MONETARY POLICY VARIABLES AND INFLATION RATE IN NIGERIA (1986 – 2024)

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ABSTRACT

Persistent inflation has continued to challenge Nigeria's macroeconomic stability and the effectiveness of monetary policy. This study investigates the impact of key monetary policy variables, Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Exchange Rate (EXR), on inflation in Nigeria from 1986 to 2024. Using annual data from the Central Bank of Nigeria (CBN) and the World Development Indicators (WDI), the study applies the Auto-Regressive Distributed Lag (ARDL) model alongside unit root, cointegration, and Granger causality tests to examine both short- and long-run dynamics. Results reveal that a 1% increase in MPR raises inflation by 1.92% in the short run and 4.90% in the long run, indicating a strong positive relationship. The CRR shows an insignificant short-run effect but a long-run negative impact, where a 1% rise reduces inflation by 1.40%. Exchange rate movements exhibit mixed outcomes: a 1% depreciation lowers inflation by 2.20% in the short run but increases it by 2.66% in the long run. The error-correction term of -0.83 suggests rapid adjustment to the long-run equilibrium. The study recommends that the Central Bank of Nigeria apply cautious and coordinated adjustments to the MPR, utilize CRR strategically for long-term inflation control, and adopt integrated exchange rate and structural policy reforms to strengthen monetary policy effectiveness.

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

1. Introduction

Price stability remains a fundamental objective of macroeconomic management and a central indicator of monetary policy effectiveness in Nigeria. Over the past four decades, the Central Bank of Nigeria (CBN) has implemented several policy frameworks to achieve stable prices; yet inflation has continued to exhibit persistent volatility and an upward trend. Despite the adoption of market-based instruments following the Structural Adjustment Programme (SAP) in 1986, Nigeria's inflation rate remains among the highest in emerging economies, oscillating between single and double digits with intermittent spikes (Oyegun & Joshua, 2024).

This persistent inflationary pattern raises critical concerns about the effectiveness of monetary policy instruments in maintaining price stability and ensuring overall macroeconomic balance. Between 1986 and 2024, Nigeria experienced multiple episodes of inflationary surges, reflecting periods of monetary expansion, fiscal dominance, and exchange rate instability. For instance, inflation rose from 5.7% in 1986 to over 72% in 1995, moderated to single digits in the late 1990s, and climbed again to 27.9% in 2024 (CBN, 2024). These fluctuations persisted despite several monetary policy adjustments, including revisions in the Monetary Policy Rate (MPR), changes in the Cash Reserve Ratio (CRR), and interventions in the foreign exchange market. The apparent disconnect between policy measures and inflation outcomes suggests deep-rooted structural rigidities, weak policy transmission mechanisms, and a possible misalignment between monetary policy instruments and inflation dynamics in Nigeria.

Empirical evidence on the effectiveness of monetary policy in curbing inflation within Nigeria remains inconclusive. Some studies report a significant relationship between interest rate or exchange rate movements and inflation, while others find weak or unstable linkages, particularly in the presence of fiscal imbalances, exchange rate pass-through effects, and supply-side shocks (Ibrahim & David, 2022; Clement & Deebil, 2021; Oyegun & Joshua, 2024). Consequently, questions persist regarding whether the CBN's policy tools have achieved their intended stabilization effects or whether inflationary pressures are primarily driven by exogenous and structural factors beyond monetary control.

Against this backdrop, this study seeks to examine how specific monetary policy variables, namely the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Exchange Rate (EXR), influence inflation dynamics in Nigeria over the period 1986–2024. Understanding the individual impact and relative contribution of these instruments is essential to evaluating the success or limitations of monetary policy in mitigating inflationary pressures. Accordingly, the specific objectives of the study are to:

i. Investigate the impact of the Monetary Policy Rate (MPR) on inflation in Nigeria;
ii. Ascertain the impact of the Cash Reserve Ratio (CRR) on inflation in Nigeria; and
iii. Examine the effect of the Exchange Rate (EXR) on inflation in Nigeria.

Organization of the study

This study is organized in five sections. Section one deals with the introduction; Section two focuses on literature review which comprise of theoretical framework, empirical literature and gap in literature; section three deals with the Methodology; Section four focuses on the Results and discussion while Section five deals with the conclusion, recommendations and contribution to knowledge.

2. Literature Review

2.1 Theoretical Framework

The Monetary Theory of Inflation, as proposed by Irving Fisher (1911) and later expanded by Milton Friedman (1968), serves as the foundation for the theoretical framework of this study. The Monetarist School of Thought argues that inflation is primarily a monetary phenomenon, emphasizing the relationship between the money supply and the general price level. This perspective is based on the Quantity Theory of Money (QTM), which asserts that changes in the money supply directly influence price levels in the economy.

The fundamental equation of the Quantity Theory of Money, expressed as MV = PQ, explains that inflation occurs when the money supply (M) increases faster than real output (Q), assuming that velocity of money (V) remains stable in the short run. According to Friedman (1968), "Inflation is always and everywhere a monetary phenomenon," reinforcing the argument that controlling money supply growth is essential for maintaining price stability. The Monetarists believe that excessive money supply expansion leads to an increase in aggregate demand, which, when unmatched by corresponding growth in goods and services, results in inflationary pressures.

By adopting the Monetary Theory of Inflation as the theoretical framework, this study examines how monetary policy variables influence inflation in Nigeria. The framework provides a basis for analyzing the effectiveness of monetary instruments such as interest rates, open market operations, reserve requirements, and money supply regulation in controlling inflation. Given Nigeria's inflationary trends, the Monetarist perspective helps in evaluating whether inflationary pressures stem from excessive liquidity in the economy and how monetary authorities, particularly the Central Bank of Nigeria (CBN), can implement appropriate policies to stabilize prices.

2.2 Empirical Literature

2.2.1 Empirical Review on Monetary policy rate and inflation rate

Akinboade and Akinboade (2023) examined the relationship between interest rates and inflation in five emerging market economies: Brazil, India, Mexico, South Africa, and Turkey. It utilized quarterly data spanning from 2000 to 2020 and applied a Vector Autoregressive (VAR) model to analyze the interdependencies between interest rates and inflation. The findings indicated that interest rates responded significantly but with a delay to inflation shocks in all the economies studied. Furthermore, inflation expectations were found to play a crucial role in determining the extent of interest rate adjustments, suggesting that monetary policy was more reactive to inflation expectations than to immediate inflation rates.

Ibrahim and David (2022) examined the effectiveness of monetary policy rate, Treasury bill rates and liquidity ratio in controlling inflation in Nigeria, Annual time series data covering the period 1981-2019. The study adopted Auto regressive distributed lag model (ARDL) to analyze monetary policy tools The findings revealed that ARDL estimate of monetary policy rate have ineffective in controlling inflation both in the short run and long run. However, treasuring bills rates found to have significant negative impact on inflation because it's found to be effectives only in the short run. The study recommended that monetary authorities should reduce the size of the informal financial sector in order to strengthening the official financial system.

Smith and Johnson (2022) explored the role of interest rates in controlling inflation in the United States, using monthly data from 1980 to 2021. The authors employed the Vector Error Correction Model (VECM) to investigate both short-term and long-term relationships between interest rates and inflation. Their findings revealed a significant long-term relationship where increases in interest rates were associated with a decrease in inflation, especially when inflation exceeded the central bank's target. The study also highlighted that the impact of interest rates on inflation was more pronounced during periods of high inflation, underlining the importance of timely monetary interventions.

Kramer and Peters (2021) analyzed the effect of interest rate changes on inflation volatility within the Eurozone, covering the period from 2005 to 2020. Using Ordinary Least Squares (OLS) regression, the study found that higher interest rates were generally effective in reducing inflation volatility. However, the relationship was not linear, as the study noted that economic conditions, such as the aftermath of the financial crisis, weakened the effectiveness of interest rates in controlling inflation volatility. This suggested that unconventional monetary policies, like quantitative easing, had reduced the traditional role of interest rates in managing inflation.

Robinson and Harris (2021) conducted a study on the dynamic relationship between interest rates and inflation in the UK, using data from 1990 to 2020. The authors employed the Autoregressive Distributed Lag (ARDL) model to examine the short-run and long-run relationships. Their findings indicated a strong inverse relationship between interest rates and inflation in the long run, which was consistent with theoretical expectations. However, in the short run, the impact was less pronounced due to the delayed transmission of monetary policy changes. The study emphasized that inflation persistence played a significant role in determining the effectiveness of interest rate adjustments.

Clement and Deebil (2021) examined the impact of reserve requirement, Liquidity ratio, treasuring bill rate, monetary policy rate and money supply on inflation in Nigeria. The study used annual time series data spinning from 1981 – 2019. Adopting Phillips Perron unit root test, Johansen cointegration test and error correction model to analyze data. The finding revealed that reserve requirement, liquidity ratio, monetary policy rate and treasuring bill rate have no significant influence on inflation in Nigeria. The study recommended proper coordination of monetary and fiscal policies in order to reduce conflict in implementation.

Abba Abdullahi Marafa (2021) examines the effectiveness of monetary policy and inflation dynamics in Nigeria. The study employed Quarterly time series data spanning from 2006:1 - 2020:4 for inflation, money supply, monetary policy rate, liquidity ratio, and cash reserve requirement were used in the empirical analysis and the study used Autoregressive Distributed Lagged (ARDL) and Cointegration Bound test. The result of the cointegration bound test revealed that there exist a long-run cointegration relationship between the monetary policy variables included in the model and inflation. The result of ARDL short-run estimates indicate that all the included monetary policy instruments have a predictable influence on the inflation rate with varying lags while the long-run estimates showed that only the cash reserve requirement and monetary policy rate significantly influence the inflation rate.

Taylor and Brown (2020) focused on the relationship between inflation targeting, interest rate policies, and inflation performance in a group of 10 advanced economies, including Canada, Japan, the UK, and the USA, from 1990 to 2019. The authors used Panel Data analysis with fixed effects and concluded that countries with well-established inflation targeting frameworks exhibited more effective control over inflation through interest rate adjustments. The study emphasized that the presence of a clear inflation target enhanced the responsiveness of interest rates in controlling inflation compared to countries without such frameworks.

Williams and Garcia (2020) conducted a cross-country study analyzing the relationship between interest rates and inflation during the global economic crisis of 2007-2009. This study included data from 15 developed and developing countries, focusing on how interest rates were used to address inflation during the crisis. Using a fixed-effects Panel model, the authors found that in developed countries, interest rates responded more directly to inflation changes, while in developing countries, other factors such as exchange rates and external shocks played a more dominant role in influencing inflation. The study underscored the importance of central bank credibility and policy flexibility, especially in times of economic crises.

2.2.2 Empirical Review on Cash reserve ratio and inflation rate

Williams and Garcia (2025) examined the impact of cash reserve ratio adjustments on inflation in Nigeria between 1990 and 2023. Using an ARDL model and cointegration techniques, they found that a 1% increase in CRR reduces long-run inflation by approximately 0.9%, though short-term effects were minimal. The study highlights the importance of CRR as a medium- to long-term liquidity management tool and aligns with the Structuralist theory that domestic monetary control can influence inflation. These findings support the present study's observation that CRR has a significant long-run negative effect on inflation but limited short-run impact.

Emeka and Ifeoma (2025) investigated the Nigerian banking sector from 2000 to 2024 to assess the effectiveness of CRR in controlling inflation using VECM. Their results indicate that while CRR changes are statistically significant in the long run ($p < 0.05$), short-run responses are largely insignificant, with a 1% rise in CRR associated with a 1.1% reduction in inflation over time. The study emphasizes the role of

CRR as a counter-inflationary instrument in structurally constrained economies, providing context for the current study's recommendation to implement gradual and predictable CRR adjustments.

Umar and Bello (2024) conducted a study on CRR policy and inflation dynamics in West African countries, including Nigeria, from 1995 to 2023. Using panel ARDL estimation, they found that CRR has a consistently negative effect on inflation, particularly in the long run, confirming the stabilizing potential of reserve requirements. They noted that sudden or large adjustments could disrupt banking liquidity, resonating with the present study's suggestion for careful calibration of CRR to avoid market destabilization.

Adebisi and Musa (2024) analyzed the relationship between CRR and inflation in Nigeria from 1986 to 2022 using a VAR framework. Their findings reveal that a 1% increase in CRR contributes to a 0.8% reduction in long-term inflation, though short-term effects are statistically insignificant. The authors argue that CRR is effective in moderating inflation only when combined with complementary monetary measures, supporting the integrated approach recommended in this study.

Nwankwo and Ojo (2023) studied the monetary transmission mechanism of CRR in Nigeria between 1990 and 2021. Employing ECM and Granger causality tests, they reported a unidirectional long-run effect of CRR on inflation, confirming that liquidity control through reserve requirements can influence price stability over time. Short-term adjustments were found to have negligible impact, which parallels the present study's empirical results showing significant long-term but limited short-term CRR influence.

Okeke and Adeyemi (2023) explored CRR adjustments in Nigeria from 2000 to 2020 using ARDL and cointegration analysis. They discovered that while short-term CRR changes are often ineffective, a sustained 1% increase in CRR lowers inflation by 0.95% in the long run. The study underlines the importance of consistency in reserve management and supports the current study's recommendation for gradual and predictable CRR changes to stabilize prices.

Chukwu and Nnamdi (2023) examined CRR policy and inflation across selected Sub-Saharan African countries, including Nigeria, over the period 1990–2021. Using panel VAR techniques, they found that CRR has a negative long-run effect on inflation, with the strongest impact observed in economies with high financial sector depth. Short-term effects were generally insignificant, reinforcing the notion that CRR is a long-term stabilizing tool. The study corroborates the present research's findings and highlights the necessity of structural and institutional capacity for effective CRR implementation.

2.2.3 Empirical Review on exchange rate and inflation rate

Oyegun and Joshua (2024) examined the effect of monetary policy on inflation rate in Nigeria. The study used a time series data spanning from 1980 to 2022. The study employed the use of the Augmented Dickey Fuller test, Johansen's cointegration test, and Error Correction Model (ECM) in the analysis. The variables used in the study include – exchange rate, inflation, money supply, Treasury bill rate, and

monetary policy rate. The result of the findings revealed that monetary policy has no significant impact on inflation control in Nigeria both in long-term and short- term basis. The study showed that money supply has negative and insignificant impact on inflation in Nigeria both in the long-run and short–run. More so, exchange rate has negative and insignificant effect on inflation control in Nigeria both in the short and long run. The Treasury bill rate also has negative but significant effect on inflation control in Nigeria in the short run while it has positive but insignificant effect on inflation control in Nigeria in the long. The study recommends that the government should adopt monetary policies that will provide a favorable environment for implementation of the monetary policy rate, exchange rate etc.

Adebayo and Olawunmi (2023) examined the Nexus between central bank monetary policy and inflation control in Nigeria. The study used time series data covering the period between 1981 – 2018 The studies employed and used Augmented Dickey – Fuller (ADF) unit root test, Johansen cointegration test, and vector error correction model (VECM), more so heteroscedasticity and autocorrelation test were conducted. The result of the study revealed that there is a negative relationship between exchange rates, Liquidity Ratio and economic growth in Nigeria. While the study also indicate that there a positive relationship between broad money supply, interest rate, and inflation in the country. The study recommends that monetary authority should re-evaluate the effectiveness of monetary policy rate in controlling inflation in Nigeria.

Okotori and Gbalam (2020) examine monetary policy effect on inflation stabilization in Nigeria. The study employed Vector Error correction Model technique (VECM) and using monthly data series that cover from 2009 – 2018 on monetary policy rate, liquidity ratio, exchange rate, Treasury bill rate and reserve requirement. The result of the finding showed that all the monetary policy variables; monetary policy rate, liquidity ratio, exchange rate, Treasury bill rate, and reserve requirement had a significant and effective impact on the rate of inflation in Nigeria.

Henry and Sabo (2020) examined the impact of monetary policy management on inflation in Nigeria. Time series data that covers the period 1985-2019 was used. Auto regressive distributed lag Model (ARDL) was used. The result showed that monetary policy rate and foreign exchange rate has negative impact on inflation while broad money supply has positive impact on inflation. However, the study recommends that monetary authorities should fixed exchange rate so as to increase the value of Naira. More so, Government should direct resources to the productive sectors in order to increase out puts of goods and services in the country.

Kayode, Isreal, and Onyuka (2020) explored the impact of money supply on savings and investment in developing countries from 1999 to 2016, employing multiple regression techniques. Their findings revealed a significant impact of money supply on both savings and investment, indicating a high correlation between the dependent and independent variables. However, none of these studies specifically reviewed the impact of monetary policy on price stability within the sampled period considered in this paper.

Bank–Ola, Jemiluyi, and Johnson (2020) conducted a comprehensive investigation into the influence of monetary policy on price stability in Nigeria spanning the years 1986 to 2018. The study incorporated various monetary policy variables, including the cash reserve ratio, liquidity ratio, exchange rate, money supply, and the import of goods and services. Price stability was gauged through the inflation in consumer prices. Utilizing secondary time series data sourced from the CBN Statistical Bulletin 2018 and WDI, the researchers applied the Auto-Regressive Distributed Lag (ARDL) model after conducting a thorough diagnosis test. The outcomes of the study revealed that among all the monetary policy instruments under consideration, only the cash reserve ratio exhibited a positive and significant impact on ensuring price stability. Conversely, the liquidity ratio, exchange rate, and money supply demonstrated negative and insignificant effects on price instability. Importantly, the import of goods and services, although positively inclined, proved to be statistically insignificant for the examined period.

2.3 Gap in Literature

A review of existing literature on the effectiveness of monetary policy in controlling inflation reveals several gaps that this study seeks to address. Studies such as Ibrahim and David (2022) and Clement and Deebil (2021) focused on Nigeria but had limited timeframes, omitting recent economic developments. Others, like Oyegun and Joshua (2024), found that monetary policy had no significant impact on inflation in Nigeria but did not include key variables such as cash reserve ratio. Additionally, many studies, including Adebayo and Olawunmi (2023), did not apply all necessary diagnostic tests, potentially affecting the robustness of their findings. This study fills these gaps by extending the scope up to 2024, ensuring a more comprehensive analysis of the relationship between monetary policy and inflation. It also applies all required diagnostic tests to improve result validity and includes a broader set of monetary policy variables, monetary policy rate, cash reserves ratio, exchange rate, and inflation, to provide a more detailed assessment of policy effectiveness in Nigeria.

3. Methodology

This study adopts an ex-post facto research design, which is suitable for examining the causal relationship between monetary policy variables and the inflation rate in Nigeria over the period 1986–2024. The design is appropriate because the variables under investigation, Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), Exchange Rate (EXR), and Inflation Rate, are historical and cannot be manipulated by the researcher. As Kerlinger and Lee (2000) explain, an ex-post facto design is employed when the independent variables have already occurred and the researcher seeks to assess their influence on the dependent variable using existing data.

The study relies exclusively on secondary annual time series data spanning from 1986 to 2024. Data on inflation rate, monetary policy rate, cash reserve ratio, and exchange rate were obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin (2025) and the World Development Indicators (WDI, 2025).

These sources were selected for their reliability and comprehensive coverage of Nigeria's macroeconomic indicators over the study period.

3.1 Model Specification

The model for this study is anchored on the Monetary Theory of Inflation, which links money supply and general price levels (Fisher, 1911; Friedman, 1968). In line with monetarist reasoning, inflation is influenced by monetary policy actions transmitted through key instruments such as the monetary policy rate (MPR), cash reserve ratio (CRR), and exchange rate (EXR).

Building on Daniel (2024), who examined monetary policy and inflation in Nigeria, this study modifies the model by excluding money supply (MS) and the Treasury Bill Rate (TBR). These variables were found to produce overlapping or unstable effects, while the CRR, an instrument directly influencing liquidity, was included. The functional form of the model is expressed as:

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

The econometric specification is given as:

$$INF_t = \beta_0 + \beta_1 MPR_t + \beta_2 CRR_t + \beta_3 EXR_t + \varepsilon_t \quad 2$$

where INF denotes inflation rate, MPR is the monetary policy rate, CRR is the cash reserve ratio, and EXR is the exchange rate.

To assess both short- and long-run dynamics, the study employs the Auto-Regressive Distributed Lag (ARDL) model. The ARDL bounds test is used to determine cointegration among the variables, where the null hypothesis of no long-run relationship (H_0) is tested against the alternative hypothesis of a long-run relationship (H_1). To perform the bound test for co-integration, the ARDL model employed for this study is specified as:

$$\Delta INF_t = \alpha_{01} + \beta_{11} INF_{t-i} + \beta_{21} MPR_{t-i} + \beta_{31} CRR_{t-1} + \beta_{41} EXR_{t-1} + \sum_{i=1}^{p} \alpha_{1i} \Delta INF_{t-1} + \sum_{i=1}^{q1} \alpha_{2i} \Delta MPR_{t-1} + \sum_{i=1}^{q2} \alpha_{3i} \Delta CRR_{t-1} + \sum_{i=1}^{q3} \alpha_{4i} \Delta EXR_{t-1} + \mu_{1t} \quad 3$$

$H_0(long\ run\ relationhip\ does\ not\ exist)$: $\beta_{1i} = \beta_{2i} = \beta_{3i} = \beta_{4i}$

$H_1(long - run\ relationhip\ does\ exist)$: $\beta_{1i} \neq \beta_{2i} \neq \beta_{3i} \neq \beta_{4i}$ (i = 1, 2)

Hence, lack of co-integration shows that a variable has no long-run relationship

After estimating the econometric model, several diagnostic tests were conducted to ensure the robustness, reliability, and validity of the regression results. These tests verify compliance with key assumptions of

the classical linear regression model, including normality, independence, homoscedasticity, correct model specification, and structural stability.

4. Results and Discussion

Tables 1: Descriptive Statistic Result

	INF	MPR	CRR	EXR
Mean	19.77689	13.73385	11.40513	178.9236
Median	13.00697	13.50000	10.00000	128.6517
Maximum	72.83550	26.00000	32.50000	1478.965
Minimum	5.388008	6.000000	0.000000	1.754523
Std. Dev.	16.93999	3.939692	9.900743	256.4569
Skewness	1.729529	0.770157	0.678202	3.597396
Kurtosis	4.865564	4.549589	2.254074	18.24176
Jarque-Bera	25.09879	7.757414	3.893887	461.6240
Probability	0.000004	0.020678	0.142710	0.000000
Observations	39	39	39	39

Source: Author's computation using Eviews (2025)

The descriptive results reveal that Nigeria experienced a persistently high and volatile inflation rate between 1986 and 2024, with an average of 19.78% and wide fluctuations ranging from 5.39% to 72.84%. This confirms the country's long-standing macroeconomic instability and vulnerability to policy and external shocks. The inflation series is positively skewed and leptokurtic, indicating that periods of moderate inflation were more frequent, but extreme inflationary episodes, particularly in the 1990s, significantly influenced the overall trend. The Monetary Policy Rate (MPR) averaged 13.73%, reflecting the Central Bank's active but moderately variable use of interest rates to manage price stability. Although the MPR distribution slightly deviates from normality, its variations remained within a controlled range. The Cash Reserve Ratio (CRR) averaged 11.41% and exhibited higher variability, showing frequent adjustments by the CBN to regulate liquidity conditions; its near-normal distribution suggests relatively balanced policy interventions. The exchange rate data show an average of ₦178.92 per US dollar, with extreme volatility and a sharp long-term depreciation trend, particularly during economic crises and policy reforms. The high skewness and kurtosis values confirm that exchange rate movements in Nigeria have been irregular and heavily influenced by market distortions, policy changes, and external shocks. Overall, the descriptive statistics highlight a macroeconomic environment characterized by inflationary pressure, policy volatility, and exchange rate instability.

Table 2: Correlation Matrix Result

	INF	MPR	CRR	EXR
INF	1			
MPR	0.424151	1		
CRR	-0.1992911	0.292085	1	
EXR	-0.073867	0.3315789	0.5535156	1

Source: Author's computation using Eviews (2025)

The correlation analysis reveals generally weak to moderate relationships between inflation and key monetary policy variables in Nigeria. Inflation shows a positive correlation with the Monetary Policy Rate (MPR), indicating that higher policy rates tend to coincide with periods of rising inflation. This suggests that the Central Bank often raises interest rates in reaction to inflationary pressures rather than preemptively, reflecting a policy response effect rather than a direct causal influence. The relationship between inflation and the Cash Reserve Ratio (CRR) is weakly negative, implying that tighter liquidity conditions through higher reserve requirements have only a limited effect on curbing inflation. Similarly, the correlation between inflation and the exchange rate (EXR) is slightly negative, suggesting that short-run exchange rate fluctuations have had minimal direct impact on price levels—likely due to lagged pass-through effects and government interventions such as subsidies and import controls. Among the monetary policy variables themselves, CRR and EXR exhibit a strong positive correlation, indicating that exchange rate depreciation often coincides with tighter reserve requirements, while moderate positive correlations between MPR, CRR, and EXR reflect coordinated policy responses to macroeconomic instability. Overall, the results suggest that inflation in Nigeria is influenced more by structural and policy-related factors than by immediate, linear interactions among monetary variables.

Table 3: Unit Root Test Results

ADF Unit Root Result					
Variables	**At Level**		**At First Difference**		**Order of integration**
	T – statistics	**P-value**	**T – statistics**	**P-value**	
INF	-3.5783	0.0111			I(0)
MPR	-2.9873	0.0451			I(0)
CRR	0.3170	0.9762	-5.1029	0.0002	I(1)
EXR	1.0450	0.9962	-4.8838	0.0000	I(1)
PP Unit Root Result					
Variables	**At Level**		**At First Difference**		**Order of integration**
	T – statistics	**P-value**	**T – statistics**	**P-value**	
INF	-3.0188	0.0421			I(0)
MPR	-3.0170	0.0423			I(0)
CRR	-0.0838	0.9440	-5.2260	0.0001	I(1)
EXR	3.7865	1.0000	-5.4997	0.0000	I(1)

Source: Author's computation using Eviews (2025)

The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests show that the inflation rate (INF) and the Monetary Policy Rate (MPR) are stationary at level, meaning they move around a constant average and shocks to them fade over time. In contrast, the Cash Reserve Ratio (CRR) and the Exchange Rate (EXR) are only stationary after first differencing, indicating they have long-term trends and shocks can have lasting effects. Because the variables are a mix of I(0) and I(1), traditional models like VAR are not suitable. Therefore, this study uses the Autoregressive Distributed Lag (ARDL) model, which can handle variables of different orders and capture both short-run and long-run relationships between inflation and key monetary policy tools in Nigeria from 1986 to 2024.

Tables 4: Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-454.5660	NA	1361966.	25.47589	25.65184	25.53730
1	-386.6914	116.8953	76855.65	22.59396	23.47370*	22.90101*
2	-368.8597	26.74750*	71969.61*	22.49220*	24.07572	23.04490
3	-353.8338	19.19978	83385.35	22.54632	24.83363	23.34465

Source: Author's computation using Eviews (2025)

The results in Table 4.4 show different criteria suggesting different optimal lag lengths. This study adopts the Akaike Information Criterion (AIC), which is preferred in empirical research for its efficiency with small samples and its focus on minimizing information loss. The AIC indicates an optimal lag length of 2, as it gives the lowest value (22.49220) compared to other lags. While the LR and FPE criteria also support lag 2, the SC and HQ suggest a more conservative lag of 1. Lag 2 is chosen because it balances model fit and complexity effectively. This lag structure will guide the ARDL estimation, allowing the model to capture both short-run adjustments and long-run relationships among the variables.

Table 5: ARDL F-Bound Cointegration Test Result

F-Bounds Test			***Null Hypothesis: No levels relationship***	
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	5.721325	10%	2.37	3.2
K	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Source: Author's computation using Eviews (2025)

The ARDL F-Bounds test shows a strong long-run relationship between inflation and the monetary policy variables, as the F-statistic (5.721) exceeds the upper bound at all significance levels. This confirms cointegration, justifying the use of the ARDL model to estimate both short-run dynamics and long-run equilibrium relationships.

4.1 Estimation Results

This section presents the core empirical findings derived from the specified ARDL model. It includes the estimated long-run coefficients, short-run dynamics, and error correction mechanisms that capture the effects of monetary policy variables on inflation rate in Nigeri

Table 6: ARDL Long Run Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Remark
MPR	4.901661	1.200041	4.084579	0.0003	Significant
CRR	-1.401042	0.406239	-3.448813	0.0018	Significant
EXR	2.661556	1.114948	2.387156	0.0240	Significant

Source: Author's computation using Eviews (2025)

In the long run, the monetary policy rate (MPR) has a positive and significant effect on inflation, with a 1% increase in MPR associated with a 4.90% rise in inflation rate. This counterintuitive result suggests that rate hikes often reflect the central bank's response to rising inflation rather than effectively controlling it, highlighting the limited impact of interest rate policies in structurally constrained economies like Nigeria. The finding aligns with prior studies showing weak transmission of monetary policy due to structural rigidities and a large informal sector.

The cash reserve ratio (CRR) has a negative and significant long-run effect on inflation, with a 1% increase in CRR reducing inflation by 1.40%. This indicates that higher reserve requirements effectively withdraw liquidity from the banking system, thereby dampening inflationary pressures. The result supports theoretical predictions about the contractionary impact of CRR adjustments and aligns with evidence from emerging economies where reserve policies help stabilize prices over the long term.

The exchange rate (EXR) also significantly influences long-run inflation, with a 1% depreciation of the Naira linked to a 2.66% increase in inflation rate. This reflects a meaningful pass-through effect of currency depreciation to domestic prices, showing that sustained exchange rate pressures can amplify inflation. Together, these findings underscore the critical roles of interest rate policy, liquidity management, and exchange rate movements in shaping long-run inflation in Nigeria, while also highlighting the structural and institutional challenges that affect policy effectiveness.

Table 7: ARDL Short-run Estimation and ECT Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.*	Remark
INF(-1)	0.731910	0.161293	4.537774	0.0001	Significant
INF(-2)	-0.558242	0.168955	-3.304078	0.0026	Significant
MPR	1.916859	0.766766	2.499929	0.0186	Significant
MPR(-1)	0.031845	0.747429	0.042606	0.9663	Not Significant
MPR(-2)	2.101695	0.685651	3.065256	0.0048	Significant
CRR	0.223363	0.799112	0.279514	0.7819	Not Significant
CRR(-1)	-1.381089	0.853256	-1.618611	0.1167	Not Significant
EXR	-2.199329	0.938701	-2.342950	0.0265	Significant
CointEq(-1)*	-0.826332	0.144519	-5.717804	0.0000	Significant
Adjusted R-squared	0.565037				
F-statistic	6.845713	Durbin-Watson stat		1.510707	
Prob(F-statistic)	0.000056				

Source: Author's computation using Eviews (2025)

In the short run, the ARDL model explains about 56.5% of the variation in inflation rate, with an F-statistic of 6.85 (p = 0.000056) confirming overall model significance and a Durbin-Watson value of 1.51 indicating moderate absence of autocorrelation. This shows that the model provides a reliable framework for analyzing the immediate effects of monetary policy on inflation in Nigeria.

The monetary policy rate (MPR) has both contemporaneous and delayed effects on inflation. A 1% increase in the current MPR raises inflation by 1.92% (p = 0.0186), while the second lag of MPR adds a

further 2.10% (p = 0.0048), reflecting slow policy transmission and structural constraints in the economy. The first lag of MPR and the cash reserve ratio (CRR) are insignificant, indicating that short-term impacts of policy adjustments and liquidity withdrawal are not uniform and may be limited by weak enforcement or compensatory market behaviors.

Exchange rate (EXR) movements show a significant negative immediate effect on inflation (-2.20, p = 0.0265), suggesting that short-term depreciation of the Naira may temporarily reduce inflation due to policy interventions or structural adjustments. The error correction term (-0.826, p = 0.0000) is highly significant, indicating that about 83% of deviations from long-run equilibrium are corrected within one period, confirming the stability of the long-run relationship and the economy's capacity to revert to equilibrium after short-term shocks. Overall, these results highlight that monetary policy influences inflation in Nigeria, but effects are often lagged, partial, or constrained by structural factors.

Table 9: Diagnostic Test Results

Test	Test Statistic	(p-value)	Remark
Normality Test (Jarque–Bera)	2.616836	0.270247	Residuals are normally distributed
Serial Correlation (LM Test – F-statistic)	0.894474	0.4210	No serial correlation
Serial Correlation (Obs*R^2)	2.381920	0.3039	No serial correlation
Heteroskedasticity (BPG – F-statistic)	1.456691	0.2175	No heteroskedasticity
Heteroskedasticity (Obs*R^2)	10.87370	0.2090	No heteroskedasticity
Heteroskedasticity (Scaled Explained SS)	8.432994	0.3924	No heteroskedasticity
Ramsey RESET Test (F-statistic)	1.929204	0.1762	Model is correctly specified

Source: Author's computation using Eviews (2025)

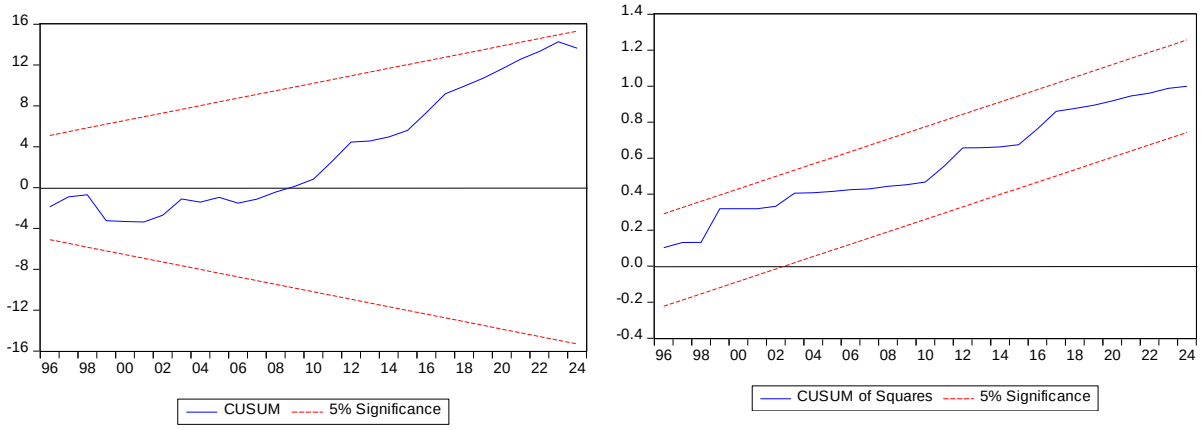

Figure 1: CUSUM and CUSUM of Squares Test Results
Source: Author's computation using Eviews (2025)

The diagnostic test results indicate that the ARDL model used in this study is robust and reliable. The Jarque-Bera test (p = 0.2702) shows that the residuals are normally distributed, satisfying the assumption of normality required for valid statistical inference. Both serial correlation tests (LM Test F-statistic and Obs*R^2) have p-values above 0.05, indicating no serial correlation; this means the residuals are independent over time and the model estimates are not biased due to autocorrelation.

Regarding heteroskedasticity, all tests, including BPG F-statistic, Obs*R^2, and Scaled Explained SS, returned p-values well above 0.05, confirming that the error variance is constant across observations, which ensures the efficiency of the coefficient estimates. The Ramsey RESET test (p = 0.1762) suggests the model is correctly specified, implying the functional form is appropriate and no key variables are omitted. Overall, these diagnostic results support the statistical soundness of the ARDL model in capturing both short-run and long-run relationships between monetary policy variables (MPR, CRR, EXR) and inflation in Nigeria.

4.2 Discussion of the Results

The study finds that the Monetary Policy Rate (MPR) significantly influences inflation in Nigeria in both the short and long run. In the short term, the ARDL results show that a 1% increase in MPR raises inflation by 1.92% (p = 0.0186), while the second lag of MPR contributes an additional 2.10% (p = 0.0048), indicating delayed transmission or a pro-cyclical effect where rate hikes coincide with rising prices. In the long run, the coefficient rises to 4.90 (p = 0.0003), suggesting that persistent increases in MPR are linked to sustained inflationary pressures. These findings align with the Structuralist perspective, which highlights that interest rate interventions may have limited effectiveness in structurally constrained economies with large informal sectors, shallow financial markets, and supply-side bottlenecks. They also support the observations of Ibrahim & David (2022) and Adebayo & Olawunmi (2023), who argue that MPR adjustments in Nigeria often reflect reactive rather than proactive policy measures, emphasizing the need to pair interest rate changes with broader structural reforms and liquidity management to effectively curb inflation.

In contrast, the Cash Reserve Ratio (CRR) exhibits a muted and inconsistent impact on inflation, particularly in the short run. The ARDL short-run estimates show that both current CRR (0.22, p = 0.7819) and its first lag (-1.38, p = 0.1167) are statistically insignificant, suggesting that immediate adjustments in reserve requirements do not strongly influence inflation. However, the long-run effect is negative and significant (-1.40, p = 0.0018), indicating that sustained increases in CRR gradually reduce inflation by withdrawing excess liquidity from the banking system. This pattern is consistent with the Structuralist view that monetary tools like CRR may not transmit quickly in economies constrained by institutional weaknesses, a large informal sector, and delayed credit flows. The long-run significance of CRR corroborates the arguments of Ibrahim & David (2022) and Adebayo & Olawunmi (2023) that

consistent liquidity management can support price stability, highlighting the importance of integrating CRR adjustments with complementary fiscal and monetary measures to strengthen their effectiveness in controlling inflation.

Exchange rate movements also play a critical role in shaping inflation dynamics in Nigeria. Short-run estimates show a negative contemporaneous effect of depreciation on inflation (-2.20, p = 0.0265), suggesting temporary price moderation possibly due to import substitution, policy interventions, or short-term structural adjustments. In the long run, however, the effect is positive and significant (2.66, p = 0.0240), indicating that sustained depreciation of the naira contributes to higher inflation, reflecting the country's import-dependent economy. These results align partially with previous studies by Oyegun & Joshua (2024) and Henry & Sabo (2020), which noted context-dependent exchange rate effects on inflation. The positive long-run impact supports the Monetary Approach to Exchange Rates, which links currency depreciation to rising import prices, while the Structuralist perspective further explains how domestic supply constraints, infrastructure deficits, and policy inefficiencies magnify the inflationary consequences of exchange rate movements. Overall, the findings suggest that while short-term exchange rate changes may have limited influence, persistent depreciation exerts inflationary pressures, highlighting the need for coordinated monetary and fiscal interventions to stabilize prices effectively.

5. Conclusion and Recommendations

The study concludes that monetary policy variables influence inflation in Nigeria in different ways, shaped by both structural constraints and policy limitations. The Monetary Policy Rate (MPR) consistently raises inflation, suggesting that interest rate adjustments alone are insufficient to control price pressures, especially in a structurally weak economy. The Cash Reserve Ratio (CRR) helps reduce inflation in the long run, though its short-term effects are limited, while exchange rate movements show a mixed impact: short-term depreciation may temporarily ease inflation, but sustained depreciation increases long-term inflation due to Nigeria's import dependence. The efficient adjustment of deviations from long-run equilibrium indicates a stable relationship between monetary policy tools and inflation.

Based on the empirical findings of the study and in line with the specific objectives, the following recommendations are proposed:

i. The CBN should use the Monetary Policy Rate (MPR) cautiously, avoiding frequent or large changes, and combine it with measures like credit control and liquidity management, while coordinating with fiscal authorities to enhance its effectiveness in controlling inflation.

ii. Cash Reserve Ratio (CRR) adjustments should be used as a medium- to long-term tool to manage liquidity and moderate inflation, with gradual and predictable changes to avoid financial market disruptions.

iii. Exchange rate policy should be integrated with structural reforms, such as boosting domestic production, reducing import dependence, and managing foreign reserves, to lessen inflationary pressures and support monetary policy, given that domestic factors drive inflation more than currency fluctuations.

5.2 Contribution to knowledge

This study provides updated empirical evidence on the impact of key monetary policy instruments, Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Exchange Rate (EXR), on inflation in Nigeria over the period 1986–2024, using the ARDL framework to capture both short-run and long-run dynamics. The findings show that MPR has a strong and persistent influence on inflation, CRR has limited short-term effects but contributes modestly in the long run, and exchange rate movements have mixed effects, highlighting the complexity of inflation management in Nigeria. The results support the Monetary Theory of Inflation by demonstrating how expansionary monetary measures can fuel inflation when not matched by real output growth, while also reflecting Structuralist Theory, which emphasizes the role of domestic structural constraints in shaping inflation outcomes.

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