International Journal of Intellectual Discourse (IJID)
ISSN: 2636-4832 Volume 5, Issue 1. March, 2022

Liquidity risk management and financial performance of listed deposit money banks in Nigeria

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Abstract
The study was carried out to examine the effect of liquidity risk management on financial performance of listed deposit money banks in Nigeria. The population of the study is made up of the 14 listed deposit money banks in Nigeria. Using a census sampling techniques Jaiz bank was filtered out. Data were collected from annual reports and accounts of the selected banks for a period of 14 years 2006-2019 and analysed using STATA 13. The findings of the study revealed that both deposits to total assets (DTA) and total loan to total deposit (TLTD) have negative insignificance effects on returns on assets (ROA) of the selected banks. On the other hand, liquid assets to total assets (LATA) and short-term liabilities to liquid assets (STLLA) both have negative significant effect on ROA of the sample banks. Based on these findings, the study concludes that liquidity risk management has significant effect on the financial performance of listed deposit money banks in Nigeria. Based on this, the study recommends that the management of listed deposit money banks in Nigeria should maintain an optimum level of liquidity as it is capable of improving their performance.

Keywords: liquidity risk, financial performance, risk management, deposit to total assets

1. Introduction

The purpose of establishing business organisation particularly deposit money banks is to maximize shareholders wealth which can be measured in terms of dividend paid out of operating profit or increased share price. This objective can be achieved through better financial performance in form of profitability. In order to achieve the objective of increasing shareholders wealth, deposit money banks engaged in different activities including granting of short-term and long-term loan to individual and corporate customers principles (Okoye & Eze, 2013). In order to achieve an improved performance, deposit money banks should always be in a position to meet their customers demand for cash. However, the lending and other activities of the banks may have adverse effect on their liquidity and as a result expose the bank to liquidity risk which will eventually affect the bank's ability to meet their customers need and as a result may have adverse effect on their financial performance. In order to avoid liquidity problem, banks should have an efficient system of liquidity risk management.

Liquidity is the ability of a bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses while effective liquidity risk management helps to ensure a bank's ability to meet cash flow obligations, which are uncertain as they are affected by external events and another agents' behaviour (Wuave, Yua, & Yua, 2020). In financial terms, liquidity connotes the amount of money that is open for investment (Effiong & Enya 2020).

Liquidity risk is the possibility that over a specific time period, the bank will become unable to settle obligations with immediacy (Drehmann & Nikolaou, 2009). It is a risk arising from a bank's inability to meet its obligations when they come due without incurring unacceptable losses (Maaka, 2013).

Hacini, Boulenfad, and Dahou, (2021) maintain that liquidity risk management for banks focuses on the ability of the bank to finance its activities and fulfill its obligations on time and at a reasonable cost. It also means the compatibility between financial reserves and their employment in various assets in the medium and short-term. Muriithi and Waweru (2017) noted that liquidity risk may arise due to liquidity mismatch which is measured in terms of liquidity gap. In the same vein, Effiong and Enya, (2020) maintain that liquidity risk arises from maturity disparities whereby liabilities are said to have a shorter maturity period than assets.

In order to avoid any liquidity crisis, central banks and regulatory authorities take strict action to maintain a certain level of liquidity. The banks are liable to maintain a level of liquidity as per requirements of central banks (Nisar, Asif, & Ali, 2021; Alim, Ali, & Metla, 2021). Policymakers all over the world are suggesting that the banking sector must maintain more liquid assets as compared to the past to hedge against any liquidity crisis. Maintaining an adequate level of liquidity can help in preventing banks from liquidity crises and as such leading to stable financial performance.

Financial performance refers to the yard stick through which the efficiency of management in terms of shareholders wealth utilization is measured. Banks performance can be seen as the reward to shareholders for taking the risk of investing their limited resources. According to Hacini et al. (2021) financial performance refers to the extent to which a bank's financial targets are achieved. In monetary terms, financial results would calculate a bank's outcomes to get a competitive edge over its rivals. Banks can set up the best financial and non-financial systems (Harrison, 2015). European Central Bank (2010) argues that bank's performance is the capacity to generate sustainable profit which is essential for banks to maintain ongoing activity and for its investors to obtain fair returns; and crucial for supervisors, as it guarantees more resilient solvency ratios, even in the context of a riskier business environment.

Despite the significance of having an optimum level of liquidity some banks are found to be in efficient in managing their liquidity which may result in financial crises due to in ability to meet customers and other short-term demand. The relevance of liquidity management became pronounced during the 2007-2008 global financial crises when the banking industry came under severe liquidity strain and stress (Wuave et al., 2020). In the current situation, liquidity threat has performed a vital function in banking quandary in the world (Kim Cuong Ly, 2015). Policymakers all over the world are suggesting that the banking sector must maintain more liquid assets as compared to the past to hedge against any liquidity crisis. It has led to an international discussion on what can be the standard measures that should be taken and what should be standards to avoid liquidity risk (Basel Committee on Banking Supervision, 2014).

Liquidity becomes a major risk in banking operations and liquidity management has received great attention from regulators and policy-makers. In the modern theory of financial intermediation, banks exist in the economy for their roles in providing liquidity and transferring risk (Azam, 2017). Liquidity risk management is highly important for not only banks but also for the total system since the consequences of liquidity insufficiency can be extremely felt

on both scales from the bank to the full system (Hacini et al., 2021).

Various studies such as Wuave et al., (2020); Effiong and Enya, (2020); Chuwdhury and Zaman (2018); Khalid et al. (2019); Alim et al. (2021) and Salim and Bilal, (2016) attempt to examine the nexus between liquidity risk management and financial performance; however, some of them arrived at inconclusive or mixed result. Based on this, the study is set to examine the effect of liquidity risk management on financial performance of listed deposit money banks in Nigeria.

2. Literature Review

The purpose of this section is to provide an extensive review of relevant literature relating to the subject matter of the study. The section is made up of conceptual, theoretical and empirical review.

2.1 Conceptual Review

Liquidity risk management is an essential component of the overall risk management framework of the financial services industry, concerning all financial institutions (Majid, 2003). Ideally, a well-managed bank should have a well-defined mechanism for the identification, measurement, monitoring and mitigation of liquidity risk. A well-established system helps the banks in timely recognition of the sources of liquidity risk to avoid losses (Maaka, 2013). Effiong and Enya (2020) maintain that liquidity risk commonly refers to a low financial ability of a company to meet its commitments as they remain outstanding or become due, without having an adverse effect on their operations. In the same manner, they observed that companies were exposed to liquidity risks (financial weakness) due largely to their inability to convert the invested capital to liquid cash.

Chuwdhury and Zaman (2018) opine that liquidity risk can be caused for various reasons. First reason is that inefficiency of banks to cope up with decreasing of liabilities and increase of asset. Another reason is the imbalance between cash inflows and outflows as well as sudden liquidity needs from contingency conditions. Liquidity risk can take place as a result of lending and funding by using off balance sheet items. The inability of banks to raise liquidity can be attributed to a funding liquidity risk that is caused either by the maturity mismatch between inflows and outflows and/or the sudden and unexpected liquidity needs arising from contingency conditions (Duttweiler, 2009).

Salim and Bilal (2016) emphasis that the fundamental role of banks in the maturity transformation of short-term deposits into long-term loans makes banks inherently vulnerable to liquidity risk, both of an institution-specific nature and that which affects markets as a whole. Therefore, a major responsibility of banks, being the source of liquidity for its clients, is to be able to manage liquidity themselves. The banking channel being a central place for flow of cash in an economy has to manage both liquidity creation and liquidity risk (Alim et al. 2021).

Khalid et al. (2019) maintain that generally, liquidity risk is measured from the balance sheet positions. Superior practices for liquidity risk calculation is centered on the utilization of liquidity ratios. The case of cash excess and cash shortage are the key reasons for rising the liquidity risk of a banking organization. Banks confront liquidity threat when ambiguity over their sufficiency emerges at the renegotiating period (Basel committee on banking supervision, 2000). An increase in liquidity decreases liquidity risks and gives banks a cushion for shock absorption in times of crisis. On the other, banks incur opportunity cost as they lose business on the funds held to achieve a certain level of liquidity. Therefore, banks need to find the balance between whether an increase in liquidity gives them more profit through avoidance of risk, or it is a source of business losses (Mwangi, 2017).

According to Tauhid, Lasisi, Gambo, Okpanachi, and Mustapha, (2020) financial

performance plays an important role in the structure and development of firm. It measures the profitability, success and enhances the reputation of a firm. According to Ali and Stanley (2016) financial performance of corporate entities is a subject that has attracted a lot of attention, comments and interests from financial experts, researchers and the general public. However, the concept of financial performance can be viewed from the profitability and market or firm value point of view.

According to Hacini et al. (2021) profitability is the first line of protection for a bank against unforeseen losses. It reinforces its capital position and increases potential profitability through retained earnings investment. Ultimately, an entity that persistently makes a loss will deplete its capital base, placing equity and debt investors at risk in turn. Liquidity position and bank's performance can be measured by various financial ratios such as Return on Assets (ROA), Return on Equity (ROE), Current Ratio, Quick Ratio, and Net Interest Margin (NIM), etc. (Murthy & Sree, 2003).

2.2 Theoretical Review

The theory that underpins this study is the shiftability theory formally developed by Harold G, Moulton in 1915, the shiftability theory held that banks could most effectively protect themselves against massive deposit withdrawals by holding, as a form of liquidity reserve, credit instruments for which there existed a ready secondary market. Included in this liquidity reserve were commercial paper, prime bankers' acceptances and, most importantly as it turned out, Treasury bills. Under normal conditions all these instruments met the tests of marketability and, because of their short-terms to maturity, capital certainty. The theory states that a bank's liquidity is adequately maintained if it holds assets that could be shifted or sold to other lenders or investors for cash even during period of crisis or distress. The shiftability theory focuses on the liability side of the balance sheet. The theory contends that supplementary liquidity could be derived from the liabilities of a bank, therefore, shiftability, marketability or transferability of a bank's assets is a basis for ensuring liquidity (Wuave et al., 2020).

2.3 Empirical Review

Hacini et al. (2021) analyse the impact of liquidity risk management on the financial performance of selected conventional banks in Saudi Arabia for the period of 2002-2019. Liquidity risk is measured with the loan to deposit ratio (LTD) and cash to deposit ratio (CTD). Financial performance is measured by the Return on Equity (ROE). Equity to total asset ratio (ETA) is used as the control variable. The study uses the panel data method (Pool, Fixed-effects and Random-effects) for testing the study hypothesis. The results show that liquidity risk has a significant negative impact on the financial performance measured by Saudi Arabian banks.

Alim et al. (2021) tests the effect of liquidity risk management on the financial performance of commercial banks in Pakistan. In this study, the effect of liquidity risk management on financial performance is studied using panel data for Ordinary Least Square analysis. Financial data of all commercial banks operating in Pakistan during the period of study was taken from the year 2006 to 2019 using data archives of the State Bank of Pakistan website. It is concluded that higher liquidity increases banks' 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 this region. This study can be further enhanced using a longer period of study and include more variables specific to the banking sector in Pakistan, like bank size, age of bank, etc. Further studies may include other non-

commercial banks to further strengthen the study and increase its reliability.

Wuave et al. (2020) examines the effect of liquidity management on financial performance of banks in Nigeria for the period 2010 to 2018. The study uses secondary data from five banks listed bank on the stock exchange in Nigeria. The proxies employ for liquidity management are; Liquidity ratio (LQR), Loan to deposit ratio (LDR), Cash reserve ratio (CRR) and deposit ratio (DR), while return on assets (ROA), return on equity (ROE) and return on net interest margin (NIM) are proxies for financial performance (Profitability). The study uses panel regression analysis in estimating the model and Hausman test while making a choice between fixed effect and random effect model. The study finds that liquidity ratio (LQR) have positive and significant effect on financial performance of DMB as measured by return on assets (ROA), return on equity (ROE) and net interest margin(NIM).It therefore recommends that banks in Nigeria should establish sound governance and risk management systems by developing strategies and policies for liquidity management that is well integrated into its risk management practices as well as establish a contingency funding plan to address any liquidity shortfall during periods of stress or emergency while ensuring that active monitoring liquidity funding needs to avert any liquidity challenge that could trigger crisis in the banks is promptly addressed.

Effiong and Enya (2020) examine the effect of liquidity risk management on the financial performance of consumer goods companies. Data for the study were obtained from the annual reports and accounts of studied companies and were converted to liquidity measurement parameters. Analyses were done using multiple regression analysis methods and findings show that long-term debts, quick ratios, and cash defensive intervals have a significant effect on EPS and ROA, while cash ratio and long-term debts affect ROCE only. Specifically, it was empirically established that there exists a significant relationship between liquidity risk management and the financial performance of consumer goods companies. The study recommends that consumer goods companies should incorporate a clear liquidity risk management approach in their strategic policy framework and communicate the same to all functional units. Because of the strategic importance of consumer goods companies to the living standards of consumers, these companies should also establish and monitor risk warning dashboards to promptly arrest and manage risk variability and risk volatility in this very important sector of the economy.

Khalid, Rashed and Hossain, (2019) (2019) aim to empirically study the relationship between liquidity and financial performance of Commercial banks in developing country like Bangladesh. The investigation has been performed using panel data procedure for a sample of Dhaka stock market enlisted all commercial banks (31) during the year of 2010-2017. The result shows that liquidity has no significant and positive or negative impact on return on asset (ROA), return on equity (ROE) as financial performance. Liquidity risk behaves in equivalent ways in different dependent variables.

Chuwdhury and Zaman (2018) aims to analyse the effect of Liquidity risk on the Islamic banks' performance for the period 2012 to 2016. In the study ROA and ROE were used as Bank performance measurement tools and Loan to deposit ratio, Liquid risky asset to total asset, Capital to total asset ratio is used as liquidity indicators. Correlation, Regression analyses are done to find the effect of liquidity on bank performance. The correlation found significant relationship between Bank performance and liquidity indicators. On the other hand, regression analysis showed that there is

negative relation between bank performance and liquidity indicators.

Ndoka, Islami and Shima, (2017) focused on liquidity risk analysis in order to identify if this risk affects the profitability of Commercial Banks operating in Albania. The paper includes the identification, the analysis and the management of this type of risk. Through numerical analysis the paper studied the quantitative effect of liquidity risk on the profitability of commercial banks in Albania during the period 2005-2015. Following the study, liquidity risk is expected to have a considerable effect on the profitability of Commercial Banks operating in Albania. The analysis is based on an empirical study with secondary qualitative and quantitative data. This study provides a contribution within the identification of liquidity risk factors that affect more the profitability of the Albania Banks and the finding of a scientific solution in order to manage this risk in a more efficient way. The recommendations derived from this study will serve to young researchers of academic area and professional field. Also, this paper will create new discussions on risk management instruments used in the Albanian banking system.

Murithi and Waweru (2017) examine the effect of liquidity risk on financial performance of commercial banks in Kenya. The period of interest was between year 2005 and 2014 for all the 43 registered commercial banks in Kenya. Liquidity risk was measured by liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) while financial performance by return on equity (ROE). Data was collected from commercial banks' financial statements filed with the Central Bank of Kenya. Panel data techniques of random effects estimation and generalized method of moments (GMM) were used to purge time-invariant unobserved firm specific effects and to mitigate potential endogeneity problems. Pairwise correlations between the variables were carried out. Wald and F-tests were used to determine the significance of the regression while the coefficient of determination, within and between, was used to determine how much variation in dependent variable is explained by independent variables. Findings indicate that NSFR is negatively associated with bank profitability both in long run and short run while LCR does not significantly influence the financial performance of commercial banks in Kenya both in long run and short run. However, the overall effect was that liquidity risk has a negative effect on financial performance. It is therefore advisable for a bank's management to pay the required attention to the liquidity management.

Salim and Bilal (2016) investigate the liquidity position and its impact on the financial performance of Omani Banks with the eventual objective to advice policies to improve the management of liquidity risk in Omani banks. A sample of 4 local commercial banks has been used to examine the relationship between the Liquidity and Financial performance for the period of five years from 2010-2014. The data has been taken from the Banks annual reports using multiple regression analysis. The study concluded significant relationship between the bank's loans to total assets ratio, illiquid assets to liquid liabilities ratio and bank's ROA; bank's Liquid assets/deposits; Liquid assets/Short-term liabilities and ROE; and bank's Loans/ Total assets, Loans/ Deposits & short-term liabilities; Bank's loans – customer deposits/ Total assets and ROAA. However, the study finds no significant relationship between Omani bank liquidity position (such as a bank high ability to absorb shocks, liquidity at short-term, ability to cope with long-term liquidity risk, less liquidity and less risk exposure) and NIM.

Osoro and Mutiri (2015) examine the effects of liquidity risk management practices on the financial performance of SACCOs in Kisii County. The objectives of

the study were to determine the effects of asset quality management, capital adequacy and capital leverage practices on the financial performance of SACCOs in Kisii County. The study was directed by the theoretical concepts of capital adequacy, asset quality management and capital leveraging practices on the financial performance. A descriptive survey design was adopted. The target population was 20 respondents from five licensed SACCOs operating in Kisii County. The study sample size was 20 respondents selected from the population by census sampling technique. Primary data was collected using structured questionnaires. Secondary data was collected from the financial reports prepared by the SACCOs and SASRA. The study found out that Capital adequacy significantly affected ROA in SACCOs. Asset quality and capital leverage did not have a significant impact on saving mobilizations.

Mwangi (2014) access the effect of liquidity risk management on the financial performance of Commercial Banks in Kenya. The study adopted a descriptive study design. The population for this research is the 43 listed Commercial Banks in Kenya analysed for a period from 2010-2013.The results of the study show that a unit increase in liquid assets to total assets ratio decreases return on assets by 1%. A unit increase in liquid assets to total deposits ratio decreases return on assets by 2.2%. A unit increase in borrowings from banks decreases return on assets by 14.2%. Finally, the control variable which was asset quality shows that a unit increase in non-performing loans as a proportion of total loans would lead to a 12.4% decrease in return on assets. The study concludes that liquidity risk management has a significant negative relationship with financial performance of commercial banks. Borrowings from banks by commercial banks to meet shorter liquidity needs do have the greatest impact on liquidity at 14.2% and was significant at 5%. The study also concludes that holding more liquid assets as compared to total assets will lead to lower returns to commercial banks in Kenya but the effect of not significant at 5%. Holding more liquid assets as compared to total deposits will lead to lower returns to commercial banks in Kenya and the effect is significant at 5%.

Maaka, (2013) sought to establish the relationship between liquidity risk and financial performance of commercial banks in Kenya. The study adopted correlation research design where data was retrieved from the balance sheets, income statements and notes of 33 Kenyan banks during 2008-2012. Multiple regressions were applied to assess the impact of liquidity risk on banks' profitability. The findings of the study were that profitability of the commercial bank in Kenya is negatively affected due to increase in the liquidity gap and leverage. With a significant liquidity gap, the banks may have to borrow from the repo market even at a higher rate thereby pushing up the cost of banks. The level of customer deposit was also found to positively affect the bank's profitability and it will therefore be encouraged for banks to open more branches in the country. The period studied in this paper is 2008-2012, due to availability of the data. However, the sample period does not impair the findings since the sample includes 14 banks, which constitute the main part of the Kenyan banking system. Only profitability was considered in the study and there is need to consider other variables such as the economic condition prevailing in a given period.

Based on the empirical literature reviewed, the researcher formulates and test the following hypotheses.

H01: Deposit to total assets has no significance effect on ROA of listed deposit money banks in Nigeria.

H02: Total loan to total deposit has no significance effect on ROA of listed deposit money banks in Nigeria.

H03: Liquid assets to total assets have no significance effect on ROA of listed deposit money banks in Nigeria.
H04: Short-term liabilities to liquid assets has no significance effect on ROA of listed deposit money banks in Nigeria

3. Methodology

The study adopts an ex-post factor research design to examine the effect of liquidity risk management on the financial performance of listed deposit money banks in Nigeria. The selection of ex-post factor research design is justified by the fact that the study used historical data. The population of the study is made up of the entire Nigerian listed deposit money banks as at 31st December 2019 which stands at 14 banks. A census was used by applying filters to banks that make up the population. For bank to be selected as sample it must be listed on or before 1st January 2006 and remain listed up to 31st December 2019. Based on these Ja'iz bank plc was filtered out.

Data for a period of 14 years were collected using the secondary method of data collection from the annual reports and accounts of the selected banks and analysed using descriptive and inferential methods of data analyses using STATA 13 statistical software. To test the fitness of the model, reliability of the data and the appropriateness of the regression model various diagnostic and post estimation test were carried out.

The model for the study was adapted from the work of Hacini et al., (2021) and Chuwdhury and Zaman (2018) with little modifications. The study model was presented below:

$$ROA_{it} = \beta 0_{it} + \beta 1(DTA_{it}) + \beta 2(TLTD_{it}) + \beta 3(LATA_{it}) + \beta 4(STLLA_{it}) + \varepsilon_{it}$$

Where;
β0 = constant intercept, β1-4 = coefficient of independent variables, ε_{it} = error term, i = firm, t = year.
ROA = Return on assets measured as net profit after tax divided by total assets (Tauhid et al., 2020)
DTA = Deposit to total assets measured as deposit divided by total assets. Hacini et al., (2021).
TLTD = Total loan to total deposit measured as total loan divided by total deposit Hacini et al., (2021): Chuwdhury and Zaman (2018).
LATA = Liquid assets to total Assets measured as Liquid assets divided by total assets Chuwdhury and Zaman (2018); Salim and Bilal (2016).
STLLA = short-term liabilities to liquid assets measured as short-term liabilities divided by liquid assets.

4. Results and Discussion

The purpose of this section is to carry out a data analyses and make an extensive discussion of the findings of the study. The hypotheses of the study were also tested in this section.

Table 1: Summary of descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	182	.0567775	.1580755	-.1263974	1.304208
DTA	182	1.07692	1.405668	.0674715	8.143082
TLTD	182	.3480498	.6745541	.0012644	5.440918
LATA	182	6.556243	84.7803	-.2606542	1144
STLLA	182	45.46097	509.9823	-1.663978	6844.476

Source: STATA 13 Outputs, 2022

Table 1 shows the result of descriptive statistics. The purpose of descriptive statistics is to summarize the data in a meaningful format which will give at glance, the mean, standard deviation as well as maximum and minimum mean. From the table the number of observations stands at 182, this is the total number of 13 deposit

money banks multiply by 14 years. ROA has a mean and standard deviation of 0.056 and 0.15 which implies that the Nigerian deposits money banks by average records about 5.6% return on their total assets. However, the minimum mean of -0.12 indicates that the lowest ROA recorded is the negative return of about 12% and the highest ROA recorded was 130% reflected by a maximum mean of 1.30.

On the other hand, Debt to total Assets (DTA) has a mean and standard deviation of 1.076 and 1.405 respectively with minimum and maximum mean of 0.0674 and 8.143. This implies that on average, deposit money banks have a mean of about 106% of deposit in relation to total assets. The standard deviation of 1.405 which is close to the mean indicates that deposit money banks have similar pattern of DTA and are within the same range with the mean. Similarly, total loan to total deposit (TLTD) has a mean and standard deviation of 0.348 and 0.674 with minimum and maximum mean of 0.0013 and 5.440 implies an average TLTD of 34% and minimum and maximum of 1% and 54% respectively.

The proportion of liquid assets to total assets (LATA) indicates the proportion of liquid assets relevant to total assets with mean of 6.556 and standard deviation of 84.780 which implies that deposits money banks LATA are mostly away from the central mean indicating high dispersion from the mean. Lastly short-term liabilities to liquid assets indicate the extent to which banks can use their short-term liquid assets to short-term liquid liabilities. This is reflected by a mean of 45.460 and standard deviation of 509.982.

Table 2: Correlation Matrix

	ROA	DTA	TLTD	LATA	STLLA
ROA	1.0000				
DTA	-0.0229	1.0000			
TLTD	0.0203	-0.0762	1.0000		
LATA	-0.0211	-0.0167	0.0007	1.0000	
STLLA	-0.0269	0.3558	-0.0279	-0.0069	1.0000

Source: STATA 13 Outputs, 2022

Table 2 shows the result of correlation analyses. The table indicate the relationship between variables of the study. From the table ROA being dependent variable has 2% relationship with all the independent variables. However, the relationship is positive in case of TLTD and negative in the case of other variables. DTA has a 7% and 2% negative relationship with TLTD and LATA and about 36%positive relation with STLLA. Similarly, TLTD has 0% positive relationship and 3% negative relationship with STLLA. Lastly, LATA also has 1% negative relationship with STLLA. The overall result shows a weak relationship between the independence variables of the study which signifies the absence of multicollinearity among the independent variables. This will be confirmed by the result of VIF test for multicollinearity.

Table 3: VIF test for Multicollinearity

Variable	VIF	1/VIF
DTA	1.15	0.868787
STLLA	1.14	0.873385
TLTD	1.01	0.994193
LATA	1.00	0.999720
Mean VIF	1.08	

Source: STATA 13 Outputs, 2022

Table 3 shows the result for VIF test for multicollinearity. The assumption of multicollinearity suggests that an VIF value of less than 4 signifies the absence of multicollinearity among independent among the independent variables. From the table, all variables have VIF value of less than 4 with mean VIF of 1.08 which signifies the absence of multicollinearity

Table 4: Shapiro-Wilk W test for normal data

Variable	Obs	W	V	Z	Prob>z
ROA	182	0.35364	88.844	10.274	0.00000
DTA	182	0.36292	87.570	10.241	0.00000
TLTD	182	0.44428	76.385	9.928	0.00000
LATA	182	0.04911	130.703	11.158	0.00000
STLLA	182	0.06189	128.946	11.127	0.00000

Source: STATA 13 Outputs, 2022

The Shapiro-Wilk test for normal data result was presented in table 4. The assumption of normality test is that the data set are not normality distributed. From the table, all variables have probability value of 0.0000 which are all significance at 1% and signify that the data set are not normally distributed. To take care of normality problem the study make used of robust standard error.

Table 5: Breusch and Pagan Lagrangian multiplier test for random effects

	Var	sd = sqrt(Var)
ROA	.0249879	.1580755
E	.022827	.1510862
U	.0018988	.0435754
chibar2(01) =	7.99	
Prob > chibar2 =	0.0023	

Source: STATA 13 Outputs, 2022

Table 5 reveal the result of Breusch and Pagan Lagrangian multiplier test for random effects test for panel effect among the data set. The overall model has a chi square value of 7.99 with probability chi square value of 0.0023 which is significant at 1%. The assumption of panel effect among the data set and this is confirmed by significance value probability chi square and therefore OLS regression model will be used.

Table 6: Linear regression Result

ROA	Coef.	Robust Std. Err	T	P>t	[95% Conf.	Interval]
DTA	-.001602	.0030777	-0.52	0.603	-.0076758	.0044717
TLTD	.004356	.0100387	0.43	0.665	-.015455	.0241671
LATA	-.0000402	.0000106	-3.77	0.000	-.0000612	-.0000192
STLLA	-6.66e-06	2.84e-06	-2.34	0.020	-.0000123	-1.05e-06
_cons	.0575526	.0138566	4.15	0.000	.0302072	.084898
F(4, 177)	4.35					
Prob > F	0.0022					
R-squared	0.170					

Source: STATA 13 Outputs, 2022

The OLS regression result is shown in table 7. From the table the model shows an F value of 4.35 and probability > F value of 0.002 which is significant at 1% which indicated the fitness of the model of the study. From the table the R-squared has a value of 0.17 which imply that about 17% of change in the deposit money banks financial performance is caused by the bank's liquidity risk management strategies. From the table, Deposit total assets has a negative coefficient values of -0.0016 with p-value of 0.603 which is not significance at 5% and as a result indicate that DTA has no significant effect on ROA of listed deposit money banks in Nigeria. In the same vein, total loans to total assets has a positive coefficient of 0.04 with p-value of 0.665 which is also not significant and as such prevail that TLTD has positive insignificant effect on ROA of selected banks.

On the other hand, Liquid assets to total assets has a negative coefficient of -.0000402 and p-value of 0.000 which is significant at 1% and implies that LATA has significant negative effect of ROA of selected banks. Similarly, short-term liabilities to liquid assets has negative coefficient of -6.66 with p-value of 0.020 which is also significant at 5% and as such confirm that STLLA has significant negative effect on ROA of listed deposit money banks in Nigeria.

Based on the result of the study as indicated by the regression result, it shows that deposit to total assets has no significant effect on the financial performance of deposit money banks in Nigeria proxied by ROA. This implies that change in this variable s will not result in proportional change in financial performance. Based on these, hypothesis one should be accepted. This is in line with the findings of Wuave et al. (2020); and contradict with that of Hacini et al., (2021); Chuwdhury and Zaman (2018).

On the other hand, the study findings revealed that liquid assets to total assets and short-term liabilities to liquid assets both have significance negative effect on the financial performance of the selected banks. This means that an increase in banks liquid assets to total assets and short-term liabilities to total liquid assets will lead to a proportionate decrease in the financial performance of the listed deposit money banks represented by ROA. On the other hand, a considerable decrease in these variables will lead to a considerable increase in banks performance. Based on these, Hypotheses three and four should be rejected. These agree with the findings of Hacini et al., (2021); Chuwdhury and Zaman (2018) and Salim and Bilal (2016) and contradict with the findings of Wuave et al. (2020).

5. Conclusion and Recommendations

This study was carried out to examine the effect of liquidity risk management on the financial performance of listed deposit money banks in Nigeria. Based on the results, the study concludes that liquidity risk management has significant effect on the financial performance of listed deposit money banks in Nigeria. However, the effect was found to be negative as regard to liquid assets to total assets as well as short-term liabilities to liquid assets. Based on this, the study recommends that deposit money banks and its management should maintain an optimum level of liquidity as it is capable of improving their performance. This can be achieved by maintaining an optimum liquid asset in relation to short-term liabilities and total assets as too much investment in liquid assets lead to capital tied up as such result in poor financial performance. Government through its regulatory bodies should ensure that banks maintain an adequate level of liquidity. This will help to prevent banks failure due to liquidity problem.

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