NON-PERFORMING LOAN AND PERFORMANCE OF LISTED DEPOSIT MONEY BANKS IN NIGERIA: MODERATING EFFECT OF BOARD FINANCIAL EXPERTISE

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Abstract

Banks carry out an important function of providing funds from surplus units and channel such funds to the deficit units of the economy. This function ensures that limited resources are allocated efficiently among different users. However, the study examined the moderating effect of board financial expertise on the relationship non-performing loan and performance of listed deposit money banks in Nigeria for a period of 2018-2023 using panel data collected from the audited annual financial statements of twelve (16) banks. Ex-post facto research design and the Generalized Least Squares method was used in its estimations with the aid of STATA Software Version 14. The study found that non-performing loan, loan loss provision ratio and loan and advances ratio have significant negative effect on the performance of listed deposit money banks in Nigeria. Board financial expertise did not only have direct significant positive effect on the performance, but it also moderates the relationship between non-performing loan variables (non-performing loan, loan loss provision ratio and loan and advances ratio) and performance of listed deposit money banks in Nigeria. However, the study recommended that CBN should mandate DMBs Boards and Managements to make sure that sufficient procedures are implemented to lessen the negative effect of non-performing loans on their day-to-day operations and Boards of DMBs in Nigeria should be made up of members who have financial expertise in dealing with the activities of the banks.

Keywords: Bank size, DMBs, *financial expertise,* non-performing loan, performance.

Introduction

Globally, banks carry out an important function of providing funds from surplus units and channel such funds to the deficit units of the economy. This function ensures that limited resources are allocated efficiently among different users. Thus, the performance of banks is important to financial stability and economic growth and development (Ongore & Kusa, 2013).

Hence, the contribution of banks to economic growth and development of any nation is important because of their role of allocating scarce resources in the economy and job creation. A sound banking system is salient to economic growth and development (Levine, 2005). Good performance of the banking sector instills confidence in banks depositors and as a result encourages savings and investment in the economy.

Deposit money banks are the leading financial institutions in most developing and emerging economies and well-strong DMBs facilitate the rate of economic growth while poorly functioning DMBs weakens economic progress (Richard, 2014). According to Waweru and Kalani (2016), loans are part of the assets of financial institutions since they are meant to earn interest in the course of time. Though, this is not always the case as some loans do not perform as expected and are characterized as non-performing loans (Waweru & Kalani, 2016).

However, bank performance for almost a decade in Nigeria remains an issue of concern to all stakeholders. Obamuyi (2013) asserts that banks performance in Nigeria remain unimpressive for quite some years. This is reflected in their first quarter of 2016 analysis of their balance sheets that showed that their After Tax Profit of about N90.07 billion. This represents a fall of almost N10.52 billion from N100.59 billion recorded in the first quarter of 2015 (Muhammad, Agabi, Shosanya and Ogwu, 2016). The analysis covered some deposit money banks such as Union Bank of Nigeria Plc, Ecobank Group, Guaranty Trust Bank Plc, UBA Plc and Zenith Bank Plc. Also, these banks got a profit Before Tax of N106.29 billion for the first quarter that ended March 31, 2016, reflecting a fall of 11.15% from N119.63 billion that was reported during the same period of 2015. The effects of such decline over the 2015/2016 financial year on the banking sector is undesirable with five banks losing N54 billion from their 2014/2015 financial year (Muhammad et al., 2016).

In 2013, the Nigeria Deposit Insurance Corporation annual statement of accounts show that the total loans and advances of listed DMBs in Nigeria stood at N10.043 trillion, indicating an increase of 23.22 percent over N8.150 trillion granted in 2012, and that the non-performing loans to total loans ratio improved from 3.51 percent in 2012 to 3.23 percent in 2013, this according to the report was within the regulatory threshold of 5 percent. However, despite this positive improvement, the size of non-performing loans increased by 13.30 percent from 281.09 billion in 2012 to 324.14 billion in 2013 (NDIC, 2013). In order to forestall the reoccurrence of non-performing loan and to guarantee safe and sound financial system, the CBN in June 2014 directed that

no financial institutions shall without the prior written approval of the CBN grant a credit facility to a potential borrower who is in default of the any existing credit facility to the tune of N500Million and above in the case of deposit banks and N250Million and above in the case of development banks and banks in liquidation.

The NDIC report in 2016 showed that, deposit money banks total loans to the domestic economy stood at N16.29 trillion as at 31st December, 2016, out of which the sum of N2.08 trillion was non-performing. The sharp rise in the quantum of non-performing loans (NPLs) by 220% from N0.65 trillion as at 31st December, 2015 to N2.08 trillion as at 31st December, 2016 and the NPL to Total loans ratio (NPL ratio) which increased from 4.88% as at 31st December 2015 to 12.80% as at 31st December 2016, compared unfavorably with the maximum prudential threshold of 5%.

The Nigeria Deposit Insurance Corporation (NDIC) statement of accounts for 2017 revealed that Nigerian DMBs Non-Performing Loans (NPLs) in 2017 was N2.36 trillion. This represents a 13.46 per cent decrease compared to N2.08 trillion in 2016. According to the corporation, the rising NPLs led to a deterioration in banks' asset quality in 2017 (Famuyiwa, 2018). Furthermore, the latest banking sector report released by the National Bureau of Statistics (NBS) revealed that Nigerian deposit money banks non-performing loans increased to N1.212 trillion at the end of June 2020, from N1.059 trillion recorded in December 2019, indicating that NPLs across Nigerian banks rose by N152.4 billion or 14.38% in six months (Adesoji, 2020). In a related development, the Central Bank of Nigeria revealed that the total non-performing loans in the banking sector amounted to N1.5tn of the N37.81tn total credit in the sector as of June 2023 (Popoola, 2023). This indicates that the banking industry's gross credit to the economy and total assets have continued to increase. From June 2022 to June 2023, the total industry assets increased by N30.92tn or 47.21%, reaching N96.4tn. Similarly, the total credit to the economy increased by N10.75tn or 39.73%, standing at N37.81tn as of June 2023 (Popoola, 2023).

Previous empirical studies on the relationship between non-performing loans and banks performance were mixed and inconsistent. For example, studies by Boussaada, Hakimi, and Karmani, (2023), Gabriel, Victor, and Innocent (2019), Jathurika, M. (2019), Kingu et al. (2018), Akter and Roy (2017), Islam and Rana (2017), and Balango and Rao (2017), Bhattarai (2016), Chimkono, Muturi and Njeru (2016), Ozurumba (2016), Lydnon, Peter and Ebitare (2016), Etale, Ayunku, and Etale (2016), Hussain and Ahamed (2015), Kiran and Jones (2016),

Nsobilla (2015) and Mwangi, (2014) revealed negative effect of non-performing loans on the performance of banks while studies by Dao, Nguyen, Hussain, and Nguyen (2020), Balagobei and Velnampy (2017), Patwary and Tasneem (2017), Ekanayake and Azeez (2015), and Adebisi and Matthew (2015), found significant positive effect of non-performing loans on the performance of deposit money banks.

In view of inconsistency in findings, it is appropriate to introduce a moderating variable (Frazier et al., 2004, Baron & Kenny, 1986). Moderator is a "variable that affects the direction and/or strength of the relationship between an independent or predictor variable and a dependent or criterion variable (Baron & Kenny, 1986). Consequently, board financial expertise is the moderating variable. Therefore, board financial expertise is the number of directors on the board of banks with professional skills in the area of accounting, finance, management and insurance. It is the proportion of people with professional skills on the board of an organization (Recadina & Ouma, 2017). Also, Rose (2015) sees it as the different fields of study found among the persons on the board. However, Mike and Wei (2014) found that board financial expertise has a beneficial influence on the performance outcomes of insurers

However, the study examining moderating effect of board financial expertise on the relationship between non-performing loan and performance of listed DMBs in Nigeria.

Literature Review

Non-performing loan and Banks Performance

Non-Performing Loans according to Fofack (2005), is used interchangeably with Bad loans and impaired loans. Berger and De young (1997) describes these types of loans as "problem loans". Alton and Hazen (2001) see non-performing loans as loans that are ninety days or more past due or no longer accruing interest. Caprio and Klingebiel (1990) see non-performing loans as loans which for a relatively long period of time do not generate income that is both the principal and interest on these loans remain unpaid for at least 90 days. High level of non-performing loans would reduce the financial performance of commercial banks in Nigeria (Gabriel, Victor, & Innocent, 2019). However, relationship between non-performing loans and bank performance is mixed. Therefore, studies by Gabriel, Victor, and Innocent (2019), Kingu et al. (2018), Akter and Roy (2017), Balango and Rao (2017),

Matin (2017), Etale, Ayunku, and Etale (2016), found that non-performing loans has significant negative effect on banks performance while studies by Patwary and Tasneem (2017), and Bhattarai (2016), found that non-performing loans has significant positive effect on banks performance. Contrary wise, Joseph and Okike (2015) found no relationship between the Non-performing Loans and Return on Asset of Nigeria Banks. Therefore, the objective and hypothesis are stated below:

To examine the effect of non-performing loan on the performance of listed deposit money banks in Nigeria.

H_1: There is no significant effect of non-performing loan on the performance of listed deposit money banks in Nigeria.

Loan Loss Provision Ratio and Banks Performance

Beatty and Lioa (2009) define loan loss provision as a policy that followed by commercial banks by putting some money aside (reserves) to face any potential loans default, which in turn would help to protect banks' positions in terms of profitability and capital. The main objectives of loan loss provision is to provide special information about the bank's future (Kanagaretnam & Lobo, 2010). Loan-loss provisioning policy is critical in assessing financial system stability, in that it is a key contributor for fluctuations in banks' profitability and capital positions, which has a bearing on banks' supply of credit to the economy (Beatty & Liao, 2009). The higher loan loss provisions decreases profitability and financial stability of the bank, and the higher provisions for loan losses decreased profitability (Tahir et al., 2014). However, relationship between loan loss provision and bank performance is mixed. Studies by Ozurumba (2016), Caporale, et al. (2015), Tahir et al. (2014), Kolapo, Ayeni, and Oke (2012), and Mustafa et al. (2012), found that loan loss provision has significant negative effect on banks performance while study by Fernando and Ekanayake (2015) found that loan loss provision has significant positive effect on banks performance. Therefore, the objective and hypothesis are stated below:

To examine the effect of loan loss provision ratio on the performance of listed deposit money banks in Nigeria.

H_2: There is no significant effect of loan loss provision ratio on the performance of listed deposit money banks in Nigeria.

Loan and Advances Ratio and Banks Performance

Loan and advances ratio measures a bank's ability to withstand deposit withdrawals as well as its readiness to meet loan demand by decreasing cash assets (Muriithi, 2016). Therefore, Ozurumba (2016) and Kolapo, Ayeni, and Oke (2012) found that loan and advances ratio has significant positive effect on banks performance. That is, found that an increase in total loan and advances increase performance. Based on the above arguments, the objective and hypothesis are stated below:

To examine the effect of loan and advances ratio on the performance of listed deposit money banks in Nigeria.

H_3: There is no significant effect of loan and advances ratio on the performance of listed deposit money banks in Nigeria.

Board Financial Expertise as a Moderating Variable

Board financial expertise is the number of directors on the board of banks with professional skills in the area of accounting, finance, management and insurance. It is the proportion of people with professional skills on the board of an organization (Recadina & Ouma, 2017). The combined expertise and knowledge of the members is an intangible asset of the board and is a proxy that is associated with firm performance (Hillman & Dalziel, 2003). According to Igneley and van der Walt (2001), the expertise of a board member is essential in decision making. For instance, oversight role could be successfully implemented if the board members are qualified and experienced. On board expertise and financial performance, Nwonyuku (2016) found that board expertise and competence has negative relationship with ROE and net assets per share. Bonsa (2015) found that board financial expertise has positive and significant effects on financial performance (ROA) of insurers. The study of Mike and Wei (2014) found that board expertise has a beneficial influence on the performance outcomes of insurers. Bernadette et al. (2014) examined financial expertise of the board and financial performance of insurance companies in US for the crisis period 2007–2008. While financial expertise is weakly associated with better performance before the crisis, it is strongly related to lower performance during the crisis. Based on the above arguments, the objective and hypothesis are stated below:

To examine the moderating effect of board financial expertise on the relationship between non-performing loan and the performance of listed deposit money banks in Nigeria.

H_4: There is no significant moderating effect of board financial expertise on the relationship between non-performing loan and the performance of listed deposit money banks in Nigeria.

Theoretical and Conceptual Frameworks

The main theoretical assumption of this study is based on Moral Hazard Theory. Moral hazards refers to a condition leading to risk that results when a banks customer provides information that is misleading about its financial statements or his or her credit capacity, or has a hidden incentive to take risks that are unusual in an attempt to earn a profit before the contract settles. Before Stiglitz and Weiss (1983) and Stiglitz (1990) proposed moral hazard model for credit market, Arrow (1963) documents that the phenomenon of using private information to benefit from an incomplete contract in the presence of information asymmetry is known as moral hazard. Musara and Olawale (2012) also noted that moral hazard exist where the borrower of bank credit takes action that adversely affects the returns to the lender. Gorton and Pennacchi (1995) posit that a bank that makes and sells loans is subject to a moral hazard problem with respect to screening borrowers. The theory is based on the assumption that the likelihood of borrowers engaging in activities that will guarantee repayment of bank credit extended to them cannot be determined ex-post by banks. The theory postulates that, the problem of moral hazard may result from information asymmetric between banks customer and the bank which makes it almost impossible to distinguish bad from good prospective borrowers (Richard, 2011). Researchers have noted that moral hazard problem has led to overtime pilling up of NPLs (Bofondi & Gobbi, 2003). However, the moral hazard theory will be adopted in this study because it states that the higher the nonperforming loan's the lower the financial performance and vice versa. However, based on the above theoretical underpinning for the relationships among the underlying variables, a schematic representation of the relationships is given below.

Moderating Variable

Independent Variables **Dependent Variable**

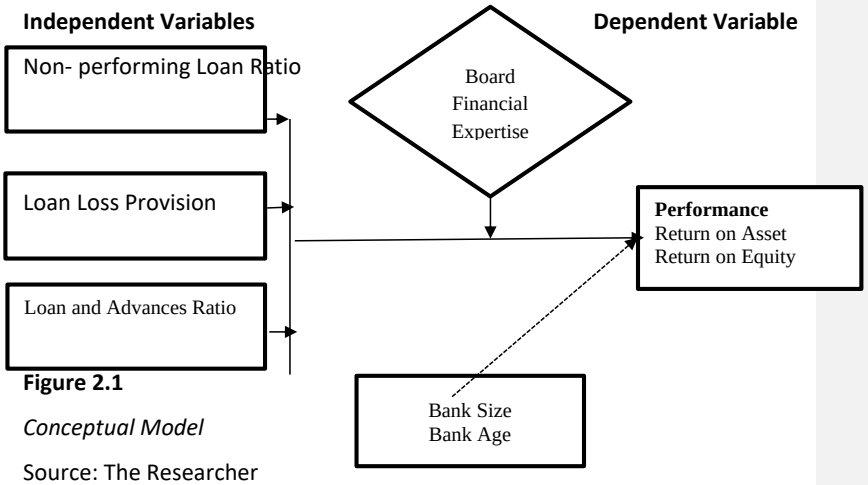

Figure 2.1

Conceptual Model

Source: The Researcher

Control Variables

Methodology

The study used Ex post facto research design which is the use of historical facts to make a judgment (Simon & Goes, 2013) while census sample was used where the universe is not vast; where there is enough time to collect data and where higher degree of accuracy is required. As stated by Asika (1991) and Turner (2003), the best sample is the whole population itself, since all the components of the population are represented in it. The population for this study consisted of sixteen (16) DMBs listed on the Nigerian Stock Exchange as at 31st December 2023. However, data are collected from the annual audited financial statements of 16 sampled listed sixteen (16) lDMBs over a six-year period (2018–2023). The selection of these years was based on the availability of data over the study period. A total of 96 observations were made for six years. The Generalized Least Squares method was used for the estimations with the help of STATA version 14.

Measurement of Variables and Model Specification

The definition and measurements of the dependent, independent, moderating and control variables are presented in Table 1 below:

Table 1
Measurement of Variables

	Variable Name	Symbol	Measurement	Source
Dependent Variable	Return on Assets	ROA	The ratio of Net Income to Total Asset	Mansyur, 2017; Mendoza & Rivera, 2017; Muthii, Githinji, & Muchiri, 2017; Yimka, Taofeek, Abimbola, & Olusegun, 2015.
	Return on Equity	ROE	The ratio of net income divided by shareholders‟ equity	Mansyur, 2017; Mendoza & Rivera, 2017; Muthii, Githinji, & Muchiri, 2017
Independent Variables	Non-performing Loan	NPL	Ratio of nonperforming to Total Loans and Advances	Hamza (2017), Annor and Obeng (2017), and Isanzu (2017),
	Loan Loss Provision Ratio	LLPR	Ratio of Loan Loss Provision to gross loan	Annor and Obeng (2017); Maxwell and Peter (2016); Aishatti (2015); Gizaw, Kebede, and Selvaraj (2015)
	Loan and Advances Ratio	LAR	Ratio of Total Loans and Advances to Total Deposit	Annor and Obeng (2017), Maxwell and Peter (2016), Muriithi (2016), Aishatti (2015), and Gizaw, Kebede, and Selvaraj (2015)
Moderating Variable	Board Financial Expertise	BFE	Proportion of board with financial expertise to the total board size	Anifowose, Rashid and Annuar (2017) Bonsa (2015), Bernadette et al (2014), Mike and Wei (2014)

Control Variables	Bank Size	BS	Natural Logarithm of Total Asset	Skopljak and Luo (2012) and Saona (2011)
	Bank Age	BA	Logarithm of the number of years from the time of its incorporation	Elvin & Hamid (2016).

Source: Researcher's Compilation, 2023

In order to examine the moderating effect of board financial expertise on the relationship between non-performing loans and the financial performance of listed deposit money banks in Nigeria, the following models are specified as follows:

$$Y_{it} = \beta_0 + \lambda_1 \mathbf{X}_{it} + \lambda_2 \mathbf{Z}_{it} + \lambda_3 \mathbf{X}_{it} * \mathbf{Z}_{it} + \varepsilon_{it} \text{ ---------- (1)}$$

Where the dependent variable is denoted by Y_{it} of bank i at time t, β_0 is the constant, the coefficients of the independent variable and the moderating variables are denoted by $\lambda_1$and λ_2 for bank i at time t while λ_3 is the coefficient of the interaction effect between X and Z which measures the moderation effect and ε_{it} is the disturbance or error term. From the above general form of the regression equation, the following models are specified as follows:

$$ROA_{it} = \alpha_0 + \lambda_1 NPL_{it} + \lambda_2 LLPR_{it} + \lambda_3 LAR_{it} + \lambda_4 BFE_{it} + \lambda_5 BS_{it} + \lambda_6 BA_{it} + \varepsilon_{it} \text{ -------- (2)}$$

$$ROE_{it} = \alpha_0 + \lambda_1 NPL_{it} + \lambda_2 LLPR_{it} + \lambda_3 LAR_{it} + \lambda_4 BFE_{it} + \lambda_5 BS_{it} + \lambda_6 BA_{it} + \varepsilon_{it} \text{ -------- (3)}$$

Hierarchical regression will be used to test the effect of board financial expertise as a moderator on the relationship between non-performing loan and performance of listed DMBs in Nigeria. This method has been suggested by Baron and Kenny (1986) as one of the suitable techniques of examining whether the expected outcome of a dependent variable from the independent variables is influenced by an interacting variable. Consistent with Fairchild and MacKinnon (2009); Hayes (2013); Judd and Kenny (2010); Kinnon (2009); Kenny (2015); and Mitchell and Jolley (2012), a moderator is expected to strengthen, weaken or change the direction of the relationship between the independent variable and the dependent variable. Therefore, if a moderator is introduced into the regression model, the hierarchical regression models will be as follow:

$$ROA_{it} = \alpha_0 + \lambda_1 NPL_{it} + \lambda_2 LLPR_{it} + \lambda_3 LAR_{it} + \lambda_4 BFE_{it} + \lambda_5 NPL*BFE_{it} + \lambda_6 LLPR*BFE_{it} + \lambda_7 LAR*BFE_{it} + \lambda_8 BS_{it} + \lambda_9 BA_{it} + \varepsilon_{it} \text{ ---------- (4)}$$

$ROE_{it} = \alpha_0 + \lambda_1 NPL_{it} + \lambda_2 LLPR_{it} + \lambda_3 LAR_{it} + \lambda_4 BFE_{it} + \lambda_5 NPL*BFE_{it} + \lambda_6 LLPR*BFE_{it} + \lambda_7 LAR*BFE_{it} + \lambda_8 BS_{it} + \lambda_9 BA_{it} + \varepsilon_{it}$ ---------- (5)

Where; ROA= Return on Assets, ROE= Return on Equity, NPL= Non-performing Loan, LLPR= Loan Loss Provision Ratio, LAR= Loans and Advances Ratio, BFE = Board Financial Expertise, NPL*BFE = interaction effect of Non-performing Loan and Board Financial Expertise, LLPR*BFE= interaction effect of Loan Loss Provision Ratio and Board Financial Expertise, LAR*BFE= interaction effect of Loans and Advances Ratio and Board Financial Expertise, BS= Bank Size of bank i at time t is a control variable, BA= Bank Age of bank i at time t is a control variable. λ_1 - λ_9 are the partial slope coefficients or parameters of the independent variables, moderating variable and control variables, NPL, LLPR, LAR, BFE, BS and BA respectively, α_0 is the intercept term or constant variable in each of the models, and e_{it} is the disturbance term or error term.

Results and Discussion

The descriptive and inferential statistics of this study are presented in this section.

Table 2.
Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
ROA	96	0.341	0.162	0.208	0.516
ROE	96	0.364	0.139	0.146	0.538
NPL	96	0.035	0.014	0.021	0.084
LLPR	96	0.554	0.142	0.246	0.792
LAR	96	0.427	0.134	0.183	0.828
BFE	96	0.424	0.116	0.228	0.615
BS	96	3.784	1.291	0.243	6.972
BA	96	37.25	24.11	17.74	127.1

Note: ROA= return on asset, ROE= return on equity, NPL= nonperforming loan, LLPR= loan loss provision ratio, LAR= loan and advances ratio, BFE = board financial expertise, BS= bank size, BA= bank age

Table 2 shows the number of observations per variable as 96. The average return on asset is 0.34, with a minimum of 0.20 and a maximum of 0.51. The standard deviation is 0.16, indicating a modest variance in return on assets among the sampled listed DMBs. In essence, the mean value of 0.34 for ROA indicates that the assets of the sampled listed DMBs generated 34 percent of

the profits. While the minimum value of ROA is 0.20, this means that the minimum return earned from the assets of the sampled banks during the research period is 20 per cent. Furthermore, the maximum value of 0.51 shows that 51 percent of the profits from the assets of listed DMBs in Nigeria was generated.

On the other hand, ROE measured by the net profit divided by total equity of the bank measures how much the banks are efficiently earning from funds invested by its shareholders. Hence, the average return on equity is 0.36, with a minimum of 0.14 and a maximum of about 0.54. The standard deviation is 0.13, indicating a modest variance in return on equity among the listed DMBs. In essence, the mean value of 0.36 for ROE indicates that the equity of the listed DMBs generated 36 percent of the profits.

NPL has a mean value of 3 per cent while the minimum value and a maximum values are 2 per cent and 8 per cent respectively with a standard deviation of 1 per cent indicating that the listed DMBs recorded high NPL ratio greater than the regulatory limit of 5 per cent in Nigeria. LLPR has a mean value of 55 per cent while the minimum value and a maximum values are 24 per cent and 79 per cent respectively while there is modest variance in loan loss provision ratios among the listed DMBs, with a standard deviation of 14 per cent. Increased loan loss provisions by the listed DMBs help them to cover their gross loans while enhancing their loss-absorption capacity. The average value of loan and advances ratio of listed DMBs is 42.7 per cent, with a standard deviation of 13.4 percent while the maximum and minimum values stood at about 83 per cent and 18.4 per cent respectively indicating that listed DMBs in Nigeria gave out substantial parts of their deposits as loans and the statistical outcome relating to the board financial expertise reveals a mean value of 0.424 with minimum and maximum members of 0.228 and 0.615 respectively. The natural logarithm of total assets was used as a proxy for banks size which has a mean value of N3.784trillion with the maximum and minimum values are N6.972 trillion and N0.243 trillion respectively while the standard deviation of N1.291 trillion indicating that the assets of the listed DMBs varied extensively. In regards to bank age, the descriptive statistics indicate that it has an average score of 37 years, with a minimum of 17 years and maximum of 127 years. The standard deviation of bank age is 24.28 years in the listed DMBs in Nigeria. However, the bank age is assumed to have an effect on their performance because ageing banks are observed to have steadily increased levels of productivity and higher profits (Coad et al., 2010).

Table

Correlation Matrix

	ROA	ROE	NPL	LLPR	LAR	BFE	BS	BA	**VIF**	**TOL.**
ROA	1.0000									
ROE	0.3789	1.0000								
NPL	-0.1372	-0.1607	1.0000						2.147	0.472
LLPR	-0.2173	-0.2806	0.0837	1.0000					1.542	0.541
LAR	-0.2871	-0.1251	0.0923	0.0551	1.0000				1.224	0.617
BFE	0.3314	0.2846	0.0412	0.0711	0.0664	1.000			1.172	0.446
BS	0.3884	0.2189	0.0271	0.0496	0.0796	0.0517	1.0000		2.341	0.688
BA	0.2413	0.1912	0.0098	0.0330	0.0593	0.0029	0.0070	1.0000	1.426	0.453
Mean VIF									**2.75**	

Note: ROA= return on asset, ROE= return on equity, NPL= nonperforming loan, LLPR= loan loss provision ratio, LAR= loan and advances ratio, BFE = board financial expertise, BS= bank size, BA= bank age,

A high level and strong form of relationship between dependent and individual independent variables is expected in correlation analysis, whereas a low level and weak form of relationship between and among independent variables is expected. However, according to the correlation matrix seen in Table 3 above, NPL, LLPR, LAR, BFE, BS and BA, have a strong relationship with ROA and ROE. The relationship between all the independent variables and performance measures are negative while the relationship between the moderating

variable (BFE) and performance measures is positive. The result shows that independent variables, control and moderating variables are not strongly related to one another. However, this implies that there is no multicollinearity problem, as suggested by Gujarati (2004). Also, Table 3 shows that the VIF values range from 1.17 to 2.34 with a mean VIF of 2.75 which is less than the threshold of 10 as recommended by Hair et al. (2014). Also, tolerance value is between 0.44 and 0.68, greater than the threshold of 0.1 as suggested by (Hair et al., 2014). This implies absent of multicollinearity among the variables.

Table 4

Normality Test

Variables	Obs.	W	V	Z	Prob>z
resid	96	0.65471	10.184	5.358	0.00000

Source: STATA Output 2023

From Table 4 above, the Prob>z for all the variables were found to be less than 0.05 (significant). Consequently, the null hypothesis (study data are normally distributed) was rejected. However, when using financial data, normally distributed data is almost impossible because the distribution is unsystematically randomly distributed between and within banks (Wooldridge, 2013).

Table 5

Heteroscedasticity Test for ROA and ROE Models

	Direct Effect Models			**Interaction Effect Models**	
	chi2(1)	Prob >chi2		chi2(1)	Prob >chi2
ROA Model	3.67	0.021	ROA Model	5.54	0.032
ROE Model	4.81	0.016	ROE Model	4.14	0.000
Ho (null): Constant variance	Do not reject	Reject		Do not reject	Reject

Source: STATA Output, 2023

From Table 5 the results of heteroscedasticity test reveal chi2 values of 3.67 and 4.81 (Direct Effect Models) and chi2 values of 5.54 and 4.14 (Indirect Effect Models) which are significant at 5% for both ROA and ROE models respectively.

This indicates that homoscedasticity assumption was violated in the dataset. Since the pooled panel result violated the assumption of homoscedasticity, as verified by the Breusch-Pagan/Cook-Weisberg test, which returned chi2 values chi2 values of 3.67 and 4.81 (Direct Effect Models) and chi2 values of 5.54 and 4.14 (Indirect Effect Models) for ROA and ROE models, respectively, which are significant at 5%, we re-ran a pooled panel regression using the Huber/White estimators also known as the Robust Standard Error (RSE) as recommended by Gujarati and Porter (2009) to correct the problem of heteroskedasticity. This approach is one of the common and reliable approaches for correcting the problem of heteroskedasticity (Wooldridge, 2013).

Table 6

Model Specification Test for ROA *and ROE Models*

Direct Effect Models			**Interaction Effect Models**	
	ROA	ROE	ROA	ROE
_hat	0.001***	0.000***	0.004***	0.012***
_hatsq	0.518	0.462	0.345	0.721

Note: ***, ** denotes 1% and 5% level of significance

Table 6 above presents the results of the link test, which is a general model specification for regression models. The link test is based on the assumption that if a regression model is adequately specified, the addition of an extra independent variable should not be significant unless by chance. In Table 6, the _hat values, which are the predicted values of the model, are significant, as expected for ROA (0.001), ROE (0.000) and ROA (0.004), ROE (0.012) for both direct and interaction models. Likewise, the _hatsq values for ROA (0.518), ROE (0.462) and ROA (0.345) and ROE (0.721) for both direct and interaction models are not significant, indicating that the models are correctly specified.

Table 4.7

Autocorrelation Test for ROA and ROE Models

Direct Effect Models			**Interaction Effect Models**	
	ROA	ROE	ROA	ROE
F	2.17	1.23	5.24	3.13
Prob> F	0.458	0.517	0.624	0.422

Source: STATA Output, 2023

Autocorrelation is an issue caused by high homogeneity in which error elements are correlated over time. It is assumed in the regression model that the error term of the components is not influenced and not correlated with

other components. The results of autocorrelation in Table 7 revealed p-values of the F-test for ROA and ROE models are 0.458 and 0.517 and for ROA and ROE models are 0.624 and 0.422 for both direct and interaction models. Since the p-values are not significant, the null hypothesis will not be rejected at 5% significance level. It can then be concluded that there is no autocorrelation problem in both ROA and ROE models in both direct and interaction models.

Test of Hypotheses

The study applied Generalized Least Square of Fixed-Effect and Random-Effect models in order to test the study hypotheses as recommended by Wooldridge (2002). Therefore, Hausman Specification test was conducted in order to choose between fixed effects and random effects models.

Table 8

Hausman Specification Test

	Direct Effect Models		**Interaction Effect Models**	
	ROA	ROE	ROA	ROE
Chi^2	52.15	34.16	61.23	42.34
p-value	0.000	0.000	0.002	0.000

Source: STATA output 2023

In Table 8 the test statistics have a chi^2 statistic of 52.15 and 34.16 (Direct Effect Models) and chi^2 statistic of 61.23 and 42.34 (Interaction Effect Models) with corresponding p-values of which are significance at 1% level for both ROA and ROE models respectively. Therefore, at the 1% level of significance, the null hypothesis that the regressors and individual heterogeneity are strictly exogenous is rejected. Therefore, the FE model is favoured over the RE model for controlling for time-invariant unobserved characteristics across the listed DMBs. As a result, the fixed effect models should be interpreted.

Regression Results

Table 9
Fixed Effect Regression Results of Non-performing Loan on the Performance of Listed DMBs
*With Robust Standard Errors (**Direct Effect**)*

	ROA Model				ROE Model			
	Coef.	Std. Err.	T-statistic	Prob.	Coef.	Std. Err.	T-statistic	Prob.
NPL	-0.314	0.217	-1.447	0.001	-0.242	1.176	-0.206	0.002
LLPR	-0.221	0.249	-0.888	0.024	-0.275	1.417	-0.194	0.032
LAR	-0.336	0.282	-1.191	0.007	-0.231	0.321	-0.719	0.004
BFE	0.173	1.275	0.136	0.002	0.263	0.411	0.639	0.003
BS	0.245	0.243	0.243	0.003	0.281	0.462	0.608	0.000
BA	0.154	0.129	0.226	0.000	0.121	0.223	0.543	0.006
CONS	7.261	3.172	2.289		5.317	2.548	2.086	
R-Squared	Within		0.5142		Within		0.4414	
	Between		0.4463		Between		0.5035	
	Overall		0.5014		Overall		0.6227	
F-statistics			31.42***				37.61***	
Obs.			96				96	

Note: ***, **, * denotes 1%, 5%, and 10% level of significance. ROA= return on asset, ROE= return on equity, NPL= nonperforming loan, LLPR= loan loss provision ratio, LAR= loan and advances ratio, BFE = board financial expertise, BS= bank size, BA= bank age.

Table 9 shows that the F-statistics produces statistically significant values of 31.42 and 37.61 for ROA and ROE models at the 1 per cent level of significance. These results supported the models' overall significance. It also lends support

to the hypothesis of a significant linear relationship between the dependent variables ROA and ROE and the independent variables. The overall R-squares are 50 per cent and 62 per cent, meaning that the variables considered in the models explain about 50 percent and 62 per cent change in both ROA and ROE, while the remaining 50 percent and 48 percent change could be due to other variables not captured by the models.

Table 9 shows that NPL is negatively associated with both ROA and ROE with coefficients of -0.314 and -0.242 with p-values less than 0.01. This means that holding other factors constant, a percentage increase in NPL decreases profitability of listed DMBs by 31% and 24% measured by ROA and ROE respectively. These results show sufficient evidence to support the research finding at 1% level of significance. This is consistent with the findings of Hamza (2017), Annor and Obeng (2017), Isanzu (2017), Olalere and Wan (2016), and Muriithii (2016), who found a significant negative effect of NPL on bank profitability, but contradicts the findings of Afriyie (2011) and Ogboi (2013), Marshal and Onyekachi (2014) who found a significant positive effect of NPL on bank profitability.

Table 9 shows that loan loss provision ratio (LLPR) is negatively associated with ROA and ROE with coefficients of -0.221 and -0.275 with p-values less than 0.05 for ROA and ROE respectively indicating significant negative effect on financial performance. This means that holding other factors constant, a percentage increase in LLPR decreases profitability of listed DMBs by 22% and 27 % measured by ROA and ROE. This result shows sufficient evidence to support the research finding at 5% level of significance. Therefore, the result shows that LLPR negatively affect the financial performance of listed DMBs in Nigeria. This is consistent with the findings of Hamza (2017), Annor and Obeng (2017), Kolapo, Ayeni, and Oke (2012) who found a significant negative effect of LLPR on bank profitability.

Also, Table 9 shows that loan and advances ratio (LAR) is negatively correlated with ROA and ROE with coefficients of -0.336 and -0.231 with p-values less than 0.01 for ROA and ROE indicating significant negative effect on financial performance of listed DMBs in Nigeria. This means that holding other factors constant, a percentage increase in LAR decreases profitability of listed DMBs by 34% and 23% measured by ROA and ROE respectively. This result shows sufficient evidence to support the research finding at 1% level of significance. Therefore, the result shows that LAR is negatively associated with financial performance of listed DMBs in Nigeria measured by ROA and ROE respectively.

This is consistent with the findings of Annor and Obeng (2017) and Kargi (2011) who found significant negative effect of LAR on banks performance.

Looking at the moderating variable, Table 9 shows that board financial expertise (BFE) is positively correlated with ROA and ROE with coefficients of 0.173 and 0.263 with p-values less than 0.01 for ROA and ROE indicating significant positive effect on financial performance of listed DMBs in Nigeria. This means that holding other factors constant, a percentage increase in BFE increases profitability of listed DMBs by 17% and 26% measured by ROA and ROE respectively. This significant positive result implies that having financial experts on board would improve financial performance of DMBs in Nigeria. That is, they can pool their domain-related knowledge to enhance the performance of these banks.

Regarding the control variables, in Table 9 bank size has significant positive effect on the performance of listed DMBs in Nigeria ROE with coefficients of 0.245 and 0.281 with p-values less than 0.01 for ROA and ROE indicating significant positive effect on financial performance of listed DMBs in Nigeria. This means that holding other factors constant, a 1% increase in bank size will lead to 24% and 28% increase in banks' performance respectively. Also, bank age has significant positive effect on the performance of listed DMBs in Nigeria with coefficients of 0.15 and 0.12 with p-values less than 0.01 for ROA and ROE indicating significant positive effect on financial performance of listed DMBs in Nigeria. This means that holding other factors constant, a 1% increase in bank age will lead to 15% and 12% increase in banks' performance respectively.

Table 10

Moderating Effect of Board Financial Expertise on the Relationship between Non-performing Loan and the Performance of Listed DMBs ***(Indirect Effect)*** *With Robust Standard Errors*

	ROA Model				ROE Model			
	Coef.	Std. Err.	T-statistic	Prob.	Coef.	Std. Err.	T-statistic	Prob.
NPL	-0.344	0.173	-1.988	0.014	-0.247	0.424	-0.582	0.010
LLPR	-0.271	0.457	-0.593	0.000	-0.412	0.378	-1.089	0.002
LAR	-0.313	0.282	-1.109	0.008	-0.124	0.227	-0.546	0.000

BFE	0.352	0.411	0.856	0.002	0.275	0.318	0.864	0.006
NPL*BFE	0.254	0.365	0.696	0.004	0.282	0.438	0.644	0.000
LLPR*BFE	0.225	0.332	0.678	0.000	0.214	0.328	0.652	0.002
LAR*BFE	0.367	0.338	1.086	0.010	0.325	0.437	0.743	0.011
BS	0.159	0.341	0.466	0.000	0.186	0.294	0.633	0.004
BA	0.241	0.355	0.678	0.015	0.327	0.381	0.858	0.012
CONS	5.447	4.536	1.201		3.561	3.272	1.088	
R-Squared	Within		0.5074		Within		0.4671	
	Between		0.4113		Between		0.4267	
	Overall		0.4828		Overall		0.5138	
F-statistics			42.65***				34.48***	
Obs.			96				96	

Note: ***, **, * denotes 1%, 5%, and 10% level of significance, ROA= return on asset, ROE= return on equity, NPL= nonperforming loan, LLPR= loan loss provision ratio, LAR= loan and advances ratio, BFE = board financial expertise, NPL*BFE= interaction term between NPL and BFE, LLPR*BFE = interaction term between LLPR and BFE, LAR*BFE = interaction term between LAR and BFE, BS= bank size, BA= bank age.

Table 10 shows that the F-statistics produces statistically significant values of 42.65 and 34.48 for ROA and ROE models at the 1 per cent level of significance. These results supported the models' overall significance. It also lends support to the hypothesis of a significant linear relationship between the dependent variables ROA and ROE and the independent variables. The R-squares overall are 48 per cent and 51 per cent, meaning that the variables considered in the models explain about 48 percent and 51 per cent change in both ROA and ROE,

while the remaining 52 percent and 49 percent change could be due to other variables not captured in the models.

Therefore, the results in Table 10 showed that board financial expertise has significant positive effect on the performance of listed DMBs in Nigeria and it also moderates the relationship between nonperforming loan variables and performance measures used in this study. That is, the study found that board financial expertise strengthened the relationship between nonperforming loan variables and performance measures. This result may be due to the fact appointment of many financial experts on board of banks improves the internal checking effectiveness which in turns improves banks performance.
It had been revealed in Table 9 (direct effect model) that nonperforming loan (NPL) had a significant negative effect on banks performance measured by ROA and ROE. In Table 10, the result showed that the board financial expertise interaction on the relationship between nonperforming loan and the performance of listed DMBs was positive and significant. The coefficients of the interaction are ROA ($\beta = .254$, $p<0.01$) and ROE ($\beta = .282$, $p<0.01$). This means that when board financial experts increases, the effect of non-performing loan on the performance of listed DMBs will be positive. Thus, it was established that board financial expertise positively moderated the relationship between nonperforming loan and the performance of listed DMBs in Nigeria.

It had been revealed in Table 9 (direct effect model) that loan loss provision ratio (LLPR) had a significant negative effect on banks performance measured by ROA and ROE. In Table 10, the result showed that the board financial expertise interaction on the relationship between loan loss provision ratio and the performance of listed DMBs was positive and significant. The coefficients of the interaction are ROA ($\beta = .225$, $p<0.01$) and ROE ($\beta = .214$, $p<0.01$). This implies that when board financial experts increases, the effect of loan loss provision ratio on the performance of listed DMBs will be positive. Thus, it was established that board financial experts positively moderated the relationship between loan loss provision ratio and the performance of listed DMBs in Nigeria.

Also, it had been revealed in Table 9 (direct effect model) that loan and advances ratio (LAR) had a significant negative effect on banks performance measured by ROA and ROE. In Table 10, the result showed that the board financial expertise interaction on the relationship loan and advances ratio and the performance of listed DMBs was positive and significant. The coefficients of the interaction are ROA ($\beta = .367$, $p<0.05$) and ROE ($\beta = .325$, $p<0.05$). This

implies that when board financial expertise increases, the effect of loan and advances ratio on the performance of listed DMBs is positive. Thus, it was established that board financial experts positively moderated the relationship between loan and advances ratio and the performance of listed DMBs in Nigeria. Therefore, appointment of many financial experts on board of DMBs strengthens the relationship between loan and advances ratio and the performance of listed DMBs in Nigeria.

Conclusion and Recommendations

The study examined the effect of non-performing loan on the performance of listed DMBs in Nigeria. Specifically, non-performing loan measures NPL, LLPR, and LAR have significant negative effect on performance of listed DMBs in Nigeria. Also, when the moderating variable, board financial expertise was introduced, it does not only have direct significant positive effect on performance of listed DMBs in Nigeria on the relationship but it also moderate the relationship between non-performing loan variables and the performance of listed deposit money banks in Nigeria. That is, board financial expertise strengthen the relationship between non-performing loan variables and the performance of listed deposit money banks in Nigeria. Therefore, the study concludes that non-performing loan has significant effect on the financial performance of listed DMBs in Nigeria while board financial expertise moderate the relationship between non-performing loan variables and the performance of listed deposit money banks in Nigeria. Therefore, the study recommends that CBN should mandate DMBs Boards and Managements to make sure that sufficient procedures are implemented to lessen the negative effects of non-performing loans on their day-to-day operations and Boards of DMBs in Nigeria should be made up of members who have financial expertise in dealing with the activities of the banks.

Commented [DA1]: Recommended

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