



RISK MANAGEMENT AND BANK PROFITABILITY: EVIDENCE FROM NIGERIAN DEPOSIT MONEY BANKS

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Abstract

Risk management issues in the banking sector do not only have greater impact on bank profitability but also on national economic growth and the general business development. The bank's motivation for risk management comes from those risks which can lead to underperformance. This study seeks to assess the impact of risk management on banks profitability in Nigeria. To achieve this, the study covered 6 years ranging from 2012-2017. Also, twelve deposit money banks were chosen as sample from the whole Nigeria DMBs. Audited annual financial statements of the selected banks for the years were used in obtaining data for the purpose of this research. The independent variable which is Risk Management is proxied as Non-Performing Loan Ratio (NPLR), Capital Adequacy Ratio (CAR) and Loan-to-Deposit (LTD) while the dependent variable which is profitability was measured as return on assets (ROA). Using panel random effects regression, the results revealed that non-performing loan ratio has a negative effect and it is statistically significant at 5% on banks profitability, and Loan-to-Deposit ratio is also statistically significant at 5% and have positive effects on banks' profitability while capital adequacy ratio is insignificant. The study concluded that risk management in terms of non-performing loan ratio and loan-to-deposit ratio has significant effect on banks' profitability. The study therefore recommended that the banks' management should do more in the area of controlling the rate at which subprime loans are given out, in order to mitigate the risk of future loss on non-performing loan. Also, banks should further implement more policies that support increased lending to customers, especially the more credit worthy ones, in order to increase returns and performance.

Keywords: Risk Management; Nonperforming loan, Loan to Deposit Ratio, Capital Adequacy Ratio, Bank Profitability

INTRODUCTION

Financial crisis has not only affected strong economies of the world but also the growing economies had worst hit. Many financial institutions have either collapsed or faced near collapse due to subprime loan to firms and people. Banking crises in Nigeria have shown that banks do not only take excessive risks, but the risks differ across banks (Adeusi, 2010).

There are numerous explanations on the causes of the current financial crisis, one factor that has received a significant and recurring attention in this crisis is poor risk management. Thus, risk management has become an important tool, from which banks try to achieve legitimacy in the eyes of the public and regulators. This has given stakeholders in the Nigerian banking industry a cause not only to consider the returns made in the sector, but also to critically examine the frameworks used to manage risks in the sector and safeguard their interests. This is because the failures faced



by the industry in recent times have been blamed largely on the weaknesses of the regulatory frameworks and the risk management procedure of the financial institutions (Valencia, 2010).

According to Li and Zou (2014), credit risk is one of the most significant risks that banks face, considering the fact that granting credit is one of the main sources of income in commercial banks. Management of the risk becomes important because it affects the profitability of the banks. However, deposit money banks form surplus unit in the economic resource distribution of countries. In playing this vital function, they ensure the distribution of credit to deficit sector in the economy. Thus they spend huge resources in credit risk management, modeling with the objective of maximizing profits (Okere & Isiaka, 2018)

The focus of the risk management programme is to manage an organization's exposure to accidental losses, and to protect its assets. Most importantly, risk management occurs any time an investor or fund manager analyses and attempts to guide against any potential loss in an investment and take appropriate action, so as to give their investment certainty and risk tolerance. Therefore, risk should be efficiently managed in a developing and fast growing economy like Nigeria, because an organization such as banks, must approach the market with an open mind and eyes so as to attain an appreciable level of profitability. Risk management practice should therefore be well coordinated in the banking system for its efficient survival (Li and Zou, 2014). The objective of this work is to examine the impact of risk management on banks profitability in Nigeria

The rate at which banks are failing in Nigeria has become a major source of concern for the stakeholders and practitioners in the banking industry. From the year 1994 to 2006, about forty eight deposit money banks were liquidated (NDIC, 2011). In 2005, the number of licensed banks operating in Nigeria reduced from twenty eight to twenty five due to the recapitalization and consolidation exercise. But, as a result of merger and acquisitions, the total number of banks operating in Nigeria as at 2018 were twenty two (CBN, 2018).

The Nigerian banking industry has been overwhelmed by a decline in the quality of its credit assets as a result of the substantial dip in equity market indices, global oil prices and sudden depreciation of naira against global currencies (BGL Banking Report, 2010). The poor quality of the banks' loan assets hinders banks in extending more credits to the domestic economy, thereby adversely affecting economic performance. This prompted the Federal Government of Nigeria through the instrumentality of an Act of the National Assembly to establish the Asset Management Corporation of Nigeria (AMCON) in July, 2010 to provide a lasting solution to the recurring causes of non-performing and bad loans that have been harassing Nigerian banks. This happen when borrowers cannot pay loans back in full, or even enough for the bank to make profit, this is usually caused by credit culture, sudden market changes, and real estate changes (Kolapo et al., 2012).

Banks in Nigeria in the past are known to have been accommodating huge loads of toxic assets that rose progressively from year to year without being reported through good credit risk management (Ugoani, 2012). Thus, failures of deposit money banks in Nigeria can be attributed to poor credit risk management resulting from such non-performing loans which came into existence as a result of giving out credits indiscriminately without proper credit appraisal and



management which further resulted to the mismanagement of funds that became bad and irrecoverable.

Due to increasing cases of non-performing loans (NPLs) and its attendant consequences, the Central Bank authorities joined the Basel I and II accord, in December 1987. The accords emphasized the importance of capital adequacy (CAR) for mitigating credit risk, because it provides protection against sudden financial losses (Greuning, 2003).

In Nigeria, banks assess their liquidity by comparing the total loans to the total deposits for a given period, and loan-to-deposits (LTD) is expressed as a percentage. If the ratio is too high, it means the bank may not have enough liquidity to cover any unforeseen fund requirements, whereas, if the ratio is too low, it may not be earning as much as it could be. Loan-to-deposits also help to show how well a bank is attracting and retaining customers; if the deposits are increasing, new money and clients will start coming in; as a result, there will be more money to lend, which should increase earnings. On the other hand, if the deposits are shrinking, there will be less money to lend and fund may likely be borrowed to satisfy its loan demand in an attempt to boost interest income. However, if a bank is using debt to finance its lending operations instead of deposits, it will have debt servicing costs with interest and will typically result in low profit margins and more debt (Murphy, 2019).

In view of the identified importance, a lot of studies have been carried out by many scholars so as to proffer likely solutions. Among the studies are effects of risk management on bank financial performance in Nigeria (Olusanmi, 2015); Asha (2007) examined the effect of credit risk management on private and public sector banks in India. A similar study was also carried out by Fan and Zou (2014) that examines the impact of credit risk management on profitability of commercial banks. Some indicators were used in all the studies highlighted above, to know the impact of risk indicators on banks profitability.

Researches have been conducted using Non-Performing Loan Ratio (NPLR) and Loan to Deposit Ratio (LTD) as independent variables, to measure banks profitability through its dependent variable, which are measured using the return on equity (ROE), and return on assets (ROA). The prime concern of this study is to determine how risk management affects bank profitability in Nigeria. In order to achieve this, the following hypotheses in their null forms are tested.

H₀₁: There is no significant effect of non-performing loan on banks' profitability in Nigeria

H₀₂: There is no significant effect of loan-to-deposits on banks' profitability in Nigeria.

H₀₃: There is no significant effect of capital adequacy on banks' profitability in Nigeria.

LITERATURE REVIEW

Conceptual Review

Risk management is the process of identifying, assessing and controlling threats to an organization's capital and earnings. These threats, or risk, could stem from a wide varieties of



source, including financial uncertainty, legal liabilities, strategic management errors, accidents and natural disasters (ISO, 2016). Risk management could also be described as the process by which managers satisfy the needs which are; identification, measurement, treatment and implementation. This will help to identify key risks, obtain consistent understandable operational risk measures, decide which risks need to be managed and by which methods, and establish procedures to monitor the resulting risk position (Li & Zou, 2014). Consequently, Van and Baesens (2008) opine that risk management is mainly focused on reducing earning volatility and avoiding large losses.

Firstly, the most important step of risk management is identification; this can begin from analysing the sources of potential risks or defining threats. Secondly, measurement needs to quantify the risk which has been identified in the identification step. For example, individual needs to measure the real default probability and how much the change of risk drivers influence the default probability. In this step, statistical analysis is needed for the risk measurement, managers need reliable risk measures, to direct capital to activities and estimate the size of potential losses to stay within the limits imposed by available capital, creditors and regulators. They need mechanisms to monitor positions and create incentives to be prudent in taking risks (Van and Baesens, 2008).

A bank faces various risks such as interest risk, market risk, credit risk, off balance risk, technology and operational risk, foreign exchange risk, country risk, liquidity risk, and insolvency risk (Tandelilin, Kaaro, Mahadwartha, & Supriyatna, 2007). The bank's motivation for risk management comes from those risks which can lead to bank underperformance. Issues of risk management in the banking sector have greater impact not only on the bank but also on economic growth (Tandelilin et al., 2007).

Bank profitability refers to the difference between the profit amount obtained from the assets and expense of the liabilities. It is described as a function of both micro and macro determinants. Micro variables consist of the accounts in the balance sheet and income statement. Therefore, they are also named as bank-specific variables which are size, capital, risk management, expense management, marketable securities and non-performing loans. On the other hand, macro variables though are not related to the internal process of the banks, but they affect profitability in a significant way and these are inflation, interest rate, GDP growth and tax rate which are used as macro variables (Yuksel, Mukhtarov, Mammadov & Ozsari, 2018). Bank profitability may also show managers attitude toward risk, that is why banks that make huge profits are not scared when venturing into risky activities. In a similar fashion, banks that are not effective in their management encounter high bad debt. Profitability measure is important to investors. The level of profitability is very significant for shareholders of a bank because it shows how effective the management has utilised their investments (Devinaga, 2010).

Return on assets (ROA) is the ratio of net income to total assets, it measures how profitable and efficient a bank management is, based on the total assets. Return on equity (ROE) is the net profit divided by shareholders' equity. It measures the bank's profitability by calculating how much profit is generated with the money invested by shareholders. It is sometimes used in measuring profitability, it does not consider factors such as timing of cash flows or turnovers (Angela, 2016). Both ROA and ROE are used as indices in measuring bank profitability. Return on assets (ROA) demonstrates the level of net income produced by the bank and also determines how the assets is



utilised by banks, to generate profit over the years. On the other hand, the return on equity (ROE) is the ratio of net income to total equity indicating returns to shareholders on the book value of their investment. It measures the rate of return for ownership interest, it also tells how efficient a bank is at generating profits from each unit of shareholder equity. The ranking of banks is usually based upon the higher ROA ratio and total assets. As a general view, particularly in the banking sector, ROA is known as good profitability multiplier, for the reason that equity multiplier does not influence it (Saeed et al., 2016).

Profitability is an indicator of banks' capacity to carry risk and/or increase their capital. It indicates banks' competitiveness and measures the quality of management (Adinde, 2014).

Theoretical Review

Agency theory developed by Jensen and Meckling (1976) seeks to explain the relationship that exists between the management of an organization and the owners of the organization who are usually the people holding stocks of the organization. The theory posits that there is an agency conflict. The management of an organization is usually considered as an agent who has been contracted by the stockholders to work towards enhancing the stockholder value through good financial performance. The management is therefore expected to act in the best interests of the shareholders and enhance the profitability of the banks. However, the theory suggests that the managers who are agents may be involved in activities that are aimed at serving personal interests at the expense of the interests of owners of the organization. Thus, Agency theory states that when this happens, the bank profitability may easily suffer. So stockholders therefore can employ a number of strategies to ensure the management acts in the interest of the organization. It also suggests that management can be rewarded financially in order to motivate them to work for the interests of the company. The owners can also issue threats such as hostile takeover to force management to perform the required duties. In addition, the principal may also incur agency costs such as the audit fee to monitor the activities of the management in order to mitigate the risks.

Anticipated Income Theory developed by H. V Prochanow. Prochanow (1945) argues that bank's management can plan its liquidity based on the expected income of the borrower and this enables the bank to grant a medium and long-term loans, in addition to short-term loans as long as the repayment of these loans are linked by the borrowers expected income to be paid in the periodic and regular premiums, and that will enable the bank to provide high liquidity when the cash inflows are regular and can be expected. Deposit money banks can manage liquidity through appropriate credit management, that is, directing of granted loans, and ensuring that these loans are collected as at when due to minimise the possibility of delays in repayment at the maturity date (Okoh, Nkechukwu & Ezu, 2016).

Empirical Review

Gitonga (2011) examined risk management and profitability among the commercial banks in Kenya using data from 2002 to 2007 annual reports of selected banks in Kenya. He employed a regression model to carry out the analysis and found that credit risk indicator has a negative effect on banks' profitability in Kenya. The findings of this research, which was based on now-stale data



set, cannot be readily relied upon in today's world due to the significant changes that have occurred in the financial sectors, particularly the global financial meltdown of 2007. It is not unlikely that a similar study that is based on more recent data would yield a different result.

Musyoki and Kadubo (2012) assessed various parameters pertinent to credit risk management as it affects banks' financial performance. They sourced data from commercial banks in Europe to determine the amount of credit, level of non-performing loans and profits for the period of 2006 to 2011. They concluded that all these variables have inverse impact on banks' financial performance. However, the study failed to adequately take into consideration country specific effects which could have influenced the outcome of the research.

Akindele (2012) examined the effect of risk indicators and corporate governance on banks' performance. In carrying out the study, he administered four hundred and eighty (480) questionnaires to employees of Wema Bank Plc. and extracted data from the annual reports of the bank for the year 2008 and 2009 using financial ratios. The study revealed that there is a positive relationship between risk indicators and bank performance. However, the use of questionnaire is not a robust method of data collection in this type of study as it might reflect the opinions of the respondents which might not necessarily reflect the actual situation. Also, this study employed only one bank and spent two years in arriving at its findings, implying that its findings cannot be generalised for the entire financial sector in Nigeria.

Some authors, however, found mixed results. These include Adeusi (2013) who reported a study that focused on the effects of risk indicators on bank financial performances in Nigeria, using a secondary data sourced from a 4-year progressive annual reports and financial statements of 10 banks and a panel data estimation technique. The author found that the effect of capital asset ratio is positive and significant on bank performance and therefore concluded that a significant relationship exists between banks' performance and the risk indicators. However, the period of only four (4) years on which the study was based is not sufficient to capture the effects of micro-economics and macro-economic factors that could have influenced the association between the risk indicators and bank performance. A longer period is likely to yield a better and more reliable result.

Also, Zou (2014) investigated the relationship between credit risk management and profitability of commercial banks in Europe using ROE and ROA as proxies of profitability while the proxies for bank risk are non-performing loan ratio (NPLR) and capital adequacy ratio (CAR). The author employed data for the largest 47 commercial banks in Europe from 2007 to 2012 and performed a series of statistical tests in order to examine the relationship. It was found that credit risk indicators have positive effects on profitability of commercial banks. Between the two proxies of credit risk management, NPLR has a significant effect on the both ROE and ROA while CAR has an insignificant effect on the two performance indicators.

A thorough evaluation of previous studies on the nexus between banks' profitability and risk indicators, as carried out above, portrays a lack of conclusive evidence on the relationship between risk indicators and banks' profitability. Most researchers have focused on one or several variables



and showed different results. Also, most of the extant studies cover periods prior to 2011 hence, the need for more recent and updated study to capture the current situation based on micro-economic and macro-economic changes that have occurred since then, so the researcher saw the existence in time gap and decided to fill the gap from 2012 to 2017.

In view of this, this research aims to fill the aforementioned gaps in the existing studies. Specifically, it seeks to fill the gaps by investigating the effects of a wide range of risk indicators as will be discussed in the next section to include non-performing loan ratio, loan-to-deposit and capital adequacy ratio on an indicator of profitability which is return on asset. To accomplish this, the study will employ a suitable econometric approach and more recent data than any of the previous study reviewed above.

METHODOLOGY

Model Specification

This section gives a brief explanation on the dependent variable, it identifies and provides the justifications for the variables employed, which are non-performing loan ratio, capital adequacy ratio and loan-to-deposits ratio. Based on the above discussion, this study modified the model of Okere, Isiaka and Ogunlowore (2018), which analysed risk management and financial performance of deposit money banks in Nigeria. Their model was specified as follows:

$ROA = \beta_0 + \beta_1NPL + \beta_2CAR + \beta_3LEV + \beta_4LDR + \mu_t$ equation 1

Where:

ROA = Returns on assets

NPL = Non-Performing Loans Ratio

CAR = Capital Adequacy Ratio

LEV = Leverage Ratio

LDR = Loan Deposit Ratio

μ_t = error term.

β_0 = intercept of the regression.

$\beta_1 - \beta_4$ = the coefficients of the regression

t = Number of period.

As this study is concerned, the functional model of the equation is presented as:

$ROA = f(NPLR, CAR, LTD)$ equation 2

By including the intercept and error terms and also the time and bank subscripts, the linear econometric model for estimation resulting from the above becomes:

$ROA_{it} = \beta_0 + \beta_1NPLR_{it} + \beta_2CAR_{it} + \beta_3LTD_{it} + \epsilon_{it}$ equation 3



Where:

ROA: Return on Asset

NPLR: Non-performing loan ratio

CAR: Capital Adequacy Ratio

LTD: Loan-to-deposit ratio

i: represents the banks in the sample

t: time period involved

β_0 : the intercept term

$\beta_1 - \beta_4$: the parameters of the explanatory variables

ϵ : Error term

Theoretically, non-performing loan ratio (NPLR) should have a negative effect on the return on asset (ROA) and capital adequacy ratio (CAR) should either increase or reduce return on asset (ROA) i.e. it could have positive or negative impact on return on asset (ROA), depending on how the banks implement their strategies, while loan-to-deposits ratio (LTD) should have a positive effect on the return on asset (ROA) theoretically. Mathematically, these apriori expectations can be described thus:

$$B_2 \geq 0 \geq B_3; \beta_3 \geq 0; \text{ and } \beta_1 \leq 0$$

Research Design

The study investigated the impact of risk management on banks profitability in Nigeria. The research work adopted ex-post factor design in obtaining variable used for the study. Ex-post factor research design uses data already in use or in existence but not necessarily amassed for research purposes. It is considered suitable for this study because it is a substitute for true experimental research and can be used to test hypotheses about cause-and-effect or correlational relationships.

Data Sources and Measurement

The variables this study uses are ROA, CAR, NPLR and LTD. Data were collected from twelve (12) selected banks. Annual reports of each of the selected banks from Nigeria Stock Exchange were collected in this study (NSE). It covered the period of 2012 to 2017. Watson *et al.*, (2002) found that the size of an organization influences information available to them. Therefore, more information can be deduced about a population by using the bigger organizations. Furthermore, they found that the smaller organization emulate the bigger ones, hence similar practice. Therefore, these banks were selected based on their size. The variables are calculated thus:

$$ROA = \frac{\text{Profit after Tax}}{\text{Total sset}}$$

$$NPLR = \frac{\text{Non-performing loan}}{\text{Total loan}}$$

$$LTD = \frac{\text{Total Loan}}{\text{Total Deposit}}$$



CAR = Total Capital / Total Risk Weighted Asset

The data were sorted and input into E-views for descriptive and inferential analysis. In order to test the validity of the pooled regression result, fixed effect model and random effect model were conducted as well as the Hausman test so as to determine which of the fixed effect or random effect models is preferable for this study.

This study has adopted only one classical performance indicator as a measure of bank performance and this is the return on asset (ROA). The return on asset will be calculated as profit after tax divided by total asset, which reflects a bank's efficiency at generating profit. The independent variables used in this study are: Non-performing Loan Ratio (NPLR), Capital Adequacy Ratio (CAR), and Loan-to-deposits Ratio (LTD). These variables are briefly explained below:

Non-performing loan ratio (NPLR) reflects the default rate on total loan and advances. Gizaw, Kebede and Selvaraj (2015) assert that non-performing loan ratio (NPLR) is the major indicator of commercial banks' credit risk. They found that NPLR has statistically significant large negative effect on performance measured by return on asset (ROA) and return on equity (ROE).

Capital adequacy ratio (CAR) is measured as the amount of bank's capital expressed as a percentage of its risk weighted credit exposures.

RESULTS AND DISCUSSIONS

Presentation and Discussion of the Descriptive Statistics

Table 1: Descriptive Statistics

Table with 5 columns: Statistic, ROA, NPLR, LTD, CAR. Rows include Mean, Median, Maximum, Minimum, Std. Dev., Skewness, Kurtosis, Jarque-Bera, Probability, and Sum.



Sum Sq. Dev.	0.291	5.469	0.293	1.441
Observations	72	72	72	72

Researcher’s Computation, 2021

It can be observed from the table above that the return on asset has the value of 0.669 on the average greater than non-performing loan ratio, loan-to-deposits ratio and capital adequacy ratio in the respective average of 0.285, 0.668 and 0.282 respectively.

The maximum and minimum outline of each of the series have positive variables. The standard deviation is a measure dispersion that explains how the variable spreads. Among the series, non-performing loan ratio has the largest ratio of standard deviation (0.278) while return on asset (ROA) has the lowest standard deviation (0.064).

From the result, all the variables are positively skewed and their values are greater than zero. This implies that the distribution has a long right tail. Three of the variables ROA, NPLR and LTD are platykurtic with the value of 2.285, 1.798, 2.281 respectively, while the CAR is 6.148, which is leptokurtic.

From the result of Jarque-Bera statistics, return on assets (ROA) and loan-to-deposits (LTD) are insignificant at 5% significance level, thus, we reject the null hypothesis that there is no normal distribution between the series. However, for the capital adequacy ratio (CAR) and non-performing loan ratio (NPLR), we can accept the null hypothesis that there is normal distribution among the series with the probability value of 0.000.

Empirical Results

Table 2: Pooled Least Squares Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.174	0.051	3.408	0.001
NPLR	-0.047	0.018	-2.649	0.010
LTD	0.759	0.079	9.608	0.000
CAR	0.004	0.036	0.103	0.918
R-squared	0.608	Mean dependent var		0.669
Adjusted R-squared	0.590	S.D. dependent var		0.064
S.E. of regression	0.041	Akaike info criterion		-3.499
Sum squared resid	0.114	Schwarz criterion		-3.373
Log likelihood	130.0	Hannan-Quinn criter.		-3.449



F-statistic	35.12	Durbin-Watson stat	0.598
Prob(F-statistic)	0.000		

Source: Author's Computation 2021

From table 2 above, the R² of 0.608 is an indication that 61% of variation in the dependent variable is explained by the explanatory variables. This connotes a high goodness of fit as borne out by the fact that its F-statistics of 35.15 is statistically significant, judging by its P-value (which is 0.000). Also, Durbin-Watson statistic of 0.598 shows that there is an absence of serial correlation.

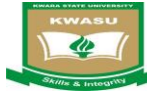
Non-performing loan ratio (NPLR): from the table above, the coefficient of NPLR is -0.047, with a t-statistic of -2.649 and p-value of 0.01, implying that NPLR is statistically significant at 5%, as the P < 0.05. Thus, this is in line with our discussion in section 3, that non-performing loan ratio has a negative impact on bank profitability. This result also corresponds with the report of Zou (2014), where NPLR has negative effect on the return on asset.

Capital adequacy ratio (CAR): from the table above, the coefficient of CAR is 0.004, with a t-statistic of 0.103, and p-value of 0.918, which implies that CAR is statistically insignificant at 5%, as the P > 0.05. This is similar to what we postulated in our apriori expectation. It also correspond with the result reported by Singh (2007), where a positive effect of CAR on the return on asset was reported.

Loan-to-Deposit (LTD): the co-efficient of LTD is 0.759, with a t-statistic of 9.608 and p-value of 0.000, implying that LTD is statistically significant 5%, as the P < 0.05. Thus, we conclude that loan-to-deposits ratio has positive effect on banks' profitability. This result is the same with what we postulated in section 3 of this study. It is also similar to the finding of the study carried out by Akindele (2012), where loan-to-deposits ratio had a positive effect on the return on asset.

Table 3: Random Effect Test

Variable	Coefficien t	Std. Error	t-Statistic	Prob.
NPLR	-0.074	0.024	-3.157	0.002
LTD	0.864	0.070	12.30	0.000



CAR	-0.071	0.045	-1.582	0.118
C	0.133	0.045	2.976	0.004

Effects Specification

	S.D.	Rho
Cross-section random	0.025	0.381
Idiosyncratic random	0.032	0.619

Weighted Statistics

R-squared	0.675	Mean dependent var	0.309
Adjusted R-squared	0.661	S.D. dependent var	0.057
S.E. of regression	0.033	Sum squared resid	0.074
F-statistic	47.17	Durbin-Watson stat	0.946
Prob(F-statistic)	0.000		

Unweighted Statistics

R-squared	0.568	Mean dependent var	0.669
Sum squared resid	0.126	Durbin-Watson stat	0.559

From table above, the R^2 of 0.675 is an indication that 67% of variation in the dependent variable is explained by the explanatory variables. This connotes a high goodness of fit as borne out by the fact that its F-statistics of 47.17 is statistically significant, judging by its P-value (which is 0.000). Also, the Durbin-Watson statistic of 0.946 as this shows that there is an absence of serial correlation.

Non-performing loan ratio (NPLR): the co-efficient of NPLR is -0.074, with a t-statistic of -3.157 and p-value of 0.002, implying that NPLR is statistically significant at 5%, as the $P < 0.05$. Thus, this is in line with our discussion in section 3, that non-performing loan ratio has a negative impact on bank profitability. This result also corresponds with the reported of Olamide (2014), where NPLR has negative effect on the return on asset.

Capital adequacy ratio (CAR): from the table above, the co-efficient of CAR is -0.071, with a t-statistic of -1.582, and p-value of 0.118, which implies that CAR is statistically insignificant at 5%, as the $P > 0.05$. This is in line to the postulation in the apriori expectation. It also contradicts the result reported by Adeyemi (2012), where a positive effect of CAR on the return on asset was reported.

Loan-to-Deposit (LTD): the co-efficient of LTD is 0.864, with a t-statistic of 12.30 and p-value of 0.000, implying that LTD is statistically significant at 5%, as the $P < 0.05$. Thus, it is concluded that loan-to-deposits ratio has positive effect on banks' profitability. This result is the same with



what we postulated in section 3 of this study. It is also similar to the finding of the study carried out by Akindele (2012), where loan-to-deposits ratio had a positive effect on the return on asset.

Table 4: Fixed Effect Regression

Variable	Coefficien		t-Statistic	Prob.
	t	Std. Error		
NPLR	-0.114	0.037	-3.122	0.003
LTD	0.949	0.077	12.36	0.000
CAR	-0.143	0.062	-2.304	0.025
C	0.108	0.047	2.307	0.025

Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.805	Mean dependent var	0.669	
Adjusted R-squared	0.757	S.D. dependent var	0.064	
S.E. of regression	0.032	Akaike info criterion	-3.892	
Sum squared resid	0.057	Schwarz criterion	-3.417	
		Hannan-Quinn		
Log likelihood	155.1	criter.	-3.703	
F-statistic	16.79	Durbin-Watson stat	1.357	
Prob(F-statistic)	0.000			

From the table above, the R² of 0.805 is an indication that 80% of variation in the dependent variable is explained by the explanatory variables. This connotes a high goodness of fit as borne out by the fact that its F-statistics of 16.79 is statistically significant, judging by its P-value (which is 0.000). Also, Durbin-Watson statistic of 1.357 shows that there is an absence of serial correlation.

Non-performing loan ratio (NPLR): the co-efficient of NPLR is -0.114, with a t-statistic of -3.122 and p-value of 0.003, implying that NPLR is statistically significant at 5%, as the P < 0.05. Thus, this is in line with our discussion in section 3, that non-performing loan ratio has a negative impact on bank profitability. This result also corresponds with the reported of Olamide (2014), where NPLR has negative effect on the return on asset.



Capital adequacy ratio (CAR): from the table above, the co-efficient of CAR is -0.143, with a t-statistic of -2.304, and p-value of 0.025, which implies that CAR is statistically significant at 5%, as the P < 0.05. This is in line with what we postulated in our apriori expectation. It also contradicts the result reported by Adeyemi (2012), where a positive effect of CAR on the return on asset was reported.

Loan-to-deposit (LTD): the co-efficient of LTD is 0.949, with a t-statistic of 12.36 and p-value of 0.000, implying that LTD is statistically significant at 5%, as the P < 0.05. Thus, we conclude that loan-to-deposits ratio has positive effect on banks' profitability. This result is the same with what we postulated in section 3 of this study. It is also similar to the finding of the study carried out by Akindele (2012), where loan-to-deposits ratio had a positive effect on the return on asset.

Hausman Test

As pointed out in the earlier section, this test can be used to differentiate between fixed effect model and random effect model in panel data. In this case, random effect model is preferred under the null hypothesis due to higher efficiency, while under the alternative hypothesis, the fixed effect model is at least as consistent and thus, preferred. The decision rule here is that, reject H₀ if the P-value is less than 5% significance level, fail to reject if otherwise. The rejection of H₀ means that fixed effect is preferred while if otherwise, random effect is preferred.

Table 5

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.476	3	0.024

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
NPLR	-0.114	-0.074	0.001	0.154
LTD	0.949	0.864	0.001	0.006
CAR	-0.143	-0.071	0.002	0.094

Following the decision rule stated above, the result of the Hausman test in the table shows that the fixed effect model is preferred to random effects model as shown by the probability value, i.e. we reject null hypothesis which states that the fixed effects method will be more effective than the random effect method.



Given the outcome of the Hausman test that the fixed effect is superior to the random effect model results, we therefore rely on the result of the fixed effect model according to which NPLR is significant and has negative effect on bank profitability, LTD is significant and have positive effects on the bank profitability, while CAR is insignificant and have negative effects on bank profitability.

CONCLUSION AND RECOMMENDATIONS

Based on the above findings, the study concludes that risk management in terms of non-performing loan ratio and loan-to-deposits ratio have significant effect on banks' profitability in Nigeria. As discussed above, the study findings show that non-performing loan ratio has a negative effect on banks profitability. The banks' management should know how to control the rate at which subprime loans are given out, in order to mitigate the risk of future loss on non-performing loan.

Finally, since it has been found that loan-to-deposits ratio has a positive effect on banks' profitability, banks should therefore look at how they can implement a policy to increase loans to customers' especially the ones who are more creditworthy in order to increase returns and performance.

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