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Loan Risk (LR), Loan Risk Management (LRM) and Commercial Bank Profitability: A Panel Analysis of Nigerian Banks

Ogbuagu, Uchechi Rex[1], Udoh, Elijah[2], Udoh, Fond M[3]
[1](Department of Economics, University of Calabar, PMB 1115, Calabar, Nigeria)
[2](Department of Economics, University of Calabar, PMB 1115, Calabar, Nigeria)
[3](Department of Economics, University of Calabar, PMB 1115, Calabar, Nigeria)

Abstract: *The study aimed at examining the risk management strategies of Nigerian commercial banks, components of effective loan management system and the effects of loan risk management (LRM) on profitability of commercial banks in Nigeria. Data were drawn from annual reports of fifteen banks, the Central Bank of Nigeria statistical bulletin and the Nigerian Stock Exchange. Based on standard econometric techniques of balanced panel regression, the result showed that; loan risk and loan risk management have a high causality and significant relationship with parameters of bank profitability. Similarly, increase in Default Rate (DR), Capital Adequacy Ratio (CAR) and Cost per Loan Asset (CLA) increases Loan Risk. The study recommends that bank should adopt different strategies of loan risk for effective LRM and increased profitability.*
Keywords: *Bank, Profitability, Loan Risk, Loan Risk Management, Nigeria*.

I. Introduction

With the advent of globalization, technology transfers, financial services, deposit taking, currency exchange and money transfer, commercial banks act as brokers between supply and demand of financial securities as well as transform short-term deposits into medium-term and long-term credit [1]. Financial institutions have the capacity to market knowledge in funding and efficient financial transactions [2]. Specifically, in today's world commercial banks render services in the areas of credit, remittance, salaries, bill payments, overdrafts, loans and advances, overnight transfers and advisory services. In many countries commercial banks constitute the core of the economy's financial system. Banks have a main role as a financial intermediary that maintains a steady flow of funds from savers to borrowers [1]. [3] is of the opinion that the intermediation role of commercial banks is catalytic to economic growth. This role of banks is however not without risks. In the words of [2] "commercial banks are in the risk business". [4]defines risk as the possibility that the outcome of an action or event could bring adverse impacts on banks' capital, earnings or its sustainability. Like many other firms, banks are exposed to a number of risks: operational risks, market risks, liquidity risks, interest rate risks, international shocks, strategic risks, reputational risks, supply and demand problems and environmental risks. Typical of a bank however, are the financial risks [1]. According to [5]:
In unstable economic environments interest rates charged by banks are fast overtaken by inflation and borrowers find it difficult to repay loans as real income fall, insider loans increase and over concentration in certain portfolios increases given a rise to credit risk.

Loan risk is the risk of loss due to non-payment of a loan. Among all the risks experienced by banks, risk attached to loans play a dominant role on banks' profitability since a large part of the revenue accrues from loans from which interest as profit is derived [3]. This risk normally gives rise to foreclosures in many banks and sometimes leads to financial crisis which culminate in non-performance of the capital markets especially when the percentage of default loans is at par or greater than the assets of majority of banks within an economy. Bank foreclosures occurred in countries like; Mexico, Venezuela, Span, Kenya, United Kingdom and Norway. One of the main causes of these foreclosures has been attributed to credit risk mismanagement "typified by high levels of insider loans, speculative lending and other high concentration of credit in certain sectors among other issues" which gives rise to low net interest margins and poor bank profitability [5].

Between 2004 and 2005, commercial banks in Nigeria experienced a host of foreclosures resulting to reduced number of banks from eighty nine (89) to twenty four (24). This marks the era of; "Nigerian banking crisis". According to [6] report, Nigerian banks experienced historic retrogressive trends in both capitalization and profitability; the year witnessed only 3 out of the 24 banks declaring profit; 8 banks were reported to be in grave situation due to capital inadequacy and risk asset depletion; the Nigerian capital market slumped by about 70 percent and most banks were forced to recapitalize to meet the CBN regulatory directive [7]. This situation was aggravated by the failure of financial institutions to implement an effective credit management framework.
One of the strategies for minimizing loan risk is loan risk management (LRM). LRM refers to the various activities that integrate recognition of risks, risk assessment and various strategies and managerial resources utilized in its management [8]. It is a process that involves appropriate identification of potential risks associated

with loans, measurement of these risks and the actual implementation of loan risk models. It is considered by researchers as the yardstick for determining failure or success of any financial institution especially commercial banks [7]. Over the years it has become an 'integral part of the loan process [8]and if effectively utilized can reduce the rate of default thereby shielding the particular financial institution from adverse effects of loan default. Furthermore, the effective management of these risks is significant in that it increases the earning ability of a bank and reduces the risks of banks becoming insolvent and shareholders not being properly rewarded. More so, depositors are not refunded. However, failure to adequately manage risks exposes financial institutions to low profitability, increases interest rates, leads to economic slowdowns and ultimately cause such institutions to be unsuccessful in achieving their strategic business goals and may as well lead to foreclosure [9].

Based on the foregoing, this paper intends to investigate empirically the impact of loan risk and loan risk management on commercial banks' profitability in Nigeria. Specifically, the objectives are: to establish the causes of loan risks, impact of loan risks on profitability, impact of loan risk management on loan risk and profitability and finally how it can be managed to improve bank profitability. Studies have been undertaken on Analysis of Credit Risk Management efficiency of Nigerian commercial banking sector 2004-2009 [10] as well as; credit risk and commercial bank's performance in Nigeria by [3]. Although there are a couple of in-depth studies on the impact of loan risks and loan risk management on commercial bank profitability in Nigeria; economists and risk management experts agree that the best approach to LRM is yet to be established. It is in this regard that this study focuses add to the body of empirical works by incorporating the ratio of total loan to total assets as an additional measure of loan risk. It is expected that this work would help risk managers understand risks better; mitigate risks associated with their operations, provide productive observations for understanding risk management practices and hence improve profitability of their various institutions as they strive to tackle loan recovery problem and tighten their credit assessment policy. Furthermore, the study provides an indication as well as a guide for further studies. Thus, this empirical evidence is of great interest both for application and for scientific research. The remainder of this paper will be organized as follows: section two reviews literature associated with the constructs, section three focuses on the research methodology, section four presents results and implications and sections five provides summary of findings, recommendations and concludes.

II. Literature Review

Risk attached to a loan is the probability that the loan might not be paid as and at when due. It is a degree of value fluctuations in loan instrument as a result of changes in the credibility of borrowers and counterparties. Loan Risk is also defined as the cost of replacing cash flow when the counterparty fails to meet financial obligations; it stems out of uncertainty in counterparty's ability or unwillingness on the part of the counterparty to meet its contractual obligations [11]. The main sources of loan risks come from loans which have exceeded their repayment dates by ninety days or more [12]. Such loans no longer accrue income or interest ([13], [14]) and are termed non-performing loans and hence lead to less profit. In point of fact, loan risks aggravates with inability of commercial banks to formulate appropriate credit and loan management policies to deal with volatile interest rate structure, inadequate institutional capacity, 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 Apex Bank [15].The causes of loan default have been classified by [16]into three levels: borrower level, financial institutional level and economy level. From the perspective of the borrower, loan default usually result from failure of investment to generate sufficient income to meet up loan agreement due to improper technical advice, inadequate support services, natural disasters (especially with agricultural loans) diversion of loans and absence of incentives for loan repayment. On the part of Financial institutions risks increases on account of; defective procedures for loan appraisal, poor quality and efficiency of loan officers, untimely loan disbursement and inappropriate payment schedules, inability of financial institutions to enforce penalties and limited contact and communication between financial institutions and borrowers. Finally, on the part of the economy it includes inappropriate monetary and fiscal policies that could manage inflationary and exchange rate fluctuations, low interest rate which encourages borrowing and discourages savings and excessive government regulations.

2.1 Effects of Loan Risks on Commercial Bank Profitability

Research on the determinants of bank profitability has often focused on both return on assets, equity and interest rate margins. It has also explored the impact on bank profitability of some bank specific factors such as risks, market power and regulatory costs [18]. A host of empirical literature has been conducted on the impact of loan risk on profitability of banks. [4] on the implication of banks risks stated that outcome of exposure to risks could either result in direct loss of bank earnings and erosion of capital or in the imposition of constraints on a bank's capability to meet up its obligations. [7]stated that non-performing loans caused by customer default; leads to illiquidity on the part of the banks, gives rise to bankruptcy and resultsin a bank being forced to

liquidate part of its assets below their market worth thereby leading to profitability issues. In a study conducted by [19]using ROA as a proxy for bank profitability and performance. The result showed that bank profitability is negatively impacted by the level of non-performing loans ratio used as a proxy for loan risk.[20] showed that non-performing or bad loans can generate financial foreclosure for a bank and create financial crises for a country when percentage of bad loans exceeds bank based capital or equity. In analyzing the Malaysian financial system[21] reported a significant relationship between credit risk and financial crises and concluded that credit risk is to blame for the failure of the Asian financial system as there was a buildup of credit risk before the failure which became serious as the level of bad loans increased.Findings from 9 largest banks; accounting for 78% of the assets of the commercial bankindustryin Nigeria over a period of 7 years (2003-2009) by [7] showed that risk management efficiency in Nigerian banks is not just affected by bank-specific factors but also determined by macroeconomic variables.

Based on data from 2004 to 2008, [15] used regression analyses to examine the impact of credit risk on the profitability of Nigerian banks and found that credit risk management has a significant impact on the profitability of Nigerian banks. The study found that levels of deposits, non-performing loans and loans and advances inversely affect commercial bank profitability in Nigeria.However, another study based on commercial banks in Kenya by [16] assessed the effects of credit risk management on profitability from 2004 to 2008 and observed that proxy for loan risk did not have any significant effects on profit of commercial banks. A research on Nigerian banks by [3] to determine the impact of credit risk on performance of commercial banks in Nigeria using a panel analytical framework for 5 banks over a period of 11 years (2000-2010) showed that 100% increase in nonperforming loans to loans and advances ratio, ratio of total loans and advances to total deposits and the ratio of loan loss provision to classified loans as proxy for credit risk reduces profitability for banks measured by the Return on Assets (ROA).This findings is similar across banks.

Of interest to this work is the research conducted by [8] on 31 banks for eleven years 2001-2011 using data generated from various financial reports of banks to determine the impact of credit risk management on financial performance of commercial banks in Nepal. Using ROA as a measure of commercial bank performance and default rate (DR), capital adequacy ratio (CAR) and cost per loan assets (CLA) found that all the independent variables have a negative relationship with ROA however only the DR and CAR were found to be significant determinants of commercial banks in Nepal, the CLA although negative had no significant effecton commercial bank performance in Nepal.

2.2Nigerian Commercial Banks: A Scenario on Risk

The introduction of the New Basil Accord in 2004 on capital management proposed by the bank supervision committee with the aim of establishing international standard that banking regulators can make use of in creating regulations about how banks need to reserve capital in order to cover for credit and operations risks saw In consonance with the New Basil Accord of 2004 on capital management;the Central Bank of Nigeria raised the capital requirement of banks in 2005 from ₦2 billion to ₦25 billion. This resulted in foreclosures and mergers of banks from 89to 25 banks as of 2006 because majority of these banks could not meet up with the recapitalization requirements.Table 1 shows the new structure of the recapitalization into 25 banks.

Table 1: Twenty five banks in Nigeria – post consolidation

S/N	Bank	Constituents	Capital Base (₦ Million)
1	First Bank Group	First Bank, MBC International, FBN Merchant Bankers Ltd	44.62
2	Diamond Bank Group	Diamond Bank, Lion Bank	33.25
3	Oceanic Bank Group	Oceanic Bank International, International Trust Bank	33.10
4	Intercontinental Bank Group	Intercontinental Bank, Global Bank, Gateway Bank, Equity Bank	51.70
5	Fidelity Bank Group	Fidelity Bank, FSB International Bank, Manny Bank	29.00
6	UBA Group	UBA, Standard Trust Bank	50.00
7	FCMB	FCMB, Coop Dev. Bank, Nigerian American Bank Limited	30.00
8	Spring Bank Group	Citizen Bank International, ACB International, Guardian Express Bank, Oceanic Bank, Trans-International Bank, Fountain Trust Bank	25.00
9	Access Bank Group	Access Bank, Marina International Bank, Capital Bank International	28.50
10	Unity Bank Group	Intercity Bank, First Interstate Bank, Tropical Commercial Bank,, Centre Point Bank, Bank Of The North, SocieteBancaire, Pacific Bank, NNB	30.00
11	Equatorial Trust Bank Group	Equitorial Trust Bank, Devcon Bank	26.50
12	Union Bank Group	Union Bank of Nigeria, Union Merchant Bank, Broad Bank, Universal Trust Bank	58.00
13	First Inland Bank Group	First Inland Bank Group, Inland Bank, IMB, Nub	28.00
14	Afribank Group	Afribank International (Merchant) Bank, Afribank of Nigeria, Trade Bank	29.00
15	IBTC Bank Group	IBTC, Chartered Bank, Regent Bank	35.00
16	Skye Bank Group	Prudent Bank, EIB, Bond Bank, Reliance Bank, Cooperative Bank	37.00
17	Wema Bank Group	Wema Bank, Lead Bank, National Bank Of Nigeria	26.20
18	Sterling Bank Group	Trade Bank, NBM Bank, Magnum Bank, NAL Bank, Indo Nigeria Bank	25.00

19	Platinum Bank Group	Habib Bank, Platinum Bank	26.00
20	Zenith Bank	Alone	38.00
21	Nigerian International Bank	Alone	25.00
22	Ecobank	Alone	25.00
23	Standard Chartered Bank	Alone	26.00
24	Guarantee Trust Bank	Alone	34.00
25	Stanbic Bank	Alone	25.00

Source: Adapted from [17]

In addition, the recapitalization exercise impressed on banks to offer loans and other credit forms to different categories of clients cutting across a range of sectors. Fig.1 below shows the loans provided by Nigerian commercial banks from 1970 to 2011; it also depicts the massive and extensive rise of loan provision by commercial banks within the recapitalization and consolidation era.

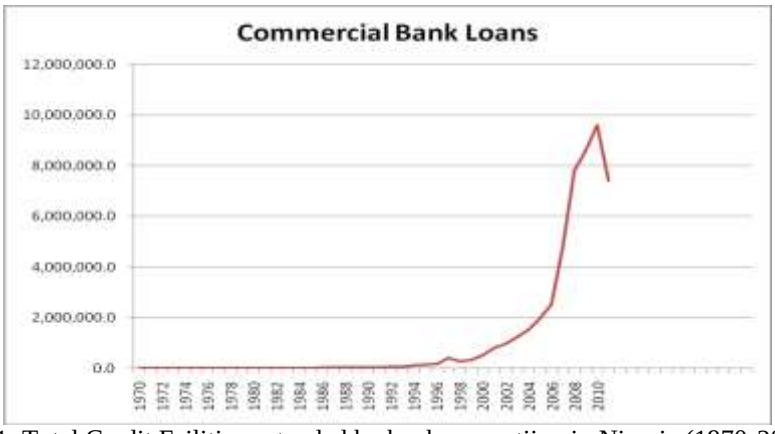

Fig 1: Total Credit Fcilities extended by banks operatiing in Nigeria (1970-2011)

Within this period total loan facilities extended by banks operating in Nigeria increased by more than a 100%. This according to[7] resulted in risk assets capital erosion of most banks as a result of massive default suffered. In the opinion of [11] the requirement to meet the ₦25 billion capital recapitalization and the incentive to attain ₦100 billion as a criteria to manage Nigeria's external reserves spurred banks to grow massively without however a corresponding growth in risk management system. It is noteworthy that Nigerian banks since after recapitalization have been doing well in the financial sector. According to a report byBankers' Database in 2008; the degree of leverage enjoyed by the Nigerian banking industry as reflected in the equity multiplier; measured as total assets divided by total equity increased from 15.2% in March 2006 to 15.8% by the end of March 2007. Nigerian banks exhibited lower degree of leverage and higher stability. The ROA is maintained and their NPA ratios became comparable to world standards.

Table 2: Rating of Banks using the "CAMEL" parameter

Parameters	**Pre-consolidation**								**Post Consolidation**	
	2001	**%**	**2002**	**%**	**2003**	**%**	**2004**	**%**	**2007**	**%**
Sound	10	11.1	13	14.4	11	12.6	10	11.5	4	16.7
Satisfactory	63	70.0	54	60.0	53	60.9	51	58.6	17	70.8
Marginal	8	8.9	13	14.4	14	16.2	16	18.4	2	8.3
Unsound	9	10.0	10	11.1	9	10.3	10	11.5	1	4.2
Total	**90**	**100**	**90**	**100**	**87**	**100**	**87**	**100**	**24**	**100**

Source: CBN Annual Report and Statement of Accounts 2004, p. 15 & 2007

The level of soundness and the industry performance improved during the period after consolidation standards as shown in Table 2. The financial condition of 21 (87.5%) of the twenty four banks were rated as sound/satisfactory in 2007 compared to 81.1% (2001), 84.4% (2002), 73.5% (2003) and 70.1% (2004) of the previous years; only two banks were rated as marginal compared to 8, 13, 14 and 16 in 2001, 2002, 2003 and 2004 respectively while only one (1) bank remained in the unsound category compared to 9, 10, 9 and 10 in the previous years before consolidation. These statistics is an indication that the banking industry benefited maximally from the stringent regulatory actions and restructuring efforts which took place in the industry during 2006. In Fig 2, it can be seen that the Nigerian banking system is currently dominated by six banks out of 20 in total. At the end of 2011, the dominant banks made up of a pan African bank and 5 domestic banks together accounted for about 60% of total banking assets [22].

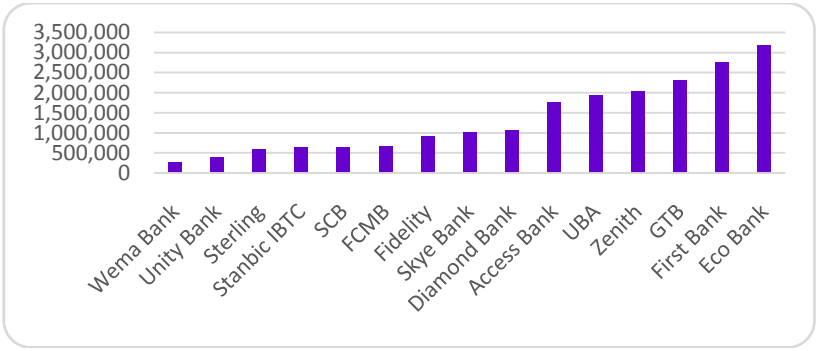

Fig 2: Case Study Bank Total Assets for 2012

During this year, the 'asset clean up' carried out by the AMCON enabled many banks who took advantage of it to reduce their NPL ratios which also resulted in the cost of risks declining for most of the banks. With the exception of ACCESS, ECOBANK, WEMA and STANBIC, all the other case study banks reported an NPL ratio below 5% (Fig. 3). In terms of deposit growth, FCMB, STANBIC Bank, Fidelity Bank, UBA and Skye Bank were the outstanding performers with growth of 57%, 27%, 27% and 20% respectively.

In terms of capital management, the capital adequacy ratio is an indication of the capital base of the bank and hence; the bank's risk weighted asset. In accordance with the Central Bank of Nigeria regulations, a minimum ratio of 15% is to be maintained for deposit money banks with international subsidiaries. The following figuredepicts that the CAR of most of the case study banks (67%) for the year 2012 was well above the minimum requirement.

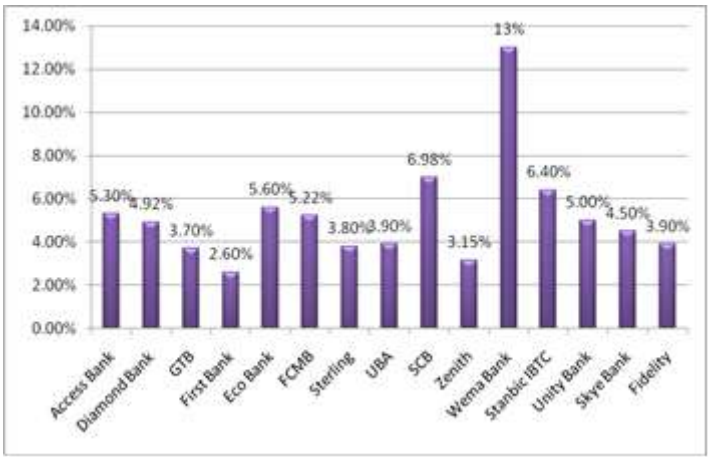

Fig 3: Case Study Default Rate (DR) for 2012

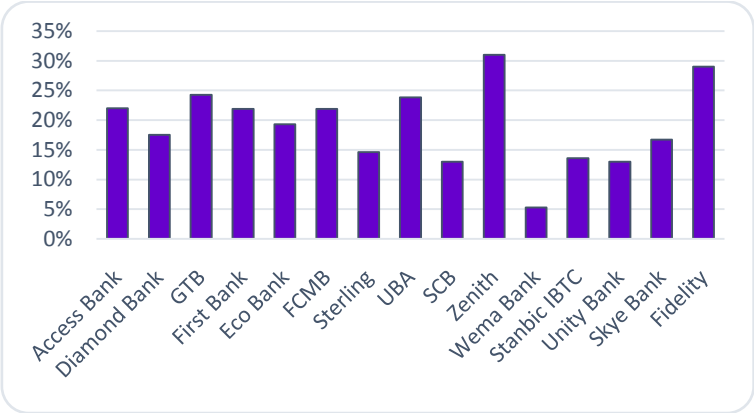

Fig 4: Case Study Capital Adequacy Ratio (CAR) for 2012

2.3 Risk Management Strategies in Commercial Banks

Most definitions of risk management agree that it is the series of activities designed to minimize the negative impact of uncertainty or possible occurrence of losses and connotes four dimensions termed the

'CIMM' of risk management: risk identification, risk measurement, risk monitoring and risk controlling to ensure risk mitigation (The European Foundation for Quality Management; 2005, [9]; 2012, [4]; 2013, [7]. These four dimensions according to [4] ensures that: (1) the risk taken decisions are explicit and clear to both parties; (2) the bank's risk exposure fall within the limits established by board of directors (BOD); (3) risk taking decisions are in line with business strategy and objectives as spelled out by the BOD (4) the expected payoff from the risks are commensurate with the risks and (5) sufficient capital is made available as a buffer to take risks.

The various strategies associated with commercial bank LR evaluation are expected to produce information on frequency of loss, maximum probable loss, maximum possible loss, and expected loss, probability distribution of loss and standard deviation of loss[16]. Some of the risk measurement approaches used by commercial banks are; The Gap Analysis, Measuring Risks to net Income (NII), Measure of Risk to Economic Value, Full Valuation Approach, Duration Analysis, Convexity, Maturing Matching Analysis, Stress testing, Simulation technique and Value at Risks. [3] has highlighted; credit derivatives; credit securitization, compliance with Basel Accord II, adoption of sound internal lending policies and establishment of credit bureau as adequate strategies for Nigerian commercial banks. A comprehensive LRM strategy is highlighted by [23]to include risk reduction, risk transfer, risk retention and risk avoidance. Among these strategies, Nigerian commercial banks usually adopt two in dealing with risk namely: risk avoidance and loss reduction.

According to [7] most bank managers in Nigeria focus more on profitability which is a short term objective with little attention paid to risk managing the quality of assets that has better impact onthe sustainability of financial institutions.Some managers have reacted to the daunting task of risk management by pulling back from risks. They engage in risk avoidance by declining to accept transactions where the risk is significant (i.e. long-term and fixed rate loans) or they transfer risks (e.g. hedging); while these techniques are important in the process of risk management, they can also compromise a financial institution's value through excessive risk avoidance [9]and this attributes between financial institutions who accept huge volumes of risk and those who 'shy' away from it is what distinguishes the seasoned from the unseasoned financial institutions. However, in the case regulations such as government imposition on banks to grant loans to specific sectors like agriculture; banks resort to *risk reduction*. This strategy leads to excessive precaution in granting loans to certain persons and portfolios. This is achieved through demand for appropriate collateral security from beneficiary before loans are granted.

Nigerian commercial banks lack proper national system of identification, lack of central databases that will promote information sharing among banks on clients past indebtedness; inability to detect fake collaterals and lack of ability to investigate multiple lending across group of banks. Furthermore, the credit system provided by the CBN in the late 1980s and 1990s do not provide sufficient credit history which will guide a lender in taking intelligent decisions on whom to grant loan to or otherwise. In the case of default, most defaulters are not reported because the financial institution involved do not want to lose their customers [11]. This do not only endanger the capital market performance in terms of generating contractual externality between lenders as each bank's lending may increase the default risk of the others [11].More so, most of the commercial banks in Nigeria depend on loan officers to take important loan decisions for them.In many cases the loan officers take advantage of this to patronize their personal relationship with intending borrowers who, though not qualified get the loans on the basis of personal recognition[11]. In the light of the above, a comprehensive loan risk management framework highlighted by the Nepal Rastra Bank has been recommended. This credit risk management framework is depicted in the diagram below:

Fig 5: Risk Management Framework (Adapted from [4])

The board and senior management have a role to play as it concerns the management of loan risk. It should be the responsibility of the board (***board oversight***) to set up, approve and regularly review loan risk strategy and policies relating to management of loan risks which should be based on the overall business strategy. In addition, the board need to define the bank's overall risk tolerance in relation to loan risk, ensure that senior management as well as staff responsible for LRM posses sound expertise and knowledge to accomplish the risk management function; ensure that internal auditing and regular reviews of bank loan risk strategy are adequate, ratify exposure to insiders and their related parties including policies thereto and implemented and outline the content and frequency of management report to the board on loan risk management.

This role of the board should translate to the decision to set up a Credit Risk Management Department (CRMD) that is independent of the other banking department whose main duties should centre around implementation of credit risk policy approved by the board, monitoring credit risk and ensure compliance with limits set by the board, recommend to the board for its approval clear policies on standards of presentation of credit proposal, financial covenants, rating standards and benchmarks and recommend delegation of credit approval powers, prudential limits on large credit exposures, standards for loan collateral, portfolio management, loan review mechanisms, risk concentrations, risk monitoring and evaluation, pricing of loans, provisioning and regulatory/legal compliance.

The responsibility of the senior management (***senior management oversight***) is to transform strategic direction set by the board in the shape of policies and procedures made through effective communication from senior management to down liners. Thus senior management is responsible for the implementation of loan risk management strategies and policies designed by the board. These is broken down into: developing loan and loan administration polices; ensure the development and implementation of appropriate reporting systems; monitor and control the nature and composition of bank's loan portfolio, monitor loan quality, ensure adequate internal control and set up clear lines of accountability and authority; and build lines of communication for the timely dissemination of loan risk management policies, procedures and other loan risk management information to all loan staff.

Organizational structure may vary according to size, age, complexity and diversification of a bank's activities. However, a comprehensive overall lending structure should be set up by board and senior management that is clearly understood by the down liners and loan officers of the bank. With regard to ***systems and procedures for identification, acceptance and measurement*** the bank should have clearly stated loan strategy, loan policies, credit procedures and credit limits, credit origination, system for administration of new credit and extension of existing credits and internal loan rating system.

Finally, ***loan risk monitoring and control*** should be able to pin point credit quality indicators such as financial position and business conditions, conduct of account, loan covenants and good collateral evaluation system. Loan risk monitoring and control should encapsulate loan risk review and stress testing, management of problem loans (negotiation and follow-up, remedial strategies, collateral and security document and reporting and reviewing) and good management information system. The loan risk control systems should lay down procedures relating to: the roles and responsibilities of individuals responsible for loan monitoring, the assessment procedures and analytical techniques for individual and overall loan portfolio, the frequency of monitoring, the periodic examination of collaterals and loan covenants, the frequency of site visits and the identification of deterioration in any loan. More so, an effective loan risk monitoring system should include measures to: ensure that the bank understands the current financial condition of the borrower or counter party, ensure that all the credits are in compliance with existing covenants, follow the use customers make of existing credit lines, ensure the projected cash flows on major loans meet debt servicing requirements for apex banks; ensure that where applicable, collateral provides adequate coverage relative to the obligor's current condition, identify and classify potential problem loans on a timely basis.

III. Methodology

3.1 The Research Design

This research adopts a descriptive design that involves "obtaining information concerning the current status of a phenomenon to be described" [8]. A convenient sample of 15 banks from 20 banks on the Nigerian Stock Exchange (NSE); that is we selected only those banks with available annual reports and web presence for the case study period. This is to enable us have access to records (annual reports) that were not available in the NSE fact book. The data used for this study were retrieved mainly from annual reports of the banks' web-sites through the use of a text content analysis approach, the Central Bank of Nigeria statistical bulletin and reports, financial summary of listed firms on the Nigerian Stock Exchange, economic publications, books and other peer-reviewed published articles for the period 2009 and 2012. The study would make use of fifteen commercial including the forerunners of credit management quality; Guarantee Trust Bank and Zenith Bank [24] as follows: Access bank, Diamond Bank, Ecobank, First City Monument Bank, Fidelity Bank Nigeria, Guarantee Trust

Bank, Standard Chartered Bank, Skye Bank, Stanbic IBTC Bank Nigeria Limited, Sterling Bank, United Bank for Africa, Unity Bank Plc, Wema Bank and Zenith Bank.

3.2 Definition OfVariables

Following the work of[8] on the "the impact of credit risk management on financial performance of commercial banks in Nepal" this work sets Return on Assets (ROA) – as the dependent variable for the study. ***The ROA*** - measures the overall efficiency of management. Return on assets shows the ability of the firm's assets in generating profits. It gives an idea as to how efficient, management is using its assets to generate earnings. According to [8]; the ROA depicts the capital strength of the banking industry. ROA is calculated as:

$$\boldsymbol{ROA = \frac{ProfitAfterTax}{TotalAssets}}$$

In addition four financial ratios have been selected as measurement of loan risk and loan risk management: the default rate, loan risk, cost per loan asset and capital adequacy ratio.

Default **Rate (DR)** is defined as the frequency in failure to pay back loans. It indicates the rate at which borrowers fail to remain current on their loan obligations and serves as an indicator used by lenders to determine the degree of risk exposure. The DR is calculated as:

$$\boldsymbol{DR = \frac{Non - PermingLoans}{TotalLoans}}$$

Loan Risk (LR)measures banks exposure to contemporary loan risks. It is calculated as:

$$\boldsymbol{LR = \frac{TotalLoans}{TotalAssets}}$$

Cost per loan asset (CLA)according to[8] is the average cost per loan advanced to customer in monetary terms. Its main aim is to indicate the efficiency in distributing loans to customers. The CLA is measured as follows:

$$\boldsymbol{CLA = \frac{TotalOperatingCosts}{TotalAmountofLoans}}$$

Capital adequacy ratio (CAR) connotes risk management efficiency [25],[7]. It denotes the adequacy of a bank's aggregate capital in relation to the risks which arise from its assets portfolio, off-balance sheet transactions, common operations and other risks associated with its business.

$$\boldsymbol{CAR = \frac{CapitalFundorRegulatoryCapital}{RiskWeightAssets}}$$

3.3 Model Specification

The econometric model used for this study is drawn from models utilized by different studies; ([3]and[8] who utilized ROA as a function of the ratio of non-performing loans to loans and advances (NPL/LA) and ratio of total loans and advances to total deposit (LA/TD) used as indicators of credit risks and also based on the efficient market hypothesis. However, the study improved upon these models by incorporating the ratio of total loan to total assets as an additional measure of loan risk. To determine the impact of loan risk and loan risk management on profitability and impact of loan risk management; the study adopts two equations stated as follows:

ROA = *f* (DR, LR, CLA, CAR) - - - - - - - (1)

LR = *f* (DR, CLA, CAR, ROA) - - - - - - - (2)

Where:

ROA = Return on Assets

DR = Default Rate

LR = Loan Risks

CAR = Capital Adequacy Ratio

CLA = Cost per Loan Asset

Under the assumption that total loan risk as well as total profit are cumulative to a bank, a linear relationship suggests that we may econometrically express the model as:

$ROA_{it} = \alpha + \beta_1 DR_{it} + \beta_2 LR_{it} + \beta_3 CAR_{it} + \beta_4 CLA_{it} + \pi_{1it}$ - - - (3)

$LR_{it} = \alpha + \beta_1 DR_{it} + \beta_2 ROA_{it} + \beta_3 CAR_{it} + \beta_4 CLA_{it} + \pi_{2it}$ - - - (4)

Where:

i = denotes the individual bank organization

t = time period

π_{it} = disturbance term

α = intercept

β = parameter for estimating bank specific variables

3.4 Data Analysis

Panel analytical approach is utilized for this study. This technique takes a stratum of time series data and cross sectional variants of the bank specific factors for the period 2009 and 2012. The technique of panel data estimation takes care of the problem of heterogeneity and bias in the banks selected for the study since the degree of freedom will be increased.

IV. Results

4.1 Descriptive Statistics

Table 3 presents descriptive statistics for the variables used in this study. The mean ROA is 0.87%, the minimum -6.21% and maximum 7.99%. On average, the default rate is 0.09% and minimum and maximum is 0.01% and 0.7% respectively. Regarding the cost per loan assets; the average is 19.16% while minimum and maximum is 87.35% and 0.65% respectively. The mean capital adequacy ratio is 0.69% and bears a minimum and maximum -0.49% and 30.72% respectively. Finally the loan risk ratio is 40.41% on average and bears a minimum and maximum 4.83% and 61.04% respectively.

Table 3: Descriptive Statistics of the Panel Data Variants

	ROA	CLA	DR	LR	CAR
Mean	0.876199	-19.16739	0.093590	40.41632	0.688972
Median	1.125614	-13.31620	0.060000	42.71492	0.192900
Maximum	7.993582	-0.646280	0.740000	61.03513	30.72000
Minimum	-6.213710	-87.35710	0.010400	4.834387	-0.495400
Std. Dev.	1.982086	18.39782	0.112989	13.09144	3.945247
Skewness	-0.469820	-2.319020	4.172805	-1.119381	7.535729
Kurtosis	7.249411	8.153890	22.38009	4.103525	57.86753
Jarque-Bera	47.35104	120.1850	1113.093	15.57456	8093.988
Probability	0.000000	0.000000	0.000000	0.000415	0.000000
Sum	52.57196	-1150.043	5.615400	2424.979	41.33830
Sum Sq. Dev.	231.7913	19970.31	0.753226	10111.75	918.3334
Observations	60	60	60	60	60

The Pearson correlation matrices in Table 4 indicate that the degree of correlation between each pair of independent variables is low which suggests the absence of multicollinearity problem in the model.

Table 4: Correlation Coefficients

	ROA	CAR	CLA	DR	LR
ROA	1.000000	0.035897	-0.005562	-0.027168	-0.001655
CAR	0.035897	1.000000	0.082771	-0.124453	0.214046
CLA	-0.005562	0.082771	1.000000	-0.312720	0.846895
DR	-0.027168	-0.124453	-0.312720	1.000000	-0.335965
LR	-0.001655	0.214046	0.846895	-0.335965	1.000000

4.2 StationarityAndCausality Tests

[26] have demonstrated that time series variables which are not stationary would be spurious and misleading. It indicates that these variables should possess three basic characteristics: finite means, variance and auto-variance. To take this into consideration we test for panel stationary to determine if the variables have unit root or not. The result of the panel unit root test as presented in Table 5 showed that the variables are stationary since the p-values of Hadri Z test is less than 5% . That means the series do not have a unit root problem.

Table 5: Panel Unit Root Test

Group unit root test: Summary: Series: OBS, BANK, ROA, DR, LR,CAR, CLA				
Balanced observations for each test				
			Cross-	
Method	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-9.91462	0.0000	5	295
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-10.8264	0.0000	5	295
ADF - Fisher Chi-square	116.729	0.0000	5	295
PP - Fisher Chi-square	113.324	0.0000	5	295
Null: No unit root (assumes common unit root process)				
Hadri Z-stat	0.01595	0.4936	6	360
** Probabilities for Fisher tests are computed using an asymptotic Chi				

-square distribution. All other tests assume asymptotic normality.

Table 6 showing the pair wise panel granger causality among the variables depicts that a unidirectional causality runs from CAR to ROA, ROA to CLA, DR to CLA while bi-directional causality could be established between ROA and DR supporting the finding that default rate is the most significant determinant of ROA. Causality however could not be established between LR and ROA, CAR and CLA, DR and CAR, LR and CAR, LR and CLA and LR and DR.

Table 6: Panel OLS Pairwise Granger Causality Test

Null Hypothesis:	**Obs**	**F-Statistic**	**Probability**
CAR does not Granger Cause ROA	30	3.49274	0.04596
ROA does not Granger Cause CAR		1.82699	0.18174
CLA does not Granger Cause ROA	30	0.38481	0.68454
ROA does not Granger Cause CLA		3.17683	0.05897
DR does not Granger Cause ROA	30	5.57208	0.00997
ROA does not Granger Cause DR		2.66347	0.08941
LR does not Granger Cause ROA	30	2.28741	0.12238
ROA does not Granger Cause LR		2.38642	0.11259
CLA does not Granger Cause CAR	30	1.23031	0.30929
CAR does not Granger Cause CLA		0.11975	0.88764
DR does not Granger Cause CAR	30	30.3362	2.1E-07
CAR does not Granger Cause DR		1.71373	0.20069
LR does not Granger Cause CAR	30	0.93368	0.40638
CAR does not Granger Cause LR		0.04412	0.95691
DR does not Granger Cause CLA	30	9.65423	0.00078
CLA does not Granger Cause DR		0.00205	0.99795
LR does not Granger Cause CLA	30	0.65344	0.52891
CLA does not Granger Cause LR		0.59943	0.55683
LR does not Granger Cause DR	30	0.23581	0.79167
DR does not Granger Cause LR		0.90867	0.41596

4.3 Robustness Tests

Coefficient of multiple determinations, F-statistics and DW checks for autocorrelation and covariance analysis. The DW statistics shows that there is no first-order autocorrelation in the model the autocorrelation result supports that error terms are not correlated and series could be adjudged stationary. The F-statistics test of the significance of the model has also strengthened the reliability of the model, significant at 5 percent level. The R-2 coefficient used in determine the explanatory power of the variables on the dependent variables shows that they explain about 89% for the risk management model and 33% for the profitability model this indicates that 33% variability in bank profitability and 89% of loan risk is jointly explained bank specific factors.

4.4 Panel Results: Profitability Model

Table 7: Estimates of Parameters for Profitability Panel Regression model

Dependent Variable: ROA				
Total panel (balanced) observations: 45				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.297840	2.273712	0.570802	0.5718
ROA(-1)	-0.005972	0.143103	-0.041733	0.9669
CAR	0.041409	0.061270	0.675845	0.5036
CAR(-1)	-0.082941	0.059291	-1.398873	0.1707
CLA	0.009419	0.048828	0.192900	0.8482
CLA(-1)	-0.002925	0.049288	-0.059341	0.9530
DR	24.22484	8.771744	2.761690	0.0091
DR(-1)	-10.03185	5.342465	-1.877756	0.0688
LR	-0.027920	0.060239	-0.463488	0.6459
LR(-1)	0.011604	0.058628	0.197927	0.8442
R-squared	0.339969	Mean dependent var		1.195306
Adjusted R-squared	0.170247	S.D. dependent var		1.838937
S.E. of regression	1.675103	Akaike info criterion		4.062756
Sum squared resid	98.20890	Schwarz criterion		4.464236
Log likelihood	-81.41201	F-statistic		2.003090
Durbin-Watson stat	1.732257	Prob(F-statistic)		0.068772

Specified regression model in equations (3) and (4) is estimated in panel OLS. The ratio used in estimating the models were computed based on data collected from sample banks annual reports and statements of accounts; other proxies were collected from institutional databases such as Central Bank of Nigeria, World Bank World Development Indicators and the bankers' databases. All the test statistics were done at 95% confidence levels, which mean that all the p-values should be ≤0.05 for the statistics to be significant. The result of table 7 (appendix) for the estimation of equation 3 shows that the current capital adequacy ratio (CAR) has a positive impact on the profitability ratio; however previous level of CAR have negative impact on profitability. The t-statistics shows that the parameter estimate is not statistically significant at 0.05 levels. The result with the CLA effects shows the same position for the coefficient and significance. Efficacy of risk managing a bank's portfolio through capital augmentation therefore is substantiated in the case of Nigerian banks. This finding is also similar to that of [7]. On the other hand the default rate (DR) showed a positive impact on bank profitability on impact while previous values indicated a negative impact on bank profitability. The DR unlike the CAR and CLA has significant effects on bank profitability at both 5 and 10% levels. Finally, The beta coefficient for loan risk (LR) depicts a negative effects on profitability on impact while previous values showed a positive impact of profitability as indicated by the Return on Assets (ROA) although the coefficient were not significant both at 10% and 5% respectively.

4.5 Loan Risk Management Model

The result of table 8 (appendix) for the estimation of equation 4 shows that the current capital adequacy ratio (CAR), Default Rate (DR) and Cost per Loan Asset (CAR) all have positive impact on the Loan Risk ratio; while the ROA has a negative impact. The result however showed that previous level of all the variables had a negative impact on loan risk besides its own previous values which has a positive impact on profitability. The t-statistics however shows that the parameter estimate for previous levels of LR and current levels of CAR, and CLA were significant at 0.05 levels. Thus, the efficacy of risk managing a bank's portfolio through capital augmentation therefore is also substantiated in this model. Thus a unit change in default rate, cost per loan asset and capital adequacy ratio result to a positive change in loan risk (reduction) to the extent of 15.3%, 0.3% and 0.4% respectively.

Table 8: Estimates of Parameters for the Risk Management Panel Regression model

Dependent Variable: LR				
Total panel (balanced) observations: 45				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.65906	5.958365	2.292418	0.0280
LR(-1)	0.711700	0.111608	6.376767	0.0000
CAR	0.381284	0.160022	2.382703	0.0227
CAR(-1)	-0.096916	0.169646	-0.571280	0.5715
CLA	0.333740	0.124479	2.681108	0.0111
CLA(-1)	-0.204890	0.133465	-1.535165	0.1337
ROA	-0.218490	0.471404	-0.463488	0.6459
ROA(-1)	-0.142305	0.399606	-0.356113	0.7239
DR	15.27595	26.95672	0.566684	0.5745
DR(-1)	-8.694879	15.61078	-0.556979	0.5811
R-squared	0.894919	Mean dependent var		40.19163
Adjusted R-squared	0.867898	S.D. dependent var		12.89270
S.E. of regression	4.685952	Akaike info criterion		6.120145
Sum squared resid	768.5350	Schwarz criterion		6.521626
Log likelihood	-127.7033	F-statistic		33.11968
Durbin-Watson stat	2.103888	Prob(F-statistic)		0.000000

V. Summary, Conclusion And Recommendations

5.1 Summary

The aim of this paper was to determine the impact of loan risk, loan risk management on the profitability of commercial banks in Nigeria. Secondary data were processed using E-views7 econometric package. In this study, our empirical investigation consists of three main steps. First, the unit root test.The results of the Unit root tests indicated that variables are stationary. Second isthe granger causality tests which showed that unidirectional causality runs from CAR to ROA, ROA to CLA, DR to CLA while bi-directional causality could be established between ROA and DR supporting the finding that default rate is the most significant determinant of ROA. The third step is the panel regressions in which the results revealed that credit

risk management is an important determinants of commercial bank profitability and risk reduction in Nigeria.The success of any bank depends on how effective and efficient the loan risk management strategies of the bank is.A significant relationship was found between default rate and profitability and CAR and CLA on loan risk.

5.2 Conclusion

In conclusion, the findings of the study reveal proper mechanisms for risk management in the banking sector of Nigeria especially via the stringent regulation and frequent stress checks on banking sector. However, most of the banks reviewed do not have a detailed risk management framework and for those who have;the risk management framework lack comprehensiveness as highlighted in section 2.2.2. Furthermore, the study found that majority of the banks whose assetsaccount for 67% of the Nigerian commercial banks do not have separate risk management department; most of the banks only have credit administration department, which takes into account credit risk. Thus, an effective risk management culture would not onlyreduce risk avoidance and thus increase profitability but would also ensure commercial banks competitiveness and survival in a global world full of uncertainties and crises.

5.3 Recommendations

Based on the findings of this work, it is recommended that:Formal risk management training should be given to bank employees.The Central Bank of Nigeria (CBN) may consider making it a mandatory requirement that all commercial banks establish a risk management unit dedicated to risk management.It is recommended that banks should begin the mandatory adoption of the IFRS collateral based system of loan administration.Banks should also allocate more funds to default rate management.Finally, from the empirical literature consulted it is evident that banks do not explore all the risk management strategies. It is thus recommended that more than one risk management strategy, tool or framework be adopted for any type of risk.

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