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Assessing Credit Derivative Strategies and Financial Performance for Managing Non-Performing Loans in Listed Deposit Money Banks in Nigeria

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Abstract

This study investigates the impact of credit derivatives and financial performance on non-performing loans in listed Deposit Money Banks in Nigeria. Employing an ex-post facto research design, the study focuses on thirteen listed Deposit Money Banks on the Nigerian Exchange as of October 31st, 2023. Findings suggest that both credit derivatives and financial performance significantly influence loan performance within banks. It was observed that Nigerian banks primarily utilize collateral such as real estate properties, securities, fixed deposits, and assets to manage credit risks. However, these collateral options may sometimes be insufficient. This indicates a lag in adopting global innovations, as credit derivatives have been effectively employed worldwide for credit risk management. Consequently, there is a need for Nigerian banking institutions to embrace newer approaches like credit derivatives to enhance credit risk management and promote economic development.

Keywords: *Credit derivative, Financial performance, Non-Performing loans*

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Background to the Study

The significance of the banking sector in driving economic activities, facilitating employment generation, fostering economic growth, and facilitating the movement of funds between surplus and deficit units is widely acknowledged. However, the operation of banks is inherently fraught with risks, and effectively managing these risks is pivotal for their sustained success. Investors often base their decisions on a bank's ability to manage risk effectively, recognizing that poor risk management can lead to substantial loan losses despite significant revenue generation (Wingard, 2022). Therefore, robust risk management practices are crucial for the operations of deposit money banks worldwide.

The challenges associated with risk management, including leverage ratio, capital adequacy, and loan management, are not exclusive to developed economies but also extend to developing economies like Nigeria and other South Asian nations (European Central Bank, 2021). Instances of banking industry risks such as loan default risk, liquidity risk, and policy-related risks have been observed in various countries, with some banks experiencing bankruptcy due to inadequate risk mitigation measures (Wingard, 2022). Consequently, it is imperative for banks to implement appropriate safeguards to mitigate both anticipated and unforeseen risks (Danisman & Demire, 2019).

Also, in emerging economies like Nigeria, the complexities of risk management often manifest during various stages of credit processing, particularly when Credit Risk Management (CRM) frameworks are lacking or insufficient (Kamran et al., 2019). Credit extension plays a pivotal role in these economies, yet the processes involved are fraught with challenges. Nigeria, for instance, has grappled with significant credit risk issues, leading to increased non-performing loans and liquidity challenges among its deposit money banks (Michael & Enang, 2022; Tega & Mojekwu, 2019). Given the critical role of deposit money banks in developing economies like Nigeria, it becomes imperative for these institutions to employ financial derivatives to hedge against unforeseen events that could impact their profitability (Sinha & Sharma, 2016). While studies in developed economies have extensively explored the efficacy of credit derivatives in mitigating risks. Acharya & Johnson, 2007; Cong & Phuong, 2017; Dickinson, 2008; Liu et al, 2020; Partnoy & Skeel, 2006; Petruk & Stadniichuk, 2020; Stulz, 2010), their adoption and impact in Nigerian banks remain understudied.

Concerns have been raised about the utilization of credit derivatives in Nigerian banks, with assertions that poor techniques in handling these derivatives contribute to credit risk diversion and diminish the banks' leverage ratio capacities (Ndubuisi, 2021; Alaka et al., 2018). Despite the potential benefits of credit derivatives, their underutilization persists among Nigerian deposit money banks (Atoi, 2018; Nwude & Okeke, 2018). Moreover, limited awareness and understanding of derivative products, coupled with high transaction costs, further deter their adoption, exacerbating risk factors within Nigerian banks (Efanga et al., 2019). This study aims to fill this gap by investigating the impact of credit derivatives on credit risk management in listed deposit money banks in Nigeria. By examining this relationship, the study seeks to enhance bank managers' understanding and utilization of credit derivatives, thus justifying the

need for such research. While credit derivatives are believed to contribute to a more efficient financial market by spreading risks and increasing liquidity and transparency, their potential to incentivize risky behavior among banks warrants empirical investigation (Ndubuisi, 2021).Following this introduction, the paper is structured as follows: Section 2 provides a review of the literature and underlying theory, Section 3 presents the data and descriptive tests, Section 4 discusses the results, and Section 5 concludes the paper.

Literature and Underpinning Theory

There are several theories that can explain the behavior of variable in this study, but the Enterprise Risk Management Theory best situate the study in its context. The Enterprise risk theory manages the various risks to which the company is exposed to. Enterprise Risk Management Theory is concerned with taking a consistent and systematic approach to managing the risks that threaten an organization. By outlining the steps of managing financial risks, the theory becomes more applicable to the study. This enables an organization to balance business pressures such as delivering success to stakeholders while also managing risks in order to sustain the business. It identifies potential events that could disrupt the organization, and it applies across the enterprise in strategy formulation, risk management within the risk appetite, and providing reasonable assurance that entity objectives will be met.

One of the key principles of ERM theory is that risk management is embedded in all aspects of the organization's operations and decision-making processes. This implies that credit risk management should not be the sole responsibility of the risk management department, but rather should be integrated into the activities of all relevant departments, such as lending, underwriting, and investment banking. Also, the key principle of ERM theory assumes that risk management should be proactive rather than reactive. This means that banks should not wait until a credit loss occurs to take action. Instead, banks should use ERM tools and techniques to identify and mitigate credit risks before they materialize. ERM theory also emphasizes the importance of risk measurement and monitoring. This is essential for banks to understand their risk profile and to track the effectiveness of their risk management strategies. Banks can use a variety of ERM tools and techniques to measure and monitor credit risk, such as credit scoring models, stress testing, and value-at-risk (VaR) modeling.

There are studies that examined how credit risk management affect profitability but on credit risk management, which this study current study filled. Kamal (2021) conducted a study that examined how credit risk management affected the profitability of deposit money banks in Nigeria from 2006 to 2018. The study found that only TRAR had a positive and significant impact on PAT, while NPLR, LLPR, and INTR had negative and insignificant impacts. The study also found that there was a long-run relationship between credit risk management and bank performance, but no causal relationship between them. Also, Ali & Dhiman (2019) examined the impact of credit risk management indicators on the financial performance of public sector commercial banks in India from 2010 to 2017 and revealed that NPLR was positively related to financial performance.

Al-Qudah et al. (2023) investigated the effects of the UAE's green credit policy, which aims to reduce environmental damage and promote green finance, on the country's non-performing loan ratio (NPLR). The study discovered that both return on equity and net present value (NPLR) were significantly impacted negatively by the ratio of green loans to total loans (ROGL). Additionally, it was discovered that the NPLR was positively impacted by the bank size, solvency ratio, inefficiency ratio, and loan quality. The study used the ratio of green loans to total loans as a stand-in for green lending, which might not fully reflect the scope and caliber of environmental performance and impact achieved by banks.

Bhattarai (2016) looked at how credit risk affected Nepalese commercial banks' (2010–2015) performance. The study discovered that while cost per loan asset had a positive and substantial impact on bank performance, the non-performing loan ratio had a negative and significant impact. The capital adequacy ratio had a marginally unfavorable impact. There was no clear theoretical framework offered by the investigation. Additionally, from 2007 to 2015, Ndoka and Islami (2016) looked into the relationship between profitability measures like return on equity (ROE) and return on assets (ROA) and credit risk indicators like the non-performing loan ratio (NPLR) and capital adequacy ratio (CAR) of 16 commercial banks in Albania. The results of the study indicated that NPLR had a statistically significant negative impact on ROE and ROA, but no statistically significant correlation was found between CAR and ROE or CAR and ROA.

Method of Data Analysis

This study examined the effect of credit derivatives on credit risk management. In achieving this, the study used panel data which was analyzed through descriptive and inferential statistics. The descriptive analysis was done through statistical measures such as mean, minimum, maximum and standard deviation. Pearson`s Product Moment Correlation and Variance Inflation Factor (VIF) was employed to examine the degree of association \and to determine whether there is multicollinearity problem among the explanatory variables.

Multivariate regression analysis was employed to determine the magnitude of the effect of credit derivatives on credit risk management. The panel regression models were estimated using fixed effect, random effect or pooled OLS depending on the assumptions about the distribution of the unobserved components and the asymptotic properties of t and i. The p-value of the Hausman test was the determinant for the selection between the fixed effect model and random effect model. Adjusted R-square was also used to explain the degree to which credit derivatives is responsible for the variation in the measures of business credit risk management of deposit money banks.

The diagnostic test conducted include heteroskedasticity test, cross-sectional dependence test and serial correlation test using Modified Wald test, Pesaran CD test, and Wooldridge test to determine whether the residuals of the models are constant over time. The tests also help to determine if there were issues of dependence across the residuals of the model and to determine the appropriate analytical method to employ to assess the degree of relationship between the dependent and independent variables.

Measurement of Variables

Variables measured in this study are credit derivatives, Financial Performance and credit risk management. Credit derivatives (independent variable) was measured with derivative assets and derivative liabilities. Credit risk management (dependent variable) was measured with non-performing loan to gross loan ratio (NPLR). These are shown in Table 3.1 below:

Table 1: Measurement of Variables

Measure	**Abbreviation**	**Definition**
Derivative Assets	DRA	This is the value of derivative assets for the sampled banks as presented in the statement of financial position as an asset.
Derivative Liabilities	DRL	This is the value of derivative liabilities for the sampled banks as presented in the statement of financial position as a liability.
Financial Performance measures (independent variable)		
Dividend Per Share	DPS	(DPS) refers to the portion of earnings allocated to shareholders. The board makes the decision based on available and distributable profit. It is computed by dividing the total dividend by the number of issued shares. It is disclosed in the Financial Statements.
Earnings Per Share	EPS	(EPS) is a metric used to assess a company's profitability. It represents the profit made on each outstanding share. It is determined by dividing net profit by total number of outstanding shares. A rising EPS shows that the company's profits are increasing, indicating financial health and stability
Net Interest Margin	NIM	(NIM) reveals the amount of money that a bank is earning in interest on loans compared to the amount it is paying in interest on deposits. NIM is one indicator of a bank's profitability and growth.
Credit risk management measures (dependent variable)		
Non-performing loan to gross loan ratio	NPLR	It is the ratio of non-performing loan to gross loan of the banks.
Total risk assets to total asset ratio	TRAR	This is the ratio of total risk assets (loans) to total assets of the banks.
Loan loss provision to total loan ratio	LLPR	This is the ratio of loan loss provision to loans of the banks.
Total loan to total deposits ratio	TLDR	This is the ratio of loans to deposits of the banks.
Control Variables		
Bank size	BS	Natural logarithm of total assets
Financial Lerage	FL	Total debt Total equity

Source: Researcher`s study, 2024.

Model Specification

The models for the study are:

Functional relationship:

$NPLR_{it} = f(DRA_{it}, DRL_{it}, DPS_{it}, GIE_{it}, NIM_{it}, EPS_{it})$……..…….equ (i)

$NPLR_{it} = f(DRA_{it}, DRL_{it}, DPS_{it}, GIE_{it}, NIM_{it}, EPS_{it}, BS_{it}, FL_{it}, BINDP_{it}, BOWNS_{it})$… equ

$NPLR_{it} = f(DRA_{it}, DRL_{it}, DPS_{it}, GIE_{it}, NIM_{it}, EPS_{it})$ ……..……..equ (i)

$NPLR_{it} = f(DRA_{it}, DRL_{it}, DPS_{it}, GIE_{it}, NIM_{it}, EPS_{it}, BS_{it}, FL_{it}, BINDP_{it}, BOWNS_{it})$

Result and Discussion

Descriptive statistics

Table 2: Descriptive Statistics

Variables	Obs	Mean	Std dev	Min	Max
CID	132	6.50	3.46	1.00	12.00
YEAR	132	2017	3.17	2012	2022
NPLR	132	6.50	11.13	0.00	97.00
DRA	110	27.46	54.20	0.00	399.06
DRL	110	5.64	10.67	0.00	66.83
DPS	132	0.65	2.16	0.00	4.17
GIE	132	29.90	276.44	-391.42	3,138.26
NIM	132	58.80	10.56	35.72	83.67
EPS	132	2.01	2.16	-1.28	7.79
BS	132	21.29	0.93	18.87	23.25
FL	132	8.22	16.36	-2.95	191.21
BINDP	132	62.24	12.47	36.84	93.75
BOWNS	132	9.42	15.00	0.00	71.60

Source: Author computation 2024

Table 2 is the descriptive statistic result, the risk assessment of the banks used was highlighted through the Non-performing Loan to Gross Loan Ratio (NPLR), indicating a moderate average level of non-performing loans but considerable variation in credit risk among banks. Financial performance metrics, such as Earnings Per Share (EPS) and Dividends Per Share (DPS), suggested profitability on average with notable variability, crucial for investor decision-making. Corporate governance aspects, like BOWNS and Board Independence, revealed a concentration of ownership and moderate board independence, aiding regulators and governance advocates in identifying concerns or commendable practices. Bank Size (BS) showed relative stability in the size of banks, relevant for regulators assessing systemic importance. Financial Leverage (FL) exhibited a wide range of leverage levels, signaling varying degrees of financial risk. Growth in Equity (GIE) demonstrated significant diversity in equity growth rates among banks, offering insights for stakeholders. Net Interest Margin (NIM) reflected consistency in the profitability of core lending activities across banks. Derivative Assets (DRA) and Derivative Liabilities (DRL) revealed diverse strategies and risk exposures in managing derivatives, with varying standard deviations.

Correlation Matrix

Table 3: Correlation Matrix

Variables	NPLR	DRA	DRL	BS	FL	DPS	BINDP	BOWNS	GIE	NIM	EPS
NPLR	1.00										
DRA	-0.08	1.00									
DRL	-0.04	0.48	1.00								
BS	0.08	0.53	0.41	1.00							
FL	-0.10	0.29	0.05	0.30	1.00						
DPS	-0.15	0.17	0.26	0.45	-0.30	1.00					
BINDP	0.29	-0.11	0.10	0.00	0.11	-0.19	1.00				
BOWNS	-0.14	0.03	-0.04	-0.20	0.43	-0.08	-0.22	1.00			
GIE	-0.26	0.18	0.12	0.12	0.00	0.07	-0.14	0.09	1.00		
NIM	0.22	-0.14	0.13	0.29	-0.45	0.58	0.02	-0.33	0.09	1.00	
EPS	-0.13	0.29	0.36	0.55	-0.24	0.84	-0.10	-0.15	0.27	0.56	1.00

Source: Author computation 2024

Table 3 presented the correlation matrix of the variables used in the analysis, revealing pairs of variables with moderate correlation, yet not high enough to cause multicollinearity issues. This finding was supported by the Vector Inflation Factor reported in Table 3 Additionally, Table 3 provided the Variance Inflation Factor (VIF) for each variable in the regression models, assessing multicollinearity among independent variables. The VIF values for variables such as EPS, DPS, BS, FL, NIM, DRA, BOWNS, DRL, BINDP, and GIE ranged from 1.28 to 5.02. Generally, a VIF above 10 indicates significant multicollinearity, but in this case, none of the variables exceeded this threshold, suggesting that multicollinearity was not a severe issue in the model. The 1/VIF column indicated the reciprocal of the VIF, reflecting the proportion of variance in each variable not explained by correlation with other independent variables, with lower values suggesting a higher proportion of unexplained variance. The mean VIF, calculated at 2.61, provided an overall measure of multicollinearity, below the commonly used threshold of 10, indicating a relatively low level of multicollinearity among the variables in the regression model.

Table 4: Vector Inflation Factor

VARIABLES	VIF	1/VIF
EPS	5.02	0.1991
DPS	4.60	0.2175
BS	3.35	0.2988
FL	2.93	0.3408
NIM	2.24	0.4469
DRA	1.96	0.5106
BOWNS	1.93	0.5179
DRL	1.50	0.6648
BINDP	1.28	0.7784
GIE	1.28	0.7826
Mean	2.61	

Source: Author computation 2024

Inferential Result

Table 5: Regression result for Hypothesis 1 and 2

Model		Model 1A				Model 1B			Changes	
	POLS Regression with Cluster ( )				Fixed-effects (within) regression					
Model	B	SE	t-stat	Sig	B	SE	t-stat	Sig	Coeff	Sig
Constant	-5.977	2.792	-2.14	**0.035**	-356.40	90.192	-3.95	**0.000**	-350.420	Sig
DRA	0.011	0.008	1.330	0.187	-0.018	0.011	-1.61	0.111	-0.029	Same
DRL	-0.007	0.0411	-1.190	0.846	-0.034	0.038	-0.80	0.429	0.027	Same
DPS	-2.215	0.797	-2.780	**0.006**	-1.658	0.958	-1.730	0.088	0.557	Same
GIE	-0.115	0.0356	-3.250	**0.002**	-0.115	0.044	-2.600	**0.011**	0.000	Sig
NIM	0.235	0.049	4.730	**0.000**	0.201	0.068	2.940	**0.004**	0.034	sig
EPS	0.013	0.370	0.040	0.972	-1.019	0.470	-2.170	**0.033**	1.032	diff
BS					16.850	4.374	3.850	**0.000**		
FL					-0.743	0.468	-1.590	0.117		
BINDP					0.039	0.041	0.960	0.342		
BOWNS					0.293	0.123	2.380	0.020		
Adj R^2	0.216				0.473				0.257	
F-stat () Prob	df= 6, 103 = 6.10 (0.000)				df=10, 90 = 3.60 (0.000)				0.000	
Hausman test (Prob)	5.930		0.431		30.970		0.000			
LM test / Tesparm	0.710		0.199		4.030		0.000			
Heteroskedasticity (Prob)	69.540		**0.000**		500.900		0.000			
Serial Correlation (Prob)	5.274		**0.047**		6.221		0.034			
Cross Sectional Dep/ (Prob)					-1.446		0.148			

Dependent variable: NPLR

Source: Authors computation 2024

Pre-Estimation Results Interpretation

Table 5 shows the regression result of model 1. To determine the most appropriate estimating approach, the study carried out a Hausman test to decide whether to use fixed effects or random effects techniques. Judging by the Hausman probability value of 0.431, this indicate that random effect is the most appropriate estimator according to the null hypothesis which state that there is presence of unsystematic difference in the model coefficient, thus the study rejected the null hypothesis. Although, the hausman test result revealed the appropriateness of Random effects; however, the confirmation of the result of the hausman test was carried out using LM test as this test helps to decide the appropriate model between Random effect and

pooled OLS regression. The result of the LM test with 0.199 which is more than the significance level of 5 percent, suggest the use Pooled OLS.

For the robustness of the model, Heteroskedasticity, and serial correlation tests were conducted. Heteroskedasticity was conducted to check for variations in the model's residuals using the heteroscedasticity test. The result had a probability value of 0.000 indicating that the model is heteroskedastic, which implies that the model's residuals are trending over time. The serial correlation test conducted to check if the coefficients and residuals of the model are correlated using the Wooldridge test had a probability value of 0.000, this indicate revealed series are autocorrelated.

Conclusively, the diagnostic test revealed that there is presence of heteroskedasticity, serial correlation problem in the model. Since Heteroskedasticity can affect the efficiency of coefficient estimates and the presence of series correlation can lead to inefficient coefficient estimates, *POLS Regression with cluster ( )* to estimate the effect credit derivative and financial performance on Non-performing loan to total loan of deposit money banks in Nigeria. Table 5 shows the regression analysis result for the component of Credit Derivative and Financial performance on Non-Performing Loan to Total Loans (NPLR). The result show that Derivative Assets (DRA) ($\beta = 0.011$, $t = 1.330$, $p > 0.05$), Net Interest Margin ($\beta = 0.235$, $t = 4.730$, $p < 0.05$) and Earning Per Share (EPS) ($\beta = 0.013$, $t = 0.040$, $p > 0.05$) had a positive effect on Non-Performing Loan to Total Loans (NPLR) and this direction based on our apriori expectation. However, only NIM is significant. Derivative Liabilities (DRL) ($\beta = -0.007$, $t = -1.190$, $p > 0.05$), Dividend Per Share (DPS) ($\beta = -2.215$, $t = -2.780$, $p > 0.05$) and Growth in Equity ($\beta = -0.115$, $t = -3.250$, $p < 0.05$) had negative effect on non-performing loan to total loans of deposit money banks in Nigeria and only Derivative Liabilities (DRL) was insignificant.

The co-efficient of multiple determination $Adj.R^2$ is 0.216, indicating that the model explains 21.6% of the variability in Non-Performing Loan to Total Loans while the remaining 78.4% changes that occurred were accounted for by other variables not captured in the model. It is crucial to note that the predictive power of the model may be limited by the Adjusted R-squared value (21.6%) as it has weak explanatory power. Hence, other factors should be considered. The predictive and prescriptive multiple regression models were thus expressed:

$NPLR_{it} = -5.977\ 0.011DRA_{it} - 0.007DRL_{it} - 2.215DPS_{it} - 0.115GIE_{it} + 0.235NIM_{it} + 0.013EPS_{it}$ ……. **(Predictive model)**

$NPLR_{it} = 2.215DPS_{it} - 0.115GIE_{it} + 0.235NIM_{it}$ …….(Prescriptive model)

Where:
NPLR = non-performing loan to gross loan ratio (NPLR),
DRA = Derivative Assets
DRL = Derivative Liabilities
DPS = Dividend Per Shares

GIE = Growth In Equity
NIM = Net Interest Margin
EPS = Earnings Per Share

The regression model showed that when holding Credit Derivative and Financial performance components constant at zero, had a negative and but statistically significant effect the predictive model. Derivative Assets, Derivative liabilities and Earnings Per Share where not insignificant, and management could downplay those variables in managing credit risk. That's why they were not included in the prescriptive model. The results of the multiple regression analysis in the prescriptive model indicated that if all other variables of Credit Derivative and Financial Performance (Net Interest Margin, Dividend Per Share and Growth in Equity) changed, Non-performing loan to total loan would also increase by 0.235 (NIM), decrease by 0.115 (GIE) and 2.215 (DPS) respectively, and vice-versa. The negative coefficient for DPS and GIE implies that higher dividend per share is associated with lower Non-performing Loan to total loan and that a higher growth in equity is associated with lower NPLR while the positive NIM indicate that higher net interest margin is associated with higher NPLR. In order to improve the non-performing loan to total loan of deposit money banks in Nigeria, the management might consider maintaining or increasing dividend pay-out to positively affect NPLR, strategies to enhance equity growth for better management for non-performing loans or review interest rate policies or strategies to manage net interest margin effectively.

At a level of significance of 0.05 and degree of 6, 103, the F-statistics = 6.1 while the *p-value* of F-statistics is 0.000 which is less than 0.05 adopted significance level. Therefore, the study rejected the Null hypothesis H01 which implied that credit derivatives and financial performance have significant effect on non-performing loans to total loans in Nigeria.

Also, in table 5b, to determine the most appropriate estimating approach, hausman test was used to decide whether to use fixed effects or random effects techniques. Judging by the Hausman probability value of 0.000, we reject the null hypothesis (random effect) and accept the use of the fixed effect analysis as there is a correlation between the unique errors and the regressors in the model. The testparm test was conducted to determine whether the coefficient for all years is jointly equal to zero, requiring the choice of time fixed effect model. The testparm test revealed a probability value of 0.000 confirming the fixed effect. For the robustness of the model, Heteroskedasticity, and serial correlation tests were conducted. Heteroskedasticity was conducted to check for variations in the model's residuals using the heteroscedasticity test. The result had a probability value of 0.00 indicating that the model is heteroskedastic, which implies that the model's residuals are trending over time. The serial correlation test conducted to check if the coefficients and residuals of the model are correlated using the Wooldridge test had a probability value of 0.000, this indicate revealed series are autocorrelated. According to Baltagi (2021), autocorrelation problem that causes the standard errors of the co-efficient to be smaller than they actual value the coefficient of determination (R-Squared) to be higher than normal. The Null hypothesis of the test state that there is no serial correlation (no first order autocorrelation). Since, the p-value is less than the significance level 5 percent is an indication that serial correlation problem does exist in the model.

Conclusively, the diagnostic test revealed that there is presence of heteroskedasticity, serial correlation and cross-sectional dependence problem in the model. As a result of this, Fixed Effect Regression within was used to estimate the effect of credit derivative and financial performance does not have any significant effect on non-performing loan to total loans. Table 5b shows the regression analysis result for the component of Credit Derivative and Financial performance on Non-Performing Loan to Total Loans (NPLR) controlled by Bank Size, Financial Leverage, Board Independence, and Board Ownership. As the result of the inclusion of the control variables, Net Interest Margin (β = 0.201, t = 2.940, p < 0.05) had positive and significant effect on NPLR while Derivative Assets (DRA) (β = -0.081, t = -1.61, p > 0.05), Derivative Liabilities (DRL) (β = -0.034, t = -0.80, p > 0.05), Dividend Per Share (DPS) (β = -1.658, t = -1.730, p > 0.05), Growth In Equity (GIE) (β = -0.115, t = -2.600, p > 0.05), Earning Per Share (EPS) (β = -1.019, t = -2.170, p > 0.05) had negative effect on Non-Performing Loan to Total Loans (NPLR) and this not line with the apriori expectation.

Table 6: Summary of result in Table 4

Hyp	Coeff	DRA	DRL	DPS	GIE	NIM	EPS	A*dj.*R^2	F-Stat (prob)
H_{01}	-5.977	0.011	-0.007	-2.215	-0.115	0.235	0.013	0.216	0.000
H_{02}	-356.4	-0.018	-0.034	-1.658	-0.115	0.201	-1.019	0.473	0.000
Diff	-350.42	-0.029	-0.027	0.557	0	-0.034	-1.032	0.257	0.000

Source: Author's computation 2024

The changes shown in table 6 indicate that the control variables provide a more comprehensive and nuanced understanding of the relationship between credit derivative and financial performance on non-performing loan to total loan of deposit money banks in Nigeria. The model complexity, significance of coefficients and the explanatory powers of the model are all enhanced in Hypothesis 2.

The baseline hypothesis model was improved by the inclusion of the control variable of Bank Size, Financial Leverage, Board Independence and Board Ownership. The magnitude of coefficients in Hypothesis 2 are generally larger specially for variables because of the inclusion of the variables. This indicate that these control variables have a more pronounced impact on the relationship between Credit derivative and financial performance on non-performing loan to total loan of deposit money banks in Nigeria. Some variables like DRL, DPS and EPS become statistically insignificant when control variables are added in hypothesis implying that Bank Size, Financial Leverage, Board Independence and Board Ownership impact on the non-performing loan ratio of deposit money banks in Nigeria for the period under consideration.

The result suggests that changes in Derivative Assets, Derivative Liabilities and Dividend Per Share are not associated to changes in Non-Performing Loan to Total Loans while a decrease in growth in equity and earnings per share are associated with a decrease in the non-performing loan ratio while increase in net interest margin is associated with an increase in the non-performing loan ratio. The control variables like Bank Size and Board Ownership have

had positive coefficients of 16.850 and 0.293 are statistically significant (p-value = 0.000), suggesting that larger banks with higher board ownership tend to have higher non-performing loan ratios however, Board Independence is not statistically significant indicating that board independence may not have a significant impact on the non-performing loan ratio to total loan. The Adjusted R-squared increased from 21.6% to 47.3% indicating that the model now explains 47.3% of the variability in Non-Performing Loan to Total Loans while the remaining 52.7% changes that occurred were accounted for by other variables not captured in the model. The predictive and prescriptive multiple regression models were thus expressed:

At a level of significance of 0.05 and degree of 10, 90, the F-statistics = 3.60 while the *p-value* of F-statistics is 0.000 which is less than 0.05 adopted significance level. Therefore, the study rejected the Null hypothesis H02 which implied that credit derivatives and financial performance have significant effect on non-performing loans to total loans in Nigeria. The negative coefficient for DPS implies that higher dividends per share are associated with a lower Non-Performing Loan to Gross Loan Ratio. This suggests that banks distributing more significant dividends per share may exhibit a lower risk of non-performing loans. A plausible explanation is that a consistent and healthy dividend payout may reflect a stable and profitable financial condition, reducing the likelihood of loan defaults.

Furthermore, the negative coefficient for GIE indicates that higher growth in equity is associated with a lower Non-Performing Loan to Gross Loan Ratio, suggesting that banks experiencing substantial growth in equity may be better positioned to manage and mitigate non-performing loans. Rapid growth in equity can enhance a bank's financial stability, providing a buffer against potential losses from defaulted loans. The losses in non-performing loans for deposit money banks in Nigeria, associated with DPS and GIE is like the findings of Danisman and Demire (2019) for banks in developed countries. The positive coefficient for NIM suggests that a higher Net Interest Margin is associated with a higher Non-Performing Loan to Gross Loan Ratio. This finding implies that banks with higher net interest margins may face increased risk or exposure to non-performing loans. A plausible explanation is that while a higher net interest margin indicates profitability, it may also reflect a higher level of risk-taking or concentration in interest-related activities, potentially leading to increased default risks.

Despite the introduction of Bank Size, financial leverage, board independence and board ownership as control variables, the negative and significant coefficient for Growth in Equity (GIE) persists. This suggests that independent of the bank's size, a positive association remains between substantial growth in equity and a lower NPLR. The continued significance of this relationship implies that banks experiencing robust growth in equity are likely to exhibit a greater capacity to manage and mitigate non-performing loans. This could be attributed to the bolstering of financial stability and an augmented capital base, enhancing the bank's resilience against potential losses.

The sustained positive and significant coefficient for Net Interest Margin (NIM) underscores its impact on the NPLR, even after considering the effect of other control variables. This

implies that a higher Net Interest Margin continues to be associated with a higher Non-Performing Loan to Gross Loan Ratio. The persistence of this positive relationship suggests that while a higher net interest margin signifies increased profitability, it may also coincide with a heightened level of risk or concentration in interest-related activities, potentially leading to an augmented risk of non-performing loans. The positive and significant effect of Bank Size (BS) indicates that larger banks, even after considering the effects of other variables, tend to have a higher Non-Performing Loan to Gross Loan Ratio. This finding emphasizes the need to recognize the potential challenges that larger banks may face in managing non-performing loans, possibly stemming from the complexity and scale of their operations.

Implication of Findings

The findings of the study offer empirical insights into the intricate relationships between credit derivatives, financial performance, and various performance indicators within the Nigerian banking sector. Researchers and analysts can leverage these empirical findings as a foundation for further investigations and comparative studies. The study provides an understanding of how credit derivatives and financial metrics interact in the Nigerian context, offering a valuable empirical basis for future research endeavors. Of particular importance is the consistent significant effects of earnings per share (EPS) on credit risk management. This should be taken to account in future empirical analysis of credit risk management in banks in Nigeria. The study emphasizes the need for tailored policies that account for the diverse risk profiles and financial structures of banks, particularly in the Nigerian context. CBN and NDIC should come up with regulatory framework on the sales and purchases of Credit Derivatives in the Nigeria capital and money market. Financial analysts can leverage the study's findings to enhance their risk assessments and performance evaluations of banks in Nigeria. The observed relationships between financial indicators and credit risk management provide analysts with additional dimensions to consider when forecasting and evaluating the stability and growth potential of financial institutions. Understanding the relationships between credit derivatives and financial performance aids analysts in providing more comprehensive insights to investors and stakeholder

Conclusion and Recommendation

This study examined the effect of credit derivatives and financial performance on credit risk management of deposit money banks in Nigeria. The study concludes that Credit Derivatives and Financial Performance have significant effect in driving credit risks management.

It was observed that Nigeria banks typically use collateral such as real estate properties, quoted and unquoted securities, fixed deposits, and assets backing as their main tool of credit risks management. However, these collateral in some cases are inadequate. The implications of this are that the Nigeria banking industries still lags behind in these new innovations around the world, Credit derivatives has been successfully used to manage credit risks around the world. The insistence of the Bank on provision of real estate properties and other earlier mentioned items as collaterals before credit can be granted will prevent would be borrowers with genuine business idea but who does not have any of these items from assessing fund thereby slowing down the economy of the nation.

Based on the findings from descriptive statistics and inferential statistics and the conclusions drawn, it is recommended key players in Nigeria banking industry especially the lenders and borrowers of loans should embrace this new product (Credit Derivatives), the regulatory Central Bank of Nigeria should look into creating relevant legal framework while the Security and Exchange Commission (SEC) should look into possibility of trading this financial instrument in the money and capital market.

Corporate and Institutional Investors and financial market Dealers should embrace trading of Credit Derivatives because it is not only a tool for managing credit risks; it is also an investment vehicle. It will boost the economy of the nation because banks will be able to finance more viable projects by releasing loan to entrepreneurs with bright ideas without necessarily insisting on the traditional collateral as this would have been catered for by Credit Derivatives.

Limitation and Suggestion for Further Studies

The study focuses specifically on deposit money banks in Nigeria. As a result, the findings may have limited generalizability to banks in other countries or regions with different economic, regulatory, and cultural contexts. Hence, further study can be extended by a comparative analysis of credit risk management, financial performance, and corporate governance across multiple countries or regions. This could highlight variations in banking practices influenced by different regulatory environments, economic conditions, and cultural factors. Furthermore, other studies can investigate the impact of macro-economic factors (e.g., interest rates, inflation, GDP growth) on credit risk, financial performance, and governance. Understanding how external economic conditions influence these variables can enhance risk management strategies.

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