Effect of Monetary Policy on Bank Profitability in Nigeria

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Certification

This is to certify that this thesis titled "Effect of Monetary Policy on Bank Profitability in Nigeria" was carried out by Muinat Biola **ADESINA** with Matriculation number of LCU/PG/002473 in the Department of Economics and Development Studies, Faculty of Management and Social Sciences, Lead City University, Ibadan, under my supervision and that this work has not been previously submitted.

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Dedication

This research is dedicated to God Almighty, the Father of Light who has made it possible for me to complete this programme successfully.

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Abstract

This study investigates the impact of monetary policy on the profitability of seven prominent Nigerian Deposit Money Banks (DMBs) with global authorization over the period 2010 to 2022. Utilizing panel data analysis, specifically panel fixed and random effects estimators, the study examines the relationship between key monetary policy instruments and various measures of bank profitability, including net interest margin (NIM), net profit margin (NPM), return on assets (ROA), and return on equity (ROE). The study employs a comprehensive dataset to explore how changes in monetary policy rates (MPR), interest rate spread (IRS), cash reserve ratios (CRR), and loan-to-deposit ratios (LDR) influence bank profitability in the Nigerian banking sector. The findings reveal mixed relationships between monetary policy variables and bank profitability indicators. Notably, the study identifies that CRR and LDR have significant negative effects on NIM, NPM, and ROE, highlighting the importance of liquidity management and prudent lending practices in enhancing bank profitability. Moreover, IRS emerges as a significant determinant of NPM, indicating the impact of interest rate risk on banks' earnings. However, the direct influence of MPR on profitability measures is found to be statistically insignificant, suggesting the need for further examination of monetary policy transmission mechanisms in the Nigerian banking context. The findings underscore the importance of sound liquidity management, effective interest rate risk management, and prudent lending practices in enhancing bank profitability amidst evolving macroeconomic conditions and regulatory frameworks. The study's insights have implications for policymakers, regulators, and banking practitioners seeking to foster a stable and profitable banking sector in Nigeria.

Keywords: Monetary policy rate, internet rate spread, cash reserve ratio, loan-deposit ratio, net interest margin, net profit margin, return on assets, return on equity.

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Chapter One

Introduction

1.1 Background to the Study

Nigeria's monetary policy journey has been marked by a series of pivotal developments that mirror the country's economic evolution. The establishment of the Central Bank of Nigeria (CBN) in 1959 marked a significant milestone[1]. The CBN's mandate to regulate and control the money supply and credit laid the foundation for the management of the country's monetary policy. The Structural Adjustment Program (SAP) implemented in Nigeria in 1986 represents a significant and transformative chapter in the country's economic history. At the time, Nigeria was facing a range of pressing economic challenges, including dwindling oil prices, fiscal imbalances, and mounting external debt[2,3]. Recognizing the need for comprehensive economic reforms, the government, under the leadership of General Ibrahim Babangida, initiated SAP as part of a broader international movement advocating economic restructuring and liberalization. SAP introduced a sweeping set of policy changes that touched various sectors, including monetary and fiscal policies, with profound implications for Nigeria's financial landscape.

Central to SAP was the decision to devalue the Nigerian Naira, shifting from a fixed exchange rate to a more flexible, market-driven exchange rate system. This devaluation aimed to enhance the competitiveness of Nigeria's exports and attract foreign investment[3]. However, the transition to a flexible exchange rate system had significant implications for the banking sector. Banks had to adapt to the newly introduced currency risk as exchange rates fluctuated, affecting the valuation of foreign currency-denominated assets and liabilities.

SAP prompted substantial changes in Nigeria's monetary policy framework. The country transitioned from direct credit controls and financial repression to a more market-oriented approach. The Central Bank of Nigeria (CBN) began to use monetary policy measures to influence interest rates, credit flows, and overall financial conditions. Within this context, the CBN introduced instruments like Treasury Bills and Certificates of Deposit to manage liquidity and control the money supply. These monetary policy shifts played a crucial role in shaping how monetary policy affected banks' profitability, lending practices, and interest rate dynamics.

SAP ushered in financial sector reforms, including the liberalization of interest rates. This move allowed banks to determine their lending and deposit rates, fostering greater competition among financial institutions. This deregulation influenced banks' strategies to attract deposits and offer competitive loan products. Furthermore, it had implications for the interest rate environment, influencing banks' net interest margins and, consequently, their profitability.

The Structural Adjustment Program of 1986 was a transformative period in Nigeria's economic history, underscoring the country's commitment to market-oriented reforms[3]. Its impact reverberated through both monetary policy and the banking sector, laying the foundation for a more market-driven financial environment. These changes in monetary policy and the financial landscape significantly influenced the profitability, risk management, and operations of banks operating in Nigeria, making it an essential period to consider in the study of monetary policy and bank profitability. The late 1990s saw a pivotal shift from a fixed exchange rate regime to a more flexible, floating exchange rate system. The adoption of this new exchange rate mechanism had profound implications for the Nigerian financial system. Exchange rate fluctuations became a significant variable impacting the profitability of banks. The valuation of assets and liabilities held in foreign currencies by Nigerian banks was now exposed to market forces.

The year 2006 was a significant turning point in Nigeria's monetary policy landscape with the introduction of the Monetary Policy Rate (MPR)[4,5,6]. This marked a fundamental shift in the way the CBN conducted its monetary policy, introducing a more transparent and effective mechanism for influencing interest rates and financial conditions within the country. The MPR is essentially an interest rate that the CBN sets as a reference point for its monetary policy decisions[5,6]. It serves as the anchor rate upon which other lending and deposit rates within the financial system are based. By adjusting the MPR, the CBN aims to influence the cost of borrowing and lending, thereby affecting credit availability and economic activity.

The introduction of the MPR directly impacted commercial banks in Nigeria[7]. These banks rely on the MPR as a guide for setting their own interest rates. A change in the MPR can significantly affect the profitability of commercial banks as it influences their net interest margins, the difference between the interest they earn on loans and the interest they pay on deposits. For instance, when the MPR is lowered, it typically reduces the cost of funds for banks, enabling them to offer more competitive loan products and potentially improving their profitability.

The MPR also plays a pivotal role in the transmission of monetary policy. It allows the CBN to signal its stance on monetary policy to commercial banks and the broader financial market. It affects the cost of funds in the interbank market and, consequently, the rates at which commercial banks lend to their customers. This influence on credit availability and cost is a critical channel through which monetary policy impacts economic growth and inflation in the country[8,9].

The introduction of the MPR was part of a broader shift towards a more market-oriented monetary policy framework[10,11]. It allowed the CBN to respond more effectively to changing economic conditions, such as inflation and exchange rate stability. The MPR, along with other

monetary policy instruments, provided the CBN with greater flexibility to manage economic challenges and support sustainable growth.

The introduction of the Monetary Policy Rate (MPR) in 2006 represented a significant step in the evolution of Nigeria's monetary policy framework[8]. It provided the CBN with a clear and transparent tool to communicate its monetary policy intentions and influence interest rates within the financial system. For commercial banks, the MPR became a critical reference point for setting their own lending and deposit rates, affecting their profitability and credit market dynamics, and shaping the financial landscape of the country.

Furthermore, in 2010, Nigeria formally adopted an inflation targeting framework as the basis for its monetary policy[7]. This framework aimed to maintain single-digit inflation rates. These historical milestones in Nigeria's monetary policy evolution form the backdrop against which the study examines the interplay between monetary policy and bank profitability. The background and rationale for this study are rooted in the historical evolution of monetary policy, the impact of critical policy reforms, and the need to understand how Nigerian banks have weathered economic challenges. Several works have been carried out related to this research, but this study stands out for its in-depth analysis, comprehensive scope, and the specific focus on Nigeria's monetary policy dynamics and the adaptability of its banking sector[12,13,14,15,16,17,18,19,20].

1.2 Statement of the Problem

The study delves into a multifaceted problem that holds significant implications for the Nigerian financial landscape. The Nigerian banking sector, as a cornerstone of the nation’s economic growth and financial stability, is inherently intertwined with the decisions made by the Central Bank of Nigeria (CBN) in shaping monetary policy. This relationship between monetary policy

and the profitability of banks, however, is rife with complexities, challenges, and uncertainties that warrant a comprehensive examination[12,13].

Foremost among these challenges is the need to decipher how alterations in monetary policy, such as changes in interest rates, inflation targeting strategies, and exchange rate policies, directly influence the profitability of Nigerian banks. While the primary goal of CBN's monetary policies is to promote economic stability and growth, the precise and nuanced effects on the profitability and stability of banks within the Nigerian context have not been rigorously explored. This knowledge gap is particularly pertinent given the pivotal role of the banking sector in the nation's economy.

The study also addresses the volatility witnessed in bank profitability over the course of the study period. Nigerian banks have experienced fluctuations in profitability, frequently driven by economic shocks and the ebb and flow of monetary policy measures. Identifying the specific determinants of this profitability volatility and comprehending how these factors interact with monetary policy actions is of paramount importance. It not only pertains to the stability of individual banks but also bears direct relevance to the broader economic well-being of Nigeria.

Furthermore, this research delves into the adaptive strategies employed by Nigerian banks in response to policy changes and economic shocks. The introduction of the Monetary Policy Rate (MPR) in 2006, along with subsequent policy interventions such as the Loan-to-Deposit Ratio (LDR) policy, presented distinct challenges and opportunities for the banks. Investigating the efficacy with which banks have managed these challenges, the adaptability of their strategic approaches, and their risk management practices is integral to comprehending the resilience and competitiveness of the banking sector.

The study also explores the aspect of resilience within Nigerian banks during times of economic shocks. With the global financial crisis of 2008 and the unprecedented COVID-19 pandemic in 2020-2021, banks faced exceptional challenges in maintaining profitability and financial stability. Understanding how these external shocks impacted the operations, risk management practices, and overall profitability of banks is essential not only for the sector itself but also for the broader economic landscape.

In essence, this study is motivated by the overarching aim of providing insightful answers to these multifaceted questions and challenges that surround the relationship between monetary policy and bank profitability in Nigeria. By addressing these challenges and uncertainties, this research endeavours to equip both policymakers and banking practitioners with knowledge that can inform more effective policy decisions, enhance the stability and profitability of the Nigerian banking sector, and, by extension, contribute to the overall economic prosperity and well-being of the nation.

1.3 Research Questions

This research seeks to answer the following research questions:

i. What is the impact of monetary policy on net interest margin of Nigerian banks?

ii. How do the monetary policy instruments impact net profit margin of Nigerian banks?

iii. What effect does monetary policy has on return on assets of Nigerian banks?

iv. To what extent does monetary policy impact return on equity of Nigerian banks?

1.4 Objectives of the Study

The main objective of this study is to investigate the relationship between monetary policy and bank profitability in Nigeria. The specific objectives are:

i. To examine the impact of monetary policy on net interest margin of Nigerian banks.

ii. To assess how monetary policy influence net profit margin of Nigerian banks.

iii. To evaluate the effect of monetary policy on return on assets of Nigerian banks.

iv. To determine the extent to which monetary policy impacted return on equity of Nigerian banks.

1.5 Hypotheses

For the purpose of this study, the following hypotheses are constructed:

H_{01}: There is no significant relationship between monetary policy and net interest margin in Nigerian banks.

H_{02}: Monetary policy has no significant impact on net profit margin in Nigerian banks.

H_{03}: There is no significant relationship between monetary policy and return on assets in Nigerian banks.

H_{04}: Monetary policy has no significant impact on return on equity in Nigerian banks.

1.6 Significance of the Study

First and foremost, it bears direct policy relevance. The findings of this study provide critical insights into the intricate relationship between monetary policy and bank profitability. For policymakers, particularly the Central Bank of Nigeria (CBN), this knowledge is invaluable. It offers a more comprehensive understanding of how their policy decisions impact the financial sector, guiding the formulation and adjustment of policies to promote economic stability and sustainable banking operations.

Furthermore, this study contributes to the stability of the banking sector. The banking industry's stability is essential for the overall health of the economy. By shedding light on the factors that influence bank profitability, the study helps identify vulnerabilities and strengths within the sector. This, in turn, enables more effective risk management and regulatory oversight, ultimately contributing to a sound and resilient financial system that can withstand economic challenges.

Economic development is another area deeply impacted by the study's findings. The banking sector is a vital driver of economic growth and development. By examining how monetary policy affects the profitability of banks, the study can illuminate the sector's role in supporting economic activities, including lending to the real sector. This understanding is crucial for sustainable development in Nigeria.

Moreover, the study's significance extends to investors, shareholders, and stakeholders in the Nigerian banking industry. For these groups, a transparent understanding of the factors that impact bank profitability can inform investment decisions and foster greater confidence in the sector. It provides valuable information for individuals and entities looking to participate in or support the banking industry in Nigeria.

Academically, this study contributes to the fields of economics, finance, and monetary policy. It provides a comprehensive analysis of the Nigerian context, which can serve as a reference for academics and researchers examining similar relationships in other economies. It adds to the body of knowledge and enriches the academic discourse on these vital subjects.

For banks operating in Nigeria, this study offers critical insights into risk management and optimizing profitability in a changing economic environment. The findings can inform strategic decisions and risk mitigation strategies, helping banks operate more efficiently and adapt to evolving monetary policy dynamics.

Public awareness is also a key aspect of this study's significance. A better understanding of how monetary policy affects banks' profitability can empower the public, including consumers and borrowers, to make more informed financial decisions. It allows individuals to comprehend the dynamics of the financial sector and understand the implications of monetary policy changes on their financial well-being.

Finally, the study holds global relevance. Its findings are not only pertinent to Nigeria but can be of interest to the broader global financial community. By contributing to the understanding of how monetary policy decisions impact banks in emerging and developing economies, this study offers insights that may be relevant in similar contexts worldwide. It adds to the global knowledge pool on the interactions between monetary policy and banking profitability.

1.7 Scope of the Study

This study conducted a survey of the seven leading customer deposit money banks with worldwide authorization from 2010 to 2022, spanning a period of 13 years. The primary objective was to examine the sampled banks' adherence to apex bank policies in their activities and operations, as well as their profitability over this period. These selected banks have significant control over a substantial portion of Nigeria's asset, deposit, and loan markets. As a result, they wield considerable influence in the deposit money bank industry, which represents the entire financial system. Their operations and performance are closely examined to gain insights into trends, issues, and policy implications that have wide-ranging effects on Nigeria's economic stability and development.

Access Bank Plc, Fidelity Bank Plc, First Bank Nigeria Limited, Guaranty Trust Bank Plc, Union Bank of Nigeria Plc, United Bank of Africa Plc, and Zenith Bank Plc possess international banking licences as authorised[21]. These financial institutions are also acknowledged as leaders in consumer deposits for the year 2022. ECO Bank Plc, with customer deposits totalling ₦8.06 trillion, and Sterling Bank Plc, with customer deposits totalling ₦1.15 trillion, were rated second and tenth, respectively, in terms of the highest customer deposits in 2022[22]. However, it should be noted that neither of these banks possess international licence. Consequently, they were excluded from the banks that were sampled. FCMB Plc was excluded from consideration due to a significant lack of available data.

1.8 Operational Definition of Terms

Bank Profitability: Bank profitability is the measure of a bank's ability to generate profits from its operations. It is typically assessed through metrics like net interest margin (NIM), net profit margin (NPM), return on assets (ROA), and return on equity (ROE). High profitability indicates that a bank is efficiently using its resources and managing risks effectively. Factors influencing bank profitability include interest rates, lending practices, operating costs, and economic conditions.

Cash Reserve Ratio (CRR): CRR is a percentage of the total deposits that commercial banks are required to hold as reserves with the central bank. This reserve ratio helps control the money supply in the economy. By changing the CRR, the central bank can influence the amount of money available for lending, affecting liquidity in the banking system.

Liquidity Ratio: The liquidity ratio, often referred to as the Liquidity Coverage Ratio (LCR) or the Statutory Liquidity Ratio (SLR), represents the portion of a bank's assets that must be held in highly liquid and low-risk instruments. The purpose is to ensure that banks have enough liquid assets to meet their short-term obligations. It is a prudential regulation to safeguard the stability and solvency of banks.

Monetary Policy Rate (MPR): MPR is the interest rate set by a country's central bank, such as the Central Bank of Nigeria (CBN), to influence the lending and deposit rates in the financial system. It serves as a benchmark for banks and other financial institutions when determining their interest rates on loans and deposits. Adjusting the MPR is a key tool for the central bank to control inflation, stimulate economic growth, or maintain price stability.

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Chapter Two

Literature Review

This section provides an overview of the relevant concepts, theories, and empirical research pertaining to monetary policy and bank profitability in Nigeria. This section provides a conceptual review for understanding the concepts of monetary policy instruments and bank profitability in Nigeria. Furthermore, the study includes an in-depth review of relevant theories and empirical research pertaining to the subject matter. Finally, gaps in the existing body of literature were identified.

2.1 Conceptual Review

2.1.1 Monetary Policy Instruments

The framework that the Central Bank uses to control the flow of money, interest rates, and credit in order to accomplish major economic goals is known as monetary policy[1]. These policies fall into two categories: monetary instruments, quantitative and qualitative.

2.1.1.1 Quantitative Instruments

Monetary Policy Rate (MPR)

A country's monetary policy framework must include the Monetary Policy Rate (MPR), which is especially important given Nigeria's economic situation. The MPR is a key instrument used by the Central Bank of Nigeria (CBN) to shape the financial stability and economic conditions of the nation. It is a fundamental interest rate.

The rate at which commercial banks and other financial institutions receive loans from the central bank is known as the MPR. The entire financial system is affected significantly when the CBN decides to change the MPR[2]. Changing the MPR is mainly done to affect inflation and

economic growth, two important macroeconomic factors. The MPR is an essential tool for accomplishing price stability and economic development in Nigeria, where these objectives are given high priority.

Higher borrowing costs for banks translate into higher borrowing costs for consumers and enterprises[3]. This helps keep inflation under control by acting as a restraint on economic activity, particularly borrowing and spending. On the other hand, a decline in the MPR has the opposite impact, encouraging investment, borrowing, and spending and fostering economic expansion.

Additionally, the MPR has an impact on Nigerian banks' profitability. An increase in the MPR raises interest rates, which has an impact on banks' Net Interest Margin (NIM), a crucial metric for profitability. Higher MPR has the ability to impact bank earnings by narrowing the difference between lending and deposit rates[3].

When deciding on the MPR, the CBN carefully weighs a number of variables, such as inflation trends, exchange rate stability, fiscal policies, and state of the world economy. The MPR influences the profitability and lending capacity of Nigeria's banking institutions while also acting as a potent tool for guiding the country's monetary policy in a direction consistent with its larger economic goals.

Cash Reserve Ratio (CRR)

Another crucial tool the Central Bank of Nigeria (CBN) uses to control the nation's financial system and affect economic circumstances is the Cash Reserve Ratio (CRR). The percentage of total deposits that Nigerian commercial banks are obliged to maintain as cash or liquid assets reserves with the CBN is known as the CRR. One crucial instrument for controlling liquidity in the financial sector is the CRR.

Stabilizing the financial system and regulating the money supply are two of the CRR's main goals. In effect, the CBN takes away some of the money that banks are able to lend to consumers when it hikes the CRR. For Nigeria's monetary officials, controlling inflation and reducing the expansion of the money supply are top priorities, and this can be achieved by reducing bank lending capacity. Lowering the CRR, on the other hand, adds liquidity to the banking system and increases the amount of money available for lending and investing, all of which can promote economic expansion.

Additionally, the CRR directly affects Nigerian banks' profitability. Banks' capacity to use deposits for lending and investing is restricted when they must retain a larger proportion of their deposits as reserves with the central bank. This could lower the amount of interest revenue the banks are able to earn. Important profitability metrics like Return on Assets (ROA) and Net Interest Margin (NIM) may be impacted by this. To strike a balance between their profit goals and the CRR's regulatory requirements, banks must carefully manage their operations.

The adjustment of the CRR is not a decision taken lightly. When deciding on the right CRR level, the CBN takes into account a number of variables, such as inflation rates, economic growth, and monetary policy objectives. The goal of these changes is to maintain the stability and liquidity of the financial system while balancing the needs of economic expansion and inflation control.

The CRR is an essential tool that the central bank of Nigeria uses to control liquidity, uphold price stability, and encourage the health of the financial sector in the country's dynamic financial environment. The CBN exerts considerable control over the activities of commercial banks and, consequently, the economy at large by mandating banks to hold a percentage of their deposits as reserves.

Open Market Operations (OMO)

Open Market Operations (OMO) are a crucial monetary policy tool employed by the Central Bank of Nigeria (CBN) to regulate liquidity within the banking sector and accomplish certain policy goals. Open Market Operations (OMO) refer to the purchase and sale of government securities, particularly Treasury Bills, in the open market. This activity exerts a substantial influence on the monetary base and near-term interest rates in Nigeria.

When the Central Bank of Nigeria (CBN) carries out Open Market Operations (OMO) through the acquisition of government securities, it introduces funds into the banking sector. This step strengthens the reserves of banks, so increasing the amount of funds that may be used for lending and investment. Hence, the augmentation of liquidity inside the system exerts a lowering influence on short-term interest rates, such as the interbank lending rate. Reduced interest rates, thus, promote the act of taking loans, spending money, and making investments, which can effectively drive economic expansion.

In contrast, when the Central Bank of Nigeria (CBN) engages in Open Market Operations (OMO) by selling government assets, it effectively removes funds from the banking system. This action diminishes the reserves of banks, so constraining their ability to lend and causing an escalation in short-term interest rates. The Central Bank of Nigeria (CBN) can effectively manage inflation and maintain price stability by selling government securities to absorb surplus liquidity. This instrument is especially valuable in circumstances where there is a potential for an excessive expansion of the money supply, which may result in inflationary pressures.

OMO is a versatile instrument that enables the CBN to precisely adjust its influence on the money supply and interest rates. The central bank is empowered to rapidly tackle specific

concerns in the financial system, thereby ensuring stability and promoting the attainment of broader monetary policy objectives.

Liquidity Ratio

The Liquidity Ratio is an essential element of a country's financial regulatory structure, guaranteeing the stability and financial soundness of banks. In Nigeria, this ratio denotes the percentage of a bank's overall deposit obligations that must be maintained in easily convertible assets, such as cash, government bonds, or deposits with the Central Bank of Nigeria (CBN). The Central Bank of Nigeria (CBN) has established a general liquidity ratio of 30%. This percentage is subject to revision or may be maintained unchanged during the meetings of the central bank's Monetary Policy Committee (MPC). Any bank that exceeds this rate is exposing itself to liquidity risk. This requirement is formulated to guarantee that banks uphold a certain threshold of liquidity to fulfill their immediate obligations and address unforeseen withdrawals.

The Liquidity Ratio is of utmost importance in the Nigerian banking sector, as it serves to protect the stability of banks during times of financial strain or economic unpredictability. The Central Bank of Nigeria (CBN) ensures public trust in the financial system by mandating that banks maintain a designated proportion of their deposits in easily convertible assets. This requirement guarantees depositors' confidence in their ability to withdraw their monies promptly.

The Liquidity Ratio is a crucial instrument for managing liquidity risks that may occur from reasons such as unforeseen deposit outflows, shifts in market circumstances, or disruptions in the global financial system. Nigerian banks enhance their ability to withstand financial shocks and promote the general stability and soundness of the banking industry by complying with the Liquidity Ratio criteria.

Banks attach great importance to complying to the Liquidity Ratio, as it goes beyond mere compliance. Implementing prudent liquidity management practices and adhering to regulatory standards enables banks to prevent severe liquidity crises, funding gaps, and even insolvency. Furthermore, the management of liquidity is intricately connected to a bank's goals for generating profit and mitigating risk. Ensuring a suitable equilibrium between easily accessible funds and investments with greater yields but limited liquidity is essential for attaining financial stability while maximizing asset returns.

The Liquidity Ratio, mandated by the CBN, emphasizes the significance of maintaining sufficient amounts of liquidity to guarantee that banks can efficiently fulfill their responsibilities, both to depositors and other financial institutions. The Nigerian banking industry relies on it as a fundamental element of financial stability and customer trust. It emphasizes the crucial function of prudential laws in protecting the whole economy from financial disturbances.

2.1.1.2 Qualitative Instruments

Direct Credit Control

Direct credit control, sometimes referred to as credit ceiling or credit rationing, is a monetary policy instrument employed by central banks to manage the accessibility and expense of credit within the financial system. In Nigeria, like in several other economies, this policy instrument plays a pivotal role in shaping lending practices, managing inflation, and upholding financial stability.

Direct credit control entails the central bank imposing precise restrictions on the extent to which commercial banks can provide credit to their customers. The purpose of these constraints is to restrain excessive lending and avert economic overheating, which might result in inflationary

pressures. This policy instrument is especially valuable when the central bank aims to exert control over the allocation of credit to particular sectors of the economy.

The Central Bank of Nigeria (CBN) utilizes direct credit control tools to regulate the financial industry in Nigeria. The Central Bank of Nigeria (CBN) has the ability to limit lending in sectors that it considers to be overheated or experiencing excessive credit expansion by implementing credit ceilings. During periods of elevated inflation or when the central bank aims to deter speculative lending, it may enforce credit restrictions on real estate or consumer loans.

On the other hand, the CBN can also loosen credit limits in order to encourage lending and promote economic expansion. This strategy is particularly advantageous in times of economic recession, since it enables the central bank to incentivize banks to provide additional credit in order to bolster enterprises and investments.

The use of direct credit control has both benefits and difficulties. Positively, it grants the central bank the ability to exert direct control over lending practices, guaranteeing that banks conform to the monetary policy objectives of the nation. During times of economic upheaval, it can serve as a powerful instrument for guiding the economy in a desired direction.

Nevertheless, direct credit control measures have certain drawbacks. An obstacle lies in the fact that they can be unwieldy to adopt and enforce. Continuous monitoring and adjustment of loan limits are necessary, which can involve administrative complexity. Furthermore, it may lack the same level of accuracy as other monetary policy instruments, such as interest rate modifications, in attaining desired results.

The Central Bank of Nigeria (CBN) utilizes direct credit control to uphold macroeconomic stability and foster sustainable economic growth. It is utilized in combination with other

monetary policy instruments such as the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Open Market Operations (OMO). The CBN aims to achieve a harmonious combination of these measures in order to maintain price stability, promote economic growth, and ensure the soundness of the financial system. Researchers and policymakers actively observe the implementation and consequences of direct credit control in Nigeria to comprehend its influence on lending practices and economic situations.

Moral Suasion

Moral suasion is a distinct and gentle monetary policy instrument utilized by central banks, such as the Central Bank of Nigeria (CBN), to shape the conduct and choices of financial institutions and market participants. Moral suasion, in contrast to other strategies that are more explicit and measurable, focuses on the use of persuasion, instruction, and communication to accomplish particular policy goals.

In Nigeria, moral suasion is commonly expressed through public remarks, informal chats, or direct contacts from the Central Bank of Nigeria (CBN) to banks and participants in the financial market. The central bank can utilize this technique to incentivize or deter specific financial behaviors or practices without implementing formal legislation or policy alterations. Moral suasion aims to synchronize the behaviour of banks with the monetary policy objectives established by the central bank, including the maintenance of price stability and promotion of economic growth.

The interwoven financial and economic landscape of Nigeria makes moral suasion exceptionally powerful in the country. The central bank has a crucial influence in influencing the conduct of banks and other financial organizations. The CBN can exert influence over lending practices,

risk management, and investment strategies through the provision of guidelines, issuance of recommendations, and expression of concerns.

As an illustration, the Central Bank of Nigeria (CBN) may utilize moral suasion as a means to urge banks to provide loans to particular sectors of the economy, such as agriculture or small and medium-sized enterprises (SMEs), in order to bolster economic growth. Alternatively, it might deter the adoption of excessive risk-taking or speculative lending practices that could potentially jeopardize financial stability.

Moral suasion offers the benefit of being highly flexible and adaptable. The CBN can promptly address evolving economic circumstances and difficulties by effectively conveying its anticipations and inclinations to financial institutions. It is particularly advantageous in dealing with market attitudes and behavioral characteristics that quantitative tools may struggle to convey.

Nevertheless, moral suasion is not without its constraints. The effectiveness of the central bank mostly relies on the trust and reputation it holds, as well as its capacity to convince financial institutions to willingly conform to its direction. Occasionally, banks may not completely adhere to moral persuasion if they regard the direction to conflict with their profit goals or the interests of their stakeholders.

2.1.2 Bank Profitability

Profit is the primary motivator for every company and serves as the key measure of a company's performance. Additionally, banks are unique types of companies that focus on gathering deposits and providing loans[4]. Bank profitability is not only a metric of performance, but also a crucial requirement for the success of banks in competitive environments and the effective execution of

monetary policy[5]. Bank profitability pertains to the financial gains a bank achieves by the provision of services and execution of activities[3]. The profitability of banks serves as a reliable indicator of the soundness and stability of banking institutions, and also plays a crucial role in predicting financial crises[6]. The determinants of bank profitability can be categorized into internal factors and external factors[7]. Empirical studies commonly employ three indices to gauge the profitability of banks: net interest margin (NIM), return on assets (ROA), and return on equity (ROE)[8]. Return on assets (ROA) is a straightforward metric used to assess the profitability of a bank. It measures the bank's ability to earn profits from its asset management activities and helps to minimize discrepancies arising from variations in capital structure[9].

Net Interest Margin (NIM)

Net Interest Margin (NIM) is a crucial metric for measuring the profitability of banks in Nigeria and plays a vital role in evaluating their financial performance[10,11]. The Net Interest Margin (NIM) is utilized in multiple research studies to measure the profitability of a bank's interest-earning activities. The Net Interest Margin (NIM) quantifies the disparity between the interest revenue generated by banks from their assets, such as loans and investments, and the interest costs accrued on their liabilities, which encompass deposits and other forms of borrowing. Essentially, NIM measures the difference between the interest earned and the interest paid.

In Nigeria, the Net Interest Margin (NIM) is a crucial factor that determines the financial well-being and profitability of banks[12,13]. It directly indicates their capacity to create revenue from their primary banking operations. A high Net Interest Margin (NIM) signifies that a bank is generating a significant profit margin from its assets that produce interest. On the other hand, a decreased Net Interest Margin (NIM) indicates that the bank's revenue is being reduced due to increased interest expenses compared to interest income.

The constituents of NIM are impacted by multiple factors, one of which is the Monetary Policy Rate (MPR) established by the Central Bank of Nigeria (CBN). Modifying the Monetary Policy Rate (MPR) by the Central Bank of Nigeria (CBN) directly affects the financial expenses incurred by banks. An increase in the MPR leads to an increase in interest rates, which in turn increases the borrowing costs for banks[14]. As a result, the gap between the amount of interest generated and the amount of interest paid, which is known as Net Interest Margin (NIM), may decrease.

The MPR has an impact on lending rates on the asset side. When the Monetary Policy Rate (MPR) is increased, banks frequently boost their lending rates in order to uphold their desired Net Interest Margin (NIM), which can have an influence on borrowers and economic activity. Conversely, a lower Monetary Policy Rate (MPR) generally results in decreased interest rates on loans, which aims to entice borrowers and promote economic expansion.

The examination of NIM is of utmost importance for both banks and investors[15,16]. Banks strive to effectively control their exposure to interest rate fluctuations and optimize their Net Interest Margin (NIM) while maintaining competitiveness in the market. Investors evaluate Net Interest Margin (NIM) as a measure of a bank's effectiveness and profitability. Hence, players in the Nigerian banking sector closely scrutinize NIM to gauge a bank's performance and evaluate its ability to navigate the complex environment influenced by monetary policy dynamics.

In summary, NIM is a pivotal metric for banks in Nigeria, reflecting their ability to generate income from their core lending and investment activities. Changes in the monetary policy environment, particularly the MPR, can significantly influence NIM by affecting the cost of funds and lending rates. As a result, NIM plays a central role in determining the profitability and

overall financial health of banks in Nigeria and is a critical focus of attention for both banks and investors.

Return on Assets (ROA)

Return on Assets (ROA) quantifies the efficiency with which the bank's resources are utilized to generate profits[17,18]. The profitability indicator is a fundamental measure used to evaluate the effectiveness of a bank in using its assets to create profits. ROA, in the context of Nigeria's banking sector, refers to the ratio of net income to total assets. It is an important measure that provides valuable insights into how effectively banks are managing their assets and resources to generate returns for their shareholders. Several studies have emphasized the significance of this metric[18,19,20,21].

Return on assets (ROA) is determined by dividing a bank's net profit by its total assets. The resulting ratio reflects the profitability percentage obtained for each unit of money (such as Naira) used in the assets. ROA is a crucial metric for investors and stakeholders as it assesses a bank's capacity to earn profits from its investments in loans, securities, and other assets.

In Nigeria, the Return on Assets (ROA) statistic holds significant importance because of its strong correlation with the country's overall economic conditions and the policies implemented by the Central Bank of Nigeria (CBN)[21]. Nigerian banks frequently encounter the task of managing economic changes and uncertainties, which necessitates the optimal allocation of their assets to optimize profitability. The monetary policy measures made by the Central Bank of Nigeria (CBN), such as adjustments to the Monetary Policy Rate (MPR) and Cash Reserve Ratio (CRR), have the ability to directly affect the interest rates and asset quality that banks face, ultimately impacting their Return on Assets (ROA).

A higher return on assets (ROA) signifies that a bank is effectively using its assets to produce profits. This frequently indicates robust risk management, efficient lending tactics, and cautious investment choices. Conversely, a decreased return on assets (ROA) could indicate inefficiency or difficulties in managing assets, which may be linked to an excessive number of non-performing loans, insufficient income from interest, or high operational expenses. Banks are more likely to generate higher Return on Assets (ROAs) when the policies implemented by the Central Bank of Nigeria (CBN) result in economic stability and favourable business circumstances.

The Return on Assets (ROA) is a crucial measure used by both investors and regulators. Investors can gain valuable insights into the performance and profitability of banks, enabling them to make well-informed decisions on their investment allocations. Regulators find ROA to be an important tool for evaluating the overall soundness and stability of the banking industry. The sound return on assets (ROA) ratios suggest that banks are effectively and cautiously handling their assets, preserving sufficient capital, and making a beneficial contribution to the overall economic environment.

Return on Equity (ROE)

Return on Equity (ROE) is a vital measure of profitability that evaluates a bank's capacity to make profits relative to its equity capital[22]. This is a crucial metric employed to assess the effectiveness and profitability of a bank's activities in Nigeria. Return on equity (ROE) is highly important for investors as it indicates the bank's efficiency in using its own capital to generate value for its owners.

Return on equity (ROE) is determined by dividing a financial institution's net profit by its shareholders' equity, typically represented as a percentage. It measures the financial gain that

equity shareholders receive from their investment. Return on Equity is a crucial measure for evaluating the performance of banks in Nigeria's banking industry, where the primary focus is on attracting capital and maximizing shareholder profit.

The correlation between Return on Equity (ROE) and monetary policy in Nigeria is significant[23]. The fluctuations in interest rates, which are determined by the Central Bank of Nigeria's (CBN) Monetary Policy Rate (MPR), have a direct effect on the expense of capital and the profitability of a bank's activities[23]. Increasing the MPR can result in elevated borrowing expenses for banks, which may reduce their net interest margins (NIM) and impact their return on equity (ROE). On the other hand, a decrease in the Minimum Profit Requirement (MPR) may encourage borrowing and investment, potentially leading to increased profits and Return on Equity (ROE).

A high return on equity (ROE) indicates that a bank is efficiently utilizing its equity capital to generate profits for its shareholders, making it appealing to investors[22,23,24]. This outcome may be attributed to astute risk management, effective cost containment, and lucrative loan and investing choices. Conversely, a lower return on equity (ROE) may suggest that a bank is encountering difficulties in efficiently using its equity capital, potentially due to elevated operational expenses, subpar asset quality, or less successful investment approaches.

Return on equity (ROE) is a crucial factor that both investors and bank management in Nigeria consider. Investors view it as a gauge of the bank's capacity to generate value, while bank management considers it a performance measure that informs strategic choices. Within a context shaped by monetary policy measures and economic volatility, banks are required to strike a balance between pursuing a high return on equity (ROE) and practicing cautious risk management and regulatory adherence[24].

Regulators also monitor ROE as a critical measure of a bank's financial stability and performance. Sound ROE ratios are indicative of a healthy banking system[25]. Therefore, ROE is closely watched by various stakeholders and is a vital component of the financial landscape in Nigeria, helping investors make informed decisions and guiding banks in their pursuit of profitable and sustainable operations.

Determinant of Bank Profitability

1. Interest Rates

Interest rates are crucial in determining a bank's profitability. As interest rates increase, banks can raise the rates they charge on loans, resulting in a bigger net interest revenue for them. Conversely, a decrease in interest rates leads to a reduction in the interest rate spread, potentially impacting profitability. Effectively managing the risk associated with changes in interest rates is of utmost importance for banks in order to maximize their profitability. They achieve this through the utilization of diverse financial instruments and hedging tactics.

2. Asset Quality

The profitability of a bank is greatly influenced by the quality of its assets, namely its loan portfolio. Non-performing loans (NPLs) might result in the need to set aside funds for loan losses, which immediately diminishes profitability. Financial institutions must meticulously evaluate loan applications and consistently evaluate the creditworthiness of borrowers in order to minimize non-performing loans (NPLs). Implementing efficient risk management strategies, conducting thorough credit analysis, and diversifying loans can contribute to the maintenance of a robust asset quality.

3. Operational Efficiency

Efficiently controlling operational expenses is crucial for achieving profitability. Banks that optimize their processes, allocate resources to automation and technology, and manage expenses effectively are more apt to maximize profits. Efficiency ratios, such as the efficiency ratio which measures operating expenses as a percentage of revenue, are employed to assess a bank's cost-effectiveness.

4. Regulatory Environment

The profitability of a bank is significantly influenced by regulatory regulations and compliance requirements. Tighter restrictions might escalate the expenses associated with compliance and limit specific banking activity. Nevertheless, it is imperative to implement strong risk management and compliance measures in order to prevent penalties and retain a positive reputation. Financial institutions frequently require investments in infrastructure and staff to comply with regulatory requirements.

5. Economic Conditions

The overall economic climate influences a bank's profitability. In a thriving economy, banks may experience increased loan demand, lower credit losses, and better investment opportunities, all of which can boost profits. Conversely, economic downturns can lead to reduced lending activity, higher loan defaults, and lower investment returns, which can strain profitability.

6. Technology and Innovation

Technological advancements and innovation have a significant impact on the banking industry. Banks that invest in modernizing their services, adopting digital platforms, and developing innovative financial products can reduce costs, reach a broader customer base, and generate new revenue streams. For instance, mobile banking apps and online services not only improve customer satisfaction but also lower the cost of in-person branch operations.

These determinants represent a mix of both internal and external factors that banks need to navigate to achieve profitability and maintain a competitive edge in the financial sector. Balancing these factors effectively requires a combination of sound strategic planning, risk management, and adaptability to changing market conditions and regulations.

2.2 Theoretical Review

Interest Rate Spread Theory

Interest Rate Spread Theory, often associated with the banking sector, focuses on the profitability of banks in relation to the interest rate spread. The concept was first developed in the context of banking and finance and has its roots in the works of several economists[26,27].

The interest rate spread, or the difference between the interest rate at which banks lend and the interest rate they pay on deposits, is a crucial determinant of bank profitability. When the central bank, like the Federal Reserve in the United States or the European Central Bank in the Eurozone, implements monetary policy, particularly changes in the policy interest rate (e.g., the federal funds rate in the U.S.), it directly affects these interest rates. The interest rate spread is instrumental for banks, as it forms a significant part of their income.

John Hicks, a British economist and Nobel laureate, made pioneering contributions to the understanding of how interest rates and monetary policy impact the economy. His work in the 1930s laid the groundwork for the concept of the interest rate spread and its relationship with bank profitability. He is well-known for his book "Value and Capital," which explored these concepts.

James Tobin, another Nobel laureate, further developed this theory by examining the implications of interest rate spreads on banking institutions. In his research, he highlighted the importance of the spread in understanding banks' profitability, particularly in relation to monetary policy decisions. His work is encapsulated in several essays and publications, with "The Theory of Portfolio Selection" and "Liquidity Preference as Behavior Towards Risk" being notable references for understanding his contributions to this theory.

The Interest Rate Spread Theory is a fundamental concept in the field of monetary economics and banking. This statement highlights the significant correlation between monetary policy and bank profitability. It establishes a foundation for examining how central banks' determinations about interest rates impact the financial well-being of banks and the overall economic climate.

The increase in interest rate spreads since the 1980s can be linked to conventional expectations and a larger preference for liquidity[28]. A low difference between lending rates and deposit rates signifies a highly efficient financial sector[29].

Modern Portfolio Theory (MPT)

Modern Portfolio Theory (MPT) is a framework that helps investors make decisions about how to allocate their investments in order to maximize returns and minimize risk. Modern Portfolio Theory is a prevalent paradigm in the financial sector for constructing diversified investment portfolios. It underscores the significance of diversification and prioritizes low risk over high return[30,31]. MPT, was created by American economist Harry Markowitz during the 1950s. It offers a methodical strategy for maximizing investment portfolios by effectively managing the trade-off between risk and return. This revolutionary theory has had a significant influence on the finance industry and has become a key principle for investors, financial analysts, and portfolio managers.

Markowitz's introduction of the concept of Modern Portfolio Theory (MPT) emphasized the need of investors not just considering the predicted return of an investment, but also taking into account the corresponding level of risk. Diversifying portfolios across a range of assets with different risk and return profiles allows investors to attain a more efficient balance between risk and expected return, as proposed by the theory. By diversifying, the risk is reduced and the possibility of achieving improved returns, taking into account the level of risk, is increased.

The fundamental tenet of Modern Portfolio Theory (MPT) is based on the concept of the efficient frontier. This refers to a collection of optimal portfolios that provide the highest anticipated return for a given level of risk, or the lowest risk for a given level of expected return. It has subsequently evolved into a key framework for comprehending the balance between risk and reward in making investment decisions.

Modern Portfolio Theory has not only revolutionized investment practices but has also facilitated the creation of diverse financial instruments and methods, such as mutual funds, exchange-traded funds (ETFs), and risk management techniques. Its influence beyond the domain of finance, since it has also been implemented in other disciplines, including as economics and corporate finance. Although MPT remains widely favoured, it is important to acknowledge its weaknesses, which include making unrealistic assumptions and overlooking macroeconomic considerations[32]. Nevertheless, these constraints can be resolved by integrating other derivative theories such as Goal-based investment and Post-modern portfolio theory[33]. In addition, the effectiveness of MPT can be improved by taking into account supplementary factors such as financial ratios for the calculation of risk-adjusted returns[34].

Traditional Banking Theory

Traditional Banking Theory provides a foundational perspective on how banks operate and generate profits by offering financial services and intermediating between depositors and borrowers. This theory has been a fundamental concept in banking and finance for many decades.

At its core, traditional banking theory emphasizes two primary functions of banks: taking deposits and making loans. Banks gather funds from depositors and channel these funds into loans to individuals, businesses, and other entities. The profitability of banks largely depends on the spread between the interest rate they pay to depositors and the interest rate they charge on loans. A wider interest rate spread typically leads to higher profitability.

Traditional banking theory also highlights the importance of managing bank assets and liabilities efficiently. Banks need to ensure that they maintain an appropriate balance between the interest rates they offer on deposits and the interest rates they earn on loans. Additionally, risk management is a key component of this theory, as banks must carefully assess the creditworthiness of borrowers to mitigate the risk of loan defaults, which could erode profitability.

This theory has guided the operations and business strategies of banks for many years, focusing on the core activities of deposit-taking and lending. While the theory remains relevant, the banking industry has evolved with the advent of technology, new financial products, and regulatory changes, leading to the development of more sophisticated approaches to bank profitability. Nonetheless, traditional banking theory continues to provide a fundamental framework for understanding the essential functions and profitability drivers of banks in the financial system.

According to conventional theory, increased bank profitability is expected to result in reduced incentives for taking risks. Numerous academics dispute this concept and suggest a contrary impact. They contend that increased profitability actually relaxes the restrictions on bank borrowing, allowing profitable banks to assume greater levels of risk. The impact is more significant when there are fewer restrictions on the amount of debt a bank may take on, or when new initiatives can be funded primarily through senior financing. These papers present a theoretical framework that elucidates the reasons for the increased risk-taking incentives of prosperous banks. This explanation aligns with the observed trends of bank risk-taking prior to the 2008 financial crisis[35,36,37,38,39].

2.3 Review of Empirical Studies

Empirical studies on the relationship between monetary policy and bank profitability have explored various aspects of how central bank actions influence the financial performance of banks.

A study examines the link between monetary policy and the financial performance of commercial banks in Thailand[40]. A study employed a fixed effect panel model to analyze quarterly bank data spanning from Q4/2002 to Q3/2020. The empirical findings demonstrated that fluctuations in the 14-day repurchase rate (Repo) had a favourable effect on the bank's profitability, as measured by the return on assets (ROA) and return on equity (ROE). It was also discovered that the bank's size, as determined by its total assets, was only positively correlated with the return on equity (ROE).

Another study examines the correlation between interest rates (monetary policy) and bank profitability, in addition to various bank-specific, industry-specific, and macroeconomic variables[41]. Some researchers incorporated a balanced panel data set consisting of 50 Indian

scheduled commercial banks across a span of 12 years, from 2008 to 2020. Fixed effect and random effect model regression were employed to ascertain the necessary link. The robust standard error results have been reported due to the presence of heteroskedasticity. Their findings indicated a strong correlation between the interest rate spread and the profitability indicators of two banks, namely return on assets (ROA) and return on equity (ROE). However, the interest rate alone has a negligible negative impact on bank profitability. The study indicated that the central bank can adjust the interest spread in order to address liquidity imbalances in the economy, either by increasing or decreasing it. Banks were then recommended to adjust their lending rate or deposit rate in accordance with the policy rate to enhance the efficiency of the transmission channel.

In a bid to present empirical evidence on the impact of various measures of monetary policy on banking profitability in Ghana, some researchers conducted analysis using data from 29 banks during the period from 2006 to 2016. To achieve this, new monetary indexes were created, and a robust panel random effect model was applied, with adjustments for year effects. The findings indicated that an increase in the monetary policy basis point had a negative impact on banking profitability, whereas the average monetary policy rate had a positive effect on banking profitability. Remarkably, the development of monetary policy basis point and rate indices resulted in a decrease in banking profitability and an increase in banking profitability, respectively. Although these results may appear paradoxical, they are supported by both theoretical and empirical evidence. Therefore, incremental changes in basis points act as a mechanism for tightening monetary policy, resulting in increased loan pricing, reduced borrowing, and decreased profitability in the short term. Over time, banks modified their loan prices and deposits to align with basis point fluctuations in their favour, resulting in a favourable

impact of the average monetary policy rate on banking profitability. In addition, a reduction in the monetary policy basis point and rate, known as monetary policy easing, improved banks profitability. These findings suggested that bank managers in Ghana's banking sector may exploit monetary policy easing to optimize their profitability. Additionally, they argued that it was important for the monetary policy committee to consider the impact of tightening monetary policy through changes in basis points[42].

A study examines the impact of monetary policy on the profitability of banks, considering the influence of bank funding patterns as a moderating factor. A study specifically examined the individual components of bank profitability in a setting that includes different monetary policy tools. The findings from analyzing a data set of commercial banks in Vietnam indicated that monetary policy has an unequal impact on bank profitability. Specifically, interest rates, both lending rates and policy rates, had a positive influence on net interest income, but a negative effect on non-interest revenue. Quantitative-based policy tools, such as the central bank's security purchases and foreign exchange reserves, exhibited a positive correlation with non-interest revenue but a negative association with net interest income in monetary policy. The impact of monetary policy adjustments on banks' net interest income directly affects their overall profitability. Additional analysis revealed that the relationship between monetary policy and bank profitability was less noticeable in banks that have a more varied and diverse source of funding[43].

Research examines the impact of monetary policy on net interest margin and bank profitability by analyzing panel data from 31 OECD countries between 2000 and 2017. The primary findings of a study carried out indicated that the implementation of expansionary monetary policy measures in various economies resulted in a detrimental effect on net interest margins and,

consequently, on the profitability of banks. The correlation between interest rates and the slope of the yield curve, as well as their impact on both the net interest margin and profitability, was non-linear, notably exhibiting concavity. This implied that the adverse effect of low interest rates and a flat yield curve was more significant when the rates are lower and the curve is more flattened, respectively. Hence, the prospective normalization of monetary policy would yield significant advantages in terms of revitalizing margins and enhancing profitability[44].

A study analyses the impact of unconventional monetary policy measures implemented by the Euro-system on the profitability of the Spanish banking sector, a novel database was constructed by amalgamating information from the Spanish Banking Industry Statistical Yearbook and the Spanish Stock Market Commission. By employing various econometric methodologies on a data set comprising 54 Spanish banks over the period of 2001-2017, while accounting for bank-specific factors and macroeconomic conditions, no significant correlation was observed between the Euro system's unconventional monetary policy measures (such as the ECB's total assets, excess reserves, and the slope of the yield curve) and bank profitability, as measured by return on assets, pre-tax operating income, and interest margins[45].

A study investigates the influence of economic policy uncertainty (EPU) on the profitability of banks, utilizing a data set of US banks spanning from 2001 to 2016. A strong inverse correlation is shown between the overall level of policy uncertainty and the profitability of banks was found by some researchers after analysis. The examination of the channel indicated that policy uncertainty had a substantial impact on reducing loan growth and increasing the nonperforming loan ratio. Significantly, they discovered crucial evidence indicating that the level of capital held by a bank might enhance the influence of policy uncertainty on the bank's economic performance and operation. It was therefore recommended that governments mitigate the negative impact of

policy uncertainty on the banking industry by implementing steps to stabilize the adequacy of bank capital[46].

A study investigates the effect of monetary policy and bank profitability, a novel comprehensive data set covering a time range of 145 years and encompassing 17 countries[47]. The study demonstrated that implementing a contractionary monetary policy result in an escalation of the difference between lending and deposit interest rates. However, despite the increase in spreads, the profitability of banks decreases. The disparity between spreads and profits is caused by a significant rise in loan losses and a reduction in credit expansion. The study additionally demonstrated that the impact of monetary policy on profitability varies significantly depending on the status of the economy. Banks' profits are particularly vulnerable to changes in policy rates when they heavily depend on mortgage loans and non-deposit funding. This phenomenon was observed in both the long-term statistics from other countries and within individual banks in the United States[47].

Also, another investigates the correlation between monetary policy and the performance of banks in a setting that involves many instruments[48]. Using a distinctive data set of Vietnamese commercial banks spanning from 2007 to 2019, a study demonstrated that banks respond to alterations in monetary policy. Specifically, when the central bank raises policy rates or introduces money into the economy via open market operations, banks reduce overall returns and heighten financial instability. In addition, they observed that the building of foreign exchange reserves had a positive impact on bank results, in contrast to open market operations. However, it is important to note that the central bank utilizes both policy instruments to adjust the money supply in the economy. Their primary examination of interest indicated that business models have a significant role in the impact of monetary policy on bank performance. Their research

also showed that banks with business models that generate higher non-interest revenue or have a greater diversification of income sources can reduce the impact of monetary policy on their performance. Their observation was consistent across all monetary policy indicators that are based on interest rates and quantitative measures, as well as across all aspects of risk-taking behaviour, earning-profit capacity, and financial stability. Moreover, when examining the impact of monetary policy on banks, they found that it was not substantial for banks that primarily depend on non-traditional sectors[48].

A study analyzes the impact of monetary policy on the profitability of commercial banks in Uganda[1]. A study employed a research strategy that focused on establishing causal relationships with data spanning a period of 9 years, from 2010 to 2018, which was gathered from all the officially registered commercial banks that were operational during the duration of the study. Their empirical model incorporated multiple monetary policy factors as predictor variables. Return on Assets was employed as a metric to assess the profitability of a bank. They employed a dynamic two-step System Generalized Method of Moments panel estimator to estimate the empirical model. Analysis revealed that there is a strong relationship between monetary policy and the lending rate, which has a notable impact on the Return on Assets. This indicates that changes in interest rates can be used to anticipate the profitability of commercial banks in Uganda. Moreover, the findings indicated that an increase in core inflation has a substantial adverse causal impact on the banks' profitability, and there is a noteworthy, delayed effect on Return on Assets. The 91-day treasury bill rate and money supply had no meaningful impact on the prediction of bank profitability. The study results recommended that the central bank should actively encourage a low and consistent level of core inflation to improve the profitability of banks[1].

A study presents a comprehensive analysis of the changes in banks' balance sheets, profitability, and ability to handle risks, and examine their significance for monetary policy[49]. Some scholars demonstrated that, although the transmission of conventional policy interest rate reductions to businesses and households was reduced during the crisis, in a situation of financial market strain and insufficient bank financial positions, unorthodox monetary policy measures have aided in the restoration of monetary policy transmission and the transfer of effects to interest rates. They additionally recorded the degree to which these unconventional approaches effectively stimulated lending and the amount to which different bank business models were significantly impacted. Ultimately, the analysis revealed that the perceived influence of recent monetary policy measures on bank profitability was not notably robust when considering all the ramifications on the overall economy and the quality of assets[49].

Another research analyzes the influence of the exceptionally low-interest rate environment on the financial performance of banks in the Euro zone, USA, and UK[50]. A study raised concerns over the potential adverse impacts of the low-interest rate environment, not only on bank profitability but also on the overall expansion of bank lending. They emphasized the possibility of reducing net interest margins, particularly when interest rates are already at the lowest level possible, as a factor that could have a detrimental impact on bank profitability. The study proposed that the current low-interest rate environment could have consequences for the expansion of bank credit, potentially affecting both lending activity and profitability[50].

A study utilized bank-level data from a worldwide sample to investigate the link between capital and profitability during the period of 2000-2013[51]. The findings indicate that there is a positive correlation between bank capital and bank profitability, but the observed effect is quite small. Nevertheless, it seems that banks with higher capitalization and profitability have a greater level

of conventional risk, a larger share of non-traditional activity in their financial statements, and a greater ability to manage their expenses. The link was contingent upon both environmental circumstances and the size of the bank. The results of the study remained consistent and reliable across many specifications and robustness tests. Their findings have significant implications for policy reforms that seek to maintain stability in the global banking industry[51].

A study examines the influence of macroeconomic variables on bank profitability indicators in Central and Southeastern European countries (CESE)[52]. A study sample comprised 13 nations from the CESE region: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Hungary, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia, and Slovenia. The study covered the period from 2008 to 2015. The objective was to conduct an empirical assessment of the influence of key macroeconomic measures, including gross domestic product, inflation, and the real interest rate, on the profitability of banks and their potential correlation. The article employed a two-step model, where model 1 incorporates return on asset (ROA) as the dependent variable, and model 2 incorporates return on equity (ROE) as the dependent variable. Conversely, the independent variables consist of gross domestic product (GDP), inflation (INF), and real interest rate (RIR). The panel study findings demonstrated a noteworthy impact of GDP and INF on bank profitability measures in the chosen nations. Specifically, there was a 1% growth in GDP and an increase in the inflation rate, resulting in a 0.47% rise in Return on Assets (ROA) and a 0.48% increase in Return on Equity (ROE). It is worth noting that inflation has a more significant impact on ROA and ROE compared to GDP. The findings from the random effect model indicated that a 1% increase in GDP and INF leads to a respective increase in ROE of 0.49% and 0.42%. Similarly, the actual interest rate does not have a substantial impact on the return on assets (ROA) and return on equity (ROE) in the chosen countries. It was recommended

that; policymakers should prioritize achieving fast economic development while keeping inflation under control in order to improve the profitability of banks in Central and Southeastern European countries[52].

Another study examines the impact of negative interest rate policy (NIRP) on bank margins and profitability[53]. A study carried out identified unique characteristics of countries and banks that either enhance or diminish the effect of NIRP on bank performance. By analyzing a data set consisting of 7,359 banks from 33 member countries of the Organization for Economic Cooperation and Development (OECD) during the period of 2012-2016, and employing a difference-in-differences technique, they discovered that bank margins and profits experienced a decline in countries that implemented negative interest rate policy (NIRP) compared to countries that did not adopt this policy. Furthermore, the negative impact of NIRP was contingent upon specific characteristics of banks, including their size, funding structure, business models, assets reprising, and specialization in product lines. The pass-through mechanism of NIRP can be influenced by the attributes of a nation's banking system, specifically, the degree of competition and the frequency of fixed or floating lending rates[53].

A study determines whether there is a statistically significant link between return on assets (ROA) or return on equity (ROE) and their factor determinants[54]. They employed the Ordinary Least Squares (OLS) approach, incorporating robust standard errors to account for panel-specific autocorrelation and heteroskedasticity. The study utilized a panel database of 13 European Union countries over duration of 18 years, from 2000 to 2017. The empirical findings demonstrated a strong and statistically significant correlation between the return on assets (ROA) or return on equity (ROE) and GDP growth. In contrast, the other independent variables had a comparatively weaker impact on ROA or ROE[54].

Another study analyzes the movement of bank interest rates and profitability and explores their link[55]. Return on equity was utilized as a metric to assess the profitability of a bank. The paper examined the disparities and commonalities across specific Western Balkan nations regarding their banking interest rates and profitability. The empirical portion of the investigation employed many scientific methodologies. The data utilized for the objective were obtained from the Central Bank of Bosnia and Herzegovina, covering the period from 2008 to 2018. Initially, a Pearson correlation coefficient analysis was conducted to examine the relationship between the variables under examination. Subsequently, the regression analysis was executed. The results demonstrate a positive correlation between long-term interest rates and banking sector profitability, as well as a negative correlation between short-term interest rates and banking sector profitability[55].

Research also examines the impact of monetary policy on the profitability of deposit money banks in Nigeria during a ten-year period from 2008 to 2017[56]. A study utilized a methodical compilation of time series and cross-sectional data combined into a panel data set to empirically ascertain the impact of monetary policy on the profitability of deposit money banks in Nigeria. The study utilized Johansen's multivariate co-integration approach to conduct the co-integration test, which was based on the error correction model (ECM). The variables were subjected to the Augmented Dickey-Fuller (ADF) test to see if they exhibited stationary or unit roots. The panel regression was utilized to formulate and test hypotheses. The study found that the monetary policy, represented by the Monetary Policy Rate (MPR) and Cash Reserve Ratio (CRR), had a substantial impact on the profitability of deposit money institutions in Nigeria. A suggestion was made to the Central Bank of Nigeria to modify the Monetary Policy Rate and Cash Reserve Ratio in order to facilitate greater liquidity. This would enable deposit money banks to

successfully carry out their lending and investment activities. Monetary policy should be aligned with fiscal policy and used in conjunction to achieve mutually beneficial outcomes[56].

A study investigated the impact of regulatory measures implemented by the Central Bank of Nigeria on the financial performance of a specific group of commercial banks known as Deposit Money Banks, during the period from 2004 to 2016[57]. The secondary data used in this study were obtained from the published Annual Financial Statements of the selected Deposit Money Banks that are regarded as highly "strong," as well as from the Central Bank of Nigeria Statistical bulletin. The data covers a period of thirteen years, from 2004 to 2016. The findings indicated that both the monetary policy rate and liquidity ratio have a positive and significant correlation with Earnings per share. Only the monetary policy rate had a positive and significant correlation with return on assets (ROA). Additionally, the monetary policy rate had a significant positive correlation with net profit margin, and it is the only variable that has a significant positive correlation with return on equity. The study found that the regulatory efforts of the Central Bank of Nigeria have not completely accomplished their goals in enhancing the profitability of the chosen deposit money banks. The study suggested that the Central Bank of Nigeria should reassess the monetary policy rate to ensure it is not excessively stringent, thereby allowing deposit money banks to achieve a satisfactory level of profitability[57].

A study focused on identifying the factors that influence the profitability of Vietnamese commercial banks[58]. The investigation focused on both internal and external elements that affect the profitability of the commercial bank sector. Data from 2013 to 2018 for 29 Vietnamese Commercial Banks was acquired through the Stock Exchange or media sources. Fixed effect panel models were employed to analyze the factors that influence profitability. By utilizing this method, they guaranteed the efficacy of the test outcome in relation to the hypothesis and sample

size, hence obtaining reliable and consistent results. The research is grounded in the scientific methodology of employing quantitative approaches to address the challenges presented, providing a practical and efficient means to achieve the research objectives[58].

A study analyses the influence of various bank-specific and macroeconomic factors on the profitability of 23 commercial banks in Bangladesh[59]. A study carried out based on data collected from the period of 2013 to 2017. The data was sourced from the annual reports of individual banks, the Bangladesh Bureau of Statistics (BBS), and various publications of the Bangladesh Bank. The fixed effect model was utilized to conduct regression analysis on the variables in panel data. Three equivalent measures of profitability, namely Return on Asset (ROA), Return on Equity (ROE), and Net Interest Margin (NIM), was utilized in the study. The model for Return on Assets (ROA) revealed that the earning variables (TIN, NII) and asset structure (DPST) exhibit a substantial positive correlation with ROA, while asset quality (NPL) had a large negative influence on ROA. The association between ROE and the explanatory variables of earnings (TIN and NII) and capital strength (CAP) was very positive. The only factor that has a notable adverse effect on return on equity (ROE) is the quality of assets, namely non-performing loans (NPL). The factors of earnings (TIN), capital strength (CAP), and liquidity (LTA) are positively correlated with NIM in a significant manner. This study concluded that the macroeconomic parameters, including the growth rate of GDP, rate of inflation, and rate of interest, do not have a substantial impact on profitability as incorporated in the models. The conclusions of this study can aid investors, policymakers, managers, and other stakeholders in making decisions and improving the performance of financial organisations in the future[59].

A paper focused on analyzing the profitability of the largest banks in the European financial industry, including those that are active in Montenegro[60]. This article aimed to employ statistical

and econometric techniques to analyze the factors and their respective magnitudes that impact the profitability of major banks in Europe. The empirical analysis employed well balanced panel models utilizing annual data on 47 prominent banks from 14 European countries over the period from 2013 to 2018. The study involved estimating and evaluating three different panel models: pooled ordinary least squares, model with fixed effects, and model with random effects. Additionally, a dynamic model was utilized using general methods of moments. The POLS model was selected as the most optimal, affirming that all macroeconomic factors exert a statistically significant influence on the profitability of large banks, although the influence of internal factors, which are under the control of the bank's management, is not significant. The profitability of banks was positively influenced by factors such as GDP growth rate, inflation rate, and market concentration[60].

A study further analyzes how economic and banking activities in Malaysia specifically impact the return on equity (ROE) of banks and gain deeper knowledge of bank profitability[61]. A study examined the impact of five key variables on return on equity (ROE): inflation rate, gross domestic product (GDP), unemployment rate, net interest income margin, and non-performing loans. The objective was to analyze the individual influence of each component on ROE. Furthermore, this study encompassed eight prominent commercial banks in Malaysia, namely Public Bank, Maybank, CIMB Bank, Hong Leong Bank, RHB Bank, AmBank, Alliance Bank, and Affin Bank. The study was conducted using secondary data, specifically macroeconomic indicators obtained from the World Bank for the period of 2007 to 2016. Additionally, microeconomic variables from the annual reports of 8 commercial banks were collected for the years 2007 to 2016. The study is performed using E-Views 10 to examine the correlation between the independent variables (Inflation Rate, Gross Domestic Product, Unemployment Rate,

Net Interest Income Margin, and Non-Performing Loans) and the dependent variable (Return on Equity). The study addressed theoretical and practical consequences based on its findings. Concisely, this study concludes by discussing the key discoveries, the significance of the research, the constraints of the study, and suggestions for further research[61].

2.4 Conceptual Framework

Figure 2.1 illustrates the conceptual connections between monetary policy instruments and the profitability of banks. Bank profitability is assessed using key indicators such as the net interest margin (NIM), net profit margin (NPM), return on assets (ROA), and return on equity (ROE). These measures provide valuable insights into the financial well-being of a bank. The assessment of a bank's profitability includes not only the Net Interest Margin (NIM) and Net Profit Margin (NPM), but also the Return on Assets (ROA) and Return on Equity (ROE). Low interest rates incentivize consumers and businesses to increase borrowing and spending, hence stimulating demand for loans and generating interest revenue. Lower policy rates can enhance the profitability of banks' return on assets and equity. Lower interest rates can increase earnings per share through enhanced economic activity and increased loan demand. Consequently, financial institutions may experience a rise in income and revenue. Extended periods of exceptionally low interest rates could potentially exert downward pressure on net interest margins and constitute a risk to overall profitability. In order to achieve a favourable equilibrium between interest revenue and potential non-interest income streams, banks must prudently oversee risk and adapt their approach.

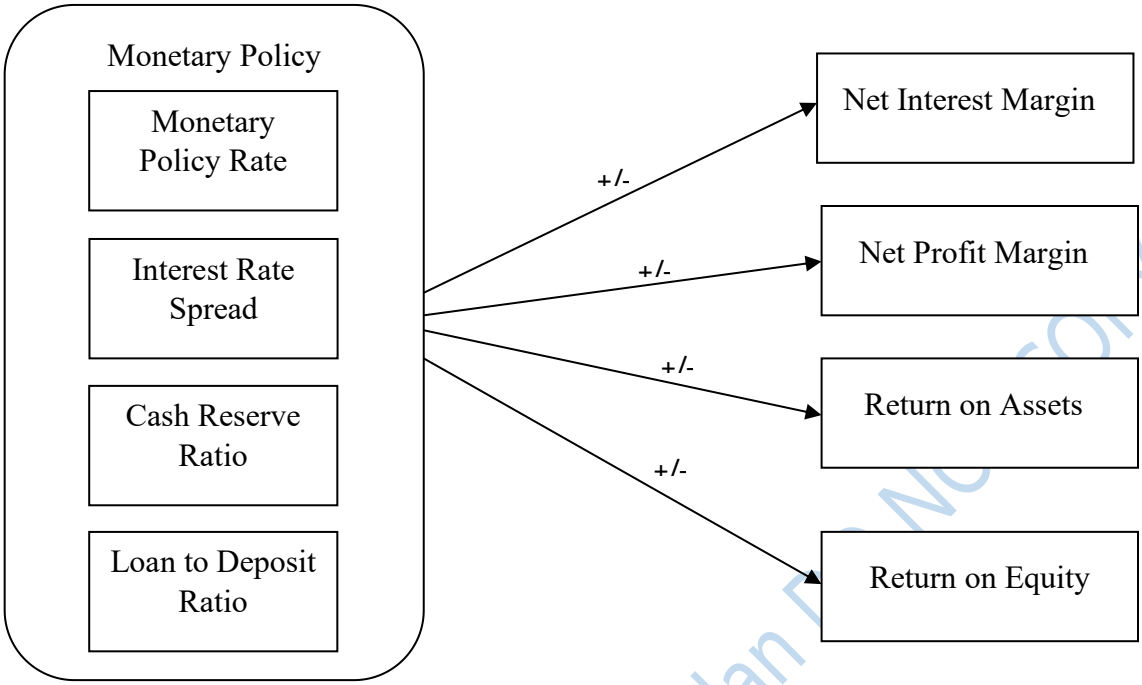

Figure 2.1: Conceptual links of monetary policy and bank profitability
Source: Author's conceptualization 2024

In addition, interest rates have a significant impact on a bank's profitability as they affect the bank's cost of funding and income generation. Short-term interest rates are commonly linked to the central bank's monetary policy rate. When the central bank decreases the policy rate, it lowers the cost of borrowing for banks, enabling them to offer loans to individuals and enterprises at more affordable interest rates. The stimulus is likely to lead to an increase in demand for bank loans and services. A reduction in the policy rate, for example, might lead to an increase in the amount of loans being issued, so enhancing the profitability of banks. In addition, banks impose an interest rate, referred to as the lending rate, on loans extended to both individuals and corporations. The interest rate spread refers to the difference between the profit banks make and the cost of funding they incur. Greater disparities in interest rates result in more revenue for banks, hence enhancing their financial performance. Banks can maintain low costs of funding in reaction to low policy rates, enabling them to stabilize their interest rate spreads. A correlation was discovered by two researchers between the difference in interest rates and the financial success of banks, particularly in situations where the policy rate is low.

In summary, interest rates and the earnings of financial firms are intricately interconnected. The monetary policy rate has a direct impact on a bank's interest revenue and profitability due to its influence on lending rates and interest rate spreads. Research has demonstrated that reducing interest rates can enhance key measures of profitability, such as net interest margin (NIM), net profit margin (NPM), return on assets (ROA), and return on equity (ROE).

2.5 Theoretical Framework

The research hinges on the traditional banking theory which provides a foundational perspective on how banks operate and generate profits by offering financial services and intermediating between depositors and borrowers. This theory has been a fundamental concept in banking and finance for many decades.

At its core, traditional banking theory emphasizes two primary functions of banks: taking deposits and making loans. Banks gather funds from depositors and channel these funds into loans to individuals, businesses, and other entities. The profitability of banks largely depends on the spread between the interest rate they pay to depositors and the interest rate they charge on loans. A wider interest rate spread typically leads to higher profitability.

Traditional banking theory also highlights the importance of managing bank assets and liabilities efficiently. Banks need to ensure that they maintain an appropriate balance between the interest rates they offer on deposits and the interest rates they earn on loans. Additionally, risk management is a key component of this theory, as banks must carefully assess the creditworthiness of borrowers to mitigate the risk of loan defaults, which could erode profitability.

This theory has guided the operations and business strategies of banks for many years, focusing on the core activities of deposit-taking and lending. While the theory remains relevant, the banking industry has evolved with the advent of technology, new financial products, and regulatory changes, leading to the development of more sophisticated approaches to bank profitability. Nonetheless, traditional banking theory continues to provide a fundamental framework for understanding the essential functions and profitability drivers of banks in the financial system.

According to conventional theory, increased bank profitability is expected to result in reduced incentives for taking risks. Numerous academics dispute this concept and suggest a contrary impact. They contend that increased profitability relaxes the restrictions on bank borrowing, allowing profitable banks to assume greater levels of risk. The impact is more significant when there are fewer restrictions on the amount of debt a bank may take on, or when new initiatives can be funded primarily through senior financing. These papers present a theoretical framework that elucidates the reasons for the increased risk-taking incentives of prosperous banks. This explanation aligns with the observed trends of bank risk-taking prior to the 2008 financial crisis[35,36,37,38,39].

2.6 Summary of Gaps in Literature Reviewed

The literature on the relationship between monetary policy and bank profitability in Nigeria has provided valuable insights into the dynamics of the banking sector in the country. However, there are several gaps in this literature that require further investigation and research to better understand the complexities of this relationship.

One notable gap in the existing literature is the limited exploration of non-interest income sources in Nigerian banks. While interest rate spreads play a significant role in bank profitability, banks in Nigeria have been diversifying their revenue streams by engaging in fee-based services and activities. Research that delves into the specific impact of these non-interest income sources on bank profitability in the context of monetary policy would be valuable.

Furthermore, the regulatory framework in Nigeria has undergone significant changes in recent years, with the adoption of Basel II and III standards and the implementation of risk-based supervision. The existing literature has yet to comprehensively evaluate how these regulatory changes interact with monetary policy to affect bank profitability. An examination of the

interplay between monetary policy measures and evolving regulatory requirements is crucial to understanding the full landscape of bank profitability in Nigeria.

In addition, there is a gap in the literature regarding the intricate relationship between monetary policy, technological changes, and their combined influence on bank profitability. A more detailed investigation into these dynamics is necessary to capture the evolving banking landscape in Nigeria, especially in the context of digital innovations and fintech developments.

The existing literature often focuses on the direct effects of monetary policy on bank profitability but frequently overlooks broader macroeconomic and political factors. Nigeria's economic conditions, inflation rates, political stability, and government policies can have a substantial impact on the banking sector and, consequently, bank profitability. Further research should incorporate a more comprehensive assessment of these external influences to provide a holistic understanding of the challenges and opportunities faced by Nigerian banks.

Moreover, the banking sector in Nigeria is not uniform across all regions of the country. There are geographic variations in terms of economic activity, infrastructure, and banking penetration. Existing literature tends to generalize the relationship between monetary policy and bank profitability without accounting for these regional differences. A more geographically specific analysis is needed to capture the nuances of how monetary policy affects banks in various parts of Nigeria.

In summary, while the literature on monetary policy and bank profitability in Nigeria has made important contributions, there remain several gaps that require further exploration. Addressing these gaps would lead to a more comprehensive understanding of the intricate relationship between monetary policy and the profitability of banks in Nigeria, providing valuable insights for policymakers, researchers, and the banking industry.

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Chapter Three

Methodology

This chapter of the study presents the methods employed throughout the empirical investigation. To provide genuine and verifiable outcomes to the research questions and objectives presented in the first chapter of this study, the procedures of this study are discussed, beginning with the strategy, design, sampling technique, model specification, theoretical expectation, estimation approaches and data sources and measurements.

3.1 Research Approach

A strategy outlining the study's underlying assumptions and methodology is developed first. A comprehensive strategy for data collection and analysis is required. Although this approach seeks to identify and summarize widespread consensus, it is essential to bear in mind that the underlying mechanisms are not set. Philosophical frameworks serve as road maps for conducting scientific research[1]. This occurs due to the fact that everyone has their own point of view from which they assess the situation and make decisions. Both positivist and interpretivist approaches can be used with these frames. Reality is objective and factual according to realists (also known as positivists) and open to different interpretations and perspectives according to idealists (also known as interpretativists). Positivist approach is employed because it permits the development of more precise definitions based on the study's data.

A study argues that positivists adopt the quantitative approach because it collects data using standard measures[2]. This is done by many methods, such as surveys, experiments, and so on, to increase our current level of comprehension. The concept places a priority on established opinions but offers little room for the investigation of specific problems that could be better

explained. Two scholars argue that positivism produces evidence that can be understood logically, verified quantitatively, or accepted by a large scientific community[1]. They put their faith in an unproven claim that one's thoughts can be evaluated, examined, and confirmed by the existence of an entity even in the lack of such evidence[3]. One of the basic ideas of positive theory is that one's own perceptions of an entity can be compared to the "reality" of that entity.

3.2 Research Design

The research design describes the steps taken to answer the study's questions. It does so by carefully explaining the methods used to collect and analyse data and by highlighting potential obstacles. A research design was interpreted as being influenced by the researchers' chosen technique and phenomena[4]. This is the current state of conducting research in a cost-effective manner[5]. One could also consider this a problem on a societal level. Both inductive and deductive methods of quantitative analysis were used in this investigation. A study defines evaluation analysis as "research which relies heavily on numerical data, such as that gathered through surveys or statistical analyses"[4]. This is the preferred method since it allows us to simultaneously affirm the presence of some objectively viable alternative explanations while ruling out other possibilities.

3.3 Research Strategy

Research strategies are the detailed plans they create for gathering, analyzing, and deducing the information that will be required to accomplish the study's stated goals[6]. This research uses a wide range of previously available data from various companies to investigate the impact of interest rates on banking earnings. This was done so the researcher could get a better picture of how the interest rate policy affects banking sector productivity and availability. In addition to other methods, a survey was used to collect data for this investigation. Research surveys are

described as the "collecting of facts from a group of people through their answers to questions"[7]. The method has potential for characterizing the characteristics of a huge population. Quantitative studies rely on the examination of numerical data gleaned from the audited financial records of companies in order to draw conclusions[8]. The information used in the study was gathered from the companies' annual reports beginning in 2010 and continuing through 2022. The informed the use of the panel FMOLS estimator for parameter estimates.

3.3.1 Sampling Technique and Sample Size

The findings are extrapolated to the entire population through the utilization of a suitable sample[9]. The inquiry is enhanced by the utilization of non-probability sampling. This type of non-probability sampling involves intentional or purposeful selection. The use of a judgmental sampling technique is informed by the researcher's discretion and the anticipated outcome of providing satisfactory answers to the questions posed in the investigation study.

A representative sample of the top 10 largest Nigerian customer deposit banks, which are worldwide authorized, was selected for the research. The study encompassed the period from 2010 to 2022. The table containing the names of the 7 selected deposit money institutions can be found in Table 3.1. These eras exhibit both the consequences of the 2008 global financial crisis and the impacts of the ongoing monetary policy[10]. This study investigates the impact of interest rate controls on banks' ability to improve their credit and profitability in the face of different policies implemented by the central bank. These policies include financial inclusion, stress tests, risk management, banking sector regulations, anti-money laundering measures, and capital adequacy requirements.

Table 3.1: Globally authorized and top 8 Nigerian deposit money banks as of 2022

Banks	Customers' deposits
Access Bank	₦8.19 trillion
Zenith Bank	₦8.04 trillion
United Bank for Africa	₦7 trillion
First Bank Plc	₦6.6 trillion
Guaranty Trust Bank	₦4.26 trillion
Fidelity Bank	₦2.29 trillion
First City Monument Bank	₦1.82 trillion
Union Bank Plc	₦1.53 trillion

Source: Nigeria Exchange Group[10].

3.3.2 Ethical Issues

Given that the financial data utilised in this study are readily accessible to the public through corporations' annual audited reports, obtaining approval from an ethical committee is unnecessary. The financial reports are publicly available and accessible to all individuals. The financial reports are created in accordance with the ethical guidelines set forth by the Nigerian Exchange Group (NEG).

3.3.3 Data Collection Procedure

The data was gathered from the yearly financial statements of the seven largest Nigerian banks that accept consumer deposits, all of which hold global authorization. The results of the gathered data align with the study's intended aims and objectives. Moreover, the analysis guarantees the reliability of the data sources. The financial facts are trustworthy as they have undergone an audit and were compiled in accordance with the standards and principles of the National Economic Group (NEG). Secondary data can assist in making inferences, identifying trends, and providing support for the study's objectives.

3.4 Model Specification

3.4.1 Empirical Model of Monetary Policy and Net Interest Margins of Deposit Money Banks

Following the theoretical framework of the traditional banking theory developed in the theoretical framework section of the previous chapter and the models of previous studies[11,12,13,14], the adapted model relating to the links between monetary policy instruments (such as monetary policy rate, interest rate spread, cash reserve ratio, and loan to deposit ratio) on net interest margin of deposit money banks including other relevant control variables (i.e. assets quality measured by total loans as a ratio of total assets, and customer deposits measured by customers' deposit as a ratio of total assets) is stated in a functional form as:

$$nim_{it} = f(mp_{it}, aqt_{it}, csd_{it}) \quad (3.1)$$

In mathematical form, it becomes:

$$nim_{it} = \varphi_0 + \mathrm{B}mp_{it} + \varphi_1 aqt_{it} + \varphi_2 csd_{it} + e_{it} \quad (3.2)$$

Where: *nim* denotes net interest margin; *mp* represents a vector of monetary policy instruments i.e. monetary policy rate (*mpr*), interest rate spread (*irs*), cash reserve ratio (*crr*), and loan to deposit ratio (*ldr*); *aqt* denotes assets quality measured by total loans as a ratio of total assets, and *csd* is customer deposits measured by customers' deposit as a ratio of total assets; $\varphi_0, \mathrm{B}, \varphi_{1-2}$ are parameters; *i* represents firms; *t* denotes time; and *e* is error term.

3.4.2 Empirical Model of Monetary Policy and Net Profit Margin of Deposit Money Banks

To investigate the impact of monetary policy on net profit margin of deposit money banks, the study modelled the banks' net profit margin as a function of monetary policy tools (such as monetary policy rate, interest rate spread, cash reserve ratio, and loan to deposit ratio) including the relevant control variables i.e. asset quality, and customers deposit[11,12,13,14]. The baseline model for the time series analysis is specified below as:

$$npm_{it} = f(mp_{it}, aqt_{it}, csd_{it}) \quad (3.3)$$

To estimate the parameters, the function is transformed into the generalized equation below as:

$$npm_{it} = \theta_0 + \Phi mp_{it} + \theta_1 aqt_{it} + \theta_2 csd_{it} + \upsilon_{it} \quad (3.4)$$

Where: *npm* denotes net profit margin; *mp* represents a vector of monetary policy instruments i.e. monetary policy rate (*mpr*), interest rate spread (*irs*), cash reserve ratio (*crr*), and loan to deposit ratio (*ldr*); *aqt* denotes assets quality measured by total loans as a ratio of total assets, and *csd* is customer deposits measured by customers' deposit as a ratio of total assets; $\theta_0, \Phi, \theta_{1-2}$ are parameters; *i* denotes firms; *t* denotes time; and υ is disturbance term.

3.4.3 Empirical Model of Monetary Policy and Return on Assets of Deposit Money Bank

To examine the role of monetary policy (such as monetary policy rate, interest rate spread, cash reserve ratio, and loan to deposit ratio) in return on assets of deposit money banks, the study modelled bank return on assets as a function of monetary policy tools, including the relevant control variables i.e. firm size, asset quality and customers deposit[11,12,13,14]. The baseline model for the time series analysis is specified below as:

$$roa_{it} = f(mp_{it}, aqt_{it}, csd_{it}) \quad (3.5)$$

To estimate the parameters, the function is transformed into the generalized equation below as:

$$roa_{it} = \alpha_0 + \Theta mp_{it} + \alpha_1 aqt_{it} + \alpha_2 csd_{it} + \varepsilon_{it} \quad (3.6)$$

Where: *roa* denotes return on assets; *mp* represents a vector of monetary policy instruments i.e. monetary policy rate (*mpr*), interest rate spread (*irs*), cash reserve ratio (*crr*), and loan to deposit ratio (*ldr*); *aqt* denotes assets quality measured by total loans as a ratio of total assets, and *csd* is customer deposits measured by customers' deposit as a ratio of total assets; $\alpha_0, \Theta, \alpha_{1-2}$ are parameters; *i* is firms; *t* denotes time; and ε is disturbance term.

3.4.4 Empirical Model of Monetary Policy and Return on Equity of Deposit Money Banks

To estimate the impact of monetary policy tools on return on equity of deposit money banks, the study modelled return on equity as a function of monetary policy tools (such as monetary policy rate, interest rate spread, cash reserve ratio, and loan to deposit ratio), including the relevant control variables i.e. asset quality and customer deposits[11,12,13,14]. The baseline model for the time series analysis is specified below as:

$$roe_{it} = f(mp_{it}, aqt_{it}, csd_{it}) \quad (3.7)$$

To estimate the parameters, the function is transformed into the generalized equation below as:

$$roe_{t} = \pi_0 + \Psi_1 mp_{it} + \pi_1 aqt_{it} + \pi_2 csd_{it} + \mu_{tt} \quad (3.8)$$

Where: *roe* denotes return on equity; *mp* represents a vector of monetary policy instruments i.e. monetary policy rate (*mpr*), interest rate spread (*irs*), cash reserve ratio (*crr*), and loan to deposit ratio (*ldr*); *aqt* denotes assets quality measured by total loans as a ratio of total assets, and *csd* is customer deposits measured by customers' deposit as a ratio of total assets; π_0, Ψ, π_{1-2} are parameters; *t* denotes time; and μ is disturbance term.

3.5 Theoretical Expectation

Regarding the theoretical expectation of deposit money bank profitability models, the study expects a direct or an indirect relationship between the instruments of monetary (monetary policy rate, interest rate spread, cash reserve ratio, and loan to deposit ratio) and deposit money banks profitability indicators (net interest margin, net profit margin, return on assets, and return on equity). It is expected that an expansionary monetary policy will enhance a great number of areas of the deposit money banks relating to net interest margin, net profit margin, return on assets,

and return on equity. On the other hand, contractionary monetary policy will curtail the credit creation of deposit money bank which may affect the profitability of the banks. Similarly, firm size is presumed to have a positive relationship with the growth indices of micro-finance banks. Likewise, customer deposit and asset quality have n direct impact on the profitability indices of micro-finance banks.

3.6 Estimation Techniques

For this study, preliminary analysis (both descriptive and correlation analysis) are initially computed before the estimation results. In this study, panel fixed, and random effects models were employed to analyze the relationship between outcome variable and explanatory variables. The choice between these models was determined using the Hausman test statistics. The Hausman test compares the coefficients estimated from the fixed effects model, which assumes that the individual effects are correlated with the independent variables, with the coefficients from the random effects model, which assumes that individual effects are uncorrelated with the independent variables. If the null hypothesis of the Hausman test is rejected, suggesting that there is a significant difference between the coefficients estimated by the two models, then the fixed effects model is considered more appropriate. Conversely, if the null hypothesis cannot be rejected, indicating no significant difference between the coefficients, then the random effects model is preferred due to its efficiency gains. This choice ensures the robustness and reliability of the regression results for further analysis. All the estimations are carried out on STATA version 17.0.

3.7 Sources and Measurements of Data

This study examines the effect of monetary policy on selected deposit money banks profitability in Nigeria for the period 2010 to 2022.

The study uses secondary type of time series data for the variables, deposit money bank profitability indicators i.e. NIM, NPM, ROA, ROE; monetary policy tools measured by monetary policy rate, interest rate spread, cash reserve ratio, and loan to deposit ratio; firm size, customers deposit and asset quality that were obtained from the Annual reports of seven international deposit money banks considered to be the highest customer deposit banks in Nigeria. The description, measurements and sources of data are presented in Table 3.2.

The lists of the microfinance banks are Access Bank Plc, Fidelity Bank Plc, First Bank Nigeria Limited, Guaranty Trust Bank Plc, Union Bank of Nigeria Plc, United Bank of Africa Plc, and Zenith Bank Plc.

Table 3.2: Data sources and measurements

Variable name	Variable description	Measurements	Data sources
Net interest margin (nim)	It captures the difference between the interest income generated from loans, investments, and other interest-earning assets and the interest expenses paid on deposits and other interest-bearing liabilities.	$\frac{Int.\ Income - Int.\ Expenses}{Average\ Earning\ Assets} \times 100\%$	Banks' annual reports
Net profit margin (npm)	This is the proportion of net income generated from total revenue. It captures how much profit a company makes for every Naira of revenue earned.	$\frac{Net\ Income}{Total\ \text{Re}venue} \times 100\%$	Banks' annual reports
Return on assets (roa)	It measures the percentage of net income produced relative to the total assets owned by the company.	$\frac{Net\ Income}{Average\ Total\ Assets} \times 100\%$	Banks' annual reports
Return on equity (roe)	It shows the return generated on shareholders' investments.	$\frac{Net\ Income}{Average\ Total\ Equity} \times 100\%$	Banks' annual reports
Monetary policy rate (mpr)	This the interest rate set by a Central Bank of Nigeria to influence monetary conditions.	Rate (%)	CBN (2022)
Interest rate spread (lrs)	It is the difference between the interest rates charged on loans and the interest rates paid on deposits by banks.	(Average lending – average deposit) rate	WDI (2022)
Cash reserve ratio (crr)	This is the percentage of banks' total deposits as reserves in the form of cash or deposits with the central bank.	$\frac{\text{Re}serve\ \text{Re}quirement}{Total\ Deposits} \times 100\%$	CBN (2022)
Loan to deposit ratio (ldr)	It is the ratio of loans granted by banks to their total customer deposits.	$\frac{Total\ \ loan}{Total\ \ Deposit} \times 100\%$	CBN (2022)
Asset quality (aqt)	It assesses the quality and performance of a bank's assets, primarily loans and investments.	$\frac{Total\ \ loan}{Average\ \ Total\ \ Assets} \times 100\%$	Banks' annual reports
Customer deposits (csd)	This is the funds deposited by customers in commercial banks.	Natural log of customers' deposit.	Banks' annual reports

Source: Author's compilation (2024).

Endnotes

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Chapter Four

Result and Discussion of Findings

This phase of the research study covers the detailed empirical analyses of the effect of monetary policy on the business profitability of deposit money banks in Nigeria. The study presents the details of data presentation, descriptive statistics, pre-estimation tests and estimation results of the investigation of the links between monetary policy and bank profitability in Nigeria. This chapter is divided into descriptive analysis which shows the measure of central tendency that includes the mean, median and measures of variation. It also takes into consideration the trend analysis which shows the trend of the time series data used from 2010-2022 and econometric analysis which focuses on test for cross-section dependence and panel fixed effect based on the Hausman test results.

4.1 Descriptive Analysis

This section presents descriptive analysis of the variables used in analyzing the effect of monetary policy tools on the profitability of deposit money banks in Nigeria. The summary statistics of the series regarding the sampled microfinance banks are presented in Table 4.1. Likewise, Table 4.2 presents the mean and standard deviation values of individual firms considered for the research study. The total number of sampled firms understudy is seven with a sample period of 13 years, 2010-2022. The data used for analyzing the relationship between monetary policy tools and deposit monk banks profitability is presented in the Appendix. More so, the detailed estimated results for the entire test carried out in this study are presented in the appendix under different sections accordingly.

Table 4.1: Summary Statistics

Signs	Variable measurements	Mean	Std Dev.	Max.	Min.	Kurtosis	Skewness	Obs.
nim	Net interest margin	5.286	6.036	56.009	0.992	65.939	7.788	79
npm	Net profit margin	18.322	22.683	103.558	-125.186	22.802	-2.595	77
roa	Return on Assets	6.285	36.160	340.213	-9.865	86.461	9.261	88
roe	Return on Equity	11.737	15.722	64.229	-86.844	19.967	-2.965	88
mpr	Monetary policy rate	12.404	2.299	16.5	6.25	2.084	-1.015	91
irs	Interest rate spread	8.243	1.381	11.064	6.371	-0.597	0.548	91
crr	Cash reserve ratio	18.885	7.940	27.5	1	-0.215	-0.882	91
ldr	Loan to deposit ratio	58.793	11.704	79.95	37.559	-0.573	-0.170	91
aqt	Asset quality	45.301	37.299	365.454	15.453	70.038	8.076	81
cdp	Total customer deposits (N'millions)	2000113	1621115	8975653	327351	5.138	2.089	82

Note: Std. Dev. - standard deviation; Max. - maximum; Min. - minimum; Obs. - observation.
Source: Author's computation (2024).

The descriptive statistics of net interest margin (NIM) and net profit margin (NPM) across seven selected deposit money banks in Nigeria, presented in Table 4.1, reveal notable variations in financial performance. On average, the banks exhibit a NIM of 5.29%, indicating the spread between interest income and expenses, with significant variability reflected in the standard deviation of 6.04%. However, this variance is further underscored by the wide range of NIM values, from a minimum of 0.99% to a maximum of 56.01%. Similarly, the NPM statistics indicate an average profitability of 18.322%, suggesting that, on average, the banks retain this percentage of total revenue as net profit. Yet, the standard deviation of 22.68% and the significant range from -125.19% to 103.558% highlight substantial discrepancies in profitability among the banks. This disparity is further emphasized by the skewness and kurtosis values, which indicate non-normal distributions with potential outliers contributing to extreme profit margins. From the descriptive statistics, it provides valuable insights into the financial landscape of the selected deposit money banks in Nigeria, offering stakeholders a nuanced understanding of their performance. The wide variation in NIM and NPM metrics underscores the diverse strategies, risk profiles, and operational efficiencies across the banking sector. While some banks demonstrate robust profitability and interest rate management, others face challenges in maintaining healthy margins and profitability.

A comparative analysis of the mean values for net interest margin (NIM) and net profit margin (NPM) across the selected firms reveals notable differences in financial performance. Among the firms, Access Bank Plc, Guaranty Trust Bank Plc and First Bank Nigeria Limited stand out with the highest mean NIM of 7.67%, 7.04% and 6.767% respectively. This indicates their ability to generate favourable spreads between interest income and expenses. This suggests efficient management of interest-bearing assets and liabilities, contributing to robust profitability.

Similarly, Guaranty Trust Bank Plc, Zenith Bank Plc, Union Bank of Africa Plc, and Access Bank Plc also exhibit the highest mean NPM of 35.06%, 30.68%, 16.31%, and 14.21% correspondingly, highlighting its strong profitability and effective cost management strategies. This exceptional performance underscores the bank's competitive advantage and financial strength in the industry. Conversely, United Bank of Africa Plc shows comparatively lower mean values of NIM (3.47%). Union Bank of Nigeria Plc records the lowest mean NPM of 8.03%, indicating narrower interest rate spreads and potentially lower interest income relative to operating expenses. This suggests a need for improved asset and liability management practices to enhance interest income generation. This suggests a relatively lower profitability levels compared to its peers. It therefore signifies higher operating costs or lower revenue streams, highlighting areas for potential efficiency gains or revenue diversification strategies to improve overall financial performance.

Table 4.2: Average of Firm Profitability Indices, Asset Quality and Customers Deposits

Firms	Net Interest Margin	Net Profit Margin	Return on Assets	Return on Equity	Asset Quality	Customers Deposits (₦'million)
Access Bank Plc	7.674 (14.564)	14.209 (5.627)	3.115 (6.189)	11.702 (5.134)	69.682 (89.197)	2573698 (2165133)
Fidelity Bank Plc	4.156 (0.796)	11.047 (3.048)	1.161 (0.350)	8.915 (3.682)	46.369 (7.787)	1082960 (641644)
First Bank Nigeria Limited	6.768 (0.786)	13.919 (5.174)	2.476 (1.270)	9.063 (6.558)	42.487 (8.285)	2134346 (491561)
Guaranty Trust Bank Plc	7.04291 (1.514)	35.05923 (13.691)	30.9634 (92.934)	27.32141 (12.948)	50.10299 (8.145)	1584985 (597304)
Union Bank of Nigeria Plc	4.419675 (1.590)	8.028598 (49.758)	1.323355 (4.899)	-4.09905 (29.085)	30.11739 (8.296)	782440 (349463)
United Bank of Africa Plc	3.466186 (1.129)	16.31294 (13.970)	1.342542 (0.916)	10.05988 (9.099)	35.66712 (5.006)	2359610 (1214761)
Zenith Bank Plc	4.329631 (1.412)	30.68479 (5.612)	2.735687 (0.604)	18.58122 (4.515)	41.1858 (6.290)	3491165 (2248190)

Note: Standard deviations are in parenthesis "()".
Source: Author's computation (2024).

Furthermore, the mean ROA of 6.29% indicates the average return generated by each bank on its total assets. A higher ROA suggests greater efficiency in asset utilization and profitability. However, the wide standard deviation of 36.16% indicates considerable variability in ROA among the banks, reflecting differences in operational efficiency and risk management practices. The maximum ROA of 340.21% suggests exceptional performance by at least one bank, possibly driven by effective asset management or favourable market conditions. Conversely, the minimum ROA of -9.87% indicates that some banks experienced losses relative to their assets, highlighting potential challenges in asset quality or operational efficiency that may require attention.

Similarly, the mean ROE of 11.737% provides an insight into the profitability of the banks relative to their shareholders' equity. A higher ROE signifies more efficient utilization of equity capital to generate profits. The wide standard deviation of 15.722 reflects varying degrees of profitability across the banks, indicating differences in business models, risk profiles, and financial strategies. The maximum ROE of 64.229% indicates outstanding performance by at least one bank, possibly driven by superior operational efficiency or innovative business strategies. Conversely, the minimum ROE of -86.85% suggests that some banks experienced significant losses relative to their equity, indicating potential challenges in profitability or capital management.

The comparative analysis of the mean values of return on assets (ROA) among the selected firms reveals significant variations in their financial performance. Guaranty Trust Bank Plc stands out with the highest mean ROA of 30.96%, indicating robust profitability and efficient utilization of its assets. This exceptional performance may be attributed to its strong market position, effective risk management practices, and innovative business strategies. Conversely, Fidelity Bank Plc

recorded the lowest mean ROA of 1.16%, suggesting relatively lower profitability and operational efficiency compared to its peers. This could be indicative of challenges in asset quality, operational efficiency, or strategic positioning that may require attention to enhance financial performance and competitiveness. The comparison of the mean values of return on equity (ROE) among the selected firms highlights significant variations in their profitability and efficiency in generating returns for shareholders. Guaranty Trust Bank Plc emerges as the top performer with the highest mean ROE of 27.32%, indicating strong profitability relative to its equity base. This suggests effective management of shareholder funds and assets to generate substantial returns, reflecting the bank's solid financial position and strategic initiatives. Conversely, Union Bank of Nigeria Plc recorded a negative mean ROE of -4.1%, signalling an unprofitable performance and challenges in generating returns for shareholders. This indicates potential issues such as poor asset utilization, high expenses, or financial distress that may require management attention to improve the bank's profitability and shareholder value.

The descriptive analysis of monetary policy instruments in Nigeria reveals several key findings that shed light on the country's financial landscape and economic dynamics. The mean monetary policy rate (MPR) stands at 12.404%, indicating the average interest rate set by the Central Bank of Nigeria (CBN) to regulate the country's monetary system. The standard deviation of 2.3 suggests some variability around this mean, indicating fluctuations in the interest rate over the observed period. This variability may stem from changes in economic conditions, inflationary pressures, or policy adjustments by the CBN in response to economic shocks or goals such as inflation targeting or economic stimulus.

Also, the interest rate spread (IRS), representing the difference between lending and deposit rates, has a mean of 8.243%. This spread reflects the profitability of banks' lending activities and their

ability to attract deposits. A higher spread typically indicates more favorable conditions for banks, allowing them to earn higher profits on loans. The standard deviation of 1.38 suggests relatively stable spreads over the observed period, implying consistent profitability in the banking sector. However, the negative skewness (-1.015) indicates a slight left-skewed distribution, suggesting a tendency towards lower spreads, possibly due to competitive pressures or regulatory interventions aimed at promoting financial inclusion and reducing lending rates.

The cash reserve ratio (CRR), which represents the proportion of bank deposits that commercial banks are required to hold as reserves with the central bank, has a mean of 18.885%. This ratio is a crucial tool for monetary policy implementation, influencing banks' liquidity levels and credit creation. The standard deviation of 7.94 suggests significant variability in banks' reserve requirements over time, reflecting adjustments by the central bank to manage liquidity in the banking system. Higher CRR requirements may restrict banks' lending capacity, while lower requirements can stimulate credit expansion and economic activity.

Besides, the loan-to-deposit ratio (LDR), measuring the ratio of loans disbursed by banks to their total deposits, has a mean of 58.73%. This ratio reflects banks' lending activities relative to their deposit base and indicates the degree of liquidity deployment in the economy. The relatively high mean LDR suggests robust lending activity in Nigeria's banking sector, supporting economic growth and investment. However, the negative skewness (-0.17) suggests a slight left-skewed distribution, indicating a tendency towards lower LDRs, possibly due to risk aversion or regulatory constraints on lending. Overall, these findings provide valuable insights into the dynamics of monetary policy transmission and banking sector performance in Nigeria.

The analysis of additional financial metrics reveals important insights into the asset quality and deposit mobilization of banks in Nigeria. Asset quality, which represent by the asset quality ratio

(AQT), has a mean of 45.30%. This metric reflects the proportion of a bank's assets that are of high quality and low risk, such as loans that are performing well and unlikely to default. The standard deviation of 37.30 indicates considerable variability in asset quality across banks, suggesting differences in risk management practices, loan portfolios, and exposure to economic factors. The high kurtosis of 8.076 suggests a leptokurtic distribution, indicating a high concentration of observations around the mean and potentially fat tails, which may indicate occasional extreme values or outliers in asset quality.

The total customer deposits (CDP), which represent the aggregate amount of funds deposited by customers in banks, have a mean of ₦2,000,113 million. This metric provides insights into the deposit mobilization efforts of banks and their ability to attract and retain customer funds. The standard deviation of ₦1,621,115 millions indicates significant variability in deposit levels across banks, reflecting differences in market share, customer base, and deposit products. The high skewness of 2.089 suggests a right-skewed distribution, indicating a tendency towards higher deposit levels, possibly driven by factors such as population growth, economic expansion, or changes in consumer savings behaviour.

4.2 Test of Hypotheses

In this section, the research study presents the empirical results in regard to the set objectives in the following four sub-sections. Prior to the findings of the stated objectives, pre-estimation test such as correlation analysis for the detection of multicollinearity problem, and Hausman tests to decide the appropriate estimation test results between panel fixed effects and panel random effects. The outcomes are presented in the following sub-sections.

4.2.1 Analysis of the First Hypothesis

This sub-section reports the empirical results relating to the relationship between monetary policy and net interest margins of deposit money banks in Nigeria.

4.2.1.1 Correlation Analysis

Table 4.3 presents the partial correlation coefficients of the variables relating to the relationship among monetary policy tools and net interest margin in Nigeria. The coefficient of correlation results shows that monetary policy rate, cash reserve ratio and loan to deposit ratio have a negative level of association with the selected microfinance banks' net interest margin. However, interest rate spread has a positive correlation coefficient with net interest margin. As to the control variable, net interest margin positively correlates with asset quality but negatively relate with customers deposits.

Table 4.3: Correlation Matrix

	nim	*mpr*	*irs*	*crr*	*ldr*	*aqt*	*cdp*
nim	1						
mpr	-0.070	1					
irs	0.079	-0.686	1				
crr	-0.200	0.682	-0.741	1			
ldr	-0.180	0.335	-0.283	0.612	1		
aqt	0.758	-0.006	-0.012	-0.060	-0.075	1	
cdp	-0.172	0.340	-0.415	0.523	0.159	-0.075	1

Note: nim - Net interest margin; mpr - Monetary policy rate; irs - Interest rate spread; crr - Cash reserve ratio; ldr - Loan to deposit ratio; aqt - Asset quality; and cdp - Total customer deposits (N'millions)
Source: Author's computation (2024).

The correlation coefficients of monetary policy tools and deposit money banks' asset quality and customer deposits are equally presented in Table 4.3. Both asset quality and customer deposit have a negative level of association with interest rate spread. Meanwhile, the result shows that monetary policy rate, cash reserve ratio, and loan-deposit ratio indirectly relate with asset quality, whereas they positively correlate with customer deposit respectively. Concerning the correlation among the monetary policy tools, monetary policy rate and interest rate spread are negatively related. Cash reserve ratio and loan-deposit ratio have a direct level of association with monetary policy but inversely correlated with interest rate spread. Also, cash reserve ratio and loan-deposit ratio are directly correlated. The values of the correlation coefficients revealed the absence of multicollinearity problem. Thus, the problem of multicollinearity is avoided in the empirical analysis. Nonetheless, the results of the correlation coefficients are just preliminary analyses that are being put through confirmation in the next sub-section after considering other determinants of deposit money banks' profitability.

4.2.1.2 Regression Analysis for the First Hypothesis

The panel fixed and random effects' methods were employed in estimating the panel regression models that examined the effects of monetary policy rate, interest rate spread, cash reserve ratio and loan-deposit ratio, other factors such as asset quality and customer deposit. More so, the estimated coefficients between the fixed and random effects' models were compared using the Hausman test with the null hypothesis "random effects are uncorrelated with the explanatory variables". The Hausman test results presented in Table 4.4 reveals that we do reject the null hypotheses for the net interest margin model at 5% significance levels based on the calculated Chi-Square values. The panel fixed effects is found to be appropriate for return on assets and

return on equity models after confirming that there is no cross-section dependency (see the appendix).

Interpretation

The regression results provide insights into the relationship between monetary policy and the net interest margin (NIM) of deposit money banks (DMBs) in Nigeria. First, the monetary policy rate (MPR), which represents the benchmark interest rate set by the central bank, shows a coefficient of 0.078. However, with a p-value of 0.2404, it is not statistically significant at conventional levels, suggesting that changes in the MPR do not have a significant impact on the NIM of DMBs in the short term. This may indicate that other factors, such as market competition or bank-specific strategies, play a more influential role in determining NIM. Likewise, interest rate spread does not have significant impact on net interest margin.

Secondly, the cash reserve ratio (CRR), which determines the proportion of customer deposits that banks must hold as reserves with the central bank, demonstrates a coefficient of -0.066 with a statistically significant p-value of 0.0382. This negative coefficient suggests that an increase in the CRR leads to a decrease in the NIM of DMBs. Higher reserve requirements reduce the funds available for banks to lend out at interest, thereby impacting their interest income and NIM. This finding underscores the importance of liquidity management and regulatory compliance for DMBs in maintaining profitability.

Table 4.4: Panel Fixed Effects Results of Monetary Policy and Deposit Money Banks Profitability

Dependent Variable: Net Interest Margin

Method: Panel Least Squares

Sample: 2010 2022

Periods included: 13

Cross-sections included: 7

Total panel (unbalanced) observations: 74

White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Monetary Policy Rate	0.077985	0.065786	1.185433	0.2404
Interest Rate Spread	-0.045191	0.129836	-0.348063	0.7290
Cash Reserve Ratio	-0.065931	0.031123	-2.118380	0.0382
Loan to Deposit Ratio	-0.030538	0.014354	-2.127575	0.0374
Asset Quality	0.157407	0.001783	88.29525	0.0000
Customers Deposit	-0.154489	0.348012	-0.443918	0.6587
C	2.730689	5.776986	0.472684	0.6381

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.966873	Mean dependent var	5.434919
Adjusted R-squared	0.960357	S.D. dependent var	6.209199
S.E. of regression	1.236289	Akaike info criterion	3.420265
Sum squared resid	93.23299	Schwarz criterion	3.825033
Log likelihood	-113.5498	Hannan-Quinn criter.	3.581732
F-statistic	148.3688	Durbin-Watson stat	1.767509
Prob(F-statistic)	0.000000		

Hausman Test	54.456
Prob. (Hausman Test)	0.0000

Source: Author's computation (2024) Extract from E-views output.

Additionally, the Loan to Deposit Ratio (LDR), representing the ratio of loans issued by banks to their total customer deposits, exhibits a coefficient of -0.031 with a significant p-value of 0.037. A negative coefficient implies that higher loan-to-deposit ratios are associated with lower NIMs for DMBs. This suggests that aggressive lending practices, especially when deposits are insufficient to cover loans, may squeeze margins as banks incur higher costs to attract funding. It highlights the delicate balance banks must strike between loan growth and maintaining profitability.

Furthermore, the coefficient of asset quality (AQT) is notably large at 0.157407, indicating a highly significant positive relationship between asset quality and NIM. Banks with higher asset quality ratios, reflecting healthier loan portfolios and lower credit risk, tend to earn higher interest income relative to their total assets. This underscores the importance of sound credit risk management practices and prudent lending standards for DMBs in maximizing interest income and preserving profitability over time. Similarly, customer deposits do not have significant impact on net interest margin of deposit money banks.

In addition, the degree of variation in net interest rate explained by monetary policy rate, interest rate spread, cash reserve ratio, loan-deposit ratio, asset quality and customer deposits are indicated in the adjusted within R-squared values which are relatively moderate. With F-statistics results, the statistics suggest that the overall effects of monetary policy tools on net interest margin of deposit money banks were significant at 5% as their probability values are less than 0.05.

Decision: The statistical significance of this model indicates that the study cannot accept the null hypothesis of this model hence the study accepted the alternate hypothesis which says that monetary policy rate have significant effect on the financial profitability measured by net interest margin of the selected Nigerian deposit money banks. This result is consistent with a'priori expectation of this model. Thus, this study have achieved the objective of this model, answered the question as well as tested the related hypothesis.

4.2.2 Analysis of the Second Hypothesis

This sub-section reports the empirical results relating to the relationship between monetary policy and net profit margin of deposit money banks in Nigeria.

4.2.2.1 Correlation Analysis

The partial correlation coefficients of the relationship between monetary policy tools and deposit money banks' net profit margin are reported in Table 4.5. The correlation result indicates that monetary policy rate and interest rate spread positively correlate with net profit margin. However, cash reserve ratio and loan to deposit ratio have direct level of association with net profit margin. Likewise, net profit margin has a positive relationship with asset quality and customers' deposits.

Table 4.5: Correlation Matrix

	npm	*mpr*	*irs*	*crr*	*ldr*	*aqt*	*cdp*
npm	1						
mpr	-0.035	1					
irs	-0.167	-0.686	1				
crr	0.076	0.682	-0.741	1			
ldr	0.105	0.335	-0.283	0.612	1		
aqt	0.084	-0.006	-0.012	-0.060	-0.075	1	
cdp	0.169	0.340	-0.415	0.523	0.159	-0.075	1

Note: npm - Net profit margin; mpr - Monetary policy rate; irs - Interest rate spread; crr - Cash reserve ratio; ldr - Loan to deposit ratio; aqt - Asset quality; and cdp - Total customer deposits (N'millions)
Source: Author's computation (2024).

The correlation coefficients between monetary policy instruments and the asset quality and client deposits of deposit money institutions are displayed in Table 4.5. There is a negative correlation between both the quality of assets and client deposits and the interest rate spread. Meanwhile, the analysis reveals that the monetary policy rate, cash reserve ratio, and loan-deposit ratio have an indirect relationship with asset quality, while they have a positive correlation with customer deposits, respectively. The relationship between monetary policy rate and interest rate spread is inversely correlated. The cash reserve ratio and loan-deposit ratio have a positive correlation with monetary policy, but a negative correlation with interest rate spread. Furthermore, there is a direct correlation between the cash reserve ratio and the loan-deposit ratio. The correlation coefficients indicated the absence of multicollinearity. Therefore, the issue of multicollinearity is circumvented in the empirical analysis. However, the correlation coefficients' results are only initial studies that will be further confirmed in the future sub-section, taking into account other factors that determine the profitability of deposit money institutions.

4.2.2.2 Regression Analysis for the Second Hypothesis

In this section, this study employed the panel fixed and random effects' methods to estimate the panel regression models that examined the effect of monetary policy tools (measured by monetary policy rate, interest rate spread, cash reserve ratio, and loan to deposit ratio), other factors such asset quality and customer deposits on net profit margin of deposit money banks. In addition, the estimated coefficients between the fixed and random effects' models were compared using the Hausman test with the null hypothesis "random effects are uncorrelated with the explanatory variables". The study found that the Hausman test results presented in Table 4.6 reject the null hypotheses for the net profit margin model at 5% significance levels based on the calculated Chi-Square values. The panel fixed effects estimator is appropriate for the model. The

panel fixed effects model was found to be consistent and efficient for this sub-section after confirming that there is no cross-section dependence among the firms (see Appendix).

Interpretation

In Table 4.6, the regression results shed light on the relationship between monetary policy and the net profit margin (NPM) of deposit money banks (DMBs) in Nigeria. The coefficient of the monetary policy rate (MPR) is -1.932, indicating a negative relationship between changes in the MPR and NPM. However, with a p-value of 0.356, the coefficient is not statistically significant at conventional levels, suggesting that variations in the MPR do not have a significant direct impact on the NPM of DMBs. This implies that other factors, such as market conditions or bank-specific strategies, may have a more pronounced influence on profitability.

The interest rate spread (IRS), representing the difference between lending and deposit rates, demonstrates a significant negative coefficient of -6.886 with a p-value of 0.0165. This suggests that wider interest rate spreads are associated with lower NPMs for DMBs. A wider spread implies that banks are earning more from lending relative to the interest they pay on deposits, indicating potentially higher costs for borrowers and lower interest income for banks. This finding underscores the importance of interest rate management and competition dynamics in shaping bank profitability.

Table 4.6: Panel Fixed Effects Result of Monetary Policy and Net Profit Margin

Dependent Variable: Net Profit Margin

Method: Panel Least Squares

Sample: 2010 2022

Periods included: 13

Cross-sections included: 7

Total panel (unbalanced) observations: 72

White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Monetary Policy Rate	-1.932179	2.074926	-0.931204	0.3555
Interest Rate Spread	-6.885665	2.791131	-2.466980	0.0165
Cash Reserve Ratio	-1.997278	1.263636	-1.580580	0.1193
Loan to Deposit Ratio	0.595489	0.303338	1.963123	0.0544
Asset Quality	0.060886	0.030192	2.016626	0.0483
Customers Deposit	18.97392	13.69777	1.385183	0.1712
C	-171.9685	200.5157	-0.857631	0.3946

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.278975	Mean dependent var	17.16932
Adjusted R-squared	0.132325	S.D. dependent var	22.99566
S.E. of regression	21.42025	Akaike info criterion	9.128533
Sum squared resid	27070.79	Schwarz criterion	9.539597
Log likelihood	-315.6272	Hannan-Quinn criter.	9.292179
F-statistic	2.902325	Durbin-Watson stat	2.078007
Prob(F-statistic)	0.032487		

Hausman Test	10.871
Prob. (Hausman Test)	0.0925

Source: Author's computation (2024) Extract from E-views output.

Additionally, the cash reserve ratio (CRR), which determines the proportion of customer deposits that banks must hold as reserves with the central bank, exhibits a negative coefficient of -1.997. However, with a p-value of 0.1193, the coefficient is not statistically significant at conventional levels. This suggests that changes in the CRR may not have a direct impact on the NPM of DMBs in the short term, although compliance with reserve requirements could indirectly affect profitability through liquidity management and lending activities.

Moreover, the loan to deposit ratio (LDR), representing the ratio of loans issued by banks to their total customer deposits, demonstrates a positive coefficient of 0.5955, bordering on statistical significance with a p-value of 0.0544. This suggests that higher loan-to-deposit ratios may be associated with higher NPMs for DMBs, although the relationship is not conclusive. Banks with higher LDRs may be earning more from interest income on loans, but this needs to be balanced against the potential risks associated with higher lending concentrations.

Furthermore, the coefficient of asset quality (AQT) is positive at 0.061 with a statistically significant p-value of 0.0483. This suggests that better asset quality, reflected in lower levels of non-performing loans and higher credit quality, is associated with higher NPMs for DMBs. Banks with healthier loan portfolios and lower credit risk may experience lower provisioning expenses and higher interest income, contributing to overall profitability. This highlights the importance of prudent credit risk management practices for banks in maintaining profitability over time.

Additionally, the extent of variation in net profit margin explained by monetary policy tools (measured by monetary policy rate, interest rate spread, cash reserve ratio and loan to deposit ratio), other factors such as asset quality and customer deposits are presented in the adjusted within R-squared values which are relatively moderate. With the F-statistics, the statistics

suggest that the overall effects of monetary policy tools on net profit margins of deposit money banks were significant at 5% as their probability values are less than 0.05.

Decision: The statistical significance of this model indicates that the study cannot accept the null hypothesis of this model hence the study accepted the alternate hypothesis which says that monetary policy tools have significant effect on the net profit margin of the selected Nigerian deposit money banks. This result is consistent with a'priori expectation of this model. Thus, this study have achieved the objective of this model, answered the question as well as tested the related hypothesis.

4.2.3 Analysis of the Third Hypothesis

In this sub-section, the empirical results concerning to the effect of monetary policy on return on assets of deposit money banks in Nigeria is reported.

4.2.3.1 Correlation Analysis

Table 4.7 presents the partial correlation coefficients of the variables relating to the relationship among monetary policy tools and return on assets of deposit money banks in Nigeria. The coefficient of correlation result shows that monetary policy rate, cash reserve ratio, and loan to deposit ratio have positive level of association with deposit money banks' return on assets. This implies that monetary policy rate, cash reserve ratio, and loan to deposit ratio have a direct correlation with return on assets of deposit money branches. However, interest rate spread negatively relates with return on assets. Concerning deposit money banks' return on assets with other controlling variables, the correlation table shows that return on assets positively correlate with asset quality but negatively related with customer deposits.

Table 4.7: Correlation Matrix

	roa	*mpr*	*irs*	*crr*	*ldr*	*aqt*	*cdp*
roa	1						
mpr	0.187	1					
irs	-0.152	-0.686	1				
crr	0.117	0.682	-0.741	1			
ldr	0.023	0.335	-0.283	0.612	1		
aqt	0.712	-0.006	-0.012	-0.060	-0.075	1	
cdp	-0.010	0.340	-0.415	0.523	0.159	-0.075	1

Note: roa - Return on Assets; mpr - Monetary policy rate; irs - Interest rate spread; crr - Cash reserve ratio; ldr - Loan to deposit ratio; aqt - Asset quality; and cdp - Total customer deposits (N'millions).
Source: Author's computation (2024).

Table 4.3 displays the correlation coefficients between the tools of monetary policy, deposit money banks' asset quality, and client deposits in an equal manner. Interest rate spread is negatively correlated with both asset quality and client deposit. In the meantime, the outcome demonstrates that while customer deposits positively connect with the monetary policy rate, cash reserve ratio, and loan-deposit ratio, respectively, they have an indirect relationship with asset quality. The interest rate spread, and the monetary policy rate have a negative relationship when it comes to the relationship between the monetary policy instruments. The loan-deposit ratio and cash reserve ratio are inversely connected with interest rate spread but directly tied to monetary policy. There is a clear correlation between the cash reserve ratio and the loan-deposit ratio. The lack of a multicollinearity issue was demonstrated by the correlation coefficient values. As a result, the empirical analysis avoids the multicollinearity issue. However, the correlation coefficient results are only early analyses, and they will be confirmed in the following subsection once more factors influencing deposit money bank profitability have been considered.

4.2.3.2 Regression Analysis for the Third Hypothesis

The panel fixed and random effects' methods were employed in estimating the panel regression models that examined the effects of monetary policy tools (measured by monetary policy rate, internet rate spread, cash reserve ratio, and customer deposits), other factors such as asset quality, and customers' deposits on return on assets of deposit money bank. As well, an estimated panel regression model was estimated based on the deposit money banks' return on assets. The model regresses deposit money banks' return on assets on monetary policy tools (measured by monetary policy rate, internet rate spread, cash reserve ratio, and customer deposits), other factors such as asset quality, and customers' deposits correspondingly.

Table 4.8: Panel Fixed Result of Monetary Policy Tools and Return on Assets

Dependent Variable: Return on Assets

Method: Panel Least Squares

Sample: 2010 2022

Periods included: 13

Cross-sections included: 7

Total panel (unbalanced) observations: 77

White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Monetary Policy Rate	-0.025605	0.057862	-0.442526	0.6596
Interest Rate Spread	-0.241461	0.136293	-1.771626	0.0812
Cash Reserve Ratio	-0.037463	0.021064	-1.778499	0.0801
Loan to Deposit Ratio	-0.009178	0.012668	-0.724519	0.4714
Asset Quality	0.067873	0.001118	60.70892	0.0000
Customers Deposit	0.395242	0.320813	1.232000	0.2225
C	-2.854622	5.023789	-0.568221	0.5719

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.925385	Mean dependent var	3.670683
Adjusted R-squared	0.911394	S.D. dependent var	5.928847
S.E. of regression	1.751286	Sum squared resid	196.2881
F-statistic	66.14454	Durbin-Watson stat	1.841473
Prob(F-statistic)	0.000000		

Hausman Test	35.938
Prob. (Hausman Test)	0.0000

Source: Author's computation (2024) Extract from E-views output.

As earlier stated in previous sub-sections, the estimated coefficients between the fixed and random effects' models were compared using the Hausman test with the null hypothesis "random effects are uncorrelated with the explanatory variables". The Hausman test results presented in Table 4.8 reveals that we do reject the null hypotheses for microfinance bank branches models at 5% significance levels based on the calculated Chi-Square values. The panel fixed effects is found to be appropriate for microfinance bank branches models. However, the null hypothesis of the Hausman tests for microfinance bank branches were not rejected at 5% significance level. As a result, the panel fixed effects method was found to be consistent and efficient for the achieving the stated objective of this sub-section after confirming that there is no cross-section dependence at 5% significance level (see Appendix).

Interpretation

The regression results provide insights into the relationship between monetary policy and the return on assets (ROA) of deposit money banks (DMBs) in Nigeria. Firstly, the coefficient of the monetary policy rate (MPR) is -0.026, indicating a negative relationship between changes in the MPR and ROA. However, with a p-value of 0.66, the coefficient is not statistically significant at conventional levels. This suggests that variations in the MPR do not have a significant direct impact on the ROA of DMBs. Other factors, such as market conditions, competition, and bank-specific strategies, may play a more significant role in determining asset profitability.

Secondly, the interest rate spread (IRS), representing the difference between lending and deposit rates, demonstrates a negative coefficient of -0.242. Although the coefficient is negative, it is not statistically significant at conventional levels, with a p-value of 0.0812. This suggests that changes in interest rate spreads may not have a significant direct impact on the ROA of DMBs in

the short term. However, wider interest rate spreads may potentially indicate higher costs for borrowers and lower interest income for banks, which could indirectly affect asset profitability.

Additionally, the cash reserve ratio (CRR), which determines the proportion of customer deposits that banks must hold as reserves with the central bank, exhibits a negative coefficient of -0.0375. Similarly to the MPR and IRS, the coefficient of the CRR is not statistically significant at conventional levels, with a p-value of 0.0801. This implies that changes in the CRR may not have a direct impact on the ROA of DMBs in the short term. However, compliance with reserve requirements could indirectly affect asset profitability through liquidity management and lending activities.

Moreover, the loan to deposit ratio (LDR), representing the ratio of loans issued by banks to their total customer deposits, demonstrates a coefficient of -0.0092. With a p-value of 0.4714, the coefficient is not statistically significant, suggesting that changes in the LDR may not have a significant direct impact on the ROA of DMBs in the short term. However, higher LDRs may indicate increased lending activity, which could potentially impact asset profitability over time, depending on the quality of loans issued.

Furthermore, the coefficient of asset quality (AQT) is positive at 0.0679, with a statistically significant p-value of 0.0000. This suggests that better asset quality, reflected in lower levels of non-performing loans and higher credit quality, is associated with higher ROA for DMBs. Banks with healthier loan portfolios and lower credit risk may experience lower provisioning expenses and higher interest income, contributing to overall asset profitability. This underscores the importance of prudent credit risk management practices for banks in maintaining profitability over time.

The joint effects of the variables were also examined using the F-statistics test. They found that the overall effects of monetary policy tools on return on assets of deposit money banks were significant at 5% as their probability values are less than 0.05. In addition, the degree of variation in return on assets of deposit money banks indicated that the adjusted within R-squared values are relatively moderate. This indicates that monetary policy rate, interest rate spread, cash reserve ratio, loan to deposit ratio, asset quality and customer deposits were found to account for about 91.14% of the total variation in return on assets of deposit money banks of the selected Nigerian banks between 2010 and 2022 respectively.

Decision: The statistical significance of this model indicates that the study cannot accept the null hypothesis of this model hence the study accepted the alternate hypothesis which says that monetary policy tools have significant effects on return on assets of deposit money banks in Nigeria. This result is consistent with a'priori expectation of this model. Thus, this study have achieved the objective of this model, answered the question as well as tested the related hypothesis.

4.2.4 Analysis of the Fourth Hypothesis

This sub-section reports the empirical results with reference to the effect of monetary policy on return on equity of deposit money banks in Nigeria.

4.2.4.1 Correlation Analysis

Table 4.9 presents the partial correlation coefficients of the variables relating to the relationship among monetary policy tools and return on equity of deposit money banks in Nigeria. The coefficient of correlation result shows that monetary policy rate, cash reserve ratio and loan to deposit ratio have positive level of association with deposit money banks' return on equity. It means that monetary policy rate, cash reserve ratio and loan to deposit ratio have a direct correlation with return on equity of deposit money banks. Conversely, interest rate spread has an indirect level of association with deposit money banks' return on equity. Pertaining to the deposit money banks' return on equity with other controlling variables, the correlation table shows that return on assets positively correlate with asset quality and customers deposits.

Table 4.9: Correlation Matrix

	roe	*mpr*	*irs*	*crr*	*ldr*	*aqt*	*cdp*
roe	1						
mpr	0.362	1					
irs	-0.382	-0.686	1				
crr	0.349	0.682	-0.741	1			
ldr	0.117	0.335	-0.283	0.612	1		
aqt	0.154	-0.006	-0.012	-0.060	-0.075	1	
cdp	0.271	0.340	-0.415	0.523	0.159	-0.075	1

Note: roe - Return on Equity; mpr - Monetary policy rate; irs - Interest rate spread; crr - Cash reserve ratio; ldr - Loan to deposit ratio; aqt - Asset quality; and cdp - Total customer deposits (N'millions).
Source: Author's computation (2024).

Table 4.3 shows the correlation coefficients between monetary policy instruments, deposit money banks' asset quality, and client deposits. Both asset quality and client deposits have a negative correlation with interest rate spread. Meanwhile, the results suggest that the monetary policy rate, cash reserve ratio, and loan-deposit ratio have an indirect relationship with asset quality but a positive correlation with client deposits. In terms of correlation among monetary policy tools, the monetary policy rate and the interest rate spread are inversely connected. The cash reserve ratio and loan-deposit ratio have a direct relationship with monetary policy but are inversely connected to the interest rate spread. Furthermore, the cash reserve ratio and the loan-deposit ratio are directly associated. The correlation coefficients demonstrated that there was no multicollinearity concern. Thus, multicollinearity is avoided in the empirical study. Nonetheless, the correlation coefficient results are preliminary and will be confirmed in the following sub-section after taking into account additional variables of deposit money bank profitability.

4.2.4.2 Regression Analysis for the Fourth Hypothesis

The panel fixed and random effects' methods were employed in estimating the panel regression models that examined the effects of monetary policy tools (measured by monetary policy rate, interest rate spread, cash reserve ratio, and loan to deposit ratio), other factors such as asset quality and customer deposits on return on equity of deposit money banks. As well, an estimated panel regression models was estimated based on the return on assets of listed commercial banks. The model regresses return on equity on monetary policy tools (measured by monetary policy rate, interest rate spread, cash reserve ratio, and loan to deposit ratio), other factors such asset quality and customer deposits correspondingly.

As earlier stated in previous sub-sections, the estimated coefficients between the fixed and random effects' models were compared using the Hausman test with the null hypothesis "random effects are uncorrelated with the explanatory variables". The Hausman test results presented in Table 4.10 reveals that we do accept the null hypotheses for return on equity of deposit money banks models at 5% significance levels based on the calculated Chi-Square values. The panel random effect is found to be appropriate for return on equity models. As a result, the panel random effects method was found to be consistent and efficient for the achieving the stated objective of this sub-section after confirming that there is no cross-section dependence at 5% significance level (see Appendix).

Interpretation

The regression analysis investigates the relationship between monetary policy and the return on equity (ROE) of deposit money banks (DMBs) in Nigeria. The coefficient of the monetary policy rate (MPR) is positive at 0.674, indicating a potential positive association between changes in the MPR and ROE. However, with a t-statistic of 1.1198 and a p-value of 0.2666, the coefficient is not statistically significant at conventional levels. This suggests that variations in the MPR do not have a significant direct impact on the ROE of DMBs. Other factors, such as market conditions, bank-specific strategies, and macroeconomic factors, may play a more substantial role in determining equity profitability.

Table 4.10: Panel Random Effects Result of Monetary Policy and Return on Equity

Dependent Variable: Return on Equity

Method: Panel EGLS (Cross-section random effects)

Sample: 2010 2022

Periods included: 13

Cross-sections included: 7

Total panel (unbalanced) observations: 77

White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Monetary Policy Rate	0.673817	0.601722	1.119814	0.2666
Interest Rate Spread	-2.138526	1.245214	-1.717397	0.0903
Cash Reserve Ratio	0.517169	0.270823	1.909618	0.0603
Loan to Deposit Ratio	-0.113778	0.114746	-0.991569	0.3248
Asset Quality	0.036531	0.030088	1.214162	0.2288
Customers Deposit	-1.097505	3.358390	-0.326795	0.7448
C	32.99453	44.83586	0.735896	0.4643

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.264189	Mean dependent var	5.631680
Adjusted R-squared	0.201120	S.D. dependent var	13.44957
S.E. of regression	11.95424	Sum squared resid	10003.26
F-statistic	4.188855	Durbin-Watson stat	1.631987
Prob(F-statistic)	0.001178		

Hausman Test	0.0687
Prob. (Hausman Test)	1.0000

Source: Author's computation (2024) Extract from E-views output.

The interest rate spread (IRS), representing the difference between lending and deposit rates, exhibits a negative coefficient of -2.139. Although the coefficient suggests a negative relationship between changes in interest rate spreads and ROE, the result is statistically significant at 10% levels, with a p-value of 0.0903. This implies that changes in interest rate spreads do have a significant direct impact on the ROE of DMBs at 10% significance level. However, wider interest rate spreads may potentially indicate higher costs for borrowers and lower interest income for banks, which could indirectly affect equity profitability over time.

Additionally, the cash reserve ratio (CRR), which determines the proportion of customer deposits that banks must hold as reserves with the central bank, demonstrates a positive coefficient of 0.517. Although the coefficient suggests a positive relationship between changes in the CRR and ROE, the result is statistically significant at 10% levels, with a p-value of 0.0644. This implies that changes in the CRR may not have a significant direct impact on the ROE of DMBs in the short term. However, compliance with reserve requirements could indirectly affect equity profitability through liquidity management and lending activities.

Moreover, the loan to deposit ratio (LDR), representing the ratio of loans issued by banks to their total customer deposits, exhibits a negative coefficient of -0.114. Although the coefficient suggests a negative relationship between changes in the LDR and ROE, the result is not statistically significant at conventional levels, with a p-value of 0.3248. This implies that changes in the LDR do not have a significant direct impact on the ROE of DMBs in the short term. However, higher LDRs may indicate increased lending activity, which could potentially impact equity profitability over time, depending on the quality of loans issued.

Furthermore, the coefficient of asset quality (AQT) is positive at 0.0365, indicating a potential positive association between asset quality and ROE. However, with a t-statistic of 1.214 and a p-

value of 0.2288, the coefficient is not statistically significant at conventional levels. This suggests that improvements in asset quality may not have a significant direct impact on the ROE of DMBs in the short term. Nonetheless, better asset quality, reflected in lower levels of non-performing loans and higher credit quality, is essential for maintaining long-term equity profitability by reducing credit risk and provisioning expenses.

The joint effects of the variables were also examined using the F-statistics test. They found that the overall effects of monetary policy tools on return on equity of deposit money banks were significant at 5% as their probability values are less than 0.05. In addition, the degree of variation in deposit money banks' return on equity indicated that the adjusted within R-squared values are relatively moderate. This indicates that monetary policy rate, interest rate spread, cash reserve ratio, loan to deposit ratio, asset quality and customer deposits were found to account for about 20.11% of the total variation in return on equity of deposit money banks in Nigeria between 2010 and 2022 respectively.

Decision: The statistical significance of this model indicates that the study cannot accept the null hypothesis of this model hence the study accepted the alternate hypothesis which says that monetary policy tools have significant effects on the return on equity of deposit money banks in Nigeria. This result is consistent with a'priori expectation of this model. Thus, this study have achieved the objective of this model, answered the question as well as tested the related hypothesis.

4.3 Discussion of Findings

For the first objective, the results indicating a negative and significant effect of the cash reserve ratio (CRR) and loan-to-deposit ratio (LDR) on the net interest margin (NIM) of deposit money banks (DMBs) in Nigeria have several economic implications. Firstly, the negative impact of the CRR suggests that higher reserve requirements imposed by the central bank reduce the funds available for lending, thereby limiting the banks' ability to generate interest income from loans. This could lead to decreased profitability for banks as they earn less interest income on their loan portfolios. Moreover, a higher CRR may lead to increased costs for banks, as they must hold a larger portion of their deposits in reserve, which could further squeeze their net interest margins[1,2,3].

Similarly, the negative impact of the loan-to-deposit ratio (LDR) on the net interest margin suggests that higher levels of lending relative to deposits negatively affect banks' interest income. When banks have a high LDR, they may need to resort to more expensive funding sources to meet their lending needs, such as borrowing from other financial institutions or raising capital in the market, which can increase their funding costs and reduce their net interest margins. Additionally, a high LDR may indicate increased credit risk for banks if they are lending excessively compared to their deposit base, which could lead to higher loan defaults and provisioning expenses, further eroding their net interest margins[4].

However, the findings regarding the monetary policy rate (MPR) and interest rate spread (IRS) suggest that their impact on the net interest margin of DMBs in Nigeria is not statistically significant at the 5% level. This implies that changes in the MPR set by the central bank and variations in the interest rate spread between lending and deposit rates may not have a direct and significant impact on the profitability of DMBs through their net interest margins. Nonetheless,

changes in monetary policy rates and interest rate spreads could indirectly affect banks' profitability through their impact on lending and deposit activities, loan demand, and overall economic conditions[5,6].

Concerning the second objective, the negative and significant impact of the interest rate spread (IRS) on the net profit margin (NPM) suggests that wider spreads between lending and borrowing rates can hinder the profitability of banks. This situation may arise due to various factors such as market inefficiencies, increased credit risk, or liquidity constraints. Banks operating in an environment with wider interest rate spreads may struggle to attract deposits at competitive rates while facing challenges in lending at higher rates. As a result, their net interest income, a key component of profitability, may decline, leading to lower overall profitability and net profit margins for banks.

On the other hand, the positive and significant influence of the loan-to-deposit ratio (LDR) on the net profit margin implies that higher levels of lending relative to deposits can contribute to increased profitability for banks. A higher LDR indicates that banks are utilizing their deposits more efficiently by lending out a larger portion of their funds. This can lead to higher interest income generated from loans, which, if managed prudently, can translate into improved profitability and net profit margins for banks. However, it's crucial to monitor LDRs closely, as excessively high ratios may indicate elevated credit risk or liquidity constraints, which could pose long-term challenges to banks' financial stability[7,8].

Additionally, the findings regarding the indirect influence of the monetary policy rate (MPR) and cash reserve ratio (CRR) on the net profit margin not being statistically significant highlight the complexities of monetary policy transmission mechanisms. While changes in MPR and CRR can influence banks' lending and funding costs, their indirect effects on net profit margins may be

influenced by various factors such as market conditions, competition, and regulatory environments.

As to the third objective, the results of the study indicating a negative and significant impact of the cash reserve ratio (CRR) on return on assets (ROA) at the 10% level suggest several economic implications for banks in Nigeria. The CRR represents the proportion of deposits that banks must hold as reserves with the central bank, and an increase in this ratio reduces the amount of funds available for lending and investment by banks. As a result, banks may experience lower interest income and profitability, leading to a decline in their return on assets. This finding underscores the importance of managing liquidity effectively to optimize asset utilization and maximize returns. Banks may need to reassess their liquidity management strategies to minimize the adverse effects of higher reserve requirements on their profitability while ensuring compliance with regulatory requirements[9].

Furthermore, the study's results regarding the indirect effects of the monetary policy rate (MPR), interest rate spread (IRS), and loan-to-deposit ratio (LDR) on return on assets, while not statistically significant at the 5% level, still carry important implications. The MPR, which represents the benchmark interest rate set by the central bank, influences banks' borrowing and lending costs and, consequently, their profitability. Similarly, the IRS reflects the difference between lending and deposit rates and affects banks' net interest income. Moreover, the LDR measures banks' lending activities relative to their deposit base and impacts their ability to generate interest income. While these factors may not have shown statistically significant direct effects on ROA in this study, their indirect influences underscore the intricate interplay between monetary policy, market conditions, and banks' financial performance[10].

Overall, the study's findings highlight the complex relationship between monetary policy instruments, market dynamics, and banks' financial performance in Nigeria. Effective management of liquidity, prudent lending practices, and careful monitoring of interest rate dynamics are essential for banks to enhance their return on assets and ensure long-term profitability and financial stability. Policymakers and regulators should consider these factors when formulating monetary policies and regulatory frameworks to support a sound and resilient banking sector while fostering economic growth and stability[7,8].

As regards the fourth objective, the results indicating a negative effect of interest rate spread (IRS) and a positive effect of cash reserve ratio (CRR) on return on equity (ROE) at the 10% significant level carry important economic implications for banks in Nigeria. The interest rate spread represents the difference between lending and deposit rates and influences banks' net interest income. A negative impact suggests that wider spreads may hamper banks' profitability and, consequently, their return on equity. This finding underscores the importance of managing interest rate risk and optimizing lending and deposit pricing strategies to maintain healthy margins and sustain profitability. Banks may need to review their interest rate policies and explore ways to minimize the adverse effects of wider spreads on their financial performance while ensuring competitive pricing to attract deposits and loans.

On the other hand, the positive effect of the cash reserve ratio on return on equity suggests that higher reserve requirements may contribute to enhanced profitability for banks in Nigeria. The cash reserve ratio represents the proportion of deposits that banks must hold as reserves with the central bank, and an increase in this ratio reduces the funds available for lending and investment. While higher reserve requirements may initially limit banks' lending activities, they can also help mitigate liquidity risks and strengthen financial stability, ultimately benefiting shareholders

through improved return on equity. However, it is essential for banks to strike a balance between liquidity management and profitability considerations to ensure optimal performance and long-term sustainability.

Moreover, the non-significant impact of the monetary policy rate (MPR) and loan-to-deposit ratio (LDR) on return on equity suggests that these factors may not directly influence banks' profitability at the current significant level. However, it is crucial for banks to consider the broader economic environment, market conditions, and regulatory requirements when assessing their financial performance and profitability prospects. Effective risk management practices, prudent lending standards, and proactive capital management are essential for banks to navigate the dynamic operating environment and maintain robust profitability and shareholder returns. Policymakers and regulators should also continue to monitor and adjust monetary policy and regulatory frameworks to support a sound and resilient banking sector while fostering economic growth and stability[7,10].

Endnotes

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Chapter Five

Conclusion

This chapter presents the concluding remarks of the research study. It is divided into three parts, namely summary of findings, conclusion and recommendations.

5.1 Summary of Findings

In this study, the existing relationship between monetary policy tools and the profitability of selected deposit money banks in Nigeria is investigated to understand the effect of monetary policy tools on the business profitability of deposit money banks regarding their net interest margin, net profit margin, return on assets and return on equity in Nigeria. Understudying this research study became necessary because it makes enquiries on the findings of past studies which can best be described as inconclusive. The study is conducted for customer deposit banks in the developing countries such as Nigeria. The datasets employed were obtained from the selected companies' annual reports for different years, CBN statistical bulletin, and the scope of the study spans from 2010 to 2022. The panel fixed and random effects estimator was used to evaluate the parameters based on the characteristics of the datasets and the Hausman test results.

For the first objective, the CRR has a detrimental effect, as it indicates that when the central bank imposes higher reserve requirements, it reduces the amount of funds that banks can lend. Consequently, this limits the banks' capacity to make interest income from loans. Similarly, the adverse effect of the loan-to-deposit ratio (LDR) on the net interest margin indicates that larger levels of lending compared to deposits have a negative influence on banks' interest revenue. When banks have a high Loan-to-Deposit Ratio (LDR), they may have to rely on costlier financing options to fulfill their lending requirements, such as borrowing from other financial

institutions or raising capital in the market. This can lead to higher funding expenses and a decrease in their net interest margins. Nevertheless, the results concerning the monetary policy rate (MPR) and interest rate spread (IRS) indicate that their influence on the net interest margin of Deposit Money Banks (DMBs) in Nigeria is not statistically significant at the 5% significance level. This suggests that alterations in the Monetary Policy Rate (MPR) established by the central bank and fluctuations in the difference between lending and deposit rates may not directly and significantly affect the profitability of Deposit Money Banks (DMBs) through their net interest margins.

Regarding the second objective, the adverse and substantial influence of the interest rate spread (IRS) on the net profit margin (NPM) indicates that larger gaps between rates for lending and borrowing might impede the profitability of banks. This scenario can occur because of multiple circumstances, including market inefficiencies, heightened credit risk, or limitations in liquidity. Conversely, the loan-to-deposit ratio (LDR) has a strong and positive impact on the net profit margin, indicating that higher levels of lending compared to deposits can enhance banks' profitability. A higher loan-to-deposit ratio (LDR) signifies that banks are effectively using their deposits by lending out a greater proportion of their cash. Furthermore, the results indicating that the indirect impact of the monetary policy rate (MPR) and cash reserve ratio (CRR) on the net profit margin is not statistically significant emphasize the intricacies of monetary policy transmission processes.

Concerning the third objective, the findings indicated a substantial and adverse effect of the cash reserve ratio (CRR) on return on assets (ROA) with statistical significance at the 10% level. Consequently, banks may encounter a reduction in their interest revenue and profitability, resulting in a decrease in their return on assets. In addition, the study found that the monetary

policy rate (MPR), interest rate spread (IRS), and loan-to-deposit ratio (LDR) do not have a statistically significant impact on return on assets at the 5% level. However, these findings still have major consequences. Although our analysis did not find statistically significant direct effects of these factors on ROA, their indirect influences highlight the complex relationship between monetary policy, market conditions, and banks' financial performance.

As to the fourth objective, the findings suggest that there is a detrimental impact of interest rate spread (IRS) and a beneficial impact of cash reserve ratio (CRR) on return on equity (ROE) at a substantial level of 10%. Wider spreads may have a detrimental influence on banks' profitability and, as a result, their return on equity may be hindered. Conversely, the positive impact of the cash reserve ratio on return on equity indicates that increasing reserve requirements may lead to improved profitability for Nigerian banks. Although increased reserve requirements may initially restrict banks' lending activity, they can also reduce liquidity concerns and enhance financial stability, ultimately benefiting shareholders by improving return on equity. Furthermore, the monetary policy rate (MPR) and loan-to-deposit ratio (LDR) have a negligible effect on return on equity.

5.2 Conclusion

This study investigates the interrelationship between monetary policy tools and deposit money banks' profitability in Nigeria over the periods of 2010 to 2022 using the panel fixed and random effects approaches. The study discovered that cash reserve ratio and loan to deposit ratio have negative and significant effect on net interest margin of deposit money banks in Nigeria. However, the positive and negative impact of monetary policy rate and interest rate spread on net interest margin is not statistically significant at 5% level. The study showed that net profit margin is negatively and significantly impacted by interest rate spread at 5%, while positively

influenced by loan to deposit ratio at 10% level. However, the indirect influence of monetary policy rate and cash reserve ratio on net profit margin is not statistically significant. Also, the study found that cash reserve ratio negatively and significantly impacted return on assets at 10% level. Also, monetary policy rate, interest rate spread and loan to deposit ratio have an indirect effect on return on assets, albeit not statistically significant at 5% level. Furthermore, interest rate spread and cash reserve ratio have negative and positive effects on return on equity at 10% significant level respectively. However, monetary policy rate and loan to deposit ratio do not have significant impact on return on equity. This study emphasized the importance of monetary policy tools in improving the profitability of deposit money banks in Nigeria in respect of their net interest margin, net profit margin, return on assets, and return on equity.

5.3 Recommendations

Following the reported findings discussed in the subsequent parts of the chapter in this research study, the following policy recommendations are discussed below:

a) Given the negative and significant impact of the cash reserve ratio (CRR) on net interest margin (NIM) and return on assets (ROA), the CBN should review and adjust reserve requirements to strike a balance between financial stability and profitability. This may involve fine-tuning the CRR to ensure adequate liquidity while minimizing its adverse effects on banks' profitability. Additionally, policymakers could explore alternative liquidity management tools to mitigate the negative impact of reserve requirements on banks' profitability.

b) Since interest rate spread (IRS) negatively affects net profit margin (NPM), it is essential for policymakers to implement measures to manage interest rate risk effectively. This could involve adopting a more transparent and predictable interest rate policy framework

to minimize volatility in interest rates. Policymakers should also promote competition in the banking sector to ensure that interest rates remain competitive and aligned with market conditions, thereby supporting banks' profitability and enhancing financial intermediation.

c) With the loan-to-deposit ratio (LDR) negatively impacting net interest margin and return on assets, policymakers should encourage banks to adopt prudent lending practices to mitigate credit risk and improve asset quality. This could include enhancing credit risk assessment frameworks, strengthening loan monitoring mechanisms, and promoting responsible lending standards. Policymakers should also provide incentives for banks to diversify their loan portfolios and prioritize high-quality assets to improve profitability and reduce the likelihood of non-performing loans.

d) Although the direct impact of the monetary policy rate (MPR) on net interest margin and return on assets is not statistically significant, policymakers should focus on strengthening monetary policy transmission mechanisms to ensure that changes in the MPR are effectively transmitted to the banking sector. This may involve enhancing communication and coordination between monetary authorities and commercial banks, improving market liquidity, and fostering a conducive operating environment for monetary policy implementation.

e) The CBN should prioritize regulatory reforms aimed at enhancing the efficiency, resilience, and competitiveness of the banking sector. This could include streamlining regulatory requirements, promoting innovation and digitalization in banking services, and strengthening governance and risk management frameworks. Additionally, policymakers should provide support for capacity building initiatives to help banks adapt to evolving

regulatory and market dynamics effectively. By fostering a sound and well-regulated banking sector, policymakers can promote financial stability, enhance investor confidence, and support sustainable economic growth.

5.4 Contribution to Knowledge

This study contributes to the existing body of knowledge in the following ways:

a) Unlike previous research, which often measure bank profitability by return on assets and return on equity, this study employs another two distinct measures like net interest margin, and net profit margin. Simultaneously, monetary policy was disentangled into four key instruments: monetary policy rate, interest rate spread, cash reserve ratio and loan to deposit ratio. This decomposition provides a granular understanding of the diverse channels through which monetary policy may influence various measures of bank profitability.

b) The findings of this study contribute novel insights to the literature by revealing that the individual impact of monetary policy tools on banks profitability measures (NIM, NPM, ROA, ROE), which is not uniform across different components. Moreover, the study sheds light on the dynamics over an extended period, demonstrating that the long-run effects of monetary policy instruments, particularly through monetary policy rate, interest rate spread, cash reserve ratio, and loan to deposit ratio, play a significant role in enhancing deposit money banks' profitability.

5.5. Suggestions for Further Studies

The findings of this study open avenues for further research in several key areas to deepen our understanding of the intricate relationship monetary policy instruments and financial profitability in the Nigerian deposit money banks. These are some suggestions for areas of future studies.

a) Future studies could delve deeper into the dynamic effects of monetary policy on bank profitability by employing time series econometric techniques such as Vector Autoregression (VAR) or Structural Vector Autoregression (SVAR). By analyzing high-frequency data, researchers can capture short-term fluctuations in monetary policy variables and their immediate impact on bank profitability indicators, providing valuable insights into the transmission channels of monetary policy in the banking sector.

b) Another avenue for further research is to conduct a sectoral analysis of bank profitability, focusing on specific segments of the banking industry such as retail banking, corporate banking, or investment banking. By disaggregating bank profitability data and examining how monetary policy affects different banking segments differently, researchers can uncover sector-specific vulnerabilities, risk factors, and profitability drivers, thereby providing tailored policy recommendations for enhancing overall sectoral resilience and performance.

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Appendix

Appendix I

f_id	Firms	Year	Net interest margin nim	Net profit margin npm	Return on Assets roa	Return on Equity roe	Monetary policy rate mpr	Interest rate spread irs	Cash reserve ratio crr	Loan to deposit ratio ldr	Asset quality aqt	Total customer deposits in millions naira cdp
1	Access Bank Plc	2010	5.481676	16.35543	1.778837	7.085534	6.25	11.06417	1	52.28692	55.46091	12.99576
1	Access Bank Plc	2011	5.345104	5.327821	0.552872	2.806324	12	10.3275	8	44.77372	51.70495	13.16657
1	Access Bank Plc	2012	56.00921	20.73626	23.60103	15.07237	12	8.386667	12	42.31292	365.4536	13.90533
1	Access Bank Plc	2013	3.91323	14.33211	1.538169	10.69077	12	8.7775	12	37.55947	43.14907	14.01204
1	Access Bank Plc	2014	4.473719	1.802316	0.201524	1.456882	13	7.210833	20	63.60699	51.45972	14.09677
1	Access Bank Plc	2015	3.733335	21.80638	2.730941	18.27511	11	7.700833	20	69.57769	51.54412	14.23961
1	Access Bank Plc	2016	3.748591	19.34324	2.068722	15.18363	14	9.372815	22.5	79.95	51.52125	14.41052
1	Access Bank Plc	2017	3.75854	13.37118	1.521247	11.33969	14	7.998847	22.5	72.84135	50.61265	14.46302
1	Access Bank Plc	2018	3.231176	16.88977	1.854685	16.69605	14	7.203185	22.5	60.16259	42.3819	14.5376
1	Access Bank Plc	2019	3.688145	12.16557	1.111005	12.91411	13.5	6.47607	22.5	58.72569	39.32194	15.11525
1	Access Bank Plc	2020	2.600331	12.60727	1.049695	12.24034	11.5	8.995394	27.5	60.33322	36.96895	15.39092
1	Access Bank Plc	2021	1.989883	15.16121	1.152352	12.7748	11.5	7.276285	27.5	60.4775	33.7041	15.52336
1	Access Bank Plc	2022	1.793562	14.81415	1.329536	15.59522	16.5	6.3712	27.5	61.69555	32.58285	15.83441
2	Fidelity Bank Plc	2010	5.518807	10.47768	1.219196	4.334826	6.25	11.06417	1	52.28692	33.16096	12.69879

2	Fidelity Bank Plc	2011	3.945596	8.565227	0.805806	4.37037	12	10.3275	8	44.77372	34.51714	13.23763
2	Fidelity Bank Plc	2012	4.025767	15.04486	1.960278	11.10155	12	8.386667	12	42.31292	37.78599	13.48248
2	Fidelity Bank Plc	2013	2.849752	6.083455	0.714103	4.723624	12	8.7775	12	37.55947	39.40708	13.60024
2	Fidelity Bank Plc	2014	4.113308	10.13711	1.162233	7.969453	13	7.210833	20	63.60699	45.63392	13.6171
2	Fidelity Bank Plc	2015	4.941375	9.465522	1.128826	7.576451	11	7.700833	20	69.57769	46.94265	13.55367
2	Fidelity Bank Plc	2016	4.770514	6.403063	0.749842	5.250213	14	9.372815	22.5	79.95	55.34075	13.58354
2	Fidelity Bank Plc	2017	5.181502	10.48217	1.367228	9.274771	14	7.998847	22.5	72.84135	55.73733	13.56097
2	Fidelity Bank Plc	2018	4.265174	15.03928	1.652729	14.62071	14	7.203185	22.5	60.16259	49.41499	13.79471
2	Fidelity Bank Plc	2019	3.928739	10.63782	1.084465	9.79618	13.5	6.47607	22.5	58.72569	53.3091	14.01863
2	Fidelity Bank Plc	2020	3.775106	12.92409	0.966228	9.742883	11.5	8.995394	27.5	60.33322	48.07958	14.34557
2	Fidelity Bank Plc	2021	2.884256	14.18767	1.0816	11.94852	11.5	7.276285	27.5	60.4775	50.41564	14.52098
2	Fidelity Bank Plc	2022	3.827893	14.15932	1.196387	15.18132	16.5	6.3712	27.5	61.69555	53.05107	14.76353
3	First Bank Nigeria Limited	2010	5.624803	12.87652	1.322201	6.481092	6.25	11.06417	1	52.28692	51.39016	14.09935
3	First Bank Nigeria Limited	2011	7.205157	8.363416	0.932736	6.110634	12	10.3275	8	44.77372	46.30749	14.39464
3	First Bank Nigeria Limited	2012	7.868122	20.98643	2.567751	19.11569	12	8.386667	12	42.31292	47.51216	14.59107
3	First Bank Nigeria Limited	2013	6.89957	15.91555	1.82854	16.92714	12	8.7775	12	37.55947	45.39668	14.7597
3	First Bank Nigeria Limited	2014	6.171783	17.42477	2.2731	18.75702	13	7.210833	20	63.60699	51.39225	14.752
3	First Bank Nigeria Limited	2015	6.838216	7.946906	1.110319	8.047905	11	7.700833	20	69.57769	43.73112	14.69091
3	First Bank Nigeria Limited	2016			2.812632	2.890587	14	9.372815	22.5	79.95	24.35342	
3	First Bank Nigeria Limited	2017			3.440014	3.540563	14	7.998847	22.5	72.84135	40.05623	

3	First Bank Nigeria Limited	2018			3.455853	3.563092	14	7.203185	22.5	60.16259	40.69191	
3	First Bank Nigeria Limited	2019			5.019263	5.194815	13.5	6.47607	22.5	58.72569	34.03627	
3	First Bank Nigeria Limited	2020					11.5	8.995394	27.5	60.33322		
3	First Bank Nigeria Limited	2021					11.5	7.276285	27.5	60.4775		
3	First Bank Nigeria Limited	2022					16.5	6.3712	27.5	61.69555		
4	Guaranty Trust Bank Plc	2010	7.129065	26.3916	3.421379	17.79615	6.25	11.06417	1	52.28692	52.79224	13.47735
4	Guaranty Trust Bank Plc	2011	6.263749	27.84227	3.146274	20.3386	12	10.3275	8	44.77372	44.70508	13.77894
4	Guaranty Trust Bank Plc	2012	7.597201	41.72971	5.26218	29.75651	12	8.386667	12	42.31292	45.82048	13.86822
4	Guaranty Trust Bank Plc	2013	6.713899	38.60374	4.492099	25.95079	12	8.7775	12	37.55947	48.67588	14.04815
4	Guaranty Trust Bank Plc	2014	5.462884	37.92423	4.008444	25.89262	13	7.210833	20	63.60699	54.14888	14.29683
4	Guaranty Trust Bank Plc	2015	5.7448	36.98244	3.938732	24.04404	11	7.700833	20	69.57769	54.34244	14.29196
4	Guaranty Trust Bank Plc	2016	6.54442	34.66279	4.853444	26.59514	14	9.372815	22.5	79.95	54.23014	14.33501
4	Guaranty Trust Bank Plc	2017	7.704605	44.77188	5.709347	27.60104	14	7.998847	22.5	72.84135	44.81429	14.3447
4	Guaranty Trust Bank Plc	2018	10.0951	46.79079	8.937269	32.68475	14	7.203185	22.5	60.16259	57.24032	14.43921
4	Guaranty Trust Bank Plc	2019	9.072126	49.90354	8.391995	28.90376	13.5	6.47607	22.5	58.72569	62.33538	14.55115
4	Guaranty Trust Bank Plc	2020	5.144164	0.048545	4.387199	25.36845	11.5	8.995394	27.5	60.33322	32.02775	14.87389
4	Guaranty Trust Bank Plc	2021			5.763171	6.017581	11.5	7.276285	27.5	60.4775		
4	Guaranty Trust Bank Plc	2022			340.2127	64.22886	16.5	6.3712	27.5	61.69555		
5	Union Bank of Nigeria Plc	2010	5.11304	103.5582	13.96257	-86.8442	6.25	11.06417	1	52.28692	21.13671	13.30289
5	Union Bank of Nigeria Plc	2011	2.60393	-125.186	-9.86521	-46.3572	12	10.3275	8	44.77372	16.65397	12.8973

5	Union Bank of Nigeria Plc	2012	6.611857	3.285519	0.357599	1.846555	12	8.386667	12	42.31292	15.45256	13.08571
5	Union Bank of Nigeria Plc	2013	6.254545	4.961008	0.581013	2.737361	12	8.7775	12	37.55947	23.83936	13.08145
5	Union Bank of Nigeria Plc	2014	5.501451	18.65308	2.226074	9.979636	13	7.210833	20	63.60699	32.85831	13.13712
5	Union Bank of Nigeria Plc	2015	5.388238	14.97136	1.775408	7.68247	11	7.700833	20	69.57769	34.96354	13.25184
5	Union Bank of Nigeria Plc	2016	5.562523	12.86704	1.413907	6.320149	14	9.372815	22.5	79.95	43.60458	13.35953
5	Union Bank of Nigeria Plc	2017	4.668516	8.148331	0.96178	3.99486	14	7.998847	22.5	72.84135	36.59805	13.58824
5	Union Bank of Nigeria Plc	2018	3.845436	13.16379	1.392286	9.214991	14	7.203185	22.5	60.16259	32.32183	13.6464
5	Union Bank of Nigeria Plc	2019	3.019444	15.24762	1.42399	10.54318	13.5	6.47607	22.5	58.72569	32.16688	13.69484
5	Union Bank of Nigeria Plc	2020	2.743618	15.71406	1.188808	9.959963	11.5	8.995394	27.5	60.33322	33.40809	13.93872
5	Union Bank of Nigeria Plc	2021	1.723506	10.95962	0.747047	7.626637	11.5	7.276285	27.5	60.4775	33.8407	14.12397
5	Union Bank of Nigeria Plc	2022			1.038346	10.00794	16.5	6.3712	27.5	61.69555	34.6815	14.20846
6	United Bank of Africa Plc	2010	4.297978	1.444176	0.15041	1.154317	6.25	11.06417	1	52.28692	38.67667	13.92934
6	United Bank of Africa Plc	2011	3.777011	-11.5789	-0.98346	-8.98719	12	10.3275	8	44.77372	33.16377	14.01146
6	United Bank of Africa Plc	2012	3.87183	26.70082	2.450771	21.50311	12	8.386667	12	42.31292	29.52379	14.19472
6	United Bank of Africa Plc	2013	3.435348	21.69335	2.096268	17.9099	12	8.7775	12	37.55947	35.94011	14.40184
6	United Bank of Africa Plc	2014	3.511329	17.56332	1.713785	14.21721	13	7.210833	20	63.60699	37.82132	14.41009
6	United Bank of Africa Plc	2015	4.832207	19.21905	2.145026	14.05578	11	7.700833	20	69.57769	37.11954	14.30229
6	United Bank of Africa Plc	2016	4.283692	17.65205	1.875976	12.18777	14	9.372815	22.5	79.95	42.93438	14.34547
6	United Bank of Africa Plc	2017	4.510568		1.411953	10.3268	14	7.998847	22.5	72.84135	40.01649	14.44558
6	United Bank of Africa Plc	2018	1.418008	29.30547	1.142955	11.25815	14	7.203185	22.5	60.16259	33.79833	14.70097

6	United Bank of Africa Plc	2019	0.992447	39.3306	1.204916	1.516986	13.5	6.47607	22.5	58.72569	28.86767	14.83233
6	United Bank of Africa Plc	2020	3.825149	9.226173	1.375827	1.092796	11.5	8.995394	27.5	60.33322	43.81818	15.15684
6	United Bank of Africa Plc	2021	3.35275	8.886294	1.052363	11.69635	11.5	7.276285	27.5	60.4775	33.14995	15.20288
6	United Bank of Africa Plc	2022	2.952095		1.816264	22.84648	16.5	6.3712	27.5	61.69555	28.84234	15.43421
7	Zenith Bank Plc	2010			1.826325	9.051327	6.25	11.06417	1	52.28692	38.31636	14.07016
7	Zenith Bank Plc	2011			2.015053	11.10191	12	10.3275	8	44.77372	34.52272	14.27122
7	Zenith Bank Plc	2012	6.068318	34.33282	3.93137	21.87268	12	8.386667	12	42.31292	36.74173	14.40441
7	Zenith Bank Plc	2013	6.457097	26.79753	2.897634	17.6492	12	8.7775	12	37.55947	39.13439	14.54781
7	Zenith Bank Plc	2014	5.424703	24.85894	2.701048	18.0374	13	7.210833	20	63.60699	46.1546	14.6332
7	Zenith Bank Plc	2015	5.399076	24.90439	2.63401	18.06102	11	7.700833	20	69.57769	49.30837	14.66267
7	Zenith Bank Plc	2016	4.940687	26.22755	2.784602	19.35336	14	9.372815	22.5	79.95	49.91279	14.75277
7	Zenith Bank Plc	2017	3.923647	25.79895	3.106044	24.56323	14	7.998847	22.5	72.84135	35.39543	14.82512
7	Zenith Bank Plc	2018	4.0912	35.95215	3.247707	23.71116	14	7.203185	22.5	60.16259		15.12122
7	Zenith Bank Plc	2019	3.35713	36.98385	3.290483	22.17285	13.5	6.47607	22.5	58.72569		15.26532
7	Zenith Bank Plc	2020	2.834347	38.69053	2.718606	20.63271	11.5	8.995394	27.5	60.33322		15.49072
7	Zenith Bank Plc	2021	2.727289	36.10869	2.588506	19.11114	11.5	7.276285	27.5	60.4775		15.683
7	Zenith Bank Plc	2022	2.402441	26.87726	1.822544	16.23791	16.5	6.3712	27.5	61.69555		16.01003

Source: CBN statistical bulletin (2022); Banks' annual reports

Appendix II

Objective 1

Dependent Variable: NIM
Method: Panel Least Squares
Date: 04/16/24 Time: 05:04
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 74
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	0.077985	0.065786	1.185433	0.2404
IRS	-0.045191	0.129836	-0.348063	0.7290
CRR	-0.065931	0.031123	-2.118380	0.0382
LDR	-0.030538	0.014354	-2.127575	0.0374
AQT	0.157407	0.001783	88.29525	0.0000
CDP	-0.154489	0.348012	-0.443918	0.6587
C	2.730689	5.776986	0.472684	0.6381

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.966873	Mean dependent var	5.434919
Adjusted R-squared	0.960357	S.D. dependent var	6.209199
S.E. of regression	1.236289	Akaike info criterion	3.420265
Sum squared resid	93.23299	Schwarz criterion	3.825033
Log likelihood	-113.5498	Hannan-Quinn criter.	3.581732
F-statistic	148.3688	Durbin-Watson stat	1.167509
Prob(F-statistic)	0.000000		

Dependent Variable: NIM
Method: Panel EGLS (Cross-section random effects)
Date: 04/16/24 Time: 05:05
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 74
Swamy and Arora estimator of component variances
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	0.070746	0.086768	0.815344	0.4178
IRS	-0.072951	0.148793	-0.490284	0.6255
CRR	-0.073945	0.036247	-2.040005	0.0453
LDR	-0.029099	0.017644	-1.649203	0.1038
AQT	0.151373	0.002571	58.86838	0.0000
CDP	-0.381225	0.208328	-1.829927	0.0717
C	6.602344	4.009433	1.646703	0.1043

Effects Specification	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	1.236289	1.0000

Weighted Statistics			
R-squared	0.937301	Mean dependent var	5.434919
Adjusted R-squared	0.931686	S.D. dependent var	6.209199
S.E. of regression	1.622898	Sum squared resid	176.4646
F-statistic	166.9318	Durbin-Watson stat	0.725780
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.937301	Mean dependent var	5.434919
Sum squared resid	176.4646	Durbin-Watson stat	0.725780

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	54.456323	6	0.0000

** WARNING: estimated cross-section random effects variance is zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
MPR	0.077985	0.070746	0.000497	0.7454
IRS	-0.045191	-0.072951	0.000195	0.0469
CRR	-0.065931	-0.073945	0.001918	0.8548
LDR	-0.030538	-0.029099	0.000072	0.8651
AQT	0.157407	0.151373	0.000002	0.0001
CDP	-0.154489	-0.381225	0.286405	0.6718

Cross-section random effects test equation:
Dependent Variable: NIM
Method: Panel Least Squares
Date: 04/16/24 Time: 05:07
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 74

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.730689	8.742500	0.312346	0.7558
MPR	0.077985	0.099201	0.786128	0.4348
IRS	-0.045191	0.175559	-0.257412	0.7977
CRR	-0.065931	0.061230	-1.076785	0.2858
LDR	-0.030538	0.018451	-1.655080	0.1030
AQT	0.157407	0.004040	38.95822	0.0000
CDP	-0.154489	0.600430	-0.257297	0.7978

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.966873	Mean dependent var	5.434919
Adjusted R-squared	0.960357	S.D. dependent var	6.209199
S.E. of regression	1.236289	Akaike info criterion	3.420265
Sum squared resid	93.23299	Schwarz criterion	3.825033
Log likelihood	-113.5498	Hannan-Quinn criter.	3.581732
F-statistic	148.3688	Durbin-Watson stat	1.167509
Prob(F-statistic)	0.000000		

Objective 2

Dependent Variable: NPM
Method: Panel Least Squares
Date: 04/16/24 Time: 05:08
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 72
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	-1.932179	2.074926	-0.931204	0.3555
IRS	-6.885665	2.791131	-2.466980	0.0165
CRR	-1.997278	1.263636	-1.580580	0.1193
LDR	0.595489	0.303338	1.963123	0.0544
AQT	0.060886	0.030192	2.016626	0.0483
CDP	18.97392	13.69777	1.385183	0.1712
C	-171.9685	200.5157	-0.857631	0.3946

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.278975	Mean dependent var	17.16932
Adjusted R-squared	0.132325	S.D. dependent var	22.99566
S.E. of regression	21.42025	Akaike info criterion	9.128533
Sum squared resid	27070.79	Schwarz criterion	9.539597
Log likelihood	-315.6272	Hannan-Quinn criter.	9.292179
F-statistic	1.902325	Durbin-Watson stat	2.578007
Prob(F-statistic)	0.052487		

Dependent Variable: NPM
Method: Panel EGLS (Cross-section random effects)
Date: 04/16/24 Time: 05:09
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 72
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	-1.970670	1.708552	-1.153415	0.2530
IRS	-6.541774	3.034601	-2.155728	0.0348
CRR	-1.376165	0.746627	-1.843177	0.0699
LDR	0.521332	0.286633	1.818813	0.0735
AQT	0.043150	0.065035	0.663485	0.5094
CDP	10.56981	4.796761	2.203531	0.0311
C	-61.39241	78.46121	-0.782455	0.4368

Effects Specification	S.D.	Rho
Cross-section random	7.69E-05	0.0000
Idiosyncratic random	21.42025	1.0000

Weighted Statistics

R-squared	0.146128	Mean dependent var	17.16932
Adjusted R-squared	0.067310	S.D. dependent var	22.99566
S.E. of regression	22.20827	Sum squared resid	32058.47
F-statistic	1.853977	Durbin-Watson stat	2.243316
Prob(F-statistic)	0.102364		

Unweighted Statistics

R-squared	0.146128	Mean dependent var	17.16932
Sum squared resid	32058.47	Durbin-Watson stat	2.243316

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	10.870515	6	0.0925

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
MPR	-1.932179	-1.970670	0.194287	0.9304
IRS	-6.885665	-6.541774	0.066696	0.1830
CRR	-1.997278	-1.376165	0.602660	0.4237
LDR	0.595489	0.521332	0.021699	0.6147
AQT	0.060886	0.043150	0.000672	0.4938
CDP	18.973920	10.569813	90.153622	0.3761

Cross-section random effects test equation:
Dependent Variable: NPM
Method: Panel Least Squares
Date: 04/16/24 Time: 05:09
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 72

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-171.9685	154.7082	-1.111567	0.2708
MPR	-1.932179	1.764494	-1.095033	0.2780
IRS	-6.885665	3.045571	-2.260879	0.0275
CRR	-1.997278	1.077085	-1.854337	0.0687
LDR	0.595489	0.322269	1.847799	0.0696
AQT	0.060886	0.070010	0.869668	0.3880
CDP	18.97392	10.63779	1.783634	0.0796

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.278975	Mean dependent var	17.16932
Adjusted R-squared	0.132325	S.D. dependent var	22.99566
S.E. of regression	21.42025	Akaike info criterion	9.128533
Sum squared resid	27070.79	Schwarz criterion	9.539597
Log likelihood	-315.6272	Hannan-Quinn criter.	9.292179
F-statistic	1.902325	Durbin-Watson stat	2.578007
Prob(F-statistic)	0.052487		

Objective 3

Dependent Variable: ROA
Method: Panel EGLS (Cross-section weights)
Date: 04/16/24 Time: 05:12
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 77
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	-0.025605	0.057862	-0.442526	0.6596
IRS	-0.241461	0.136293	-1.771626	0.0812
CRR	-0.037463	0.021064	-1.778499	0.0801
LDR	-0.009178	0.012668	-0.724519	0.4714
AQT	0.067873	0.001118	60.70892	0.0000
CDP	0.395242	0.320813	1.232000	0.2225
C	-2.854622	5.023789	-0.568221	0.5719

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.925385	Mean dependent var	3.670683
Adjusted R-squared	0.911394	S.D. dependent var	5.928847
S.E. of regression	1.751286	Sum squared resid	196.2881
F-statistic	66.14454	Durbin-Watson stat	1.841473
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.651417	Mean dependent var	2.320978
Sum squared resid	328.6731	Durbin-Watson stat	2.293245

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 04/16/24 Time: 05:13
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 77
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	-0.215926	0.162497	-1.328802	0.1882
IRS	-0.471206	0.300449	-1.568336	0.1213
CRR	-0.092606	0.075587	-1.225163	0.2246
LDR	0.023316	0.028435	0.819966	0.4150
AQT	0.067014	0.006600	10.15370	0.0000
CDP	0.847930	0.518363	1.635785	0.1064
C	-5.891334	8.292277	-0.710460	0.4798

Effects Specification	S.D.	Rho
Cross-section random	0.393756	0.0326
Idiosyncratic random	2.145684	0.9674

Weighted Statistics

R-squared	0.568335	Mean dependent var	1.975923
Adjusted R-squared	0.531335	S.D. dependent var	3.451030
S.E. of regression	2.359708	Sum squared resid	389.7757
F-statistic	15.36047	Durbin-Watson stat	1.769901
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.554779	Mean dependent var	2.320978
Sum squared resid	419.7909	Durbin-Watson stat	1.643352

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	35.9378	6	0.0000

* Cross-section test variance is invalid. Hausman statistic set to zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
MPR	-0.173995	-0.215926	0.001201	0.2263
IRS	-0.518432	-0.471206	0.000447	0.0256
CRR	-0.219800	-0.092606	0.005137	0.0759
LDR	0.044296	0.023316	0.000194	0.1316
AQT	0.071037	0.067014	0.000006	0.0870
CDP	2.516025	0.847930	0.767886	0.0570

Cross-section random effects test equation:
Dependent Variable: ROA
Method: Panel Least Squares
Date: 04/16/24 Time: 05:16
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 77

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-28.78899	14.87107	-1.935906	0.0573
MPR	-0.173995	0.166150	-1.047211	0.2989
IRS	-0.518432	0.301193	-1.721262	0.0900
CRR	-0.219800	0.104164	-2.110139	0.0388
LDR	0.044296	0.031657	1.399269	0.1666
AQT	0.071037	0.007006	10.13957	0.0000
CDP	2.516025	1.018129	2.471225	0.0161

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.687497	Mean dependent var	2.320978
Adjusted R-squared	0.628903	S.D. dependent var	3.522266
S.E. of regression	2.145684	Akaike info criterion	4.517534
Sum squared resid	294.6535	Schwarz criterion	4.913242
Log likelihood	-160.9251	Hannan-Quinn criter.	4.675814
F-statistic	11.73318	Durbin-Watson stat	2.196311
Prob(F-statistic)	0.000000		

Objective 4

Dependent Variable: ROE
Method: Panel EGLS (Cross-section weights)
Date: 04/16/24 Time: 05:19
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 77
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	0.326376	0.459772	0.709865	0.4804
IRS	-1.438494	0.894384	-1.608362	0.1127
CRR	0.415174	0.220642	1.881664	0.0644
LDR	-0.105465	0.070596	-1.493924	0.1401
AQT	0.011369	0.008712	1.305022	0.1966
CDP	-2.697234	3.299983	-0.817348	0.4168
C	55.54586	49.77431	1.115954	0.2686

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.726786	Mean dependent var	19.05360
Adjusted R-squared	0.675558	S.D. dependent var	19.07979
S.E. of regression	8.259667	Sum squared resid	4366.215
F-statistic	14.18739	Durbin-Watson stat	1.298229
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.510509	Mean dependent var	10.98148
Sum squared resid	8816.917	Durbin-Watson stat	0.695056

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 04/16/24 Time: 05:20
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 77
Swamy and Arora estimator of component variances
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	0.673817	0.601722	1.119814	0.2666
IRS	-2.138526	1.245214	-1.717397	0.0903
CRR	0.517169	0.270823	1.909618	0.0603
LDR	-0.113778	0.114746	-0.991569	0.3248
AQT	0.036531	0.030088	1.214162	0.2288
CDP	-1.097505	3.358390	-0.326795	0.7448
C	32.99453	44.83586	0.735896	0.4643

Effects Specification

	S.D.	Rho
Cross-section random	5.475051	0.2097
Idiosyncratic random	10.62879	0.7903

Weighted Statistics

R-squared	0.264189	Mean dependent var	5.631680
Adjusted R-squared	0.201120	S.D. dependent var	13.44957
S.E. of regression	11.95424	Sum squared resid	10003.26
F-statistic	4.188855	Durbin-Watson stat	0.631987
Prob(F-statistic)	0.001178		

Unweighted Statistics

R-squared	0.140867	Mean dependent var	10.98148
Sum squared resid	15475.04	Durbin-Watson stat	0.408524

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.00000	6	1.0000

* Cross-section test variance is invalid. Hausman statistic set to zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
MPR	0.086491	0.673817	0.019490	0.0000
IRS	-2.027272	-2.138526	0.005579	0.1363
CRR	1.735803	0.517169	0.087147	0.0000
LDR	-0.354186	-0.113778	0.003233	0.0000
AQT	0.010200	0.036531	0.000063	0.0009
CDP	-15.866975	-1.097505	12.931361	0.0000

Cross-section random effects test equation:
Dependent Variable: ROE
Method: Panel Least Squares
Date: 04/16/24 Time: 05:21
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 77

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	241.1133	73.66479	3.273115	0.0017
MPR	0.086491	0.823036	0.105087	0.9166
IRS	-2.027272	1.491979	-1.358780	0.1790
CRR	1.735803	0.515981	3.364082	0.0013
LDR	-0.354186	0.156814	-2.258646	0.0273
AQT	0.010200	0.034704	0.293914	0.7698
CDP	-15.86697	5.043367	-3.146108	0.0025

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.598602	Mean dependent var	10.98148
Adjusted R-squared	0.523339	S.D. dependent var	15.39498
S.E. of regression	10.62879	Akaike info criterion	7.717749
Sum squared resid	7230.150	Schwarz criterion	8.113456
Log likelihood	-284.1333	Hannan-Quinn criter.	7.876029
F-statistic	7.953547	Durbin-Watson stat	0.851425
Prob(F-statistic)	0.000000		

Objective 1

Dependent Variable: NIM
Method: Panel Least Squares
Date: 04/16/24 Time: 05:04
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 74
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	0.077985	0.065786	1.185433	0.2404
IRS	-0.045191	0.129836	-0.348063	0.7290
CRR	-0.065931	0.031123	-2.118380	0.0382
LDR	-0.030538	0.014354	-2.127575	0.0374
AQT	0.157407	0.001783	88.29525	0.0000
CDP	-0.154489	0.348012	-0.443918	0.6587
C	2.730689	5.776986	0.472684	0.6381

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.966873	Mean dependent var	5.434919
Adjusted R-squared	0.960357	S.D. dependent var	6.209199
S.E. of regression	1.236289	Akaike info criterion	3.420265
Sum squared resid	93.23299	Schwarz criterion	3.825033
Log likelihood	-113.5498	Hannan-Quinn criter.	3.581732
F-statistic	148.3688	Durbin-Watson stat	1.167509
Prob(F-statistic)	0.000000		

Dependent Variable: NIM
Method: Panel EGLS (Cross-section random effects)
Date: 04/16/24 Time: 05:05
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 74
Swamy and Arora estimator of component variances
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	0.070746	0.086768	0.815344	0.4178
IRS	-0.072951	0.148793	-0.490284	0.6255
CRR	-0.073945	0.036247	-2.040005	0.0453
LDR	-0.029099	0.017644	-1.649203	0.1038
AQT	0.151373	0.002571	58.86838	0.0000
CDP	-0.381225	0.208328	-1.829927	0.0717
C	6.602344	4.009433	1.646703	0.1043

Effects Specification	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	1.236289	1.0000

Weighted Statistics			
R-squared	0.937301	Mean dependent var	5.434919
Adjusted R-squared	0.931686	S.D. dependent var	6.209199
S.E. of regression	1.622898	Sum squared resid	176.4646
F-statistic	166.9318	Durbin-Watson stat	0.725780
Prob(F-statistic)	0.000000		

Unweighted Statistics			
R-squared	0.937301	Mean dependent var	5.434919
Sum squared resid	176.4646	Durbin-Watson stat	0.725780

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	54.456323	6	0.0000

** WARNING: estimated cross-section random effects variance is zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
MPR	0.077985	0.070746	0.000497	0.7454
IRS	-0.045191	-0.072951	0.000195	0.0469
CRR	-0.065931	-0.073945	0.001918	0.8548
LDR	-0.030538	-0.029099	0.000072	0.8651
AQT	0.157407	0.151373	0.000002	0.0001
CDP	-0.154489	-0.381225	0.286405	0.6718

Cross-section random effects test equation:
Dependent Variable: NIM
Method: Panel Least Squares
Date: 04/16/24 Time: 05:07
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 74

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.730689	8.742500	0.312346	0.7558
MPR	0.077985	0.099201	0.786128	0.4348
IRS	-0.045191	0.175559	-0.257412	0.7977
CRR	-0.065931	0.061230	-1.076785	0.2858
LDR	-0.030538	0.018451	-1.655080	0.1030
AQT	0.157407	0.004040	38.95822	0.0000
CDP	-0.154489	0.600430	-0.257297	0.7978

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.966873	Mean dependent var	5.434919
Adjusted R-squared	0.960357	S.D. dependent var	6.209199
S.E. of regression	1.236289	Akaike info criterion	3.420265
Sum squared resid	93.23299	Schwarz criterion	3.825033
Log likelihood	-113.5498	Hannan-Quinn criter.	3.581732
F-statistic	148.3688	Durbin-Watson stat	1.167509
Prob(F-statistic)	0.000000		

Objective 2

Dependent Variable: NPM
Method: Panel Least Squares
Date: 04/16/24 Time: 05:08
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 72
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	-1.932179	2.074926	-0.931204	0.3555
IRS	-6.885665	2.791131	-2.466980	0.0165
CRR	-1.997278	1.263636	-1.580580	0.1193
LDR	0.595489	0.303338	1.963123	0.0544
AQT	0.060886	0.030192	2.016626	0.0483
CDP	18.97392	13.69777	1.385183	0.1712
C	-171.9685	200.5157	-0.857631	0.3946

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.278975	Mean dependent var	17.16932
Adjusted R-squared	0.132325	S.D. dependent var	22.99566
S.E. of regression	21.42025	Akaike info criterion	9.128533
Sum squared resid	27070.79	Schwarz criterion	9.539597
Log likelihood	-315.6272	Hannan-Quinn criter.	9.292179
F-statistic	1.902325	Durbin-Watson stat	2.578007
Prob(F-statistic)	0.052487		

Dependent Variable: NPM
Method: Panel EGLS (Cross-section random effects)
Date: 04/16/24 Time: 05:09
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 72
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	-1.970670	1.708552	-1.153415	0.2530
IRS	-6.541774	3.034601	-2.155728	0.0348
CRR	-1.376165	0.746627	-1.843177	0.0699
LDR	0.521332	0.286633	1.818813	0.0735
AQT	0.043150	0.065035	0.663485	0.5094
CDP	10.56981	4.796761	2.203531	0.0311
C	-61.39241	78.46121	-0.782455	0.4368

Effects Specification	S.D.	Rho
Cross-section random	7.69E-05	0.0000
Idiosyncratic random	21.42025	1.0000

Weighted Statistics

R-squared	0.146128	Mean dependent var	17.16932
Adjusted R-squared	0.067310	S.D. dependent var	22.99566
S.E. of regression	22.20827	Sum squared resid	32058.47
F-statistic	1.853977	Durbin-Watson stat	2.243316
Prob(F-statistic)	0.102364		

Unweighted Statistics

R-squared	0.146128	Mean dependent var	17.16932
Sum squared resid	32058.47	Durbin-Watson stat	2.243316

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	10.870515	6	0.0925

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
MPR	-1.932179	-1.970670	0.194287	0.9304
IRS	-6.885665	-6.541774	0.066696	0.1830
CRR	-1.997278	-1.376165	0.602660	0.4237
LDR	0.595489	0.521332	0.021699	0.6147
AQT	0.060886	0.043150	0.000672	0.4938
CDP	18.973920	10.569813	90.153622	0.3761

Cross-section random effects test equation:
Dependent Variable: NPM
Method: Panel Least Squares
Date: 04/16/24 Time: 05:09
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 72

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-171.9685	154.7082	-1.111567	0.2708
MPR	-1.932179	1.764494	-1.095033	0.2780
IRS	-6.885665	3.045571	-2.260879	0.0275
CRR	-1.997278	1.077085	-1.854337	0.0687
LDR	0.595489	0.322269	1.847799	0.0696
AQT	0.060886	0.070010	0.869668	0.3880
CDP	18.97392	10.63779	1.783634	0.0796

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.278975	Mean dependent var	17.16932
Adjusted R-squared	0.132325	S.D. dependent var	22.99566
S.E. of regression	21.42025	Akaike info criterion	9.128533
Sum squared resid	27070.79	Schwarz criterion	9.539597
Log likelihood	-315.6272	Hannan-Quinn criter.	9.292179
F-statistic	1.902325	Durbin-Watson stat	2.578007
Prob(F-statistic)	0.052487		

Objective 3

Dependent Variable: ROA
Method: Panel EGLS (Cross-section weights)
Date: 04/16/24 Time: 05:12
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 77
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	-0.025605	0.057862	-0.442526	0.6596
IRS	-0.241461	0.136293	-1.771626	0.0812
CRR	-0.037463	0.021064	-1.778499	0.0801
LDR	-0.009178	0.012668	-0.724519	0.4714
AQT	0.067873	0.001118	60.70892	0.0000
CDP	0.395242	0.320813	1.232000	0.2225
C	-2.854622	5.023789	-0.568221	0.5719

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.925385	Mean dependent var	3.670683
Adjusted R-squared	0.911394	S.D. dependent var	5.928847
S.E. of regression	1.751286	Sum squared resid	196.2881
F-statistic	66.14454	Durbin-Watson stat	1.841473
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.651417	Mean dependent var	2.320978
Sum squared resid	328.6731	Durbin-Watson stat	2.293245

Dependent Variable: ROA
Method: Panel EGLS (Cross-section random effects)
Date: 04/16/24 Time: 05:13
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 77
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	-0.215926	0.162497	-1.328802	0.1882
IRS	-0.471206	0.300449	-1.568336	0.1213
CRR	-0.092606	0.075587	-1.225163	0.2246
LDR	0.023316	0.028435	0.819966	0.4150
AQT	0.067014	0.006600	10.15370	0.0000
CDP	0.847930	0.518363	1.635785	0.1064
C	-5.891334	8.292277	-0.710460	0.4798

Effects Specification	S.D.	Rho
Cross-section random	0.393756	0.0326
Idiosyncratic random	2.145684	0.9674

Weighted Statistics

R-squared	0.568335	Mean dependent var	1.975923
Adjusted R-squared	0.531335	S.D. dependent var	3.451030
S.E. of regression	2.359708	Sum squared resid	389.7757
F-statistic	15.36047	Durbin-Watson stat	1.769901
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.554779	Mean dependent var	2.320978
Sum squared resid	419.7909	Durbin-Watson stat	1.643352

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	35.9378	6	0.0000

* Cross-section test variance is invalid. Hausman statistic set to zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
MPR	-0.173995	-0.215926	0.001201	0.2263
IRS	-0.518432	-0.471206	0.000447	0.0256
CRR	-0.219800	-0.092606	0.005137	0.0759
LDR	0.044296	0.023316	0.000194	0.1316
AQT	0.071037	0.067014	0.000006	0.0870
CDP	2.516025	0.847930	0.767886	0.0570

Cross-section random effects test equation:
Dependent Variable: ROA
Method: Panel Least Squares
Date: 04/16/24 Time: 05:16
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 77

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-28.78899	14.87107	-1.935906	0.0573
MPR	-0.173995	0.166150	-1.047211	0.2989
IRS	-0.518432	0.301193	-1.721262	0.0900
CRR	-0.219800	0.104164	-2.110139	0.0388
LDR	0.044296	0.031657	1.399269	0.1666
AQT	0.071037	0.007006	10.13957	0.0000
CDP	2.516025	1.018129	2.471225	0.0161

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.687497	Mean dependent var	2.320978
Adjusted R-squared	0.628903	S.D. dependent var	3.522266
S.E. of regression	2.145684	Akaike info criterion	4.517534
Sum squared resid	294.6535	Schwarz criterion	4.913242
Log likelihood	-160.9251	Hannan-Quinn criter.	4.675814
F-statistic	11.73318	Durbin-Watson stat	2.196311
Prob(F-statistic)	0.000000		

Objective 4

Dependent Variable: ROE
Method: Panel EGLS (Cross-section weights)
Date: 04/16/24 Time: 05:19
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 77
Linear estimation after one-step weighting matrix
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	0.326376	0.459772	0.709865	0.4804
IRS	-1.438494	0.894384	-1.608362	0.1127
CRR	0.415174	0.220642	1.881664	0.0644
LDR	-0.105465	0.070596	-1.493924	0.1401
AQT	0.011369	0.008712	1.305022	0.1966
CDP	-2.697234	3.299983	-0.817348	0.4168
C	55.54586	49.77431	1.115954	0.2686

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

R-squared	0.726786	Mean dependent var	19.05360
Adjusted R-squared	0.675558	S.D. dependent var	19.07979
S.E. of regression	8.259667	Sum squared resid	4366.215
F-statistic	14.18739	Durbin-Watson stat	1.298229
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.510509	Mean dependent var	10.98148
Sum squared resid	8816.917	Durbin-Watson stat	0.695056

Dependent Variable: ROE
Method: Panel EGLS (Cross-section random effects)
Date: 04/16/24 Time: 05:20
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 77
Swamy and Arora estimator of component variances
White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	0.673817	0.601722	1.119814	0.2666
IRS	-2.138526	1.245214	-1.717397	0.0903
CRR	0.517169	0.270823	1.909618	0.0603
LDR	-0.113778	0.114746	-0.991569	0.3248
AQT	0.036531	0.030088	1.214162	0.2288
CDP	-1.097505	3.358390	-0.326795	0.7448
C	32.99453	44.83586	0.735896	0.4643

Effects Specification

	S.D.	Rho
Cross-section random	5.475051	0.2097
Idiosyncratic random	10.62879	0.7903

Weighted Statistics

R-squared	0.264189	Mean dependent var	5.631680
Adjusted R-squared	0.201120	S.D. dependent var	13.44957
S.E. of regression	11.95424	Sum squared resid	10003.26
F-statistic	4.188855	Durbin-Watson stat	0.631987
Prob(F-statistic)	0.001178		

Unweighted Statistics

R-squared	0.140867	Mean dependent var	10.98148
Sum squared resid	15475.04	Durbin-Watson stat	0.408524

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.00000	6	1.0000

* Cross-section test variance is invalid. Hausman statistic set to zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
MPR	0.086491	0.673817	0.019490	0.0000
IRS	-2.027272	-2.138526	0.005579	0.1363
CRR	1.735803	0.517169	0.087147	0.0000
LDR	-0.354186	-0.113778	0.003233	0.0000
AQT	0.010200	0.036531	0.000063	0.0009
CDP	-15.866975	-1.097505	12.931361	0.0000

Cross-section random effects test equation:
Dependent Variable: ROE
Method: Panel Least Squares
Date: 04/16/24 Time: 05:21
Sample: 2010 2022
Periods included: 13
Cross-sections included: 7
Total panel (unbalanced) observations: 77

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	241.1133	73.66479	3.273115	0.0017
MPR	0.086491	0.823036	0.105087	0.9166
IRS	-2.027272	1.491979	-1.358780	0.1790
CRR	1.735803	0.515981	3.364082	0.0013
LDR	-0.354186	0.156814	-2.258646	0.0273
AQT	0.010200	0.034704	0.293914	0.7698
CDP	-15.86697	5.043367	-3.146108	0.0025

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.598602	Mean dependent var	10.98148
Adjusted R-squared	0.523339	S.D. dependent var	15.39498
S.E. of regression	10.62879	Akaike info criterion	7.717749
Sum squared resid	7230.150	Schwarz criterion	8.113456
Log likelihood	-284.1333	Hannan-Quinn criter.	7.876029
F-statistic	7.953547	Durbin-Watson stat	0.851425
Prob(F-statistic)	0.000000		

Biodata

Personal Data

Full Name: Muinat Biola ADESINA

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Date of Birth: 4th August, 1981

Nationality: Nigerian

Name and Address of Next of Kin: Mr. Gbenga Adesina, Same Address as above

Education Background

Education Institutions Attended with Dates

St. Mary RCM Special School, Iseyin	1988 – 1993
St. John Catholic Grammar School, Iseyin	1993 – 1999
St Andrews College of Education, Erelu, Oyo	1999 – 2004
Ekiti State University, Ado Ekiti	2005 – 2011

Academic Qualification(s) Obtained with Dates

West African Examination Council (WAEC)	1999
Nigerian Certificate of Education (NCE)	2004
Bachelor of Science (Education) in Economics	2011

Working Experience with Dates

St. Bernadines Girls Grammar School, Oyo 2005	2005 - 2014

Olivet Baptist High School, Olivet Heights, Oyo 2014 till date

Membership of Academic Professional Bodies

Member, Teacher Registration Council of Nigeria

Member, Nigerian Union of Teachers

Publications: Nil

Major Conferences Attended with Dates: Nil

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Signature Date

The University Compliance Certification

This is to certify that this thesis by **Muinat Biola ADESINA** with Matric. Number **LCU/PG/002473** in the Department of Economics, Faculty of Management and Social Sciences, Lead City University, Ibadan is in full compliance with the approved University format and style.

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Signature **Date**