



Liquidity Indicators and Deposit Money Banks Profitability in Nigeria: 1981-2023

¹Stephanie Ivosire Samson, ²Ogwuche David Dauda & ³Oniore Jonathan Ojarikre

^{1,2,&3}Department of Economics, Faculty of Social Sciences, Bingham University, Karu, Nigeria

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Abstract

Deposit money banks are continuously under the watchful eye of monetary authorities; therefore, they are unable to operate and fulfil their core duty of raising capital from customer deposits for economic investments on their own volition. Policies such as liquidity management are a major concern for monetary authorities since liquidity difficulties can have a considerable impact on bank profitability. Profitability and liquidity, in general, are good measures of the health and success of all businesses focused on making money, including deposit money banks. Unfortunately, many Nigerian banks lack the proper planning necessary for effective liquidity management. Thus, employing time series data spanning from 1981 to 2023, the study experimentally investigated the effect of liquidity indicators on deposit money banks' profitability in Nigeria. The Autoregressive Distributed Lag technique was utilized in the paper to analyse the data. The paper revealed a negative correlation between the loan to deposit ratio and the short-term growth in deposit money bank profitability. Additionally, research findings showed that, in the near term, deposit money banks' profit growth is strongly and favourably impacted by cash balances stored with the Central Bank of Nigeria. However, both in the short and long terms, loans, advances, and liquidity ratio had a favourable and considerable impact on deposit money institutions' profitability. Thus, in order to increase their profitability, the study recommended that deposit money banks in Nigeria focus more on their liquidity by growing its level through conservative expenditure, aggressive deposit acquisition, and debt collection. Deposit money banks should also concentrate on utilizing the loan to deposit ratio in order to optimize their financial performance, as the cash reserve ratio appears to have an adverse effect on it. In order to improve banks' performance, regulatory bodies like the Central Bank of Nigeria and the Nigeria Deposit Insurance Corporation should also demand raising the percentage of loans that banks make to their depositors; since the result of the investigation indicated that loans and advances are positively and significantly related to deposit money banks profit growth both in the short run and long run.

Keywords: *Liquidity, Profitability, Banks ARDL, and Nigeria*

Corresponding Author: Stephanie Ivosire Samson

Background to the Study

Deposit money banks perform essential fund intermediation roles in the economy by collecting consumer deposits and using these funds for market investments. This process stimulates economic growth and helps achieve economic objectives. However, these banks do not operate independently. The Central Bank of Nigeria (CBN) is responsible for regulating their activities to ensure they align with national economic goals, using either contractionary or expansionary monetary policy tools. The CBN's oversight influences the banks' operations and objectives, as monetary policies impact factors such as bank liquidity, loans, and advances. These effects ultimately influence the banks' ability to achieve their primary goal of profitability, with net profit serving as a measure of their success.

Monetary supervisors place significant emphasis on policies like the liquidity ratio due to its critical impact on banks' operational performance and profitability. Liquidity issues can lead to bank insolvency and potentially result in bank failure. Moreover, stringent liquidity ratios can diminish a bank's solvency, which refers to its ability to meet long-term financial obligations. The money supply also influences a bank's liquidity, affecting its capacity to mobilize deposits and extend credit. Consequently, any impact on credit affects interest income. Interest rates play a crucial role in the loans and advances banks offer to customers, and high rates can reduce the customer base, thereby hindering the bank's ability to achieve corporate goals and perform its intermediation function, ultimately affecting the economy in the long run.

From a practical perspective, profitability and liquidity serve as reliable indicators of the performance of money-making enterprises, including commercial banks (Eljelly, 2004). However, successful liquidity management necessitates thorough planning, which is often deficient in many Nigerian banks. Only a select few deposit money banks are capable of effectively planning for their short-term, medium-term, and long-term liquidity needs. The nature of a firm's business primarily dictates its liquidity requirements. Recently, managing liquidity levels in firms, especially banking institutions, has faced numerous challenges, causing significant economic difficulties. Consequently, this paper empirically examined the impact of liquidity indicators on the profitability of deposit money banks in Nigeria by analysing time series data from 1981 to 2023. Five sections make up the remainder of the paper. The concepts of bank profitability and liquidity management, as well as a theoretical analysis and empirical data, are included in the next section's concise summary of the literature. Sections Three and Four describe the analytical framework and the empirical conclusions from the data analysis. The paper's results and suggestions are presented in Section five.

Literature Review

Conceptual Review

Profitability is about a business's capability and potential to make money from sales and other specific sources of income over a specific period (Margaretha & Spartina, 2016). It's when the money earned during a period is more than the money spent during that same period, all for the sole purpose of making money (Malik & Aqeel, 2017). The key is that the money earned

and spent happen at the same time, and the money earned directly comes from the money spent. The profitability of a bank can be assessed through various indicators like return on assets, gross profit, net profit, and return on capital employed. However, the most frequently used indicator is the Return on Assets (ROA) ratio. The Return on Assets ratio is a profitability indicator primarily used to evaluate the profit generated by banks at the end of a period. It calculates the total net profit derived from the bank's total assets over a specific time. This ratio indicates how effectively a bank can use its assets or utilize its available assets to achieve the highest profit.

Liquidity is a financial term that refers to the amount of capital available for investment (Kyari *et al.*, 2023). It encompasses a bank's ability to promptly meet its obligations, including cash, checks, other withdrawals, and new loan requests, while adhering to existing reserve requirements. Liquidity measures the ratio of assets (either in cash or easily convertible to cash without loss of value) available to cover short-term liabilities. During economic downturns, liquid assets are particularly vital for maintaining a bank's reputation. Trust in banks is significantly influenced by their ability to honor their debts as they fall due. According to Roy *et al.* (2019), bank liquidity is the assurance that banks can invest in assets while fulfilling all their obligations at the right time and in a prudent manner. Liquidity is essentially the capacity of banks to ensure that account holders can access their funds at any time, and the assurance banks provide that they can meet all their financial commitments by maintaining a high proportion of liquid assets (Alali, 2019). However, it's important to note that a successful business may not always be liquid, and liquidity alone does not guarantee profitability. Key indicators of liquidity management include loan and advance portfolios, bank balances held with the Central Bank of Nigeria (CBN), treasury bills and certificates, Loan-to-Deposit ratio, liquidity ratio, and cash ratio.

Empirical Review

Mariscal-Cáceres *et al.* (2024) conducted a comprehensive analysis of the evolution of bank liquidity regulations, spanning from the onset of the banking and liquidity crisis in 2007–2008 to the current era. Their study focused on the recent developments in credit institutions in Spain, examining how various banking perspectives have evolved in response to new regulations and supervisory measures initiated by the European Central Bank at the end of 2014. The research methodology was structured around a literature review, followed by the compilation and analysis of financial and statistical data from key sources, including the European Central Bank, the Bank of Spain, and other relevant agencies and financial institutions. The analysis concluded with a reflection on the sector's future prospects, considering the recent effects of the COVID-19 pandemic and the supply chain disruptions exacerbated by global inflation and rising interest rates. Additionally, the study highlighted that credit institutions in Spain have made significant strides in enhancing their liquidity positions over the past 15 years.

The impact of liquidity management on the performance of Nigerian banks was explored by Tasié *et al.* (2024). The study selected three banks at random to serve as representatives of the entire Nigerian banking sector. The indicators of liquidity management included loans and

advances, bank balances held with the Central Bank of Nigeria (CBN), and treasury bills and certificates. Meanwhile, profit after tax was used as a proxy for performance. The research utilized regression analysis to test the hypothesis. The findings revealed that liquidity management indeed poses a significant challenge within the Nigerian banking industry. Consequently, the authors recommend that banks should employ competent and qualified personnel to ensure the adoption of appropriate decisions, particularly regarding the optimal level of liquidity, while maximizing profit. It is recognized that no firm is exempt from the necessity of a certain level of liquidity, which varies based on the nature and scope of its operations. Liquidity within the financial system is crucial for sustaining the vitality of an economy.

Chokroborty and Hasan (2024) conducted a study examining the impact of liquidity management on the profitability of both public and DSE-listed private sector banks and compared the outcomes across these sectors. The research was based on a sample of nine banks from the public sector, comprising six state-owned banks and three specialized banks, and nine banks from the private sector listed on the DSE. Additionally, data spanning five years, from 2013 to 2017, was collected to assess the influence of liquidity management on profitability. Given the inherent trade-off between liquidity and profitability, the study aimed to determine whether this trade-off was present across all banking sectors and evaluate the efficiency of liquidity management within these banks. The study also highlighted the liquidity challenges faced by the banking industry in Bangladesh, particularly noting issues related to liquidity since 2018. The analysis phase of the study reviewed the liquidity management conditions before 2018 and explored the relationship between liquidity and profitability across both public and private sector banks. To measure liquidity management, financial ratios such as the current ratio, cash-deposit ratio, credit-deposit ratio, and investment-deposit ratio were utilized. Similarly, profitability was measured using return on assets and return on equity. Descriptive statistics were employed to determine the average, standard deviation, maximum, and minimum values of these ratios. To assess the correlation between variables, the Pearson Correlation test was used. The study aimed to evaluate the relationship between liquidity and profitability by constructing a regression model. Initially, the return on assets was selected as the dependent variable, with all liquidity ratios as independent variables. The model was developed separately for public sector and DSE-listed private sector banks. The findings were then compared to understand the effect of liquidity management on profitability and to assess the efficiency of liquidity management across these sectors. The results indicated that DSE-listed private sector banks were more efficient in managing liquidity, suggesting that their liquidity management practices did not negatively impact profitability. Conversely, public sector banks were encouraged to enhance their liquidity management strategies to better align with the profitability standards set by DSE-listed private sector banks, thereby improving their competitiveness in the banking sector of Bangladesh.

The study conducted by Stevcevska-Srbinska and Gjelevska (2024) explored the correlation between liquidity (measured by the ratio of liquid assets to short-term liabilities) and profitability (assessed through Return on Assets (ROA) and Return on Equity (ROE))

positions) within the commercial banking sector in North Macedonia and Serbia. The aim was to determine whether fluctuations in liquidity levels affect profitability. Utilizing descriptive, correlation, and regression analysis, the researchers examined two sub-periods: 2010-2019 and 2020-2021, focusing on changes in the liquidity-profitability positions during crises in both countries. Their findings shed light on the performance of liquidity and profitability during periods of instability, marking this study as a pioneering effort in evaluating the impact of the pandemic on liquidity and performance in these markets through empirical analysis.

Furthermore, Uruakpa (2024) investigated the influence of liquidity management on the profitability of deposit money banks in Nigeria. The specific objectives included determining the impact of cash management on banks' Return on Assets (ROA), evaluating the effect of shareholders' capital on ROA, and exploring the relationship between Loan to Deposit Ratio (LDR) and ROA. Data for this study were collected from the Central Bank of Nigeria (CBN) and Nigeria Deposit Insurance Corporations (NDIC), spanning the period from 1995 to 2021. The collected data were analyzed using descriptive statistics and multiple regression analysis. The results indicated significant relationships between cash management, shareholders' capital, and banks' ROA. Additionally, the study found a significant relationship between LDR and ROA. Based on these findings, the paper recommended that bank management adopt efficient cash management policies to enhance profitability.

The study conducted by Mikou *et al.* (2024) delved into the unique challenges and strategies associated with liquidity risk management in Islamic banks. It explored the customary obstacles and limitations these institutions face, alongside the methods they employ to effectively manage and mitigate these risks. The inclusion of a comprehensive literature review, covering the most cited articles on the subject, provided a summary of key studies and research in the field of liquidity risk management within Islamic banking. This review aimed to cover various aspects of liquidity risk management in Islamic banks, including risk identification, measurement, mitigation strategies, governance, interbank relationships, regulatory considerations, and the role of Shariah compliance. It offered researchers and practitioners a thorough overview of the existing body of knowledge, enabling them to understand the current state of research and build upon existing insights. By providing a comprehensive coverage of current information and practical strategies available in the literature, the paper highlighted the persistent need for effective liquidity risk strategies in the Islamic banking sector and offered insights into the application of liquidity risk management practices that align with Islamic finance principles. Additionally, the paper attempted to address a gap in the existing literature, which could serve as a foundation for future research perspectives.

Shrestha and Chaurasiya (2023) conducted a study to explore the relationship between liquidity management and profitability among joint venture commercial banks in Nepal. Their research employed descriptive statistics, Pearson correlation, regression analysis, and t-tests to analyze data from five samples, each representing out of a total of 27 samples covering the period from 2012 to 2021. The study focused on liquidity management, which was

measured by variables such as Credit Deposit Ratio (CDR), Capital Adequacy Ratio (CAR), Current Reserve Ratio (CRR), Total Deposit to Total Assets Ratio (TDTAR), Total Loan to Total Assets Ratio (TLTAR), and Return on Assets (ROA). The findings of the study indicated a R square value of 0.615, suggesting that 61.5% of the variation in the dependent variable (ROA) could be explained by the independent variables, with the remaining 38.5% attributed to other factors not accounted for in the model. Additionally, the study revealed a strong positive correlation between the dependent variable (ROA) and the set of independent variables. The results showed a significant impact of Total Loan to Total Assets Ratio (TLTAR) on ROA, while there was no significant effect of Credit Deposit Ratio (CDR), Capital Adequacy Ratio (CAR), Current Reserve Ratio (CRR), and Total Deposit to Total Assets Ratio (TDTAR) on ROA for joint venture commercial banks in Nepal.

The financial performance of Nigerian listed deposit money banks was explored by Nwokoro *et al.* (2023) in the context of liquidity management. They collected panel data on liquidity management and return on equity from the annual reports of eight listed international banks on the Nigerian Exchange Group spanning the years 2010 to 2020. The analysis employed Ordinary Least Squares regression and Error Correction Model techniques. The results revealed a significant correlation between liquidity management and return on equity, leading to the conclusion that effective liquidity management positively influences financial performance. The study recommended that the Central Bank of Nigeria should closely monitor and, if necessary, enforce sanctions on banks failing to implement liquidity policy tools effectively, aiming to achieve the desired liquidity levels.

Igwenwanne *et al.* (2023) further investigated the impact of liquidity management on the performance of banks in Nigeria over a decade, from 2012 to 2021. They used four liquidity management proxies—liquidity ratio, cash ratio, efficiency ratio, and loan-to-deposit ratio—and regressed them against Tobin's q using the Fixed Panel Least Square method for model estimation. Preliminary tests, including descriptive statistics, Levin, Lin, and Chu (LLC) unit root tests, and Hausman Specification tests, were also conducted. The study found a positive and significant relationship between liquidity management and bank performance, with the efficiency ratio and liquidity management having the strongest positive impact. Conversely, the cash ratio showed a negative but insignificant relationship with bank performance. Based on these findings, the study emphasized the importance of effective liquidity management for bank performance in Nigeria. It concluded that banks should prioritize measures that ensure efficient liquidity management over focusing solely on profit maximization. This suggests that banks should allocate their excess cash to short-term money market instruments.

The study by King and Iwedi (2023), explored the impact of liquidity risk management methods on the profitability of Nigerian financial institutions. Utilizing the Ordinary Least Squares technique, the research found that the current ratio of the banks ranged from 1.74 to 2.49, indicating that most banks were well within the desired range and not overextended, ensuring they could meet depositors' withdrawal demands in the near future. The coefficient of the cash ratio, however, was statistically insignificant, suggesting its negligible impact on

the profit margins of commercial banks. Regarding the coefficients of the current ratio and cash ratio, they were also statistically insignificant and negatively related to the banks' net profits, implying a limited effect of these ratios on profitability. The study concluded that the majority of Nigerian commercial banks possess adequate financial resources to cover their current liabilities, attributed to their strong capitalization.

Adaghegbe and Idolor (2023) delved into the trade-off between liquidity and profitability in Nigerian banks. Their research focused on 10 deposit money banks in Nigeria, utilizing a panel data set spanning from 2010 to 2022. To measure profitability, return on assets (ROA) was employed as a proxy, while liquidity indicators such as the Current Ratio (current assets to current liabilities), Cash to Total Asset (CTA), Cash to Total Deposit Ratio (CTD), Liquid Asset to Total Assets (LATA), and Loan to Total Deposit (LTD) were considered. The Ordinary Least Squares (OLS) technique was applied for estimation. The findings revealed a statistically significant and positive relationship between the Cash to Total Asset (CTA) ratio and profitability (ROA), as well as a positive, but statistically insignificant, relationship between Liquid Asset to Total Assets (LATA) and profitability. Conversely, a negative, statistically significant relationship was observed between the Cash to Total Deposit (CTD) ratio and ROA. The study also noted a positive, but statistically non-significant, relationship between the Current Ratio and Loan to Total Deposit (LTD) ratio and profitability. The researchers recommended that while the survival of deposit money banks hinges on effective liquidity management, banks should not solely focus on maximizing profit but also prioritize measures that enhance liquidity management efficiency.

The impact of liquidity management on the profitability of Nigerian listed deposit money banks was examined by El-Maude *et al.* (2022). The study's target population encompassed all 16 quoted deposit money banks in Nigeria as of December 31, 2020. Out of these, 14 were purposefully selected based on their comprehensive annual reports and accounts over the study period. Employing an ex-post factor research design, the necessary data were collected from the banks' financial statements spanning ten years (2011-2020). The data were then analyzed using both descriptive and inferential statistics. The findings indicated a positive and significant correlation between liquidity ratios and return on assets, with a positive but insignificant effect observed for the loan to deposit ratio on return on assets. Conversely, the cash reserve ratio was found to have a negative but significant impact on the banks' returns on assets. Consequently, the study concluded that liquidity management significantly influences the profitability of Nigerian listed deposit money banks. To enhance profitability, the study recommended that bank management focus on maintaining an optimal liquidity level through prudent spending and aggressive deposit and debt recovery efforts, which were found to positively affect return on assets. Additionally, shifting attention away from the cash reserve ratio, which was shown to have a negative effect on returns on assets, was advised.

Theoretical Framework

The paper was underpinned by the shift-ability theory of liquidity management. This theory, proposed by Moulton in 1918, suggests that banks should not rely on the maturities of their financial obligations. Instead, they should maintain a reasonable amount of liquid assets that

can be easily transferred to other banks for immediate cash needs, without significant loss in asset value. According to this theory, the assets to be transferred should be easily transferable and retain their value. Such assets are typically short-term, like bills of exchange and treasury bills, which are readily available when banks need cash. This concept is valid when liquidity crises are not widespread; however, during a universal liquidity crisis, banks should hold assets that can be quickly transferred to the central bank, as the central bank acts as the lender of last resort.

This theory holds some truth, as banks now accept sound assets that can be easily transferred, such as treasury bills, shares, bills of exchange, and debentures of multinational companies. However, the theory has its limitations. Simply having assets that can be transferred does not necessarily mean a bank is more liquid. The situation depends on the economic circumstances. During an economic crisis, assets like shares, debentures, and bills of exchange may not be transferable because there is a high demand to sell, and no one wants to buy. A bank may have a large volume of shiftable assets to sell but could face adverse effects if it tries to sell them to other banks during a run. If all banks simultaneously decide to transfer their shiftable assets, the consequences could be disastrous for both borrowers and lenders.

Methodology

The ex-post facto design is the chosen research design for this work. An empirically based study design that establishes the cause-and-effect link between the independent and dependent variables is called the ex-post facto design. The incapacity of the researcher to alter the data being studied is what distinguishes this method.

Model Specification

Following the theoretical framework discussion in the section above, the paper's empirical model specification was in accordance with the model used by Tasié *et al.* (2024), who investigated how liquidity management affected Nigerian banks' performance between 2015 and 2022. Their original model is as follows:

$$PAT_t = \delta_0 + \delta_1 LA_t + \delta_2 CB_t + \delta_3 TBC_t + \mu_t \quad (1)$$

Where, PAT_t = Profit after tax; LA_t = Loans and advances; CB_t = Cash and balance held with Central Bank of Nigeria; TBC_t = Treasury bill and certificate; and μ_t = Other variables not explicitly included in the model.

Loans and advances, bank balances held with the CBN, treasury bills and certificates, loan to deposit ratios, liquidity ratios, and cash ratios were added as proxies for liquidity management, while return on assets was added as a proxy for deposit money banks' profitability. All these factors are expected to be significant determinants of banks profitability. Previous research has incorporated these factors into the analysis from various angles; however, no particular study that considers all of these liquidity management indicators in a single model has been found. Thus, equation (1) can be functionally rewritten in semi-logarithm equation as:

$$ROA_t = \beta_0 + \beta_1 LDR_t + \beta_2 InCB_t + \beta_3 InLA_t + \beta_4 LR_t + \varepsilon_t \quad (3)$$

Where, In: Natural logarithm; ROA_t = Return on assets as proxy for deposit money banks profitability; LDR_t = Loan to deposit ratio; CB_t = Cash balances held with the CBN; LA_t = Loans and advances; LR_t = Liquidity ratio; β_0 = The intercept or autonomous parameter estimate, β_1 to β_4 = Parameter estimate representing the coefficient of LDR, CB, LA and LR respectively, and ε_t - other variables not explicitly included in the model. The apriori expectations of the parameter are as thus; β_1 to $\beta_2 < 0$ and β_3 to $\beta_4 > 0$. Furthermore, to examine the impact of liquidity management on deposit money banks profitability in Nigeria, equation (3) was transformed into Autoregressive Distribution Method (ARDL) by incorporating of liquidity management policy variables as follow:

$$y_t = \alpha_0 + \sum_{i=1}^p \alpha_i \Delta y_{t-i} + \sum_{i=0}^k \beta_{2i} \Delta X_{t-i} + \sum_{i=0}^k \beta_{3i} X_{t-i} + \mu_t \quad (4)$$

Where y_t is return on assets as proxy for deposit money banks profitability, $X_{t,i}$ represent the vector of liquidity management variables and its lagged. Δ distinguishes the short-run effects from the long-run effects and μ_t is the idiosyncratic error term at time t.

The Autoregressive Distribution Method (ARDL) estimation approach was used due to the following reasons. Firstly, the ARDL approach of co-integration analysis is unbiased and relatively more efficient in small or finite sample data sizes such as the present study (Oteng-Abayie & Frimpong, 2006; Narayan & Narayan, 2003). Secondly, the ARDL cointegration approach is utilizable irrespective of whether the regressors in the estimating model are purely I(0), purely I(1) or mutually integrated. However, the procedure crashes in the presence of I(2) series (Oteng-Abayie & Frimpong, 2006). Thirdly, both the long-run and short-run components of the model can be estimated simultaneously, thereby eliminating problems associated with omitted variables and autocorrelations (Narayan & Narayan, 2003).

Variables Description

Table 1 Gives specific summary of variables description, and source of data.

Table 1: Variables Description

Variables	Description and Measurement	Sources
Return on Asset	Return on Asset is the ratio of bank net profit to total assets	NDIC
Loan to deposit ratio	This is an indicator of the bank's ability to meet the day-to-day cash requirements of depositors	CBN
Cash balances	This is the level of cash reserves that a bank is expected to maintain at the Central Bank of Nigeria	CBN
Loans and advances	Loan is credit granted and its recovery is made on a later date. Advance on the other hand, is a 'credit facility' granted by bank	
Liquidity ratio	This is a ratio of a bank's total liquid assets to total liabilities	CBN

Source: Researchers' Compilation, 2024

Notes: NDIC: *Nigeria Deposit Insurance Corporation*; and CBN: Central Bank of Nigeria Statistical Bulletin.

Results and Discussions Descriptive Statistics

Table 2 presents the descriptive statistics for the paper.

Table 2: Descriptive Statistics

	ROA	LDR	CB	LA	LR
Mean	2.707442	66.83233	2943.545	5613.171	48.76233
Std. Dev.	1.258215	13.63383	6263.781	7943.764	14.63860
Skewness	1.566349	-0.154634	2.571109	1.562524	1.413759
Kurtosis	8.114261	2.516867	8.899100	5.019499	6.325633
Jarque-Bera	64.44530	0.589574	109.7248	24.80436	34.13966
Probability	0.000000	0.744690	0.000000	0.000004	0.000000
Observations	43	43	43	43	43

Source: Authors Compilation, 2024 (Eviews-12)

All of the variables have positive mean values, as can be seen from the summary statistics shown in Table 2, with LA and ROA having the highest and lowest mean values, respectively. Also, because an outlier can significantly exaggerate the range of data, the standard deviation of each variable provides a more precise and thorough indication of dispersion. LA shows the biggest deviation from the mean, whereas ROA shows the lowest. With the exception of LDR, the probability values of the Jarque–Bera statistics indicated that the null hypothesis is not rejected, suggesting the residual's normalcy.

Unit Root Test

Time series data frequently display trends that can be addressed with differencing, mainly to determine the data's stationarity. To ascertain the stationarity of the series, an essential step in time series analysis is the Augmented Dickey-Fuller (ADF) unit root test, whose findings are shown in Table 3.

Table 3: Unit Root Test Result

Variable	ADF Test Statistics		
	ADF	Critical Value	Order of Integration
ROA	-3.778678	-3.520787**	I(0)
LDR	-4.856141	-4.21186*	I(0)
CB	-7.327067	-4.273277*	I(1)
LA	-2.510337	-1.951332**	I(1)
LR	-7.365984	-4.198503*	I(0)

Note: *, **, *** significant at 1%, 5% and 10%

Source: Authors Computation, 2024 (Eviews-12)

The variables are integrated in a mixed-order fashion, with ROA, LDR and LR being integrated at the level and the other variables being integrated at first order, according to the results of the Augmented Dickey-Fuller (ADF) unit root test. As a result, I (0) and I (1) are the integration order.

Cointegration Test

Table 4 presents the analysis of cointegration, using the ARDL bounds technique.

Table 4: Result of ARDL Bounds Test for Cointegration

Null Hypothesis: No Long-run Relationships Exist		
Test Statistic	Value	K
F-Statistic	6.662684	4
Critical Value Bounds		
Significance	Lower Bound	Upper Bound
5%	2.56	3.49

Source: Researcher's Computations based on E-Views 12

The Table clearly showed that at 5%, where the F-statistic is higher than the critical values at both the lower and upper boundaries, the null hypothesis (H0: No cointegration) is rejected. This demonstrates that there is a long-term link between the variables. Thus, it can sufficiently lead to the conclusion that the variables of the analysis have long-run relationship.

Autoregressive Distributed Lag Estimates

Table 5 displays the findings of the Linear ARDL estimate in light of the cointegration of the dependent variable with the regressors and the mixed-order of integration derived from the unit root analysis.

Table 5: ARDL Regression Results Dependent Variable: D(ROA)

Co-integrating Estimates (ECM Estimates)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ROA(-1))	0.382495	0.143695	2.661849	0.01
D(LDR)	-0.019435	0.010275	-1.891416	0.07
D(LDR(-1))	-0.038498	0.010871	-3.541334	0.00
DLOG(CB)	1.658327	0.289569	5.726883	0.00
DLOG(CB(-1))	0.271077	0.379753	0.713825	0.48
DLOG(LA)	2.250061	0.610851	3.683484	0.00
DLOG(LA(-1))	2.623788	0.660122	3.974704	0.00
D(LR)	0.021766	0.008680	2.507737	0.02
D(LR(-1))	-0.032467	0.008422	-3.855047	0.00
CointEq(-1)*	-0.442540	0.145870	-7.147068	0.00
R-squared	0.862127			
Adjusted R-squared	0.772210			
Durbin-Watson stat	2.018226			
Long Run				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LDR	0.012790	0.022019	0.580860	0.57
LOG(CB)	-0.919580	0.242850	-3.786616	0.00
LOG(LA)	1.079242	0.270782	3.985645	0.00
LR	0.048615	0.018155	2.677850	0.01
C	-5.775896	2.395150	-2.411497	0.03

Source: Researcher's Computation Using EViews-12 (2024)

From Table 5, all the variables used in this paper have statistically significant influence on deposit money banks profitability in the short run. Similarly, all the variables except loan to deposit ratio (LDR) have statistically significant impact on deposit money banks profitability in the long run. Furthermore, cash balances held with the Central Bank of Nigeria, loans and advances and liquidity ratio agree with the paper a priori expectations in the short run. While loan to deposit ratio, loans and advances and liquidity ratio conform to the paper a priori expectations in the long run.

On a basis of variable-by-variable analysis, the paper found that loan to deposit ratio is negatively related to the growth of deposit money banks profitability in the short run. Consequently, one percentage increase in loan to deposit ratio will lead to a decrease in deposit money banks profitability in Nigeria by -0.019 percent in the short run. The import of this finding may not be unconnected with the several reforms carried out in the banking sector to strengthen their liquidity management as well as performance. Most of the banks in Nigeria that could not meet up with the liquidity requirements have to wind up, leaving only the strong ones to thrive. However, the estimated impact of loan to deposit ratio on deposit money banks profitability is positive in the long-run. Specifically, one percentage increase in loan to deposit ratio will lead to an increase in deposit money banks profitability by 0.013% in the long-run. This outcome is consistent with the a priori expectations of the investigation and Uruakpa (2024) who suggested that loan to deposit ratio has no statistically significant effect on banks' return on assets.

On the other hand, the findings indicated that cash balances held with the Central Bank of Nigeria appears to affect deposit money banks profit growth significantly and positively in the short run. Controlling for other factors, for instance, a 1 percent increase in cash balances will increase deposit money banks profit growth by 1.658% in the short run. However, the estimated impact of cash balances on deposit money banks profitability is negative and significant in the long-run. Specifically, one percentage increase in cash balances will lead to a decrease in deposit money banks profitability by -0.919% in the long-run. This outcome is consistent with the a priori expectations of the research and an indication that ideal cash do not make returns and that the banks keeps higher liquid cash. This may be that Nigerian banks are always in dilemma on keeping more cash to meet the needs of banking customers or investing such cash to make more returns. This supports the earlier study of Tasie *et al.* (2024) which found that cash balances of Nigerian banks do not impact on their returns. The policy implication of this to bank management is the need to review their cash balances and see more productive sectors to invest while also ensuring it doesn't constrain them from meeting the needs of their depositors.

Also, the estimated impact of loans and advances on deposit money banks profit growth is positive and significant both in the short run and long run. By implication, one percentage change or increase in loans and advances will lead to 2.250% and 1.079% increase in deposit money banks profit growth both in the short-run and long-run respectively. This outcome is consistent with the a priori expectations of the investigation and an indication that banking business is not all about accepting deposit but creating loans and advances which provides

returns through interest charges. Thus, poor use of customer deposits for loans may leads to poor returns and better use of customer deposits for loans leads to higher returns. The policy implication of this is that banks must constantly review which investment favours them while also reviewing their non-performing loans to ensure that the level of defaults do not depreciate their assets quality.

Furthermore, the estimated impact of liquidity ratio on deposit money banks profitability is positive and significant both in the short run and long run. By implication, one percentage change or increase in liquidity ratio will lead to 0.021% and 0.048% increase in deposit money banks profitability both in the short-run and long-run respectively. This outcome is consistent with the a priori expectations of the investigation and El-Maude *et al.* (2022) who evaluated the influence of liquidity management on the profitability of quoted deposit money banks in Nigeria and suggested that liquidity ratio is positively, strongly and significantly impacting on financial performance of the DMBs in Nigeria. The Error Correction Model is as expected, negatively signed and highly statistically significant at one percent level. This is a further indication of the existence of long-run relationship between the dependent variable and the regressors. The absolute value of the coefficient lies between zero and 1, and it indicates that about 44% of the short-run deviation from the equilibrium (long-run) position is corrected annually to maintain the equilibrium. The R-squared value of 0.862127 implies that the model is a good fit as over 86% variation in deposit money banks profitability is explained by the explanatory variables. Even after removing the effect of insignificant estimators, the adjusted R-squared value of 77% implies that the model is still very good. While, the DW figure of 2.018226 showed that the serial correlation issue is not present. Therefore, the paper's conclusions can be relied upon for formulating policy recommendations.

Post-Estimation Test Results

The paper conducted a few diagnostic tests to assess the model's stability and applicability as well as the validity of the results. The model did not display serial correlation or heteroskedasticity during the period of investigation, according to Table 6 findings. The heteroscedasticity tests indicated that the residuals are homoscedastic. The results of the diagnostic tests for serial correlation and heteroscedasticity suggested that the data is reasonably well behaved. Furthermore, the p-value for the normality test for the research period is greater than 0.05, indicating that the residues are distributed normally. This results in a uniform distribution of the residuals. As a result, the normal distribution null hypothesis was not rejected.

Table 6: Diagnostic Test Results

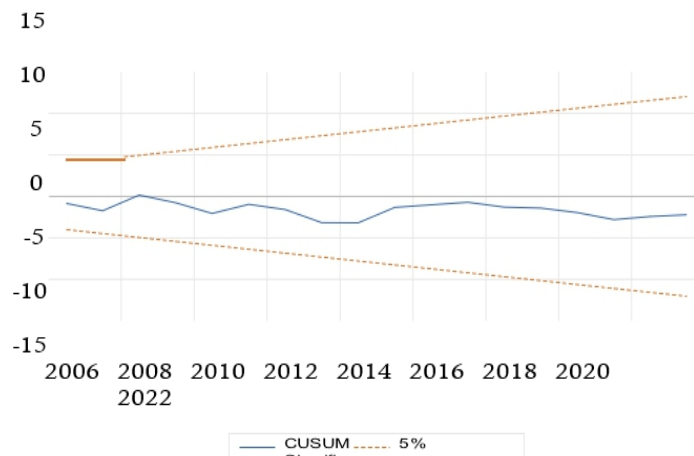
Test	Null Hypothesis	T-Statistic	Prob
Jarque-Bera	There is a normal distribution	0.897	0.64
Breusch-Godfrey LM	No serial correlation	0.364	0.70
Heteroskedasticity: Breusch-Pagan-Godfrey	No conditional heteroscedasticity	1.825	0.10

Source: Researcher's Computations based on E-Views 12

Stability Test Result

The deposit money banks profitability model was shown to be stable during the investigation period by the stability test in Figure 1 because the chart plots at the 5% significant level fall within the critical constraints.

Figure 1: Stability Tests Result



Source: Researcher's Plot using E-Views 12

Conclusion and Recommendations

The paper investigated the impact of liquidity indicators on deposit money banks profitability in Nigeria by employing time series data from 1981 to 2023, by employing Autoregressive Distributed Lag (ARDL) technique. The result revealed that all the variables used have statistically significant influence on deposit money banks profitability in the short run. Similarly, all the variables except loan to deposit ratio (LDR) have statistically significant impact on deposit money banks profitability in the long run.

Summary wise, the paper found that loan to deposit ratio is negatively related to the growth of deposit money banks profitability in the short run. In addition, paper findings revealed that cash balances stored with the Central Bank of Nigeria have a considerable and beneficial short-term impact on deposit money institutions' profit growth. Loans and advances, as well as liquidity ratio, have a favourable and significant impact on deposit money banks' profitability in both the short and long run. The significance of these findings may be linked to several banking sector reforms aimed at improving liquidity management and performance. These findings have policy implications for bank management, who should assess their cash balances and look for more productive areas to invest in while still serving the needs of their depositors.

Therefore, in order to increase their profitability, the paper recommended Nigerian deposit money banks to pay closer attention to their liquidity by raising it through cautious spending, aggressive deposit taking, and debt recovery. It also suggested that these banks shift their focus to using the loan-to-deposit ratio to maximize their financial performance, as the cash reserve

ratio has a negative effect on their performance. A greater percentage of DMBs' total assets should be lent to clients by regulating organisations like the Nigeria Deposit Insurance Corporation and the Central Bank of Nigeria in order to enhance DMBs' performance. Given that the investigation's findings revealed that advances and loans have a positive and significant association with deposit money banks' profits increasing in the short and long run.

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