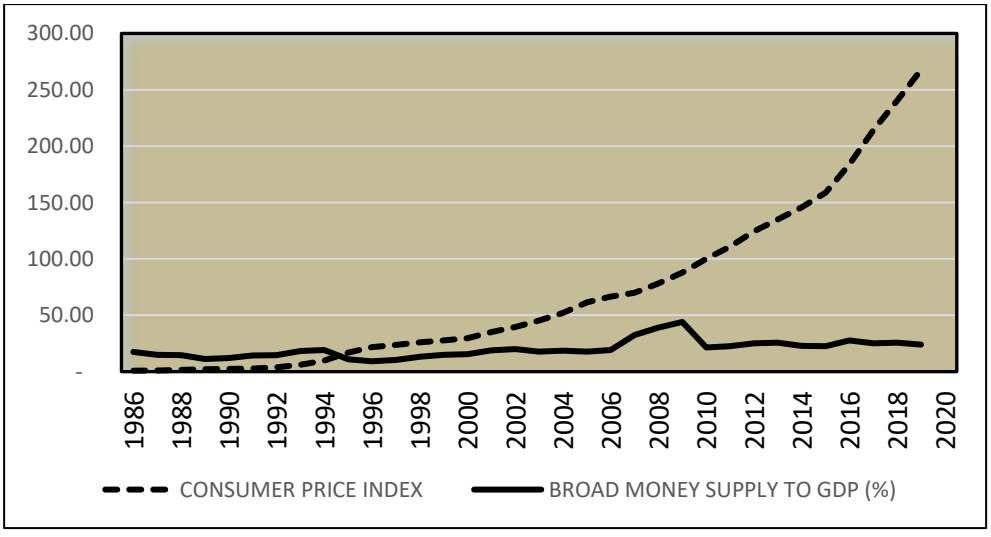


Source: *Authors' computation using EViews*

Figure 1: *Trend Analysis between Exchange rate and consumer price index*

From figure 2, the trend analysis between inflation and money supply depicts a negative relationship existing between the series. The negative relationship is more pronounced between 1986 and 2006, after which the relationship became asymmetric.



Source: *Authors' computation using EViews*

Figure 2: *Trend Analysis between money supply and consumer price index*

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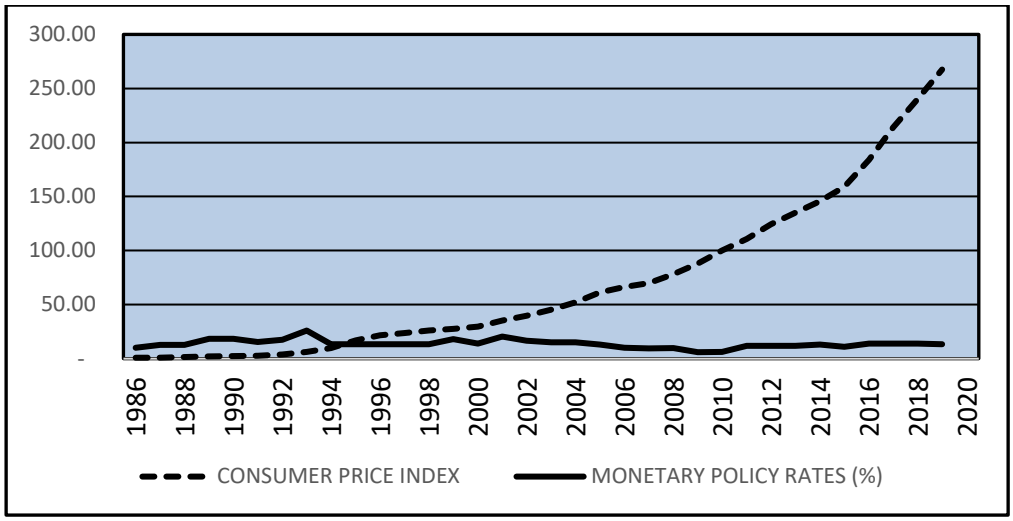
In terms of inflation and monetary policy rate, the trend analysis in figure 3 revealed that there is fair negative relationship existing between the series. The negative relationship infers a negative coefficient in the model to be estimated.



Source: *Authors' computation using EViews*

Figure 3: *Trend Analysis between monetary policy rate and consumer price index*

The trend analysis between consumer price index and real interest rate revealed that there is fair negative relationship existing between the series. This negative relationship means that a negative coefficient in the model to be estimated should expect.

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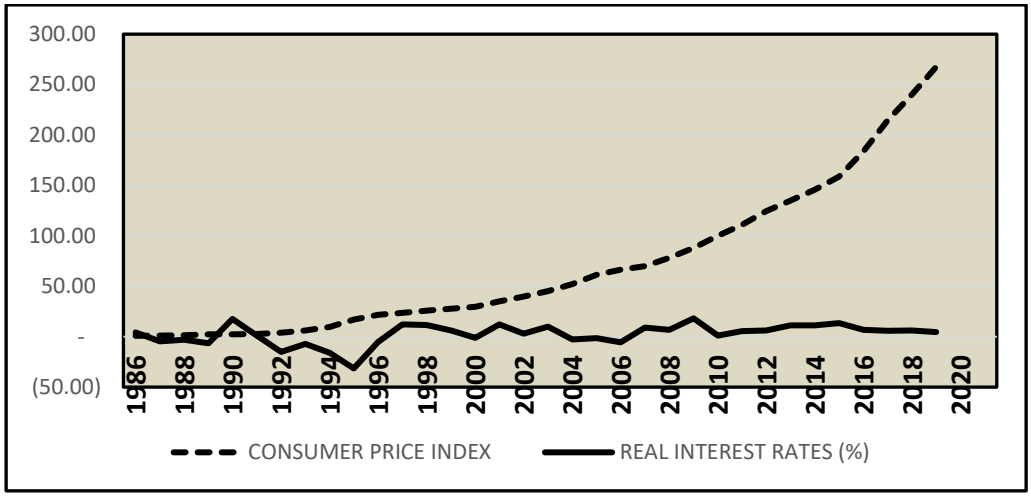

Source: *Authors' computation using EViews*

Figure 4: *Trend Analysis between interest rate and consumer price index*

4.2 Data Analysis

Diagnostic analysis of the data were executed using unit root tests, ARDL Bounds Test for Cointegration, ARDL Long-Run and short-run ECM Model Estimation.

4.2.1 Unit Root Tests

The ADF unit root test results at levels (see Table 3) led to the rejected the null hypothesis of the presence of unit root at levels for real interest rates and monetary policy rate, because absolute test statistic was greater than absolute critical value at 5%. Thus, RIR and MPR were integrated of order zero [$I(0)$]. On the other hand, the ADF test fails to reject the null hypothesis of no unit root for Inflation (INF), Exchange Rate (EXR), and Broad Money (M2). However, these were stationary when the test was conducted at first difference, making them integrated of order one, [$I(1)$].

Table 3: Stationarity Tests at Levels and First Difference

Variables	ADF Tests: Levels	ADF Tests First Difference

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	Absolute Test Statistic with intercept	Absolute Critical Values @ 5%	Order of Integration	Absolute Test Statistic with intercept	Absolute Critical Values @ 5%	Order of Integration
INF	0.64677	2.97185	-	3.46835	2.95711	I(1)
EXR	2.41872	2.95113	-	3.58798	2.95402	I(1)
M2	1.00898	2.95402	-	4.59426	2.95711	I(1)
MPR	3.22269	2.95113	I(0)	-	-	I(0)
RIR	3.48697	2.95402	I(0)	-	-	I(0)

Source: *Authors' computation using EViews*

It has been established by Pesaran, Shin and Smith (2001) that the bounds technique allows a mixture of I(1) and I(0) variables as regressors. Based on this ground, we proceed to perform the ARDL bounds test for cointegration.

4.2.2 ARDL Bounds Test for Cointegration

The Wald test (*F*-statistic) was conduct to ascertain the presence or otherwise of long-run relationship between the variables. The decision is based on if the computed *F*-statistic is smaller than the lower bound value, then the null hypothesis is not rejected and the conclusion is that there is no long-run relationship between the variable. Conversely, if the computed *F*-statistic is greater than the upper bound value, then the variables share a long-run level relationship. But, if the computed *F*-statistic falls between the lower and upper bound values, then the results are inconclusive.

The Bounds test of ARDL presented in Table 4 shows the presence of cointegration (long-run relationship) among the variables. It can be inferred from the results in the table, that all the values of the computed F-statistic are clearly above upper bounds levels at the critical values of 5% significance levels. The null hypothesis was all rejected, implying that a long-run relationship does exist among monetary policy variables and price stability variables.

Table 4: Results of ARDL Bounds Test for Cointegration

Model Specification	F-statistic	5% Upper Bound Value	Decision
Monetary Policy Model	14.24401	4.01	Reject H0

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Source: *Authors' computation using EViews*

4.2.3 ARDL Long-Run Model Estimation

Based on the existence of long-run cointegrating relationship, the coefficients of the ARDL long-run relationship between monetary policy and consumer price index, (i.e., broad money supply and and consumer price index, monetary policy rates and consumer price index, real interest rates and consumer price index, exchange rate and consumer price index) was estimated. With regards to the lag specification of the ARDL model, the ARDL modelling procedure has Akaike model selection selected as default.

On the basis of the lag specification of the ARDL model, the study estimated the long-run coefficients of the ARDL(3, 0, 1, 2, 0)selected based on the ARDL-Akaike Information Criterion. The lagged result of our long-run relationship monetary policy variables and consumer price index is given as shown in Table 5.

Table 5: Estimates of the Long-run ARDL relationship between Monetary Policy and Consumer Price Index

Dependent Variable: LNCPI				
Method: ARDL				
Selected Model: ARDL(3, 0, 1, 2, 0)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.***
lnCPI(-1)	1.4425	0.1125	12.8165	0.0000
lnCPI(-2)	-0.6641	0.1856	-3.5779	0.0019
lnCPI(-3)	0.2066	0.0972	2.1253	0.0462
lnEXR	-0.0004	0.0002	-1.9484	0.0655
lnM2	0.0067	0.0042	1.5815	0.1295
lnM2(-1)	0.0055	0.0042	1.3168	0.2028
lnMPR	0.0045	0.0033	1.3531	0.1911
lnMPR(-1)	-0.0026	0.0029	-0.8908	0.3836
lnMPR(-2)	0.0103	0.0035	2.9312	0.0083
lnRIR	-0.0056	0.0012	-4.4967	0.0002
C	-0.1398	0.1073	-1.3033	0.2073
Adjusted R-squared	**0.9989**			
Durbin-Watson stat	**2.2381**			
Prob(F-statistic)	**0.0000**			

Source: Authors' computation using EViews

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The model estimates of the ARDL long-run relationship between monetary policy variables and inflation (see Table 5) presents some interesting statistical significance of some variables. The result indicates that exchange rates and monetary policy rates have negative relationships with price stability in Nigeria. This is evident from their respective coefficient values. Although the instant impact of exchange rate policy and monetary policy rate on price stability is not statistically significant (p-values: 0.0655 > 0.05; p-values: 0.1911 > 0.05), but the lag impact of monetary policy rate is statistically significant (p-values: 0.0083 < 0.05). When the lag impact of monetary policy rate becomes significant, the impact becomes positive. This means that increases in previous monetary policy rate lead to future increases in price stability.

On the contrary, with a coefficient of -0.0056 and p-values of 0.0002, real interest rate has significant instant negative relationship with price stability in Nigeria. This means that consumer prices react instantly to real interest rates.

4.2.4 Short-Run and Error Correction Model Estimation

After the confirmation of the long-run relationship, we went ahead to estimate the confirmation of the error correction term, which must be smaller than unity in absolute term and should be negative and statistically significant. This means that divergence from the long-run equilibrium is corrected in the short-run, depending on the speed of adjustment.

From the bounds test conducted, all of the results indicated a long-run or cointegrated relationship between the variables. Based on the ARDL error correction model (ECM) (see equation 4) for estimating the short-run relationship between monetary policy variables and consumer price index, the parsimonious model estimates of this short-run relationship are presented in Table 6.

Table 4.9: Short-run and Error Correction ARDL relationship between Monetary Policy Variables and Consumer Price Index

ARDL Error Correction Regression				
Dependent Variable: D(LNCPI)				
Selected Model: ARDL(3, 0, 1, 2, 0)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-0.1398	0.0269	-5.1996	0.0000
D(lnCPI(-1))	0.4576	0.0930	4.9217	0.0001

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D(lnCPI(-2))	-0.2066	0.0795	-2.5987	0.0172
D(inM2)	0.0067	0.0036	1.8713	0.0760
D(lnMPR)	0.0045	0.0025	1.7656	0.0927
D(lnMPR(-1))	-0.0103	0.0023	-4.5295	0.0002
ECT(-1)*	-0.0151	0.0016	-9.2447	0.0000
R-squared	**0.9206**			
Adjusted R-squared	**0.9007**			
Durbin-Watson stat	**2.2381**			
Prob(F-statistic)	**0.0000**			

Source: Authors' computation using EViews

The adjusted R-squared of 0.9007 is indicates that about 90.07% of short-run variations in consumer price index were explained by variations in money supply and monetary policy rates with its lag and the Error Correction Term (ECT). The coefficient of -0.0151 meets the theoretical expectation, meaning a unit change in the monetary policy variables cause a speed of adjustment of 1.51% back to the equilibrium with the consumer price index. The probability value of the F-statistic (0.0000) shows that the F-value is also statistically significant, suggesting that all the variables have collective significant impact on consumer price index. The Durbin-Watson statistic of 2.2381 showed that the model seems not to have any severe case of first order autocorrelation.

4.2.5 Post-Analysis and Residual Diagnostic Tests

To ensure the validity of the estimates of the parsimonious models above, tests to verify the extent of the violations of the assumptions of Ordinary Least Squares estimates were carried out. They include the Breusch-Godfrey Serial Correlation LM, Heteroscedasticity and Jarque-Bera Normality tests.

I. Serial Correlation CM Test

The Breusch-Godfrey Serial Correlation LM test was conducted. The decision is that, if the residuals are serially correlated, the F-statistic will not be significant, meaning that the *p*-value of the F-statistic will be bigger than 0.05, hence no serial correlation; otherwise, serial correlation exists.

Table 6: Breusch-Godfrey Serial Correlation LM Tests

	Prob. F	Prob. Chi-Square	Remark
Monetary Policy Model	0.3301	0.1660	No Autocorrelation

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Source: Authors' computation using EViews

Given that the *p*-value is considerably in excess of 0.05, we conclude that there is no statistical evidence of serial correlation in the model involving Monetary Policy Variables and Consumer Price Index variables. This makes the results have valid implications.

II. Heteroskedasticity Test

The Breusch-Pagan-Godfrey Tests for non-constant variance of errors of a series (*heteroskedastic*) was performed with both the *F* and χ^2 versions of the test statistic leading to the same conclusion that there is no evidence for the presence of heteroscedasticity.

Table 7: Heteroskedasticity Tests: Breusch-Pagan-Godfrey Tests

	Prob. F	Prob. Chi-Square	Remark
Monetary Policy Model	0.2265	0.2198	Homoskedastic Distribution

Source: Authors' computation using EViews

The conclusion is premised on the fact that the *p*-value of the F-statistic and Chi-square are greater than 0.05 as evident from Table 7.

III. Jarque-Bera Normality Test

One of the most commonly applied tests for normality, the Jarque-Bera (JB) test, was used to test for the property of normal distribution of the random variables of the study. The decision criterion is anchored on the premise that for a distribution to be normally distributed, the *p*-value should be bigger than 0.05 to not reject the null of normality at the 5% level.

Table 8: Jarque-Bera Tests

	Prob.	Remark
Monetary Policy Model	0.7005	Normally Distributed

Source: Authors' computation using EViews

The results obtained, as summarized in Table 8, show that the *p*-value of the Jarque-Bera statistics is greater than 0.05. We, thus, concluded that the variables of monetary policy and consumer price index are normally distributed and fit for the analyses they have been subjected to.

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IV. Model Stability Test

In testing the stability of the long-run coefficients alone with the short-run dynamics, the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) are applied. A graphical illustration of CUSUM and CUSUMSQ for the model is exposed in Figures 1.

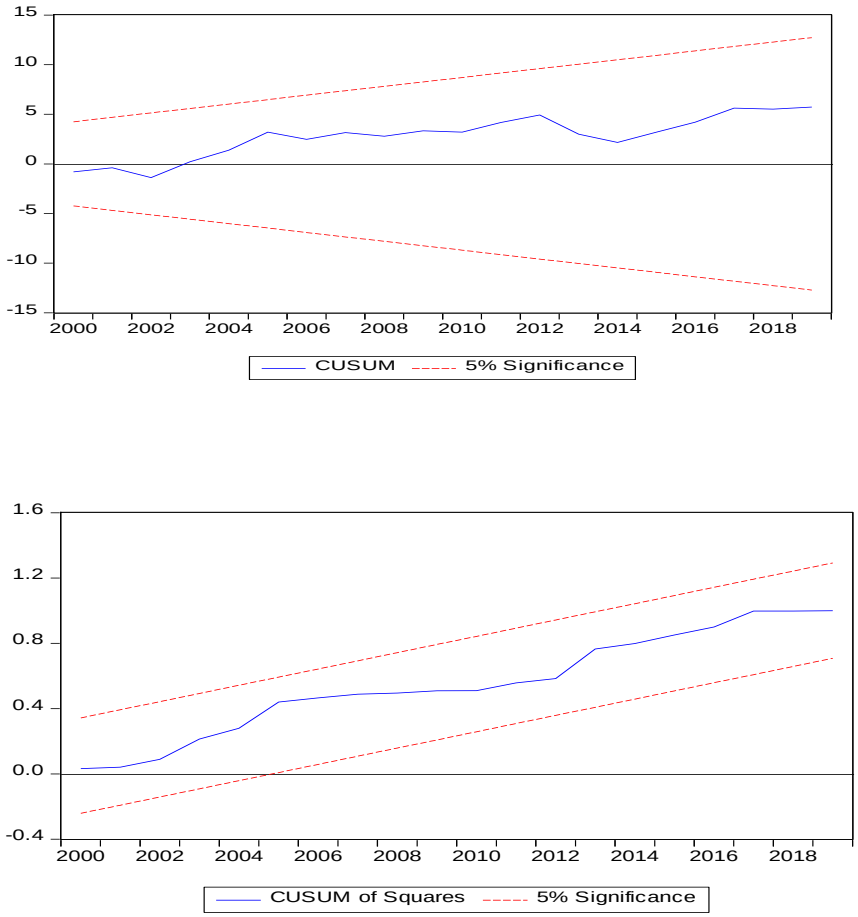

Figure 1: CUSUM and CUSUMSQ for the monetary policy model

A graphical illustration of CUSUM and CUSUMSQ is depicted in Figures 1. The plots of both the CUSUM and the CUSUMSQ are within the 5% boundaries, and, hence these statistics prove the stability of the long-run coefficients of monetary policy variables have an effect on price stability in Nigeria. The model appears to best able and properly specified given that none of the two tests statistics went outside the bounds of the 5 percent level of significance.

4.3 Discussion

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i. Effects of exchange rate on price stability

The impact of exchange rate on price stability is negative and insignificant. The findings of this study are partially in agreement with the works of Chinedu (2014). One of the most serious challenges facing the Nigerian economy is inflationary pressure coupled with exchange rate volatility. In Nigeria, the Central Bank is saddled with the responsibility of maintaining stable exchange rate and price stability in the economy and, this is done by ensuring that the rate of inflation is kept within a certain bound. Since Nigeria is highly dependent on imports and imports exerts deterioration on the exchange rate in Nigeria, the negative impact of exchange rate on inflation in Nigeria can be attributed to the position that import has a negative effect on inflation in Nigeria. This negative coefficient is an indication that Nigeria is an import dependent economy, suggesting that excessive importation of goods is inimical to the growth prospect of the economy while at the same time fueling inflation into the economy.

ii. Effects of money supply on price stability

It was found from our empirical results that there is a negative and insignificant impact of money supply on price stability that money supply has varying impact on price stability in Nigeria. In all, money supply has insignificant impact on price stability in Nigeria. This finding is in consonant with the findings of Idoko, Seyi and Rotimi (2017), while in variance with Folorunsho and Abiola (2000) and Iyaji et al. (2012). The diminishing strength of the relationship between money and prices may be explained in part by recent developments in the Nigerian financial system. New products and asset classes are seemingly starting to affect the demand for both money and traditional asset classes. This is not unexpected judging by the experiences of other countries like Australia and USA as noted in the review of literature.

It needs to be stressed, however, that the absence of a statistically significant relationship in the second sub-sample (1986-2012) does not imply a disconnect between money and prices, giving the long-run equilibrium relationship between them. Rather, it points to some underlying dynamics and complexities arising from recent developments in the economy such as the expansion of e-money and financial products and assets. In which case, the developments have to be seen as transitory or temporary. The key policy implication of the findings is that the CBN should continue to factor growth in monetary

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aggregates in its monetary policy considerations aimed at achieving price stability while keeping a keen eye on financial innovations and their impact on money supply.

iii. Effects of Real interest rate on price stability

The impact of real interest rate on price stability has turned out as negative and significant. The findings of this study are partially in agreement with the works like those of Abubakar (2012), Sulaiman (2015), Ahmed and Ibitoye (2016) and others who found a significant relationship between interest as a tool of monetary policy on price stability; and against the findings of Ndidi (2013), Kromtit (2019), and Ejire (2020) who on the contrary found interest rate, together with trade openness, income level, exchange rate, having no significant on price changes in the long run. This seems to justify the position that targeting monetary aggregates becomes less and less fashionable and the growing instability of money demand functions could be the main reason for this. However, the negative relationship is as postulated by theory from the Fisher Effect that "*the real interest rate equals the nominal interest rate minus the expected inflation rate*". Therefore, real interest rates fall as inflation increases, unless nominal rates increase at the same rate as inflation.

iv. Effects of monetary policy rate on price stability

In terms of monetary policy rate, our empirical results revealed that, monetary policy rate has a negative and insignificant impact on price stability. This finding agrees with Ngerebo (2016) who maintained this monetary policy rate does not have sufficient statistical evidence to exert significant impact on price stability in Nigeria. Kromtit (2019) also found no evidence to confirm that monetary policy rate is not effective in stabilizing prices in Nigeria. This could be due to the large number of the non-bank public in the country, or the unfashionable posture of monetary targeting aggregates of central banks.

5. CONCLUSION AND RECOMMENDATION

This study analyzed the impact of monetary policy on price stability and found that monetary policy is viable policy tools that can stimulate economic activities, through lowering inflation (measured in terms of consumer price index). Monetary policy variables comprise: Broad Money (M_2), Monetary Policy Rate (MPR), Real Interest Rate (RIR), and Exchange Rate (EXR). Autoregressive Distributed Lag technique was employed to estimate the model after conducting the unit root test and ARDL Bounds test. Result from our ARDL model estimation revealed that only interest rate had a significant

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impact on price stability, though a negative one. The study concluded that monetary policy in Nigeria is does has insignificant impact on general piece stability. This shows a weak policy targeting in Nigeria, especially where monetary policy is still being relied up as a measure of economic repositioning in the face of many economic perturbations.

Based on our findings, it is recommended that, to ensure optimal price stability in Nigeria, monetary policy can be more effective if the Central Bank of Nigeria should promote policies for greater financial inclusion.

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