

Asymmetric Effects of Monetary Policy and Exchange Rate on Commercial Bank Profitability in Nigeria: Evidence from a Nonlinear ARDL Approach

Simeon Oamen Obode and Benneth Kiyentei Gini

Department of Economics,
University of Port Harcourt, Rivers State, Nigeria

Email: simeon.obode1@gmail.com

and nobleagini@gmail.com

<https://doi.org/10.56201/ijbfr.vol.12.no9.2026.pg62.78>

Abstract

This study explores the asymmetric effects of monetary policy and exchange rate movements on the profitability of Nigerian deposit money banks from 2008 to 2024. To account for potential differences between positive and negative changes in monetary policy and exchange rate, the study employs the nonlinear panel ARDL (NARDL) technique. The results reveal that positive and negative changes in MPR have significant negative long-run effects on bank profitability. However, the Wald test reveals that these effects are statistically similar; this shows that MPR has a symmetric long-run effect on bank profitability. On the other hand, exchange rate movements reveal significant long-run asymmetry, with positive and negative changes producing statistically different effects on bank profitability. The study suggests that monetary policy has a symmetric effect on the profitability of Nigerian banks, while exchange rate movements have asymmetric long-run effects, with increases and decreases in the exchange rate affecting bank profitability differently. The study therefore recommends that monetary and banking sector authorities consider the asymmetric and persistent effects of exchange rate movements when designing policies aimed at enhancing bank profitability and financial stability.

Keywords: Monetary Policy Rate; Exchange Rate; Bank Profitability; Asymmetry; Nonlinear Panel ARDL; Pooled Mean Group; Deposit Money Banks, Nigeria.

1.1: Introduction

The banking sector plays an essential role in the economic development of any nation through its core function of financial intermediation. In most countries including Nigeria, commercial banks mobilize deposits (savings) from areas where there is surplus and extend such deposits as loans to the deficit units of the economy for productive investments. Hence, deposit money banks (DMBs) contribute to money supply creation in the economy through fund transmission. The performance of these banks, especially in terms of profitability, is not only vital for their continued operations but also for the general stability of the financial system, (Claessens et al. 2018). Return on equity (ROE) and return on assets (ROA) are the major profitability indices often used to assess how efficiently banks including DMBs utilize their resources to generate income, (Athanasoglou et al., 2008). Return on equity measures how effectively a bank uses owners' funds to generate profit, while return on assets shows how efficiently a bank uses its

assets to generate earnings. The major economic variables that affect banks' profitability include monetary policy and exchange rate fluctuation. In Nigeria, the Apex Bank, that is, the Central Bank of Nigeria (CBN) uses the monetary policy rate (MPR) as a major instrument to regulate banking activities. Changes in the MPR affect banks' cost of funds, lending activities, and risk-taking decisions. The MPR also serves as a major regulatory control that affects both lending and deposit rates in the banking system. A contractionary policy measure of the central bank with high interest rates often affects banks' profitability through reduction in demand for loans and increase in default risk. On the other hand, an expansionary policy may increase lending but reduce interest margins depending on market conditions, (Demirgüç-Kunt & Huizinga 2010). Available data show that, as a result of the CBN tight monetary policy targeted at controlling inflation return on assets (ROA) of Nigerian DMBs decreased from 3.8% in 2010 to 1.32% in 2021, while return on equity (ROE) fell from 16% in 2020 to about 11.82% in 2021. Similarly, net interest margin decreased from 12.12% in 2002 to 3.61% in 2021 (World Bank, 2022).

Exchange rate fluctuation is another important economic factor that affects bank performance. It affects banks through various medium such as foreign currency exposure; macroeconomic stability as well as valuation of assets and liabilities. Currency depreciation usually have negative effects on bank earnings through increases in the cost of servicing loans denominated in foreign currency and rising default risk among borrowers. Findings from Claessens et al. (2018) show that exchange rate volatility plays a significant role in affecting banking sector earnings, especially in developing economies such as Nigeria with less stable macroeconomic environments. Exchange rate volatility usually introduces uncertainty, reduces lending activity, and adversely affects bank profitability, especially for deposit money banks with transactions denominated in foreign currencies. Similarly, Ozili (2017) found that exchange rate fluctuations have negative effects on banking performance in most economies of Africa.

However, recent findings show a reversal in this trend, the return on assets of Nigerian banks rose from 1.32% in 2021 to about 3.5% in 2024, while return on equity increased from 11.82% in 2021 to approximately 31% in 2024. Net interest margin also increased from 3.6% in 2021 to about 8.5% in 2024, (CBN Statistical Bulletin, 2025). These increases were recorded by these DMBs mainly from foreign exchange revaluation gains, which also indirectly increased their profitability. The Nigerian economy has witnessed continued economic instability including the 2016 foreign exchange crisis, the COVID-19 pandemic, and the exchange rate reforms introduced in 2023. These economic shocks have increased credit risk within the banking sector and affected banks' profitability. The Nigerian banking sector is affected by exchange rate risk, credit risk, and liquidity challenges as a result of the fragile nature of the local economy. Depreciation of the exchange rate increases the proportion of non-performing loans, while monetary policy tightening often reduces expansion of loans (credit) and banks' profits. Kashyap & Stein (2000) conclude that monetary policy shocks have stronger effects on banks' lending behavior and liquidity conditions. Despite the recognized importance of monetary policy and exchange rate patterns, most empirical studies including (Adewole & Anthony 2019; Aginam & Obi-Nwosu 2019; Haruna 2025; Uruakpa 2023; Oladele et al 2017; Afolabi 2023 and Ekpenyong et al 2025) have adopted the linear modeling approach of ordinary least squares, panel regression, vector error correction models that assumes symmetric relationships between these variables and bank profitability. These studies believe that increases and decreases in monetary policy rates or exchange rates have equal but opposite effects on bank performance. However, this assumption does not always hold in most cases. In reality, financial institutions tend to respond differently to positive and negative shocks. For instance, an increase in interest

rates may have a stronger negative effect on bank profitability than the positive effect generated by a decrease of the same amount.

Similarly, exchange rate depreciation may have a stronger effect on banks than appreciation due to structural factors in the economy. An empirical finding by Bikker and Vervliet (2018) show that the effects of exchange rate on banks' profitability is asymmetric, with negative shocks having larger impacts. These asymmetric responses show that conventional linear models may be inadequate in explaining the relationship between macroeconomic variables and bank profitability. To address this drawback, this study adopts the nonlinear autoregressive distributed lag model developed by Shin et al., (2014), which allows decomposition of explanatory variables into positive and negative changes. This approach enables the investigation of both short-run and long-run asymmetries. It also provides a detailed understanding of the relationship between monetary policy, exchange rate, and bank profitability in Nigeria. The study contributes to effective financial sector management and policy formulation in Nigeria by providing useful empirical findings on how monetary policy and exchange rate fluctuations affect bank profitability.

2.1: Conceptual Framework

The conceptual framework of this study shows the relationship between monetary policy and exchange rate fluctuation on the profitability of DMBs in Nigeria.

2.2: Monetary Policy and Bank Profitability

Monetary policy is the measures/actions taken by a Central Bank to control money supply and interest rates with the aim of achieving price stability and economic growth (Oyadeyi, 2024; Onaga et al., 2023). In most economies, including Nigeria, the Central Bank uses the monetary policy rate (MPR) as a major tool to achieve the desired economic objective of price stability. Changes in MPR affect bank profitability through its effects on lending rates and deposit rates (Windsor et al. 2023). An increase in the MPR usually increases lending rates, reduces loan expansion and aggregate demand. The core objective of deposit money banks (DMBs), like other business organizations is to maximize profit. Recent studies (Jiang et al 2024; Windsor et al., 2023) found that increases in the policy rate/MPR reduce bank profitability through increase in borrowing costs and default risk. On the other hand, a reduction in the MPR or monetary easing may improve bank profitability through increased credit demand and lower default risk (Oyadeyi 2024). The two major indices used to measure DMBs' profitability are the return on assets and return on equity. Return on assets shows how efficiently a bank uses its assets to generate earnings, while return on equity shows how effectively a bank uses shareholders' funds to earn profit. The effect of monetary policy on DMBs' profitability may exhibit asymmetrical and nonlinear form. In emerging economies such as Nigeria where there is existence of structural bottlenecks and poor banking supervision, an increase or decrease in the monetary policy rate (MPR) may not have the same effect on bank profitability. For instance, Oyadeyi (2024), using an asymmetric ARDL model, found that positive and negative monetary policy shocks have different effects on economic and financial variables in Nigeria. Similarly, Altavilla et al. (2018) in their study "monetary policy and bank profitability in a low interest rate environment" concluded that increases and decreases in the MPR do not necessarily have the same effects on banks' profitability. Časta and Švéda (2024) also noted that monetary policy shocks affect bank profitability through various transmissions medium and with different levels of impact. This shows that banks do not react symmetrically to policy tightening and easing. Windsor et al. (2023) investigated the impact of interest rate changes on bank profitability using data sourced

from different banks from several countries. The study found that interest rate adjustments affect bank profitability through different channels. The study noted that while higher policy rates may increase interest income, they may also increase borrower default risk. On the other hand, lower policy rates may reduce interest income but improve loan performance by reducing the cost of loan servicing. The study concluded that the effect of monetary policy on bank profitability may not always be symmetric, that is, increases and decreases in policy rates affect profitability through various medium. Even with the upward review of the MPR by the Central Bank of Nigeria from 11.5% in 2020 to 27.5% in 2024, the Nigerian DMBs recorded a significant increase in profitability indicators. For instance, the average industry return on assets increased from 2% in 2020 to 3.5% in 2024, while the return on equity rose from 14.3% to 31% over the same period (CBN, 2025). Most of these DMBs' earnings were partly from gains from foreign exchange revaluation and growth in non-interest income. This shows that the relationship between monetary policy and bank profitability may not always be symmetric, as increases and decreases in the MPR may not have the same level of effect on bank profitability.

2.3: Exchange Rate and Bank Profitability

Exchange rates play an essential role in the world economy. Kingsly (2024) and Jamil et al. (2023) see exchange rate as the price of one nation's currency in terms of another and serves as an important measure of a country's economic performance. The factors that affect exchange rate include inflation, interest rates, foreign reserves and economic growth. Exchange rate can either appreciate or depreciate. Exchange rate is said to appreciate when a nation's currency gains value in relation to another currency, while exchange rate depreciation occurs when the domestic/local currency loses value in relation to foreign currencies (Bosupeng 2024; Abdulhamid 2024). Exchange rate fluctuations in the form of currency appreciation or depreciation usually have considerable impacts on the profitability of deposit money banks (DMBs). The relationship between exchange rate and bank profitability operates through several medium. Exchange rate appreciation can either have positive or adverse effects on DMBs' profitability depending on the composition of banks' assets and liabilities. For instance, DMBs that maintain considerable foreign currency-denominated assets and engage in foreign exchange transactions may earn gains from foreign exchange revaluation during periods of domestic currency depreciation, thereby increasing their profitability (Menicucci & Paolucci 2016). The Nigerian DMBs' foreign exchange (FX) gains increased from N132 Billion in 2022 to N754.Billion in 2023 as a result of exchange rate depreciation (CBN, 2024). These foreign exchange gains contributed significantly to the substantial profits declared by many DMBs in 2024. For instance, GTBank Plc and Zenith bank recorded impressive profit after tax of N1.02Trillion and N1.03Trillion respectively in 2024. While United Bank for Africa Plc, First Bank of Nigeria and Access Bank also recorded profit after tax of N766.6Billion, N739.9Billion and N642.2Billion during the same period (see individual banks' audited financial reports of 2024). However, exchange rate depreciation may also negatively affect bank profitability (Ozili 2017). Exchange rate depreciation may lead to an increase in the cost of servicing loans denominated in foreign currency and increase the default risk of borrowers. It may also negatively affect lending activities and increase non-performing loans (NPLs). An increase in NPLs often leads to increase in provisioning expenses that reduce DMBs' profitability. On the contrary, exchange rate appreciation may reduce foreign exchange gains but increase the ability of borrowers with foreign currency loans to repay their liabilities.

The impact of exchange rate fluctuation on bank profitability may be asymmetric, that is, exchange rate appreciation and depreciation may not have the same level of effect on bank profitability. For example, Shin et al., (2014) show that positive and negative exchange rate changes can have different effects on economic variables. Similarly, Bahmani-Oskooee and Fariditavana (2015) in their study on Nonlinear ARDL approach and the J-curve analysis found that currency appreciations and depreciations have different effects on trade performance. These findings show that exchange rate appreciation and depreciation may have asymmetrical effects on bank profitability. The Nigerian banking sector shows proof of a nonlinear relationship between DMBs' profitability and exchange rate fluctuation. As a result of the domestic currency depreciation, some Nigerian DMBs recorded significant foreign exchange revaluation gains that improved their profitability; while others faced increased NPLs due to high credit default risk in foreign currency denominated loans. This shows that exchange rate depreciation does not affect all banks in the same way. Therefore, the relationship between exchange rate and bank profitability may not always be linear. Moderate exchange rate depreciation may increase profitability through foreign exchange revaluation gains, while severe depreciation may reduce profitability through increase in credit risk and loan defaults. This shows that exchange rate fluctuation may have asymmetric and nonlinear effects on the profitability of DMBs.

2.4: Theoretical Review

2.5: Monetary Policy Transmission Mechanism Theory

There are several theories that attempt to explain the factors that influence banking profitability. The theoretical framework for this study is anchored on the monetary policy transmission mechanism developed by Frederic S. Mishkin (1995). The main idea in this theory is that changes in monetary policy affect banks' earnings through their impact on banks' cost of funds, lending activities and exchange rate fluctuations. According to this theory, an increase in the monetary policy rate may increase bank profitability through wider interest margins, while excessive monetary tightening may reduce loan demand and increase loan defaults, which may negatively affect profitability. Similarly, exchange rate fluctuations affect profitability through their effects on banks' asset quality and income. The theory further suggests that monetary policy and exchange rate fluctuations may have different effects on banking profitability. That is, positive and negative changes in these variables may have different effects depending on prevailing economic and banking conditions. In line with this theory, Huynh (2023) examined the monetary policy pass-through mechanism using Vietnamese commercial banks. The author found that expansionary monetary policy encourages banks to increase lending and concluded that the effectiveness of monetary policy depends on banks' responses to policy changes. Therefore, the monetary policy transmission mechanism provides an appropriate theoretical foundation for examining the asymmetric effects of monetary policy and exchange rate on commercial bank profitability in Nigeria.

2.6: Empirical Review

Several studies have examined the relationship between monetary policy and commercial banks profitability across the world. Haruna (2025) analyzed the impact of monetary policy on the profitability of Nigerian deposit money banks. The monetary policy instruments included in the model were money supply, exchange rate and interest rate. Banking profitability was proxied by return on assets. The empirical data were analyzed using multiple regressions (Ordinary Least Squares). The study finds that money supply has a negative significant effect on profitability,

while exchange rate and interest rate are statistically insignificant. The study concludes that monetary policy variables individually affect profitability differently. The paper recommends proper money supply management to enhance banking profitability. Similarly, Aromatize et al. (2025) examined the effects of monetary policy instruments on bank performance in Nigeria from 1980 to 2022. The monetary policy instruments examined in the model include the monetary policy rate, Treasury bill rate; cash reserve ratio and money supply. The results show that the monetary policy instruments have positive significant effects on bank performance. The study concludes that monetary policy remains an important determinant of banking sector stability and profitability. The paper recommends that the Central Bank of Nigeria should adopt coordinated monetary policy instruments to sustain banking sector performance

Salachas et al. (2025) explored the effects of monetary policy changes on bank profitability and risk-taking in developed countries and BRICS nations. The authors used country-level and bank-level data from the Eurozone, the US, the UK, Japan and BRICS countries. The dependent variables included in the model were bank profitability and bank risk-taking. The independent variables included domestic monetary policy shocks, foreign monetary policy shocks, while the control variables were bank characteristics and macroeconomic variables. They analyzed the data using panel econometric analysis. Using this method, they were able to distinguish the effects of domestic monetary policies from international monetary spillover effects. The findings reveal that tight domestic monetary policy increases bank profitability and reduces bank risk-taking. While monetary policy actions in developed countries have significant effects on the profitability and risk-taking behavior of banks operating in BRICS countries through international funding channels. The study concludes that monetary policy has both domestic and global effects on banking performance. The authors recommend that policymakers should always consider international monetary spillover effects when formulating monetary and risk management policies. From 2010 to 2024; Olofinlade (2025) examined the effect of monetary policy on the growth performance of deposit money banks in Nigeria using the vector error correction model. The study specifically examines the impact of monetary policy rate, exchange rate, Treasury bill and cash reserve ratio on bank profitability. The paper finds that monetary policy rate has a positive significant effect on profitability, while Treasury bill rate and cash reserve ratio negatively affected bank profitability. The paper further noted that exchange rate has a significant long-run adverse effect on bank profitability. The study concludes that exchange rate instability reduces bank profitability. The author recommends proper exchange rate management to enhance banking profitability. On the contrary, Idris and Iheonkhan (2025) evaluated the impact of exchange rate on the profitability of commercial banks in Nigeria from 2015 to 2024 using a multivariate regression approach. The dependent variable included in the model was return on equity, while the regressors were exchange rate, gross domestic product, inflation rate and non-performing loans. The study finds that exchange rate volatility has a negative significant effect on bank profitability. Gross domestic product improves profitability, while inflation produces mixed effects. The paper concludes that exchange rate instability has an adverse effect on commercial bank profitability. The authors recommend that banks should strengthen foreign exchange risk management and diversify their sources of incomes.

Similarly, from 2000 to 2022, Iyadi et al. (2025) investigated the impact of exchange rate policies on bank profitability using regression analysis. The variables examined in the model include bank profitability, real exchange rate, trade balance, foreign direct investment and gross domestic product. The results confirm that gross domestic product has a positive significant effect on bank profitability, while the real exchange rate has an adverse effect on banking

performance. The study concludes that exchange rate policy plays an important role in determining banking sector performance. The paper recommends that policymakers should implement exchange rate policies that promote macroeconomic stability and enhance banking sector performance. On the other hand, Aisagbonbuomwan and Akrawah (2024) assessed the effects of macroeconomic variables on the profitability of Nigerian deposit money banks from 2000 to 2022 using the ordinary least squares approach. The macroeconomic variables included in the model were gross domestic product, exchange rate, inflation rate, interest rate and crude oil price. Bank profitability was proxied by return on assets. The findings show that gross domestic product and crude oil prices have positive significant effects on profitability. Exchange rate has a negative but insignificant effect, while inflation and interest rate have insignificant effects. The paper concludes that macroeconomic conditions have significant effects on commercial bank profitability. The authors recommend that the government should promote sustained economic growth and maintain macroeconomic stability to improve banking sector performance. Using the Autoregressive Distributed Lag (ARDL) method, Bolivar et al. (2024) evaluated the impact of bank business models and bank size on profitability using machine learning and bank-level panel analysis. The empirical exercise focused on the European Union banking system. Their specific objectives include identifying whether bank size and profitability influence business model heterogeneity. The paper finds that larger banks that adopt efficient retail business models recorded a significant increase in profitability. The paper concludes that bank size and business model jointly influence profitability. The paper recommends that banks should focus on operational efficiency in order to enhance profitability. Iwedi and James (2023) analyzed the impact of monetary policy on the profitability of commercial banks in Nigeria from 1988 to 2021. They included the following variables in their model: Return on assets, return on equity, credit-to-deposit ratio, money supply, interest rate, interest rate spread and inflation. The findings showed the existence of a long-run cointegrating relationship between monetary policy variables and commercial bank profitability. Their results also confirmed that inflation negatively affected bank profitability, while interest rate produced a mixed effect on profitability. The study concluded that monetary policy has a significant effect on commercial bank profitability in both the short and long run. Therefore, the authors recommended that the government should adopt inflation-control policies and reduce the interest rate spread in order to boost bank profitability. On the contrary, Mawutor et al. (2023) empirically investigated how income diversification and intellectual capital improve bank profitability. The study adopted a panel regression technique to analyze data obtained from eighty banks across twenty-one countries from 2000 to 2020. The study employed the two-step System GMM and the dynamic panel threshold regression estimation methods to evaluate the hypotheses. The findings show that income diversification has a negative significant effect on the profitability of banks in Sub-Saharan Africa. The results also reveal that value-added intellectual coefficient (VAIC), human capital efficiency (HCE), and structural capital efficiency (SCE) have positive significant effects on bank profitability, while capital employed efficiency (CEE) has a negative significant effect on banks' profitability. The results further reveal that VAIC and HCE positively and significantly moderate the relationship between income diversification and the profitability of banks. The threshold regression results show that VAIC and HCE positively affect profitability, while VAIC and HCE enhance profitability only when they exceed their respective threshold values. The authors recommend that banks should invest in human capital and diversify their sources of income.

From Ghana, Apau and Sibindi (2023) examined the effects of bank-level factors on the profitability of banks under changing economic conditions from 2007 to 2021, using a dynamic panel system Generalized Method of Moments (GMM) technique on panel data collected from 18 universal banks in the country. The variables included in the analysis were nonperforming loans, return on assets, capital adequacy ratio, return on equity, asset quality and bank size. The results show that while capital adequacy, bank size, liquidity, and management efficiency have positive effects on profitability, non-performing loans have negative significant effect on profitability. The paper recommends that while banks maintain adequate capital and liquidity, they should also enhance asset quality and operational efficiency. Finally, Davis and Abdilahi (2022) explored the determinants of bank profitability in three major Sub-Saharan African countries of Kenya, Nigeria, and South Africa using System Generalized Method of Moments and panel econometric techniques. The specific objective of the study was to identify the bank-specific, banking sector and macroeconomic determinants of bank profitability in 240 banks across the three countries from 1990 to 2019. The variables analyzed in the model included banking liquidity, the non-interest income to total-income ratio, the cost-to-income ratio and gross domestic product. The results show that banking liquidity and non-interest income to total income ratio have positive significant effects on profitability while credit risk and the cost-to-income ratio have negative significant effects. The paper concludes that banking profitability in African countries is most determined by both bank-specific and macroeconomic variables. The study recommends that policymakers should improve macroeconomic stability to boost banking sector profitability. In summary, the literature review has revealed the effects of monetary policy and exchange rate on commercial bank profitability across different regions of the world. A common finding from the reviewed papers is that monetary policy and exchange rate are important variables affecting banks' profitability. Several econometric techniques, including the Ordinary Least Squares (OLS) approach, the Autoregressive Distributed Lag (ARDL) model, the dynamic panel threshold regression model, and the Generalized Method of Moments (GMM) estimator for panel data, have been used to examine the relationship between monetary policy and bank profitability. However, to enhance the understanding of this relationship, the present study adopts the Nonlinear Autoregressive Distributed Lag (NARDL) model developed by Shin et al. (2014) to examine both the short-run and long-run asymmetric effects of monetary policy and exchange rate on commercial bank profitability in Nigeria. The findings are expected to contribute to effective financial sector management and policy formulation.

3.1: Method of study

Using the models of Idris and Iheonkhan (2025) and Aisagbonbuomwan and Akrawah (2024), this study specifies an econometric model in which bank profitability is influenced by the monetary policy rate and the exchange rate. Therefore, the functional relationship is specified as follows:

$$ROA = f(MPR, EXR, CAR, INF) \quad (3.1)$$

To capture asymmetry, MPR and EXR are decomposed into their positive and negative partial sums:

$$ROA_{it} = f(MPR^+_{it}, MPR^-_{it}, EXR^+_{it}, EXR^-_{it}, CAR_{it}, INF_t) \quad (3.2)$$

Where:

ROA = Return on Assets MPR⁺ = Positive changes in Monetary Policy Rate MPR⁻ = Negative changes in Monetary Policy Rate EXR⁺ = Positive changes in Exchange Rate EXR⁻ = Negative changes in Exchange Rate CAR = Capital Adequacy Ratio INF = Inflation Rate

3.2: Model Specification

The functional link among the variables is specified as follows:

$$ROA_{it} = \alpha_i + \beta_1 MPR^+_{it} + \beta_2 MPR^-_{it} + \beta_3 EXR^+_{it} + \beta_4 EXR^-_{it} + \beta_5 CAR_{it} + \beta_6 INF_t + \epsilon_{1t} \quad (3.3)$$

Where: α_i = Constant terms; β_1 - β_6 = Coefficients of the independent variables ϵ_{1t} = White-noise error term

3.3: Definition of variables in the model:

1: Return on Assets (ROA)

Return on assets measures a bank's profitability in relation to its total assets. It shows how efficiently bank use its assets to generate earnings. In this study, return on asset serves as the dependent variable and is measured as: $ROA = \frac{\text{Net Profit After Tax}}{\text{Total Assets}} * 100$

Where:

ROA = Return on Assets. Net Profit after Tax = Profit earned after taxes. Total Assets = Bank's total assets.

2: Monetary Policy Rate (MPR)

The monetary policy rate (MPR) is the standard interest rate set by the Central Bank of Nigeria It is used to control money supply, inflation and level of economic activity in the country. The MPR is included in this study as an independent variable because changes in the MPR affect banks' lending and deposit rates, which in turn impact on their profitability.

3: Exchange Rate (EXR)

The exchange rate is another independent variable included in this study because of its impact on bank profitability through exposure to foreign currency transactions. Changes in exchange rate affects banks' profitability through its impact on transactions denominated in foreign currencies, and other international trade activities.

4: Capital Adequacy Ratio (CAR)

The capital adequacy ratio measures the percentage amount of capital a bank holds in relation to its loan port-folio. It indicates the extent to which a bank's regulatory capital can absorb potential losses that may arise from its risk-bearing assets such as loans and advances. Banks with a high capital adequacy ratio usually have capacity to increase lending and absorb unexpected credit losses, while lower capital ratios may limit lending and reduce profitability. In this study, capital adequacy ratio is serving as a control variable because it is a major determinant of banks' profitability.

The capital adequacy ratio is calculated as: $CAR = \frac{\text{Total Regulatory Capital}}{\text{Risk-Weighted Assets}} * 100$

Where:

CAR = Capital Adequacy Ratio Total Regulatory Capital = Tier 1 Capital + Tier 2 Capital
Risk-Weighted Assets = Total assets adjusted for their respective risk weights.

5: Inflation Rate (INF)

This study included inflation as a control variable because continuous increases in the general price level may affect bank profitability through high operating costs, decrease in asset quality, reduced loan repayment capacity among borrowers and changes in interest rates. Periods of high inflation are often characterized by increased default in loan repayment and rising non-

performing loans which may have negative effects on banking profitability. The inflation rate is measured as the annual percentage change in the consumer price index.

3.4: Method and Techniques of Data Analysis

The non-linear ARDL (NARDL) model developed by Shin Y. and Greenwood-Nimmo (2014) was adopted in the study to examine the asymmetric short-run and long-run effects of positive and negative changes in monetary policy rates and exchange rates on banking profitability in Nigeria. The NARDL (PMG) models for the study are specified as follows:

The long-run model

$$ROA_{it} = \alpha_i + \beta_1 MPR^+_{it} + \beta_2 MPR^-_{it} + \beta_3 EXR^+_{it} + \beta_4 EXR^-_{it} + \beta_5 CAR_{it} + \beta_6 INF_t + \epsilon_{1t} \quad (3.4)$$

The Short-run model

The Panel NARDL (PMG) error correction model is specified as:

$$\begin{aligned} \Delta ROA_{it} = & \theta_1 (ROA_{it-1} - \beta_1 MPR^+_{it-1} + \beta_2 MPR^-_{it-1} + \beta_3 EXR^+_{it-1} + \beta_4 EXR^-_{it-1} + \\ & \beta_5 CAR_{it-1} + \beta_6 INF_{t-1}) + \sum_{j=1}^{p-1} \lambda_{ij} \Delta ROA_{it-j} + \sum_{j=0}^{q-1} \partial_{1ij} \Delta MPR^+_{it-j} + \\ & \sum_{j=0}^{q-1} \partial_{2ij} \Delta MPR^-_{it-j} + \sum_{j=0}^{q-1} \partial_{3ij} \Delta EXR^+_{it-j} + \sum_{j=0}^{q-1} \partial_{4ij} \Delta EXR^-_{it-j} + \\ & \sum_{j=0}^{q-1} \partial_{5ij} \Delta CAR_{it-j} + \sum_{j=0}^{q-1} \partial_{6ij} \Delta INF_{t-j} + \mu_i + \epsilon_{1t} \end{aligned} \quad (3.5)$$

Where:

θ_1 = Error correction coefficient (expected to be negative and statistically significant).

μ_i = Bank-specific effects. ϵ_{1t} = White-noise error term. Δ = First-difference operator

4.1: Results and Discussion

4.2: Panel Unit Root Tests

The study adopted the Levin Lin and Chu (LLC) and Im-Pesaran-Shin panel unit root tests to assess the stationarity characteristics of the variables. The stationary tests results of the variables are depicted in Table 4.1.

Table 4.1: Unit root test results (Im-Pesaran-Shin and Levin, Lin and Chu)

Variables	Im-Pesaran-Shin		Levin-Lin-Chu		Integration Order
	Level P Value	First Difference P Value	Level P Value	First Difference P Value	
ROA	-----	0.000	-----	0.000	I(1)
MPR	1.000	0.001	1.000	0.000	I(1)
EXR	1.000	0.050	1.000	0.000	I(1)
CAR	0.001	-----	0.001	-----	I(0)
INF	1.000	0.000	1.000	0.000	I(1)

Source: Researcher's Computation Using Stata

The tests for stationarity displayed in Table 4.1 were done using both the Im-Pesaran-Shin and Levin Lin and Chu unit root tests. The panel unit-root results display a mixed order of integration

among the variables. ROA, MPR, EXR and INF are mostly integrated of order one, $I(1)$, while only CAR is stationary at level, $I(0)$. Hence, the results signify that the variables are a mixture of $I(0)$ and $I(1)$ processes.

4.3 Panel Cointegration Test

The long run relationship of the variables was assessed using the Pedroni and Westerlund tests for cointegration. The Pedroni cointegration test is an enhanced test that has two core dimensions of within and between dimensions. And these two dimensions present three test statistics of null hypothesis of no cointegration. The cointegration test result for this study is displayed in Table 4.2.

Table 4.2: Westerlund and Pedroni Residual Cointegration Tests

Tests	Statistic	P-value
Westerlund Test	2.215	0.0134
Phillips–Perron test	-1.079	0.1403
Augmented Dickey–Fuller Test	-1.0928	0.1272
Modified Phillips–Perron Test	2.8653	0.0021

Source: Researcher's Computation Using Stata

The panel cointegration results presented in Table 4.2 show mixed but suggestive proof of a long-run relationship among the variables. The Westerlund statistic is statistically significant at the 5% level, while the Modified Phillips-Perron statistic is also significant, leading to the rejection of the null hypothesis of no cointegration. However, the Phillips-Perron and Augmented Dickey-Fuller statistics are statistically insignificant, with p-values of 0.1403 and 0.1272, respectively. In all, the results show that although not all statistics support cointegration, two of the four statistics show evidence of a stable long-run relationship among the variables. This provides reasonable evidence for exploring the long-run and short-run dynamics using the panel NARDL framework.

4.4: Estimation of the Panel NARDL Model

The results of the Panel Nonlinear Autoregressive Distributed Lag (NARDL) model as developed by Shin Y. and Greenwood-Nimmo (2014), which examine whether positive and negative changes in an explanatory variable have different effects in the short run and/or long run is presented in Table 4.3. The Wald test results that show the symmetrical nature of the variables under consideration is presented in Table 4.4

Table 4.3: Panel Nonlinear Autoregressive Distributed Lag (NARDL) Model Results

Dependent Variable: Return on asset (ROA)				
Method: Panel Nonlinear Autoregressive Distributed Lag (NARDL) Model				
Variable	Coefficient	Standard. Error	p-value	Significance
INFLATION	-0.0001867	0.00030	0.535	Not significant
MPR POS	-0.0021355	0.00034	0.000	Significant
MPR NEG	-0.0022932	0.00078	0.003	Significant
LEXR POS	0.0336081	0.00760	0.000	Significant

LEXR NEG	1.5272250	0.27723	0.000	Significant
CAPITAL ADE. RATIO	0.0337634	0.013197	0.011	Significant

Source: Researcher's Computation Using Stata

Summary of Key Findings

- 1. Monetary Policy Rate Positive = -0.00214:** An increase in MPR has a negative and statistically significant effect on ROA in the long run.
- 2. Monetary Policy Rate Negative = -0.00229:** A decrease in MPR is also associated with a negative and statistically significant effect on ROA.
- 3. Exchange Rate Positive = 0.03361:** An increase in the exchange rate has a positive and significant effect on ROA.
- 4. Exchange Rate Negative = 1.52723:** A decrease in the exchange rate has an even larger positive and significant effect on ROA.
- 5. Capital Adequacy Ratio = 0.03376:** Higher capital adequacy is associated with higher ROA in the long run.
- 6. INFLATION = -0.00019:** Inflation has a negative but statistically insignificant long-run effect on ROA.

Table 4.4: Wald Test for Long-Run Asymmetry for ROA Model

Variab le	Positive Long-Run Coefficient (β^+)	Negative Long-Run Coefficient (β^-)	Wald χ^2	p-value	Decision	Conclusion
MPR	-0.0021360	-0.002290	0.040	0.8377	Fail to reject H_0	Symmetric
EXR	0.0336081	1.527225	29.51	0.0000	Reject H_0	Asymmetric

Source: Researcher's Computation Using Stata

Summary of Key Findings

The Wald test presented in Table 4.4 shows that the long-run effect of MPR is symmetric. The Wald statistic of 0.04 has a p-value of 0.8377, which is greater than 0.05. Therefore, the null hypothesis that the positive and negative MPR coefficients are equal cannot be rejected. Although increases and decreases in MPR have individually significant negative effects on ROA, their long-run effects are not statistically different.

On the other hand, the Wald test for the exchange rate provides strong evidence of long-run asymmetry. The Wald statistic is 29.51 with a p-value of 0.0000. Thus, the null hypothesis of equality between the positive and negative exchange-rate effects is rejected at the 5% level. This means that increases and decreases in the exchange rate have significantly different long-run effects on bank profitability (ROA).

5.1: Discussion of Findings

The core objective of this study was to assess the asymmetric effects of monetary policy rate (MPR) and exchange rate movements on the profitability of Nigerian deposit money banks, measured by return on assets (ROA). The panel NARDL results presented in Table 4.3 shows that increase in MPR has a negative and statistically significant effect on ROA in the long run, while decrease in MPR is also associated with a negative and statistically significant effect on ROA. However, the Wald test present in Table 4.4 confirms that the difference between the two effects is not statistically significant. This shows that positive and negative changes in MPR do not have statistically different long-run effects on bank profitability. In other words, the result confirms that changes in MPR have a symmetric effect on the profitability of Nigerian banks rather than an asymmetric effect. The symmetric effect of MPR found in this study agrees with Odior and Ejedegba (2018) and Borio et al. (2017), who found that monetary policy variables have similar effects on Nigerian banks' profitability in both the short and long run. The Panel NARDL results also show that an increase in the exchange rate has a positive and significant effect on ROA, while a decrease in the exchange rate has an even larger positive and significant effect on ROA. The Wald test indicates that positive and negative movements in the exchange rate have statistically different long-run effects on the profitability of Nigerian deposit money banks. The result therefore shows that movements in exchange rate have an asymmetric effect on the profitability of Nigerian banks. The finding of exchange rate asymmetry agrees with Dang (2022), who found that monetary policy affects bank profitability through various channels, leading to asymmetric responses of bank income components. The finding is also consistent with Mesagan (2022), who noted that exchange rate movements have asymmetric effects on Nigeria's financial sector. The observed long-run asymmetry in this study may be ascribed to the exposure of Nigerian banks to foreign currency transactions and exchange rate risk. The asymmetric response shows that the different ways through which exchange rate movement affect banking profitability, such as the valuation of foreign currency assets, foreign exchange gains or losses, and repayment capacity of borrowers may not operate with equal strength when the exchange rate appreciates or depreciates. Therefore, the finding shows the importance of considering nonlinear exchange rate dynamics when examining the relationship between macroeconomic conditions and bank profitability in Nigeria.

5.2: Conclusion

This study assessed the asymmetric effects of monetary policy rate (MPR) and exchange rate movements on the profitability of Nigerian deposit money banks using the Panel NARDL-PMG approach. The findings show that MPR has a symmetric long-run effect on bank profitability, as the Wald test fails to reject the null hypothesis of symmetry. On the other hand, exchange rate movements show significant long-run asymmetry. It shows that positive and negative exchange rate changes affect bank profitability differently. The results indicate that monetary policy has a symmetric effect on the profitability of Nigerian banks, while exchange rate movements have asymmetric long-run effects, with increases and decreases in the exchange rate affecting bank profitability differently.

5.3: Recommendations

Based on the findings, the study recommends that:

1. Considering the negative effect of MPR on bank profitability, the CBN should consider the profitability implications of MPR changes when designing monetary policy.

2. In view of the observed asymmetric effect of exchange rate movements, the CBN should strengthen exchange rate stability measures and encourage banks to improve foreign exchange risk management.
3. The Nigerian deposit money banks should strengthen their management of foreign currency exposures and develop suitable hedging strategies to reduce exchange rate-related risks.
4. Monetary and exchange rate policies should be coordinated to enhance financial stability and sustainable bank profitability.

References

- Abdulhamid, J., Aliyu, U. S., Rabi, S., Ibrahim, S. S., & Cavusoglu, B. (2024). A novel bootstrap approach for the effect of exchange rate shocks on growth performance in Nigeria. *SAGE Open*, 14(4).
- Access Bank Plc (2025). Annual Report and Accounts 2024
- Adewole, C., & Anthony, N. O. (2019). Effect of monetary policy on deposit money banks profitability in Nigeria. *International Journal of Management Science Research*, 5(1), 259–277.
- Afolabi, B. (2023). Monetary policy and the performance of deposit money banks in Nigeria. *FUOYE Journal of Finance and Contemporary Issues*, 4(1).
- Aginam, C. J., & Obi-Nwosu, V. O. (2019). Effect of monetary policy on the performance of deposit money banks in Nigeria: *Zik Journal of Multidisciplinary Research*, 2(1)
- Aisagbonbuomwan, B., & Akrawah, D. O. (2024). Macroeconomic indicators and bank profitability in Nigeria. *Jalingo Journal of Social and Management Sciences*, 5(3).
- Altavilla, C., Boucinha, M., & Peydró, J. L. (2018). Monetary policy and bank profitability in a low interest rate environment. *Economic Policy*, 33(96), 531–586.
- Apau, R., & Sibindi, A. B. (2023). The effect of bank-specific dynamics on profitability under changing economic conditions: Evidence from Ghana. *Banks and Bank Systems*, 18(4), 169–180.
- Aribatise, A., Adeyemi, G., Daniel, A., & Adeseke, A. (2025). Effect of monetary policy on bank performance in Nigeria. *African Banking and Finance Review Journal (ABFRJ)*. International Open Access Journal Vol. 20 Issue 6
- Athanasoglou, P., Brissimis, S. N., & Delis, M. D. (2008). Bank-Specific, Industry-Specific and Macroeconomic Determinants of Bank Profitability. *Journal of International Financial Markets, Institutions and Money*, 18, 121-136
- Bahmani-Oskooee, M., & Fariditavana, H. (2015). Nonlinear ARDL approach and *the* J-curve phenomenon. *Open Economies Review*, 26(1), 51–70.
- Bikker, J. A. and Vervliet T. M (2018), 'Bank profitability and risk-taking under low interest rates', *International Journal of Finance & Economics*, 23(1), 3–18.
- Bolivar, F., Duran, M. A., & Lozano-Vivas, A. (2024). Bank business models, size, and profitability. *arXiv:2401.12323 [econ.GN]*
- Borio, C., Gambacorta, L., & Hofmann, B. (2017). The influence of monetary policy on bank profitability. *International Finance*, 20(1),
- Bosupeng, M., Naranpanawa, A., & Su, J. E. (2024). Does exchange rate volatility affect the impact of appreciation and depreciation on the trade balance? A nonlinear bivariate approach. *Economic Modelling*, 130, 106592.
- Časta, M., & Švéda, J. (2024). Monetary policy shocks and bank profitability: Evidence from the Euro Area. SSRN Working Paper. <https://doi.org/10.2139/ssrn.4770689>
- CBN statistical bulletin, 2024 & 2025.
- Claessens Stijn, Nicholas Coleman, Michael Donnelly (2018). “Low-for-long” interest rates and Banks’ interest margins and profitability: Cross country evidence. *Journal of Financial Intermediation*, 35, 1–16.
- Dang, V. D. (2022). The impact of monetary policy on bank profitability and the moderating role of funding patterns in Vietnam. *Institutions and Economics*, 14(1), 115–139

- Davis, E. P., & Abdilahi, R. A. (2022). Econometric analysis of the determinants of bank profitability in three major African countries: Kenya, Nigeria, and South Africa. Economics and Finance Working Paper No. 2206, Brunel University London.
- Demirgüç-Kunt, A. and Huizinga H.A. (2010). Bank activity and funding strategies: The impact on risk and returns. *Journal of Financial Economics*, 98(3), 626–650.
- Ekpenyong, G. U., Ademola-John, I. C., & Mohammed, A. (2025). Assessing the effects of monetary policy on bank profitability in Nigeria. *International Journal of Business Economics and Management Science*, 7(7).
- FBN Holdings (2025). Annual Report and Accounts 2024
- Guaranty Trust Holding Company Plc (2025). Annual Report and Accounts 2024
- Haruna, A. D. (2025). Effect of monetary policy on the profitability of deposit money banks in Nigeria (2010–2024). *ADSU International Journal of Applied Economics, Finance and Management*. Vol. 10 No. 2
- Huynh, J. (2023). The monetary policy pass-through mechanism: Is the search-for-yield incentive at work? *Humanities and Social Sciences Communications*, 10, 886. <https://doi.org/10.1057/s41599-023-02425-z>
- Idris, A., & Iheonkhan, I. S. (2025). Impact of exchange rate on the profitability of commercial banks in Nigeria. *International Journal of Economics and Financial Management*, 10(3).
- Iwedi, M., & James, E. D. (2023). Monetary policy and commercial banks profitability in Nigeria. *Journal of Business and African Economy*, 9(2), 32–49.
- Jamil, M. N., Rasheed, A., Maqbool, A., Mukhtar, Z., & others. (2023). Cross-cultural study of macroeconomic variables and their impact on exchange rate regimes. *Future Business Journal*, 9(1), Article 9.
- Jiang, E. X., Matvos, G., Piskorski, T., & Seru, A. (2024). Monetary tightening and U.S. bank fragility in 2023: Mark-to-market losses and uninsured depositor runs? *Journal of Financial Economics*, 159, 103899.
- Kashyap, A. K., & Stein, J. C. (2000). What do a million observations on banks say about the transmission of monetary policy? *American Economic Review*, 90(3), 407–428.
- Kingsly, K. M. (2024). Currency exchange rates. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4959096>
- Mawutor, J. K. M., Boadi, I., Antwi, S., & Tetteh, A. B. (2023). Improving banks' profitability through income diversification and intellectual capital: The Sub-Saharan Africa perspective. *Cogent Economics & Finance*, 11(2), Article 2271658.
- Menicucci, E., & Paolucci, G. (2016). The Determinants of Bank Profitability: Empirical Evidence from European Banking Sector. *Journal of Financial Reporting and Accounting*, 14, 86-155.
- Mesagan, E. P. (2022). Symmetric and asymmetric effects of exchange rate: Evidence from capital market and financial sector in Nigeria. *Journal of Public Affairs*, 22(3), e2776.
- Mishkin, F. S. (1995). Symposium on the monetary transmission mechanism. *Journal of Economic Perspectives*, 9(4), 3–10.
- Odior, E. S. O., & Ejedegba, R. U. (2018). Central Bank of Nigeria contemporary monetary policy and banks profitability: An ARDL approach. *Sokoto Journal of the Social Sciences*, 8(2), 1–16.
- Oladele, S. A., Amos, M. O., & Adedeji, A. A. (2017). Effects of interest rate on the profitability of deposit money banks in Nigeria. *European Journal of Business and Management*, 9(10).

- Olofinlade, S. O. (2025). Monetary policy and growth performance of deposit money banks in Nigeria. *Nigerian Journal of Banking and Financial Issues*. Vol. 11 no 2
- Onaga, I. F., Arize, A. C., Onwumere, J. U. J., & Kalu, E. U. (2023). Monetary policy transmission channels and the performance of the real sectors in selected Sub-Saharan African countries: A system-GMM approach. *Future Business Journal*, 9(49).
- Oyadeyi, O. O.(2024). Financial development, monetary policy, and the monetary transmission mechanism: An asymmetric ARDL analysis. *Economies*, 12(8), 191.
- Peterson K. Ozili, 2017. "Bank Profitability and Capital Regulation: Evidence from Listed and non-Listed Banks in Africa," *Journal of African Business*, Taylor & Francis Journals, vol. 18(2), pages 143-168,
- Salachas, E., Kouretas, G. P., & Laopodis, N. T. (2025). International monetary spillovers in bank profitability and risk-taking. *Oxford Economic Papers*, 77(4), 1148–1174.
- Shin, Y., Yu, B.,and Greenwood-Nimmo, M. (2014). Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In R. Sickles & W. Horrace (Eds.), *Festschrift in honor of Peter Schmidt* (pp. 281–314). Springer.
- United Bank for Africa PIC (2025). Annual Report and Accounts 2024
- Uruakpa, P. C. (2023). Monetary policy and deposit money banks' profitability: Evidence from Nigeria. *European Journal of Accounting, Finance and Investment*, 9(12), 19–28.
- Windsor, C., Jokipii, T., & Bussiere, M. (2023). The impact of interest rates on bank profitability: A retrospective assessment using new cross-country bank-level data (Research Discussion Paper 2023-05)
- World Bank (2022). Global financial development report:
- Zenith Bank Plc (2025). Annual Report and Accounts 2024