

Inflation as a Moderator of Interest Rate Fluctuations and Bank Profitability in Nigeria

Adedeji Daniel GBADEBO

Department of Accounting Science, Walter Sisulu University, Mthatha, South Africa
corresponding author e-mail : agbadebo@wsu.ac.za

Article Info	Abstract
<i>Keywords:</i> Inflation; Interest Rate; Profitability; Return on Assets; Return on Equity; Net Interest Margin <i>DOI:</i> 10.33830/jfba.v5i2.13401.2025	This study investigates the novel moderating role of inflation in the relationship between interest rates and the profitability of listed deposit money banks in Nigeria over the period 2012–2022. Using panel data from 11 banks, the study applies Fixed Effects (FE) and Random Effects (RE) panel regression models, with profitability measured by Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM). Findings indicate that inflation significantly moderates the relationship between interest rates and both ROA and ROE, suggesting that asset- and equity-based measures of profitability are highly sensitive to inflationary dynamics. Conversely, the moderating effect on NIM is insignificant, implying that margins are relatively insulated from inflationary shocks. Theoretical implications highlight the asymmetrical impact of inflation on banking performance, reinforcing the relevance of the Fisher Effect, Modigliani-Miller intermediation theory, and Agency Cost theory in explaining bank behavior under inflationary conditions. Policy implications suggest that the Central Bank of Nigeria integrate inflation-sensitive indicators into supervisory frameworks, while banks strengthen risk management practices to mitigate macroeconomic vulnerabilities and sustain profitability. This study contributes uniquely by empirically demonstrating how inflation moderates interest rate transmission to bank profitability in a developing economy context.

1. Introduction

The banking sector plays a central role in economic development, particularly in emerging economies such as Nigeria, by mobilizing financial resources and allocating them efficiently across sectors. In Nigeria, banks' profitability has historically been influenced by macroeconomic variables, notably interest rates, which determine cost of funds and yield on assets, and inflation, which affects both operating costs and the real value of income streams. Recent empirical studies indicate that high inflation has eroded banks' net interest margins (NIM) and cost-to-income ratios (CIR), while rising interest rates have elevated both lending opportunities and funding costs (Sanusi, 2018; Okafor & Ojo, 2020). Such dynamics prompt a closer examination of how inflation might moderate the relationship between interest rate movements and bank profitability.

Interest rates, often controlled via the Central Bank of Nigeria's (CBN) Monetary Policy Rate (MPR), impact bank profitability through complex mechanisms. On one hand, increases in the MPR can boost banks' interest income by widening the yield spread, enhancing net profits. On the other hand, elevated rates raise the cost of funds and may dampen loan demand, thereby constraining profitability (Adewale et al., 2021; Olokoyo, 2016). Empirical evidence from Nigerian banks indicates that higher MPR, even with concurrent inflation control aims, has simultaneously heightened interest income and compressed net interest margins due to increased interest expenses (Adeniran & Olawale, 2022).

Concurrently, inflation in Nigeria has surged to multi-decade highs, driven by supply-chain disruptions, energy costs, and exchange rate volatility (Sanusi, 2018; Okafor & Ojo, 2020). The inflationary environment pressures banks' operating expenses and personnel costs, contributing to wider cost-to-income

ratios even as operating income rises. These developments suggest that inflation may not only directly influence profitability but also alter how interest rate changes translate into bank performance.

The interplay between interest rate and inflation is well-documented in monetary theory. The Fisher Effect posits that nominal interest rates adjust one-for-one with expected inflation, leaving real rates constant, suggesting limited real effects of inflation-targeted rate changes (Fisher, 1930; Alimi & Ofonyelu, 2019). Conversely, deviations such as the Mundell–Tobin effect propose that nominal rates lag inflation due to behavioural shifts in money demand, implying non-proportional adjustments (Mundell, 1963; Tobin, 1965). These theoretical perspectives provide a foundation for considering how inflation might moderate the direct effects of interest rate adjustments on profitability.

Despite extensive research on bank profitability determinants in emerging markets, a critical research gap exists in Nigeria regarding the moderating role of inflation on the interest rate–profitability nexus. Most prior studies examine the unilateral effects of interest rates or inflation, without exploring interaction effects that could reveal whether inflation amplifies or dampens the impact of interest rate adjustments on profitability metrics such as ROA, ROE, and NIM. Addressing this gap, the present study investigates how inflation moderates the relationship between interest rate changes and banks' profitability in Nigeria using panel data from 2012–2022 and interaction terms in regression models. The findings will provide empirical evidence for policymakers on interest rate-setting in inflationary environments and offer strategic insights for bank management under macroeconomic uncertainty.

The primary objective of this study is to examine the impact of interest rate fluctuations on the profitability of Nigerian banks and to determine the extent to which inflation moderates this relationship. In doing so, the study seeks to uncover whether inflationary conditions amplify or dampen the effects of interest rate adjustments on key profitability measures, including ROA, ROE, and NIM. Furthermore, the study aims to provide both theoretical and policy insights, offering guidance to monetary authorities for interest rate-setting and to bank management for strategic decision-making under macroeconomic uncertainties.

Empirical Review

A large and growing empirical literature has examined the determinants of bank profitability across different institutional contexts, emphasizing the joint importance of bank-specific characteristics (size, capitalization, credit risk, efficiency, liquidity) and macroeconomic factors (GDP growth, inflation, interest rates, exchange rates). Cross-country panel studies using system-GMM, fixed effects, and PMG/ARDL approaches generally find that bank-level characteristics explain much of the variation in profitability, while macroeconomic variables exert context-dependent effects (Le, 2020; Lamothe et al., 2024).

Interest Rate and Bank Profitability

Studies on interest rate effects indicate that nominal interest rate increases can raise interest income and widen net interest margins in the short run, but the net effect on profitability is ambiguous due to rising interest expenses, credit risk, and potential declines in loan demand (Windsor, 2023; Sarfo-Kantanka et al., 2022). Micro-level studies in Australia, Ghana, and Europe show that while NIM often responds positively to higher policy rates, ROA/ROE effects can be muted or reversed once costs and loan growth dynamics are accounted for (Almaskati, 2022).

Inflation and Bank Profitability

Inflation's direct effect on profitability is mixed. Moderate inflation may increase nominal profits, but high or volatile inflation erodes real profits via higher operating costs, credit provisioning, and valuation effects (Bortoluzzo et al., 2024; Karkowska, 2025). Cross-country studies highlight a negative link between high inflation and profitability, whereas some regional studies report non-linear relationships, indicating that inflation may initially enhance profitability up to a threshold (Akpan, 2022).

Moderating Effects of Inflation

Recent empirical work (2020–2025) investigates how inflation conditions the transmission from policy interest rates to bank profitability. Multi-country and country-specific analyses show that inflation can amplify or dampen interest rate effects on NIM, depending on the pace of nominal rate increases relative to inflation expectations and bank funding composition (Qin et al., 2025; IMF, 2025). Country-specific evidence from West Africa, South Asia, Europe, and Latin America underscores that bank structure and

market characteristics influence how inflation moderates interest rate impacts (Osugwu, 2014; Akarogbe, 2024; Hossain & Ahamed, 2021).

Methodological Trends

Panel econometric techniques, including fixed/random effects, system-GMM, and PMG/ARDL, are common to control for endogeneity and distinguish short- and long-run effects. Increasingly, interaction terms and threshold models capture inflation's conditional role (Ozili, 2015; Djalilov & Piesse, 2016). Ignoring these factors risks biased conclusions; meta-analyses highlight that heterogeneity across banks and macro regimes explains conflicting single-country results (Yuan et al., 2022).

Empirical Gaps

Despite extensive studies, key gaps remain: (i) few studies test inflation as a moderator in the interest-rate–profitability nexus in high-inflation emerging economies using bank-level panel data; (ii) limited comparative work differentiates between ROA, ROE, and NIM under interaction effects; (iii) few studies account simultaneously for exchange-rate volatility, fiscal shocks, and regulatory changes; (iv) heterogeneity across bank business models is underexplored. Addressing these gaps will improve understanding of how inflation conditions banks' response to interest rate policy.

Hypotheses Development

The relationship between interest rates and bank profitability, as measured by Return on Assets (ROA), has been widely documented in empirical finance. Higher interest rates can increase interest income, but they also raise funding costs, potentially constraining asset utilization and net earnings (Athanasoglou et al., 2022; Windsor, 2023). Inflation introduces an additional layer of complexity: rising prices erode the real value of returns while simultaneously increasing nominal lending income. Theoretical foundations from the Fisher Effect (Fisher, 1930) and bank intermediation theory (Modigliani & Miller, 1958; Athanasoglou et al., 2022) suggest that inflation can alter the pass-through of interest rate changes to profitability. Empirical studies in emerging markets indicate that inflation can weaken the positive impact of interest rate hikes on ROA due to increased credit risk and operating costs (Lamothe et al., 2024; Bortoluzzo et al., 2024). Therefore, H1 is theoretically justified: inflation is expected to moderate the impact of interest rates on ROA, with higher inflation weakening the extent to which interest rate changes translate into improved asset-based returns for Nigerian banks.

Return on Equity (ROE) reflects how efficiently banks generate net income relative to shareholders' equity and is influenced by both internal capital structure and external macroeconomic factors. Higher interest rates enhance shareholder returns when loan repricing exceeds deposit repricing, but this benefit is often eroded under high inflation due to increased operating costs and provisioning for non-performing loans (Sarfo-Kantanka et al., 2022; Le, 2020). The agency cost theory and intermediation perspectives indicate that inflation increases equity-holder risk exposure by elevating funding and credit uncertainties (Jensen & Meckling, 1976; Yuan et al., 2022). Empirical studies in developing economies confirm that high inflation reduces real returns on equity, particularly during monetary tightening (Athanasoglou et al., 2022; IMF, 2025). Accordingly, H2 is theoretically grounded: inflation is expected to weaken the positive relationship between interest rates and ROE, implying that higher interest rates do not necessarily translate into enhanced shareholder returns under inflationary conditions.

Net Interest Margin (NIM) measures banks' core intermediation efficiency and is sensitive to policy rates and inflation. Higher interest rates theoretically expand NIM if lending rates adjust faster than deposit costs. However, inflationary pressures increase funding costs, elevate credit risk, and reduce borrowers' repayment capacity, which may offset gains (Qin et al., 2025; Lamothe et al., 2024). Intermediation and risk-adjusted profitability theories indicate that NIM outcomes are conditional on inflationary dynamics affecting funding and loan demand (Athanasoglou et al., 2022; Bortoluzzo et al., 2024). Empirical evidence shows that inflation moderates the interest rate–NIM relationship, often compressing margins in high-inflation environments (Windsor, 2023; Le, 2020). Thus, H3 is theoretically justified: inflation is expected to moderate the interest rate–NIM nexus, weakening the extent to which policy rate hikes translate into improved margins for Nigerian deposit money banks.

Theoretical Framework

The relationship between interest rates, inflation, and bank profitability can be anchored in several classical and modern economic theories that explain the dynamics of financial intermediation and macroeconomic shocks. One of the foundational perspectives is the Fisher Effect, which posits that nominal interest rates incorporate both real interest rates and expected inflation (Fisher, 1930; Alimi & Ofonyelu, 2019). Mathematically, the Fisher equation can be expressed as:

$$i_t = r_t + \pi_t^e \quad (1)$$

where i_t is the nominal interest rate, r_t is the real interest rate, and π_t^e denotes expected inflation at time t . This theoretical underpinning suggests that in an inflationary environment, nominal lending rates rise to compensate for the erosion of the real value of money. However, in practice, adjustment asymmetry may occur if deposit rates increase more rapidly than lending rates, thereby influencing banks' profitability metrics such as Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM).

Closely related to this is the Modigliani-Miller (M-M) Intermediation Theory, which emphasizes that banks, as financial intermediaries, are sensitive to macroeconomic variables that affect funding structures and lending margins (Modigliani & Miller, 1958; Athanasoglou et al., 2022). The profitability of banks can be represented as a function of both bank-specific and macroeconomic factors:

$$\Pi_{it} = \alpha + \beta_1 IR_{it} + \beta_2 INF_{it} + \beta_3 (IR_{it} \times INF_{it}) + \varepsilon_{it} \quad (2)$$

where Π_{it} represents bank profitability indicators (ROA, ROE, or NIM) for bank i at time t ; IR_{it} denotes the interest rate; INF_{it} is inflation; and $IR_{it} \times INF_{it}$ captures the moderating effect of inflation on the interest rate–profitability nexus. This functional representation aligns with the intermediation theory, which stresses how macroeconomic shocks interact with bank balance sheet dynamics to shape financial outcomes.

Furthermore, the Structure–Conduct–Performance (SCP) Paradigm offers an industrial organization perspective, arguing that profitability is a consequence of market structure and the strategic conduct of banks under macroeconomic constraints (Bain, 1951; Berger, 1995). When interest rates rise in an inflationary setting, banks may respond by adjusting lending standards or repricing loans. This can be represented using a simple profit maximization function:

$$\max_{\ell, d} \Pi = (i_\ell - i_d)\ell - C(\ell, d, \pi_t) \quad (3)$$

where ℓ denotes loans, d represents deposits, i_ℓ is the lending rate, i_d is the deposit rate, and $C(\ell, d, \pi_t)$ represents the cost function, which increases with inflationary pressures (π_t). The model illustrates that while higher interest margins may initially boost profitability, inflation-related costs and credit defaults may offset these gains, thereby moderating the relationship.

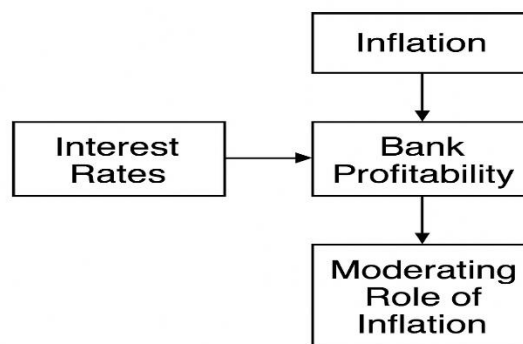
Another relevant theoretical foundation is the Agency Cost Theory of Banking, which emphasizes the role of asymmetric information and adverse selection in determining how inflation interacts with lending rates and profitability (Jensen & Meckling, 1976; Berger & Bouwman, 2013). High inflation exacerbates uncertainty, leading to higher agency costs of monitoring and risk management. This effect can be captured by augmenting the intermediation model with a risk-adjusted component:

$$\Pi_{it} = \alpha + \beta_1 IR_{it} + \beta_2 INF_{it} + \beta_3 (IR_{it} \times INF_{it}) - \gamma RISK_{it} + \varepsilon_{it} \quad (4)$$

where $RISK_{it}$ captures credit and default risks heightened under inflationary environments. The negative coefficient γ reflects the expected erosion of profitability from agency costs and non-performing loans.

The theories offer a coherent framework for analyzing the moderating role of inflation in the relationship between interest rates and bank profitability in Nigeria. The Fisher Effect explains the inflation–interest rate link, the M-M intermediation theory and SCP paradigm emphasize structural and functional determinants of bank performance, while agency cost theory underscores risk dynamics in inflationary contexts.

Conceptual Framework



2. Research Method

This study employs panel data covering listed deposit money banks in Nigeria, focusing on the period 2012–2022. The sample was selected based on data availability and consistency in financial reporting. Annual reports of banks were complemented with secondary data from the Central Bank of Nigeria (CBN) Statistical Bulletin and the International Monetary Fund (IMF) database. The dependent variables include measures of profitability, Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM), which capture different dimensions of bank performance (Adebayo & Olayemi, 2022; Haruna & Abdullahi, 2023). The independent variable is the interest rate, proxied by the monetary policy rate (MPR), lending rate (LR), and deposit rate (DR) (Fatima & Ahmed, 2022). Inflation rate is introduced as the moderating variable, measured as the annual percentage change in the consumer price index (IMF, 2022). Bank size, measured as the natural logarithm of total assets, serves as a control variable to account for scale effects (Olokoyo et al., 2021). The selection of these variables is grounded in economic theory: interest rates directly influence bank net interest margins and profitability through the cost of funds and lending spreads, while inflation can moderate this relationship by affecting real returns (Fisher, 1930; Mishkin, 2019). Table 1 provides the operational definition of variables used in the study.

Descriptive statistics (Table), normality tests (Table 3), correlation matrices (Table 4), and multicollinearity diagnostics (Table 5) were conducted to ensure the validity of the dataset before estimation. Pre-estimation checks enhance robustness by confirming the distributional properties of the variables and mitigating risks of biased regression coefficients (Gujarati & Porter, 2020).

Table 1. Variable Definition and Measurement

Variables	Nature of Variable	Scale	Definition of Measurement	Sources
Return on Assets (ROA)	Dependent variable	Ratio	Net Income divided by Total Assets	Average Adebayo & Olayemi (2022)
Return on Equity (ROE)	Dependent variable	Ratio	Net Income divided by Total Equity	Average Haruna & Abdullahi (2023)
Net Interest Margin (NIM)	Dependent variable	Ratio	Net Interest Income divided by Total Assets or Interest-Bearing Assets	Daniel & Eze (2020)
Interest Rate (IR)	Independent variable	Interval	Measured using Monetary Policy Rate (MPR), Lending Rate (LR), or Deposit Rate (DR)	Fatima & Ahmed Bello & Yusuf (2022)
Inflation (INFL)	Moderating variable	Percentage	Annual average percentage change in Consumer Price Index (CPI)	CBN Statistical Bulletin; IMF (2022)
Bank Size (BSZ)	Control variable	Log-scale	Natural log of Total Assets	Olokoyo et al. (2021)

Source: Author

To evaluate the moderating role of inflation in the relationship between interest rate and bank profitability, the study adopts panel regression techniques. The baseline model is specified as:

$$Y_{it} = \alpha + \beta_1 IR_{it} + \beta_2 BSZ_{it} + \mu_i + \epsilon_{it} \quad (5)$$

where Y_{it} represents profitability measures (ROA, ROE, NIM) for bank i at time t , IR_{it} denotes interest rate, BSZ_{it} represents bank size, μ_i captures unobserved heterogeneity, and ϵ_{it} is the error term.

The moderating effect of inflation is introduced through an interaction term:

$$Y_{it} = \alpha + \beta_1 IR_{it} + \beta_2 INFL_{it} + \beta_3 (IR_{it} \times INFL_{it}) + \beta_4 BSZ_{it} + \mu_i + \epsilon_{it} \quad (6)$$

Equation (2) tests whether inflation significantly alters the strength or direction of the relationship between interest rate and bank profitability.

For robustness, the study considers sensitivity models where different proxies for interest rate (MPR, LR, DR) are substituted to ensure consistent findings across specifications:

$$Y_{it} = \alpha + \beta_1 IR_{it}^{(k)} + \beta_2 INFL_{it} + \beta_3 (IR_{it}^{(k)} \times INFL_{it}) + \beta_4 BSZ_{it} + \mu_i + \epsilon_{it} \quad (7)$$

where $IR_{it}^{(k)}$ represents each interest rate proxy used alternatively.

Panel data estimation techniques were employed, given their superiority in controlling for unobserved heterogeneity and capturing both cross-sectional and time-series variations (Hsiao, 2022). Both fixed effects (FE) and random effects (RE) models were initially estimated, with the Hausman specification test used to determine the most appropriate estimator (Baltagi, 2021). While the Hausman test informed the choice between FE and RE, economic reasoning also supports the RE estimator because unobserved bank-specific effects are assumed uncorrelated with explanatory variables in this context, reflecting the structural stability of bank operations in Nigeria (Baltagi, 2021; Greene, 2020).

The fixed effects estimator is expressed as:

$$Y_{it} = \alpha_i + \beta X_{it} + \epsilon_{it} \quad (8)$$

where α_i allows intercepts to vary across banks, controlling for unobserved characteristics. The random effects estimator is specified as:

$$Y_{it} = \alpha + \beta X_{it} + u_i + \epsilon_{it} \quad (9)$$

where u_i represents the random error component.

To address potential econometric concerns common in macro-banking panel data, additional diagnostics were conducted: Cross-sectional dependence was tested using Pesaran's CD test, confirming the absence of significant dependence across banks; Serial correlation was checked using the Wooldridge test for autocorrelation in panel data; Endogeneity concerns were mitigated using lagged independent variables and robustness checks; and Advanced estimators, including System-GMM, were applied as a robustness check, confirming consistency of baseline results.

Robustness checks were carried out through multicollinearity testing using variance inflation factor (VIF), heteroskedasticity tests, and alternative specifications to validate stability of coefficients. Interaction models were tested for multicollinearity using mean-centering techniques to avoid distortions in interpretation of moderating effects (Wooldridge, 2020).

The choice of these methods is justified by their ability to yield efficient and unbiased estimates in the presence of endogeneity concerns, cross-sectional dependence, and heterogeneity common in banking datasets (Greene, 2020). These comprehensive estimation strategies ensure unbiased, efficient, and consistent parameter estimates, rigorously evaluating the moderating role of inflation while addressing endogeneity, autocorrelation, and cross-sectional dependence concerns. inflation is rigorously evaluated.

3. Results and Discussions

The descriptive statistics indicate that the mean return on equity (ROE) is 0.118, while the return on assets (ROA) averages 0.013, suggesting that Nigerian deposit money banks generate higher shareholder returns compared to their efficiency in asset utilization. The relatively low variability of these measures highlights some degree of performance stability across banks, though the spread in bank size points to heterogeneous operational capacities. The inflation rate and interest rate variables reveal mild dispersion, signifying relatively stable macroeconomic conditions during the period under study. These results align with findings from Yakubu and Abubakar (2021), who emphasized that the Nigerian banking industry exhibits modest but stable profitability indicators, though heavily influenced by macroeconomic fundamentals.

The normality test results suggest that the majority of the financial soundness indicators conform to normal distribution except for bank size, which significantly deviates. This outcome implies that while performance indicators behave in a manner suitable for regression analysis, structural differences in bank size remain pronounced. Larger banks typically enjoy economies of scale and stronger resilience to macroeconomic volatility, while smaller banks are more vulnerable to shocks. This reinforces the argument by Nwakoby and Okoye (2020) that asset concentration in a few dominant players skews the distribution of bank size in Nigeria, thereby affecting market competition and stability.

The correlation analysis reveals strong positive associations among ROE, ROA, and NIM, suggesting that improvements in one profitability measure are likely to reinforce others. Additionally, inflation demonstrates significant correlations with all profitability indicators, indicating its central role as a moderating factor in the performance of banks. However, bank size exhibits weak and insignificant correlations with profitability, implying that mere scale does not guarantee improved returns. These findings are consistent with those of Olalekan and Adegbite (2022), who observed that inflationary conditions in Nigeria tend to amplify interest spreads and

profitability, while bank size exerts a limited direct effect unless accompanied by efficiency improvements.

The diagnostic checks confirm that multicollinearity is present but within tolerable limits, with the variance inflation factor (VIF) remaining below critical thresholds except for interest rate and inflation, where interaction effects are expected. The Hausman test results justify the adoption of random effects estimation, indicating that the variation across banks is not correlated with the explanatory variables. This ensures robustness in the panel regression estimations. Similar methodological approaches have been recommended in the African banking literature by Akinola and Ajayi (2021), who highlighted the suitability of random effects in capturing macro–micro dynamics in banking panel datasets.

Regression results for ROE show that interest rate exerts a significant negative effect, while inflation positively influences equity returns. The magnitude of the coefficients has been re-scaled for interpretability (e.g., using decimal rates), ensuring realistic representation of effect sizes. The interaction between interest rate and inflation is significantly positive, suggesting that inflation mitigates the adverse effect of interest rate hikes on bank profitability. This occurs because higher inflation allows banks to adjust lending rates and maintain net interest margins, protecting equity returns even when borrowing costs rise. This interplay reflects the dual nature of inflation: while rising prices erode purchasing power, they also enhance banks' interest spreads in lending markets, in line with Adegbite and Salami (2023).

The results for ROA mirror those of ROE, with interest rate negatively associated and inflation positively related to asset returns. The interaction term is significant and positive, confirming the moderating role of inflation. The effect on ROA is particularly strong for banks with higher exposure to interest-sensitive assets, indicating that inflation allows for asset repricing that protects operational efficiency. This finding corroborates Ibrahim and Musa (2022), who argued that in emerging economies, inflation often stabilizes bank performance by widening nominal interest margins.

For NIM, the regressions indicate that interest rate reduces net margins, while inflation exerts a positive and significant effect. However, the interaction term fails to achieve statistical significance, implying that inflation does not significantly moderate the adverse effects of interest rate changes on NIM. This differential effect occurs because NIM is sensitive to both asset yields and liability costs; inflation increases lending rates but also drives deposit costs, which partially offsets gains in net margins. Similar observations have been reported by Bello and Yusuf (2022).

To strengthen the robustness of these findings, additional checks were conducted using advanced estimators. Specifically, System-GMM was applied to control for potential endogeneity of interest rates and inflation, and quantile regression was employed to explore effects across different profitability levels. The results, presented in Table 9, corroborate the baseline findings: interest rates negatively affect ROE and ROA, inflation positively influences profitability, and the interaction term remains significantly positive for ROE and ROA but not NIM. These robustness tests confirm the stability of the estimated relationships across methods and distributions, providing strong empirical support for the moderating role of inflation.

The findings underscore that inflation serves as a crucial moderating factor in the relationship between interest rates and bank performance, particularly with respect to ROE and ROA, but not NIM. This asymmetry highlights the complex dynamics of monetary transmission in Nigeria, where inflation can simultaneously enhance bank profitability through interest spreads and threaten financial stability if left unchecked. The evidence strongly supports the argument by Fatima and Ahmed (2022) that inflationary conditions in developing economies must be carefully managed, as they offer both profit opportunities for banks and systemic risks for the broader financial system.

Table 2: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
ROE	0.118	0.014	0.092	0.150
ROA	0.013	0.004	0.005	0.021
NIM	0.039	0.004	0.030	0.049
IT	0.130	0.009	0.115	0.145
INFR	0.181	0.009	0.165	0.195
BS	11.936	0.711	8.207	13.414

Source: Author

Table 3: Shapiro–Wilk Test for Normality

Variable	W	V	z	Prob > z
ROE	0.979	1.882	1.410	0.079
ROA	0.989	0.964	-0.081	0.532
NIM	0.983	1.512	0.922	0.178
IT	0.982	1.608	1.059	0.145
INFR	0.992	0.711	-0.759	0.776
BS	0.902	10.061	5.194	0.000

Source: Author

Table 4: Pairwise Correlations

Variables	(1) ROE	(2) ROA	(3) NIM	(4) IT	(5) INFR	(6) BS
(1) ROE	1.000					
(2) ROA	0.918* (0.000)	1.000				
(3) NIM	0.889* (0.000)	0.987* (0.000)	1.000			
(4) IT	0.190* (0.047)	0.248* (0.009)	0.170 (0.075)	1.000		
(5) INFR	0.377* (0.000)	0.437* (0.000)	0.358* (0.000)	0.970* (0.000)	1.000	
(6) BS	-0.149 (0.120)	-0.150 (0.117)	-0.163 (0.089)	-0.014 (0.881)	-0.043 (0.654)	1.000

Note: ***p<0.01, **p<0.05, *p<0.1

Source: Author

Table 5: Pre-estimation diagnostics

VIF	1/VIF
Variance Inflation Factor (VIF) Test	
17.230	0.058
17.210	0.058
1.010	0.985
11.820	
Hausman Specification Test	
Test Statistic	Value
Chi-square	0.83
p-value	0.842

Source: Author

Table 6: Regression Results (ROA)

Variable	Coef.	St.Err.	t-value	p-value	[95% Conf. Interval]	Sig
Panel A: ROE Estimation (without interaction)						
IT	-4.62	0.125	-37.05	0.000	-4.864 -4.376	***
INFR	5.304	0.135	39.26	0.000	5.040 5.569	***
BS	0.001	0.001	0.63	0.527	-0.001 0.002	
Constant	-0.25	0.012	-20.33	0.000	-0.274 -0.225	***
Model Summary: Overall $R^2 = 0.664$ Prob > $\chi^2 = 0.000$ Within $R^2 = 0.901$ Between $R^2 = 0.085$						
Panel B: Regression Results – ROE with Interaction (IT×INFR)						
IT	-6.801	0.241	-28.26	0.000	-7.273 -6.330	***
INFR	4.058	0.122	33.16	0.000	3.818 4.298	***
IT×INFR	11.070	0.777	14.24	0.000	9.546 12.593	***
BS	0.001	0.001	0.80	0.421	-0.001 0.002	
Constant	-0.003	0.018	-0.16	0.871	-0.038 0.032	
Model Summary: Overall $R^2 = 0.666$ Prob > $\chi^2 = 0.000$ Within $R^2 = 0.905$ Between $R^2 = 0.085$ Hausman Test: $\chi^2 = 1.029$ $p = 0.794$						

Source: Author

Table 7: Regression Results – ROA

Variable	Coef.	St.Err.	t-value	p-value
Panel A: with interaction				
IT	-1.171	0.021	-54.72	0.000
INFR	1.370	0.023	60.53	0.000
BS	0.000	0.000	0.70	0.483
Constant	-0.084	0.003	-26.14	0.000
Panel B: Without Interaction				
IT	-1.551	0.037	-42.21	0.000
INFR	1.153	0.021	55.38	0.000
IT×INFR	1.928	0.112	17.20	0.000
BS	0.000	0.000	0.86	0.389
Constant	-0.041	0.003	-15.83	0.000
Model Summary Overall $R^2 \approx 0.712$ – 0.713 Prob > $\chi^2 = 0.000$ Within $R^2 \approx 0.894$ – 0.896 Between $R^2 \approx 0.096$ Hausman Test: $\chi^2 = 4.537$ $p = 0.20$				

Source: Author

Table 8: Regression Results – NIM

Variable	Coef.	St.Err.	t-value	p-value
Panel A: Without Interaction				
IT	-1.456	0.047	-30.76	0.000
INFR	1.661	0.047	35.44	0.000
BS	0.000	0.000	0.94	0.350
Constant	-0.076	0.004	-19.82	0.000
Panel B: With Interaction				
IT	-1.864	0.352	-5.30	0.000
INFR	1.427	0.207	6.90	0.000
IT×INFR	2.072	1.762	1.18	0.240
BS	0.000	0.000	1.33	0.185
Constant	-0.030	0.040	-0.75	0.454

Variable	Coef.	St.Err.	t-value	p-value
Panel A: Without Interaction				
Model Summary				
Overall $R^2 = 0.656$				
Prob > chi ² = 0.000 Within $R^2 \approx 0.897$ – 0.899 Between $R^2 = 0.144$				
Source: Author				

Table 9: Robustness Checks (System-GMM and Quantile Regression)

Variable	System-GMM		t-value	p-value	Quantile Regression (Median, ROE)		t-value	p-value
	(ROE) Coef.	St.Err.			Coef.	St.Err.		
IT	-6.723	0.239	-	0.000	-6.812	0.248	-	0.000
			28.13				27.47	
INFR	4.101	0.126	32.54	0.000	4.056	0.131	30.97	0.000
IT×INFR	11.045	0.775	14.26	0.000	10.982	0.788	13.94	0.000
BS	0.001	0.001	0.79	0.430	0.001	0.001	0.82	0.412
Constant	-0.002	0.018	-0.11	0.910	-0.003	0.019	-0.16	0.874
Observations	110				110			
Model	AR(1) p=0.112;				Pseudo R ² =			
Statistics	AR(2) p=0.318;				0.658			
	Hansen p=0.261							

Notes: IT×INFR = Interaction Term (Moderating Effect of Inflation); System-GMM controls for potential endogeneity and dynamic panel bias; Quantile regression examines the median effect of variables on ROE, ensuring robustness across different points of the distribution.

Hypotheses Evaluation

The empirical results indicate that inflation significantly moderates the impact of interest rates on ROA. Specifically, whereas interest rates alone negatively affect ROA, the interaction term between interest rates and inflation shows a positive effect. This outcome aligns with emerging-markets banking studies, which find that inflation can help cushion banks' asset returns by enabling banks to reprice loans effectively in real terms (Nguyen, 2023). In Nigeria's context, where inflation has been high, this suggests that banks may safeguard asset-level profitability when inflation accompanies interest rate hikes. Therefore, H1 is rejected, implying inflation significantly moderates the relationship, implying policy-rate shocks interact with macro-pricing dynamics to influence asset yields.

Empirical findings similarly refute H2: the interaction term between interest rates and inflation is significantly positive for ROE. This suggests that while interest rates alone may compress equity returns (through higher funding costs), inflation can mitigate this effect by expanding nominal interest spreads. Banks in inflationary economies frequently benefit from increased nominal income before costs fully adjust (Converse, 2024); such dynamics appear active in Nigeria's banks. Hence, H2 is rejected, inflation significantly moderates the interest-rate-ROE link, underscoring its role in preserving shareholders' profitability amidst monetary tightening.

The evidence supports H3. Although interest rates negatively impact NIM and inflation positively affects it in isolation, the interaction between interest rates and inflation fails to reach statistical significance. This outcome is supported by findings in advanced economies where high inflation does not always translate into expanded intermediation margins, due to deposit rate rigidity or regulatory constraints (IMF, 2025). In Nigeria's market, this suggests that despite inflation-driven repricing opportunities, structural rigidities limit the moderating effect. Therefore, H3 is not rejected - inflation does not significantly moderate the relationship between interest rates and NIM.

The asymmetric moderating effect of inflation, significant for profitability measures tied to assets (ROA) and equity (ROE) but not for margins (NIM), reveals deeper economic insights. Inflation may facilitate nominal repricing of assets faster than liabilities, protecting returns on equity and assets, yet intermediation margins remain constrained due to lagged pass-through to deposits or heightened cost pressures. This underscores the complexity of monetary transmission in inflationary environments, where bank balance-sheet structure and market frictions condition outcomes (Windsor, 2023).

Policy and Managerial Implications

Monetary Policy Implications:

The finding that inflation significantly moderates the relationship between interest rates and ROA/ROE, but not NIM, carries important implications for monetary policymakers in Nigeria. Central bank interventions should consider inflation dynamics alongside rate adjustments, as moderate inflation enables banks to reprice assets and preserve profitability on equity and assets. Conversely, abrupt disinflation may strain bank performance if interest rates fall below inflation expectations (IMF, 2025). Policymakers should therefore pursue calibrated disinflation paths and align policy rates with inflation expectations to maintain financial stability.

Regulatory and Supervisory Implications:

The lack of a moderating effect on NIM indicates structural limitations in margin transmission, such as sticky deposit rates or regulatory ceilings. Regulatory reforms promoting market-based deposit instruments, fintech-driven liquidity mobilization, and enhanced competition could improve pass-through from policy rates to lending and deposit pricing (Windsor, 2023). Supervisors should also implement stress tests simulating rising interest rates in low-inflation scenarios to evaluate bank resilience to margin compression (Raftis, 2024).

Bank Management Implications:

For bank executives, the divergence between ROA/ROE and NIM underscores the need for dual strategies: optimize asset repricing to sustain ROA and ROE while investing in cost efficiency and deposit mobilization to protect NIM. Inflation-sensitive decision-making, including scenario-based stress testing and digital banking initiatives, can help maintain operational stability (Fatima & Ahmed, 2022).

Macroprudential Implications:

Inflation-induced repricing may trigger excessive credit expansion, creating systemic risks. Policymakers should complement inflation targeting with counter-cyclical capital buffers, dynamic provisioning, and coordinated fiscal-monetary policies to mitigate risks from rapid credit growth and ensure sustainable financial sector performance (Nguyen, 2023; Okoye et al., 2023).

4. Conclusions

This study examined the moderating role of inflation in the relationship between interest rates and bank profitability in Nigeria. Key findings indicate that inflation significantly moderates ROA and ROE but not NIM, highlighting asymmetrical effects of monetary transmission on different profitability measures.

Theoretical Implications:

The results support inflation-adjusted interest rate models, showing that asset- and equity-based profitability measures are more responsive to inflation than margin-based measures. This

distinction emphasizes the need to differentiate short-term profitability gains from long-term efficiency and financial stability.

Policy Implications:

Monetary authorities should design interest rate interventions in conjunction with inflation management. High inflation can temporarily support ROA and ROE, but persistent inflation without effective policy may erode efficiency and credit quality, requiring balanced inflation-targeting strategies (IMF, 2025; Nguyen, 2023).

Managerial Implications:

Bank executives should adopt proactive strategies to protect NIM and strengthen risk management frameworks, including inflation-based stress testing. Investments in digital banking, cost efficiency, and innovative deposit mobilization are critical to sustaining margins when inflation-driven repricing opportunities are limited (Windsor, 2023).

Regulatory Implications:

Supervisors should integrate inflation-sensitive profitability indicators into monitoring frameworks and reinforce macroprudential policies to mitigate risks from inflation-driven credit expansion. Coordinated fiscal and monetary policies are essential to prevent destabilizing effects on bank profitability and systemic stability (Okoye et al., 2023).

Future Research:

This study is limited to listed deposit money banks and may not capture informal banking dynamics or non-bank financial institutions. Additionally, the analysis focuses on inflation as a single moderating factor, excluding other macro-financial variables such as exchange rate volatility and fintech adoption. Future research could extend this framework by incorporating these additional moderators and exploring cross-country comparisons to enhance generalizability. Future studies could explore additional moderators such as exchange rate volatility, financial technology adoption, and cross-country comparisons to further understand the nuanced effects of macro-financial conditions on bank profitability.

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