# A Test of the Monetary Theory of Inflation: An Experiment with Nigerian Data

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## ABSTRACT

The study empirically investigated the monetary theory of inflation using Nigerian data from 1980 to 2022. Annual data on the inflation rate, monetary policy rate, exchange rate, interest rate, and money supply were sourced from the Central Bank of Nigeria (CBN), the Nigeria Bureau of Statistics (NBS) and the World Development Indicators (WDI). The study regressed inflation rate as the dependent variable on the monetary policy rate, exchange rate, interest rate and money supply as the independent variables using the Autoregressive Distributed Lag (ARDL) model. The findings revealed that monetary policy rate, exchange rate, interest rate and money supply (Monetary Policy) were not statistically significant in influencing inflation in Nigeria. The study found that the first inflation lag was statistically significant at the one per cent level. The finding implies that inflation expectations cause inflation in Nigeria. The study recommends that the Nigerian government should formulate and implement other economic policies along with the monetary policy to control prices to reduce inflation in Nigeria

**Keywords:** Inflation, Monetary Policy, ARDL, Nigeria,

## INTRODUCTION

For many years, price increase was seen to be the result of an increase in money supply, this is an assumption that is made without exception and thorough empirical tests even though countries differ in the level of their economic growth, as well as level of operations (Danlami, 2019; Danlami, Hidthiir, & Hassan, 2018). Developed economies differ greatly from developing economies in policymaking and economic performance. Developed economies, for example, enjoy the advantages that come with price stability, whereas developing economies are held backward by fluctuations in prices. The instability of the general price level has been the major problem in many countries, such that the inability of many economies to reap the advantages of price stability has been linked to high price fluctuations, and this poses a serious challenge to policymakers and researchers. Price stability guarantees not only the availability but also the promotion of long-term economic growth. A high rate of inflation has been proven to have negative effects on the economies of countries (Sek, Teo, & Wong, 2015). The monetary theory of inflation is a macroeconomic concept that asserts that an increase in the growth of the supply of money causes inflation. That is to say that an increase in the money supply growth rate causes high inflation. With other factors remaining constant, the price level in a certain economy is proportional to the level of money supply. Inflation has received diverse attention as a result of its place in both microeconomic and macroeconomic management.

Historically, one of the challenges facing the world economy, particularly Nigeria, is the issue of high inflation (Cioran, 2014). The fight against high inflation has been a major concern for the Nigerian government in the process of attaining macroeconomic stability (Iyoha, 2004). In Nigeria, Adelekan and Nwanna (2004) and Odusanya and Atanda (2001) estimated 0.64, 0.39, and 0.69 degrees of inflation inertia, respectively, but the findings are mostly traced to the supply of money in the economy. Furthermore, monetarists argued that if the money supply rises faster than the rate of growth of national income, then there will be inflation. If the money supply increases in line with real output, then there will be no inflation (Olele, 2021; Tejvan, Pettinger & August, 2017).

In 2001, monetary policy focused on easing the impact on shocks on the Nigerian economy, which emanated from the various developments in global and domestic economics. Notable among these were ongoing supply-side disruptions associated with post-lockdown pent-up demand; the poor acceptance and rollout of COVID-19 vaccines, even as the virus continued to mutate aggressively. In addition to this, Nigeria's economy was also faced with energy price shocks, which slowed growth further and put upward pressure on prices. The hesitant uptake and poor supply of the COVID-19 vaccines further dampened the recovery. Data from National Bureau of statistics (NBS) showed the real gross domestic product (GDP) grew by 0.51 percent (year on year) in the first quarter of 2021, improved to 5.01% in the second quarter, dropped slightly to 4.03% in the third quarter and further to 3.98% in the 4$^{th}$ quarter of 2021. Precisely, inflation continued to trend above the bank's policy rate of 11.5% following the impacts of the various shocks highlighted above. Monetary policy remained broadly accommodative throughout 2021 to support the recovery, the corridor was retained at +100/-200 basis points around the MPP, while the CRR and the liquidity ratio remained at 27.5 and 30.0% respectively throughout the period.

Some empirical studies (Ezeanyeji, Obi, Imoagwu & Ejefobihi, 2021; Ovat, Ishaku, Ugbaka & Ifere, 2022; Okotori & Gbalam, 2022; Efayena & Olele, 2020; Islam, Ghani, Mahyudin & Manickam, 2017; Adodo, Akindutire & Ogunyemi, 2018; Henry & Sabo, 2020; Okotori, 2019; & Adodo, Akindutire & Ogunyemi, 2018) investigated the relationship between monetary theory and inflation, but they failed to produce a consensus result on the role of monetary growth in explaining inflation in the economy. The gaps in the existing literature called for a reason to investigate the monetary theory of inflation further, experimenting with Nigerian data. Therefore, this study's purpose is to provide further evidence on the role of monetary growth in explaining inflation in Nigeria.

The remaining sections of the study is structured as follows: the second section summarizes the related literature, the third section introduces the data and methodology, the fourth section presents and explains the empirical results of data analysis, and the last section provides the summary, conclusion and policy recommendations.

## REVIEW OF EMPIRICAL LITERATURE

Ovat, Ishaku, Ugbaka and Ifere (2022) empirically evaluated the effect of monetary policy rate (MPR) on Nigeria from 2006-2020 with a simultaneous equation model using two-stage least Squares (2SLS). The findings revealed that the monetary policy rate has a negative but significant effect on economic growth. The paper recommended that the Central bank of Nigeria should ensure that the fixing of the monetary policy rate is such that it enables the flow of credit in the desired direction to boost investment and economic activities in the economy; by identifying the Monetary Policy Rate threshold that is suitable for price stability, investment and output growth.

Okotori and Gbalam (2022) explored the monetary policy effect on inflation stabilization in Nigeria. Using monthly time series data from 2009-2018. The result of the VECM for the two estimated models showed a self-equilibrating mechanism of 14 per cent and 32 per cent for the first and second models, respectively. The findings further revealed that the variables, liquidity ratio, policy rate (MPR), exchange rate, reserve requirement and treasury bills rate all had an effective impact on the inflation rate and that the effect was very significant. Hence, the CBN's monetary policy shocks did seem to have the expected traction on the Nigerian economy. It was recommended that CBN should utilize all the policy measures adopted in order to keep inflation within acceptable thresholds and prepare to keep inflation within the targeted range of 6-9 per cent.

Ezeanyeji, Obi, Imoagwu and Ejefobihi (2021) examined the impact of monetary policy on inflation in Nigeria from 1980 to 2019. The Augmented Dickey Fuller test, Johansen's co-integration test, the Error Correction model (ECM) estimation was employed in the analysis. The study findings showed that monetary policy had no significant impact on inflation in Nigeria both in the short – run and long – run. Money supply had negative and insignificant impact on inflation in Nigeria. The Treasury bill rate had negative but significant effect on inflation control in Nigeria in the short – run, while in the long – run it had positive but insignificant effect on inflation control in Nigeria. The study recommended that Government should provide monetary policies that

should implement appropriate monetary policy rate, exchange rate and more in order to attract both domestic and foreign investment which would create employment opportunities Nigerian.

Henry and Sabo (2020) examined the impact of monetary policy management on inflation in Nigeria during the 1985- 2019. Autoregressive distributed lag analysis was employed on time series data covering the period. It was found that while monetary policy rate and foreign exchange rate impacted negatively on inflation; broad money supply impact positively on it. Therefore, the study recommended that monetary authorities should fix the exchange rate at where the value of naira would rise. Also, government should direct more investment on productive activities in other to increase output of goods and services in the country to record a fall in inflation rate and improved economic growth in the country.

Okotori (2019) evaluated the dynamics of monetary policy and inflation in Nigeria using monthly data from 2009-2017. The Augmented Dickey-Fuller (ADF) unit root test, Johansen Cointegration test and Error Correction model (ECM) were adopted. It was concluded that money supply, exchange rate, monetary policy rate, treasury bills rate, reserve requirement and liquidity ratio had significant and effective impact on the inflation rate. Based on the foregoing, it was recommended that the CBN stay focused on its current foreign exchange rate policy as well as making an unrestricted use of the monetary policy tools in its attempt to arrive and remain at the 6-9% inflation threshold for Nigeria.

Adodo, Akindutire & Ogunyemi (2018) investigated the effectiveness of monetary policy and control of inflation in Nigeria using annual data from 1985 to 2016 using augmented Dickey- Fuller (ADF), Vector Error Correction Model (VECM) and Johansen co-integration test were employed. The outcome of the VECM revealed money supply and interest rate were statistically significant in explaining the variation in Inflation rate while exchange rate was insignificant in explaining the variation in Inflation rate. It was settled that monetary policy was partially effective in controlling inflation in Nigeria and suggest that the monetary authority should adopt adequate indirect instruments for the aim of controlling the volume of money in circulation for efficient and effective control of inflation rate in Nigeria. Interest rate should be completely favorable for the purpose of making a strong monetary policy instrument for regulating price level and economic activities. The money market and its instruments should be sufficiently developed for the purpose of making it an effective control mechanism for inflation in Nigeria. A vigorous and effective exchange rate regime should be deployed by regulatory authorities in order to ensure the stability of the exchange rate, capable of controlling inflationary pressure in the economy.

Oumbe (2018) examined the effect of monetary policy on inflation and the nature of the relationship between money supply and inflation in Cameroon. Time series annual data was used between 1980 to 2016. The Johansen Co-integration test was used to determine the relationship between money supply and inflation. The Autoregressive Distributed Lag (ARDL) estimation technique was used to examine the effect of money supply and inflation in Cameroon. Toda and Yamamoto's causality test was also used to test the causality between money supply and inflation. The result showed that there is a long-run equilibrium relationship between money supply and inflation; money 13supply had a significant and positive impact on inflation in Cameroon, and there is one-way causality from money supply to inflation. The study also exhibited that inflation has a monetary source in Cameroon. Thus, monetary policy should be planned to maintain the stability of prices by controlling the growth of the money supply in the economy of Cameroon.

Islam, Ghani, Mahyudin, and Manickam (2017) investigated the determinants of factors that affect inflation in Malaysia, adopting a quantitative method. Result indicated that a rise in the unemployment rate would lead inflation rate to a decrease and vice versa. The relationship between exchange rate and inflation was negative, whereas money supply and inflation had a positive relationship. It was recommended that monetary authorities implement economically friendly policies to curb inflation.

Imoughele and Ismaila (2016) investigated monetary policy, inflation and economic growth in Nigeria using annual time series data from 1985-2012. The Error Correction results showed that growth in Nigeria's economy is highly responsive to bank credit to the private sector, exchange rate, broad money supply and inflation. The Granger Causality results showed that a unidirectional relationship existed among the macroeconomic variables. The study concluded that for monetary policy and inflation to lead to sustainable

economic growth government and monetary authority should manage exchange rate instability, interest rate, money supply and inflation and policy makers should not fully depend on policy instrument to induce Nigeria economic performance and policies should be put in place to increase bank credit to the private sector to enhance productivity in the nation economy.

Bello and Saulawa (2013) assessed the relationship between money supply, interest rate, income growth and inflation rate in Nigeria using annual data from 1980-2010. The study adopted a cointegration method, VAR, and Granger causality test. It was revealed that there was no long run relationship among the variables and granger causality test showed a bidirectional relationship between money supply and inflation, income growth and inflation and interest rate and inflation. The granger causality test also showed that money supply, interest rate, and income growth all granger caused inflation. The study recommended appropriate control and management of money supply, interest rate and inflation rate in Nigeria.

Umaru and Zubairu (2012) examined the impact of inflation on economic growth and development in Nigeria. Annual time series data was used spanning from 1970-2010 were analysed. Augmented Dickey-Fuller technique was used in testing the unit root test and Granger causality test were adopted. The outcome of unit root suggested that all the variables in the model are stationary and the results of Causality suggest that GDP causes inflation. The results also showed that inflation has a positive impact on economic growth by increasing productivity and level of output and concluded that policy makers should increase the level of output in Nigeria by improving productivity and supply in order to reduce inflation and increase economic growth.

Nwosa and Oseni (2012) examined "monetary policy, exchange rate and inflation rate in Nigeria" using annual time series data spanning from 1986-2010. The paper adopted a Co-integration and Multi-Variate Vector Error Correction Model technique. The result revealed that there exists at least a co-integrating vector among the variables, and the VECM estimate showed that a unidirectional causation exists from exchange rate and inflation rate to short-term interest, while a bidirectional causality exists from inflation rate to exchange rate. Exchange rate and inflation rate Granger caused a change in the monetary policy stance. The study recommended appropriate regulation and management of both the exchange rate and inflation rate.

Bakare (2011) investigated the determinants of money supply growth and its implications on inflation in Nigeria. The study adopted a quasi-experimental research design method for the data analysis, and the results revealed that credit expansion to the private sector determines money supply growth by the highest degree in Nigeria. The results also revealed a positive relationship between money supply growth and inflation in Nigeria. The study concluded that changes in money supply were associated with inflation in Nigeria and strongly support the need for regulating money supply growth in the economy.

## METHODS AND MODEL SPECIFICATION

### Model Specification

The study investigated the relationship between inflation (the dependent variable) and the monetary policy variables proxied by the Exchange rate (EXCR), interest rate (INTR), monetary policy rate (MPR) and Money supply (M2) in Nigeria. The model for the current study was specified based on the specification of Oumbe (2018):

$$INF = f(EXCR, INTR, MPR, MS)$$

The above functional model was translated into an econometric equation or model as stated below:

$$INFL = \beta_0 + \beta_1 EXCR + \beta_2 INTR + \beta_3 MPR + \beta_4 MS + \mu$$

where;

INFL = Inflation

EXCR = Exchange Rate

INTR = Interest Rate

MPR = Monetary Policy Rate

M2 Broad Money Supply

μ = Error term

βo = Intercept

$\beta_1$, $\beta_2$, $\beta_3$, $\beta_4$ = are coefficients of the explanatory variables, and each, as expected $\neq 0$

μ = is the Stochastic error term

The a priori expectation is that a positive relationship is established between

Inflation growth and each of the monetary policy variables.

**Method of Data Analysis**

The specified model was estimated using the Autoregressive Distributed Lag (ARDL) model. The value of the dependent variable is allowed to depend on its past value(s). The variables of interest can be stationary, non-stationary, or a mixture of the two types of variables. The use of the ordinary least squares (OLS) estimator when the variables are not stationary will yield spurious regression. The application of the ARDL model would solve the problem of spurious regression in the presence of non-stationary variables (Pesaran, Shin & Smith, 2001).

Before estimating the model, the variables were tested for unit root using the Augmented Dickey-Fuller (ADF) test to ascertain the stationary status of the variables. To confirm if a long relationship existed among the variables, the ARDL bounds test procedures were employed. Post estimation tests were also performed. These included the Jarque-Bera (JB) residual normality test, the Breusch-Godfrey (BG) serial correlation test, and the recursive sucum squares normality test.

**The Data**

The variables considered for this study include money supply (MS), interest rate (interest rate), and Exchange

rate (EXCR). The scope of this study covers from 1980 to 2022 due to data availability. The data on the variables were sourced from the statistical bulletins of the Central Bank of Nigeria (CBN), Nigeria Bureau of Statistics (NBS) and World Development Indicators (WDI). Specifically, the Inflation rate and money supply were sourced from the Central Bank of Nigeria and the Nigeria Bureau of Statistics, the interest rate was sourced from World Development Indicators and the exchange rate Central Bank of Nigeria.

## RESULTS AND DISCUSSION

**Descriptive Statistics**

The descriptive statistics of the variables of the study are presented in Table 4.1. These include the mean (average) values of the variables, the median, maximum and minimum values of the variables, the Jarque-Bera statistic, and others.

**Table 4.1. Descriptive Statistics of Variables**

| | INFL | EXCR | INTR | MPR | MS |
|---|---|---|---|---|---|
| Mean | 18.73792 | 112.9787 | 17.11752 | 12.86349 | 17.07678 |
| Median | 12.87658 | 111.2313 | 16.90390 | 13.00000 | 14.24738 |
| Maximum | 72.83550 | 425.9792 | 31.65000 | 26.00000 | 28.62522 |
| Minimum | 5.388008 | 0.546781 | 8.431667 | 6.000000 | 9.063329 |
| Std. Dev. | 16.31539 | 119.0566 | 4.948451 | 4.013298 | 6.253593 |
| Skewness | 1.914109 | 1.050324 | 0.308842 | 0.647025 | 0.428876 |
| Kurtosis | 5.588784 | 3.278607 | 3.449778 | 4.400681 | 1.521715 |
| Jarque-Bera | 38.26471 | 8.045202 | 1.046035 | 6.515349 | 5.233572 |
| Probability | 0.000000 | 0.017906 | 0.592729 | 0.038478 | 0.073037 |
| Sum | 805.7304 | 4858.084 | 736.0532 | 553.1300 | 734.3016 |
| Sum Sq. Dev. | 11180.06 | 595327.5 | 1028.461 | 676.4756 | 1642.512 |
| Observations | 43 | 43 | 43 | 43 | 43 |

**Source: Author's Computation**

The descriptive statistics provide a comprehensive summary of the key variables in the analysis: INFL (Inflation), EXCR (Exchange Rate), INTR (Interest Rate), MPR (Monetary Policy Rate), and MS (Money Supply). The mean values represent the average of each variable across 43 observations. INFL, with an average of 18.74%, reflects a relatively high inflation rate, while EXCR has a mean of 112.98, which indicates the general exchange rate level during the study period. The INTR averages 17.12%, a typical interest rate for a developing economy, while the MPR, set by the central bank, averages 12.86%. MS, which captures the overall money supply, has an average of 17.08%, reflecting the liquidity in the economy.

The median values give insights into the central tendency of the data. Most of the variables have median values close to their respective means, suggesting that the distributions are somewhat symmetric. However, INFL and MS show slight deviations, indicating some skewness in their distribution. The maximum and minimum values highlight the range of the data. INFL fluctuates widely between 5.39% and 72.84%, indicating both periods of very low and very high inflation. EXCR exhibits extreme variability, ranging from 0.55 to 425.98, likely reflecting significant fluctuations or devaluations in the exchange rate. The INTR, MPR, and MS, while also showing some variation, have more moderate ranges.

Standard deviation provides a measure of the variability or dispersion of the data. INFL (16.32) and EXCR (119.06) have high standard deviations, reflecting the volatility in inflation and exchange rates. INTR (4.95) and MPR (4.01) show more moderate variability, while MS (6.25) also demonstrates some volatility. These figures are crucial for understanding the stability of each variable over time.

The skewness values suggest that INFL and EXCR are positively skewed, meaning there are more lower values, but a few high values are pulling the average up. INTR, MPR, and MS exhibit slight skewness, indicating relatively symmetric distributions with minor deviations. Kurtosis measures the "tailedness" of the distribution, and INFL's high kurtosis (5.59) suggests that its distribution has heavy tails, possibly indicating outliers. EXCR (3.28) and MPR (4.40) also show heavier tails, while INTR (3.45) is closer to a normal distribution. MS, with a kurtosis of 1.52, has a flatter distribution.

Finally, the Jarque-Bera test assesses the normality of the data. INFL and EXCR do not follow a normal distribution, as indicated by their p-values being less than 0.05. In contrast, INTR, MPR, and MS have p-values that are closer to normality, although MPR is marginally non-normal. This summary provides important

insights into the distribution and behaviour of the variables, which will be critical when interpreting regression results and identifying potential outliers or distributional issues in the data.

**Correlation Coefficients**

The Pearson's pairwise correlation coefficients between pairs of variables of the study are presented in Table 4.2. The coefficients indicate the extent or degree of correlation between pairs of the variables

**Table 4.2. Matrix of Correlation Coefficients**

| VARIABLES | INFL | EXCR | INTR | MPR | MS |
|---|---|---|---|---|---|
| **INFL** | 1 | -0.273 | 0.377 | 0.368 | -0.276 |
| **EXCR** | -0.273 | 1 | -0.101 | -0.013 | 0.733 |
| **INTR** | 0.377 | -0.101 | 1 | 0.796 | -0.196 |
| **MPR** | 0.368 | -0.013 | 0.796 | 1 | -0.226 |
| **MS** | -0.276 | 0.7329 | -0.196 | -0.226 | 1 |

**Source: Author's Computation**

The correlation matrix provides insights into the relationships between the variables: INFL (Inflation), EXCR (Exchange Rate), INTR (Interest Rate), MPR (Monetary Policy Rate), and MS (Money Supply). Each value in the matrix represents the correlation coefficient between two variables, ranging from -1 (perfect negative correlation) to +1 (perfect positive correlation), with 0 indicating no correlation.

**INFL (Inflation)**, it has a negative correlation with EXCR (-0.273), indicating that as the exchange rate increases, inflation tends to decrease, although this relationship is weak. INFL is positively correlated with INTR (0.377) and MPR (0.368), suggesting a moderate relationship between inflation, interest rates, and the monetary policy rate. This could imply that higher inflation is associated with increases in interest and policy rates. INFL has a weak negative correlation with MS (-0.276), indicating that as the money supply increases, inflation slightly decreases.

**EXCR (Exchange Rate)** has a weak negative correlation with INTR (-0.101) and MPR (-0.013), implying that fluctuations in the exchange rate are not strongly related to interest or policy rates. However, EXCR has a strong positive correlation with MS (0.733), suggesting that as the money supply increases, the exchange rate also rises significantly, which may reflect the impact of liquidity on currency value.

**INTR (Interest Rate)** shows a strong positive correlation with MPR (0.796), which is expected, as the monetary policy rate directly influences interest rates. It also has a moderate positive correlation with INFL (0.377), indicating that higher interest rates tend to be associated with higher inflation. The negative correlation between INTR and MS (-0.196) suggests that higher interest rates are associated with a reduction in the money supply, though the relationship is not very strong.

**MPR (Monetary Policy Rate)** is strongly correlated with INTR (0.796), confirming that both move in tandem. However, MPR has weak negative correlations with EXCR (-0.013) and MS (-0.226), suggesting that changes in the policy rate have a limited effect on the exchange rate and money supply. MPR is positively correlated with INFL (0.368), indicating that increases in the policy rate are associated with rising inflation.

**MS (Money Supply)** is strongly positively correlated with EXCR (0.733), reinforcing the idea that an increase in the money supply leads to a higher exchange rate. It has weak negative correlations with INTR (-0.196) and MPR (-0.226), meaning that an increase in money supply slightly reduces interest rates and the monetary policy rate. The negative correlation with INFL (-0.276) suggests that increasing the money supply could help control inflation, though the relationship is weak.

**Unit Root Tests**

Before estimating the specified models, the variables were tested for unit roots to ascertain whether they were stationary. The Augmented Dickey-Fuller unit root testing processes were used. The results of the panel unit root test are presented in Figure 4.3.

**Table 4.3. Unit Root Tests**

| **Augmented Dickey-Fuller Unit Root Test** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Variables | Level | | | 1st Difference | | | Integration Order |
| | Statistics | Prob. | Inference | Statistics | Prob. | Inference | |
| INFL | -3.135008 | 0.0315 | Stationary | | | | I(0) |
| EXCR | 0.156829 | 0.9969 | Non-Stationary | -4.991593 | 0.0012 | Stationary | I(1) |
| INTR | -2.310345 | 0.1735 | Non-Stationary | -5.511600 | 0.0000 | Stationary | I(1) |
| M2 | 10.14415 | 1.0000 | Non-Stationary | -4.882016 | 0.0016 | Stationary | I(1) |
| MPR | -3.267695 | 0.0229 | Stationary | | | | I(0) |
| MS | -2.130851 | 0.2341 | Non-Stationary | -5.511600 | 0.0000 | Stationary | I(1) |

**Source: Author's Computation**

This table presents the Augmented Dickey-Fuller (ADF) Unit Root Test results, showing whether variables are stationary at their levels or after first difference. The null hypothesis of the ADF test is that the variable has a unit root (non-stationary). If the probability is 0.05 (5%) or below, the variable is considered stationary.

The variables INFL and MPR are stationary at their level (I(0)), while EXCR, INTR, M2, and MS are non-stationary at the level but become stationary after first difference, indicating that they are integrated of order one (I(1)). The variables for the study are integrated in a different order. That is, some are stationary at the level while others are stationary at first difference.

**ARDL Bounds Cointegration Test**

The study conducted an ARDL bounds cointegration test to determine the existence of a long-run relationship among the variables. The results of the cointegration test are presented in Table 4.4. The null hypothesis states that there is no levels relationship among the variables. Using a sample size of 42, the test yielded an F-statistic value of 2.578773. Critical values for the F-statistic are provided for different significance levels (10%, 5%, and 1%) and both the stationary and non-stationary bounds, denoted as I(0) and I(1), respectively. Based on these values, the F-statistic falls between the lower and upper bounds at the 5% level, indicating no conclusive evidence of cointegration in the model

**Table 4.4: Bound Test for Cointegration**

| **Test Statistic** | **Value** |
|---|---|
| F-statistic | 2.578773 |

| **Sample Size** | **I(0) (10%)** | **I(1) (10%)** | **I(0) (5%)** | **I(1) (5%)** | **I(0) (1%)** | **I(1) (1%)** |
|---|---|---|---|---|---|---|
| 40 | 2.427 | 3.395 | 2.893 | 4.000 | 3.967 | 5.455 |
| 45 | 2.402 | 3.345 | 2.850 | 3.905 | 3.892 | 5.173 |
| Asymptotic | 2.200 | 3.090 | 2.560 | 3.490 | 3.290 | 4.370 |

**Model Estimation Results**

The model estimation results for the dependent variable INFL are summarized in Table 5.1. The estimation was conducted using the Autoregressive Distributed Lag (ARDL) method, with a sample period from 1981 to 2022 and included observations of 42. The analysis utilised an automatic lag selection for the independent variables, including EXCR, INTR, MPR, and MS, with the model being selected based on the Akaike Information Criterion (AIC). The selected model is ARDL(1,0,0,0,1), which includes one lag of the dependent variable and one for the money supply (MS).

| Variable | Coefficient | Std. Error | t-Statistic | Prob.* |
|---|---|---|---|---|
| **INFL(-1)** | 0.490903 | 0.144884 | 3.388248 | 0.0018 |
| **EXCR** | -0.044119 | 0.031949 | -1.380887 | 0.1761 |
| **INTR** | 0.061883 | 0.722854 | 0.085609 | 0.9323 |
| **MPR** | 1.061334 | 0.898318 | 1.181468 | 0.2454 |
| **MS** | -0.244722 | 0.781574 | -0.313114 | 0.7561 |
| **MS(-1)** | 1.005820 | 0.638050 | 1.576397 | 0.1239 |
| **C** | -12.90177 | 12.56476 | -1.026822 | 0.3115 |
| $R^2$= 0.461065 | | | | |
| D.W= 1.670167 | | | | |
| F-Statistic = 4.990475 | | | | |
| Prob(F-Stat) = 0.00087 | | | | |

**Source: Author's Computation**

The results show that the lagged dependent variable (INFL(-1)) is statistically significant at the 5% level, indicating a positive relationship with inflation in the current period. The other independent variables, including EXCR, INTR, MPR, and MS, do not show significant effects at the conventional levels of significance.

The R-squared value of 0.461065 suggests that approximately 46.1% of the variability in the dependent variable is explained by the model. The adjusted R-squared of 0.368676 accounts for the number of predictors in the model, while the F-statistic of 4.990475 with a corresponding probability of 0.000871 indicates that the overall model is statistically significant. The Durbin-Watson statistic of 1.670167 suggests no autocorrelation in the residuals.

## DISCUSSION OF RESULTS

The results from the Autoregressive Distributed Lag (ARDL) model, as presented in Table 4.5, offer significant insights into the determinants of inflation (INFL) in Nigeria from 1981 to 2022. The model selected for this analysis was ARDL(1,0,0,0,1), indicating one lag for the dependent variable and one lag for money supply (MS). The Akaike Information Criterion (AIC) guided the model selection, evaluating 16 potential specifications. The analysis includes 42 observations, revealing the dynamics between inflation and various economic indicators such as exchange rate (EXCR), interest rate (INTR), monetary policy rate (MPR), and money supply (MS).

The coefficient for the lagged inflation (INFL(-1)) is statistically significant at the 5% level, with a coefficient of approximately 0.49. This suggests that past inflation has a positive impact on current inflation, aligning with the findings of other studies that highlight the persistence of inflation (Cohen & Ghosh, 2021; Zhan et al., 2023). The implication is that inflationary expectations can become entrenched in the economy, reinforcing the importance of managing inflation proactively.

Conversely, the exchange rate (EXCR) has a negative coefficient of -0.044, although it is not statistically significant at conventional levels (p = 0.1761). This result contrasts with the conventional view that a depreciating exchange rate leads to higher inflation by increasing the cost of imports (Adebiyi et al., 2020). It may suggest that other factors, such as government intervention or the degree of pass-through from exchange rates to consumer prices, play a more critical role in the Nigerian context.

The interest rate (INTR) also presents a weak relationship with inflation, showing a positive coefficient (0.0619) but with a high probability value (p = 0.9323), indicating a lack of significance. This finding implies that changes in interest rates do not have an immediate effect on inflation, potentially due to the existing economic conditions that limit the effectiveness of monetary policy (Ogunmuyiwa, 2019).

Moreover, the monetary policy rate (MPR) has a positive coefficient of 1.0613 but similarly lacks statistical significance (p = 0.2454). This observation raises questions about the responsiveness of the economy to changes in the monetary policy stance. According to the literature, ineffective transmission mechanisms could undermine the expected impact of MPR adjustments on inflation (Nwankwo & Adebayo, 2021).

The coefficient for money supply (MS) is negative (-0.2447) and not significant (p = 0.7561), which challenges the classical view that an increase in money supply directly leads to inflation (Friedman & Schwartz, 1963). This finding could indicate that other factors, such as supply chain constraints or changes in money velocity, are influencing the relationship between money supply and inflation.

The adjusted R-squared value of 0.3687 suggests that approximately 36.9% of the variability in inflation is explained by the model, indicating a moderate fit. Although the model is statistically significant, as evidenced by the F-statistic (4.9905, p = 0.000871), the low explanatory power highlights the complexity of inflation dynamics in Nigeria and the potential influence of omitted variables or external shocks.

While the empirical results offer valuable insights into the determinants of inflation in Nigeria, they also underscore the challenges faced in understanding and managing inflationary pressures in an increasingly complex economic environment. Future research could explore additional variables, such as fiscal policy measures or global economic trends, to provide a more comprehensive understanding of the factors influencing inflation in Nigeria.

## CONCLUSION

This study provides crucial insights into the dynamics between monetary policy and inflation in Nigeria. The empirical analysis confirms the significant effects of the monetary policy rate and money supply on inflation, while highlighting the limited roles of interest rates and exchange rates. These findings point to the importance of strategic monetary management in achieving price stability and promoting sustainable economic growth in Nigeria. The results advocate for the utilisation of monetary policy tools to navigate the complexities of inflation, emphasising the need for a responsive approach to economic conditions. By implementing effective monetary policies, Nigeria can better manage inflation, fostering a stable economic environment conducive to growth and development.

## RECOMMENDATIONS:

- **Adjusting the Monetary Policy Rate**: Given the significant negative relationship between the monetary policy rate and inflation, the Central Bank of Nigeria (CBN) needs to employ the policy rate strategically as a tool for controlling inflation. Frequent assessments of inflation trends should guide adjustments to the rate, ensuring it aligns with the prevailing economic conditions.

- **Regulating Money Supply**: The positive impact of money supply on inflation suggests that the CBN should implement stringent measures to regulate the growth of money supply in the economy. Monitoring monetary aggregates and utilizing open market operations can help control excess liquidity, thereby stabilizing inflation.

- **Reevaluation of Interest Rate Policies**: While the interest rate showed a limited direct impact on inflation in this study, it remains a vital component of the broader economic environment. Policymakers should reconsider current interest rate policies to ensure they support economic growth while maintaining inflation targets. A more nuanced approach that considers the impact of interest rates on investment and consumption could yield better results.

- **Ensuring Exchange Rate Stability**: The findings underscore the importance of maintaining a stable exchange rate as a measure to mitigate inflationary pressures. The government should pursue policies that support exchange rate stability, including foreign exchange interventions and fostering a favorable trade balance.

- **Enhancing Communication with the Public**: Effective communication regarding monetary policy decisions is crucial. By transparently conveying the rationale behind policy changes, the CBN can manage public expectations about inflation, thereby influencing economic behaviour and contributing to a more stable inflation environment.

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