Liquidity Risk Management and Financial Performance of Listed Commercial Banks in Nigeria

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ABSTRACT

The study investigates the relationship between liquidity risk management and financial performance of listed commercial banks in Nigeria. To achieve this, liquidity risk management proxies which have been widely used in the literature were employed namely deposit to total asset, total loan to deposit, liquidity asset to total asset and short-term liability to total asset ratios (independent variables) and a measure of financial performance return on asset (dependent variable). *Ex-post facto* research design was employed and panel data sourced from the yearly published annual reports and accounts of listed commercial banks in Nigeria. The fixed and random effects panel regression results reveal mixed evidence suggesting that the effect of liquidity risk management on financial performance of the listed commercial banks in Nigeria depends largely on measures of liquidity risk management used in this study. One key policy implication of this outcome is that maintaining a balanced lending and funding strategy is crucial for commercial banks. Hence, it recommends among others that managers of listed commercial banks in Nigeria should find an optimal balance that aligns with bank's risk appetite and growth objectives and should also exercise caution in expanding lending.

Keywords: Deposit to total asset ratio; Total loan to deposit ratio; Liquidity asset to total asset ratio; Short-term liability to total asset ratio; Return on total assets

INTRODUCTION

Every business organization particularly the commercial banks is to maximise shareholders wealth which can be measured in terms of dividend paid out of operating profit or increased share price. The objective can be achieved through better financial performance in form of profitability. In order to achieve the objective of profit maximization of the shareholder wealth, commercial banks engage in different activities including granting of short term and long term loan to individual or corporate organization (Okoye & Eze, 2013; Odiri, 2015; and Odiri, 2016a). The activities of commercial banks may have a negative effect on liquidity and as a result expose the bank to liquidity risk which affects the banks' ability to meet customers demand and as a result affect their financial performance. To avoid liquidation of shareholders resource, commercial banks are expected to have efficient systems of liquidity risk management. Liquidity is the ability of a bank to fund, increase asset and meet customer obligations as they come without incurring losses while effective risk management helps to ensure a bank's ability to meet cash flow obligations (Wuave, Yua & Yua 2020; Odiri, 2014a; Odiri, 2014b; and Odiri,, 2009).

Liquidity means the amount of money cash that is open for investment (Effiong & Enya, 2020; and Odiri,

2020). Due to the dramatic losses witnessed by Nigeria financial banks which are majorly statement of financial position risk that are suddenly reported on capitalized bank financial statements. This is because some commercial banks were discovered by the Central Bank of Nigeria (CBN) in its first and second round "stress test" to have serious risk problems due to inability of statement of finance position to absorb shocks (Risks) associated with intermediary role in the economy. Liquidity is very important to the on-going viability of any commercial bank, as liquidity or over liquidity can have adverse effect on even well capitalised banks. This study is aimed at achieving liquidity stability in Nigerian commercial bank since liquidation has become the other of the day. Liquidity risk management has been a priority for every organization most especially commercial banks which face daily liquidity risk management in the course of attending to its teeming customers and business organizations. In Nigeria few studies are conducted on liquidity risk (Adebayo, David & Samuel 2011; Uremadu, 2012; Odiri, 2019; and Odiri & Ideh, 2020) in the area. The unemployed area that this study wants to address is the use of different proxies to measure liquidity risk and it enhances our understanding on how the different liquidity proxies impacted on the financial performance of commercial banks in Nigeria.

The proxies are cash to deposit ratio, liquid assets to total assets, total loan to total asset ratio, liquid assets to total deposit ratio as a measure of liquidity risk and ROA (Return on Assets) as a measure for financial performance. Previous study on this topic used different proxies like NIM (Net Interest Margin), ROE(Return on Equity), ROI(Return on Investment) as measure of performance. The directions of findings of previous studies on liquidity risk and bank profitability are mixed, (Molyneux& Thornton, {1992}; Basey, Caprio & Leuine, (2003) found positive association and (Bourke, {1998}; Demirguc-Kunt& Huizinga, 1999; Kosmidou, (2005); Kosmidou (2008) resulted to negative relationship. These finding may vary in Nigeria banking industry because of difference in the period economies and environment within which the studies are carried out. In Nigeria, on a daily basis, the Central Bank injects and drains money in response to the needs of the moment, such as fund outflows and inflows from the banking system.

Credit becomes more accessible during a recession because of an increase in money being added by the Federal Reserve, which is responsible for controlling the economy such as increase in economic activities such as interest rate, consumer spending and taxes. Businesses and individuals borrow money to fund purchases and operation so as to increase in economic activities results. This affects many aspects of the economy such as interest rate, consumer spending and taxes. Thus, the focus of this research is to empirically investigate the impact of liquidity risk management on the financial performance of commercial banks in Nigeria. This study proceeded on the postulate that;

Ho1: Bank deposit to total asset ratio has no significant effect on financial performance of banks in Nigeria.

Ho2: Loan – Asset ratio has no significant effect on financial performance of banks in Nigeria.

Ho3: The proportion of liquid assets has no significant effect on financial performance of banks in Nigeria.

Ho4: The proportion of short-term liabilities to liquid assets has no significant effect on financial performance of banks in Nigeria.

CONCEPTUAL REVIEW

Liquidity Risk Management

Liquidity Risk Management is an essential component of the overall risk management framework of the financial services industry and concerning all financial institutions in particular (Majid, 2003). Ideally, a well-defined mechanism for identification, measurement, monitoring and mitigating liquidity risk. Liquidity

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has been a source of worry to the management of banks due to the uncertainty of the future. This is because the financial institutions that do most investments prefer using borrowed money. High liquidity means that there is a lot of capital because interest rates are low, and so capital is easily available (Niresh, 2012). The term liquidity is often used in multiple contexts. When a firm acquires much fixed assets, it can be said the firm is liquid. Liquidity risk management is of paramount importance because a liquidity shortfall at a single institution can have system-wide repercussion (BCBS, 2008).

The problem of maintaining adequate liquidity always to meet customer's obligation is an essential feature of banking. Therefore, banks ensure that adequate provisions of cash and other near cash securities are available to meet daily withdrawals obligations and new loan demands by customer (Salim Bilal, 2016). It is in this regard that banks in Nigeria are required to comply with the Cash Reserve Requirement (CRR) policy at the Central Bank of Nigeria (CBN), Nigerian Deposit and Insurance Corporation (NDIC). Inadequate liquidity might jeopardize a bank's ability to satisfy client demands for money on schedule. This results in strained relationships with bank customers, making it critical to devise a plan for efficient management (Uremadu, 2012; and Agbada & Osuji, 2013). Effective liquidity management in bank provides a proper balance between cash inflows and outflows, and the adoption of a strategy by all banks results in the establishment of a stable financial system (Dzapasi, 2020; and Busihge, 2017). Effective liquidity management ensures successful firm operations, aid in increasing return on assets, and boosts earning and capital.

Deposit to Total Asset Ratio and Return on Asset

Research on the relationship between liquidity (in isolation) and bank performance in the context of Botswana is scarce. The majority of studies conducted in this context have measured the impact of liquidity among other independent variables, arguing that liquidity is not the only factor affecting bank performance. These determinants have been divided into internal and external factors, where the internal factors are bank-specific factors that the bank's management can control, and the external factors are macroeconomic factors like GDP, inflation, and money supply. Despite this, contradictory findings have been observed regarding the liquidity variable and profitability even when evaluated in conjunction with other variables. For instance, Sathyamoorthi, Mapharing, Ndzinge, Tobedza, and Wally-Dima (2017) used the Camel Model to evaluate the performance of Botswana's listed commercial banks and found that the liquidity position had a positive, significant, and positive impact on the performance of the chosen banks.

Ibe (2013) looked into how Nigerian banks' profitability was affected by liquidity management. For the purpose of representing the whole banking sector, three banks were chosen at random. While earnings after taxes served as a stand-in for profitability, cash and short-term funds, bank balances, and treasury notes and certificates served as the proxies for liquidity management. The study's findings demonstrate that, in the Nigerian banking sector, liquidity management is, in fact, a major issue. Therefore, the study suggests that banks hire knowledgeable staff members to guarantee that the proper decisions are made, particularly when it comes to the ideal degree of liquidity, while still maximizing profit (Ibe, 2013).

In general terms, higher deposit to total asset ratio and ROA indicates that if a financial institution has a higher deposit to total asset ratio, it means that a larger portion of its assets is funded by deposits rather than other forms of financing. In some cases, this can indicate stability and lower funding costs, which may positively impact the ROA. Lower funding costs can lead to higher profitability if the institution can lend out those deposits at higher interest rates than it pays to depositors. Conversely, a lower deposit to total asset ratio might indicate that the financial institution relies more on other forms of funding, such as borrowing or equity financing. This could potentially result in higher funding costs, which might impact the ROA negatively.

The relationship can also be influenced by the prevailing interest rate environment. In a low-interest-rate

environment, a higher deposit to total asset ratio might not necessarily translate into higher profitability because the interest margins could be compressed. Conversely, in a high-interest-rate environment, a higher deposit to total asset ratio might lead to higher profitability. It is essential to consider risk management practices. While a higher deposit to total asset ratio might indicate stability in terms of funding, it could also signify a higher concentration of risk if the institution relies heavily on a specific type of deposit. Effective risk management practices can mitigate this risk and positively impact the ROA. Market conditions and competitive dynamics also play a role. In highly competitive markets, financial institutions might face pressure to offer higher interest rates on deposits, which could impact their profitability regardless of their deposit to total asset ratio.

Total Loan to Total Deposit Ratio and Return on Assets

Shingjergji and Hyseni (2015) both of them have examined the effect of some bank factors on capital adequacy as "a capital adequacy ratio determined in Albanian baking system in during 2007 to 2014 "the result of research showed that asset return hasn't any especial effect on stakeholder's equity while other variable as like as fund and fund ratio has a diver's relation with capital adequacy. In an effort to stimulate the economy, the Central Bank of Nigeria (CBN), on July 3, 2019, mandated banks to keep a minimum loan-to-deposit ratio (LDR) (defined as loan to funding ratio) of 60.0 per cent and was later reviewed upward to 65.0 per cent on September 30, 2019 to encourage banks increase consumer, mortgage, and corporate credits thereby stimulating aggregate demand, output growth and employment.

In addition to growth outcomes, the LDR policy has both liquidity and solvency implications in the short to medium, and medium to long-term horizons. This underscores the need to measure the impact of LDR on banks' liquidity to ensure the achievement of the mandate of the Bank – to promote a sound financial system in Nigeria – without compromising the health of domestic banks. Banks typically operate to make profit while ensuring an adequate level of liquidity is maintained to meet depositors demands as well as other financial obligations (Ajao, 2018). LDR refers to the interaction between total loans and total deposits, expressed as a percentage. The LDR gives an insight into the proportion of assets a bank can create from its liabilities. It also indicates the amount of income/profit a bank can generate (Rengasamy, 2014). It is expected that the larger the deposits (liabilities), the larger the amount of assets (loans) it creates. This is, however, dependent on a few key financial variables and the economy.

The LDR is a useful tool for assessing the funding profile of banks. It is used mainly to determine the level of liquidity of a bank and provides insight on banks' risk level, fund utilisation, and intermediation activities, (Rengasamy, 2014). The entire value of loan facilities issued divided by the total amount of deposits mobilized is known as the LDR, (Kurotamunobaraomi et. al., 2017). A higher total loan to total deposit ratio typically shows that, the bank is utilizing its deposits more aggressively for lending activities. If the bank can lend out deposits at interest rates higher than what it pays to depositors, it can generate higher interest income, potentially leading to higher ROA. However, this also comes with higher risk, as it increases the bank's exposure to loan defaults and other credit risks.

Conversely, a lower total loan to total deposit ratio might indicate that, the bank is holding a larger portion of its deposits in liquid or low-risk assets rather than lending them out. While this strategy may reduce the bank's exposure to credit risk, it might also result in lower interest income and, consequently, a lower ROA. The prevailing interest rate environment can significantly impact the relationship between the total loan to total deposit ratio and ROA. In a low-interest-rate environment, banks might struggle to generate sufficient interest income from loans, even with a high loan to deposit ratio. Conversely, in a high-interest-rate environment, banks might see higher interest margins, potentially leading to higher ROA, especially with a higher loan to deposit ratio.

The quality of loans in the bank's portfolio and its risk management practices are crucial considerations. A

high loan to deposit ratio could result in higher profitability if the loans are of high quality and well-managed. However, if the bank extends too many risky loans without adequate risk assessment and management, it could lead to increased loan defaults and lower ROA. Regulatory requirements and constraints may also influence the relationship between the loan to deposit ratio and ROA. Regulatory guidelines often dictate the minimum reserves and capital ratios that banks must maintain, which can impact their ability to lend and generate returns.

Liquidity Asset to Total Asset Ratio and Return on Assets

The general state of the money supply and demand is referred to as liquidity, and it shows how far the two are out of balance (Reserve Bank of India, 2017). According to Bank of Jamaica (2018), it might also be described as the guarantee or availability of money to meet all cash outflow obligations (both on and off the balance sheet) as they become due. From the standpoint of central banking, liquidity is defined as the central bank's obligations, which it is the exclusive supplier of, particularly its currency and banking system reserves (Gray, 2017; and Reserve Bank of India, 2017). To deposit money banks, however, liquidity refers to the ability to meet its day-to-day obligations, which includes the availability of cash on demand. Liquidity could be in form of cash holdings, funds in the account with other banks, and the central bank, amongst others. It could also take the form of securities holding with short-term maturities such as government securities which could easily be traded with low transaction costs (Elliott, 2014).

The maintenance of adequate liquidity levels by banks is vital for financial stability, since banks would have to meet their customers' obligations to avoid bank runs. One of the major lessons from the GFC of 2007/2008 was that bank liquidity should be treated as important as capital. Maintaining adequate capital serves as a safety net against large losses, but liquidity is just as critical because it can start or exacerbate a bank run. A bank may have enough assets to cover its liabilities but end up having issues because of the illiquidity of its assets (Elliott, 2014). A higher liquidity asset to total asset ratio typically shows that, the bank holds a larger portion of its assets in liquid or near-liquid instruments such as cash, short-term securities, or highly liquid assets. While these assets provide safety and stability, they usually offer lower returns compared to lending activities. Therefore, a higher liquidity ratio could result in a lower ROA since the bank's assets are not being deployed in higher-yielding investments.

Conversely, a lower liquidity asset to total asset ratio suggests that the bank has fewer liquid assets and may be more aggressively investing in higher-yielding assets such as loans or securities. This could potentially result in higher returns on assets if the investments are profitable and well-managed. However, it also exposes the bank to liquidity risk, as it may face challenges meeting short-term obligations if its assets are tied up in illiquid investments. The prevailing interest rate environment can impact the association between liquidity asset ratio and ROA. In a low-interest-rate environment, holding more liquid assets may result in lower returns since the yields on these assets are typically lower. Conversely, in a high-interest-rate environment, banks may decide to hold fewer liquid assets and allocate more funds to higher-yielding investments to maximize ROA.

Effective liquidity management is essential for risk mitigation. While maintaining a higher liquidity asset ratio offers protection against unforeseen shocks to liquidity, it may also result in lower returns. Conversely, reducing liquidity buffers to pursue higher returns can expose the bank to liquidity risk if market conditions deteriorate. Balancing liquidity needs with return objectives is critical for optimizing ROA while managing risk. Regulatory requirements often mandate minimum liquidity ratios for banks to ensure their capacity to fulfil immediate obligations. Compliance with these regulations may influence liquidity asset ratio and, consequently, ROA. Banks must strike equilibrium between regulatory compliance and profitability objectives

Short-Term Liability to Liquidity Asset Ratio and Return on Assets

Liquidity management is an important tool for the management of organizations; it reflects the organization's ability to repay short-term liabilities, which include operating expenses and financial expenses resulting within the organization in the short term, in addition, a portion of the long-term debt during the operating cycle or the financial year, whichever is longer. Many liquidity ratios, including the current ratio, quick ratio, cash ratio, and defensive interval ratio, are used by corporations to manage their liquidity and have a significant impact on businesses' financial success (Robinson et al., 2015). The entity's ability to satisfy its short-term commitments is demonstrated by its liquidity ratios; a weak ratio's value suggests that the organization may have trouble meeting its short-term financial obligations (Amengor, 2010).

A higher short-term liability to liquidity asset ratio indicates that a bank has a larger proportion of short-term liabilities relative to its liquidity assets. Short-term liabilities typically include obligations such as deposits or short-term borrowings that must be repaid within a year. If the bank has a robust strategy for managing these liabilities and can invest them profitably in higher-yielding assets, it may result to higher returns on assets. However, a high ratio also increases liquidity risk, as the bank may face challenges in meeting its short-term financial obligations if its liquidity assets are insufficient.

Conversely, a lower short-term liability to liquidity asset ratio submits that the bank has a smaller proportion of short-term liabilities relative to its liquidity assets. While this may indicate a more cautious approach to liquidity management, it could also limit the bank's ability to leverage short-term funding for higher returns. Lower reliance on short-term liabilities reduces liquidity risk but may lead to lower returns if the bank's assets are primarily invested in lower-yielding liquid assets. The prevailing interest rate environment can influence the association between the short-term liability to liquidity asset ratio and ROA. In a low-interest-rate environment, banks may be incentivized to rely more on short-term funding to invest in higher-yielding assets, potentially increasing ROA. Conversely, in a high-interest-rate environment, banks may opt for more stable, long-term funding sources to mitigate interest rate risk, which could impact ROA.

Effective risk management is essential in balancing short-term liabilities with liquidity assets. While higher short-term liabilities can provide funding for profitable investments, they also expose the bank to liquidity risk, especially during periods of market stress. Banks must ensure that their liquidity assets are sufficient to meet short-term financial obligations while maintaining profitability. Regulatory authorities often impose liquidity requirements on banks to ensure their ability to withstand liquidity shocks. Compliance with these regulations may influence the short-term liability to liquidity asset ratio and its effect on ROA. Banks must strike equilibrium between regulatory compliance, liquidity management and profitability objective

Given the review of literature, the following conceptual model was shown in figure 1:

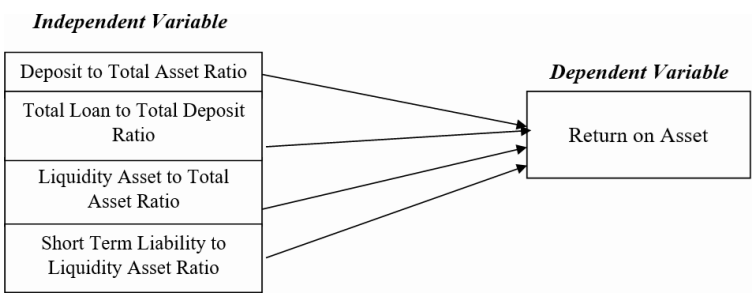

Fig. 1: Conceptual Model of the Study

Source: Conceptualized by the Researcher, 2023

Empirical Review

Alim et al (2021) test the effect of liquidity risk to management on the financial performance of commercial banks in Pakistan. In the study, the effect of liquidity risk management on the financial performance is studied using panel data for ordinary least square analysis. Financial data of all commercial operating in Pakistan during the period of study was taken from the year 2006 – 2019 using data achieves of the state bank of Pakistan website. It was observed that higher liquidity increases bank's performance in commercial banks of Pakistan. The results are in line with several studies and available literature. This study can become a good reference for future policy decisions regarding the minimum liquidity requirements of banks in Pakistan.

Onyekwelu, Chukwuani, and Onyeka (2018) examined the effect of liquidity on financial performance of deposits money banks in Nigeria for the period 2007 – 2016 using secondary data from five banks. This study employs multiple repression analysis and finds that liquidity has positive and significant effects on both bank's profitability ratios and on return on capital employed. The study recommends that; in addition, in investigating human capital should create for where they sensitize their customer on variety of activities, they carry out in that are capable of hindering effective liquidity management and regulating authority should put in place appropriate policy measures to ensure compliance and check high volume cash transaction handling and hoarding prevalent in the economy. The study concluded that the Central Bank of Nigeria should critically review and monitor the effectiveness of the implementation of its liquidity policy tools in banks to achieve the desire liquidity level and where necessary imposed appropriate sanctions on erring banks.

Obi, Nwosu, Okaro and Astanan (2017) examines the effect of liquidity management on the performance of DMB's (Deposit Money Banks) in Nigeria from 2000 to 2015. The study employs augmented Dickey Fuller unit proof test, OLS regression and grander casualty. The study finds out that liquidity mechanism is not significantly related to DMBs performance within the period under review in the study, hence the study recommends that deposit money bank should be given leverage of plugging back fund into investment to boost profitability while maintaining a level of liquidity ratio.

Alshatti (2015) evaluated the influence of bank liquidity management on profitability in Jordanian commercial banks between 2005 and 2012 using data from the Amman Stock Exchange. Profitability was calculated by ROA and ROE, whereas the independent variableswere investment ratio, net credit facilities/total assets, capital ratio, liquid ratio, and fast acid ratio. The research findings established that there was an effect of liquidity management on commercial bank profitability, with the effect of investment and quick ratios on profitability being positive when measured by ROE, the effect of capital ratios on profitability being positive when measured by ROA, and the effect of the other independent variables on ROA and ROE being negative. The researcher attributes the negative effect to increased volume of untapped deposits at the Jordanian commercial banks.

Demirgunes (2016) used time series data from the Turkish retail business in 1998 to assess the potential influence of liquidity on financial performance. The study revealed that there is a substantial positive association between liquidity and financial success after the examination. Stanley and Ali (2016) performed a review of liquidity management elements influencing commercial bank financial performance in Mogadishu, Somalia. The study's target group was 112 Modagishu commercial bank workers, and a sample size of 87 respondents was chosen using Slog Van's formula. According to the findings, liquidity management has a major impact on the financial performance of commercial banks in Modagishu.

Somalia.Edem (2017) used secondary data from the whole deposit money banking sector between 1986 and

2011 to conduct a study to identify empirical evidence of the influence of liquidity management on the financial performance of deposit money banks in Nigeria. According to research, liquidity management has both a good and negative influence on the financial performance of Nigerian deposit money institutions. Afolabi and Williams (2019) conducted study to evaluate the financial performance of Deposit Money Banks in relation to liquidity management across Nigerian listed banks. For the 15 sample businesses, the financial reports from 2009 to 2018 served as the primary source of data collection. The study discovered that liquidity management has both good and negative effects on the financial performance of Nigerian deposit money institutions. The study revealed that liquidity management has an impact on the financial performance of Nigerian deposit money institutions.

Wuave, Henry, and Paul (2020) investigated the influence of liquidity management on the financial performance of Nigerian banks from 2010 to 2018. The study used data from five Nigerian Stock Exchange-listed deposit money institutions. Liquidity ratio, Loan to deposit ratio, Cash reserve ratio, and Deposit ratio were the variables used to assess liquidity management, while financial success was proxied by return on assets, return on equity, and return on net interest margin. According to the findings of the study, liquidity management has a major influence on the financial performance of Nigerian deposit money institution

Dzapasi (2020) investigated the impact of liquidity management on bank financial performance in a weak economy. This study gathered a sample of the top five banks in Zimbabwe. The study revealed a substantial positive association between liquidity management and the financial performance of Zimbabwean banks years of 2010 -2017. According to the research, liquidity did not have impact on return on asset [ROA] and return on equity (ROE). The study focus on eight commercial banks and descriptive study design was adopted. Secondary data were collected covering five years from 2013-2017. The result of this research shows a significant negative nexus between liquidity risk management and financial performance of commercial banks in Sierra Leone. The study also reveals that liquid asset to total asset had the greatest impact on financial performance and had an inverse relationship.

METHODOLOGY

This study adopts an *ex-post facto* design to examine the effect of liquidity risk management on the financial performance of listed commercial banks in Nigeria. The selection of ex-post factor research design is justified by the fact that the study use Historical data. Panel data was used to examine the relationship between the dependent variable (financial performance) and independent variable (liquid risk management) and the study period is from 2012 – 2021 (10 years). On the basis of this, data on liquidity risk management and financial performance was obtained; the liquidity risk management was computed using deposit to total asset ratio, total loan to total deposit ratio", "liquid asset to total asset ratio', and "short-term liability to liquidity asset ratio" while the financial performance measured by "return on asset".

The data was obtained from the annual reports and accounts are deemed reliable as they have been audited and approved by the Board of the commercial banks. More so, data that was obtained from the NGX and CBN are deemed reliable as they have been approved by the regulatory authorities governing the NGX and CBN. The analytical tools used encompassed panel regression. First, descriptive statistics (such as the mean, standard deviation, minimum and maximum, skewness, kurtosis and Pearson Moment Correlation) was used in describing the nature of the dataset on liquidity risk management and financial performance of commercial banks in Nigeria.

Second, the diagnostic statistics (variance inflation factor and the Breusch-Pagan Cook/Weisberg) was used in ascertaining whether there was the presence or absence of multicollinearity among the pairs of the independent variables (liquidity risk management variables); and third, inferential statistics (ordinary least

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square, fixed and random effects panel data) was used in validating the research hypotheses of the study. Besides, Hausman specification test was done to determine whether random or fixed effect model is more efficient. This study adopts the model of Chuunhury and Zaman (2018) Kumar, Harsha, Anana and Dhruva (2012), and Xu (2011). On the basis of this, the following multiple regression models were estimated on which basis the research hypotheses were validated.

ROA = F(DTAR, TCTDR, LATAR, STLRAR) Eqn 1

$ROA_{it} = \delta_0 + \delta_1 D_t AR_{it} + \delta_2 TLTDR_{it} + \delta_3 LATAR_{it} + \delta_4 SLTRAR_{it} + E_{it}$ Eqn 2

Where; DTAR = Deposit to Total Asset Ratio; TLTDR = Total Loan to Deposit Ratio; LATAR = Liquidity Asset to Total Asset Ratio; STLRAR = Short Term Liability to Total Assets Ratio; δ_0 = Constant; $\delta_1 - \delta_4$ = Slope Coefficient; Σ = Stochastic Error Term; I = ith Commercial Bank; T = Time Period

$ROA_{it} = a + \beta 1 DTAR_{it} + \beta_2 TLTDR_{it} + \beta_3 LATAR_{it} + \beta_4 STLRAR$ Eqn 3

Table 1: Estimation of Variables in the Model

Variables	**Variables Construct**	**Methodology & Logic**	**A-priori Expectation**
Bank Performance (ROA)	ROA = Profit after Tax/Total Asset	Measured by the ratio of after – tax profit to total assets	+
Liquidity Risk (LIQD)	LIQD = Liquid Asset/Total Deposit	Measured by the ratio of liquid assets to total deposit	–
Liquidity Risk (LIQA)	LIQA = Liquid Assets/Total Assets	Measured by the liquid assets to total assets	+
Liquidity Risk (LIQB)	LIQB = Total Loan/Total Asset Ration	A high ratio is a sign of high risk as loans are less liquid. It also, however, indicates that the bank will have high profit through high interest income	+
Liquidity Risk (LIQC)	LIQC = Short Term Liability / Liquidity Asset Ratio	A high ratio informs customers on bank's liquidity strength to return their deposit if they ask for it. It also denotes what percentage of deposits received and were lent out.	–

Source: Compiled by the Researchers, 2023

RESULTS AND DISCUSSION

Table 2: Descriptive Statistics Result

Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
roa	117	0.392859	0.669377	-1.02165	1.726332
ldr	115	1.044035	2.002578	0	16.571
qratio	120	1.5235	0.347492	0.54	3.13
lar	120	0.156175	0.064139	0.006	0.343
stlr	120	6.594023	11.5526	1.397558	113.2152

Source: Researchers' Computation, 2023

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Table 2 describes the independent and dependent variables in relation to its arithmetic mean, standard deviation, maximum and minimum values for the period under review. For the dependent variable of financial performance, the table reveals that the mean value of ROA is 0.393 corresponding to a standard deviation of 0.669. This outcome is suggestive of growth potential of the average commercial banks and that the future earnings of the deposit money bank (on average) will be higher than its current earnings. The result suggests that on average the banks' managers were able to effectively utilize its assets to generate profits. Positive return on asset will benefit various stakeholders, such as employees, customers, suppliers, and lenders.

In the case of the independent variables, the study finds that Deposit to Total Asset Ratio (LDR) has a mean value of 1.04 with a standard deviation of 2.00. This outcome generally implies that the proportion of deposits held by the bank relative to its total assets is higher than the average or that deposits constitute a reasonable proportion of total assets in commercial banks in Nigeria and this can be seen as a positive sign of stability and liquidity, as customer deposits are generally considered a stable and reliable source of funding.

Further, the result from the descriptive statistics also shows that the mean value of Total Loan to Deposit Ratio (QRATIO) is 1.52 corresponding to a standard deviation of 0.347. Generally, a positive value for the Total Loan to Deposit Ratio (L/D) indicates that, on average, the bank has a higher amount of loans outstanding compared to the amount of customer deposits it holds. A cursory look at the variable of Liquidity Asset to Total Asset Ratio (LAR), shows that it has a mean value of 0.156 corresponding to a standard deviation of 0.064. The mean value of Short-Term Liability to Total Assets Ratio (STLR) is 6.594 with a standard deviation of 11.55. A positive mean value for the Short-Term Liability to Total Assets Ratio (STLR) for commercial banks indicates that, on average, the bank relies to some extent on short-term liabilities to finance its total assets.

Table 3: Shapiro Wilk Data Normality Test

Variable	Obs	W	V	z	Prob > z
roa	117	0.98412	1.496	0.9	0.18393
ldr	115	0.38517	57.076	9.04	0
qratio	120	0.83329	16.042	6.218	0
lar	120	0.99299	0.674	-0.883	0.81144
stlr	120	0.29289	68.043	9.455	0

Source: Researchers' Computation, 2024

The Table 3 shows the result obtained from the Shapiro-Wilk normality test for the data employed in this study. It is observed that the dependent variable of financial performance proxied with the return on total asset measure ROA (z = 0.900; Prob>z = 0.18393) and the independent variable of Liquidity Asset to Total Asset Ratio (LAR) (z = -0.883; Prob>z = 0.81144), are normally distributed since the probability values of their z-statistics are statistically insignificant at 1% or 5%. Further, a cursory look at the independent variables shows that Deposit to Total Asset Ratio (LDR) (z = 9.040; Prob>z = 0.00000), Total Loan to Deposit Ratio (QRATIO) (z = 6.218; Prob>z = 0.00000), and Short-Term Liability to Total Assets Ratio (STLR) (z = 9.455; Prob>z = 0.00000) are not normally distributed as the probabilities of the z values are statistically significant at 1% level

Table 4: Correlation Analysis

	roa	ldr	qratio	lar	stlr
roa	1.000				
ldr	-0.3652	1.000			
qratio	-0.3223	0.4769	1.000		
lar	-0.3373	0.0834	-0.0776	1.000	
stlr	0.4034	-0.229	-0.2261	-0.938	1.000

Source: Researchers' Computation, 2024

Specifically, the analysis from the spearman rank correlation analysis in table 3 showed that the independent variables to include deposit to asset ratio (-0.3652/36%) loan to deposit ratio (-0.3223/32%) and liquidity to asset ratio (0.1694/17%) are negatively correlated with the dependent variable: return on total asset. Further, investigation showed that short term liability to asset ratio (stlr) (0.4034/40%) is positively correlated with return on total asset. Other positive correlation which we observed in the analysis include the correlation between deposit to asset ratio (ldr) and loan to deposit ratio (qratio) 0.4769, which translate to about 48% during the period under investigation.

In the analysis, deposit to asset (ldr) ratio and liquidity to asset (lar) ratio also show positive correlation (0.0834/8%) while short-term liability to asset ratio (stlr) is seen to be negatively correlated with deposit to asset ratio (-0.2290/23%) during the period under consideration. In this study, liquidity to asset ratio reveals a negative correlation with total loan to asset ratio (-0.0776/8%) during the period under investigation. Particularly, it is seen that all positive and negative correlations presented in table 3, are seen to be relatively weak (less than 80%) hence there is no room to suspect the presence of collinearity in the estimated model.

Table 5: Return on Asset (ROA) Regression Analysis Result

Variable	**Pool Panel OLS**	**Panel Fixed Effect**	**Panel Random Effect**	**Robust Panel Regression**
LDR	-0.035 (0.222)	-0.013 (0.556)	-0.015 (0.476)	-0.015 (0.187)
QRATIO	-0.515*** (0.003)	-0.295** (0.014)	-0.322*** (0.006)	-0.322*** (0.001)
LAR	-2.962*** (0.005)	-1.364 (0.112)	-0.09187	-1.584** (0.018)
STLR	0.007 (0.213)	-0.000 (0.997)	0.000 (0.899)	0.000 (0.735)
_CON	1.639*** (0.000)	1.077*** (0.000)	1.137*** (0.000)	1.137*** (0.000)
F-stat/Wald Stat	8.38*** (0.0000)	2.21* (0.0738)	11.75** (0.0193)	78.92*** (0.0000)
R-Squared	0.2386	0.0842	0.0839	0.0839
VIF Test	1.22			
Hausman Test Prob>chi2	5.69 (0.2233)			
Breusch and Pagan LM			146.41 (0.000) ***	
Joint Test for Normality			e: 1.56 (0.4575)	
			u: 0.01 (0.9928)	

Note: (1) bracket () are p-values; (2) *, **, *, implies statistical significance at 10%, 5%, and 1% levels respectively**

Table 5 present the results obtained from the sampled commercial banks regression analysis. As observed from the table, the pool ordinary least square regression analysis result revealed an R-squared value of 0.2386 which indicate that about 23% of the systematic variations in financial performance measured in terms of ROA for commercial banks in Nigeria is jointly explained by the independent variables in the model. Further, the F-statistic value of 8.38 and its associated p-value of 0.0000 shows that the specified model is statistically significant at 1% level. Specifically, as indicated in the Table 4, a mean VIF value of 1.22 shows that VIF is within the benchmark value of 10, to indicate the absence of multicollinearity.

Further, a cursory look at both the F-statistic and Wald-statistic values {11.75 (0.0193) and 2.21 (0.0738)} for random and fixed effect regression models respectively shows that both models are statistically significant at 5% and 10% respectively. The coefficient of determination (R-squared), values of 0.0842 and 0.0839 (fixed and random effect models respectively) indicate that about 8% of the systematic changes in return on asset is jointly explained by the independent and control variables in both models of interest. In this study the p-value of the Hausman specification test [0.2233] reveals a statistically significant probability value indicating the adoption of the random effect model over the fixed effect model. However, following the test for normality of residua for the random effect model the result show no statistically significant idiosyncratic e: = 1.56 (0.4575) and u: = 0.01 (0.9928) which suggest the absence of cross-sectional effect which could have led to the violation of the assumption of homoscedasticity of the error term. However, we resort to the robust panel least square regression analysis technique to control for random effect error and consequently employed it to test the study hypotheses.

Hypothesis 1: Bank deposit to total asset ratio has no significant effect on financial performance of banks in Nigeria.

The results revealed that deposit-to-total asset ratio [LDR, coef. = -0.015 (0.187)] has an insignificant effect on financial performance of banks in Nigeria. In line with the ceteris paribus axiom (all things been equal) the result indicate that a ratio increase in deposit to asset will yield a statistically insignificant effect on return on total asset of deposit money banks in Nigeria during the period under consideration. Therefore, this study accepts the null hypothesis that bank deposit to total asset ratio has no significant effect on financial performance of banks in Nigeria during the period under study.

Hypothesis 2: Loan – Deposit ratio has no significant effect on financial performance of commercial banks in Nigeria.

The results revealed that loan-to-deposit ratio [QRATIO, coef. = -0.322 (0.001)] has a significant negative effect on financial performance of banks in Nigeria. The result in line with the ceteris paribus axiom (all things been equal) implies that a ratio increase in loan-to-deposit will significantly decrease financial performance proxied as return on total asset during the period under study. Hence, this study rejects the null hypothesis which states that Loan – Asset ratio has no significant effect on financial performance of commercial banks in Nigeria during the period under review.

Hypothesis 3: The proportion of liquid assets has no significant effect on financial performance of banks in Nigeria.

The results obtained from the robust regression model revealed that liquidity to-total asset ratio [LAR, coef. = -1.584 (0.018)] has a statistically significant negative effect on financial performance of banks in Nigeria. Under the ceteris paribus assumption, the result implies that, a ratio increase in the liquidity to total asset ratio will significantly decrease financial performance (return on total asset) during the period under

consideration. Therefore, this study fails to accept the null hypothesis that the proportion of liquid assets has no significant effect on financial performance of banks in Nigeria during the period under study.

Hypothesis 4: The proportion of short-term liabilities to liquid assets has no significant effect on financial performance of banks in Nigeria.

Further, the result revealed that the variable of short-term liability-to-total assets ratio [STLR, coef. = 0.000 (0.735)] has an insignificant effect on financial performance of banks in Nigeria. In line with the ceteris paribus axiom (all things been equal) the result indicate that a ratio increase in short term liability to liquidity asset will yield a statistically insignificant effect on return on total asset of deposit money banks in Nigeria during the period under consideration. Therefore, this study accepts the null hypothesis that short-term liabilities to liquid assets has no significant effect on financial performance of banks in Nigeria during the period under study.

CONCLUDING AND RECOMMENDATIONS

The study concludes that the financial performance of banks in Nigeria can be improved by the established of sound and robust liquidity management structure in place to ensure that adequate liquidity is maintained to meet matured and maturing obligations as they fall due. The study also conclude that liquidity risk management has significant effect on the financial performance of listed commercial banks in Nigeria. The effect has negative as regards to liquid asset to total asset as well as short term liabilities to liquid asset. The study there recommends that banks in Nigeria should establish a sound governance and risk management system such as Asset Liability Management Committees (ALCO) for liquidity management, develop strategies and policies for the management of liquidity that is well integrated in the banks risk management practices, establish contingency funding plan that clearly articulate the steps to be taken to address liquidity shortfalls during period of stress or emergency carryout active the monitoring of the liquidity funding needs of banks to avert any potenrtial liquidity challenge that could trigger crisis is promptly addressed.

On the negative effect of deposit to total asset ratio on financial performance proxied as return on total asset, one key policy implication of this outcome is that maintaining a balanced lending and funding strategy is crucial. Finding may might suggest caution in expanding lending too aggressively, hence managers of listed deposit banks in Nigeria should find an optimal balance that aligns with the bank's risk appetite and growth objectives. Further, we recommend that regulators and policymakers should emphasize prudent risk management practices to ensure that banks do not become overly reliant on short-term funding sources to support their lending activities. On the negative effect of liquidity asset ratio on financial performance, a key policy implication of the outcome is that excessively high liquidity levels can potentially hinder profitability.

The study recommends that regulatory authorities should continue to set and enforce liquidity requirements that encourage banks to maintain an appropriate level of liquidity. However, these requirements should also consider the potential trade-off with profitability, ensuring that banks are not overly burdened with excess liquidity that impacts their earnings. In line with this outcome, we also recommend the implementation of robust asset-liability management practices which can help banks manage the trade-off between liquidity and profitability. By aligning the maturity and interest rate characteristics of assets and liabilities, banks can maintain liquidity while optimizing income.

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