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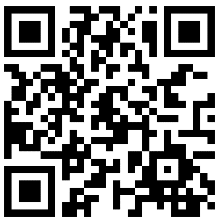
Effect of Liquidity and Profitability on Credit Risk Management of Listed Deposit Money Banks in Nigeria



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ABSTRACT: This study examined the moderating effect of liquidity on profitability and credit risk management of listed deposit money banks in Nigeria. Ex-post facto research design was adopted to define the structure and strategy of the study, while the target population was all the listed deposit money banks in Nigeria as at 31st December, 2023 which were 14 in number. Out of the 14 banks 12 were purposively chosen based on their complete annual reports and accounts over the period of the study (2019-2023). Panel regression analysis was used to analyze the collected data, and the results shows a positive but insignificant direct effect of returns on assets on credit risk management of the banks. However, returns on equity revealed a positive and significant effect on credit risk management of the banks. While, returns on capital employed was found to have negative but significant effect on credit risk management of the banks. Furthermore, liquidity management shows positive and significant moderating effect on returns on assets, returns on equity, returns on capital employed and credit risk management of the banks. Therefore, the study concluded that: effective liquidity management have positive and significant moderating effect on profitability and credit risk management of listed deposit money banks in Nigeria. This signifies that, effective liquidity management would improve banks profitability, and subsequently improve credit risk management of the banks. Therefore, this study recommends that; the management of listed deposit money banks in Nigeria should pay adequate attention on liquidity management, which would improve profitability and subsequently enhance credit risk management.

KEYWORDS: Credit risk management, liquidity, listed deposit money banks, Nigeria, Profitability

1. INTRODUCTION

Banking sector is expected to play a significant role in promoting commercial activities and to create development in economy. Thus, banks achieve this objective through the provision of financing facilities and direct participation in the economy. Banks provide credit facility as a prominent strategy in the area of marketing and financial management. Thus, Ifeanyi and Francis (2017) described credit facility as the amount of lending of cash and cash equivalent (in the form of loan and advances) to customers on agreed conditions.

Credit creation is the main business of banks however, these intermediaries' activities are quite risky (Ahmed, 2020). Credit risk is defined by Odion et al. (2022) as the losses from the refusal or inability of credit customers to pay the principal and interest as at when due. Hence, studies such as Coyle (2014) and Odion et al. (2022) were of the view that, high credit risk is cause by factors such as limited institutional capacity, inappropriate credit policies, low capital and liquidity levels, poor loan underwriting, poor credit assessment, poor financial performance, and poor lending practices, and inadequate supervision by the central bank. To this extent, studies such as Raymond et al. (2015) and Tunde and Babandi (2023) believed that, these factors have tremendous influence on credit risk management practice of businesses. To ascertain the extent of the impact of these factors on credit risk management, studies were conducted on the effect of profitability on credit risk management, however, the results of these studies were inconsistent, hence inconclusive (Ahmed, 2020). Studies such as Ifeanyi and Francis (2017), Omar et al. (2018), and Odion et al. (2022) reported positive and significant effect of firms' profitability on credit risk management. However, Zou (2014), Raymond et al. (2020), and Ahmed (2020) documented negative and insignificant influence of profitability on credit risk management among different companies in different context. Hence, in their study, Ahmed (2020), Omar et al. (2018) and Samoei (2015) concluded that, results of the studies on profitability and credit risk management are inconclusive. Therefore, there is a

need for the use of mediating or moderating variable to observe its interactive effect. Furthermore, most of the prior studies on credit risk management and profitability were mainly cross-sectional in nature investigating the relationship over few years. Studies such as Samoei (2015) and Omar et al. (2018), used a year. However, studies such Tunde and Babandi (2023) were of the view that, if such relationships exist, the results obtained cannot be realistic over short period of time as the listed banks and credit policies may prove to be unstable from year to year. Hence, the motivation of this study to used banks liquidity as a moderating variable to examine its moderating effect on the relationship between profitability and credit risk management of listed DMBs in Nigeria over a period of five years from 2019 to 2023. This helped to resolve issues concerning causality and shed more light on the evolving pattern of the role of effective liquidity management in determining the profitability and its subsequent effect on credit risk management practice of listed DMBs in Nigeria.

Therefore, null hypotheses were formulated to guide the study.

H_{o1}: Return on assets has no significant effect on credit risk management of listed DBMs in Nigeria.

H_{o2}: Return on equity has no significant effect on credit risk management of listed DMBs in Nigeria.

H_{o3}: Returns on capital employed has no significant effect on credit risk management of listed DMBs in Nigeria.

H_{o4}: Liquidity has no significant moderating effect on the relationship between profitability and credit risk management of listed DMBs in Nigeria

The novelty of this study is in its contributions to knowledge in the area of corporate finance, corporate performance, and risk management. Therefore, the study would benefit management and investors of listed deposit money banks. It would enlighten the management of the banks on the influence of effective liquidity management on banks financial performance and its effect on credit risk management. Therefore, the remaining part of this study is structured into four sections given that section one is introduction. The review of relevant literatures is presented in Section 2, while Section 3 described the methodology adopted for the study. Then, Section 4 discusses the results of the empirical analyses, while Section 5 presents conclusions and recommendations.

2. LITERATURE REVIEW

2.1 Credit Risk Management

Credit risk was described by Odion et al. (2022) as the losses from the refusal or inability of credit customers to pay both principal and interest on loan and advances collected as at when due. While Jamil and Omar (2021) viewed credit risk as the risk that a borrower defaults on his debt and does not honor his obligation to pay that debt totally or partially as agreed for any reason. This risk could take the form of outright default or alternatively, losses from changes in portfolio value arising from actual or perceived deterioration in credit quality (Jacob et al., 2020). It is the uncertainty associated with borrowers' loan repayments. It is one of the main risks that banks encounter all the time due to the nature of their activities. Hence, Iwedi and Onuegbu (2014) stressed that, banks play an important role in achieving banking stability and contributing to reducing credit risk not only for themselves by examining the feasibility and profitability of their business ventures, but also for the banking system through effective credit risk management and the effective use of funds available to them in different economic sectors. Hence, Samoei (2015), Omar et al. (2018), and Theogene and Radjab (2022) believed that, effective credit risk management would significantly be influence by the profitability of a business.

2.2 Profitability

Onyekwelu et al. (2018) defines profitability as the capacity of a business to generate sustainable revenue above expenses, while, Fatihudin et al. (2018) describes profitability as the financial achievement of a businss over a time as a result of the utilizations of available resources. It is the bottom-line for every organization thus, use as a measure of managerial ability and corporate analysis (Ishaya & Zephaniah, 2021). Hence, this study viewed profitability as the degree to which financial objective of a business is achieve. Therefore, for banks to be successful, managers must weigh complex trade-offs between growths, return and risk, favoring the adoption of risk-adjusted metrics (Athanasoglou et al., 2016). According to Raza et al. (2011), business profitability measure can be classified into traditional, economic and market-based. However, Mochklas and Teguh (2018) were of the view that, business profitability is mostly measured using market share growth, return on investment, return on equity, return on capital employed and liquidity. Hence, based on the study of Purba and Bimantara (2019) that return on assets (ROA), returns on equity (ROE), and return on capital employed (ROC) are the most acceptable measure of firm's profitability when compared with assets management, in addition to the idea that, ROA, ROE, ROC measure the ability of the management to effectively and efficiently utilized firms' assets to generate profit. Thus, adopted for this study to measure banks profitability.

2.3 Liquidity

El-Maude et al. (2022) describes liquidity as the rate of inflows and outflows of cash and cash equivalent. While Alhassan and Islam (2021) define liquidity as an organization's ability to satisfy immediate and long-term requirements using cash or cash equivalent. Dzapasi (2020) describe liquidity as the capacity to turn an investment portfolio into cash rapidly with little or no loss of value. Thus, liquidity is the lifeline of any banking institution, and its unavailability will impact the smooth running of banking activities (Ahmed, 2020). Banks could be illiquid if it is not in a position to meet its maturing obligations without incurring a substantial loss. Therefore, liquidity measures the cash and cash equivalent banks have at their disposal to quickly discharge their short-term trade and financial obligations as they mature. If illiquidity persists over time, it may lead to the solvency and eventual banks liquidation. Hence, bank should implement safeguards against the mismatch of maturities between its assets and liabilities (El-Maude et al., 2022). In the Nigerian contest, banks are required to keep a minimum of 30% liquidity ratio to avoid liquidity problems. Liquid assets are highly rated securities whose market value and liquidity do not decline during adverse market conditions (Tunde & Babandi, 2023). Studies such as Mohammad and Bassl (2021) identified different types of liquidity such as central bank liquidity, market liquidity, and funding liquidity; however, this study focused on funding liquidity. Hence, Edem (2017) posited that, the understanding and efficient utilization of business liquidity explain the managerial competence of the business which reflects in corporate profitability. Thus, liquidity risk arises from an institution’s inability to purchase or otherwise obtain the necessary funds, either by increasing liabilities or converting assets, to meet on and off-balance sheet obligations as they come due without incurring unacceptable losses (Tunde & Babandi, 2023).

2.4 Empirical Review

Theogene and Radjab (2022) assessed the impact of credit management on the profitability of manufacturing companies in Ruwanda over a period five years (2016-2020). Structured questionnaire was used to collect primary data, and was analyzed using Microsoft Excel. The result of the analysis shows that, effective credit risk management have positive and significant effect on both return on assets and return on equity of the selected companies. Likewise, Odion et al. (2020) studied the effect of credit risk management on the profitability of 10 listed deposit money banks in Nigeria over a period of five years (2015-2021). Using STATA 13 to analyze the data collected from annual reports and accounts of the banks, the study reported positive but insignificant relationship between non-performing loan, loan loss provision and profitability of the banks. These findings corroborated the results of the study of Omar et al. (2018), who studied the effect of credit management on the profitability of fifty-seven telecommunication companies in Garowe, Somalia. Using primary data collected from respondents through structured questionnaire, the study reported positive and significant effect of credit risk management on the profitability of the companies. Furthermore, Samoei (2015) evaluated the effect of credit management on the profitability of eighteen Saving and Credit Co-operative in Kenya. Using structured questionnaire to collected data from Credit Officers, Managers, Accountants, and Business development officers, the data collected was analyzed using regression analysis. The result of the study revealed that, effective credit risk management have positive and significant effect on the profitability of the companies.

However, Ahmed (2020) conducted a study on the impact of liquidity, credit, financial leverage risk on the profitability of thirteen Islamic banks in Sudan over a period of ten years (2008-2018). The data collected from annual reports and accounts of the banks was analyzed with panel regression analyses, and the study reported a negative but significant relationship between credit risk management and the profitability of the banks over the period of the study. Furthermore, Ifeanyi and Francis (2017) studied the effect of credit management on the profitability of listed deposit money banks in Nigeria for the period of ten years (2006-2015). Using secondary data obtained from annual reports and account of the banks, the data collected was analyzed with OLS. The study reported that, loans and advances, and loan loss provision have positive but insignificant effect on both return on assets and return on equity, while non-performing loan was found to have negative effect on return on assets and return on equity. With respect to liquidity, Tijani and Mohamed (2019) examined the impact of liquidity and credit risk on the banks stability in Tunisia for the period of ten years (2006-2015). Using secondary data obtained from forty-nine banks, and regression analysis to analyze the data collected, the study documented no direct significant relationship between liquidity and credit risk. However, liquidity and credit risk were found to have positive and significant impact on banks stability.

2.5 Theoretical Review

Several theories were used by previous studies to explain the concept of risk and profitability. Such theories as stated by Tunde and Babandi (2023) include shiftability theory, liability management theory, and commercial loan theory. However, this study is anchored on both commercial loan theory and shiftability theory.

Commercial loan theory was first propounded by Adam Smith in 1976. The theory states that a commercial bank should focus on providing short-term commercial lending to support entrepreneurs through a business cycle (Chinweoda et al., 2020). By financing short-term self-liquidating transactions that will mature within a short term, banks are well-positioned to meet their liquidity

needs. In essence, banks should only create loans where the source of repayment is derived directly from the funds generated by the transactions financed by the loans (Berger & Bowman, 2009). Consequently, these loans offer the bank liquidity and low credit risk. This theory was complemented by Shiftability Theory developed by Harold G. Moulton in 1915. The theory believes that, bank can meet its liquidity needs if it holds significant assets easily convertible to meet maturing financial obligations (Tunde & Babandi, 2023). These assets can quickly be sold to other banks or investors for cash without waiting until maturity and with no material loss in asset value. In other words, these assets could be sold to the Central Bank or other financial institutions for cash instead of depending on maturing loans to solve their liquidity problems. This theory applies to short-term financial market instruments like Treasury Bills and Certificates.

3. METHODOLOGY

This study adopted ex-post facto research design to define the structure and strategy of the study. While the target population consisted of all the listed deposit money banks in Nigeria as at 31st December, 2023 and were fourteen (14) in number. Out of the 14 banks, 12 were selected as sample based on the availability and the complete required annual reports and accounts of the banks over the period of five years from 2019 to 2023. The data collected were analyzed using both descriptive and inferential analysis.

Two models were developed for this study, and were in line with the models used by Ahmed (2020). Model 1 was developed to evaluate the direct effect of banks' profitability (ROA, ROE, and ROC) on credit risk management (CRM) while controlling banks characteristics such as firm's size (FMS) and firm's leverage (FML). Model 2 was developed to examine the moderating effect of banks liquidity (LQT) on the relationship between banks profitability and credit risk management. These models are presents as follows:

Y = F (LQT, ROA, ROE, ROC, CRM, FMS, and FML) ……..equation

$CRM_{it} = \beta_0+\beta_1ROA_{it}+\beta_2ROE_{it}+\beta_3ROC_{it}+\beta_4LQT_{it}+\beta_5FMS_{it}+\beta_6FML_{it}+\mu_{it}$……model 1

$CRM_{it} = \beta_0+\beta_1ROA_{it}+\beta_2ROE_{it}+\beta_3ROC_{it}+\beta_4LQT_{it}+\beta_5ROA_{it}*LQT_{it}+\beta_6ROE_{it}*LQT_{it}+\beta_7ROC_{it}$
$*LQT_{it}+\beta_8FMS_{it}+\beta_9FML_{it}+\mu_{it}$…… ……..model 2

Table 1 present study variables which gives information in respect to the measurement as used by the previous studies.

Table 1: Variable identification and measurement

SN	Label	Variables	Description	Sources
1	CRM	Credit risk management	Total non-performing loan to total loans for the year	Ahmed, 2020
2	ROA	Returns on assets	Profit before tax at the year-end divide by total assets	Kumshe et al., 2024
3	ROE	Returns on equity	Profit before tax at the year-end divide by total equity share	Angela, 2016
4	ROC	Returns on capital employed	Profit after tax at the year-end divide by total capital employed	Raymond et al., 2015
5	LQT	Liquidity ratio	Liquid assets to total assets	El-Maude et al., 2022
6	FMS	Firm's size	Natural logarithms of total assets	Ifeanyi & Francis, 2017
7	FML	Firm's leverage	Debt to equity ratio	Ahmed, 2020

4. RESULTS AND DISCUSSION

Descriptive statistics was conducted to analyze the pattern and properties of the data collected using mean, standard deviation, minimum and maximum values, and the result is presented in Table 2.

Table 2: Descriptive Statistics

Variables	Mean	Std. Dev.	Min.	Max.
CRM	0.1962	0.0133	0.36	0.78
ROA	0.4506	0.0727	0.31	0.65
ROE	0.6538	0.0953	0.17	0.68
ROC	0.5242	0.0765	0.02	0.79
LQT	0.4341	0.0421	0.12	0.53

FMS	15.1472	1.5780	11.13	18.68
FML	0.4027	0.1641	0.13	0.77

Source: STATA 14 Output (2024)

The descriptive statistics in Table 2 revealed the mean value of credit risk management (CRM) of 0.1962 with a standard deviation of 0.0313 that falls in between the minimum value of 0.36 and the maximum value of 0.78. In respect to explanatory variables, the results in Table 2 shows a mean value of ROA of 0.4506 with a standard deviation of 0.0727, minimum value of 0.31 and maximum value of 0.65. ROE has a mean value of 0.6538 in between minimum value 0.17 and maximum value of 0.68 with a standard deviation of 0.0953. ROC has a mean value of 0.5242 with a standard deviation of 0.0765 and minimum value of 0.02 and maximum value of 0.79. LQT mean is 0.4341, standard deviation is 0.0421, minimum value is 0.12, and maximum value of 0.53. Regards to banks characteristics, FMS mean is 15.1472, standard deviation 1.5780, minimum value 11.13, maximum value 18.68. For FML, mean value is 0.4027, standard deviation of 0.1641, minimum value 0.13 and maximum value of 0.77.

Furthermore, correlation analysis was carried using Pearson moment correlation statistics and the results presents in Table 3.

Table 3: Correlation Results

Variables	CRM	ROA	ROE	ROC	LQT	FMS	FML
CRM	1						
ROA	0.1036	1					
ROE	0.0682	-0.1204	1				
ROC	-0.0163	0.0113	-0.1844	1			
LQT	0.0215	0.1065	0.0936	0.0625	1		
FMS	0.1401	0.1693	0.0189	-0.0144	0.1764	1	
FML	0.0531	-0.0203	0.0787	0.0150	0.1063	0.1625	1

Sources: STATA 14 Output (2024) @ 5% significant level

The results of correlation analysis in Table 3 shows a positive correlation between returns on assets (ROA) and credit risk management (CRM), returns on equity (ROE) and credit risk management (CRM), liquidity (LQT) and credit risk management (CRM), banks size (FMS) and credit risk management (CRM), and banks leverage (FML) and credit risk management. However, the results shows a negative correlation between return on capital employed (ROC) and credit risk management (CRM). In regards to the magnitude of the correlation, the results in Table 3 shows a weak correlation between the variables of the study with an absolute minimum value of 0.0113 and a maximum absolute value of 0.1764.

The correlation results in Table 3 further shows that, there was no problem of multicollinearity among the variables of the study, since the highest absolute correlation coefficient of 0.1764 is the correlation between banks size and liquidity is less than 0.800 critical level of multicollinearity problem (Hair et al., 2017).

To carry out regression analyses, a diagnostic test was conducted using variance inflation factor, standard skewness, standard kurtoses, and Durbin Watson test statistics, and the results presents in Table 4.

Table 4: Diagnostic test results

Variables	VIF	1/VIF	Skewness	Kurtosis
ROA	1.04	0.9615	-0.2363	4.7993
ROE	1.15	0.8696	0.6641	4.3788
ROC	1.04	0.9615	0.2472	3.6577
LQT	1.11	0.9009	0.3151	4.2184
FMS	1.08	0.9259	-0.2569	3.0152
FMA	1.01	0.9901	0.4621	4.1411
Durbin Watson test = 1.2843				
Chi2-Prob. = 0.0042				

Sources: STATA 14 Output (2024) @5% significant level

The diagnostic results in Table 4 shows that, the absolute skewness values were all less than 1.96, and kurtosis more than 3. Hence, the data are considered to be moderately skewed and platy Kurtic in accordance to the rule of thumb (Gujarati, 2008).

Furthermore, VIF shows the maximum value of 1.15 with a minimum value of 1.01, while the maximum tolerance coefficient of 0.9901 with a minimum value of 0.8696. This means that, the data collected are normally distributed and has no multicollinearity problem (Hair et al., 2017). The value of Hausman model specification test of 0.0042 at 5% significant level is significant, thus, the null hypothesis was rejected (random effect) in favor of fixed effect. With respect to the issue of autocorrelation, the result of Durbin Watson test statistics of 1.2843 is less than the standard value of 2, thus no problem of autocorrelation among the variables of the study (Adefila, 2014).

Given that, the data collected were normally distributed, and there was no problem of autocorrelation and multicollinearity, the regression analysis was carried out and the result presents in Table 5.

Table 5: Regression results

Models	Model 1			Model 2		
Variables	Coeff.	t-value	p-value	Coeff.	t-value	p-value
Constant	0.1050	1.16	0.048	0.4101	5.42	0.000
ROA	0.2275	1.29	0.199	0.1208	1.38	0.006
ROE	0.4775	6.15	0.000	0.4007	5.36	0.000
ROC	-0.1308	-2.27	0.025	0.5314	4.80	0.000
LQT	0.2174	3.15	0.014	0.1021	3.42	0.000
FMS	0.0221	4.80	0.000	0.0209	4.49	0.000
FML	0.0020	4.82	0.073	0.0019	4.50	0.000
ROA*LQT				0.2698	1.72	0.088
ROE*LQT				0.6402	5.37	0.000
ROC*LQT				0.0814	3.123	0.0120
R^2		0.5344			0.5848	
Wald chi2 (5)		52.17			46.63	
Prob>chi2		0.0000			0.0000	

Source: STATA 14 Output (2023) @5% significant level

The regression results in Table 5 revealed a coefficient of determination (R^2) of model 1 of 0.5344 indicating that, about 53.44% of the variation in credit risk management of the banks could be explained by the explanatory variables included in model 1, while 46.56% could be explained by other factors. Moreover, model 1 is found to be significant (Wald chis2 (5) = 52.17, $p < 0.05$), indicating a goodness of fit and validity of the model. Furthermore, given that the intercept p-values of model 1 and model 2 of 0.048 and 0.000 at 5% significant level respectively, are significant, thus the models are significant and have good predictive power.

More so, Table 5 model 1 shows that returns on assets (ROA) has an insignificant positive effect on credit risk management (CRM) at 5% level of significance ($\beta = 0.2275$; $p=0.199$). This implies that increase in return on assets (ROA) will result to an increase in the credit risk management (CRM) of the banks but insignificantly. Hence, the conclusion that, return on assets has no significant effect on the credit risk management system of the banks. However, Table 5 model 1 revealed that return on equity (ROE) has a significant positive effect on credit risk management (CRM) at 5% level of significance ($\beta = 0.4775$; $p=0.000$). This implies that an increase in the rate of returns on equity (ROE) will positively and significantly influence credit risk management of the banks. However, Table 5 model 1 shows that returns on capital employed (ROC) has a significant negative effect on credit risk management ($\beta = -0.1308$; $p=0.025$). Table 5 model 1 shows that, FMS has positive and significant effect on risk management practice of the banks, while FML has positive but insignificant effect on the risk management system of the banks.

Table 5 model 2 shows the regression results after liquidity management was introduced as a moderating variable. This result shows an R^2 value of 0.5848 indicating that all the explanatory variables in model 2 accounted for 58.48% of variations in the dependent variable (CRM). More so, model 2 as a whole is significant at 5% (Wald chis2 (5) = 46.63; $p < 0.05$), indicating a goodness of fit of the model. Therefore, after inputting the moderating variable in model 2, the effect of return on assets (ROA) on credit risk management (CRM) remained positive but significant, likewise the effect of return on equity (ROE) on credit risk management (CRM) remained positively significant. However, introducing the moderating variable has positively and significantly moderated the effect of return on capital employed (ROC) on credit risk management (CRM) from negative to positive.

Therefore, the introduction of moderating variable has affected the value of R^2 from 0.5344 to 0.5848, and F-statistics decreased from 52.17 to 46.63 which signifies that effective liquidity management has moderated the relationship between banks profitability (ROA, ROE, and ROC) and credit risk management (CRM). The decrease in F-statistics from 52.17 to 46.63 implies the

capability of effective liquidity management in moderating the relationship between banks profitability and credit risk management. Thus, the conclusion that, effective liquidity management has a significant positive moderating effect on the relationship between profitability and credit risk management of listed DMBs in Nigeria over the period of the study.

5. CONCLUSION AND RECOMMENDATIONS

The results of this study revealed that, returns on equity and liquidity management have a direct positive and significant effect on credit risk management practice of the banks, while returns on assets shows a positive but insignificant direct effect on credit risk management of the quoted DMBs in Nigeria over the period of the study. However, returns on capital employed has negative but significant effect on credit risk management of the banks. Furthermore, effective liquidity management has significantly and positively moderated the relationship between returns on assets, returns on equity, and returns on capital employed and credit risk management of the banks over the period of the study. Therefore, the conclusion that effective liquidity management has positive and significant moderating effect on the relationship between profitability and credit risk management of listed DMBs in Nigeria. This implies that effective liquidity management significantly influence credit risk management through higher profitability of the listed DMBs.

Therefore, this study recommends that, in order for listed DMBs in Nigeria to effectively control credit risk, the management of the banks should pay more attention to the banks liquidity which would subsequently improve banks profitability. This, would help management to maximize profit through effective credit risk management.

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