

Research article

Monetary policy and inflation in Nigeria: a dynamic ordinary least squares approach

Anne Urenna Azuike

Department of Economics, Faculty of Social Sciences, Imo State University, Owerri, Nigeria

* Corresponding author.

E-mail address: azuikeanne@imsuonline.edu.ng, anneazuike@gmail.com (Azuike, A. U.). 

Abstract

This study investigates the long-term impact of monetary policy on inflation in Nigeria from 2000 to 2025, focusing on the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and broad money supply (M2). The study was driven by the persistence of high inflation in the face of an exceptional monetary tightening cycle that increased the MPR to 27.25% and the CRR to 50% by 2024. Using an ex-post facto quantitative design and annual data from the CBN Statistical Bulletin, the Augmented Dickey-Fuller test confirmed that all variables have order one integration, $I(1)$, while the Johansen test identified two cointegrating equations. The Dynamic Ordinary Least Squares (DOLS) estimator was used for long-term estimation. The MPR ($\beta = 0.417$; $p = 0.873$) and CRR ($\beta = 0.436$; $p = 0.582$) were not statistically significant in the long term. However, the wide money supply had a negative and substantial effect ($\beta = -6.048$; $p = 0.015$), indicating financial deepening rather than excess demand. Post-estimation diagnostics validated the model's robustness, normalcy, and structural integrity. The paper indicates that traditional monetary instruments are ineffective against Nigeria's supply-side inflation and suggests a whole-of-government approach that includes exchange rate stabilisation, supply-chain investment, and credible inflation targeting.

Keywords: Monetary Policy Rate, Cash Reserve Ratio, Broad Money Supply, Inflation, Dynamic Ordinary Least Squares

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INTRODUCTION

Monetary policy is a key tool used by central banks to achieve price stability; however, the relationship between monetary policy and inflation in Nigeria is still debated. The Quantity Theory of Money (Fisher, 1911; Friedman, 1963) suggests that excess money supply growth leads to inflation, while Keynesian and New Keynesian approaches prioritise aggregate demand, expectations, and interest rate transmission (Galí, 2015).

Despite the Central Bank of Nigeria (CBN) raising the Cash Reserve Ratio (CRR) to 50.0% and the Monetary Policy Rate (MPR) by a total of 1,575 basis points between 2022 and September 2024, Nigeria's headline inflation increased from 11.98% in December 2019 to a modern-era peak of 34.8% in December 2024 (CBN, 2024; NBS, 2024). This study was inspired by the paradox of aggressive tightening and rising inflation, which Adebisi, Adenuga, Abeng, Adeboye, and Adamgbe (2024) refer to as a "price puzzle." There is conflicting data in the empirical literature: Ashakah, Nwadike, and Onuoha (2025) discover a negative and minor M2 effect on inflation, whereas Ajoke, Abdullahi, Bamigbose, Baba, and Saadu (2026) report a significant positive MPR effect and a significant negative CRR effect. In order to close this gap, this study simultaneously estimates the long-term impacts of the MPR, CRR, and M2 on inflation using annual data from 2000 to 2025, which includes two cycles of commodity prices, the financial crisis of 2008–2009, the COVID-19 shock, and the tightening cycle of 2022–2024. The specific objectives are to examine the effect of the MPR, the CRR, and broad money supply (M2) on Nigeria's inflation rate.

LITERATURE REVIEW

Theoretical Framework

The study anchors on Friedman's (1963) reformulation of the Quantity Theory of Money, which is represented by Fisher's (1911) equation of exchange, $MV = PT$, which forecasts a positive long-term link between the money supply and prices. It is supplemented by the Fiscal Theory of the Price Level (Leeper, 1991; Sims, 1994), which emphasises the role of fiscal dominance in Nigeria's inflation dynamics, particularly the CBN's Ways and Means advances, and the New Keynesian framework, in which the MPR operates through interest rate and credit channels and the CRR operates through the liquidity channel (Galí, 2015).

Empirical Review

Research on the relationship between MPR and inflation indicates that Nigeria continues to face a "price puzzle." Nadani and Isah (2024) discovered that inflation stays positive after contractionary MPR shocks using a structural VAR on monthly data from 2006 to 2023. While Akande, Dandaura, and Akanni (2024) observed that the MPR has a substantial influence through the Treasury bill rate channel using an FAVAR model, Okafor, Ezebilo, Ezeibe, and Eze (2025) similarly found that structural rigidities diminish the MPR's long-run effect on inflation.

According to Omonibo, Gambo, Adeyemo, and Atolagbe (2025), the 50% CRR caused Nigerian banks to lose about ₦840.2 billion in revenue in 2024. Meanwhile, Okunade, Lawal, and Balogun (2025) discovered that the CRR, even at a global high of 45–50%, failed to stop inflation from getting worse amid dominant supply-side drivers. Similarly, supply-side inflation reduces the efficiency of CRR, according to Obode and Gini (2025).

Results on the money supply are inconsistent. M2 has a large positive long-run effect on inflation, which is consistent with the QTM, according to Ibikunle, Adamu, and Olawale (2025) using GMM on 1985–2024 data and Williams, Bank-Ola, and Agelebe (2022) using ARDL-ECM. This analysis fills an empirical gap by using jointly estimated, updated time series data from 2000 to 2025. In contrast, Ashakah, Nwadike, and Onuoha (2025) showed an insignificant M2-inflation effect, and Ajoke et al. (2026) found an inconsequential connection.

RESEARCH METHOD AND MATERIALS

This study employs an ex-post facto quantitative research design, utilising annual time-series data for Nigeria from 2000 to 2025 (26 observations) obtained from the CBN Statistical Bulletin and NBS publications. The model, taken from Okafor, Ezebilo, Ezeibe, and Eze (2025), but extended to include the CRR and updated to 2025, is as follows:

$$INFL_t = \beta_0 + \beta_1MPR_t + \beta_2CRR_t + \beta_3LNBMS_t + \varepsilon_t$$

INFL is the headline inflation rate (CPI-based), MPR is the monetary policy rate, CRR is the cash reserve ratio, and LNBMS is the natural logarithm of broad money supply (M2). MPR and CRR are supposed to have a negative relationship with inflation, but LNBMS should have a positive relationship, according to traditional monetary transmission theory.

Descriptive statistics, Johansen (1988) multivariate cointegration testing, Dynamic Ordinary Least Squares (DOLS) estimation (Stock & Watson, 1993) with two leads and two lags, Variance Inflation Factor (VIF) multicollinearity assessment, and post-estimation diagnostics including the Breusch-Godfrey serial correlation test, the Harvey heteroskedasticity test, the Ramsey RESET test, the Jarque-Bera normality test, and the CUSUM structural stability test are used in the analysis. EViews 13 was used for all estimations.

RESULT PRESENTATION AND DISCUSSION

Descriptive Statistics

The descriptive statistics for the study variables from 2000 to 2025 are shown in Table 1. The mean MPR and CRR were 13.17% and 17.21%, respectively, illustrating the CBN's inconsistent use of both instruments across policy regimes, while the mean inflation for the period was 14.14%, ranging from 5.40% to 33.20%. While CRR and the logged M2 series are roughly normally distributed, INFL and MPR show notable deviations from normality (Jarque-Bera $p < 0.01$), which is consistent with the leptokurtic, shock-prone nature of Nigerian macroeconomic statistics.

Table 1. Descriptive Statistics of Study Variables (2000–2025)

Statistic	INFL	MPR	CRR	LNBMS_M
Mean	14.1365	13.1731	17.2115	9.4990
Median	13.0500	12.1250	13.5000	9.8630
Maximum	33.2000	27.2500	50.0000	11.7313
Minimum	5.4000	6.0000	1.0000	6.9432
Std. Deviation	6.1933	4.9167	13.3223	1.3888
Jarque-Bera (Prob.)	16.39 (0.0003)	20.38 (0.0000)	2.68 (0.2612)	1.43 (0.4891)
Observations	26	26	26	26

Unit Root and Cointegration Results

The ADF test results in Table 2 confirm that all variables are non-stationary at the level but stationary at the first difference, indicating that INFL, MPR, CRR, and LNBMS_M are of order one, I(1).

Table 2. ADF Unit Root Test Results

Variable	Level (t-stat)	Prob.	1st Diff. (t-stat)	Prob.	Order
INFL	-2.6091	0.1050	-4.1060	0.0045**	I(1)
MPR	0.1869	0.9661	-4.5017	0.0017**	I(1)
CRR	0.1452	0.9629	-5.9633	0.0001***	I(1)
LNBMS_M	-0.9373	0.7582	-3.0087	0.0483*	I(1)

The Johansen cointegration test was used in light of the common order of integration (Table 3). The null hypothesis of no cointegration is rejected by both the trace and maximum-eigenvalue statistics, which find two cointegrating equations and validate a stable long-term equilibrium relationship between the variables.

Table 3. Johansen Cointegration Test Results

Hypothesized No. of CE(s)	Eigenvalue	Trace Stat.	5% Crit. Value	Max-Eigen Stat.	Prob.
None *	0.7175	61.4919	47.8561	30.3363	0.0016
At most 1 *	0.5392	31.1557	29.7971	18.5949	0.0347
At most 2	0.3862	12.5607	15.4947	11.7126	0.1319
At most 3	0.0347	0.8482	3.8415	0.8482	0.3571

DOLS Long-Run Estimates

The DOLS long-run estimates (sample 2003–2023, 21 observations after lead and lag adjustment) are shown in Table 4. Both the CRR coefficient ($\beta = 0.436$; $p = 0.582$) and the MPR coefficient ($\beta = 0.417$; $p = 0.873$) are not insignificant. Inflation is significantly and negatively impacted by the broad money supply ($\beta = -6.048$; $p = 0.015$). The regressors collectively account for around 97% of the variation in inflation across the study period, according to the model's R-squared of 0.973.

Since the centred VIF values (MPR = 3.77; CRR = 6.23; LNBMS_M = 2.42) are all less than 10, multicollinearity does not affect the estimates.

Table 4. DOLS Long-Run Estimation Results (Dependent Variable: INFL)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	0.4170	2.3075	0.1807	0.8733
CRR	0.4358	0.6700	0.6503	0.5822
LNBMS_M	-6.0478	2.8215	-5.1434	0.0153**
C (Constant)	62.5143	43.5421	1.4357	0.2876

Diagnostic Tests

The post-estimation diagnostics, which all attest to the DOLS specification's sufficiency, are compiled in Table 5. The Harvey test verifies homoskedasticity ($p = 0.767$), the Ramsey RESET test verifies proper functional form ($p = 0.214$), the Breusch-Godfrey test finds no evidence of serial correlation ($p = 0.282$), residuals are roughly normal, and the CUSUM statistic stays within the 5% bounds throughout the sample, confirming parameter stability.

Table 5. Post-Estimation Diagnostic Test Results

Test	Statistic	Prob.
Breusch-Godfrey Serial Correlation LM (F)	1.3492	0.2821
Harvey Heteroskedasticity (F)	0.3817	0.7672
Ramsey RESET (F)	1.6688	0.2137
Jarque-Bera Normality (residuals)	—	> 0.05
CUSUM Stability	—	Within 5% bounds

Discussion

The "price puzzle" reported by Nadani and Isah (2024) and Okafor et al. (2025) is supported by the negligible MPR effect, which reflects Nigeria's structural limitations on interest rate transmission, such as restricted financial inclusion, administered pricing, and the predominance of cost-push inflation drivers (Ozili, 2023). The little CRR effect is in line with the findings of Okunade, Lawal, and Balogun (2025) and Obode and Gini (2025), who discovered that reserve requirement tightening cannot sustainably limit inflation that is mostly supply-side and structural in origin, even at historic highs of 45–50%.

The most noteworthy result is the negative, significant M2-inflation association, which deviates from the QTM prediction but is consistent with Ajoke et al. (2026) and Ashakah, Nwadike, and Onuoha (2025). This finding is interpreted as proof that M2 expansion between 2000 and 2025, which was largely fuelled by digital financial inclusion and mobile banking, financed supply-chain activity and productive capacity rather than just demand-driven consumption, ultimately reducing rather than increasing inflation. This result provides empirical backing for the CBN's shift away from monetary aggregate targeting and toward explicit inflation targeting under Governor Cardoso.

CONCLUSION

The long-term impact of monetary policy on Nigerian inflation between 2000 and 2025 was investigated in this study. The results show that, in contrast to conventional monetarist assumptions, the wide money supply has a considerable disinflationary effect whereas Nigeria's traditional monetary tools, the MPR and CRR, have no long-term impact on inflation. The findings show that, even in cases where individual instrument effects are not statistically significant, monetary policy and inflation are systematically linked through cointegration, and that supply-side and structural factors outside the purview of traditional monetary tools are primarily responsible for Nigeria's inflation.

In order to achieve long-term price stability, the study suggests that: (i) the CBN strengthen its commitment to explicit inflation targeting, supplementing interest rate adjustments with credible forward guidance and coordinated monetary-fiscal frameworks; (ii) the CRR be deployed more selectively, given its documented cost to bank profitability relative to its limited disinflationary effect; (iii) M2 expansion be directed toward productive investment, particularly in agriculture, energy, and infrastructure, to reinforce its observed disinflationary, supply-enhancing role; and (iv) policymakers adopt a whole-of-government approach that combines exchange rate stabilisation and supply-side interventions with monetary policy.

The lack of clear structural-break controls for events like the 2014–2016 oil price crash and the 2023 withdrawal of fuel subsidies, as well as the study's dependence on annual data, which limits research of short-run dynamics, are its main limitations. To evaluate the generalisability of these results, future studies could use a threshold regression technique or a Vector Error Correction Model and expand the investigation to a panel of West African economies.

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