Effect of Credit Risk Management on Return on Assets And Return on Equity: Empirical Evidence from Nigerian Banks

Musa Yelwa Abubakar[1], Yakubu Shaba[2], Mary Ovayioza Ezeji[3] and Sunusi Sa'ad Ahmad[4]

[1]Department of Accounting, Faculty of Management Sciences, Usmanu Danfodiyo University, Sokoto, Nigeria
[2]Department of Business Administration, Faculty of Management Sciences, Usmanu Danfodiyo University, Sokoto, Nigeria
[3]Postgraduate Student, Department of Accounting, Faculty of Management Sciences, Usmanu Danfodiyo University, Sokoto, Nigeria
[4]Department of Accounting, Faculty of Management Sciences, Usmanu Danfodiyo University, Sokoto, Nigeria.

Abstract: *There is certainly nothing more important to DMBs than the credit they grant to their teeming customers for it constitutes the largest single income-generating asset in their portfolios. The major cause of bank distress in Nigeriaisassociatedwith poor credit management which results to decline in credit standing of thebanks. The study adopts judgmental sampling techniqueas banks that did not have the required data were not selected. The study which employed Panel regression estimation techniqueon a sample of 14 Deposit Money Banks (DMBs) quoted on the Nigerian Stock Exchange (NSE), examined the effect of credit risk management on bank performance in Nigeria over the period, 2000 through 2013.Regressing Non-performing Loans (NPL), Interest Income (INTINC), Loans and Advances (LA), Loan Loss Provision (LLP), Total Assets (TA) and Equity Capital (CAP) on Return on Assets (ROA) and Return on Equity (ROE), the findings provide sufficient evidence that credit risk management indicators impact significantly on bank performance in Nigeria.These findings call on the DMBs to increase loans and advances, equity capital and bank size in order to achieve superior performance. The findings also suggest the need for the banks and the regulatory agencies to re-examine the procedures for granting loans and advances so as to minimize the incidences of non-performing loans.*
Key Words: *Credit Risk Management, Return on Assets, Return on Equity, Deposit Money Banks, Nigeria*

I. Introduction

There is certainly nothing more important to DMBs than the credit they grant to their teeming customers for itconstitutes the largest single income-generating asset in their portfolios. This explains why banks spend enormous resources in estimating, monitoring and managing credit quality.Thus, when banks grant loans, they expect the customers to repay the principal and interestin accordance with agreed repayment terms. However, when credits go bad, it can be fatal to the banks; which often lead to bank distress and failure.

Global events concerning high profile bank failure and the resultant negative consequences ondepositors, debt holders, employees, other firms and the economy in general informed the growing research interest in credit risk management by banks, their regulators, academics and other stakeholders. The infamous collapse of Bank of Credit and Commerce International (BCCI) in the UK in 1991, the East Asian financial crises of 1997 and the Russian financial crises of 1997 among others all question the efficacy of credit risk management as a tool of averting potential crises and enhancing bank performance. The most recent is the American credit crunch which led to the global financial and economic crises in 2008 and the manner the governments of affected countries chose to save the affected banks by laying the burden on taxpayers while exercising austerity measures has also triggered a number of discussions over several fundamental credit risk management issues across the globe.

In the Nigerian context, similar incidences of banking crises occurred in the 1990s and 2000s. Prominent among them are the incidences of the former Intercontinental Bank Nigeria Plc and Oceanic Bank International Plc. They crumbled on the back of irrecoverable credit questions. Executive management were reckless with investors' funds, neglected due processes, took biased decisions and gave out huge loans without

collateral.The increasing level of non-performing loan rates in banks, poor loan processing, capital adequacy ratio, loan loss provision, undue interference in the loan granting process, inadequate or absence of loan collaterals among others are associated with poor and ineffective credit risk management which ultimately pose negative impact on their performance. Similarly, non-performing loan poses a great threat to the success of a bank and also reduces their profit channels. Loan loss provision is also another credit risk management technique which reduces funds that should be channeled to viable investment which ultimately affects their performance and survival. Moreover, inefficient credit management poses a great danger to the liquidity position of a bank, as it affects the amount of cash balances, bank balances and treasury bills representing short-term cash management which ensures the day-to-day running of the bank.

The need for banks to manage loans efficiently has thus become more important given the recurring incidences of bank distress and failure. Consequently, regulatory agencies have responded by issuing series of stringent credit guidelines and mandatory codes of corporate best practices which are believed to minimize banks'exposure to credit default andadjusted risks. Furthermore, efficient credit management policies ensure high and constant interest income from loans and advances given to various individuals, firms, corporate bodies and government institutions. As a result, it is expedient that poor credit management policies will drastically affect interest income. In Nigeria for instance, this problem warranted the intervention of Asset Management Corporation of Nigeria (AMCON) to acquire Spring Bank Plc, Platinum Habib Bank Plcand Afribank Plc in 2011.

In an attempt to address the foregoing issues, this study examines the interrelations among credit risk management indicators proxied by loans and advances, loan loss provision and non-performing loans and bank performance as measured by ROA and ROE.In addition, the effects of institutional factors such as total assets and equity capital which are considered theoretically cogent in determining bank performanceare also investigated. To the best of our knowledge, most studies (e.g., Hosna, Manzura & Juanjuan,2009; Afriyie & Akotey,2010; Kolapo, Ayeni & Oke, 2012; Ogboi & Unuafe, 2013)focused majorly on credit risk management and bank performance using ROA and ROE as their performance indicators. It appears that most of the previous studies failed to captureboth the credit risk management indicators and the institutional factors.

This paper is divided into five sections. Section two and three are on literature review and methodology respectively. Section four explains the results and discussion of findings, while section five concludes the paper.

II. Literature Review

Many studies have provided both theoretical as well as empirical insights into the credit risk management conundrum and in the process offered different viewpoints on the relationship between credit risk management indicators and firm performance. Whereas some results indicate existence of a relationship, some do not provide evidence of any. Worse still, there is no unanimity on the exact nature and extent of the relationship even among scholars that reported evidence of relationship between credit risk management and firm performance.This subsection reviews relevant literature on the subject matter. It is divided into conceptual, theoretical and empirical reviews.

Conceptual Framework

The Basel Committee on Banking Supervision (2001) defined credit risk as the possibility of losing the outstanding loan partially or totally, due to credit events (default risk). Accordingly, credit risk is an internal determinant of bank performance. A bank exists not only to accept deposits but also to grant credit facilities, therefore inevitably exposed to credit risk. Credit risk is by far the most significant risk faced by banks and the success of their business depends on accurate measurement and efficient management of this risk to a greater extent than any other risks.

According to Cai and Anjan (2008), credit management is the most important function of the banking industry. It is the most risky and difficult and at the same time the most profitable function performed by banks. The main source of credit risk include, limited institutional capacity, inappropriate credit policies, volatile interest rates, poor management, inappropriate laws, low capital and liquidity levels, direct lending, massive licensing of banks, poor loan underwriting, laxity in credit assessment, poor lending practices, government interference and inadequate supervision by the relevant regulatory authorities (Kithinji, 2010).

Additionally, credit risk is a serious threat to the performance of banks which when unchecked may lead to the total collapse of banks while, liquidity risk also act as a snare to banks with an unsound risk assessment and control policy (Ejoh, Okpa & Egbe,2014). Coyle(2000) is of the view that these two risks cannot be ignored as they both have considerable bearing on the performance and survival of banks.

Further, Kolapo, Ayeni and Oke (2012) are of the view that credit facility is said to be performing if payment of both principal and interest are up to date in accordance with agreed repayment terms. They further explained that NPL represents credits which the banks perceive as possible loss of funds due to loan defaults which are classified into substandard, doubtful or lost.

Furthermore, Felix and Claudine (2008) state that there are various indicators of measuring performance of a bank and they include: ROA, ROE, Earnings per Share (EPS) and Profit after Tax (PAT). To Olowe (2009), ROA is the ratio of net operating profit that a company earns from its business operations in a given period of time to the amount of the company's total assets while, ROE is the ratio of net income of a business during a year to its shareholders equity during that year. It is a measure of profitability of shareholders investments (Pandey, 2010).

Theoretical Framework

Several theories have emerged in an attempt to highlight the objective of the firm and how it should manage its credits. Chief among the theories of liquidity and credit risk management are: liquid asset theory, anticipated income theory, commercial loan theory, shift-ability theory and liability management theory. The theoretical framework that serves as the basis for the study is the anticipated income theory.

Anticipated Income Theory

Anticipated income theory was propounded by Herbert Victor Prochanow in 1944 at the end of World War II as a result of the fact that the compositions of the earnings assets of commercial banks began to change as resources shifted from the government to the private sector. The spectacular rise in the loan demand of the immediate postwar years provided commercial banks with strong incentives to expand their loan portfolios and hence increase bank earnings. After the postwar, commercial banks began to make loans that were of longer maturity, covered a much wider variety of borrowers and extended to many more purposes than originally envisaged.

As a result, bank's management acquired more experience in meeting withdrawals and found that through prudent asset management, a mixture of very liquid and not-so-liquid assets could achieve the desired degree of overall liquidity. Thus, the loan portfolios of commercial banks in the postwar years included such items as intermediate and long-term loans to customers, home owners and business firms that would not qualify as liquid assets under the traditional theory of bank liquidity and would qualify only in part, if at all under the theory. However, loans of this type qualify under the anticipated income theory.

According to Ibe (2013), anticipated income theory holds that a bank's liquidity can be managed through the proper phasing and structuring of the loan commitments made by a bank to the customers. Here the liquidity can be planned if the scheduled loan repayments by a customer are based on the future cash flows of the borrower. The theory emphasizes the earning potential and the credit worthiness of a borrower as the ultimate guarantee for ensuring adequate liquidity.

In addition, anticipated income theory of liquidity of commercial banks holds the view that banks liquidity can be estimated and met if scheduled payments are based on the income of the borrowers (Ngwu, 2006). It is worth noting that this theory does not deny the applicability of self-liquidating and suitability theories. It emphasizes relating loan repayment to income rather than relying heavily on collaterals. It also holds that, bank liquidity can be influenced by the maturity pattern of the loans and investment portfolios, short-term business and customer installment loans which would have more liquidity than those secured by real estate. Thus, appropriate credit risk management policies of a bank will increase interest income and ultimately ensure adequate liquidity.

In conclusion, anticipated income theory serves as the theoretical underpinning of this study because it incorporates credit and liquidity management policies and equally analyzes borrowers' credit worthiness. The theory alsoprovides the banks with the criteria for evaluating the potentials of a borrower to successful repayment of loan on time which ultimately affects the interest income which can be used to influence the

liquidity position of a bank. Moreover, the theory holds the view that if credit were adequately managed, interest income will be influenced, which will affect the investment opportunities and ultimately increase the liquidity position of the bank.

Empirical Review

Studies within and outside Nigeria focused on the impact of capital market on the economy (see Hosna et al., 2009; Afriyie & Akotey, 2010; Kolapo et al.,2012; Ogboi & Unuafe, 2013). For instance,Hosna et al. (2009) used regression analysis to examine credit risk management and profitability in commercial banks in Sweden over the period, 2000 to 2008. The study revealed that credit risk management has effect on bank profitability. It recommended a qualitative study of credit risk management which will make the findings more objective and informative by including other credit risk management indicators to grasp better variations in profitability.

Also, Afriyie and Akotey (2010) used panel regression model to estimate credit risk management and profitability of selected rural banks in Ghana fora period of five years (2006 – 2010). The result showed a significant positive relationship between non-performing loans and profitability of rural banks while, capital adequacy ratio showed a positive but insignificant relationship. The study recommends that Bank of Ghana should tighten its control mechanisms of rural banks to stop the unfortunate trend in the rural banking industry.

Furthermore, Kolapo et al.(2012) used panel model analysis to examine credit risk and performance of five commercial banks in Nigeria over the period, 2000 through 2010. The study revealed a negative relationship between NPL, LLP and profitability and a positive relationship between loan and advances and profitability. The study recommends that banks in Nigeria should enhance their capacity in credit analysis and loan administration while the regulatory authority should pay more attention to banks' compliance to relevant provisions of the Banks and Other Financial Institutions Act (2004) as amended and prudential guidelines.

In a more recent study, Ogboi and Unuafe (2013) used panel data analysis to investigate credit risk management and capital Adequacy on financial performance of commercial banks in Nigeria for a period of six years (2004 – 2009). The result showed that sound credit risk management and capital adequacy impacted positively on bank financial performance with the exception of loans and advances which was found to have a negative impact on the performance of the sampled banks. The authors recommended that Nigerian banks should strengthen credit risk management strategies by conducting rigorous credit appraisal before loan disbursement and drawdown.

Model Specification

The study adopts the following models as used by Kargi (2011), Poudel (2012), Kolapo et al. (2012) and Ogboiand Unuafe (2013).

$$ROA = f(\text{NPL, LLP, LA, } \frac{LA}{TD}) \qquad (1)$$

$$ROA_{it} = \beta_0 + \beta_1 NPL_{it} + \beta_2 LLP_{it} + \beta_3 LA_{it} + \beta_4 \frac{LA}{TD}_{it} + \mu_{it} \qquad (2)$$

Where:
β_0 = Constant
ROA   = Return on Assets
NPL   = Non-Performing Loans
LLP   = Loan Loss Provision
LA   = Loans and Advances
TD   = Total Deposits
it   = Subscripts *i* and *t* refer to cross and time series dimensions respectively, explaining the panel nature of the model.
μ = Error term

In line with the studies of Kargi (2011), Poudel (2012), Kolapo et al. (2012) and Ogboi and Unuafe (2013), the model for the study is specified as bank profitability being a function of interest income,non-performing loans,

loan loss provision and loans and advances. The control variables are Total Assets (TA) and Equity Capital (CAP). Specifically, the model is modified below.

General Model

$BP = f$ (*Credit Management*)

$BP = f$ (INTINC, NPL, LLP, LA, TA, CAP) (3)

$BP = \beta_0 + \beta_1 INTINC_{it} + \beta_2 NPL + \beta_3 LLP + \beta_4 LA + \beta_5 TA + \beta_6 CAP + \mu_{it}$ (4)

Where:

BP = Bank Performance represented by ROA and ROE.

The model is further divided into two based on the dependent variables which are used as a proxies for bank performance. They include ROA andROE.

Model One

$ROE_{it} = \beta_0 + \beta_1 LOGINTINC_{it} + \beta_2 LOGNPL_{it} + \beta_3 LOGLLP_{it} + \beta_4 LOGLA_{it} + \beta_5 LOGTA_{it} + \beta_6 LOGCAP_{it} + \mu_{it}$ (5)

Model Two

$ROA_{it} = \beta_0 + \beta_1 LOGINTINC_{it} + \beta_2 LOGNPL_{it} + \beta_3 LOGLLP_{it} + \beta_4 LOGLA_{it} + \beta_5 LOGTA_{it} + \beta_6 LOGCAP_{it} + \mu_{it}$ (6)

Where:

LOGINTINC	=Logarithm of Interest Income
LOGNPL	= Logarithm of Non-Performing Loans
LOGLLP	= Logarithm of Loan Loss Provision
LOGLA	= Logarithm of Loans and Advances
LOGTA	= Logarithm of Total Assets
LOGCAP	= Logarithm of Equity Capital

The data used for this study were sourced from annual report and accounts of the sampled banks covering 2000 through 2013. The study adopts a non-probability method in the form of judgmental sampling technique in selecting banks into the sample. From a total population of 24 banks, a sample of 14 banks quoted on the Nigeria stock Exchange was drawn. The modelsare estimated using pooled panel data. This is justified on the premise that the statistical techniques employed are based on time series and cross-sectional data. The study used StataStatistical Software version 13 for its analysis.

III. Results and Interpretation

Table 1: Regression Results of the Impact of Credit on Return on Equity and Return on Assets

Estimated Results

Variables	Return on Equity						Return on Assets					
	POLS		RE		FE		POLS		RE		FE	
	Coefficient	P-Val	Coefficient	P-Val	Coefficient	P-Val	Coefficient	P-Val	Coefficient	P-Val	Coefficient	P-Val
Constant	-4.633	0.242	-6.633	0.132	-10.784	0.034	-0.2579	0.088	0.2037	0.059	-0.1089	0.749
LOGINTINC	-0.789	0.000	6.652	0.000	-0.578	0	-0.0242	0.236	6.0128	0.042	0.0104	0.63
LOGNPL	-0.477	0.049	-0.048	0.059	-0.054	0.033	0.0074	0.724	-0.0978	0.05	0.01606	0.502
LOGLLP	0.308	0.048	-0.227	0.124	0.229	0.133	0.01502	0.502	-0.0055	0.123	-0.00521	0.821
LOGLA	0.559	0.003	0.537	0.002	0.601	0.001	0.0266	0.313	0.0228	0.008	0.0258	0.344
LOGTA	0.651	0.001	0.751	0.001	0.651	0.001	0.0074	0.724	9.978	0	0.01606	0.502
LOGCAP	0.308	0.048	0.371	0.004	0.229	0.133	0.0074	0.724	10.978	0	0.01606	0.502
			Corr(u_i, X)	0.000	Corr (u_i, Xb)	-0.197			Corr(u_i, X)	0.000	Corr (u_i, Xb)	-0.3304
Prob>X²	0.0000		0.0000		0.0000		0.3299		0.7883		0.9306	
R²	0.7995		0.7742		0.7373		0.6527		0.6499		0.6321	
Rho			0.2119		0.3485				0.3646		0.2016	
Sigma_u			1.1940		1.6836				0.0916		0.1752	
Sigma_e			2.3025		2.3025				0.3487		0.3487	
Hausman X²			0.0600						0.0700			

Return on Equity

Table 1 shows that the result generated from using the random effects estimator is used to determine the impact of credit management on ROE of the sampled banks. The presence of heterogeneity in the model also signals that the data cannot be pooled together. This therefore implies that the Pooled OLS method is inappropriate for the model. The *Corr (u_i, Xb)* value of -0.197 produced from the Fixed Effects (FE) model also shows that there is a weak correlation with the explanatory variables. A weak correlation indicates that random effects model is the most appropriate. Further, the Hausmantest gives a probabilityvalue of 0.06 implying that the probability value is not significant at 5%, therefore random effect is the most appropriate for the study. The R^2which gives a value of 0.774 implies that the independent variables captured 77.42% variation in the dependent variable (ROE).

Furthermore, the result from the Random Effects (RE) model revealed that the *Prob>Chi^2* gives a value of 0.0000 indicating that the model is statistically significant at 1%. The result also revealed that the coefficients of INTINC, NPL, LA, TA and CAP are statistically significant in explaining variations in ROE, while LLP is not statistically significant in explaining variations in ROE across Nigerian DMBs. The estimate of *Rho*which gives a value of 21.19%shows thatthe variance of this value is due to differences across the banks.

Inferring from the result in Table 1, the coefficient of INTINC is statistically significant at 1% with a coefficient of 6.652. This implies that a per cent change in Interest Income would lead to a 0.067% increase in ROE across the sampled banks. The positive relationship between INTINC and ROE indicates that the former has a positive impact on the latter. Also, the coefficient of Loans and Advances is statistically significant at 1% with a coefficient of 0.537. This implies that a per cent change in Loans and Advances would lead to a 0.537% change in ROEof the sampled banks. The positive relationship between LA and ROE signifies that as Loans and Advances increase, ROE follows suit.

In addition, the coefficient of NPL is also statistically significant in explaining the variation in ROE at 5% and with a coefficient of -0.048. The study found that there is no linear relationship between NPL and ROE implying that there is a curve-linear relationship between the two variables; meaning that a per cent change in NPL leads to a -0.048% change in ROE and as the formerincreases, the latter decreases by 0.0048.

The coefficient of TA (0.7513) is statistically significant at 1%. The positive relationship between TA and ROE indicates a unidirectional movement such that as Total Assetsincreases ROE follows suit and vice-versa. Similarly, the coefficient of Equity Capital is also statistically significant at 1% with a coefficient of 0.371 signifying an increase in CAP of 0.371 to be associated witha 0.00371% increase in ROE.

Return on Equity

Table 1also shows the result generated from using the random effects estimator which describes the impact of credit management on ROA of DMBs in Nigeria. The presence of heterogeneity in the model also signals that the data cannot be pooled together. This therefore implies that the pooled OLS method is inappropriate for the model. The *Corr (u_i, Xb)* value of -0.3304 produced from the fixed effectsmodel also shows that there is a weak correlation with the explanatory variables. A weak correlation usually indicates that random effects model is the most appropriate for the ROA.Furthermore, the Hausman Chi-Square test gives a *p*-value of 0.07 implying that the probability value is not significant at 5%, hence random effects is the most efficient for this model. From the results presented in Table 1, the R^2 is 0.6449 implying that 64.49% of ROA is aggregately determined by the regressors.

The result from the random effects model revealed that the *Prob>Chi^2* gives a value of 0.0000 indicating that the model is statistically significant at 1%. The result also revealed that the coefficients of INTINC, NPL, LA, TA and CAP are statistically significant in explaining variations in ROA across the sampled banks. On the other hand, LLP is not statistically significant in explaining variation in bank performance as measured by ROA. The estimate of *Rho*gives a value of 0.3646 signifying that 36.46% of the variance is due to differences across DMBs.

Inferring from the result above, the coefficient of INTINC is statistically significant at 5% with a coefficient value of 6.0128. This implies that a percent change in Interest Income leads to 0.060128% increase in ROA of the sampled banks. The positive relationship between INTINC and ROA indicates that Interest Income has a positive impact on ROA. The coefficient of Loans and Advances is also statistically significant at

1%. This implies that a per cent change in Loans and Advances leads to 0.00228% change in ROA. The positive relationship between LA and ROA indicates that as Loans and Advances increase, ROA increases as well.

Similarly, the coefficient of NPL is also statistically significant in explaining variations in ROA at 5% with a coefficient of -0.0978. This shows that a per centincrease in NPL leads to a 0.0978% decrease in ROA.Conversely, the Coefficient of LLP is not statistically significant in explaining variation in ROA. Interestingly, the coefficient of TA is statistically significant at 1% and reported a coefficient of 9.9780. This implies that a per cent change in Total Assets leads to a 0.09978% increase in ROA across the sampled banks. The positive relationship between TA and ROA indicates that as Total Assets increases, ROA increases as well.Furthermore, the coefficient of Equity Capital is also positive and statistically significant at 1%.

Fig. 1: Graphical Representation of ROE and ROA

From Fig. 1 and taking into account ROE as a measure of performance, Access Bank reported the highest ROEfollowed by GTBank with Sterling Bank having the lowest.Similarly, Access Bank also reported the highest ROA with Sterling Bank ranking the lowest.
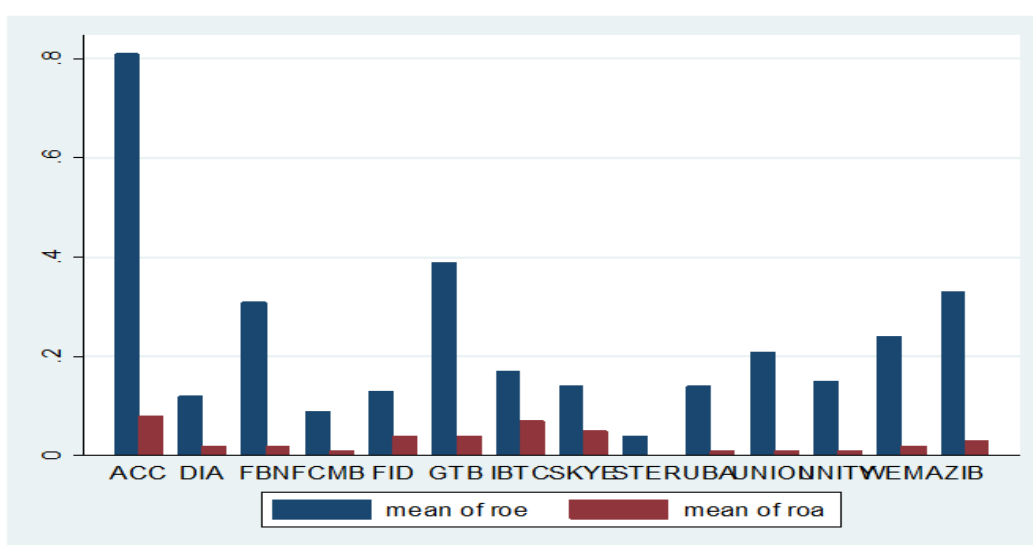
IV. Discussion of Findings

Overall, the findings revealed a significant positive influence of Interest Income, Loans and Advances, Total Assets and Equity Capital on bank performance as measured by ROE and ROA in Nigerian DMBs.However, the study discovered that Non-Performing Loans is negative and statistically significant in explaining variations in returns on owners' equity and the banks' total assets. The implications of these findings are two folds. First, increases in Interest Income, Loans and Advances, Total Assets and Equity Capital of the banks are beneficial to equity holders as these magnify their returns. Second, Non-Performing Loans are hitherto, detrimental to the wellbeing of the owners as the more loans go bad the less the returns both on shareholders' equity and the banks' total assets.

In the main, the results are consistent with conventional wisdom, the a-priori expectationand the Anticipated Income Theory which hypothesizes that if credit were adequately managed, interest income will be influenced, which will affect the investment opportunities and ultimately enhance performance of the banks. Furthermore, the findings are also in tandem with empirical documentations of Hosna et al. (2009), Afriyie and Akotey (2010), Kithinji (2010), Kargi (2011) and Ogboi and Unuafe (2013) who reportedsignificant influence of credit risk management on bank performance. This study is however not incongruence with the findings of Kurawa and Abubakar (2014) who concluded that the inconsistencies in theirfindingsmay be due to differences in case studies and sample sizes.

V. Conclusion

The general interest of stakeholders in the performance of banks in Nigeria can largely be attributed to the role they play in mobilizing deposits from the surplus sector and channeling same to the deficit sector. However, inefficient credit management poses a great danger to the liquidity position of a bank to create assets. Consequently,effective and efficient credit risk management have become more critical given the recurring incidences of bank distress and failure not only in Nigeria but across the globe. This study adds to the existing literature on the relationships among credit risk management indicators and bank performance. In the context of this study, sufficient evidences have emerged that credit risk management indicators impact significantly on the performance of Nigerian DMBs as measured by return on equity and return on assets.

VI. Recommendations and Policy Implications

The positive and significant impact of interest income, loans and advances, total assets and equity capital on ROE and ROAcalls on the DMBs to increase their size of operations in order to improve performance. The findings also suggest the need for the DMBs, Bankers' Committee, Central Bank of Nigeria (CBN), Nigeria Deposit Insurance Corporation (NDIC) and AMCON to re-examine the procedures for granting loans and advances so as to minimize the incidences of non-performing loans. In this direction, the study recommends the need for the DMBs to effectivelyavail themselves with the required credit information from theexisting credit bureaux in order to reduce the incidences thereof. Most importantly, access to these credit information should be made free to the DMBs. To this end, the CBN as a social institution and in its bid to ensure sound financial systemshould as a matter of urgency assume the responsibility of gathering and disseminating such vital information.

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