



# Strategic Effects of Credit Risk Management (CRM) On the Performance of Nigerian Deposit Money Banks

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## Abstract

The paper examined the effects of strategic credit risk management on the performance of selected Nigeria Deposit Money Banks. The specific objectives examined the type of credit risk management policies adopted by Nigeria Deposit Money Banks, evaluated the impact of asset quality management on the performance of Nigeria Deposit Money Banks and to analyzed the extent to which credit risk management policies influenced the performance of Nigeria Deposit Money Banks. Ten banks were sampled constituting 52% of the total population of the deposit taking banks in Nigeria as of February, 2018. Secondary data were used for the study and this was collected from the annual reports of the selected banks. Descriptive statistics such as frequency tables, percentages, standard, and deviation minimum and maximum were used to describe the data while data envelopment analysis and panel data regression with random and fixed effect analysis were used for major research questions and hypothesis. The results showed that asset quality management had an overall mean of 215.9678; standard deviations were 1663, minimum and maximum were 0.3868 and 12.888. The constant and coefficient are statistically significant confirmed by Prob.  $F = 0.0000$ . Asset quality management variables namely; return on average asset ( $p = 20304.15$ ;  $p < 0.05$ ), return on average asset ( $FJ = -1540.30$ ;  $p < 0.05$ ), operating profit margin ( $p = 858.77$ ;  $p < 0.05$ ), net R2 of 0.0742 and adjusted R2 of 0.0144, it indicated that the variables incorporated into the model are fit. It further showed the relationship with return on average asset ( $p = 1.1130$ ;  $p < 0.05$ ), return on average equity ( $p = -0.15000$ ;  $p < 0.05$ ), operating profit margin ( $P = -0.17288$ ;  $p < 0.05$ ) and net interest margin ( $P = -0.03556$ ;  $p < 0.05$ ). The table showed that credit risk management "had positive relationship with return on average asset (ROAA), return on average equity (ROAE), operating profit margin (OPM) and net interest margin (NIM) at 0.088, 0.270, 0.0174 and 0.887. Null hypothesis rejected and alternative accepted.

**Keywords:** Credit risk management; Banks performance; Financial risks; Pure risks; Credit creation.

## 1. Introduction

Financial institutions are established primarily to offer financial services to the public. It is an organization e.g. a bank or brokerage that offers financial services such as deposit taking, checking accounts, loans or various investment services. These institutions mobilize funds and allocate them to meet various sectoral demands. They are private (shareholder owned) or public (government owned) organizations that broadly speaking act as channel between savers and borrowers of funds (suppliers and consumers of capital). There are three main types of financial institution, there are deposit-taking institutions that accept and manage deposits and make loans, including banks, building societies, credit unions, trust companies and mortgage loans companies, insurance companies including pension funds and the brokers and underwriters (Wikipedia, 2010).

A bank is a depository financial institution, it is a person or firm entrusted with the responsibility of safekeeping of funds, securities, or other valuable assets or storage in which something is placed to be taken out later. A person shall be deemed to be receiving money as deposits if the person accepts deposits from the general public as a feature of its business or if it issues an advertisement or solicits for such deposit (Sofia, 1991). The role of banks in the development of an economy cannot be overemphasized. It is the bedrock of any economic growth and development.

Imala (2005) explained the roles of banks in promoting economic growth to include improving the efficiency of resource mobilization by pooling individual savings and increasing the proportion of societal resources devoted to interest yielding assets and long-term investments, which in turn facilitates economic growth, providing a more efficient allocation of savings into investment than the individual savers can accomplish on their own. This flow of savings into investment ensures that more goods and services can be provided thus increasing productivity and the nation's standard of living, reducing the risk faced by firms in their production process by providing liquidity and capital. It enables investors to improve their portfolio diversification by providing insurance and project monitoring, providing a veritable platform for an effective monetary policy implementation thereby enhancing the effective management of the economy. Facilitating a reliable payments system which provides support for the economy e.g.

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current accounts, deposit accounts, credit and electronic transfers, providing credit, the banking system provides credit to finance investment and consumption.

The financial services sector and the capital markets are no doubt strong forces for the sustainability of any economy. The size and reliability of these service infrastructures enhance trade and economic development activities and serve as both yardstick and instrument for investors. The banking industry is the most vibrant sector in the Nigerian economy; the shares of banks are the most traded in the Nigerian Stock Exchange, (Nnanna, 2004). The role of banks within the larger economy has expanded with technological advancement; the core traditional roles have not changed and still remain the bedrock of the banking system. Augusto (2004) enumerated the roles to include financial intermediation, payments and settlements, international trade transfers, and investment banking activities,

A bank with strong capital base has the ability to absorb losses arising from non-performing liabilities (Ajayi, 2005). Uchendu (2005) also explained that a banking crisis can be triggered by the preponderance of weak banks characterized by persistent liquidity, insolvency, undercapitalization, high level of non-performing loans and weak corporate governance among others. Obviously, it has been difficult for banks to function effectively and fully achieve the objectives for which they were established, reasons include mismanagement of assets, lack of adequate capital, inexperience personnel, lack of regulation or non-adherence to regulations and sharp practices by personnel with bad character and lack of integrity (Federal Ministry of Information, 2009).

Banks are facing difficulties ranging from financial risk to operational, business and event risks. Financial risk is made up of pure and speculative risks. Pure risks consist of liquidity, solvency and credit risks while speculative risks consist of market price, currency and interest rate risk (Greuning and Bratanovic, 2003).

One major source of income to the banks is credit creation. Credit is the provision of, or commitment to provide, funds or substitute for funds to a borrower, including off-balance sheet transactions, customers' lines of credit, overdrafts, bills purchased and discounted and finance leases. This is associated with a lot of credit risk. Credit risk is the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms, or the risk of credit loss that results from the failure of a borrower to honour the borrower's credit obligation to the financial institution. It means that payments may be delayed or the borrower may not pay both the capital and interest and this will create cash flow problems and affect the liquidity of the bank. This is a serious cause of bank failure and a major concern to most bank authorities.

Nigerian banks are not an exemption, situation arises when managing director had approved and disbursed loans even when board of directors declined it (Federal Ministry of Information, 2009). Many customers may fail to meet their obligations to repay the bank. Banks are also facing credit risk problem in the banks' funding, investment, and trading portfolios, where counterparties have repayment or other obligations to the bank.

Liquidity risk has to do with the ability of the bank to efficiently accommodate the redemption of deposits and other liabilities and cover funding increase in the loan and investment portfolio. A bank has adequate liquidity potential when it can obtain needed funds promptly and at a reasonable cost. Market risk is the risk that a bank may experience loss due to unfavorable movements in market prices, exposure to such risk may arise as a result of the bank taking deliberate speculative positions (proprietary trading) or may ensue from the bank's market-making (dealer) activities, it may result from changes in the prices of equity instruments, commodities, money, and currencies. Currency risk is as a result of changes in exchange rates between a bank's domestic currency and other currencies. It originates from mismatched and may cause a bank to experience losses as a result of adverse exchange rate movement during a period in which it has an open on-or off-balance-sheet position, either spot or forward, in an individual foreign currency.

Credit risk management is a structured approach to managing uncertainties through risk assessment, developing strategies to manage it, and mitigation of risk using managerial resources. The strategies include transferring to another party, avoiding the risk, /reducing the negative effects of the risk, and accepting some or all the consequence of a particular risk (Takang and Ntui, 2008).

### **1.1. Statement of the Problem**

The introduction of the consolidation programme by Central Bank of Nigeria (CBN) in 2004 was anchored on fragile nature of the banking industry, its boom and burst cycles, and imminent major banking crisis, and the need to reposition the industry to grow the domestic economy and become an active participant in the sub-regional and global financial systems. The completion of the exercise produced twenty four (24) banks then with a minimum capital of twenty five billion (N25 billions) naira and created the impression in the minds of depositors and investors that the sector was safer than ever. But, the nature of banking services is the one that exposed them to credit risks because over 85% of their liability is deposits from depositors.

Nigerian deposit taking banks depend largely for their income on interest earning from loans and advances. This reliance on interest income from loans is being jeopardized by the incidences of rising 'toxic' assets otherwise called non-performing loans. Incidences of rising 'toxic' assets invariably affect income generating ability of banks, survival and continual growth into future. The credit crises have also led to the dissolution of some banks' board of directors. These problems have also made the Central Bank of Nigeria to come to the rescue of five other banks. Four of the five rescued banks have so far been acquired by some other banks, therefore, reducing the number of deposit taking banks in Nigeria to twenty.

Credit risk is still the major single cause of bank failure. The reason is that more than 80 percent of a bank's financial statement generally relates to this aspect of risk management (Greuning and Bratanovic, 2003). Asset

quality management is an important issue because bank asset quality not only affects the financial and operating performance of the bank itself, but also further impinges on the soundness of the national financial system.

At the tail end of 2009, many bank employees were relieved of their jobs on the grounds that the affected banks could not cope with their wage bills. This situation therefore, calls for immediate attention to salvage our banking industry and restore confidence in the sector.

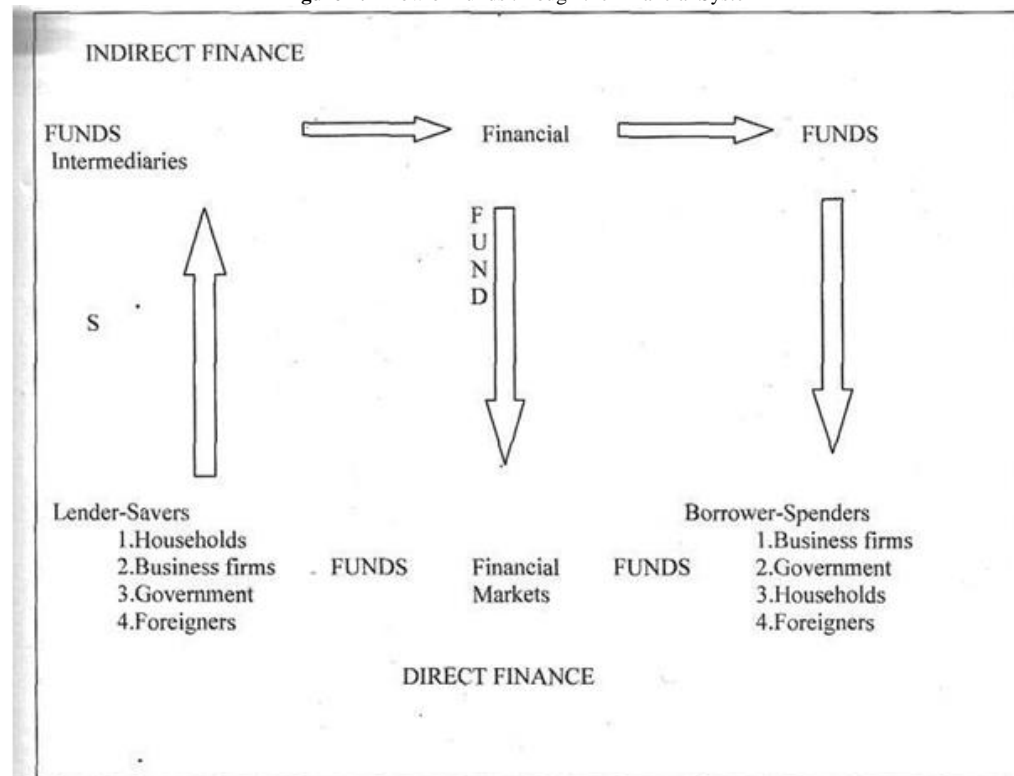
## 1.2. Conceptual Framework

Financial markets perform the essential economic function of channeling funds from households, firms, and governments that have saved surplus funds by spending less than their income to those that have shortage of funds because they wish to spend more than their income.

Those who have saved and are lending funds, the lender-savers, are at the left and those who must borrow funds to finance their spending, the borrower-spenders, are at the right. The principal lenders-savers are households, but business enterprises and the government (particularly State and Local Government), as well as foreigners and their government, sometimes also find themselves with excess funds and so lend them out. The most important borrower-spenders are businesses and the government (particularly the federal government), but households and foreigners also borrow to finance their purchases of cars, furniture, and houses. The arrows show that funds flow from lender-savers to borrower-spenders via two routes.

Mishkin (2007) went ahead to explain that in direct finance, borrowers borrow funds directly from lenders in financial markets by selling their securities (also called financial instruments), which are claims on the borrower's future income or assets, in indirect finance funds can move from lenders to borrowers through a financial intermediary that stands between the lenders-savers and the borrowers-spenders and helps to transfer funds from one to the other. This function is shown in figure 2.1

Figure-2.1 Flow of Funds through the Financial System



Source: Mishkin, F. S. 2007

A financial intermediary does this by borrowing funds from the lender-savers and then using these funds to make loans to borrower-spenders. The process of indirect finance using financial intermediaries, called financial intermediation, is the primary route for moving funds from lenders to borrowers. Financial intermediaries are so important in financial markets because of the roles they play in reducing transaction cost. They have developed expertise in lowering them since their large size allows them to take advantage of economies of scale. Another role played by the intermediaries is the risk sharing. They help to reduce risk exposure by the investor i.e. uncertainty about the returns investors will earn on assets. They create and sell assets with risk characteristics that people are comfortable with, and the intermediaries then use the funds they acquire by selling these assets to purchase other assets that may have far more risk. Low transaction costs allow financial intermediaries to share risk at low cost, enabling them to earn a profit on the spread between the returns they earn on risky assets and the payments they can make on the assets they have sold, this is also sometimes referred to as asset transformation.

Out of several theories adopted to examine the impact of credit risk management on performance of commercial banks in Nigeria, six theories are relevant. Five of these theories explained why financial intermediation (banking)

exist. These theories relate to: delegated monitoring, information production, liquidity transformation, consumption smoothing, and the role of banks as a commitment mechanism while the sixth is on portfolio theory.

### **1.3. Delegated Monitoring**

One of the theories put forward as an explanation for the existence of banking relates to the role of banks as 'monitors of borrowers'. Since monitoring credit risk is costly, it is efficient for surplus units (depositors) to delegate the task of monitoring to specialized agents such as banks. Casu (2006) explained Diamond's study which investigated -the determinants of delegation costs and develops a theoretical model in which a financial intermediary (typically a bank or an insurance company) has net cost savings relative to direct lending and borrowing. Diamond's approach was essentially developed around two interconnected factors:

- i. Diversification among different investment projects, this is crucial in explaining why there is a benefit from delegation monitoring to an intermediary that is not monitored by its depositors, and
- ii. The size of the delegated intermediary that can finance a large number of borrowers. Since usually diversification will increase the number of bank loans, larger delegated intermediaries will generate higher economies of scale in monitoring and this will allow for greater portfolio diversification than any individual lender could achieve. One issue that arises, however, relates to who is monitoring the monitor. Surplus units (depositors) can reduce monitoring expense if the costs of monitoring the intermediary are lower than the cost of surplus unit lending direct to borrowers and therefore directly incurring the monitoring cost. As a financial intermediary increases in size, it can commit to offer deposit facilities to surplus units only if the intermediary is undertaking the appropriate monitoring activity.

### **1.4. Information Production**

If information about possible investment opportunities is not free, then economic agents may find it worthwhile to produce such information. For instance, surplus units could incur substantial search costs if they were to seek unit borrowers directly. If there were no banks, then there would be duplication of information production costs as surplus units would individually incur considerable expense in seeking out the relevant information before they committed funds to a borrower. An alternative is to have a smaller number of specialist agents (banks) that choose to produce the same information. Banks have economies of scale and other expertise in processing information relating to deficit units - this information may be obtained upon first contact with dealings with the borrower. As banks build up this information (e.g. the knowledge of credit risk associated with different types of borrowers -customer relationships) they become experts in processing this information. As such they have an information advantage and depositors are willing to place funds with a bank knowing that these will be directed to the appropriate borrowers without the former having to incur information costs.

### **1.5. Liquidity Transformation**

Banks management provide financial or secondary claims to surplus units (depositors) that often have superior liquidity features compared to direct claims (like equity or bonds). Banks deposits can be viewed as contracts that offer high liquidity and low risk that are held on the liabilities side of bank's balance sheets. These are financed by relatively illiquid and higher risk assets (e.g. loans) on the assets side of the bank's balance sheet. It should be cleared that banks can hold liabilities and assets of different liquidity features on both sides of their balance sheet through diversification of their portfolios. In contrast, surplus units (depositors) hold relatively undiversified portfolios (e.g. deposits typically have the same liquidity and risk features). The better banks are diversifying their balance sheets, the less likely it is that they will default on meeting deposit obligations.

### **1.6. Consumption Smoothing Strategy**

The three aforementioned theories are usually cited as the main reason why financial intermediaries exist. However, recent studies have suggested that banks perform a major function as consumption smoothers. Namely, banks are institutions that enable economic agents to smooth consumption by offering insurance against shocks to a consumer's consumption path. The argument goes that economic agents have uncertain preferences about their expenditure and this creates a demand for liquid assets. Financial intermediaries

iii. Internal Rating at Banks - Over the years, banks have subdivided the pass/performing rating category, for example, at each time there is always a 'probability that some pass or performing loans will go into default, and that reserves should be held against such loans.

iv. Credit Scoring System - A credit score is a number that is based on a statistical analysis of a borrower's credit report, and is used to represent the credit worthiness of that person. A credit score is primarily based on credit report information. Lenders, such as banks use credit scores to evaluate the potential risk posed by giving loans to consumers and to mitigate losses due to bad debt, using credit scores, financial institutions determine who are the most qualified for a loans, at what rate of interest, and to what credit limits.

### **1.7. Risks and Distresses of Banks**

Olawoyin (2007) saw risk as a concept that denotes a potential negative impact to an asset or some characteristic of value that may arise from some present process or future events, and it is an indicator of threat. Sanusi (2007) also asserted that risk is the probability that outcomes vary from our expectations: it is the threat or possibility that an action or event will adversely or beneficially affect an organization's ability to achieve its objectives.



ADB Institute (2010) stressed that risk-return profile may indicate the financial distress risk of a bank or the probability of a bank under financial distress. Financial distress generally means that a bank cannot pay off, or has difficulty in paying off, its financial obligations, which can be equivalent to economic insolvency (i.e. the loss exceeds the equity capital). Thus, the financial distress risk can be defined as the likelihood of event that a bank loss exceeds its total capital. De Young *et al.* (2001) explained that banks with strong intrinsic safety and soundness generally take on risk prudently. They usually earn high expected returns for the risk they assume and thereby have low probability of experiencing financial distress and a high probability of recovering from adverse exogenous circumstances. Banks' ability to create liquidity may be hampered during times of distress. This is a primary source of concern because bank, distress can negatively affect the overall provision of liquidity to the real economy.

Allen, Christia, Thomas and Klauss (2010) said that distress bank may be subjected to different types of interventions. While regular primary focus on reducing the risk at such bank in order to preserve them as going concern, their action may affect bank liquidity creation as well. They went further that poorly capitalized institutions, institutions with low return on equity, and institutions with high levels of nonperforming loans are more likely to be subjected to regulatory intervention and capital injection, and that distress awareness is a strong predictor for regulatory intervention but not for capital injection,

Risk can be diversifiable or non-diversifiable. Diversifiable risk is the one that can be eliminated by diversification; this is also known as unsystematic risk. On the other hand, non-diversifiable, systematic or market risk is the one that cannot be eliminated by diversification. It is the variability in all risky assets resulting from macroeconomic variables. It changes over time with changes in the macroeconomic variables (Sanusi, 2007).

### **1.8. Strategic Credit Risk Management Policies**

Regulator authorities have prescribed minimum standards for credit risk management. These measures include clearly defined policies that express the bank's credit risk management philosophy and the parameters within which credit risk is to be controlled. The policy measures include: limit or reduce credit risk, asset classification, and loan loss provisioning.

Policy to limit or reduce credit risk:

Futures and Options Association (2002) explained that the Board of Directors (or its equivalent) of an organization should devise a credit risk policy (including criteria governing the allocation of credit limits) and a strategy which is constituted with the commercial policy and objectives, the financial position, the risk appetite and the levels of expertise of the organization, ensure that there is an adequate framework of systems and controls in place to give effect to that policy, and ensure that the senior managers appointed to the task of establishing, overseeing and operating within that framework of systems and controls have appropriate qualities and expertise to carry out that task. The fact that credit risk is the most common cause of bank failures has made regulatory authorities to prescribe minimum standards for credit risk management. Loan loss Provisioning:

Sarawan *et al.* (2009) explained that loan loss provisions have traditionally been backward - looking. That is, they have tended to be low ahead of banking crises, and to rise sharply as losses mount. In response to the latest crisis, national and international authorities are considering measures to promote more forward looking provisioning practices that would result in banks entering periods characterized by deterioration in credit quality with higher levels of reserves. As loan loss materialize, the already higher level of reserve would reduce the downward pressure on bank earnings and capital that would otherwise occur, in making loans, banks face the risk that borrowers will default and the full amount of the loan will not be recovered. When a loan loss becomes likely, a bank will make a charge to the profit and loss statement ("provision") to create a loan loss reserve that is shown on the balance sheet. When the full amount of principal and interest on the loan becomes uncollectible, the loan balance is reduced through a charge to the loan loss reserve. Mitchell and Giovanni (2001) explained that banks' loan loss provision has attracted considerably less attention than that of banks' minimum -capital. They claimed that the difficulty faced by the regulation of banks' provisioning practices - and therefore its delayed formulation - lies in the presence of agency problems of difficult solution between different classes of banks' shareholders such as banks' "outsiders" (minority shareholders or the fiscal authority) and banks' "Insiders" (bank managers and majority shareholders).

Danvee (2010) explained that research on the determinants of loan loss provisioning mainly takes into account two different behavioural components merging from different perspectives. The accounting and banking literature distinguishes these two as the non-discretionary and the discretionary components. The non-discretionary component is more closely linked to the concept of credit risk, wherein banks set aside loan loss provisions according to the underlying quality of their loan portfolio. The decision to set aside provisions depend on certain credit risk considerations: default risk, risk tolerance, and the macroeconomic environment (economic activity and monetary policy, for example), among others. In most countries, provisions are set up between the specific and general provisions, where the former represents identified loss in individually assessed loans, or the amount of defaulted loans, while the latter is made against a portfolio of loans, and the computation of which varies significantly across countries.

### **1.9. Credit Risk Model**

Quite a number of models have been developed for proper management of credit risks. The models are used to assist banks to evaluate their risk exposures, assess their performance, portfolio management and decision making. Credit risk modeling is a potent tool which is employed for proper internal risk management and control. Basel Committee (1999) explained that over the last decade, a number of the world's largest banks have developed sophisticated systems in an attempt to model the credit risk arising from important aspect of their business lines.

Such models are intended to aid banks in quantifying, aggregating and managing risk across geographical and product lines. [Saunders and Cornett \(2007\)](#) explained that credit scoring models use data on observed borrower characteristics to calculate the probability of default or to group borrowers into different default risk classes.

Authors have developed various credit risk scoring models, prominent among these is the [Altman and Hotchkiss \(2005\)](#) with the form:

$$Z = 6.56x_1 + 3.26x_2 + 6.72x_3 + 1.05x_4 \text{ where:}$$

$X_1$  = working capital/total assets;

$X_2$  = retained earnings/total assets;

$X_3$  = EBIT/total assets;

$X_4$  = book value equity/total assets.

[Altman and Sabato \(2005\)](#) explained that the higher the value of Z, the lower the borrower's default risk, any firm with Z - score less than 1.81 should be considered a high default risk, and between 1.81 - 2.99 an indeterminate default risk, and greater than 2.99 a low default risk. This model was criticized on the premise that it only discriminates among three borrower behavior i.e. high, indeterminate and low default risk, and that there is no obvious economic reason that the weight in the Z - score model or, more generally, the weight in any credit scoring model will be constant over any but short periods. Furthermore, is the problem that this model ignores important, hard to quantify factors (such as macroeconomic factors) that may play a crucial role in the default or non-default decision.

[Altman and Al-Mazrooei \(2007\)](#) study on "banks risk management: comparison study of UAE national and foreign banks". The study discovered three most important risks facing UAE commercial banks which were foreign exchange risk, credit risk and operational risk. UAE commercial banks suffer from loan default in assessing, monitoring and identification of credit risk and the significant statistical differences between UAE national and foreign banks. [Iwedi and Onuegbu \(2014\)](#) studied "credit risk and performance of selected deposit money banks in Nigeria: an empirical investigation", using five banks, concluded that banks with good or sound credit risk policies had lower default ratio (bad loan) and higher interest income (profitability). Banks with higher profits potentials can better absorb credit losses whenever they crop up and therefore record better performance as this is the case of the banks under study.

[Hamisu \(2011\)](#) wrote on credit risk and performance of Nigerian banks. Six banks were sampled, it was concluded that banks' profitability was inversely influenced by the levels of loans and advances, non-performing loans and deposits thereby exposing them to great risk of illiquidity and distress. Therefore, management need to be cautious in setting up a credit policy that will not negatively affect profitability and also they need to know how credit policy affects the operation of their banks to ensure judicious utilization of deposits and maximization of profit, improper credit risk management reduced the bank profitability, affects the quality of its assets and increase loan losses and non-performing loan which may eventually lead to financial distress.

[Kolapo et al. \(2012\)](#) wrote on the empirical investigation into the quantitative effect of credit risk on the performance of commercial banks in Nigeria using panel data analysis to estimate the determinants of the profit function, concluded that the effect of credit risk on bank performance was cross-sectional invariant, that is, the effect was similar across banks in Nigeria suggesting that banks in Nigeria should enhance their capacity in credit analysis and loan administration. [Kithinji \(2010\)](#) examined the effect of credit risk management on the profitability of commercial banks in Kenya between 2004 and 2008. The study showed that the bulk of the profits of the commercial banks were not influenced by the amount of credit and non-performing loans and that other variable other than credit and non-performing loans impacted on profits.

[Idowu and Awoyemi \(2014\)](#) studied the impact of credit risk management on the commercial banks performance in Nigeria between 2005 and 2011 sampling seven banks. It was concluded that the sampled banks had poor credit risk management practices, hence the high level of non-performing loans in their loan portfolios. Despite the high levels of non-performing loans, their profit levels kept rising as an indication of the transfer of the loan losses to other customers in the form of large interest margin. [Indiael and Dickson \(2013\)](#) focused on "credit risk and commercial banks performance in Tanzania: a panel data analysis". They reported that increase in credit risk tends to lower firms' performance; both indicators had produced the negative coefficients which tend to lower profit level. Credit risk is not a bad situation as it is related to bank return, from empirical theory, it has been stated, that the higher the risk the higher the bank return due to the banks' ability to increase portfolio, but the banks need to balance and for see the return. With this, the banks need to maintain substantial amount of capital reserve to absorb credit risk in event of failure, moreover, the bank need to enhance lending criteria, portfolio grading and credit mitigation techniques to reduce chance of default. [Ahmad and Arif \(2007\)](#) assessed the key determinants of credit risk of commercial banks on emerging economy banking systems compared with the developed economies. The study showed that credit risk in emerging banks was higher than in developed economies. [Abdullahi \(2013\)](#) examined the "efficacy of credit risk management on the performance of banks in Nigeria: a study of Union bank pic 2006 - 2010, He explained that there was a significant relationship between bank performance (in terms of profitability) and credit risk management (in terms of loan performance). He concluded that better credit risk management resulted in better bank performance. Thus, it is of crucial importance that banks practice prudent credit risk management and safeguarding the assets of the banks and protect the investors' interest.

### 1.10. Objectives of the Study

The general objective of this study is to examine the effects of credit risk management on bank performance. The following specific-objectives:

- i. Examined the type of credit risk management policies adopted by Nigeria Deposit Money Banks.

ii. evaluated the impact of asset quality management on the operational performance of Nigeria Deposit Money Banks.

Analysed the extent to which credit risk management influence the performance of a typical Nigerian commercial bank.

### 1.11. Research Hypotheses

i. The following null hypotheses were formulated and tested in this study:

ii. H01: There is no relationship between credit risk management and bank performance in Nigeria Deposit Money Banks.

H02: There is no relationship between asset quality management practices and bank performance in Nigeria Deposit money Banks.

### 1.12. Population and Study Sample

Twenty four banks emerged from the consolidation exercise which commenced on July 6, 2004 and completed on December 31, 2005. As of February 2018, the Central Bank of Nigeria's reform agenda had increased the number of the banks to twenty eight. Ten banks were selected for the purpose of this study which constituted 50 percent of the entire population of deposit taking banks. The 50 percent was in line with previous studies on bank performance by Hamisu (2011). The banks are arranged in alphabetical order and are assigned numbers from 1-10.

**Table-3.2.** Arrangement of Selected Banks by Numbers

1	Access Bank Plc
2	Diamond Bank Plc
3	Ecobank Nigeria Plc
4	First Bank Nigeria Plc
5	First City Monument Bank Plc
6	Guaranty Trust Bank Plc
7	Sterling Bank Plc
8	Union Bank of Nigeria Plc
9	Unity Bank Plc
10	Zenith Bank Plc

Source: CBN (2018)

## 2. Methodology

Two sets of data were collected from each of the sampled banks i.e. primary and secondary data. Primary Data are data collected specifically for the research project being undertaken. Therefore, questionnaires were used to collect data on credit risk management policies adopted by commercial banks in Nigerian. As a result of the inability to determine the total population of the staff in the sampled banks, sixty respondents were randomly selected from each bank and a total number of six hundred questionnaires were distributed. Four hundred and sixty one respondents actually filled and returned the questionnaires. Secondary data on the other hand are data that have already been collected for some other purposes, they include both raw data and published summaries which are collected and stored by most organizations to support their operations. In view of this, data were collected on asset quality management credit risk management policies and performance of the selected banks through the use of financial statements over the period of 2006 and 2011.

The study employed the use of descriptive statistics such as frequency tables, standard deviation, minimum, maximum and percentages to describe the data. Ratios and inferential statistics such as simple regression through R-Studio were used to analyze data generated for research questions 2 and 3 and hypothesis 1 and 2. This was informed by the need to determine the effects of credit risk management on bank performance. The selection of these tools was based on their abilities to assess the strength of relationship between one dependent and one independent variable and to test whether two variables are associated. The DBA is a non-parametric performance measurement tool that can be used for analysis and decision making on bank performance. It sorts banks according to their performances and also provides much more information that cannot be investigated with other methods, (Mehrnert and Suleyman, 2010).

The independent variables in this study are asset quality management and credit risk management policy. Asset quality management relates to the quality of the loan portfolios and the credit administration programme. This is measured using the ratio of loss provisioning to total loans, loss provisioning to non-performing loans, non-performing loans to total loans and overdue loans to total loans. Credit risk management on the other hand examined roles and responsibilities, acceptable practices, limits and treatment of exceptions, methodologies, reports and control that exist for managing credit. This is measured through the ratio of total loan to total assets, total performing loan to total assets, loss provisioning to non-performing loan and total loan to net interest income.

The dependent variable is the performance of the banks. This performance is measured using the Return on Average Assets (ROAA), Return on Average Equity (ROAB), Operating Profit margin (OPM) and Net interest Margin (NIM).

### 2.1. Models and Model Specification

Three sets of working models were specified for this study. These models related bank credit risk, performance and vulnerability of return to selected parameters of bank asset quality. Model 1 tested the relationship between asset

quality and operational performance and provides solution, to research question ii, while model II determined the relationship between credit risk, management and bank performance and provided solution to research question iii. Model III- determined the relationship between asset quality management, credit risk management and bank performance and it is to provide a clear relationship between the dependent and independent variables. The models are:

**Model I;**

$Y = f(x)$

Y = Dependent Variable

X = Independent Variable

Therefore,

$P(\text{ROAA, ROAE, OPM, NIM}) = f(a + \beta_1 \text{LP/TL} + \beta_2 \text{LP/NP} + \beta_3 \text{NP/TL} + \beta_4 \text{OL/TL})$

Where:

a = Regression Coefficient

$\beta$  = Coefficient of Independent Variables

P - Performance (Profitability)

ROAA = Return on Average Asset

ROAE = Return on Average Equity

OPM = Operating Profit Margin

NIM = Net Interest Income

LP/TL = Loss Provisioning to Total Asset

LP/NP = Loss Provisioning to Non-performing Loan

NP/TL = Non-performing Loan to Total Loan

OL/TL - Overdue Loan to Total Loan

e - Error Term

**Model II:**

$Y = f(x)$

Y = Dependent Variable

X = Independent Variable

Therefore,

$P(\text{ROAA, ROAE, OPM, NIM}) = f(a + \beta_1 \text{TL/TA} + \beta_2 \text{TPL/TA} + \beta_3 \text{LP/KP} + \beta_4 \text{TL/NII} + e)$

Where:

a - Regression Coefficient

$\beta$  = Coefficient of Independent Variables

P = Performance (Profitability)

TL/TA = Total Loans to Total Asset

TPL/TA = Total Performing Loans to Total Assets

LP/NP = Loss Provisioning to Non-performing Loans

TL/NII = Total Loans to Net Interest Income

e = Error Term

ROAA, ROAE, OPM and NIM are as earlier defined.

Model 111: Data Envelopment Analysis (DEA)

The DEA approach assumes that there are data on K inputs and M outputs on each of N banks or decision making unit (DMU). For i-th DMU these are represented by the vectors  $x_i$  and  $y_i$  respectively. The  $K \times N$  inputs matrix, X, and the  $M \times N$  output matrix, Y, represent the data of all N DMUs. For each DMU we obtain a measure of the ratio of all outputs over all inputs, such as  $u'y_i/v'x_i$ , where u is an  $M \times 1$  vector of output weights and v is a  $K \times 1$  vector of input weight. To select optimal weights, we specify the mathematical programming problem:  $\max u'y_i/v'x_i$

st  $u'y_j/v'x_j \leq 1, j = 1, 2, \dots, N$

$u, v > 0$ . Where:

X =  $K \times N$  input matrix Y =  $M \times N$  output matrix  $u'y_i/v'x_i$  = ratio of all outputs over all inputs u =  $M \times 1$  vector of output weight v =  $K \times 1$  vector of input weight

Find values for u and v, such that the efficiency measures of the i-th DMU is maximized. Subject to the constraint that all efficiency measures must be less than or equal to one. The panel data, DBA and the Malmquist index was used to measure performance change, and to decompose this performance change into technical change and technical efficiency change. Fare *et al.* (1994) specified an output-based Malmquist performance change index as:

$M_o(y_{t+1}, x_{t+1}, y_t, x_t) = [d_o^t(x_t, y_t) / d_o^{t+1}(x_{t+1}, y_{t+1})]^{1/2}$

This represents the performance of the bank  $(x_{t+1}, y_{t+1})$  relative to the production point  $(x_t, y_t)$ . A value greater than one indicates positive technical efficiency growth (TFP) from period t to t+1. A major advantage of this method is the ability to measure each bank on yearly basis. The fixed effect and random effect were used with the panel data regression. The fixed effect involves relatively straight forward extension of multiple regressions, it allows for the control for unobserved factors. Fixed-Effect Regression Model:

$y_{it} = \alpha + \beta X_{it} + u_i + v_t$ ,  $i = 1, \dots, N$ ,  $t = 1, \dots, T$ , with the identifying condition  $\sum u_i = 0$  and the individual fixed -effects (FE) regression model,  $(v_t)$  fulfills the usual conditions on errors: independent,  $E v_t = 0$ ,  $\text{var } v_t$



$= a_v^2$ . The random effect states that there is an individual effect, but the effect may reflect omitted variables which are not fixed. The model is stated below:

$y_{it} = a + \rho X_{it} + u_{it}$ ,  $u_{it} = f_{it} + v_{it}$ ,  $f_{it} \sim N(0, \sigma_f^2)$ ,  $v_{it} \sim N(0, \sigma_v^2)$ , for  $i = 1, \dots, N$ , and  $t = 1, \dots, T$ .  $a$  and  $v$  are mutually independent.

### 3. Analysis and Discussion

The fixed-effect regression of impacts of asset quality management practices on the performance of commercial banks in Nigeria is shown on [table 4.12](#). This further tests the null hypothesis 1. At the coefficient levels, the table shows that a unit increase in asset quality management increased return on average asset and operating profit margin by 2.0 and 8.5 units respectively while a unit increase in asset quality management reduced return on average equity and net interest margin by 1.5 and 3.0 units respectively with  $R^2$  0.7803 and adj.  $R^2$  0.5758, this signified that the variables incorporated into the model are fit.

The fixed-effect regression showed a significant relationship with return on average asset (ROAA), return on average equity (ROAE) and operating profit margin (OPM) at 0.000, 0.000 and 0.009 respectively with  $P < .1$  and  $F = 40.83$ . The constant and coefficient are statistically significant confirmed by Prob.  $F = 0.0000$ . Asset quality management variables namely; return on average asset ( $p = 20304.15$ ;  $p < 0.05$ ), return on average equity ( $FJ = -1540.30$ ;  $p < 0.05$ ), operating profit margin ( $p = 858.77$ ;  $p < 0.05$ ), net interest margin ( $P = -304.79$ ;  $p < 0.05$ ) were significant predictors of performance of banks. However, the negative value of return on average equity ( $p = -1540.30$ ) and net interest margin ( $p = -304.79$ ) indicated negative relationship.

This indicates that both the GLS and the fixed-effect regression showed that there is a significant relationship between asset quality management practices and bank performance. It revealed that as asset quality improves there will be a corresponding increase in bank performance and hence banks should strive to as much as possible to reduce the level of toxic or non-performing assets to barest minimum. This is in consonant with the studies by [Takang and Ntui \(2008\)](#), [Hamisu \(2011\)](#), [David and Vlad \(2002\)](#). The null hypothesis is therefore rejected.

**Table-4.12.** Fixed - Effect Regression of Asset Quality Management Practices on Bank Performance

Fixed-effects (within) regression Group variable:

bank R-sq: within 0.7803 between = 0.4273

• avg. overall = 0.5758

max F(4,46)

- 40.83 corr.( $u_i, X_b$ ) = -0.6161

Number of obs. = 60 Number of groups = 10 Obs. per group; min = 6 = 6.0 = 6

Prob. > F = 0.0000

Aqm	Coef.	Std. Err.	t	P>	t	[95% Conf. Interval
roaa	20304.15	1615371	12.57	0.000	17052.57	23555.72
roae	-1540.301	339.5432	-4.54	0.000	-2223.766	856.8359
Opm 858.7712		316.6213	2.71	0.009	221.4456	1496.097
Nim	-304.7928	627.3483	-0.49	0.629	-1567.579	957.9939

Cons-1325.295 363.5119 111.343 0.001-2057.006 -593.5834

Sigma\_u| 1077.0799

sigma\_e| 813.07832

rho. 63699908 (fraction of variance due to  $u_i$ ) (significant at 0.05)

**Source:** Fixed effect result of asset quality management

#### 3.1. GLS Estimator of Impact of Credit Risk Management on Bank Performance

The Generalized Least Square estimator of the impacts of credit risk management on the performance of commercial banks in Nigeria is shown on [Table 4.13](#). It was used to test the null hypothesis two ( $H_{02}$ ) which states that "there is no significant relationship between credit risk management and the performance of Nigerian commercial banks".

The table showed that a unit increase in credit risk management reduced return on average asset, return on average equity, operating profit margin and net interest margin by 8.15, 1.01, 0.8 and 0.3 respectively. Given the coefficient of determination  $R^2$  of 0.0688, it indicated that the independent variables in the model determined the variation of crmp to 6% and the prob.  $\chi^2$  is 0.7229. The analysis showed that there is a productivity decline that is a negative relationship between credit risk management (CRMP) and return on average asset (ROAA), return on average equity (ROAE), operating profit margin (OPM.) and net interest margin (MM) at 0.174, 0.426, 0.421 and 0.901 respectively with  $P > .1$ .

The implication of this is that the type of credit risk management policy adopted by a bank within the sample is not significant with performance; rather, what matters is proper implementation of whatever policies that are formulated. The GLS therefore upheld the null hypothesis two.

**Table-4.13.** GLS Estimator of Impact of Credit Risk Management Policies on Bank Performance

Random-effects GLS regression

Group variable: bank

R-sq: within -0.0688

between = 0.0933

overall = 0.0123

Random effects  $u_i \sim \text{Gaussian}$  $\text{Corr}(u_j, X) = 0$  (assumed) Prob.> chi2

Number of obs. = 60 Number of groups = 10 Obs. per group: min = 6 max = 6.0

Waldchi2(4) - 2.07 = 0.7229

Var. Crmp. Coeff. Std Err. Pr. &gt; |t| [95% Conf. Interval]

<b>RoA</b>	<b>-.8151757</b>	<b>.6001888</b>	<b>1.36</b>	<b>0.174</b>	<b>-.3611728</b>	<b>1.991524</b>
Roe	-.1016487	.1276962	-0.80	0.426	-.3519287	.1486313
opm 1	-.0839867	.1043643	0.80	0.421	-.1205635	.288537
nim 1	-.0302943	.2430647	-0.12	0.901	-.5066924	.4461039

Cons1.068741 .1887425.66 0.000 .698813 .438669

sigma u| .46140945

SigmaTel.32143895 rho j.6732577 (fraction of variance due to  $u_i$ )**Source:** GLS and random effect results of credit risk management policies

### 3.2. Fixed-Effect Regression of the Impact of Credit Risk Management On Bank Performance

Table 4.14 showed the fixed-effect regression of the impact of credit risk management policies on the performance of Nigerian commercial banks. This also tested the null hypothesis two (Ho2) which states that "there is no significant relationship between credit risk management and the performance of Nigeria Deposit Money Banks".

The table showed that a unit increase in credit risk management increased return on average asset by 1.1 unit while a unit increase in credit risk management reduced return on average equity, operating profit margin and net interest margin by 1.5, 1.7 and 0.3 units respectively with  $R^2$  of 0.0742 and adjusted  $R^2$  of 0.0144, it indicated that the variables incorporated into the model are fit. It further showed the relationship with return on average asset ( $p = 1.113013$ ;  $p < 0.05$ ), return on average equity ( $p = -0.1500022$ ;  $p < 0.05$ ), operating profit margin ( $p = -0.1728821$ ;  $p < 0.05$ ) and net interest margin ( $p = -0.0355555$ ;  $p < 0.05$ ). The table showed that credit risk management "had negative relationship with return on average asset (ROAA), return on average equity (ROAE), operating profit margin (OPM) and net interest margin (NIM) at 0.088, 0.270, 0.0174 and 0.887 with  $P > .1$  confirmed by F - 0.92

The fixed-effect regression like the GLS estimator also upheld the null hypothesis two and hence there is no significant relationship between credit risk management and the performance of Nigerian commercial banks.

**Table-4.14.** Fixed Effects Regression of the Impact of Credit Risk Management on Banks Performance

Fixed-effects (within) regression Group variable: bank R-sq: within -0.0742 between = 0.0798 overall = 0.0144

corr(uj, Xb) - -0.5275

F(4,46)

Number of obs.— 60 Number of groups = 10 Obs. per group: min = 6 avg. = 6.0 Max. = 6 = 0.92

Prob.&gt; F = 0.0005

Var. Crmp. Coef. Std. Err. P&gt;|t| [95% Conf. Interval]

<b>roaa</b>	<b>1.113013</b>	<b>.6386141</b>	<b>1.74</b>	<b>0.088</b>	<b>-.1724503</b>	<b>2.398477</b>
roae	-.1500022	.1342336	-1.12	0.270	-.4202004	.1201959
opm	-.1728821	.1251717	1.38	0.174	-.0790755	.4248398
nim	-.0355555	.2480332	-0.14	0.887	-.5347802	.4636693

Cons.972073814370936.76 0.000.682802261346

sigma u|.46257528

sigma\_e|.32143895 rho .67436697 (fraction of variance due to  $u_i$ )(significant at 0.05)**Source:** Author's Computation (2018)

## 4. Conclusions and Recommendations

The results showed that asset quality management had an overall mean of 215.9678; standard deviations were 1663, minimum and maximum were 0.3868 and 12.888. These values

Increasing productivity growth in efficiency change (Eff.ch), 60 percent in technological change and 50 percent in total performance change (productivity index equaled to 1). The GLS and fixed effect regression analysis showed a significant relationship between asset quality management and bank performance with  $P < .1$  and no significant relationship between credit risk management policy and bank performance with  $P > .1$ . It was concluded that proper policy implementation is as important as the policy itself, [Mehmet and Suleyman \(2010\)](#) and [Hamisu \(2011\)](#). Arising from the study and subsequent results, this study recommends that Access bank and 'Diamond should find out factors responsible for their low assets quality and take appropriate actions to rectify it. Since credit risk management policies were generally weak. The banks should find out factors responsible for this and re-examine the implementation and control with a view to make necessary adjustments to improve then-productivity. The banks

granted credit facilities to customers that have operated accounts with them for less than six months, this therefore calls for some restraints to allow the banks to really study and understand their customers.

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