DETERMINANTS OF CREDIT RISK IN THE NIGERIAN BANKING INDUSTRY

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ABSTRACT

The deposit money banks are faced with the problem of credit risk, which occurs from their intermediary role in the economy, which is channeling customers' deposits from the surplus sector to the deficit/productive sector to improve their performance and stimulate financial stability and growth. It is imperative to examine the internal and external factors that influence the credit risk component of the deposit money banks in Nigeria. This study examines the determinants of credit risk in the Nigerian banking industry. The secondary data was sourced from twelve deposit money banks listed on the Nigerian Stock Exchange Group from 2019 to 2023. The static regression analysis was employed to determine the inference of the objective. The findings from the fixed effect model revealed that board size, operating efficiency, bank size, gross domestic product growth rate, and unemployment rate have a significant effect on the non-performing loan ratio, while return on assets, board independence, loan-to-deposit ratio, debt-to-equity ratio, loan-to-total asset ratio, and inflation rate have an insignificant effect on the non-performing loan ratio. Therefore, it is recommended that deposit money banks in Nigeria integrate internal governance enhancements with macroeconomic stability, which is essential for effectively managing non-performing loans in Nigerian banks. Collaborative efforts between banks, regulators, and policymakers are critical to achieving sustainable credit risk management.

Keywords: Credit Risk; Profitability; Liquidity; Corporate Governance; Macroeconomic

INTRODUCTION

The banking system constitute the provider of the capital supply and credit provision activities that would aid in the channeling of idle fund to the productive sector of the economy, to trigger economic growth and development both now and in future. The effectiveness of this fund would spur financial and economic prosperity, but internally the associated risk could lead to economic downturns and global economic collapse (Nguyen and Tran 2017; Le Thanh, 2021; Baoko et al., 2017).

The Deposit money banks are faced with the problem of credit risk which occurs from their intermediary role in the economy that is channeling customer's deposit from the surplus sector to the deficit/productive sector to improve their performance and stimulate financial stability and growth (Abebrese et al., 2016; Giang et al., 2024). A high credit risk could lead to the collapse of the banking system, which would have a ripple effect on the economy, credit risk which is large volume of non-performing loans in the books of the banks in the economy (Accorner et al, 2018; Khan et al., 2020), due to borrower's unable to meet their future credit obligation. The internal effect of high credit risk to deposit money banks is related to bank-specific risk (profitability, corporate governance practices, liquidity, regulatory compliance, risk management practices, strategic decision) while external effect includes tight credit standards that would discourage borrowing and investment and reduced market confidence (Rizkullah and Suhel, 2023; Siddique et al., 2022).

To achieve sustainable development in the banking industry, developing countries, including Nigeria, require monetary and human resources. With such a high rate of return on the loan, the accessible resources must be used efficiently and effectively if the industry is to achieve sustainable development. Non-Performing Assets (NPAs) pose a significant threat to financial institutions around the world because their ability to continue operations is highly dependent on customers' ability to repay loans plus interest (Widarjono, et al., 2020). Banks' bottom lines, GDP growth, and the stability of the financial system are all impacted by the current state of bank asset quality. For example, the undermining of the multiplier impact of these funds in the economy is caused by non-performance of loans, which discourages one of the primary responsibilities of commercial banks, which is the provision of funds from the surplus side to the deficit side (Sukmana, 2015; Misman and Bhatti 2020).

However, the financial crisis has hinted at an increase in the volume of non-performing loans of deposit money banks, which signifies the problem of the real economy. In the quest to reduce the volume of credit risk, deposit money banks have concurrently invested in human and operational structure in creating credit risk management systems that would alleviate the increase in credit risk (Non-performing loans). Some prominent Nigerian banks went under due to the devastating effects of Non-Performance Loans (NPLs). As an example, the nonperforming loans (NPLs) in Nigeria were 2.88 percent in 2013, 4.48 percent in 2014 (equivalent to N363.31 billion), and 5.33 percent in 2015 (equivalent to N649.63 billion) (CBN, 2015). The issue is getting worse despite the CBN and other financial regulatory agencies' efforts to keep the maximum value of nonperforming loans in the country at 5%. Additionally, the country's industrial sector had nonperforming loans (NPLs) rise from 5.3% in 2014 to 11.7% in 2015. An increase in nonperforming loans (NPLs) poses a liquidity concern since it lowers gross net profit ratios (Omobolade, et al., 2020).

Several banks are allocating substantial financial resources and personnel to the development of credit risk management systems. The bad performance of some banks can be attributed to the challenge of non-performing loans, which has arisen due to

several factors. If the credit system is weak, there is a higher likelihood of an increase in non-performing loans, which in turn leads to an increase in the level of loan loss provisions (Buthiena, 2019; Olaoye, and Ojuolape 2019). This expense has a direct impact on the income statement and, as a result, decreases the bank's profitability. When the level of non-performing loans rises, it indicates that the anticipated or expected cash inflows are either delayed or not received at all. This has a detrimental impact on the banks' liquidity positions. Moreover, the rise in non-performing loans necessitates the recruitment of more personnel to effectively handle the loan issue, resulting in increased expenses and therefore raising the cost-to-income ratio (Kihuro and Iraya, 2018).

However, the Central Bank of Nigeria has identified non-performing loans as a major credit risk problem facing deposit money banks and microfinance institutions in Nigeria (CBN, 2022). Afolabi et al (2020) revealed that credit risk is caused by loan default from individuals, corporations, financial institutions, or governments. Credit risk to the performance of loan provision for loan-loss, portfolio risk, net charge-off portfolio, pre-provision profit, total loans and advances, and others in the banks (Ekinci, 2016; Achugamonu et al, 2017). Hambolu et al., (2022) revealed that most banks experience credit or default risk in Nigeria, due the retarding economic condition that stifles investment to generate returns that would be used to meet future loan obligation. The continuous increase in credit risk would increase the tendency of bankruptcy risk and a drop in the liquidity level of the banks. Banks increase their risk exposure to survive and sustain sufficient profit in the extremely competitive environment (Akhanolu et al., 2022; Hamboleunt et al., 2022).

Studies like Priyadi et al (2021), Naili and Lahrichi (2022), Siddique et al (2022) captured determinants of credit risk from the firm-specific, micro-economic specific, and macro-economic all showing positive and negative relationships with credit, peculiarly the works of Siddique et al (2022) and Giang, et al. (2024) measuring credit risk from the perspective of non-performing loans and capital adequacy ratio. In Nigeria context, Omobolade et al (2020), Afolabi et al (2020), Chiamaka (2023), Bala & Alao (2021), Hamisu et al (2021) and Akhanolu et al (2020) all in the studies captured determinant of credit risk from the concept of profitability factors, Macro-economic factors, Behavioral determinant of lenders, credit risk management factors. Knowing fully well that the determinant factors that affect credit risk of banks cut-across the corporate governance factors, liquidity factors, profitability factors, efficiency factors, leverage factors, asset quality factors and macro-economic factors.

All this factors could be categorized into internal and external factors that has the impetus to dictate volume of non-performing loan ratio in the books of the deposit money banks in Nigeria. A good corporate governance practice in the deposit money bank in terms of effective control and internal control measure could make or mar the level of credit exposure of the banks in the country. The efficiency factor impact the non-performing loans of banks, in terms of high efficiency cost would implies that the bank are incurring high level of cost and expenses to generate income or deposit. This would signify inefficiencies in managing resources and potentially weaker loan monitoring and risk assessment capabilities. A bank with higher level of liquidity signifies that ability of the organization meet its day to day current obligation, that allows the bank remain a going concern in the industry and economy. But in the other hand, extremely high liquidity implies poor intermediation prowess of the bank in contribution its part to the capital formation and accumulation of deficit unit of the country.

The liquidity and profitability are two bank-specific factors that should be balanced in meeting a favorable non-performing loan in their books. The asset-quality

factors capture that ability of the banks to employ its asset and resources in generating return and interest on loan. The asset quality of the banks must be sustained and used at the same time to ensure continuity prospect of the banks. The macro-economic factors are external factors/ systematic factors that affect the credit risk exposure of the deposit money banks. They are uncontrollable factors that can dictate the swing of the non-performing loans in Nigeria. Moreover, all these studies still remain inconclusive in terms of the actual factors that should be illustrated in determining the factors of credit risk in Nigeria.

Based on this factors and inconclusiveness in literature this study examined into the effect of corporate governance factors, liquidity factors, profitability factors, efficiency factors, leverage factors, asset quality factors and macro-economic factors has determinant of credit risk in Nigeria banking industry.

LITERATURE REVIEW

The Information Asymmetry Theory, introduced by George Akerlof in 1970, explains the imbalanced distribution of information between participants in a transaction. Within the banking and credit default sectors, this theory proposes that borrowers and lenders often possess unequal insights regarding loan quality and associated risks, potentially leading to adverse selection and moral hazard issues. For studies focused on credit default in Nigeria's banking industry, grasping the implications of information asymmetry on lending practices and risk management processes is essential. This knowledge can illuminate critical elements like credit scoring, credit reporting, and regulatory policies that reduce the negative impacts of information gaps (Stiglitz & Weiss, 1981). Furthermore, by addressing these information asymmetries, banks can better evaluate loan applicants and implement more accurate risk assessment models, which in turn supports more resilient credit systems.

Giang, et al (2024) investigated into Determinants of Credit Risk under Basel II Accord: Case of the Vietnam Banking Sector. To examine the credit risk of Vietnamese commercial banking system. The variables include; Unexpected Loss, Expected Loss, Gross Domestic product, Exchange rate, Inflation rate, Interest rate, Market share, Bank Size, Income Diversification and Asset Composition, Loans deposit ratio, Structure owner, operational efficiency, Delta share price and return on asset. The study employed the Correlation matrix, Variance inflation factor, Regression analysis. The findings reveal that the two dependent variables align with the Basel II accord. The study was able to itemize determinant of credit risk from the industrial, macro-economic perspective and bank performance perspectives. But the study a lack theoretical framework.

Tisa and Suresh (2023) examines into the determinants of credit risk using empirical evidence from Indian commercial banks. The subject matter was to determine the relationship between profitability, microeconomic and macroeconomic factors that affect banks credit risk. The secondary panel data was sourced from 2012 to 2021. The variables include; Non-performing loans, Loan loss provision return on equity, Net interest margin, Age, Size, Efficiency, Capitalization, Bank Diversification, Ownership, Mergers & Acquisitions, Inflation and Gross Domestic product. The panel regression revealed that that return on equity has negative significant effect on credit risk (Non-performing loan) while bank age and ownership type has positive effect bank credit risk. The macroeconomic variables showed that gross domestic product has positive impact on credit risk. The study a lack a theoretical framework. But very comprehensive in terms of the variables that was selected from the overall inquiry.

Rizkullah & Suhel (2023) examines into analyzing the determinants that affects the credit growth of seven selected commercial banks in Indonesia. The study employs the Generalized Method of Moments, while the secondary data was from the period of 2017 to 2022. The variables employed includes; Credit growth, Bank size, Non-performing loan, The Third party fund, Loan to Deposit ratio, Capital Adequacy ratio. The findings from the econometric technique revealed that banks size and third-party funds have a positive and significant influence on credit growth while non-performing loans have a negative and significant effect on credit growth while inclusively loan deposit ratio has a positive and insignificant effect on credit growth of the selected banks. The study lacks a theoretical framework. But factors used where not properly conceptualized like other studies.

Chiamaka (2023) explored the key factors contributing to credit default within the Nigerian banking sector. Using a desk-based research approach, the study conducted a literature review grounded in agency theory, pecking order theory, and information asymmetry theory. The analysis identified several determinants of credit default in Nigeria, including economic stability, regulatory oversight, risk management practices, the quality of loan portfolios, and broader macroeconomic conditions. While the theoretical framework was well-articulated, the study's robustness was limited by the absence of empirical data. An empirical approach could have enhanced the study's practical relevance and analytical depth.

Kabir et al. (2022) conducted a comparative study to identify the determinants of credit risk in Islamic and conventional banks in Bangladesh. The analysis focused on a wide range of variables, including non-performing loans, Z-score, distance to default, GDP growth rate, inflation, real interest rate, and several bank-specific indicators such as loan growth, loan-to-deposit ratio, equity-to-asset ratio, return on equity, cost inefficiency, total assets, capital ratio, and governance-related factors like board size, board independence, insider ownership, and institutional ownership. Using the system-GMM method, the study found that GDP growth helps reduce credit risk, while inflation and real interest rates tend to increase it. Additionally, bank-specific variables indicated that both Islamic and conventional banks are affected by issues related to adverse selection and moral hazard. The research is considered comprehensive due to its inclusion of both macroeconomic and institutional-level factors, making the analysis thorough and well-rounded

Naili & Lahrichi (2022) examines into determinant of banks credit risk. The study employed literature review technique by focusing on the determinant of the non-performing loans with a focus on the current dynamics of the field. The study enumerates and discussed the main theories that are peculiar on non-performing loans, bank-specifics, macro-economic factors and industry related factors. The study was able to review sixty-nine papers from the period of 1987 to 2019 from 40 peer-reviewed journals. The findings of the empirical work revealed that the issue of credit risk despite many and continuous debate remain unsolved which leaves the room for critical debates.

Siddique et al. (2022) investigated how credit risk management and bank-specific factors influence the financial performance of commercial banks in South Asia. The study aimed to analyze the relationship between financial performance measured by Return on Assets (ROA) and Return on Equity (ROE)—and variables such as non-performing loans, capital adequacy ratio, cost-efficiency ratio, average lending rate, liquidity ratio, bank size, inflation, and bank age. Utilizing the Generalized Method of Moments (GMM) on data from nineteen commercial banks, the study found that non-performing loans, capital adequacy ratio, and liquidity ratio were significantly and negatively associated with financial performance. Interestingly, both the capital adequacy ratio and liquidity ratio also exhibited a significant positive relationship in

other dimensions, suggesting a nuanced impact. A notable strength of the research was its dual focus on credit risk via non-performing loans and capital adequacy, which enriched the analysis. However, the absence of a supporting theoretical framework was a key limitation.

Hambolu et al. (2022) examined how credit risk affects the profitability of deposit money banks in Nigeria, using data from 11 banks over the period 2008 to 2018. Employing panel data analysis, the study assessed various credit risk indicators. The results showed that the ratio of loan loss provisions to total assets had a positive and significant effect on bank profitability. In contrast, both the ratio of loans and advances to total deposits and the capital adequacy ratio were negatively related to profitability, though the relationships were statistically insignificant. Additionally, non-performing loans relative to total assets had a significant negative impact on profitability, while bank size showed a positive but insignificant association. Based on these findings, the study recommended that banks regularly update and strengthen their credit risk management policies to reduce the likelihood of default and its adverse effects on profitability.

Priyadi, et al., (2021) investigated into determinants of credit risk of Indonesian rural banks. The subject matter is to examine the internal and external factors of credit risk on Islamic financial services especially to the small and medium scale enterprises in Indonesia. The study employs the Auto-regressive Distributed Lag (ARDL) to determine the short-run and long-run relationship between the variables. The findings revealed that four variables experienced a lag in the short run which are the non-performing loan, inflation, capital adequacy while the long-run relationship capital adequacy and return on asset influence non-performing loans of the organization positively. The study was able to shows the internal and external factors that could affect the credit risk level of the banks. The study also lacks a theoretical framework.

Bala & Alao (2021) examines into the determinants of Bank Asset Quality among the listed Deposit Money banks in Nigeria. To examine the determinant of bank asset quality among the deposit money banks in Nigeria. The variables: Bank asset quality, Liquidity management, Credit to the private sector, lending rate, crude oil. The secondary data was sourced from annual financial statement of from 2009 to 2018. The findings revealed liquidity management and oil price have negative effect on bank asset quality. The study lacks a theoretical framework.

Omobolade et al. (2020) examined the key factors influencing bank credit risk using data from twelve out of the twenty-two Deposit Money Banks listed on the Nigerian Stock Exchange. The study considered variables such as credit risk, firm size, bank liquidity, ret urn on equity, capital adequacy ratio, loan-to-asset ratio, loan loss provisions, operational inefficiency, GDP growth, and inflation. Data were obtained from the banks' annual reports, the Central Bank of Nigeria's Statistical Bulletin, and the Nigerian Stock Exchange. The findings showed that loan loss provisions, loan-to-asset ratio, GDP growth, and inflation had a positive and significant impact on credit risk. Conversely, bank liquidity and capital adequacy ratio exhibited a significant negative effect. The study was limited by the absence of a theoretical framework and relied solely on internal and macroeconomic factors, suggesting the need for a more structured conceptual model.

Obamuyi and Egbetunde (2020) explored the link between credit risk and financial performance using data from six microfinance banks in Nigeria over the period 2012 to 2018. Relying on secondary data from published financial statements, the study focused on variables such as Return on Assets (ROA), Non-Performing Loans (NPLs), Loan Loss Provisions, and Total Loans and Advances. Results from the panel regression

analysis indicated that NPLs had a significant negative impact on ROA, while loan loss provisions also negatively affected ROA but without statistical significance. The authors noted that including additional performance metrics could have enhanced the comprehensiveness of the study.

Akhanolu, et al (2020) investigate the impact of credit management and macroeconomic variables on the performance of banks in Nigeria. This study was prompted by the significant levels of bad debt in deposit money banks, as indicated by existing data, which have negatively affected their performance. To address this issue, the researchers analyzed macroeconomic data and various indicators of credit management and bank performance from 2009 to 2017, covering 12 deposit money banks in Nigeria. They employed the ordinary least squares (OLS) method to identify the factors influencing the subject matter. The findings revealed a positive relationship between the capital adequacy ratio and gross national income on Return on Assets. Consequently, deposit money banks with higher capital adequacy ratios are better positioned to extend more loans and absorb credit losses, thereby achieving greater financial efficiency with respect to their assets.

Echobu and Philomena (2019) investigated how credit risk affects the financial performance of listed Deposit Money Banks (DMBs) in Nigeria, covering the period from 2006 to 2017. Using secondary data obtained from the audited financial statements of all 15 listed DMBs as of December 31, 2017, the study applied regression analysis to assess the relationships. The findings revealed that both non-performing loans and impairment loan charge-offs significantly and negatively influenced bank performance. Although capital adequacy also showed a negative effect, it was not statistically significant. Based on these results, the authors recommended that banks strengthen their risk management practices to minimize loan defaults. They also suggested more frequent reviews of prudential guidelines and credit-related regulations to ensure they remain relevant in managing evolving credit risk challenges.

Research Framework
The deposit money banks are money creation and money dissemination hub that help in the channeling of fund from the surplus sector to the deficit sector in the economy and also the enabler in ensuring investment creation and multiplier through their intermediation responsibility. The deposit money banks are confronted internal and external factors that could affect their ability to sustain their credit responsibility which is also captured has credit risk. The following factors that affect their credit risk exposure includes profitability, liquidity, corporate governance, efficiency, leverage, asset quality and macro-economic factors.

Dependent Variable   *Independent Variable*
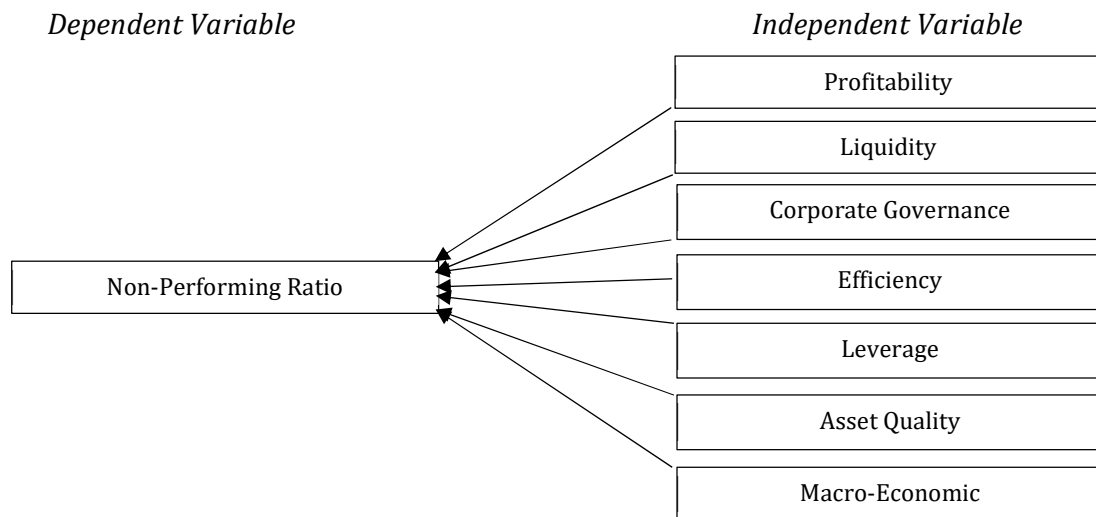
Source: Aurthor's Compliation, 2024

Figure 1
Determinant of Credit risk framework

METHODS

This study is grounded in the Information Asymmetry Theory, (Akerlof, 1970; Stiglitz & Weiss, 1981) which is particularly relevant in the context of banking and credit creation. The theory posits that borrowers and lenders often possess differing levels of information, which affects the perceived quality and risk associated with loans, potentially leading to issues like adverse selection and moral hazard. Akerlof, 1970; Stiglitz & Weiss, 1981). Banks face a unique challenge in lending to deficit sectors of the economy, where credit can stimulate development and investment without compromising their financial stability. Consequently, bank management at strategic and tactical levels must be well-informed about specific internal factors that can enhance their capacity to grant loans sustainably. They must also consider external environmental factors (political, economic, and social) that could impact credit risk exposure. By addressing these elements, banks can better align their credit creation volume with long-term viability, supporting both economic growth and their own operational resilience.

$$NPL_t = f(PF_t CGF_t LF_t EF_t LEF_t ASQ_t MEF_t)$$

PF: profitability factors, CGF: corporate governance factors, LF: Liquidity factors, EF: Efficiency factors, LEF: Liquidity factors, ASQ: Asset Quality factors, MEF: Macro-economic factors.

The model gives a mathematical and theoretical expression to the position of the information asymmetry theory which implies that factors that have the impetus to determine the value and volume of non-performing loan in the Nigeria banking industry.

This research work utilizes a descriptive research design, relying on secondary data that was obtained from the annual audited financial statement of the selected deposit money banks in Nigeria. The study employs twelve (12) deposit money banks listed on the Nigeria Stock Exchange group. The panel data was sourced from audited financial statement of the banks from the period of 2019 to 2023. The dependent variables for this inquiry includes the non-performing loan, to captures the credit risk

while the determinant was captured with the profitability (return on assets), corporate governance (board size and board independence), Liquidity (Loan-to-Deposit ratio), Efficiency (operating efficiency ratio and bank size), leverage (debt-to-equity ratio), Asset quality (Loan-to-total asset ratio), Macro-economic factors (GDP Growth rate, Inflation rate and Unemployment rate). This model was adopted and adjusted to suit this present study from the works of Hambolu, et al (2022) and Giang et al (2024). The static panel regression model was employed from the works of Arellano and Bond (1991).

$$NPLR_{it} = (\gamma_0 + \beta_2 ROA_{it} + \beta_3 BS_{it} + \beta_4 BI + \beta_5 LDR_{it} + \beta_6 OER_{it} + \beta_7 BnZ + \beta_8 DER + \beta_9 LTAR_{it} + \beta_{10} GDPGR_{it} + \beta_{11} INF + \beta_{12} UR + \mu_i + \varepsilon_{it})$$

Where: NPLR stands for Non-performing loan ratio; ROA stands for return on asset; BS stands for board size; BI stands for board independence; LDR stands for loan-to-deposit ratio, OER stands for operating efficiency, BnZ stands for bank size, DER stands for debt-to-equity ratio, LTAR stands for loan-to-total asset ratio, GDPGR stands for gross domestic product growth rate, INF stands for inflation rate, and UR stands for unemployment rate. i=N (firm is 15), t is 2019……2023, i= number of individuals or cross section; t= number of periods; ε_t= white noise, γ_0 is the constant value, β_2 is the coefficient estimation of the explanatory variables, ε_{it} is error variance between the entities in the model, μ_i is the firm specific effect.

Dependent Variables	Measurement	
Non-performing loan	Non-performing loan to total loan (%)	(Khan et al., 2020; Priyadi et al., 2021; Nathan et al., 2020)
Independent Variables		
Loan-to-deposit ratio	Total Loan to total deposit (%)	(Mahyoub & Said, 2021; Rahman et al., 2017; ALrfai et al., 2022)
Return on Asset	Total Net Profit to total Asset ratio (%)	(Kaaya & Pastory, 2013; Rahman et al., 2017)
Operating Efficiency	Total operating expenses to total operating income ratio (%)	(Priyadi et al., 2021; Zheng et al., 2018; Ahmadyan, 2018)
Loan to total Assets ratio	Total Loans to Total Asset Ratio (%)	(Rajha, 2017)
Debt-to-Equity ratio	Total Debt/Total Asset	(Ahmadyan, 2018)
Bank Size	Log of total asset	(Misman & Bhatti, 2020; Rajha, 2017)
Board Size		
Board Independence		
GDP Growth Rate	(GDPt – GDPt-1)/ GDPt-1 (%)	(Nathan et al., 2020; Messai & Jouini, 2013)
Inflation rate	(CPIt – CPIt-1)/ CPIt-1 (%)	(Zheng et al., 2018; Rajha, 2017)
Unemployment rate	Unemployed People to Total Labour Force (%)	(Kartikasary et al., 2020)

Author's Compilation, 2024

RESULTS AND DISCUSSIONS

The table shows the pre-estimation analysis of the selected variables in the inquiry. The table captures characteristics of the variables in terms of measures of central tendency (mean, median, minimum and maximum), measure of dispersion (standard deviation, skewness, and kurtosis), and measure of normality (Jarque-Bera).

Table 1
Descriptive Analysis

	NPLR	ROA	BS	BI	LDR	OER	BNZ	DER	LTAR	GDPGR	INF	UN
Mean	0.018256	0.018325	12.61667	0.184390	0.514317	0.953585	6.503492	9.363809	0.363000	5.197407	12.61200	92.68000
Median	0.014061	0.014614	12.00000	0.176471	0.516197	0.686841	6.498618	9.117023	0.365432	5.182769	11.98000	91.90000
Maximum	0.051391	0.055685	21.00000	0.285714	0.919819	3.819473	7.314987	16.46807	0.533091	5.299586	15.40000	96.23000
Minimum	0.002342	0.004673	7.000000	0.100000	0.234433	0.230991	5.223427	4.468811	0.108133	5.106316	10.30000	91.61000
Std. Dev.	0.012379	0.011281	3.081336	0.049740	0.151555	0.753558	0.490698	2.870054	0.103454	0.067178	1.851692	1.793242
Skewness	0.969330	1.459062	0.512126	0.894810	0.344462	1.867816	-0.514412	0.575805	-0.572770	0.219900	0.317878	1.486256
Kurtosis	3.019472	4.771560	3.579655	3.265353	2.963281	6.570193	2.843194	2.825719	2.847654	1.860306	1.668062	3.232132
Jarque-Bera	9.396955	29.13467	3.462733	8.182886	1.189910	66.75307	2.707667	3.391447	3.338683	3.730813	5.445615	22.22429
Probability	0.009109	0.000000	0.177042	0.016715	0.551587	0.000000	0.258248	0.183466	0.188371	0.154833	0.065690	0.000015
Sum	1.095341	1.099490	757.0000	11.06341	30.85903	57.21508	390.2095	561.8286	21.78002	311.8444	756.7200	5560.800
Sum Sq. Dev.	0.009041	0.007508	560.1833	0.145967	1.355170	33.50316	14.20627	485.9954	0.631466	0.266262	202.2970	189.7272
Observations	60	60	60	60	60	60	60	60	60	60	60	60

Author's Compilation, 2024

The table 1 shows that ROA and NPLR has a low value of 0.018, which indicates a low average level of profitability and non-performing laons ratios while INF and UN shows a mean value of 12.61 and 92.68 which quite high and 92.68% for the level of unemployment. The BS, DER and OER shows a relatively high level of variability while INF and UN shows a lower level of variability of 1.85 and 1.79. The DER shows a visible leverage variation of 4.47 and 16.47 while OER ranges from 0.23 to 3.82, showing a wide operational cost differences.

ROA and OER shows a level of positive skewness that in right-tailed in distribution at 1.46 and 1.86 while BNZ and LTAR shows a negative skewness at -0.51 and -0.57. The Kurtosis implies leptokurtic distribution at OER AT 6.57 while NPLR has a normal distribution at 3.01. The variable ROA, OER are normally distributed at (29.13, p = 0.0000) and (66.75, p = 0.0000) while BS, LDR, DER and LTAR are all likely distributed.

Table 2
Correlation Matrix

	NPLR	ROA	BS	BI	LDR	OER	BNZ	DER	LTAR	GDPGR	INF	UN
NPLR	1											
ROA	0.0133	1										
BS	0.2269	-0.0285	1									
BI	-0.0822	0.4160	-0.1750	1								
LDR	-0.4037	-0.3303	-0.0028	-0.2303	1							
OER	-0.1956	-0.3842	0.1302	-0.2731	0.6292	1						
BNZ	-0.0901	0.2175	0.2602	0.2024	0.1996	0.1614	1					
DER	0.0724	-0.5600	0.0136	-0.2517	-0.0885	-0.0037	-0.2034	1				
LTAR	-0.1846	-0.4569	0.1437	-0.2535	0.8316	0.5892	0.3500	0.1380	1			
GDPGR	0.0967	0.0937	-0.2565	0.2230	-0.2044	-0.1796	0.3203	0.3415	-0.1154	1		
INF	-0.1126	-0.0985	0.0479	-0.0469	0.1826	0.0677	-0.2141	-0.1947	0.1084	-0.6164	1	
UN	0.1842	0.2416	-0.1888	0.1625	-0.1289	-0.2379	0.2816	0.2805	-0.0827	0.8006	-0.6523	1

Author's Compilation, 2024

The table 2 shows that NPLR has positive relationship with BS at 0.22, DER at 0.07, GDPGR at 0.09, and UN at 0.18 while the dependent variable has negative relationship with BI at -0.08, LDR at -0.40, OER at -0.19, BNZ at -0.09, LTAR at -0.18, INF at -0.11.

Table 3
Regression Analysis

Dependent Variable: Non-performing loan (NPLR)

Variables	Pooled	Fixed	Random
C	-0.3347	-0.5035	-0.0789
	(0.0579)	(0.0622)	(0.5622)
ROA	-0.3244	0.1771	0.0300
	(0.1084)	(0.3702)	(0.8630)
BS	0.0012	-0.0018	2.5386
	(0.0226)**	(0.0377)**	(0.0311)**
BI	-0.0279	-0.1777	-0.0005
	(0.3746)	(0.1250)	(0.9895)
LDR	-0.0896	0.0162	-0.0562
	(0.000)*	(0.6644)	(0.0227)**
OER	0.0016	-0.0039	-0.0562
	(0.5092)	(0.0080)*	(0.0227)**
BNZ	-0.0096	-0.0991	-0.0072
	(0.0266)**	(0.0162)**	(0.2357)
DER	-0.0023	-0.0012	-0.0013
	(0.0041)*	(0.1092)	(0.0568)***
LTAR	0.0842	-0.0913	0.0558
	(0.0074)*	(0.1838)	(0.0549)***
GDPGR	0.0020	0.1916	-0.0133
	(0.9593)	(0.0354)**	(0.6595)
INF	0.0013	-0.0002	0.0002
	(0.1870)	(0.7591)	(0.6950)
UN	0.0045	0.0002	0.0025
	(0.0044)*	(0.0227)**	(0.0196)**
R^2	0.6620	0.8332	0.5716
Adjusted R-square	0.6787	0.7341	0.5847
Durbin-Watson	1.0443	2.1716	1.4403
F-statistics	3.7472	8.4041	1.6272
Prob (F-statistics)	0.0006	0.0000	0.1211
Hausman Test		0.0084	

Author's Compilation, 2024

The Pooled Regression model revealed that return on asset has an insignificant positive effect on Non-performing loans which also shows that an increase in return on asset leads to a negative decrease in Non-performing loans at -0.32. Board Size has significant positive effect on Non-performing loans which also shows that an increase in return on asset leads to 0.00 increase in Non-performing loans. Board Independence has an insignificant negative effect on Non-performing loans which also shows that an increase in board independence leads to a -0.02 decrease in Non-performing loans. Loan-to-deposit ratio has a significant negative effect on Non-performing loans which also shows that an increase in loan-to-deposit ratio leads to -0.08 decrease in Non-performing loans. Operating efficiency has an insignificant positive effect on Non-performing loans which also shows that an increase in operating efficiency leads to 0.00 increase in Non-performing loans.

Bank Size has a significant negative effect on Non-performing loans which also shows that an increase in bank size leads to -0.00 decrease in Non-performing loans. Debt-to-Equity ratio has a significant negative effect on Non-performing loans which also shows that an increase in Debt-to-Equity ratio leads to -0.00 decrease in Non-performing loans. Loan-to-total asset ratio has a significant positive effect on Non-performing loans which also shows that an increase in Loan-to-total asset ratio leads to 0.08 increase in Non-performing loans. Gross domestic product growth rate has an insignificant positive effect on Non-performing loans which also shows that an increase in Gross domestic product growth rate ratio leads to 0.00 increase in Non-performing loans. Inflation rate has an insignificant positive effect on Non-performing loans which also shows that an increase in Inflation rate growth rate ratio leads to 0.00 increase in Non-performing loans. Unemployment rate has a significant positive effect on Non-performing loans which also shows that an increase in Unemployment rate growth rate ratio leads to 0.00 increase in Non-performing loans. The independent variables were able to explain Non-performing loan at 66.20% and also still explained when other variable are included ta 67.87%.

The Fixed Regression model revealed that return on asset has an insignificant positive effect on Non-performing loans which also shows that an increase in return on asset leads to a positive increase in Non-performing loans at -0.37. Board Size has significant negative effect on Non-performing loans which also shows that an increase in return on asset leads to -0.00 decrease in Non-performing loans. Board Independence has an insignificant negative effect on Non-performing loans which also shows that an increase in board independence leads to a -0.17 decrease in Non-performing loans. Loan-to-deposit ratio has an insignificant positive effect on Non-performing loans which also shows that an increase in loan-to-deposit ratio leads to 0.01 increase in Non-performing loans. Operating efficiency has a significant negative effect on Non-performing loans which also shows that an increase in operating efficiency leads to -0.00 decrease in Non-performing loans.

Bank Size has a significant negative effect on Non-performing loans which also shows that an increase in bank size leads to -0.09 decrease in Non-performing loans. Debt-to-Equity ratio has an insignificant negative effect on Non-performing loans which also shows that an increase in Debt-to-Equity ratio leads to -0.00 decrease in Non-performing loans. Loan-to-total asset ratio has an insignificant negative effect on Non-performing loans which also shows that an increase in Loan-to-total asset ratio leads to 0.09 decrease in Non-performing loans. Gross domestic product growth rate has a significant positive effect on Non-performing loans which also shows that an increase in Gross domestic product growth rate ratio leads to 0.19 increase in Non-performing loans. Inflation rate has an insignificant negative effect on Non-performing loans which also shows that an increase in Inflation rate growth rate ratio leads to -0.00 decrease in Non-performing loans. Unemployment rate has a significant positive effect on Non-performing loans which also shows that an increase in Unemployment rate growth rate ratio leads to 0.00 increase in Non-performing loans. The independent variables were able to explain Non-performing loan at 83.32% and also still explained when other variable are included ta 73.41%.

The Random Regression model revealed that return on asset has an insignificant positive effect on Non-performing loans which also shows that an increase in return on asset leads to a positive increase in Non-performing loans at 0.03. Board Size has significant positive effect on Non-performing loans which also shows that an increase in return on asset leads to 2.53 increase in Non-performing loans. Board Independence has

an insignificant negative effect on Non-performing loans which also shows that an increase in board independence leads to a -0.00 decrease in Non-performing loans. Loan-to-deposit ratio has a significant negative effect on Non-performing loans which also shows that an increase in loan-to-deposit ratio leads to -0.05 decrease in Non-performing loans.

Operating efficiency has a significant negative effect on Non-performing loans which also shows that an increase in operating efficiency leads to -0.05 decrease in Non-performing loans. Bank Size has an insignificant negative effect on Non-performing loans which also shows that an increase in bank size leads to -0.00 decrease in Non-performing loans. Debt-to-Equity ratio has a significant negative effect on Non-performing loans which also shows that an increase in Debt-to-Equity ratio leads to -0.00 decrease in Non-performing loans. Loan-to-total asset ratio has a significant positive effect on Non-performing loans which also shows that an increase in Loan-to-total asset ratio leads to 0.05 decrease in Non-performing loans. Gross domestic product growth rate has an insignificant negative effect on Non-performing loans which also shows that an increase in Gross domestic product growth rate ratio leads to -0.01 decrease in Non-performing loans. Inflation rate has an insignificant positive effect on Non-performing loans which also shows that an increase in Inflation rate growth rate ratio leads to 0.00 increase in Non-performing loans. Unemployment rate has a significant positive effect on Non-performing loans which also shows that an increase in Unemployment rate growth rate ratio leads to 0.00 increase in Non-performing loans. The independent variables were able to explain Non-performing loan at 57.16% and also still explained when other variable are included ta 58.47%.

The Hausman test aids in determine the appropriate model that inference would be drawn from between fixed effect model and random effect model. The Hausman test with an F (p-value) of 0.0084 shows the acceptance of the fixed effect model for drawing inference for the objective.

Table 4
Post-Estimation Test

Post-Estimation Test

Test	Statistic	d.f	Prob	
Breusch-Pagan LM	91.91224	66		0.6192
Pesaran scaled LM	1.210905			0.2259
Pesaran CD	1.025044			0.3053

Author's Compilation, 2024

The table 4 showing (p>0.05) reveals that no presence of heteroskedasticity and cross-dependency in the model. This is captured by Breusch-pagan LM and Pesaran scaled LM
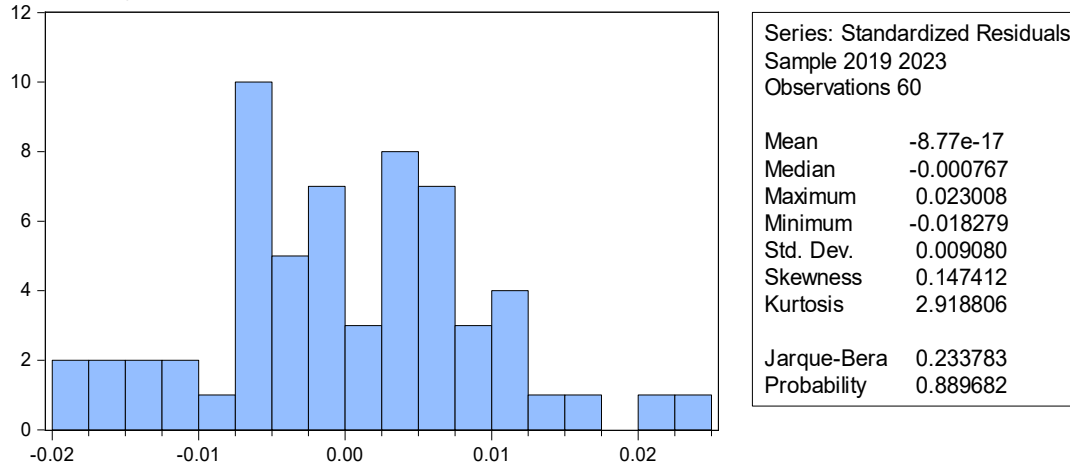
Normality Test

Series: Standardized Residuals	
Sample 2019 2023	
Observations 60	
Mean	-8.77e-17
Median	-0.000767
Maximum	0.023008
Minimum	-0.018279
Std. Dev.	0.009080
Skewness	0.147412
Kurtosis	2.918806
Jarque-Bera	0.233783
Probability	0.889682

Figure 1
Normality Test

The normality test of Jarque-Bera show a probability value that is above 0.05 probability. It indicated that the variables are normally distributed in the regression model.

Discussion of Findings

The findings from the fixed effect model, validated by the Hausman test, indicate varying impacts of both internal and macroeconomic factors on non-performing loans (NPLR) among selected deposit money banks in Nigeria. Return on Assets (ROA) was found to have a positive but statistically insignificant effect on NPLR. This aligns with the studies by Echobu and Philomena (2019) and Hambolu et al. (2022), who also found no significant impact, but contradicts the findings of Obamuyi and Egbetunde (2020), who reported a significant positive relationship. Board Size (BS) showed a negative and significant influence on NPLR, suggesting that larger boards may help reduce credit risk, a view consistent with Priyadi et al. (2021). Similarly, Board Independence (BI) had a negative but insignificant effect, also in line with Priyadi et al.'s assertion that internal governance factors influence bank risk profiles. The Loan-to-Deposit Ratio (LDR) exhibited a positive but insignificant relationship with NPLR. This contradicts Akhanolu et al. (2020), who downplayed the role of capital adequacy in managing loan performance, but supports Siddique et al. (2022), who observed a positive link between liquidity and credit risk. Operating Efficiency Ratio (OER) had a negative and significant effect on NPLR, implying that more efficient operations reduce credit risk. This supports Siddique et al. (2022), who noted that high operational costs could elevate risk levels. Bank Size (BNZ) also showed a negative and significant effect, reinforcing the idea that larger banks are better equipped to manage non-performing loans, as supported by Seriki and Kola (2020).

The Debt-to-Equity Ratio (DER) demonstrated a negative but insignificant effect on NPLR, consistent with Kabir et al. (2022) but contradicting Tisa and Suresh (2023). Likewise, the Loan-to-Total Asset Ratio (LTAR) was negatively but insignificantly related to NPLR, which disagrees with Obamuyi and Egbetunde (2020), who found a significant link. Among macroeconomic indicators, Gross Domestic Product Growth Rate (GDPGR) had a positive and significant impact on NPLR, consistent with Akhanolu et al. (2020) and Seriki and Kola (2020), though not with Tisa and Suresh (2023). Inflation (INF) had a

negative but insignificant effect, contrary to Seriki and Kola (2020), who reported a significant positive impact. Finally, Unemployment Rate (UN) showed a positive and significant influence on NPLR, echoing the findings of Giang et al. (2024), who emphasized the role of macroeconomic conditions in shaping credit risk.

CONCLUSION AND SUGGESTIONS
This study evaluated the effects of various internal and external factors on the non-performing loan ratio (NPLR) of selected deposit money banks in Nigeria using the fixed effects model, validated by the Hausman test. The findings provide significant insights into the dynamics of credit risk management in Nigerian banks. Return on assets (ROA) was found to have a positive but insignificant effect on NPLR, aligning with some studies while contradicting others, highlighting the variability in its influence across contexts.

Board size (BS) and bank size (BNZ) demonstrated a significant negative effect on NPLR, underscoring the importance of governance structures and bank scale in mitigating credit risk. Board independence (BI) and debt-to-equity ratio (DER) showed a negative but insignificant impact, suggesting that while these factors may not directly influence non-performing loans, they contribute to broader governance effectiveness. Similarly, loan-to-deposit ratio (LDR) and loan-to-total asset ratio (LTAR) had positive and negative insignificant effects, respectively, reflecting the nuanced role of liquidity management. Operating efficiency (OER) exhibited a significant negative relationship with NPLR, confirming that operational excellence directly reduces credit risks. Among macroeconomic variables, gross domestic product growth rate (GDPGR) and unemployment rate (UN) had a positive and significant effect on NPLR, indicating the sensitivity of bank performance to economic cycles. Inflation (INF) showed a negative, insignificant effect, highlighting its limited direct impact on non-performing loans. These findings emphasize the interplay between internal governance factors and macroeconomic conditions in influencing credit risk.

Based on the findings, several recommendations are proposed to enhance the management of non-performing loans in Nigerian banks. First, banks should strengthen their governance structures by optimizing board size and ensuring effective oversight functions, as these significantly reduce credit risk. Larger bank sizes should also be leveraged to capitalize on economies of scale in managing non-performing loans effectively. Operational efficiency (OER) should be prioritized by investing in technology and process optimization to streamline banking operations, thus reducing credit risks. Additionally, while board independence (BI) and debt-to-equity ratio (DER) had insignificant effects, fostering greater independence and maintaining a balanced capital structure could indirectly enhance credit risk management. For liquidity management, banks should carefully balance loan-to-deposit (LDR) and loan-to-total asset ratios (LTAR) to ensure sufficient liquidity while avoiding overexposure to risky loans.

Policymakers and regulators should support banks with policies that encourage sound liquidity and risk management practices. Considering the significant effects of GDP growth (GDPGR) and unemployment rate (UN), macroeconomic stability should be a priority for policymakers. Efforts to stimulate economic growth and reduce unemployment will have a direct impact on lowering non-performing loans. Inflation management, while not directly impactful on NPLR, remains vital for broader economic stability. From a balanced approach perspective, deposit money banks in Nigeria should integrate internal governance enhancements with macroeconomic stability is essential for effectively managing non-performing loans in Nigerian banks. Collaborative efforts

between banks, regulators, and policymakers are critical to achieving sustainable credit risk management.

REFERENCES

Afolabi, T. S., Obamuyi, T. M., & Egbetunde, T. (2020). Credit risk and financial performance: Evidence from microfinance banks in Nigeria. *IOSR Journal of Economics and Finance*, *11*(1), 8-15.

Ahmet, I. & Harun, C. (2019). Credit Risk Management: A Panel Data Analysis on the Islamic Banks in Turkey. 3rd World Conference on Technology, Innovation and Entrepreneurship 947–954.

Akerlof, G. A. (1970). *The market for "lemons": Quality uncertainty and the market mechanism*. *The Quarterly Journal of Economics, 84*(3), 488–500. https://doi.org/10.2307/1879431

Akhanolu, I. A., Ehimare, O. A., Mathias, C. M., Deborah, K. T., & Yvonne, O. K. (2020). The Impact of Credit Risk Management and Macroeconomic Variables on Bank Performance in Nigeria'. *WSEAS Transactions on Business and Economics*, *17*(1), 956-965.

ALrfai, M.M., Salleh, D.B. and Waemustafa, W. (2022). Empirical examination of credit risk determinant of commercial banks in Jordan,‖ *Risks*, 10(4),85. Available at: https://doi.org/10.3390/risks10040085.

Bala, J. E., & Alao, M. M. (2021). Determinants of Bank Asset Quality among the Listed Deposit Money Banks in Nigeria. International Journal of Technology Innovation and Management: 2(1).

Buthiena, K. (2019). Determinants of Bank Credit Risk: Empirical Evidence from Jordanian Commercial Banks. *Academy of Accounting and Financial Studies Journal* 23(3).

Central Bank of Nigeria (CBN, 2018). *Deposit money banks activities report*. Available at

Central Bank of Nigeria (CBN, 2022). *Deposit money banks activities report*. Available at

Chiamaka, A. (2023). Determinants of Credit Default in Banking in Nigeria. *International Journal of Modern Risk Management*, *1*(2), 33-44.

Echobu, J., & Nkiru Philomena, O. (2019). Credit risks and financial performance of Nigerian banking industry. *Amity Journal of Finance ADMAA*, *4*(1).

Giang, N. T., Anh, N. D., Chi, V. T. T., Anh, N. B., & Dinh, N. T. Q. (2024). Determinants of Credit Risk under Basel II Accord: Case of Vietnam Banking Sector. In *11th International Conference on Emerging Challenges: Smart Business and Digital Economy 2023 (ICECH 2023)* (194-205). Atlantis Press.

Hambolu, V. O., Omuemu, S. O., & Majeed, A. T. A. (2022). The impact of credit risk on the profitability of commercial banks in Nigeria. *Fuoye Journal of Finance and Contemporary Issues*, *3*(2).

Hamisu, M., Ibrahim, M. A., & Zango, A. G. (2021). Credit risk management and financial performance of selected banks in Nigeria. *Polac Economic Review (PER)*, *1*(1), 1-12. https://tapchinganhang.gov.vn/cac-yeu-to-anh-huong-den-rui-rotin-dung-cua-cac-ngan-hang-thuong-mai-viet-nam.htm.

Jorion, P. (2009*). Financial risk manager handbook*. New Jersey: John Wiley & Sons, Inc.

Kaaya, I. and Pastory, D. (2013). Credit Risk and Commercial Banks Performance in Tanzania: a Panel Data Analysis', *Research Journal of Finance and Accounting*, 4(16), 55–62.

Kabir, M. N., Dulal M,., & Huda, R. N. (2022). Determinants of credit risk: A comparative analysis between Islamic and conventional banks in Bangladesh. *The Singapore Economic Review*, *67*(01), 349-379.

Kartikasary, M. *et al.* (2020). Factors affecting the non-performing loans in Indonesia', *Accounting*, 97–106. doi:10.5267/j.ac.2019.12.003.

Khan, M.A., Siddique, A. and Sarwar, Z. (2020). Determinants of non-performing loans in the banking sector in developing state,‖ *Asian Journal of Accounting Research*, 5(1), 135– 145. Available at: https://doi.org/10.1108/ajar-10-2019-0080.

Kihuro, J. M. & Iraya, C. M. (2018) Credit risk management and bank performance: A Critical literature Review. IOSR *Journal of Economics and Finance 9*(6), 9-13.

Le, T. T., Doan, N. M., & Bui, G. T. (2021). Factors affecting credit risk of commercial banks in Vietnam. Retrieved from Banking Magazine:

Mahyoub, M. and Said, R.M. (2021). Factors influencing non-performing loans: Empirical evidence from commercial banks in Malaysia', *Pressacademia*, 8(3), 160–166. doi:10.17261/pressacademia.2021.1448

Maverick, J. B. (2021). Financial Risk: The major kinds that companies face. https://www.investopedia.com/ask/answers/062415/what-are-major-categories-financial

Messai, A.S. and Jouini, F. (2013). Micro and Macro Determinants of Non-performing Loans', *International Journal of Economics and Financial Issues*, 3(4), 852–860.

Misman & Bhatti (2020). The determinants of credit risk: An evidence from ASEAN and GCC Islamic banks. *Journal of Risk* and *Financial Management*, *13*(89) 1-22.

Misman, F.N. and Bhatti, M.I. (2020). The determinants of credit risk: An evidence from ASEAN and GCC Islamic Banks', *Journal of Risk and Financial Management*, 13(5), 89. doi:10.3390/jrfm13050089.

Muskan, S. (2021).Types of Risk and its management in banking.

Naili, M., & Lahrichi, Y. (2022). The determinants of banks' credit risk: Review of the literature and future research agenda. *International Journal of Finance & Economics*, *27*(1), 334-360.

Nathan, S., Ibrahim, M. and Tom, M. (2020). Determinants of Non-Performing Loans in Uganda's Commercial Banking Sector', *African Journal of Economic Review*, 8(1),26–47. doi:http://dx.doi.org/10.22004/ag.econ.301049.

Nguyen, D. T., & Tran, H. T. (2017). The analysis of major credit risk factors-The case of the Vietnamese commercial banks. *International Journal of Financial Research, 8*(1), 33-42.

Norlida, A. M., Ng Y. T. & Rohani, M. (2015). The determinants of credit risk in Malaysia. *Procedia - Social and Behavioural Sciences* 172, 301 – 308.

Olaoye, F., & Ojuolape, T. C. (2019). Credit risk disclosure compliance and bank performance in Nigeria: Case-study of Zenith bank. *Archives of Business Research*, 1, 1 – 14.

Omobolade, O. S., Seriki, A. I., & Kola, O. J. (2020). Determinants of bank credit risk: evidence from deposit money banks in Nigeria. *Islamic university multidisciplinary journal*, *7*(3), 93-102.

Patrick, O. N., Ikenna, J. E.and Ekemezie, L. I. (2017). The impact of credit risk management on deposit money banks performance in Nigeria. *Nigerian Journal of Managemen Sciences*, 6, (1). 120 –134.

Priyadi, U. *et al.* (2021). Determinants of credit risk of Indonesian Sharīʿah Rural Banks,‖ *ISRA International Journal of Islamic Finance*, 13(3), 284–301. Available at: https://doi.org/10.1108/ijif-09-2019-0134.

Rahman, M. A., Asaduzzaman, Md. and Hossin, Md.S. (2017). Impact of financial ratios on non-performing loans of publicly traded commercial banks in Bangladesh', *International Journal of Financial Research*, 8(1), 181. doi:10.5430/ijfr.v8n1p181.

Rajha, K.S. (2017). Determinants of non-performing loans: Evidence from the Jordanian banking sector', *Journal of Finance and Bank Management*, 4(1), 125–136. doi:10.15640/jfbm.v5n1a5.

Rejda, G. E. (2011). Principles of risk management and insurance. *Pearson Education India.* risk-company.asp.

Rizkullah, A. R., & Suhel, S. A. (2023). Determinants of Credit Growth: An Empirical Study of Commercial Banks in Indonesia. *Journal of Applied Economic Research*, *22*(2), 404-424.

Sanusi, L. S. (2012). Banking reform and its impact on the Nigerian economy. *CBN Journal*

Siddique, A., Khan, M. A., & Khan, Z. (2022). The effect of credit risk management and bank-specific factors on the financial performance of the South Asian commercial banks. *Asian Journal of Accounting Research*, *7*(2), 182-194.

Stiglitz, J. E., & Weiss, A. (1981). *Credit rationing in markets with imperfect information*. *The American Economic Review, 71*(3), 393–410.

Sukmana, R. (2015). "Determinants of non performing financing in Indonesian Islamic banks", Islamic Research and Training Institute (IRTI) Working Paper Series 1436-03, available at: https://irti.org/product/ determinants-of-non-performing-financing-in-indonesian- islamic-banks/
(accessed 27 July 2020).

Tisa, M. A. and Suresh G. (2023). Determinants of credit risk: Empirical evidence from Indian commercial banks. Banks and Bank Systems, 18(2), 88- 100. doi:10.21511/bbs.18(2).2023.08

Widarjono, A., Anto, M.B.H. and Fakhrunnas, F., (2020). "Financing risk in Indonesian Islamic rural banks: do financing products matter?", The Journal of Asian Finance, Economics and Business, 7(9), 305-314.

Zheng, C., Sarker, N. and Nahar, S. (2018). Factors affecting bank credit risk: An empirical insight, *Journal of Applied Finance & Banking*, 8(2), 45–67.