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**THE MODERATING EFFECT OF COST PER LOAN ASSET  
RATIO ON THE RELATIONSHIP BETWEEN CREDIT  
RISK AND FINANCIAL PERFORMANCE OF LISTED  
DEPOSIT MONEY BANKS IN NIGERIA**

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**ABSTRACT**

In recent years, banks in Nigeria have experienced a significant increase in delinquent loan portfolios, which has contributed immensely to the financial difficulties in this sector. Due to the trust of depositors, banks should be responsible for the efficient utilization of resources to achieve cost efficiency, which in turn contributes to raising income. This paper seeks to investigate the moderating role of the cost per loan asset ratio (CLAR) on the relationship between credit risk and return on asset (ROA) of Nigerian deposit money banks (DMBs). This study employs panel data analysis followed by the use of GLS regression models to examine the relationship in question. The population consists of all fifteen (15) listed DMBs in the Nigerian

stock market as at December 31st, 2018, while the adjusted population was eleven (11). The results revealed a significant positive moderating relationship between the non-performing loan ratio (NPLR) and capital adequacy ratio (CAR), while the loan loss provision ratio (LLPR) and asset quality ratio (AQR) were negative, but statistically significant. Moreover, the cost per loan asset ratio was found to have an inverse moderating effect on the relationship between the loan and advance ratio (LADR) and the bank's probability, even though it was not statistically significant. Based on the research findings, the study recommends that policymakers focus on capital regulation as measured by the capital adequacy ratio, risk level, liquidity, and operational cost efficiency. In addition, banks should have effective and efficient strategies to manage credit risks, which might help to enhance their performance.

**Keywords:** Credit risk, return on assets, loans and advances, non-performing loans, loan loss provision, cost of loan asset quality, asset ratio.

JEL Classification: G21.

## INTRODUCTION

The constant rise in lending rates and other borrowing costs in Nigeria have consistently raised concerns among investors, policymakers, and other stakeholders in the economy. This is the result of the rigidity in the monetary and structural policies in the economic system, which in turn has led to an increase in costs associated with funds sourcing by Nigerian deposit money banks (DMBs). These two factors have contributed to high lending rates. In addition, increases in overhead costs, contributions of sinking funds by banks to the asset management corporation of Nigeria (AMCON) and premium payments to the Nigerian deposit insurance corporation (NDIC) have exerted extra demands on the cost of funds and earnings for banks. Furthermore, owners and bank managers are seriously concerned with the cost of funds since they can earn a higher return if these costs are minimized. In addition, customers are also concerned with costs since they could end up paying a higher amount for the use of the bank's products and services. Similarly, governments and other bank regulators are

concerned about costs because if banks are unable to reduce their costs, it can have an impact on their profits and liquidity (Ware & Wambua, 2014).

Banking sector profitability is an important indicator of a stable financial sector. The high cost of funds can affect the level of bank profit in unique ways. Bank financial profitability has received significant attention from scholars, bank management, supervisors, financial markets, and other stakeholders in different sectors of the economy. The primary objective of every entity in the economy is to make profits and minimize costs at a given level of risk. Good financial performance shows management effort in making use of the bank's resources. There is ample evidence that a profitable bank can withstand negative shocks, as well as contribute to stability in the sector. In addition, the earnings of DMBs in Nigeria are affected by various factors, which include internal and external forces (Alhadab & Alsahawneh, 2016).

However, the lack of proper monitoring and evaluation of loan portfolios can lead to the accumulation of NPLs, which have become a major threat to the Nigerian banking sector. NPLs are caused by the lack of liquidity and a bank's loan expansion. Moreover, the NPL could be seen as one of the most serious causes of banking failure in the Nigerian banking industry (Sheefeni, 2015). Many steps have been taken to curtail the negative consequences of such risks by local and international organizations. These organizations have developed several procedures and policies that should be followed to mitigate the above mentioned risks. One of the provisions of the policies is the loan loss provision. Furthermore, loan loss provision (LLP) plays an important role in strengthening the financial position of banks (Olabamiji & Michael, 2018). In addition, banks play a vital role in the channeling of funds from surplus units (investors) and extending them to the deficit units (borrowers) within the economy. Loans and advances represent the major income of the banking industry, and it can lead to bank failure if the loan portfolio is not properly managed and utilized. Many bank failures that occurred in Nigeria were the result of poor loans and advances, which had led to the accumulation of NPLs.

To protect the bank from future uncertainty, the CBN (Central Bank of Nigeria) and other regulators require all banks to maintain a certain

percentage of capital adequacy ratio. In addition, a good capital adequacy ratio may protect banks from any unforeseen circumstances that may pose a threat to their existence and survival (Balango & Rao, 2017). Asset quality is regarded as an important indicator of the banking industry's financial dependability and health. Many scholars have considered it one of the key causes of severe banking distress. Loans form an important part of a bank's assets, as delays in repaying it can cause serious problems for the bank, investors (depositors), and the economy in general (Iheanyi & Sotonye, 2017).

The CBN released its financial stability report concerning commercial banks in the country, which revealed that three banks failed a stress test conducted on financial institutions in the country. The CBN reports that loans and advances given by the bank are not performing and cannot be recovered. This has led to an accumulation of bad debts in customer accounts. According to the Komolafe (2017), as of the first half of 2017, 14 banks had recorded a total of N177.3 billion in delinquent facilities. Furthermore, investors and other stakeholders have started to lose confidence due to the failure of some banks to manage their investments within a given level of risk. The continuous diminishing of a bank's asset quality over the years was due to the negligence of some bank officials in managing and handling their portfolios, which reduced the confidence of depositors, shareholders, and foreign investors in the Nigerian banking sector (Olabamiji & Michael, 2018). The most recent bank failure in Nigeria was that of Diamond Bank Plc. This was due to the economic meltdown, huge exposure to the oil sector, breach of corporate governance by the bank management, and board disharmony, among others. This has led to the accumulation of huge non-performing loans (NPLs), which has forced the bank to sell its foreign subsidiaries. According to its financial statement, the bank's management acted contrary to its prudential guidelines. As a result, the bank has a 12.6 percent NPL rate, compared to the industry average of 5 percent, and high impairment charges. Similarly, these problems have caused the bank to lose value in its share price, falling from N7 to N1.37.

Despite some policies and measures undertaken by regulators like the CBN and the NDIC to curtail the implications of default risk in the sector, there is still a rise in the number of NPLs. Therefore, there is a need for additional research in the area to re-examine and identify

the causes of such default risks. There have been several studies conducted on credit risk and the performance of banks, but there are no studies conducted on the moderating aspect in either developing or least developed countries. Therefore, the aim of the present study is to contribute to the existing literature by examining the moderating effect of cost per loan asset ratio on the association between default risk and the ROA of listed DMBs in Nigeria, as well as to identify the relationship between NPLs and the ROA. The study spanned the period from 2010 to 2018, and looked at loan loss provisions (LLPs) on the ROA, loans and advances (LAD) and the ROA, capital adequacy ratio (CAR) and the ROA, and the impact of asset quality (AQ) on the ROA of Nigerian listed DMBs. The rest of the paper is organized as follows: Section 2 reviews the literature and provides testable hypotheses. Section 3 introduces the research methodology. Section 4 presents the empirical results and reports on the robustness of testing, and section 5 concludes the study with recommendations

## **LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT**

In this section, the nexus between credit risk and profitability is explored by reviewing the available body of literature. More specifically, the focus was on previous studies that covered the credit risk of banks and the profitability of both developed and developing countries. Lastly, the mechanisms and hypotheses of development will be discussed.

### **Literature on Non-performing Loans and Bank Performance**

Bhusare et al. (2018) assessed the effect of default risk on the profitability of commercial banks in India for a period of eight years, from 2009 to 2016. Their study adopted a multiple regression model in analyzing the data. The results showed that NPLs measured by gross NPLAs to gross loans and advances had a positive relationship with the ROI, but were statistically insignificant. There was the possibility of high sampling error in the cluster sampling used in this research. Similarly, Kishori and Sheeba (2017) examined the effect of credit risks on the return of capital employed by Indian banks over a period of 20 years, starting from 1997 to 2016. A regression model was

used in the analysis of the data. Findings showed that NPLs had a significant impact on the ROCE. The ROCE used in this research did not account for the depreciation and amortization of the capital employed. Regression analysis was used in another study conducted by Singh and Sharma (2018) on the relationship between credit risk and the ROA of public sector banks in India over a six-year period (2011–2016). The result indicated that the NPLR and ROA had a significant negative relationship. The random sampling technique used in this study might be subjected to a misrepresentation or inaccurate reflection of the population.

Based on the literature and theory, the following hypotheses were developed in the null form:

H<sub>01</sub> : Cost per loan asset ratio (CLAR) has no significant moderating effect on the association between non-performing loans and the ROA of deposit money banks in Nigeria.

### **Literature on Loan Loss Provision and Bank Performance**

Kutum (2017) investigated the effect of credit risk on the ROA of Palestine banks listed on the Stock Exchange for six years (2010–2015). The findings showed that LLPs had a positive association with the ROA, but it was not statistically significant. The technique used in this study only models relationship that is linear and is sensitive to outliers. In their study, Mwaurah et al. (2017) examined the implication of default risk on the stock returns of listed Nairobi commercial banks from 2006 to 2015.

The study was analyzed using the GLS regression model. Regression output showed that loan loss provisions (LLPs) had significant positive relationships with the stock returns. In contrast, Hamza (2017) analyzed the impact of credit risk on the returns of Pakistan's commercial banks for a six-year period (2006–2011). A pooled OLS was used in the analysis. The findings indicated that the loan loss provision ratio (LLPR) had a negative impact on bank returns, which was measured using the return on equity, but it was statistically significant. However, the risk of using pooled OLS in this study is that there will be some form of endogeneity. Based on the above studies, the following hypotheses were developed in the null form:

$H0_2$  : Cost per loan asset ratio (CLAR) has no significant moderating effect on the relationship between loan loss provision and the ROA of deposit money banks in Nigeria.

### **Literature on Loan Advances and Bank Performance**

Kayode et al. (2015) evaluated the relationship between default risk and the ROA in Nigerian commercial banks for the duration of fourteen (14) years from 2000 to 2013. The findings revealed that the LAD significantly affected the profitability of banks in Nigeria. The period covered in this study had been taken over by events, and the study now is not considered reliable because so many things had happened in the banking industry in Nigeria from 2013 to date. For instance, the CBN 2016 new prudential guideline pointed out that the methodology used in the study was flawed due to design and data collection problems, distortions of measurement errors, and the method was unpredictable. In another study, Muriithi et al. (2016) investigated the effect of loan risk on the ROA of banks in Kenya for ten (10) years, from 2005 to 2014. A generalized method of moments (GMM) was employed as a technique for data analysis. Results indicated that the LADR had significant implications on the banks' ROA in Kenya. This indicates that as the LADR is increased, profitability is decreasing. Samuel (2015) investigated the effects of bank profitability on the ROA in Nigeria over a five-year period (2008–2015) and found that loans and advances had no significant effect on the profitability of banks in Nigeria. The technique used in the above study was sensitive to outliers. Similarly, test statistics might be unreliable if the data were not normally distributed. Based on the above findings; the following hypotheses were developed in the null form:

$H0_3$  : Cost per loan asset ratio (CLAR) has no significant moderating effect on the association between loans and advances and the ROA of deposit money banks in Nigeria.

### **Literature on Capital Adequacy Ratio and Bank Performance**

Isanzu (2017) conducted research on the relationship between credit risk and the ROA of Chinese banks for seven years from 2008 to 2014. The results were analyzed using a balanced panel data regression model. They found that the CAR significantly affected the profitability of banks in China. There is distortion of measurement

errors and selectivity problems in the method used in their study. Mendoza and Rivera (2017) evaluated the consequences of default risks and the CAR on returns of Philippine rural banks covering the period of five years from 2009 to 2013. The data was subjected to Arellano-Bond regression. Dynamic results revealed that the CAR had significant implications for profitability. While Bhattarai (2017) measured the impact of credit default risk on the ROA of Nepalese banks for the duration of 8 years from 2009 to 2016. The data were analyzed using the pooled OLS method. According to the findings of the analysis, the CAR had a significant negative correlation with bank profitability. The study used a convenience sampling method that considers samples to represent the entire populations. This may lead to over or under representation of some groups in the samples. Based on the reviewed literature, the following hypotheses were developed in the null form:

$H_{04}$  : Cost per loan asset ratio (CLAR) has no significant moderating effect on the relationship between capital adequacy ratio and the ROA of deposit money banks in Nigeria.

### **Asset Quality Literature and Bank Performance**

Cheruiyot (2016) examined the impact of asset quality on the ROA of banks in Kenya for the period of five years (2011–2015). The study adopted a multiple regression model and concluded that asset quality had a positive effect on the ROA of banks in Kenya. According to the research findings, as the ratio of default rates was lower, asset quality would also be lower, and vice versa. The Capital Asset Pricing Model used in this research is a market-based theory, and it is applicable in the market. Ogbulu and Eze (2016) used a multiple regression model to examine the relationship between asset quality management and the performance of Nigerian DMBs over a 24-year period (1990–2013). They discovered that asset quality had a significant positive correlation with performance.

Furthermore, the study did not provide a theory to underpin the variables in the study. In contrast, Iheanyi et al. (2017) examined the implications of good credit quality on the profitability of Nigerian banks. This research adopted the CAMEL Model, and it spanned a period of 19 years, from 1996 to 2014. The researchers found that

credit quality in Nigerian banks had negative implications for their profit. The technique used in this study was very sensitive to outliers. Similarly, the test statistics of the study might be unreliable because the data was not normally distributed. Based on the results and analysis of the above studies, the following hypotheses were developed in the null form:

H<sub>05</sub> : Cost per loan asset ratio (CLAR) has no significant moderating effect on the association between asset quality and the ROA of deposit money banks in Nigeria.

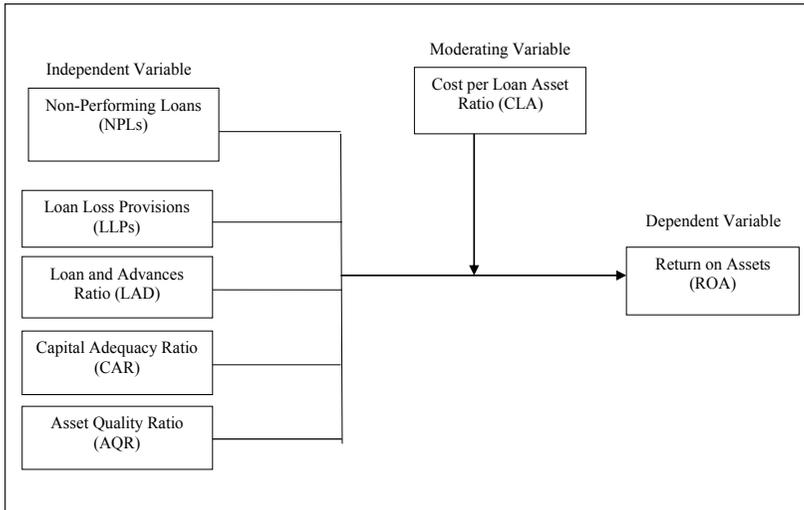
Overall, in their analyses, the above studies did not consider the moderating role of cost per asset ratio. The present study has contributed to the existing literature by examining the moderating role of cost per loan asset ratio on the association between credit risk and the financial performance of deposit money banks in Nigeria. It has applied the GLS regression to correct potential endogeneity, heteroscedasticity, cross-section dependence, and autocorrelation problems. In addition, the literature reviewed had used asset quality as a credit risk management yardstick, whereas the present research used it as a variable to determine credit risk level. Hence, this study has also contributed to the existing literature by examining the role of asset quality in determining the credit risk level on profitability and modern portfolio theory, which is rarely the focus in the literature.

### **Conceptual Framework**

The conceptual framework has been developed from the review of literature and the underpinning theories are as presented in the above diagram (see Figure 1). The diagram represents the various variables used in the study; it shows the interrelationships between the independent variables, such as the non-performing loans, loan loss provision, loan and advances, capital adequacy, asset quality, and the dependent variable ROA. Similarly, the ROA was used as a dependent variable as it could measure the ability of the bank's management to generate income by utilizing company assets at their disposal. The five independent variables directly affected the financial performance of the banks. Furthermore, cost per loan asset was used as a moderating variable, which was expected to influence the relationship between the two variables.

**Figure 1**

*Framework of the Study*



**RESEARCH METHODOLOGY**

In this section, the research design, sources and methods of data collection, population and sample size, techniques of analysis, model specifications, and variables of measurement used in carrying out the present study will be discussed. Moreover, the research employed a correlation research design due to the effectiveness of the design in establishing a relationship among variables. The population for this research comprised 15 (fifteen) DMBs quoted on the Nigerian stock exchange, as at December 31st, 2018. A filter was introduced in the study to include banks according to the following criteria: any banks with available annual reports and accounts over the research period; banks that were not acquired during the period of the study and have branches in all the state capitals; and lastly, any banks that are quoted on the Nigerian Stock Exchange (NSE). Based on the above criteria, eleven (11) banks were selected from the fifteen (15) banks quoted on the Nigerian stock exchange market during the nine-year period starting from 2010 to 2018. Over the period covered by the research, secondary sources of data from published annual reports of eleven (11) listed DMBs under the NSE were employed.

Table 1 presents the variables used in this study. The measurement for each variable is also provided. In this study, profitability (profit after tax divided by total assets) was applied as a dependent variable. Independent variables consisted of non-performing loans, loan loss provision, loans and advances, capital adequacy, and asset quality. The moderating variables were cost per loan asset ratio and are in line with previous studies (Poudel, 2012; Bhattarai, 2016).

**Table 1**

*Variables and Their Measurement*

Variables	Types of Variables	Variable Measurement	Sources
ROA	Dependent	Profit after tax to total assets	Kargi (2011)
Non-performing loans	Independent	NPLs to loan and advances	Alshatti (2015)
Loan loss provisions	Independent	LLP to loan & advances	Alhadabetal (2016)
Loan and advances	Independent	LAD to total deposit	Bizuayehu (2015)
Capital adequacy	Independent	Shareholders fund to total assets	Abiola (2014)
Assets quality	Independent	Net nonperforming assets to total assets	Abata etal. (2014)
Cost per loan assets	Moderator	Total operating cost to total loan and advance	Poudel (2012)

*Note.* Based on the conceptual and empirical literature reviewed

This study has employed the panel data method to examine the moderating effect of cost per loan asset ratio on the association between credit risk and the ROA. This method allows the elimination of unobservable heterogeneity for each observation in the sample of a study. Panel data analysis was carried out using the Generalized Least Square (GLS) model. The study applied GLS regression to correct for potential endogeneity, heteroscedasticity, cross-section dependence, and autocorrelation problems. The regression models for the panel data must comply with some assumptions; either they must be linear, unbiased, have a lag structure, or contain important results prior to

testing the model. To examine the moderating effect of cost per loan asset ratio, this research used the following model:

$$\begin{aligned} ROA_{it} = & \beta_0 + \beta_1 NPLR_{it} + \beta_2 LLPR_{it} + \beta_3 LADR_{it} + \beta_4 CAR_{it} \\ & + \beta_5 AQR_{it} + \beta_6 CLAR_{it} + CLAR \\ & (\beta_7 NPLR_{it} + \beta_8 LLPR_{it} + \beta_9 LADR_{it} + \beta_{10} CAR_{it} + \beta_{11} AQR_{it} + \epsilon_{it}) \end{aligned}$$

$ROA_{it}$  denotes the profitability ratio of bank  $i$  at time  $t$ , calculated as net profit after tax divided by total assets.  $NPLR_{it}$  represents the non-performing loan ratio of bank  $i$  at time  $t$  and is calculated as non-performing loan to loan and advances.  $LLPR_{it}$  is the loan loss provision ratio of bank  $i$  at time  $t$  and is calculated as loan loss provisions to loan and advances.  $LADR_{it}$  is the loan and advances of a bank at time  $t$ , which is measured as loan and advances to total deposits.  $CAR_{it}$  represents the capital adequacy ratio of a bank at time  $t$ , measured as shareholders' funds to total assets.  $AQR_{it}$  is the asset quality ratio of bank  $i$  at time  $t$ , which is measured as net non-performing assets to total assets, and  $CLAR_{it}$  is the cost associated with loans and advances of bank  $i$  at time  $t$ , measured as total operating cost to total loans and advances.

Furthermore, the main advantage of using this model is that it allows for the relationship between non-performing loans, loan loss provisions, loans and advances, capital adequacy, asset quality, and financial performance. This study uses the GLS estimator proposed by previous research studies to investigate the effects of non-performing loans, loan loss provisions, loan and advances, capital adequacy, asset quality, and cost per asset ratio on financial performance.

## **RESULTS AND DISCUSSION**

Results from the various tests conducted for the sample of banks from the period 2010 to 2018 were presented, analyzed, and interpreted. The overall aim is to examine whether cost per loan asset ratio (CLAR) has a significant moderating effect on the relationship between non-performing loans, loan loss provision, loan and advances, capital adequacy ratio, asset quality and return on assets of deposit money banks in Nigeria. The section also presented analyses of descriptive statistics of the selected variables, the correlation matrix, robustness test, Hausman specification test, Generalized Least Squares (GLS) regression results, test of hypotheses, and discussion of findings.

## Descriptive Statistics

The descriptive statistics below show the nature of the data used. Table 2 presents the descriptive statistics such as the mean, standard deviation, and variance, minimum and maximum for each variable, which are return on assets, non-performing loans, loan loss provisions, loan and advances, capital adequacy ratio, asset quality, and cost per loan asset ratio of each dependent and independent variable.

**Table 2**

### *Descriptive Statistics*

	Mean	Std. Deviation	Minimum	Maximum	Observations
ROA	0.021	0.053	-0.099	0.482	99
NPLR	0.111	0.169	0.004	1.044	99
LLPR	0.067	0.089	0.009	0.539	99
LADR	0.654	0.196	0.036	1.064	99
CAR	0.118	0.213	-1.547	0.281	99
AQR	0.045	0.064	0.001	0.381	99
CLAR	0.141	0.275	0.035		99

*Note.* The table describes the nature of the variables in terms of the vv mean, STD deviation, minimum values, maximum values and number of observations.

The results of the descriptive statistics from Table 2 show the mean value of the ROA, which is 2.1 percent. This means that in the period between 2010 and 2018, the total assets of sample DMBs generated a 2.1 percent return on average. While it deviated 5.3 percent, this indicated variation in the ROA among the sample banks. Table 2 also shows that the NPLs have a mean of 11.1 percent, while their deviation stood at 16.9 percent. The NPLs had a minimum value of 0.4 percent while their maximum was 104.4 percent. This indicates the huge NPLs among the sample of banks during the period under investigation. The spread between the maximum and minimum value was 104 percent. It can be seen from Table 2 that the LLPs on average were 6.7 percent, while their minimum and maximum stood at 0.9 percent and 53.9 percent, respectively; this implies that the DMBs were slightly above the required 8 percent provision by the Basel Accord. The results showed that the LAD has a 65.4 percent average and it deviated by 19.6 percent. In addition, it had a maximum value of 106.4 percent, while the minimum value was 3.6 percent. This means that the DMBs

concentrated more attention on giving loan facilities that have more risk. Table 2 also shows that the capital adequacy ratio had an average of 11.8 percent, with a standard deviation of 21.3 percent. Similarly, the minimum stood at -154.7 percent, while the maximum value was 28.1 percent. The spread between the maximum and minimum value was -126.6 percent. However, the maximum value of the CAR was more than the 15 percent that was regulated by the CBN. This also means that the DMBs’ investments were mainly derived from long-term debts or liabilities. Asset quality was also maintained at an average of 4.5 percent, with a minimum value of 0.1 percent, while the maximum value stood at 38.1 percent. This shows that the DMBs concentrated more on financing businesses which was riskier than other investments. Regarding the LA, the average mean was 14.1 percent, while the minimum value was 3.5 percent and the maximum value was 273.1 percent. This indicates a huge cost among the sample of DMBs.

### **Correlation Matrix for Dependent and Independent Variables**

Table 3 represents the correlation matrix, which shows the relationship between each two pairs of the variables in the model. The correlation matrix is a preliminary test to check for the possibility of multicollinearity. However, in this study, a further test of multicollinearity was conducted using the variance inflation factor (VIF) and tolerance value (TV).

**Table 3**

#### *Correlation Matrix*

	ROA	NPLs	LLP	LAD	CAR	AQ	CLA
ROA	1.0000						
NPL	0.056	1.0000					
LLP	-0.167	0.155	1.0000				
LAD	0.157	-0.237	-0.151	1.0000			
CAR	0.182	-0.217	0.056	0.454	1.0000		
AQ	0.126	0.877	0.154	-0.026	0.074	1.0000	
CLA	-0.261	0.283	0.087	-0.431	-0.644	-0.014	1.0000

*Note.* Table 3 shows the correlation relationship between the variables signifying absence of multicollinearity, because all correlation between all the variables is below 70%.

Table 3 shows the correlation coefficients between variables. The Pearson correlation coefficient indicates a positive correlation between the ROA and the NPL. Moreover, the NPL has a correlation coefficient value of 0.056. The correlation coefficient of 0.056 (NPL/LA) indicates an increase in the ROA with every rise in the NPL. This is unusual because, according to the theory, the NPL and the ROA have an indirect relationship. Moreover, the positive effect of NPLs on returns indicated that NPLs were increasing proportionately to profitability, even though there was credit default. The correlation matrix above shows that the coefficient of return on assets (ROA) and loan loss provisions (LLPs) is -0.167. This implies that loan provisions (LLPs) have a negative correlation with financial performance as measured by the ROA. The correlation coefficient of -0.167 (LLPs/LA) indicated a decrease in the ROA with every rise in NPLs. The correlation output from the table above shows a positive relationship between loans and advances (LAD) as credit risk indicators and profitability. The correlation coefficient of 0.157 indicated a rise in profitability with every increase in the risk factors of loans and advances. There was a direct correlation between the CAR and the return on assets. The CAR ratio had a correlation coefficient of 0.182, which shows a positive correlation between the CAR and the ROA. This implies that as the capital adequacy ratio is increased, ROA will increase. The ROA had a positive correlation with asset quality in Table 3. It had a correlation coefficient of 0.126. The correlation output shows a positive relationship between good asset quality and the ROA, with the coefficient of correlation being 0.126. In terms of the CLAR and the ROA, they were seen as inversely related. The correlation coefficient of -0.261 means that as the CLAR rises, the ROA will decrease.

From Table 4, it can be observed that the R<sup>2</sup> is 0.22, which means that 22 percent of the variation in the financial performance of deposit money banks in Nigeria is explained jointly by the independent variables captured in the model of the study. The F-statistic is 114.04, which is greater than the critical value at the one percent level of significance. Therefore, the variables (credit risk components) are jointly significant in explaining the variations in return on assets in the random effects specification. The wild-performance, which is significant at 1percent, indicates that the model is fit. Similarly, a positive moderating effect was found on the association between non-performing loans and the ROA, with a coefficient of 2.068 percent

and a statistical significance of 1 percent. According to the analysis, one naira rise in the NPL could increase profitability by 2.068 percent. This states that banks with a high NPL can obtain a high profit. This is in line with the predictions of previous theory, which stated that the higher the risk, the higher the return. The positive sign also indicates that riskier banks are more cost-efficient and profitable. This result does not contradict the preliminary hypothesis (H01), and it is supported by Bhusare et al. (2018), Kishori and Sheeba (2017), but it is refuted by Singh and Sharma (2018) and Bhattarai (2016).

**Table 4**

*GLS Regression Results*

VARIBLES	COEFFICIENT	Z-VALUE	P> Z
NPL	-0.147	-1.74	0.085
LLP	0.054	1.15	0.253
LAD	0.068	0.92	0.358
CAR	-0.201	-3.14	0.002**
AQ	0.866	2.00	0.049
Cost per Loan Asset	0.231	0.67	0.502
Moderation of NPLs	2.068	3.81	0.000*
Moderation of LLPs	-0.876	-2.60	0.011*
Moderation of LAD	-0.419	-0.77	0.444
Moderation of CAR	0.735	2.96	0.004**
Moderation of AQ	-8.373	-2.66	0.009**
R-Squared: 0.22	Adjusted R-Squared: 0.17		
F-statistic: 114.04			
Prob.: 0.0000			

*Note.* \*\*\* Significant at 1%, \*\* significant at 5%, \* significant at 10%

In addition, a negative moderating effect was found in the relationship between loan loss provisions and the ROA, with a coefficient of -0.876 (87.6%). This means that a one naira increase in loan loss provisions will reduce profitability by 87.6 percent. The negative relationship is in line with the prior expectations of this study. Furthermore, the LLPR has a p-value of 0.01, which is at a 10 percent significant level. This outcome offers unswerving support to the preliminary hypothesis (H02) and is further corroborated in the studies by Hamza (2017), Alhadab and Alshawneh (2016). However, this was the case in the findings of Kutum (2017) and Mwaurah et al. (2017). Also, Table 4 shows

a negative moderating role of the CLA on the association between the LAD/TD and the ROA, with a coefficient of -0.419 (41.9%). This shows that as loans and advances increased by one, profitability would decline by 41.9%, even though the increase is not significant. The coefficient of TL/TD was negative, which indicated that more aggressive banks were involved in lending activities as compared to deposits and, therefore, were less profitable. In the case of developed countries, the scenario may be different (Bhattarai, 2016). However, in the case of developing countries like Nigeria, where people have a tendency to default on loans, a higher TL/TD may hinder efficiency because it increases the cost related to cash collection. On the basis of this, H03 would not be rejected and is supported by Kayode et al. (2015) and Bizuayehu. (2015), but opposed by Muriithi et al. (2016) and Samuel, (2015).

From Table 4, it can be seen that the CLAR has a negative moderating effect on the association between capital adequacy ratio and the ROA, with a coefficient of 0.735 (73.5%), and it was statistically significant at the 5 percent level of significance. This implies that capitalized banks are in a better position to withstand any negative shock. In a developing country like Nigeria, the cost of capital is higher, and therefore, it is expensive to maintain more capital. Hence, banks with high capital have higher capital efficiency. This finding is inconsistent with the hypothesis H04 and contrasts with the findings in Isanzu, (2017) and Bhattarai (2016). It could also be seen from the results that the CLAR moderates the relationship between the AQ and the ROA negatively, with a coefficient of -8.373 percent, but is significant at 5 percent. This indicates that a one naira increase in the AQ will reduce profitability by 8.373 percent. The negative relationship contradicts the prior expectations of this study. This contradicts the initial hypothesis (H05), but is supported by Cheruiyot (2016), and Ogbulu and Eze (2016), who reported insignificant relationships.

## **CONCLUSION AND RECOMENDATIONS**

The findings of the study point to the conclusion that the cost per loan asset ratio (CLAR) moderates the relationship between NPLs and the financial performance of listed DMBs positively. Secondly, it can also be concluded that the cost per loan asset ratio (CLAR) moderates the association negatively between LLPs and the ROA of deposit money banks. Since LLPs normally serve as a financial backup for banks,

they can absorb losses. Moreover, a one-naira increase in the ratio of LLPs to loans and advances (LAD) will decrease bank performance. Thirdly, the study has revealed that as measured by the ROA, and even though it was not statistically significant, the cost per loan asset ratio (CLAR) moderates negatively the relationship between loans and advances and profitability. The study also showed that loans and advances (LAD) played an important role in explaining changes in the ROA. Thus, the research has concluded that loans and advances are a determinant of the ROA of Nigerian listed DMBs. Fourthly, the results also confirmed that the CLAR moderates the relationship between the CAR and return on assets positively. This finding is in line with prior expectations. The significant result of the CAR means that the CAR may influence the bank's ROA. Lastly, results show that the CLAR moderates the relationship between the ROA and asset quality of listed DMBs in Nigeria and is statistically significant. There is clear evidence that asset quality is one of the credit risk attributes that may influence the ROA of banks. This means banks with high asset quality and lower NPLs earn more profits than others.

In summary, it is clear that the CLAR has a moderate effect of asset quality on the ROA of DMBs. In light of this finding, the study recommends that the management of DMBs in Nigeria should take comprehensive measures, such as the use of CAMEL indicators to curtail the negative implications of non-performing loans on financial performance. The study also recommends that bank management should place a greater emphasis on deposit mobilization because it can affect their returns. The study also recommends that the capital adequacy ratio should be managed because adequate liquidity can reduce the banks' sensitivity to credit risk. Furthermore, this could affect the financial performance positively. Finally, the study recommends that regulators develop effective prudential guidelines and policies to strengthen the management of credit risk. This may include maintaining an adequate level of provisions for non-performing and bad loans, transferring default risk to third parties, extending maturity, restructuring the duration of non-performing loans, and decreasing interest rates for loans.

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## REFERENCES

- Abata, D., & Adeolu, M. (2014). Asset quality and bank performance: A study of commercial banks in Nigeria. *Research Journal of Finance and Accounting*, 5, 39–44. <https://iiste.org/Journals/index.php/RJFA/article/view/16209/16592>.
- Abbas, A., Zaidi, S. A. H., Ahmad, W., & Ashraf, R. U. (2014). Credit risk exposure and performance of banking sector of Pakistan. *Journal of Basic Applied Science Research*, 4(January,2014),240-245.[https://www.researchgate.net/publication/271327721\\_Credit\\_Risk\\_Exposure\\_and\\_Performance\\_of\\_Banking\\_Sector\\_of\\_Pakistan](https://www.researchgate.net/publication/271327721_Credit_Risk_Exposure_and_Performance_of_Banking_Sector_of_Pakistan)
- Abiola, I., & Olausi, A. S. (2014). Impact of credit risk management on the commercial banks performance in Nigeria. *International Journal of Management and Sustainability*, 3, 295–306. <https://doi.org/10.18488/journal.11/2014.3.5/11.5.295.306>
- Alhadab, M., & Alshahwneh, S. (2016). Loan loss provision and the profitability of commercial banks: Evidence from Jordan. *International Journal of Business and Management*, 11(12), 242. <https://doi.org/10.5539/ijbm.v11n12p242>
- Alshatti, A. S. (2015). Effect of credit risk management on the financial performance of the Jordanian commercial banks. *Journal of Investment Management and Financial Innovations*, 12, 338-345. <https://doi.org/10.5897/AJBM2013.7171>
- Asare, O. (2015). Impact of credit risk on profitability of some selected banks in Ghana. *School of Business KNUST, Kenya, Ghana*. <http://ir.knust.edu.gh/xmlui/handle/123456789/8653>
- Balango, T. K., & Rao, M. K. (2017). Effect of NPL on profitability of banks with reference to commercial bank of Ethiopia. *Business and Management Research Journal*, 7(June), 45–50. <https://www.ijsrp.org/research-paper-0517/ijsrp-p6566.pdf>
- Bhatarai, Y. R. (2016). Effect of credit risk on the performance of commercial banks in Nigeria. *NRB Economic Review*, 4(1), 42–64. <https://doi.org/10.1007/s13398-014-0173-7.2>
- Bhatarai, Y. R. (2017). Credit risk and commercial banks 'profitability in Nepal: A panel approach. *Journal for Studies in Management and Planning*, 3, 1–15. <https://www.pen2print.org/2017/10/credit-risk-and-commercial-banks.html>
- Bhusare, P. S., Shukla, S., & Indi, R. (2018). The effect of credit risk on returns of select public and private scheduled commercial Banks In India. *IOSR Journal of Business and Management*, 2(June), 30–7. [www.iosrjournals.org](http://www.iosrjournals.org)

- Bizuayehu, M. (2015). *Impact of credit risk on profitability performance of commercial banks in Ethiopia* (Unpublished master's thesis). Department of Accounting & Finance, College of Business and Economics Addis Ababa, Ethiopia. <https://doi.org/10.5897/ajbm2013.7171>
- CBN. (2016). CBN financial stability report-december, 2016. *Global Economic and Financial System Stability Outlook*. [https://www.cbn.gov.ng/out/2017/fprd/fsr%20december%202016%20\(2\)](https://www.cbn.gov.ng/out/2017/fprd/fsr%20december%202016%20(2)).
- Cheruiyot, R. K. (2016). *Effect of asset quality on profitability of commercial banks in Kenya* (Unpublished master's thesis). University of Nairobi, Kenya.
- Hamza, S. M. (2017). Impact of credit risk management on banks performance: A case study in Pakistan banks. *European Journal of Business and Management*, 9, 57–64. <https://www.iiste.org/Journals/index.php/EJBM/article/view/34898>.
- Iheanyi, I. H., & Sotonye, I. (2017). Assessing the performance of nigeria's bank through Camel model. *Journal of Accounting and Finance Management*, 3, 14-22. <https://www.iiardjournals.org/get/jafm/vol.%203%20NO.%201202017/assessing%20the>.
- Isanzu, J. S. (2017). Impact of credit risk on the financial performance of Chinese banks. *Journal of International Business Research and Marketing*, 2(March), 14–17. <https://doi.org/10.18775/jibrm.1849-8558.2015.23.3002>
- Kargi, H. S. (2011). Credit risk and the performance of Nigeria banks. *European Journal of Finance Management*, 1(July, 2011), 1-24. <https://www.ijsrp.org/research-paper-0517/ijsrp-p6566>.
- Kayode, O. F., Obamuyi, T. M., Owoputi, J. A., & Adeyefa, F. A. (2015). Credit risk and bank performance in Nigeria. *IOPSR Journal of Economics and Finance*, 6(March-April), 21-28. <https://doi.org/10.9790/5933-06222128>
- Kishori, B., & Sheeba, J. (2017). Impact of credit risk on the profitability of state bank of India. *International Journal of Science Research and Technology*, 3, 2587-2594. <https://doi.org/10.21917/ijms.2017.0073>
- Komolafe, B. (2017, January 1). *Economic recession: The vanguard*. Nigeria edition.
- Kutum, I. (2017). The impact of credit risk on the profitability of banks listed on the Palestine exchange. *Research Journal of Finance and Accounting*, 8(November), 136–41. <https://www.iiste.org/Journals/index.php/RJFA/article/view/36781>

- Mendoza, R., & Rivera, J. P. R. (2017). Effect of credit risk and capital adequacy on the profitability of rural banks in the Philippines. *Scientific Annals of Economics and Business*, 64, 83–96. <https://doi.org/10.1515/saeb-2017-0006>
- Muriithi, J., Waweru, K., & Muturi, W. M. (2016). Effect of credit risk on financial performance of commercial banks Kenya. *Journal of Economics and Finance*, 7(4), 72–83. [www.iosrjournals.org](http://www.iosrjournals.org)
- Mwaurah, I., Muturi, W., & Waititu, A. (2017). The influence of credit risk on stock returns. *International Journal of Scientific Research Publications*, 7(5), 575–84. <https://www.ijsrp.org/research-paper-0517/ijsrp-p6566>.
- Mwongela, M. C. (2015). *The relationship between interest rates and profitability of commercial banks in Kenya* (Unpublished master's thesis). Department of Business Administration, University of Nairobi, Kenya.
- Ogbulu, O. M., & Eze, G. P. (2016). Credit risk management and the performance of deposit money banks in Nigeria: An error correction analysis. *Applied Economics and Finance*, 4, 97–109. <https://doi.org/10.11114/aef.v3i2.1356>
- Olabamiji, O., & Michael, O. (2018). Impact of credit management practices and bank performance: Evidence from First bank. *South Asian Journal of Social Studies and Economics*, 1(19 April), 1–10. [10.9734/sajsse/2018/v1i125772](https://doi.org/10.9734/sajsse/2018/v1i125772)
- Poudel, P. R. S. (2012). Impact of credit risk management on financial performance of commercial banks in Nepal. *International Journal of Arts and Commerce*, 1(5), 9–15. <https://doi.org/10.5897/AJBM2013.7171>
- Samuel, O. L., & Iwoye, A. (2015). Effect of credit risk on the performance of commercial banks in Nigeria. *African Journal of Accounting, Auditing and Finance*, 2, 118. <https://doi.org/10.1007/s13398-014-0173-7.2>
- Sheefeni, J. P. S. (2015). Impact of macro-economic determinants on non-performing loans in Namibia. *International Review of Research in Emerging Markets and the Global Economy*, 1, 612–632. <https://doi.org/10.5901/ajis.2015.v4n3s1p534>
- Singh, S., & Sharma, K. (2018). Impact of credit risk on profitability of indian public sector banks. *International Journal of Research Economics and Social Sciences (IJERESS)*, 8(2), 492–8. <http://euroasiapub.org>. <https://www.vanguardngr.com/2017/01/economic-recession-constrained-banking-2016/>
- Were, M., & Wambua, J. (2014). What Factors drive interest rate spread of commercial banks? Empirical evidence from Kenya. *Journal Advance Research*, (December), 1-11. <http://dx.doi.org/10.1016/j.rdf.2014.05.005>