

## **DETERMINANTS OF NET INTEREST MARGIN OF DEPOSIT MONEY BANKS IN NIGERIA**

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### **Abstract**

*This study investigates the determinants of net interest margin (NIM) of deposit money banks in Nigeria. Specifically, it examines the relationship between savings deposit rate (SDR), prime lending rate (PLR), maximum lending rate (MLR), and treasury bill investment volume (TB) on NIM over the period 2014 to 2023. The study employs panel data analysis techniques, including descriptive statistics, correlation analysis, panel unit root tests, and fixed effects regression. Findings reveal that SDR has a positive and statistically significant effect on NIM, underscoring the importance of competitive savings rates in enhancing deposit mobilization and interest income. In contrast, PLR and MLR exhibit positive but statistically not significant effects, indicating that changes in lending rates alone may not significantly impact bank profitability due to broader market and regulatory constraints. Treasury bill holdings (TB) show a negative but statistically insignificant effect on NIM, suggesting that while they provide risk-free returns, excessive allocation to T-bills may reduce banks' income from core intermediation activities. Based on these findings, the study recommends that banks adopt a deliberate strategy to maintain attractive savings deposit rates to strengthen deposit mobilization and loanable funds. It also advises that lending rates be managed through targeted credit pricing that supports productive sectors while remaining competitive. Furthermore, banks should review their portfolio allocation strategies to avoid over-reliance on treasury bills and instead channel more resources into profitable lending. A balanced interest income management approach is essential for sustaining healthy margins, and regulatory authorities are encouraged to support this with macroeconomic stability and clear monetary policy guidance.*

**Keywords:** Net interest margin, prime lending rate, maximum lending rate, savings deposit rate, treasury bills, interest rate management

## **1. Introduction**

The financial performance of deposit money banks (DMBs) remains central to the stability and growth of the Nigerian financial system. Among the key indicators of bank performance is the net interest margin (NIM), which reflects the efficiency of banks in generating interest income relative to the cost of funds. NIM is particularly important in Nigeria, where banks depend heavily on interest-based activities as their primary source of revenue. However, in recent years, Nigerian DMBs have experienced volatile and sometimes declining NIM, raising concerns about the sustainability of their intermediation role (Adekunle & Asaolu, 2021).

Interest rate dynamics play a crucial role in shaping the net interest margin (NIM) of Nigerian deposit money banks. As the primary determinants of interest income and interest expenses, key interest rate indicators such as the savings deposit rate (SDR), prime lending rate (PLR), and maximum lending rate (MLR) directly influence the spread that banks earn from their intermediation activities. The savings deposit rate affects the cost of mobilizing funds, while lending rates determine the pricing of loans and the potential interest income generated from credit operations. In Nigeria, these rates have fluctuated significantly over the years as a result of macroeconomic pressures including inflation, exchange rate instability, and shifts in monetary policy (Nwosu & Okeke, 2022). These fluctuations create uncertainty in banks' income structures, making it difficult for them to maintain stable interest margins. In addition, the increasing preference for treasury bills (TBs) a risk-free investment option raises concerns about whether higher allocations to government securities enhance or weaken banks' margins relative to traditional lending (Vandeweyer, 2024)

The interaction between interest rate components and bank profitability in Nigeria has become increasingly important in understanding movements in net interest margin (NIM). Savings deposit rates in Nigeria are relatively low, which can limit deposit mobilization and constrain the pool of loanable funds available to banks. Conversely, high prime and maximum lending rates may discourage borrowing, particularly for productive activities, thereby reducing the volume of interest-earning loans (Adebayo & Salawu, 2021). These conditions can influence the spread between interest income and interest expenses, which ultimately determines the NIM of banks. Several empirical studies have reported mixed findings on how interest rate structures affect NIM, with some suggesting that inconsistencies between deposit and lending rates may contribute to pressure on banks' margins (Olagunju et al., 2020). However, the evidence remains inconclusive, especially within the Nigerian context.

Furthermore, external factors such as treasury bill rates intensify the challenges associated with effective interest rate management by deposit money banks in Nigeria. Treasury bills, being risk-free government securities, often provide higher returns compared to traditional lending activities. This incentivizes banks to allocate a larger portion of their assets to treasury bills rather than extending credit to the private sector. Such a shift not only constrains credit availability but may also impact banks' profitability and their broader role in fostering economic development (Nwosu & Okeke, 2022).

The challenges affecting net interest margins (NIM) in deposit money banks are not unique to Nigeria but reflect broader trends observed across different economies worldwide. In developed economies such as the United States and the Eurozone, financial systems benefit from stable regulatory frameworks and advanced monetary policy tools that help manage interest rate movements effectively. Central banks in these regions, including the U.S. Federal Reserve and the European Central Bank, employ sophisticated interest rate forecasting and risk management techniques that contribute to relatively stable NIMs and consistent bank profitability, even amid economic uncertainties (Smith, 2020).

Emerging economies, including Brazil and India, face challenges related to less mature financial markets and transitional regulatory environments, which influence the levels of interest rates and their impact on banking profitability. Nonetheless, banks in these countries have adopted dynamic asset-liability management practices and regulatory reforms that help mitigate adverse effects stemming from changes in interest rate conditions. For instance, Indian banks have implemented strategies that adjust lending and deposit rates in response to macroeconomic developments to sustain their interest margins (Singh & Sharma, 2021; Johnson & Olayemi, 2022).

In contrast, developing economies like Nigeria grapple with additional structural challenges such as weak regulatory oversight, heavy dependence on volatile oil revenues, and exposure to external economic shocks. These factors contribute to more volatile interest rate environments and influence banks' portfolio choices, including significant investment in treasury bills. This context exacerbates the complexity of managing net interest margins, highlighting the need to analyze how specific interest rate components such as savings deposit rates, prime lending rates, and maximum lending rates and treasury bill holdings jointly impact Nigerian banks' financial performance (Eze & Anozie, 2023).

Building on this context, this study seeks to explore the relationship between interest income drivers and the financial performance of Nigerian deposit money banks, focusing specifically on interest rate components such as savings deposit rates, prime lending rates, and maximum lending rates. In addition, the study incorporates treasury bill investment volume as a proxy for banks' short-term investment behavior in risk-free securities. Net Interest Margin (NIM) is employed as the primary indicator of financial performance, reflecting the efficiency with which banks manage their interest-earning assets and interest-bearing liabilities.

A review of the existing literature reveals critical gaps in understanding the interplay between these variables, particularly in the Nigerian context. While extensive research has been conducted on the effects of general macroeconomic variables on bank performance, limited studies have examined the specific influence of individual interest rate indicators alongside banks' investment behavior in government securities. For instance, while Adekunle and Asaolu (2021) analyzed macroeconomic determinants of bank profitability, their study did not explore the distinct impacts of prime lending rates, savings rates, and maximum lending rates on net interest margin. Similarly, the role of treasury bill holdings as a substitute for lending activity remains underexplored in relation to NIM in Nigeria.

By addressing these research gaps, this study aims to provide valuable insights for policymakers, regulators, and banking practitioners. A deeper understanding of how interest rate components and treasury bill investments influence bank profitability will

support the formulation of strategies that enhance income stability, optimize asset allocation, and strengthen the overall financial performance of deposit money banks in Nigeria.

The main objective of this study is to examine the effect of interest rate and treasury bill holdings on the net interest margin of deposit money banks in Nigeria.

The following research questions are proposed in the study:

What is the effect of interest rate and treasury bill holdings on Net Interest Margin of selected deposit money banks in Nigeria?

The following hypotheses is formulated in the study:

**H<sub>01</sub>:** There is no significant effect of Prime Lending Rate on Net Interest Margin of selected deposit money banks in Nigeria.

**H<sub>02</sub>:** Maximum Lending Rate does not have any significant on Net Interest Margin of selected deposit money banks in Nigeria.

**H<sub>03</sub>:** Savings Deposit Rate does not have any significant on Net Interest Margin of selected deposit money banks in Nigeria.

**H<sub>04</sub>:** There is no significant effect of Treasury Bill on Net Interest Margin of selected deposit money banks in Nigeria.

## **2. Literature Review**

### **2.1 Conceptual Review**

#### **2.1.1 Net Interest Margin**

NIM represents the difference between interest income earned on loans and interest expenses incurred on deposits, expressed as a percentage of average earning assets. It is a key indicator of how well a bank manages its interest-bearing activities to maximize profitability (Olagunju et al., 2020). Savings deposit rates, prime lending rates, and maximum lending rates are crucial determinants of NIM. Savings deposit rates reflect the cost of funds for banks; lower rates typically reduce funding costs but may discourage deposits. On the other hand, prime lending rates, applied to low-risk borrowers, and maximum lending rates, charged to higher-risk customers, dictate the revenue banks earn from their loan portfolios. A wide spread between deposit and lending rates often enhances NIM but can lead to higher credit risks due to expensive borrowing costs (Eze & Anozie, 2023).

In Nigeria, banks face challenges in maintaining stable NIM due to high lending rates and low deposit mobilization, which are compounded by macroeconomic instability and high inflation. Treasury bill rates, representing risk-free returns, also affect NIM as banks may prefer investing in government securities over extending credit to the private sector. Similarly, the loan-to-deposit ratio (LDR) plays a role, as low ratios indicate inefficiencies in converting deposits into loans, reducing potential interest income (Johnson & Olayemi, 2022).

Globally, NIM trends vary. Banks in developed economies generally maintain stable NIMs due to efficient risk management, while emerging and developing economies, such as Nigeria, experience greater volatility. Structural challenges, such as weak

credit infrastructure and high non-performing loans, further constrain Nigerian banks' ability to optimize NIM, affecting their financial performance (Nwosu & Okeke, 2022).

### **2.1.2. Prime Lending Rate**

Prime lending rates refer to the interest rates that banks charge their most creditworthy customers, typically large corporations with strong credit histories. The prime lending rate serves as a benchmark for other lending rates, influencing the overall cost of borrowing in an economy. In Nigeria, prime lending rates are often influenced by the monetary policy rate set by the Central Bank of Nigeria (CBN) (Eze & Anozie, 2023).. High prime lending rates can constrain access to credit for businesses, particularly small and medium-sized enterprises (SMEs), which may lack the financial strength to qualify for preferential rates. Empirical evidence suggests that elevated prime lending rates in Nigeria have contributed to reduced credit uptake, hindering economic growth and limiting the ability of banks to generate income from loans (Olagunju et al., 2020).

### **2.1.3. Maximum Lending Rate**

Maximum lending rates, on the other hand, represent the upper limit of interest rates charged by banks to borrowers. These rates typically apply to customers with higher credit risks, such as individuals or businesses with limited credit histories or lower credit scores (Olagunju et al., 2020). Maximum lending rates are significantly higher than prime lending rates and can discourage borrowing for productive purposes, particularly in developing economies like Nigeria, where access to affordable credit is essential for economic development. High maximum lending rates have been linked to increased default risks, as borrowers struggle to meet repayment obligations, further impacting the asset quality and profitability of banks (Eze & Anozie, 2023).

### **2.1.4. Savings Deposit Rate**

Savings deposit rates are the interest rates offered by banks to attract deposits from customers. These rates influence the ability of banks to mobilize funds, as higher savings deposit rates often encourage individuals and businesses to save more. Conversely, low savings deposit rates can discourage deposit mobilization, limiting the resources available for lending and other investment activities. According to Adebayo and Salawu (2021), savings deposit rates in Nigeria have remained relatively low compared to inflation rates, reducing the incentive for individuals to deposit funds in banks. This dynamic has created challenges for banks, as they must find alternative ways to attract deposits while maintaining their cost of funds at manageable levels.

### **2.1.5. Treasury Bill Holdings**

Treasury bill holdings refer to the investment by banks in short-term government securities, particularly treasury bills (T-bills), which are debt instruments issued by the government to finance short-term budget deficits. These bills are considered risk-free investments, as they are backed by the sovereign authority of the issuing country, and they provide a predictable stream of interest income (CBN, 2021). For deposit money banks (DMBs), treasury bill holdings serve multiple strategic purposes. First, they provide a liquid and secure investment avenue to manage excess reserves and comply with regulatory liquidity requirements. Second, they act as an income-generating asset, especially when lending conditions in the private sector are weak or when credit risk is high (Okonkwo & Udeh, 2019). The attractiveness of treasury bills increases during

periods of macroeconomic uncertainty or high-interest rate volatility, making them an important component of a bank's asset portfolio.

Conceptually, treasury bill holdings represent a bank's allocation of funds away from traditional lending activities toward low-risk government instruments. This shift in portfolio preference is particularly relevant in countries like Nigeria, where high T-bill rates often encourage banks to invest in government securities rather than extend credit to the private sector (Olagunju et al., 2020). While this enhances short-term earnings through interest income, it may limit the bank's contribution to real sector growth.

## **2.2 Empirical Review**

### **2.2.1 Prime Lending Rate and Net Interest Margin**

Ibrahim and Musa (2021) investigated the influence of prime lending rates and savings deposit rates on the net interest margin (NIM) of Nigerian banks, highlighting the differential impact of these interest rate components on bank profitability. Their study found that prime lending rates exhibited a positive correlation with NIM, suggesting that increases in lending rates can enhance banks' interest income and thus improve profitability. However, fluctuations in savings deposit rates were identified as a source of risk, as volatile or rising deposit rates increase the banks' cost of funds, which can compress net interest margins and threaten sustainable profitability. This dual effect underscores the complex balance Nigerian banks must maintain between attracting deposits and setting profitable loan rates.

Similarly, Olawale and Adeyemi (2020) focused on the role of maximum lending rates and their effect on NIM. Their findings reveal that higher maximum lending rates, while potentially increasing loan yields, often result in reduced loan uptake by borrowers due to affordability constraints. This decline in credit demand can negatively impact banks' overall profitability despite higher interest charges, demonstrating the delicate trade-off inherent in setting lending rate ceilings. The authors emphasize the importance of strategic and well-calibrated interest rate policies that consider both the income effects of higher rates and the potential dampening effect on credit growth.

Supporting these insights from emerging markets, research from developed economies also highlights the critical role of strategic interest rate management in banking profitability. Anderson and Smith (2018) examined U.S. banks and found that the loan-to-deposit ratio serves as a key moderator in the relationship between interest rate fluctuations and profitability. Their study showed that maintaining a balanced loan-to-deposit ratio is essential for ensuring liquidity and optimizing income from loans, particularly in volatile interest rate environments. This balance allows banks to effectively manage funding costs and interest income, thereby stabilizing net interest margins.

Further evidence from the UK banking sector comes from Johnson et al. (2020), who identified prime lending rates as a significant determinant of financial performance, especially during periods of economic uncertainty. Their study demonstrated that fluctuations in prime lending rates have a pronounced impact on banks' profitability, as lending rates directly affect interest income and credit demand. These findings highlight the importance of adaptable interest rate strategies that can respond to macroeconomic shifts, thereby safeguarding banks' financial stability.

### **2.2.2. Maximum Lending Rate and Net Interest Margin**

A study by Singh and Rao (2021) on Indian banks showed that maximum lending rates directly influenced credit growth, with lower rates spurring economic activity but potentially squeezing margins. In Kenya, Njoroge and Wanjiku (2020) found that the savings deposit rate significantly affected banks' cost of funds, influencing their ability to maintain competitive lending rates. Also, Wennborg and Sandberg (2025) investigate the factors driving NIM among Swedish banks between 2015 and 2024. Their study, grounded in the dealership model by Ho and Saunders (1981), utilizes panel data from 17 Swedish banks to analyze how bank-specific factors (such as size and market power measured by the Lerner index), alongside macroeconomic variables (including policy rates, inflation, GDP growth, yield spread, and volatility), influence NIM. The findings reveal that rising policy rates have been a central driver in recent margin increases, while inflation and banks' pricing power also play significant roles in explaining variations in net interest margins.

In contrast, Baye Kebede (2025) focuses on Ethiopian government and private banks, examining the relationship between lending interest rates and profitability over the period 2009 to 2024. Using Pearson's correlation analysis on financial statement data, the study finds a statistically significant negative relationship between lending interest rates and bank profitability. Specifically, increases in lending rates correspond with decreases in profitability, suggesting that higher borrowing costs may suppress loan demand or increase default risk, thereby adversely affecting bank earnings. Further evidence from South Asia reinforces the interconnectedness of interest rate policies and banking performance. Rayamajhi and Bhandari (2024) investigated capital adequacy, bank size, and lending interest rates as determinants of profitability in Nepalese commercial banks. Their results reveal that strong capital adequacy significantly enhances profitability by promoting financial stability and lowering funding costs. In contrast, lending interest rates negatively affect ROA, largely due to reduced loan demand, increased default risk, and higher repayment pressure on borrowers. This finding aligns with evidence from Nigeria, suggesting that excessively high lending rates can hinder bank profitability despite appearing beneficial in the short term.

Similarly, within the Nigerian banking sector, Ebinum (2024) explores the impact of interest rates on the financial performance of deposit money banks over a 34-year period from 1991 to 2024. Employing an ex-post facto research design with Ordinary Least Squares regression and comprehensive diagnostic tests, the study demonstrates that both lending interest rates and deposit interest rates negatively and significantly affect return on assets (ROA), a proxy for bank profitability. The study further identifies currency depreciation, as measured by the exchange rate, as a factor undermining bank performance, while inflation was found to have no statistically significant effect

### **2.2.3. Savings Deposit Rate and Net Interest Margin**

Satriyaningsih and Aliyah (2024) using data from major Indonesian banks listed on the Indonesia Stock Exchange, examined how CASA ratios, NIM, and credit risk shape profitability. Their findings show that while CASA does not significantly influence profitability, NIM exerts a strong positive effect, reaffirming the crucial role of interest-based income in driving bank performance. Conversely, credit risk was found to negatively affect profitability, reflecting how deteriorating asset quality can

erode returns despite strong interest margins. Similarly, Mensah and Addo (2021) explored Ghanaian banks and found that competitive savings deposit rates attracted deposits, enhancing liquidity and financial performance. Scholars have also explored the role of macroeconomic factors. Adebisi and Ogundele (2020) examined the moderating effects of inflation and monetary policy on interest rates in Nigerian banks. They concluded that aligning interest rate policies with macroeconomic conditions improved financial status.

Complementing these insights, Idi and Jabil (2024) explored the broader macroeconomic channel by assessing how interest rate movements influence savings and investment in Nigeria from 1980 to 2023. Their results indicate that interest rates significantly affect both savings mobilisation and investment levels. Higher deposit rates can stimulate savings, thereby improving loanable funds available to banks, while lending rate variations shape investment behaviour. The study recommends policies aimed at boosting savings through attractive deposit rates, a measure that could indirectly enhance banking sector liquidity and support sustainable lending.

#### **2.2.4 Treasury Bill and Net Interest Margin**

A related study by Adebayo et al. (2022) analyzed the relationship between treasury bill rates and NIM, finding that higher treasury bill rates provided alternative investment opportunities, thus influencing banks' lending behaviors and profitability. Oluwafemi and Olayinka (2021) examined the effects of treasury bills and loan-to-deposit ratios in Nigerian banks and found that treasury bills served as a hedge against interest rate volatility, stabilizing NIM. Additionally, they observed that banks with optimized loan-to-deposit ratios experienced better liquidity management and improved financial performance.

Recent research by Vandeweyer (2024) offers valuable insights into the dynamics of treasury bill markets and their implications for banking liquidity and interest rate spreads in the post-Great Financial Crisis (GFC) era. The study models how capital regulations influence banks' willingness to intermediate liquidity derived from reserves, leading to segmentation in money markets and creating scarcity in Treasury bills available to shadow banks. This scarcity is identified as a key driver of short-term spreads, which affects the pricing of treasury bills and related assets. Vandeweyer's framework highlights how open market operations, by swapping ample reserves for scarce Treasury bills or repos, can inversely affect net liquidity provision.

Eze and Nwachukwu (2019) explored the role of interest rate management in mitigating credit risk in Nigerian banks. They discovered that effective control of lending rates minimized non-performing loans, ultimately boosting profitability. The relevance of interest rate management in other African contexts is further demonstrated in studies like that of Mwangi and Kamau (2019), analyzed interest rate caps in Kenya. They found that capping lending rates constrained credit growth but stabilized NIM. Similarly, Mensah and Addo (2021) explored Ghanaian banks and found that competitive savings deposit rates attracted deposits, enhancing liquidity and financial performance. Scholars have also explored the role of macroeconomic factors. Adebisi and Ogundele (2020) examined the moderating effects of inflation and monetary policy on interest rates in Nigerian banks. They concluded that aligning interest rate policies with macroeconomic conditions improved financial stability.

### **2.3 Theoretical Review**

### **2.3.1 Interest Rate Parity (IRP) Theory**

The Interest Rate Parity (IRP) theory, initially proposed by John Maynard Keynes in 1923, provides a fundamental framework for understanding the relationship between interest rates and exchange rates in financial markets. The theory asserts that differences in interest rates between two countries are directly linked to the expected changes in exchange rates between their currencies. This relationship ensures that arbitrage opportunities do not persist in global markets. IRP assumes that investors will move their capital across borders to exploit higher returns until equilibrium is achieved.

The IRP theory operates on the assumption that capital markets are efficient, with minimal restrictions on the movement of funds. It presumes that investors have equal access to information and make rational decisions. Furthermore, the theory assumes that there are no significant transaction costs or barriers, such as exchange controls, which could distort capital flows.

Several scholars have supported the IRP theory in various contexts. Frenkel and Levich (1975) provided empirical evidence of IRP in developed financial markets, demonstrating its accuracy in predicting exchange rate movements. Dornbusch (1980) extended its relevance by integrating it into models of international monetary systems, emphasizing its utility in understanding global capital flows.

Despite its foundational role in international finance, the IRP theory has faced criticism. Aliber (1973) highlighted its limitations in markets with significant transaction costs or regulatory constraints, such as capital controls. Obstfeld and Rogoff (1996) argued that the theory does not account for market inefficiencies or the impact of macroeconomic instability, especially in developing economies. These criticisms underscore the challenges of applying IRP in less efficient or regulated markets.

The relevance of the IRP theory to this study lies in its ability to explain the interplay between interest rate variables—such as savings deposit rates, prime lending rates, and maximum lending rates—and financial performance. In Nigerian deposit money banks, the theory underscores the need to manage interest rate risks in a way that aligns with international benchmarks. However, given the imperfections in Nigeria's financial markets, the IRP theory must be applied with caution, considering local market dynamics and regulatory constraints.

### **2.3.2 Asset-Liability Management (ALM) Framework**

The Asset-Liability Management (ALM) framework, developed in the 1980s with notable contributions from Crouhy et al. (2001), provides a structured approach to managing the risks associated with mismatches between a financial institution's assets and liabilities. The framework emphasizes the importance of optimizing the balance sheet to mitigate risks such as interest rate fluctuations, liquidity shortages, and credit exposures. It is particularly vital for institutions like banks, which rely heavily on interest-sensitive assets and liabilities.

The ALM framework operates under several key assumptions. It assumes that financial institutions aim to achieve an optimal balance between assets and liabilities to maximize profitability while minimizing risks. The framework also assumes that interest rates, liquidity, and credit risks are the primary factors influencing financial

performance. Furthermore, it presupposes the availability of dynamic and data-driven approaches to address mismatches effectively.

Supporters of the ALM framework, such as Van Deventer et al. (2003), have emphasized its critical role in managing interest rate risks. Bessis (2011) argued that the framework enhances financial stability by providing institutions with tools to navigate volatile markets. These scholars highlight ALM's relevance in aligning financial institutions' strategies with market conditions.

Critics, however, point out certain limitations of the ALM framework. Choudhry (2018) argued that the framework often focuses too narrowly on interest rate risks, potentially neglecting other critical risks, such as operational and market risks. Saunders and Cornett (2020) highlighted that the framework's reliance on sophisticated modeling tools might limit its applicability in underdeveloped banking systems, such as those in emerging economies.

The relevance of the ALM framework to this study lies in its application to Nigerian deposit money banks, particularly in managing variables such as savings deposit rates, prime lending rates, and maximum lending rates. By using ALM strategies, these banks can effectively optimize their loan-to-deposit ratios and investments in treasury bills, thereby stabilizing net interest margins (NIM) and improving financial performance. However, the underdeveloped nature of Nigeria's financial markets necessitates adjustments to traditional ALM practices to account for local market challenges.

### **2.3.3 Efficient Market Hypothesis (EMH)**

The Efficient Market Hypothesis (EMH), propounded by Eugene Fama in 1970, posits that financial markets are "informationally efficient." According to this theory, asset prices at any given time fully reflect all available information, implying that no investor can consistently achieve higher-than-average returns through market timing or stock selection. The EMH categorizes market efficiency into three forms: weak, semi-strong, and strong, based on the type of information incorporated into asset prices.

The EMH operates under several assumptions. It assumes that markets are highly competitive and that investors respond rationally to new information. The theory also assumes that transaction costs are negligible and that information is freely available to all market participants. Additionally, it presupposes that investors cannot consistently outperform the market using historical data or public information.

Supporters of the EMH, such as Jensen (1978), have demonstrated its predictive accuracy in developed markets, emphasizing its relevance in understanding asset pricing. Malkiel (2011) also advocated for the theory, arguing that it justifies the adoption of passive investment strategies over active management.

Critics of the EMH, however, have challenged its assumptions and conclusions. Shiller (1981) argued that behavioral biases and market inefficiencies undermine the theory's validity. Lo (2004) introduced the Adaptive Market Hypothesis, suggesting that market efficiency is not constant but varies over time and across contexts. These critiques highlight the limitations of the EMH in explaining real-world market anomalies, particularly in less developed financial markets.

The relevance of the EMH to this study lies in its implications for interest rate management in Nigerian deposit money banks. The theory highlights the importance of transparency and the efficient dissemination of information in setting interest rates, such as savings deposit rates, prime lending rates, and maximum lending rates. However, inefficiencies in Nigeria’s financial markets, characterized by information asymmetry and regulatory challenges, limit the full applicability of the EMH, necessitating a localized approach to interest rate management and financial performance optimization.

In summary, the Asset-Liability Management (ALM) Framework is the most relevant theoretical framework for this study because it directly addresses the management of interest-sensitive assets and liabilities, which is central to understanding how interest rates affect financial performance in Nigerian deposit money banks. The framework emphasizes balancing assets and liabilities to mitigate risks such as interest rate fluctuations, liquidity mismatches, and credit exposures, aligning well with variables like savings deposit rates, prime lending rates, and net interest margin (NIM). Unlike broader theories like the Interest Rate Parity (IRP) and Efficient Market Hypothesis (EMH), the ALM framework focuses on internal strategies for optimizing financial performance, making it particularly suitable for navigating Nigeria's unique banking sector challenges. This practical approach ensures its relevance to the study's objectives.

### 3. Method

This study made use of the *Ex-post* facto research design. Sets of regression estimation techniques was applied to resolve the hypothesis stated while panel fully modified ordinary least square was employed to examine the magnitude and significance of the relationship among the research variables. The population of this study consist of all the twenty-four (24) deposit money banks in Nigeria as at December 31st 2024

A sample of ten banks was selected from the population of the study. The selected banks include WEMA bank, Unity Bank, Eco bank, Sterling Bank and Stanbic IBTC bank, Access bank, Guarantee Trust Bank, Polaris bank, Zenith Bank and United Bank of Africa. The sampling technique is the purposive sampling technique which is a direct way of obtaining the samples in which the researchers only consider typical cases which may quickly and easily provide the required information.

Data for this study were obtained from annual reports of selected banks covering the period between 2014 and 2023. The study's scope from 2014 to 2023 is justified by significant economic and regulatory changes in Nigeria's banking sector during this period. It captures the impact of economic volatility, banking reforms, and technological advancements on interest rate management and financial performance, ensuring the findings are relevant and reflective of recent trends in the sector. Secondary source was used in gathering data for this study. The secondary data for this study was collected and sourced from published financial statement of the selected ten (10) banks.

**Table 1:** Variable Definitions and Measurements

Variable	Acronym	Measurement	Source
Net Interest Margin	NIM	Ratio of net interest income to total interest-earning assets	English (2002); Puspitasari et al. (2021)

Prime Lending Rate	PLR	The benchmark interest rate at which banks lend to their most creditworthy customers	Ibrahim and Musa (2021); Olawale and Adeyemi (2020)
Maximum Lending Rate	MLR	The highest legally or regulatorily permitted lending interest rate	Singh and Rao (2021); Wennborg and Sandberg (2025)
Savings Deposit Rate	SDR	The interest rate paid by banks on savings deposit accounts	Satriyaningsih and Aliyah (2024); Idi and Jabil (2024)
Treasury Bill	TB	TB Volume or value of treasury bills held by banks, representing short-term government securities	Adebayo et al. (2022); Vandeweyer (2024)

### Model Specification

The model in this study follows the work of Adebayo et al. (2022) where they examined the nexus between treasury bill rates and deposit money banks' profitability in Nigeria. Taking cognizance of their models, the model for this study was coined and modified in respect to the objectives of the study and giving as:

Model on the Effect of Interest Rate Indicators and Treasury Bill Holdings on the Net Interest Margin of Deposit Money Banks in Nigeria

$$NIM = f(PLR, MLR, SDR, TB) \text{-----}$$

------(3.1)

Where:

NIM= Net Interest Margin

PLR= Prime Lending Rate

MLR= Maximum Lending Rate

SDR= Savings Deposit Rate

LTB = Log of Treasury Bill

Mathematically

$$NIM = \beta_0 + \beta_1 PLR + \beta_2 MLR + \beta_3 SDR + \beta_4 LTB + u \text{-----}$$

------(3.2)

To reduce some variables with a tenfold difference between two values to a twofold difference, some variables were log-transformed, while others were not because they were already expressed as rates. The model was then restructured into...

$$NIM = \beta_0 + \beta_1 PLR + \beta_2 MLR + \beta_3 SDR + \beta_4 LTD + \beta_4 LTB + u \text{-----}$$

--(3.3)

## 4. Results and Discussion

### 4.1 Pre-Estimation Test

**Table 2: Descriptive Statistics**

	<b>NIM</b>	<b>PLR</b>	<b>MLR</b>	<b>SDR</b>	<b>LTB</b>
Mean	5.7537	56.14907	26.6167	3.9203	15.927
Median	4.8300	1.1378	26.000	3.6000	16.827
Maximum	11.100	900.00	40.000	33.000	20.664
Minimum	3.3800	0.0000	14.000	2.1000	8.319
Std. Dev.	2.2199	173.7422	5.1736	2.990832	3.7328

Skewness	0.9942	3.3959	-0.0897	9.4131	-0.8691
Kurtosis	2.5263	14.13426	3.1258	92.132	2.4463
Jarque-Bera	17.236	701.6582	0.1979	34232.89	13.311
Probability	0.0002	0.000	0.9058	0.000	0.0013
Sum	569.62	5558.76	2635.0	388.11	1528.96
Sum Sq. Dev.	482.95	2958261.	2623.1	876.62	1323.7
Observ	99	99	99	99	99

**Source:** Authors' computation (2025) using E-views 9

Where NIM is Net Interest Margin, PLR is Prime Lending Rate, MLR is Maximum Lending Rate, SDR is Savings Deposit Rate, TB is Treasury Bill Holdings,

Table 2 presents the descriptive statistics result of the interest rate drivers and Net Interest Margin of deposit money banks in Nigeria. The variables used were log of Treasury Bills (LTB), net interest margin (NIM), Savings Deposit rate (SDR), Prime Lending rate (PLR) and Maximum Lending rate. Mean of NIM, LTB, SDR, PLR and MLR. were 5.754 15.926, 3.920, 56.149, 0.72455, 0.389 and 26.61667 respectively. The table shows that their mean is within the minimum and maximum, this invariably show that their mean is consistent. The skewness indicated that SDR, PLR and NIM, are positively skewed. The kurtosis implies the peakedness of the bell shape, hence NIM and TB are leptokurtic giving their value of below 3 while SDR, PLR and MLR are platykurtic as the values lies above 3. The coefficients of the Jarque-Bera (JB) statistical test signified that MLR were normally distributed at 5% significant Level.

#### 4.1.2 Correlation Analysis

**Table 3:** Correlation Matrix

	NIM	PLR	MLR	SDR	LTB
NIM	NIM	NIM	NIM	NIM	NIM
PLR		1		-0.0243	
MLR		-0.0525	1	-0.0462	
SDR				1	
LTB	0.2324	-0.0106	-0.1221	-0.0096	1

**Source:** Authors' computation (2025) using E-views 9

Table 3 presents the correlation coefficients of Savings Deposit Rate (SDR), Prime Lending Rate (PLR), Maximum Lending Rate (MLR), Net Interest Margin (NIM) and Log of Treasury Bills (LTB). The results show that the correlation between the variables were low, this shows that none of the independent variables has tendency of causing multicollinearity in the model since none of the correlations value is close to 1.00

#### 4.1.3 Panel Unit Root Test.

**Table 4:** PP - Fisher Chi-square Unit Roots Test Result

Var	Level & (P-value)	First Diff (P-value)	Order of Integration	Max. No Lags
NIM	0.51697 (0.6974)	-8.35323 (0.0000)	I (1)	2

PLR	-5.12664 (0.0000)***	-3.47159 (0.0003)	I (0)	2
MLR	41.2726 (0.0014)*	80.2646 (0.0000)***	I (0)	2
SDR	29.6610 (0.0755)	78.5447 (0.0000)	I (1)	2
LTB	0.84864 (0.8020)	-5.64899 (0.0000)***	I (1)	<b>2</b>

**Source:** Authors' computation (2025) using E-views 9

Table 4 reports the outcome for the Phillips-Perron panel unit root tests. The results show that the null hypothesis of the unit roots for the panel data for log of Treasury Bills (LTB), net interest margin (NIM), Savings Deposit rate (SDR), Prime Lending rate (PLR) and Maximum Lending rate cannot be rejected in the level. However, this hypothesis was rejected when the series are in their first differences. The result strongly indicates that the series were not stationary at their level but became stationary at their first differences. Also, MLR was stationary at the level, hence the null hypothesis of no unit root test was rejected at level.

#### 4.1.4 Panel Co-integration Test

**Table 5:** Pedroni Residual Cointegration Test

Series: NIM PLR MLR SDR LTB				
	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	0.920016	0.1788	-0.607344	0.7282
Panel rho-Statistic	3.478478	0.9997	3.720589	0.9999
Panel PP-Statistic	-7.888488	0.0000	-6.138250	0.0000
Panel ADF-Statistic	-5.595321	0.0000	-3.588306	0.0002

**Source:** Authors' computation (2025) using E-views 9

Table 5 shows the result of co-integration test using Pedroni Residual Co-integration test. Like the former result, both PP and ADF was consistent as both show that there exists a long run relationship between the NIM and the explanatory variables given the Probability value of ADF and PP statistics to be less than 5% significance inference. The studies proceed to estimate the cointegration Regression test using the Fully Modified Ordinary Least Square technique.

## 4.2 Test of Hypotheses

### 4.2.1 Estimation of the effect of Interest rates on Net Interest Margin

Table 6: Estimation Result of the Effect of Interest Rates and Treasury Bill Holdings on Net Interest Margin

Dependent Variable: NIM				
Method: Panel Fully Modified Least Squares (FMOLS)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
PLR	0.000102	0.000375	0.272909	0.7857
MLR	0.005919	0.021139	0.280016	0.7803
SDR	0.402508	0.171643	2.345023	0.0217
TB	-2.530000	5.650000	-0.447677	0.6557
R-squared	0.943368	F-statistic		6.264044***
Adjusted R-squared	0.932507	Chi-square		25.05617***

Long-run variance	0.323558
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**Source:** Authors' computation (2025) using E-views 9

Note: \*\*\* implies 5% significance level

The results presented in Table 6 estimate the effect of interest income drivers—specifically savings deposit rate (SDR), prime lending rate (PLR), maximum lending rate (MLR), and treasury bill holdings (TB)—on the net interest margin (NIM) of deposit money banks in Nigeria. The coefficients for SDR, PLR, and MLR are all positive, which aligns with theoretical expectations, indicating that increases in these rates are associated with improvements in net interest margin. In contrast, treasury bill holdings show a negative coefficient, which deviates from theoretical expectations. This suggests that greater investment in treasury bills may reduce NIM, possibly because such investments substitute more profitable lending activities.

In terms of magnitude, the savings deposit rate exerts the most substantial positive effect on NIM, with a coefficient of 0.4025. However, only SDR is statistically significant at the 5% level ( $p = 0.0217$ ), indicating a meaningful individual impact. The prime lending rate (PLR), maximum lending rate (MLR), and treasury bill holdings (TB) all show statistically insignificant effects, as their p-values exceed the 5% threshold.

The model demonstrates a high explanatory power, with an R-squared value of 0.943, implying that 94.3% of the variation in net interest margin is explained by the independent variables in the model. The adjusted R-squared is also high at 0.933, confirming the robustness of the model. Furthermore, the F-statistic, indicated by the Wald Chi-square value of 25.05617, is statistically significant at the 5% level, suggesting that the independent variables jointly have a significant effect on NIM. Therefore, the null hypothesis of no joint effect is rejected in favor of the alternative hypothesis, which posits that interest income drivers significantly influence the net interest margin of deposit money banks in Nigeria.

### 4.3 Discussion of Findings

The findings from Table 6 reveal that the savings deposit rate (SDR) has a positive and statistically significant effect on the net interest margin (NIM), indicating that an increase in SDR enhances NIM. This outcome aligns with theoretical expectations, as higher savings deposit rates attract more deposits, increase the availability of loanable funds, and potentially improve banks' interest income. This finding is consistent with Wambari and Mwangi (2017), who reported a positive relationship between interest rates and NIM in Kenya, and Kalsoom and Kashif (2016), who emphasized the importance of interest rate spreads in bank profitability in Pakistan. Similarly, Chaudron (2016) highlighted that net interest income is a core component of bank profitability, underscoring the need for effective interest rate management. However, this result contrasts with Peng and Shu (2013), who found a negative and significant relationship between lending rates and NIM in Hong Kong, and Bordo (2007), who noted that interest rate volatility compresses banks' interest margins in the United States.

The effects of the prime lending rate (PLR) and maximum lending rate (MLR) on NIM are positive but statistically insignificant. This suggests that although higher lending rates may theoretically enhance margins, factors such as loan demand sensitivity, competitive pricing, and regulatory constraints may mitigate their actual impact. This aligns with Chaudron (2016), who argued that interest rate changes influence

profitability indirectly. Nonetheless, this finding differs from that of Oladele et al. (2017), who reported a significant positive effect of lending rates on bank profitability in Nigeria.

Treasury bill holdings (TB) also exhibit a negative relationship with NIM, though the effect is statistically insignificant. The negative coefficient suggests that increased investment in treasury bills may crowd out lending activities and reduce net interest margins, possibly due to the lower returns from government securities compared to private sector lending. This result aligns with Enyioko (2012), who found that interest rate policies in Nigeria had minimal impact on bank performance. However, it contrasts with the findings of Oladele, Amos, and Adedeji (2017), who observed a significant positive relationship between treasury bill investments and bank profitability.

Overall, the model displays strong explanatory power, with an adjusted R-squared value of 93.3%, indicating that the independent variables jointly explain a substantial proportion of the variation in net interest margin. Moreover, the significant F-statistic confirms that the variables collectively exert a statistically significant effect on NIM, validating the rejection of the null hypothesis in favor of the alternative.

## **5. Conclusion and Recommendations**

This study examined the effect of interest income drivers including savings deposit rate (SDR), prime lending rate (PLR), maximum lending rate (MLR), and treasury bill holdings (TB) on the net interest margin (NIM) of deposit money banks in Nigeria between 2014 and 2023. The findings revealed that SDR had a positive and statistically significant effect on NIM, highlighting the importance of deposit mobilization in boosting bank profitability. Although PLR and MLR showed positive relationships with NIM, their effects were statistically insignificant, suggesting that broader regulatory or market factors may influence their effectiveness. Importantly, treasury bill holdings exhibited a negative but statistically insignificant relationship with NIM, indicating that higher allocations to government securities may reduce interest margins by diverting resources away from potentially more profitable lending opportunities. Based on the study's findings, the following recommendations are made in line with its objectives.

Since SDR showed a significant positive effect on net interest margin, banks should focus on offering competitive and sustainable savings rates to encourage deposit mobilization. More deposits increase the volume of loanable funds, which can be channeled into interest-earning assets. Regulatory authorities should also ensure monetary and inflationary stability to protect the real value of deposit returns.

Although both PLR and MLR showed positive but statistically insignificant effects, banks can still explore their potential by targeting lending strategies toward sectors that offer stable and high returns. Adjusting lending rates alone may not yield significant changes in NIM unless paired with strong credit risk assessments and tailored loan products.

The negative relationship between treasury bill holdings and NIM implies that over-reliance on government securities might reduce profitability. Banks should strike a balance between holding risk-free assets like treasury bills and allocating funds to productive lending activities. Treasury bills may serve liquidity or safety purposes, but excessive holdings can reduce income margins.

Since not all interest rate indicators significantly affect NIM individually, banks should adopt a comprehensive income strategy balancing deposit rate policies, loan pricing, and investment allocation. Innovative lending products, improved customer segmentation, and better interest rate risk management can help sustain and grow net interest margins over time.

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