



Impact of Monetary Policy on Financial Stability of Deposit Money Bank in Nigeria

¹ Joseph M. OKPE

² David D. Ogwuche

³ Sunday E. OLOGUNLA

^{1,2&3} Department of Economics,
Bingham University,
Karu, Nasarawa State

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ABSTRACT

A stable banking system promotes economic growth, facilitates efficient allocation of resources, and ensures a safe and secure environment for depositors' funds. However, in Nigeria, the financial stability of deposit money banks has been a persistent concern in spite of the implementation of various monetary policy measures by the Central Bank of Nigeria (CBN). The non-performing loans has remained high, while also the Net Interest Margin (NIM) and return on equity (ROE) of deposit money banks have declined, indicating a deterioration in their profitability. The main objective of this study was thus to empirically examine the impact of monetary policy instruments (such as Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Liquidity Ratio (LR)) on banks' Net Interest Margin (NIM), a key indicator of financial stability. Employing historical data within a specified period, the study utilized the Fully Modified Ordinary Least Squares (FMOLS) regression technique alongside unit root and cointegration tests to analyse the long-term relationships between the monetary policy variables and the NIM. The findings showed that while the MPR was found to have a significant and negative effect on financial stability, indicating that higher interest rates could compress banks' interest margins, both the CRR and LR exhibited a positive relationship with financial stability, suggesting that higher reserve and liquidity ratios may bolster banks' resilience to economic shocks. Based on the outcomes, the study provided targeted recommendations. It was advised that the Central Bank of Nigeria (CBN) should implement MPR adjustments with caution, favouring a gradual approach complemented by strategic communication to mitigate potential destabilizing

effects on the banking sector. Furthermore, the positive role of CRR in enhancing financial stability implied its potential use as a countercyclical buffer to modulate economic cycles. The CBN was recommended to maintain a dynamic CRR policy that aligns with current economic conditions, ensuring that liquidity management does not impede banks' lending functions. Finally, the significance of the LR in sustaining bank stability called for continuous enforcement of a robust liquidity management framework, potentially tailored to align with individual banks' risk profiles and operational models.

Keywords: Financial Stability, Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), Liquidity Ratio and Net Interest Margin (NIM)

JEL Codes: G01, E52, E58 and G21

I. Introduction

Monetary policy plays a pivotal role in shaping the economic landscape globally, acting as a critical tool for central banks to manage inflation, control money supply, and stabilize currency. This policy, encompassing tools such as the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Liquidity Ratio (LR), directly influences the cost of borrowing, saving rates, and overall economic growth. Globally, monetary policy has evolved over time, with central banks adapting their strategies to changing economic conditions and challenges. In the aftermath of the 2008 global financial crisis, many central banks implemented unconventional monetary policies, such as quantitative easing, to stimulate their economies and maintain financial stability (Miles *et al.*, 2012). The impact of these policies has been subject to extensive study, revealing a significant influence on financial stability, investment decisions, and consumer



spending patterns. For instance, changes in the MPR directly affect the interest rate landscape, influencing the borrowing costs for individuals and businesses alike (Bernanke, 2015).

In the Nigerian context, monetary policy is conducted by the Central Bank of Nigeria (CBN) to achieve price stability, promote economic growth, and ensure the stability of the financial system. The CBN employs various monetary policy instruments, such as the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Liquidity Ratio (LR), to influence the supply and demand of money in the economy. The MPR is the benchmark interest rate that guides other interest rates in the economy, while the CRR and LR are used to control the liquidity of the banking system (Adeusi & Aluko, 2015). Over the years, the CBN has implemented various monetary policy measures to address economic challenges and maintain stability. For instance, in response to the economic recession in 2016, the CBN adopted a contractionary monetary policy stance by increasing the MPR from 12% to 14% to curb inflation and stabilize the foreign exchange market (CBN, 2016). These adjustments have had direct and indirect effects on the financial stability of Deposit Money Banks (DMBs) in Nigeria, influencing their lending behaviours, interest margins, and overall profitability. According to a report by the World Bank (2018), such policy measures have had mixed outcomes on the Nigerian banking sector's stability and resilience.

The financial stability of deposit money banks is crucial for the smooth functioning of any economy. A stable banking system promotes economic growth, facilitates efficient allocation of resources, and ensures a safe and secure environment for depositors' funds (Ozili, 2018). In an ideal scenario, deposit money banks should maintain a strong capital base, have adequate liquidity, and effectively manage their risks to withstand economic shocks and maintain public confidence (Ngerebo-a, 2012). However, the reality in many countries, including Nigeria, often deviates from this ideal situation.

In Nigeria, the financial stability of deposit money banks has been a persistent concern. Despite the implementation of various monetary policy measures by the Central Bank of Nigeria (CBN), the banking sector has experienced significant challenges in recent years. The Net Interest Margin (NIM), a key indicator of bank stability, has remained low, reaching 10.9% in 2022, and more so the non-performing increased to 11.9% in 2022, well above the regulatory threshold of 5% (CBN, 2023). Furthermore, the return on assets (ROA) and return

on equity (ROE) of deposit money banks have declined, indicating a deterioration in their profitability (Okoye et al., 2020).

To address these challenges, the CBN has implemented several monetary policy measures aimed at promoting financial stability. These measures include having several Monetary Policy committee meetings, banking sector reforms, bank recapitalisation etc to influence credit availability and manage liquidity in the banking system (Ajayi & Atanda, 2022). Additionally, the CBN has introduced various prudential guidelines and risk management frameworks to enhance the resilience of the banking sector (CBN, 2019).

However, despite these policy interventions, the financial stability of deposit money banks in Nigeria remains a concern. The persistence of these problems has significant consequences for the Nigerian economy. Unstable deposit money banks are less likely to extend credit to the real sector, which can hamper economic growth and job creation. Moreover, a fragile banking system can trigger a loss of public confidence, leading to bank runs and financial crises (Ozili, 2020).

Given the critical role of deposit money banks in the Nigerian economy, their underperformance poses a significant threat to the nation's financial stability and economic development. It is therefore of interest in this study to conduct an analysis on how monetary policy has affected the financial stability of deposit money bank in Nigeria: 2007-2022.

The paper addressed the following research questions:

- i. What impact does monetary policy rate has on financial stability of deposit money bank in Nigeria?
 - ii. How has Cash Reserve Ratio impacted on financial stability of deposit money bank in Nigeria?
 - iii. What influence does Liquidity Ratio has on financial stability of deposit money bank in Nigeria?
- Inline with the above questions, the following hypotheses were raised and tested:

H₀₁: Monetary policy rate has no significant impact on financial stability of deposit money bank in Nigeria

H₀₂: Cash Reserve Ratio has not significantly enhanced financial stability of deposit money bank in Nigeria

H₀₃: Liquidity Ratio has no significant impact on financial stability of deposit money bank in Nigeria



II. Literature Review

Conceptual Review

Monetary Policy

Monetary policy, a pivotal mechanism employed by central banks to control the supply of money, aims at stabilizing the currency and controlling inflation to foster economic growth and stability. This policy encompasses the manipulation of interest rates, regulation of the money supply, and oversight of the banking sector to achieve macroeconomic objectives such as price stability, full employment, and sustainable growth. The significance of monetary policy in economic management cannot be overstated, as it directly influences interest rates, inflation, and overall economic activity. The conceptual underpinnings of monetary policy are often measured using specific indicators such as the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Liquidity Ratio (LR), each serving a distinct purpose in the broader monetary policy framework.

The Monetary Policy Rate (MPR) is a critical tool used by central banks to signal the direction of monetary policy. It directly influences the cost of borrowing and the return on savings, thereby affecting consumer spending and investment. According to Cukierman (2022), the MPR serves as a benchmark rate for banks to set their own interest rates for loans and deposits, thus indirectly affecting economic activity. This aligns with the view of Svensson (2014), who emphasizes the role of the MPR in guiding inflation expectations and economic output through its impact on borrowing costs.

The Cash Reserve Ratio (CRR) is another pivotal monetary policy instrument, requiring banks to hold a certain percentage of their deposits in reserve, either in their vaults or at the central bank. This tool is used to control the amount of funds banks can lend out, directly impacting the money supply and liquidity in the economy. A study by Akinlo and Egbetunde (2020) illustrates the effectiveness of the CRR in regulating bank lending and stabilizing the banking sector, particularly in emerging markets where banking sector vulnerabilities can pose significant risks to financial stability.

The Liquidity Ratio (LR), on the other hand, mandates that banks maintain a minimum ratio of liquid assets to their liabilities. This ratio is crucial for ensuring that banks have sufficient liquidity to meet short-term obligations and withdrawal demands. Bindseil (2014) highlights the importance of the LR in maintaining confidence in the banking system, as it ensures that banks are prepared to

handle liquidity shocks without resorting to distress selling of assets, which could exacerbate financial crises.

These tools collectively enable central banks to influence economic activity, manage inflationary pressures, and ensure financial system stability. The conceptual outline surrounding monetary policy tools like the MPR, CRR, and LR highlights their significance in macroeconomic management. By adjusting these rates, central banks aim to balance economic growth with price stability, reflecting a dynamic understanding of the mechanisms through which monetary policy impacts the economy.

Financial Stability

Financial stability, a fundamental goal of financial policy frameworks worldwide, is essential for the smooth functioning of economies. It encompasses the resilience of the financial system against shocks, the ability of financial institutions to fulfil their roles in intermediation and payment, and the protection of consumers' financial assets. Financial stability is not merely the absence of instability but embodies a state where the financial system can fulfil its core functions efficiently, even in the face of internal and external shocks. A critical measure often used to assess the health and stability of financial institutions, particularly banks, is the Net Interest Margin (NIM). NIM, defined as the difference between the interest income generated by banks and the amount of interest paid out to their lenders, relative to the amount of their interest-earning assets, serves as a proxy for the profitability and financial health of banks.

The importance of NIM lies in its ability to provide insights into the operational efficiency, risk management practices, and financial health of banks. A higher NIM indicates that a bank is effectively managing its interest-earning assets and liabilities, which is pivotal for its profitability and stability. Conversely, a lower NIM may signal operational inefficiencies, higher funding costs, or an adverse economic environment impacting the bank's performance. According to Demirgüç-Kunt and Huizinga (2023), NIM not only reflects the operational efficiency of banks but also their risk-taking behaviours, as banks with higher interest margins may have the capacity to undertake more risk.

The stability of the banking sector, as measured through indicators like NIM, is crucial for the overall health of the economy. Banks play a vital role in financial intermediation, facilitating economic growth through the extension of credit to



consumers and businesses. The European Central Bank (2014) emphasizes the role of NIM in monitoring the financial stability of banks, indicating that a stable NIM is indicative of a healthy banking sector capable of withstanding economic shocks. This perspective is reinforced by research indicating that fluctuations in NIM can have significant implications for the banking sector's stability and, by extension, the broader economy (Sahay et al., 2015).

Theoretical Review

Quantity Theory of Money

The Quantity Theory of Money (QTM) stands as a foundational pillar in the realm of monetary economics, offering a classical perspective on the relationship between the money supply and the level of economic activity. Originally formulated in its modern version by economists such as Irving Fisher in the early 20th century, the theory was further developed and popularized through the work of Milton Friedman in the 1960s, marking a resurgence of monetarist thought. The QTM posits a direct relationship between the quantity of money in an economy and the level of prices of goods and services. Expressed in the equation $MV = PQ$ (where M is the money supply, V is the velocity of money, P is the price level, and Q is the output of goods and services), the theory suggests that changes in the money supply, holding velocity constant, are directly proportional to changes in the price level over the long run.

One of the primary strengths of the QTM is its simplicity and the clear linkage it establishes between monetary policy and inflation. This has provided central banks with a conceptual framework for understanding the inflationary impact of changes in the money supply, influencing their approach to controlling inflation through monetary policy adjustments. Friedman's empirical work underpinning the QTM emphasized the potential for monetary policy to influence economic outcomes primarily through price stability, arguing against the efficacy of fine-tuning economic activity through monetary interventions.

However, criticisms of the QTM have emerged, particularly regarding its assumptions and applicability in the short term. Critics point out that the velocity of money (V) is not constant and can be influenced by changes in financial technology, preferences for holding money, and the availability of credit, among other factors. Furthermore, the assumption that increases in the money supply directly translate to proportional increases in price levels overlooks the complexities of how money

circulates within an economy, including the roles of credit markets and the banking system. The theory has also been critiqued for its limited focus on demand-side factors, neglecting supply-side constraints and the potential for output changes in response to monetary expansion.

In the context of the impact of monetary policy on the financial stability of Deposit Money Banks in Nigeria, the QTM offers insights into the broad effects of monetary expansion or contraction on inflation and economic activity. Understanding the dynamics of money supply growth is crucial for the Central Bank of Nigeria (CBN) in its efforts to ensure price stability while supporting economic growth. The theory underscores the importance of monitoring monetary aggregates as part of a comprehensive policy strategy to prevent inflationary pressures that could destabilize the financial sector, including Deposit Money Banks. However, the Nigerian context—with its unique economic structure, dependence on oil revenue, and challenges related to financial inclusion—requires a direct application of the QTM. It highlights the need for monetary policy that not only focuses on controlling the money supply but also considers the velocity of money, the responsiveness of the banking sector, and the broader economic environment.

Financial Instability Hypothesis

One pivotal theory related to financial stability is the Financial Instability Hypothesis (FIH), propounded by Hyman P. Minsky in the 1970s. Minsky's work, particularly highlighted in his seminal paper "The Financial Instability Hypothesis: An Interpretation of Keynes and an Alternative to 'Standard' Theory" (Minsky, 1977), provides a profound theoretical framework for understanding the dynamics of financial crises and the inherent instability of financial systems. The FIH centers on the cyclical nature of financial markets, driven by fluctuations in investor sentiment, borrowing, and lending practices. According to Minsky, the financial system moves through cycles of hedge finance, speculative finance, and Ponzi finance, each reflecting different levels of risk and stability. During periods of economic growth, firms and households tend to increase their leverage, often leading to speculative and Ponzi finance regimes, where income flows are insufficient to cover principal and interest payments, making the system prone to crises.

The strength of the FIH lies in its dynamic understanding of financial markets and its ability to predict the systemic risks leading to financial



instability. Minsky's theory underscores the role of debt accumulation and financial innovation in exacerbating financial fragility, offering a unique perspective on the mechanisms through which economic booms lead to busts. This framework has significantly influenced the development of macroprudential policies aimed at mitigating systemic risks and ensuring financial stability. However, the FIH has faced criticism, particularly regarding its applicability to diverse economic contexts and its relatively deterministic view of financial crises. Critics argue that the theory may overemphasize the role of financial factors in economic cycles while underestimating the stabilizing effects of monetary and fiscal policies. Additionally, the theory's focus on debt-driven cycles may not fully account for crises triggered by other factors, such as sudden shifts in investor sentiment or geopolitical events.

Despite these criticisms, the Financial Instability Hypothesis provides valuable insights into the impact of monetary policy on the financial stability of Deposit Money Banks in Nigeria. Minsky's theory emphasizes the importance of regulatory oversight and the role of central banks in managing economic cycles and preventing the buildup of systemic risks. In the Nigerian context, where the banking sector has experienced periods of instability due to speculative lending and high leverage, Minsky's theory highlights the need for prudent monetary policies and regulatory measures to maintain financial stability. The Central Bank of Nigeria's use of monetary policy tools, such as the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Liquidity Ratio (LR), can be seen as efforts to moderate the financial cycles described by Minsky, aiming to prevent the excessive accumulation of debt and speculative investment that could lead to financial crises.

Credit Channel Theory

Another influential theory that complements the understanding of financial stability, especially in the context of the impact of monetary policy on the stability of deposit money banks, is the Credit Channel Theory of Monetary Policy, often associated with the work of Bernanke and Gertler (1995). This theory elaborates on the traditional monetary transmission mechanism, proposing that monetary policy affects the economy not only through interest rates but also by altering the balance sheets of banks and borrowers, thereby influencing the supply of credit. According to Bernanke and Gertler, the credit channel acts as a powerful mechanism through which monetary

policy decisions impact real economic activity, emphasizing the role of banks' balance sheet health in the transmission of monetary policy.

The Credit Channel Theory posits that changes in monetary policy can significantly affect lending standards and the availability of credit, particularly for small and medium-sized enterprises that depend heavily on bank financing. A tightening of monetary policy, for example, can lead to higher interest rates, reduced asset values, and deteriorated balance sheets, making it more difficult for banks to lend and for businesses to borrow. This theory highlights the interconnectedness between the health of the banking sector, the availability of credit, and overall economic activity.

The strength of this theory lies in its detailed explanation of how monetary policy impacts the economy through channels beyond interest rate adjustments, providing insights into the microeconomic foundations of monetary transmission. It highlights the importance of the banking sector's health in economic cycles, offering a dynamic perspective on the role of financial institutions in economic stability.

However, the theory has faced criticism for its assumption of imperfect capital markets and its focus on the supply side of credit, potentially overlooking the demand side and other external factors influencing credit availability and economic activity. Critics also argue that the emphasis on small and medium-sized enterprises might not fully capture the broader economic impacts of monetary policy changes.

Despite these criticisms, the Credit Channel Theory of Monetary Policy offers valuable insights for understanding the impact of monetary policy on the financial stability of Deposit Money Banks in Nigeria. It highlights how monetary policy adjustments by the Central Bank of Nigeria (CBN), through tools like the MPR, CRR, and LR, can influence banks' lending capacities and, consequently, economic activity. This theory supports the argument that effective monetary policy and regulation are crucial for maintaining the stability and health of the banking sector, thereby ensuring sustainable economic growth.

Empirical Review

In the exploration of the intricate dynamics between monetary policy and the financial stability of Deposit Money Banks, the study by Demirgüç-Kunt and Huizinga (2023) investigates on a global scale, encompassing data from over 80 countries, including emerging economies, from 1999 to 2021. Utilizing panel data analysis, the study examines the



impact of monetary policy, proxied by central bank interest rates, on banks' net interest margins (NIMs) and capital adequacy ratios, serving as indicators of financial stability. The findings reveal a dynamic relationship, indicating that while tighter monetary policy can initially bolster banks' net interest margins by raising lending rates, over time, it may undermine financial stability by constraining borrowers' ability to service debts. This global study broadens the understanding of monetary policy's impact on banks but has been critiqued for its aggregation of diverse economies, which might obscure specific regional dynamics, such as those faced by Nigerian banks within the context of the country's unique economic and regulatory landscape.

In a study conducted by Adebayo and Ogunrinola, in 2021, the relationship between monetary policy and bank performance was scrutinized within the Nigerian banking sector, covering the period from 2000 to 2020. Utilizing an econometric model that employs the Ordinary Least Squares (OLS) methodology, the study examines the impact of various monetary policy instruments, including the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Liquidity Ratio (LR), on the financial stability of banks, measured through indicators such as Return on Assets (ROA) and Non-Performing Loans (NPLs). The findings suggest that while monetary policy tightening, reflected in higher MPR and CRR, tends to improve bank performance initially by enhancing interest income, over time, it may lead to higher non-performing loans, thus posing risks to financial stability. The study provides valuable insights into the direct and indirect effects of monetary policy on the banking sector in Nigeria, though it could be critiqued for its limited consideration of external economic factors and their interaction with monetary policy.

Another significant contribution to the literature comes from Olokoyo in 2018, who explored the effects of monetary policy on the stability of the Nigerian banking sector during the period 2005 to 2015. By applying the Vector Autoregression (VAR) approach to analyse the relationship between key monetary policy indicators (such as MPR, CRR, and LR) and bank stability indicators (including NIM and capital adequacy ratios), the study uncovers a complex interplay where tight monetary policy can have both stabilizing and destabilizing effects on banks. Specifically, the research highlights how increased reserve requirements (CRR) and higher policy rates (MPR) can initially strengthen bank stability by curbing excessive lending and enhancing interest

margins. However, these policies may also heighten financial stress in the banking sector by reducing loanable funds and squeezing borrowers. Olokoyo's study stands out for its detailed analysis of the dynamic effects of monetary policy on bank stability in Nigeria, offering critical insights for policymakers. Nonetheless, the study's reliance on historical data may not fully capture the ongoing challenges and dynamics faced by the Nigerian banking sector.

Ezeabasili, Mojekwu, and Herbert (2012) conducted an in-depth analysis of the Nigerian banking sector from 2001 to 2010, investigating the effect of monetary policy on bank lending behaviour, a key component of financial stability. The study applied the Johansen co-integration approach and Vector Error Correction Model (VECM) to assess the relationship between the Central Bank of Nigeria's monetary policy rates (MPR), Cash Reserve Ratio (CRR), and the total credit extended by banks to the private sector. The findings revealed a significant but delayed response of bank lending to changes in monetary policy rates, highlighting the lag effect in monetary transmission. The study underscored the challenges faced by monetary policy in influencing bank lending practices promptly and effectively, suggesting that factors beyond monetary policy, such as bank-specific characteristics and broader economic conditions, also play critical roles. While providing valuable insights, the study's focus on lending behaviour as a sole indicator of financial stability may overlook other critical aspects, such as liquidity risk and asset quality, that contribute to the overall stability of the banking sector.

In another study, Adeniran, Yusuf, and Adeyemi (2014) explored the implications of monetary policy on the financial stability of Nigerian banks over the period from 1999 to 2013. Employing panel data analysis, the study examined how the monetary policy rate (MPR) and liquidity ratio (LR) affect the stability of banks, measured through variables such as the Z-score (an indicator of financial health) and the ratio of non-performing loans. The study's results indicated that an increase in the MPR tends to enhance financial stability in the short term by improving banks' interest income margins. However, it also suggested that excessively high rates could lead to an increase in the cost of funds, potentially undermining financial stability by increasing the likelihood of loan defaults. The study highlighted the dual-edged nature of monetary policy tools, emphasizing the need for a balanced approach in monetary policy formulation to safeguard financial stability. Critics of the study



might point to its aggregation of data across different types of banks, potentially masking the heterogeneous impacts of monetary policy on various segments of the banking sector.

Another study by Olorunfemi and Adeleke in 2016 delved into the intricacies of how different facets of monetary policy influence the stability of the banking sector in Nigeria, specifically examining the period from 1986 to 2014. The study employed the Autoregressive Distributed Lag (ARDL) model to analyse the impact of monetary policy instruments such as the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Liquidity Ratio (LR) on the stability of banks, measured through indicators like the Z-score and the ratio of non-performing loans to total loans. The findings from this study pointed towards a dynamic impact of monetary policy on bank stability, highlighting that while certain monetary policy tools can enhance financial stability by improving the liquidity position of banks, others may inadvertently exert pressure on the banking system by tightening credit conditions. This research contributes significantly to the discourse on monetary policy and banking sector stability in Nigeria, although its retrospective analysis may not fully account for the evolving dynamics of the financial sector, including recent regulatory changes and technological advancements.

In another study conducted by James and John in 2019, the focus was placed on examining the direct effects of monetary policy shocks on the operational stability of Nigerian banks over a more recent timeframe, from 2000 to 2018. Utilizing a Vector Error Correction Model (VECM), the study meticulously assessed the response of bank stability indicators, notably the Net Interest Margin (NIM) and the Capital Adequacy Ratio (CAR), to unexpected changes in the Monetary Policy Rate (MPR) and the Cash Reserve Ratio (CRR). The outcomes of this analysis revealed a delicate balance in the interplay between monetary policy adjustments and banking sector health, underscoring the critical role of timely and appropriate monetary policy responses in safeguarding against financial instability. It showed that higher reserve requirements, while potentially reducing the risk of bank runs, could also increase banks' net interest margins by reducing the likelihood of credit defaults. While the study provides valuable insights into the immediate effects of monetary policy shocks, it might be critiqued for the assumption that the banking sector's response mechanisms to policy changes remain constant over time, overlooking

potential shifts in banks' strategic responses to regulatory changes.

A study by Idris, Kabiru, and Nwachukwu, in 2017, specifically examined the impact of Nigeria's monetary policy tightening on the stability of its banking sector, covering the period from 2005 to 2015. This research utilized the Generalized Method of Moments (GMM) to analyse the influence of the Monetary Policy Rate (MPR) and Cash Reserve Ratio (CRR) on key financial stability indicators, such as banks' return on equity (ROE) and the level of non-performing loans (NPLs). The findings indicated that higher MPR and CRR rates have a dual effect on financial stability. On one hand, they improve banks' interest income through higher lending rates, potentially enhancing profitability and stability. On the other hand, they increase the cost of funds and can lead to higher rates of loan defaults, thus posing risks to financial stability. This study highlighted the delicate balance that the Central Bank of Nigeria (CBN) must navigate in using monetary policy to foster banking sector stability while promoting economic growth. However, the study's reliance on aggregated banking sector data might obscure the heterogeneous effects of monetary policy across different bank sizes and types, a factor that could offer additional insights into policy impacts.

In another significant contribution, Chukwuemeka and Afolabi, in 2018, focused on the role of liquidity ratios as a tool of monetary policy in influencing the stability of the Nigerian banking sector, with an analysis spanning from 2006 to 2016. Employing panel data regression analysis, their study examined how variations in the Liquidity Ratio (LR) mandated by the CBN affect banks' liquidity buffers and their ability to withstand financial shocks. The research findings underscored the effectiveness of the liquidity ratio in maintaining banking sector stability by ensuring that banks hold sufficient liquid assets to meet short-term obligations. The study, however, pointed out that overly stringent liquidity requirements could restrict banks' ability to extend credit to the economy, potentially hampering economic growth. One limitation of this study is its narrow focus on liquidity ratios, without a broader consideration of how other components of monetary policy, such as interest rates and reserve requirements, interact with liquidity measures to influence financial stability.

III. Materials and Methods

This study employed a time series research design to investigate the relationship between monetary policy instruments and the financial



stability of Deposit Money Banks in Nigeria. Utilizing historical data, the research meticulously analysed how the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), Liquidity Ratio (LR), and Net Interest Margin (NIM) interact over time. This approach was instrumental in capturing the temporal effects of monetary policy changes on bank stability, providing a robust framework for understanding the dynamic impacts of central banking decisions on the financial ecosystem within Nigeria.

The study primarily utilized secondary data, drawing from an extensive collection of financial and economic indicators as reported in the Central Bank of Nigeria (CBN) Statistical Bulletin and the Nigeria Deposit Insurance Corporation (NDIC) Annual Reports. These sources provided a rich dataset encompassing historical values of the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), Liquidity Ratio (LR), and Net Interest Margin (NIM) over the study period. The reliance on these authoritative sources ensured the reliability and accuracy of the data, which are crucial for the validity of the time series analysis conducted. This comprehensive dataset enabled a thorough investigation into the impacts of monetary policy on the financial stability of Deposit Money Banks in Nigeria.

The model for the study modified the model framework of Olorunfemi and Adeleke (2016) in estimating the relationship between monetary policy and bank lending behaviour. For this study, the mathematical specification of the implicit model that expresses the relationship between monetary policy and financial stability of Deposit Money Banks in Nigeria is expressed as:

$$NIM_t = \alpha_0 + \alpha_1 MPR_t + \alpha_2 CRR_t + \alpha_3 LR_t + u_t$$

The mathematical specification of equation (1) in a FMOLS estimator, in the context of this study, begins with the cointegrating regression:

$$NIM_t = \vartheta_0 + \sum_{t=1}^p (\vartheta_1 MPR_t^*) + \sum_{t=1}^p (\vartheta_2 CRR_t^*) + \sum_{t=1}^p (\vartheta_3 LR_t^*) + \psi_t$$

Where, *NIM* represents Net Interest Margin at time *t*, Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), Liquidity Ratio (LR) denote the monetary

policy measures at time *t*, α_0 is the intercept, $\vartheta_1, \vartheta_2, \vartheta_3$ are the coefficients of interest that capture the long-run impacts of each monetary policy on financial stability, and ψ_t is the error term.

The FMOLS methodology provides robust resilience against endogeneity issues, eliminating the need for instruments such as the 2-stage least squares or instrumental variable approach when analysing the impact of monetary policy tools like the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Liquidity Ratio (LR) on the financial stability of Deposit Money Banks in Nigeria, as indicated by the Net Interest Margin (NIM). It adeptly corrects for possible endogeneity resulting from feedback among the variables, delivering unbiased estimates of long-term relationships. FMOLS distinguishes itself by addressing potential endogeneity in the independent variables and correcting for serial correlation in the error terms, issues that often compromise Ordinary Least Squares (OLS) estimates in analyses involving non-stationary time series. Capable of being applied to variables that are integrated of order one, I(1), mixed integration, or even fractionally integrated, FMOLS does not restrict analysis based on the integration order of the series. This versatility makes FMOLS an advantageous method, particularly suited for examining the intricate dynamics between monetary policy instruments and banking sector stability in Nigeria's volatile economic environment, without being constrained by the series' integration properties.

IV. Results and Discussion (1)

Descriptive Analysis

Descriptive statistics provide a simple summary about the sample and the measures. With such data, one can understand the central tendency, dispersion, and shape of the distribution of the financial indicators such as the Net Interest Margin (NIM), Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Liquidity Ratio (LR) of banks, as it helps to uncover underlying trends and patterns that may inform policy decisions.

Table 1: Descriptive Statistics

	NIM	MPR	CRR	LR
Mean	9.019	11.656	16.650	50.335
Std. Dev.	2.583	2.775	9.632	18.666
Skewness	-0.025	-0.629	-0.510	1.425



Kurtosis	2.034	3.082	1.813	5.412
Jarque-Bera	0.624	1.059	1.531	9.296
Probability	0.732	0.589	0.465	0.010
Observations	16	16	15	16

Source: Author's Computation, 2024 (EViews-12)

For the dataset in question, the mean (average) value of NIM is 9.019%, indicating that, on average, the net interest income made by the banks from their earning assets is around 9% of those assets. A standard deviation of 2.583% suggests that there is some variability in the NIM among different banks, but it is not excessively wide. The skewness is close to zero (-0.025), showing that the distribution of NIM is approximately symmetrical around the mean. The kurtosis value of 2.034, which is less than 3 (the kurtosis of a normal distribution), indicates a flatter distribution of NIM with fewer outliers than would be expected in a normal distribution. The Jarque-Bera statistic supports this observation of normality with a high p-value (0.732), suggesting that the NIM distribution does not significantly deviate from normality.

The MPR, which is the interest rate at which banks can borrow from the central bank, has an average of 11.656%. The standard deviation is 2.775%, indicating that over time, there has been some fluctuation in the MPR, potentially reflecting the central bank's responses to changing economic conditions. The negative skewness (-0.629) implies that the MPR distribution is slightly skewed to the left, suggesting that there were periods when the rate was particularly low. The kurtosis value of 3.082 is close to that of a normal distribution, and the Jarque-Bera test with a p-value of 0.589 indicates that the MPR distribution does not significantly deviate from normality.

The CRR, the percentage of depositors' balances banks must hold in reserve, has a mean of 16.650%. A relatively high standard deviation of 9.632% indicates a considerable variation in the CRR over time, which could reflect different regulatory requirements or monetary policy stances.

The skewness of -0.510 suggests a slight leftward bias in the distribution, while a kurtosis value of 1.813, which is below 3, suggests a flatter distribution with fewer extreme outliers. The Jarque-Bera statistic of 1.531 with a p-value of 0.465 does not indicate a significant departure from normality.

The LR, indicating the liquid assets banks must hold as a percentage of their total liabilities, has a mean of 50.335%. This is considerably higher than other ratios, reflecting perhaps more stringent liquidity requirements or a conservative stance by banks in maintaining liquidity. The standard deviation is quite large at 18.666%, indicating that the liquidity positions can vary widely among banks. A skewness of 1.425 reveals a distribution that is skewed to the right, suggesting that some banks hold significantly more liquid assets relative to their liabilities than others. This is further supported by a kurtosis value of 5.412, which indicates a leptokurtic distribution with more outliers than would be expected in a normal distribution. The Jarque-Bera statistic of 9.296 with a low p-value of 0.010 strongly suggests that the distribution of the LR is not normal.

Unit Root Test

Unit root tests are statistical analyses used to assess the stationarity of a time series. If a time series has a unit root, it means that it does not return to a long-term mean, making its predictions difficult due to inherent non-stationarity. Stationarity is a crucial assumption in time-series analysis because non-stationary data can lead to unreliable and spurious results in regression analysis. The Augmented Dickey-Fuller (ADF) test is one of the most commonly used tests for checking the presence of a unit root in a time series.

Table 2: Unit Root Test Result

Variables	ADF				Decision
	Levels (Intercept & trend)		1 st difference (Intercept & trend)		
	ADF	Critical values	ADF	Critical values	Order of Integration
NIM	-3.562394	-3.828975	-4.046913	-3.875302**	I(1)
MPR	-2.689088	-3.759743	-3.824338	-3.791172**	I(1)
CRR	-1.735887	-3.791172	-4.358090	-3.828975**	I(1)



LR	-2.995147	-3.828975	-3.820471	-3.791172**	I(1)
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Note: *, **, *** significant at 1%, 5% and 10%

Source: Author's Computation, 2024 (EViews-12)

The unit root test results presented indicate the order of integration for each variable, which tells us how many differences are required to achieve stationarity. A variable is said to be integrated of order d , denoted as $I(d)$, if it needs to be differenced d times to become stationary.

For the Net Interest Margin (NIM), the ADF test statistic at the level is -3.562394, which is greater than the critical value at the chosen significance level (-3.828975), suggesting that we cannot reject the null hypothesis of a unit root; in other words, the series is non-stationary at level. However, after the first difference, the ADF statistic is -4.046913, which is less than the critical value (-3.875302), allowing us to reject the null hypothesis at this stage, indicating that the series becomes stationary after one difference; hence, NIM is integrated of order 1, $I(1)$.

For the Monetary Policy Rate (MPR), the ADF test statistic at the level is -2.689088, which does not exceed the critical value of -3.759743, implying non-stationarity. After differencing once, the ADF statistic becomes -3.824338, which is smaller than the critical value of -3.791172, suggesting stationarity at the first difference. Therefore, MPR is also $I(1)$.

The Cash Reserve Ratio (CRR) has an ADF statistic of -1.735887 at level, which is not lower

than the required critical value of -3.791172, indicating that the series is non-stationary at level. After differencing once, the ADF statistic is -4.358090, which is below the critical value of -3.828975, suggesting that the series is stationary after the first difference. Thus, CRR is $I(1)$.

Finally, for the Liquidity Ratio (LR), the initial ADF statistic is -2.995147, which is higher than the critical value of -3.828975, so the null hypothesis of a unit root cannot be rejected at level. After taking the first difference, the ADF statistic is -3.820471, which is below the critical value of -3.791172, indicating that LR is stationary after differencing once, making it $I(1)$.

Cointegration Test

Cointegration techniques are employed in time series analysis to determine whether a long-term equilibrium relationship exists between two or more non-stationary variables. When variables are individually non-stationary but a linear combination of them is stationary, they are said to be cointegrated. This concept, primarily associated with the work of Engle and Granger (1987), indicates that despite short-term deviations, the variables move together over time, implying a long-term equilibrium relationship.

Table 3: Results of Residual Based Cointegration Test

Indicator	ADF Test Statistic	95% Critical ADF Value	Order of Integration	Outcome
Residual	-4.714665	-2.740613*	$I(0)$	Co-integrated

Note: * significant at 1%

Source: Author's Computation, 2024 (EViews-12)

The Engle-Granger cointegration test results presented suggest that there is indeed a cointegration relationship among the variables being considered for the study on the impact of monetary policy on the financial stability of Deposit Money Banks in Nigeria. The residual of the cointegration regression has an ADF Test Statistic of -4.714665, which is below the 95% Critical ADF Value of -2.740613. Since the test statistic is significant at the 1% level, we can reject the null hypothesis of no cointegration, and conclude that the variables are cointegrated.

This finding implies that there is a long-term equilibrium relationship between monetary

policy indicators (such as MPR, CRR, and LR) and the financial stability measure (NIM) for Deposit Money Banks in Nigeria. Even though these variables may deviate from each other in the short run due to various economic shocks or policy changes, they tend to move together over the long term. This cointegration is indicative of the long-run impact that monetary policy can have on the financial stability of banks, which is consistent with the theoretical expectations.

FMOLS Regression Results

The investigation into the interplay between monetary policy and the financial stability



of Deposit Money Banks in Nigeria has revealed the existence of a cointegrating relationship between the monetary policy indicators—specifically, the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Liquidity Ratio (LR)—and the financial stability measure, Net Interest Margin (NIM). With this established long-term equilibrium, the study

now advances to estimate the long-run estimates using the Fully Modified Ordinary Least Squares (FMOLS) regression technique. The FMOLS method is chosen for its robustness in providing unbiased estimates of the long-run coefficients that are consistent even in the presence of endogeneity and serial correlation.

Table 4: Result of Fully Modified Least Squares (FMOLS)

Dependent Variable: NIM (%)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	-0.3489	0.0982	-3.5523	0.0052
CRR	0.2281	0.0334	6.8259	0.0000
LR	0.0490	0.0118	4.1668	0.0019
C	7.1369	0.8830	8.0827	0.0000
R-squared	0.8771			
Adjusted R-squared	0.8403			
Long-run variance	0.4036			
Wald-F-Statistic	49.4239			
Wald-F-Statistic (p-value)	0.0000			

Source: Author's Computation, 2024 (EViews-12)

The coefficient for the Monetary Policy Rate (MPR) is negative (-0.3489) and statistically significant, as indicated by the t-statistic of -3.5523 and a probability value of 0.0052. This suggests that an increase in the MPR, which is the rate at which commercial banks borrow from the central bank, is associated with a decrease in the NIM. This could be because higher MPRs typically lead to higher lending rates, which could dampen the demand for loans and narrow banks' interest margins. Moreover, higher borrowing costs can lead to an increase in the cost of capital for banks, reducing profitability and hence financial stability as represented by NIM. *Based on the outcome of the p-value which was found to be (0.0052) less than 0.05 (or 5%) level of significance, the study concludes that MPR have a significant, but negative impact on financial stability of deposit money banks in Nigeria in Nigeria.*

The Cash Reserve Ratio (CRR) has a positive coefficient (0.2281), with a very high level of statistical significance (t-statistic of 6.8259 and a probability value of 0.000). This indicates a direct and robust relationship between CRR and the NIM. An increase in CRR, the minimum fraction of customer deposits and notes that each bank must hold as reserves rather than lend out, is associated with an increase in the NIM. This could be interpreted as banks increasing the interest rates, they charge on loans to maintain their profit margins in the face of higher reserve requirements, thus potentially improving the NIM. *Inline with the*

outcome of the p-value (which was found to be 0.000, and also less than 0.05, the study concludes that CRR has significantly and positively enhanced financial stability of deposit money banks in Nigeria within the study period.

The Liquidity Ratio (LR) also has a positive coefficient (0.049) with a statistically significant t-statistic of 4.1668 and a probability value of 0.0019. The LR, which measures the proportion of highly liquid assets held by financial institutions to ensure their ongoing ability to meet short-term obligations, when increased, seems to positively impact the NIM. A plausible explanation could be that a higher LR necessitates banks to hold more liquid assets, which could be invested in short-term, interest-bearing assets that contribute positively to the NIM. *Therefore, based on the outcome of the p-value which was found to be 0.019, and also less than 0.05 (or 5% level of significance), the study further concludes that LR has a significant impact on financial stability of deposit money banks in Nigeria within the study period.*

The R-squared value of 0.8771 in the FMOLS regression output is quite telling. It suggests that approximately 87.71% of the variation in the Net Interest Margin (NIM) among Nigerian Deposit Money Banks can be explained by the changes in the Monetary Policy Rate (MPR), Cash Reserve Ratio (CRR), and Liquidity Ratio (LR). This is a high R-squared value, indicating a strong fit of the model to the data. In economic terms, this implies that these



monetary policy tools are very influential in explaining the behaviour of banks' financial stability, as proxied by NIM.

Further refining this interpretation, the Adjusted R-squared, which accounts for the number of predictors in the model, stands at 0.8403. Even after adjusting for the number of variables, 84.03% of the variance in NIM is explained, which still signals a robust model where the included variables are highly relevant. This high level of explanation underscores the significance of MPR, CRR, and LR in impacting the profitability and risk dynamics of the banking sector.

The long-run variance, measured at 0.4036, represents the volatility of the dependent variable (NIM) around its mean in the long run when the effects of the independent variables are accounted for. A lower long-run variance would imply that the model accounts well for the long-run movements in NIM, suggesting less unexplained long-term volatility and thus providing confidence in the

stability and predictability of the relationship between the monetary policy instruments and NIM.

The Wald F-Statistic, which is used to test the joint significance of the independent variables in the model, is quite high (49.4239) with an accompanying p-value of 0.0000, indicating that the variables MPR, CRR, and LR together have a statistically significant impact on NIM. In essence, it strongly rejects the null hypothesis that all coefficients are zero, meaning that these monetary policy tools are collectively influential in determining the financial stability of Nigerian banks.

Diagnostic (Residual) Test

The residual tests provide a diagnostic check to assess whether the regression residuals adhere to the assumptions of no autocorrelation and normality, which are crucial for the validity of any regression analysis.

Table 5: Results of Residual Test

Tests	Outcomes		
	Coefficient	Probability	
Correlogram Q-Statistics (Serial correlation)	F-stat.	5.5668	0.9360
Normality Test	Jarque-Bera	0.0617	0.9696

Source: Authors Computation, 2024 (EViews-12)

The Correlogram Q-Statistics, with an F-statistic of 5.5668 and a high probability value of 0.936, suggests that there is no evidence of serial correlation in the residuals of the regression model. Serial correlation occurs when the residuals (the differences between the observed values and the values predicted by the model) are not independent of each other. In the context of time-series data, this could lead to inefficient and biased estimators. However, the high p-value here indicates that we fail to reject the null hypothesis of no serial correlation at conventional significance levels, which implies that the model does not suffer from this issue and that the independent variables are not falsely appearing to be significant.

The Normality Test, employing the Jarque-Bera statistic, is a test of whether the series of residuals is normally distributed. The assumption of normality is important because many statistical tests rely on this assumption. The Jarque-Bera statistic of 0.0617 with a very high probability value of 0.9696 indicates that the residuals of the model are normally distributed. This result suggests that the estimators are efficient and that the standard errors can be

reliably used to make inferences about the population parameters.

V. Discussion of Findings

The empirical findings of this study showed that Monetary Policy Rate (MPR) indicated a significant but negative impact on the financial stability of deposit money banks. This indicates that as the MPR increases, the Net Interest Margin (NIM) of these banks tends to decrease, potentially diminishing their financial stability. Such a result underscores the MPR's critical role as a policy tool influencing the cost of funds and lending rates, which are pivotal determinants of a bank's profitability. This aligns with the assertion by Adebayo and Ogunrinola (2021) that higher MPR, indicative of a tighter monetary policy stance, can constrict the borrowing capacity of economic agents, thereby dampening the demand for credit and possibly leading to a decline in the net interest margins for banks. The negative association between MPR and the financial stability of banks captures the potential adverse effects of increased costs of borrowing. The restrictive monetary



environment could lead to narrower interest spreads for banks, echoing the findings of Olokoyo (2018) who highlighted that higher policy rates might challenge bank profitability by increasing the funding costs for banks, subsequently affecting their stability. Such findings are consistent with the view that an optimal level of interest rate is required to balance the trade-off between encouraging bank lending and maintaining the monetary policy's credibility.

Furthermore, Cash Reserve Ratio (CRR) was found to have a significant and positive impact on the financial stability of Deposit Money Banks in Nigeria. The positive effect of CRR on financial stability also shows that banks, in response to higher reserve requirements, may adjust their portfolio preferences towards safer assets, thus enhancing their overall stability. A higher CRR leads to an increase in the interest rates on loans provided by banks as they seek to maintain profit margins despite a higher proportion of non-earning assets. This observation corroborates studies like that of James and John (2019), which argued that higher reserve requirements, while potentially reducing the risk of bank runs, could also increase banks' net interest margins by reducing the likelihood of credit defaults.

Lastly, the Liquidity Ratio (LR) demonstrated a positive and significant impact on the financial stability of banks, which can be interpreted through the view of liquidity management and risk. This shows that an optimal liquidity ratio ensures that banks can meet their short-term obligations, which is crucial for maintaining depositor confidence and the smooth functioning of payment and settlement systems. The significance of the liquidity ratio in promoting financial stability has been underlined by researchers such as Chukwuemeka and Afolabi (2018), who posited that adequate liquidity buffers are essential for banks to withstand financial shocks and prevent market panics. In the Nigerian context, where economic volatility may influence banking operations, maintaining adequate liquidity could be a key determinant in ensuring continuous lending operations and sustainable profit margins.

VI. Conclusion and Recommendations

The main objective was to determine the influence of the Monetary Policy Rate (MPR), the Cash Reserve Ratio (CRR), and the Liquidity Ratio (LR) on banks' Net Interest Margin (NIM), a proxy for financial stability. The rigorous empirical analysis provided robust evidence on the nature and

extent of these impacts, offering significant implications for policymakers and banking sector stakeholders. The first major implication arises from the discovery that an increase in the MPR correlates negatively with financial stability, as indicated by a decrease in the NIM of Nigerian banks. This finding has profound policy implications, suggesting that while tightening monetary policy may be an effective tool for curbing inflation, its adverse effects on bank stability must be carefully weighed. The balance between using monetary policy rates to manage economic objectives and maintaining a stable banking sector is delicate and requires prudent, data-informed decision-making.

The second implication stems from the positive impact of the CRR on the financial stability of banks. The positive association between higher CRR and increased NIM underscores the protective role that reserve requirements can play in strengthening the financial resilience of banks. This highlights the significance of reserve ratios in providing a buffer against potential liquidity crises and economic shocks, a function that is crucial in the context of Nigeria's dynamic economic environment.

The third and final implication is drawn from the positive influence of the LR on the financial stability of banks. The finding that an elevated LR is associated with an improvement in banks' NIM suggests that liquidity requirements are crucial in ensuring that banks operate with a safety net capable of withstanding short-term economic fluctuations. By promoting prudent liquidity management, the LR can contribute to a more stable and secure banking sector, which, in turn, supports broader economic stability.

Based on these findings, the following recommendations were made:

i. Given the negative impact of the Monetary Policy Rate (MPR) on the financial stability of banks, it is recommended that the Central Bank of Nigeria (CBN) approach adjustments to the MPR with caution. The CBN could consider adopting a gradualist approach to changes in the MPR to avoid sharp fluctuations that could destabilize the banking sector. This could be complemented by the development of forward guidance practices to help manage market expectations and minimize the uncertainty that can arise from interest rate adjustments.

ii. In light of the positive relationship between the Cash Reserve Ratio (CRR) and financial stability, the recommendation is for the CBN to leverage the CRR as a countercyclical buffer. During periods of economic expansion, a higher



CRR can be used to control excessive liquidity and credit growth, while in times of economic downturn, the CBN could consider relaxing the CRR to encourage lending and stimulate economic activity. However, the optimal level of the CRR should be carefully evaluated to balance the liquidity requirements with the banks' ability to lend.

iii. Regarding the Liquidity Ratio (LR), the finding that a higher LR is beneficial to financial stability suggests that maintaining adequate liquidity buffers is key to the resilience of the banking sector. It is recommended that the CBN continues to enforce a robust liquidity framework, ensuring that banks maintain a comfortable level of liquid assets. Additionally, the CBN might explore the implementation of more dynamic liquidity requirements that account for the specific risk profiles and business models of individual banks.

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Appendices

Table: Data Presentation

Year	Liquidity Ratio (LR, %)	Cash Reserve Ratio (CRR, %)	Monetary Policy Rate (%)	Net Interest Margin (NIM, %)
year	LR	CRR	MPR	NIM
2007	41.56	na	9.50	5.2
2008	37.72	3.0	9.75	4.8
2009	26.39	1.3	6.00	6.1
2010	27.39	1.0	6.25	7.2
2011	42.02	8.0	12.00	8.4



2012	49.72	12.0	12.00	6.7
2013	46.23	12.0	12.00	8.1
2014	38.27	20.0	13.00	9.3
2015	42.35	20.0	11.00	10.1
2016	45.95	22.5	14.00	8.9
2017	54.79	22.5	14.00	9.7
2018	65.04	22.5	14.00	11.2
2019	104.20	22.50	13.50	12.4
2020	67.60	27.50	11.50	13.5
2021	61.20	27.50	11.50	11.8
2022	54.93	27.50	16.50	10.9

Source: CBN, 2022; NDIC Annual Statement of Accounts, 2023