

# Risk Management and Sustainability of Deposit Money Banks in Nigeria

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## ABSTRACT

This study investigated the nexus between risk management and the sustainability of banks in Nigeria by means of ex-post-facto research design. Risk management measures of non-performing loan-to-total loans, loan-loss provision-to-total loans and bad debt-to-total loans and sustainability measure of equity-to-asset ratio of banks were obtained from the annual reports and accounts of banks and Central Bank of Nigerian statistical bulletin during the period 2007-2017. The data obtained were analyzed using both descriptive (mean, standard deviation, minimum, maximum values, normality and correlation tests) and inferential (linear regression) statistical techniques. Based on the analysis, a nexus between risk management measures (non-performing loan-to-total loans loan-loss provision-to-total loans and equity-to-asset ratio of banks) and sustainability measure (equity to asset ratio of banks) in Nigeria was found. On the basis of the findings, it was recommended among others that bank management as well as the regulatory framework of the banking subsector should devise risk management strategies or measures aimed at curbing or reducing the level of non-performing loans so as to further sustain banks and make them going concern. As a matter of fact and urgency, the loan loss provision of banks should be further reviewed such that banks are made to reduce their loan losses in every financial period.

**Key words:** Regulatory Framework, Sustainability of Banks, Expost-Facto Research, Management Measures, Loan Loss Provision

## INTRODUCTION

In the dynamic global environment, risk management has become a fundamental issue for organizations and researchers alike. Risk management according to Mohamad and Mohd (2010), can be viewed from a holistic perspective, commonly referred to as Enterprise Risk Management (ERM). Given the fundamental role of ERM in a dynamic global environment, there has been series of argument that effective risk management may result to sustainability of organizations of different types, sizes and capacities (COSO, 2004; Nocco & Stulz, 2006; and Hoyt & Liebenberg, 2009). One sector or sub-sector that is characterized with huge risks as well as the need for effective risk management towards ensuring sustainability in the banking sub-sector. The Nigerian banking sub-sector is volatile due to the high level of risky assets traded by deposit money banks (DMBs), coupled with the continuing deregulation and liberalization of the sector; hence having in place effective risk management have become crucial to the conduct of banking business (Adebisi, 2014). This is also significant in view of the initiation of the Basel Accord under which capital maintained will be more closely aligned to the risks undertaken towards risk-based supervision by DMBs. Thus, risk management plays a critical role in aiding the sustainability of banks.

According to Guo and Mande (2012), risk management refers to the identification, assessment and prioritization of risks. It is defined in ISO 31000 as the effect of uncertainty on objectives (whether positive/negative) followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events or to maximize the realization of

opportunities. As observed by Al-Khouri, Magableh and Aldamen (2010), the key issues in risk management comprised of the probability (i.e. likelihood) of event occurring, severity (impact) of the event on set objectives, the strategies to manage risk (transferring the risk to another party), avoiding the risk, reducing the negative effect or probability of risk, or even accepting some/all of the potential or actual consequences of a particular risk.

Beasley, Clune and Dana (2015) assert that in order for DMBs to minimize risk, they should first make a comprehensive list of potential organization-wide risks, assess the magnitude and probability of occurrence and the various quantitative techniques that are available. In addition to assessing the potential cost of a risk materializing, benefits accruing from an appropriate response to the risk should also be assessed. There are several risks (e.g. market, operational, liquidity, strategic etc.) militating against the sustainability of DMBs in Nigeria.

Prominent among these forms of risks militating against the sustainability of DMBs as opined by Oderinde (2011); and Nnanna (2012), encompassed liquidity risks which may take the form of non-performing loans, loan losses, bad debts, etc. and market risks (e.g. interest, foreign exchange, equity and commodity prices risks). However, this study focused on one aspect of risk management – liquidity risk which according to Dorfman (2007), is the major problem facing DMBs sustainability, given the fact that if risk not effectively managed may affect the equity-to-asset base of DMBs. The broad objective of this study is to examine risk management and the sustainability of banks in Nigeria. The specific objectives are to:

- (i) Assess the relationship between non-performing loan-to-total loans and equity to asset ratio of banks in Nigeria.
- (ii) Determine the nexus between loan-loss provision-to-total loans and equity-to-asset ratio of banks in Nigeria.
- (iii) To ascertain the extent of effect of bad debt-to-total loans on equity-to-asset ratio of banks in Nigeria.

### **Statement of the Problem**

In the immediate aftermath of the global financial crisis which rocked both developed and developing economies of the world, emphasis has been on managing risk, given the fact that risk is an integral feature of business activity. Effective risk management not only helps companies avoid costly financial distress, and augmented investment programmes, but also improves company-wide sustainability. Gordon Loeb and Tseng (2009) contend that the dominant roles of DMBs are its ability to distribute risk across diverse participants. This view is supported by Saunders and Cornett (2006) that banks are in the risk management business as they undertake the functions of bearing and managing risks on behalf of their customers via the pooling of risks and the sale of their services as risk specialists.

Indeed, there is growing support for the wide-ranging argument that DMBs since they are characterized with risky assets will be sustainable if and only if they engage in effective risk management. While there has been a general consensus that risk management may result to the sustainability of DMBs, to the best of the researcher's knowledge, there is dearth of empirical evidence aimed at validating this assertion. A search for studies on the nexus between risk management and the sustainability of banks in Nigeria has yielded little or no empirical evidence. Thus, there is a gap in literature as regards the effect of risk management on the sustainability of bank in Nigeria.

Prior studies (see Abdelgalil, 2014;Guo& Mande, 2012; Adebisi, 2014; and Beasley, Clune& Dana, 2015) have employed equity-to-asset ratio as an indicator for the sustainability of banks. In this study, the sustainability of banks was measured by equity-to-asset ratio (as informed by prior studies) and risk

management by non-performing loan to total loans, loan loss provision to total loans and bad debt to total loans.

## LITERATURE REVIEW

There is no consensus on a single formal definition of risk. Given this lack of consensus, a definition from common usage serves to start our discussion: risk is a concept linked to human expectations. According to Guo and Mande (2012), risk indicates a potential negative effect on an asset that may derive from given processes in progress. In the common language, risk is often used as a synonym of probability of a loss or of a danger. In the assessment of professional risk, the concept of risk combines the probability of an event occurring with the impact that event may have and with its various conditions of occurring. Credit risk is defined as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms; market risk refers to the risk of loss to an institution resulting from movements in market prices, in particular, changes in interest rates, foreign exchange rates, and equity and commodity prices. On the other hand, operational risk refers to the loss resulting from inadequate or failed internal processes, people and systems, or from external events.

In 1892 Nigeria's first bank, the African Banking Corporation, was established. No banking legislation existed until 1952, at which point Nigeria had three foreign banks (the Bank of British West Africa, Barclays Bank, and the British and French Bank) and two indigenous banks (the National Bank of Nigeria and the African Continental Bank) with a collective total of forty branches. A 1952 ordinance set standards, required reserve funds, established bank examinations, and provided for assistance to indigenous banks. Yet for decades after 1952, the growth of demand deposits was slowed by the Nigerian propensity to prefer cash and to distrust checks for debt settlements during that period (Adebisi, 2014).

Biodun (2010) posits that British colonial officials established the West African Currency Board in 1912 to help finance the export trade of foreign firms in West Africa and to issue a West African currency convertible to British pounds sterling. But colonial policies barred local investment of reserves, discouraged deposit expansion, precluded discretion for monetary management, and did nothing to train Africans in developing indigenous financial institutions. In 1952 several Nigerian members of the federal House of Assembly called for the establishment of a central bank to facilitate economic development. Although the motion was defeated, the colonial administration appointed a Bank of England official to study the issue. He advised against a central bank, questioning such a bank's effectiveness in an undeveloped capital market.

In 1957 the Colonial Office sponsored another study that resulted in the establishment of a Nigerian Central Bank and the introduction of a Nigerian currency. The Central Bank of Nigeria, which was statutorily independent of the federal government until 1968, began operations on July 1, 1959. Following a decade of struggle over the relationship between the government and the Central Bank, a 1968 military decree granted authority over banking and monetary policy to the Federal Executive Council. The role of the Central Bank, similar to that of central banks in North America and Western Europe, was to establish the Nigerian currency, control and regulate the banking system, serve as banker to other banks in Nigeria, and carry out the government's economic policy in the monetary field. This policy included control of bank credit growth, credit distribution by sector, cash reserve requirements for commercial banks, discount rates—interest rates the Central Bank charged commercial and merchant banks—and the ratio of banks' long-term assets to deposits. Changes in Central Bank restrictions on credit and monetary expansion affected total demand and income. For example, in 1988, as inflation accelerated, the Central Bank tried to restrain monetary growth (Oderinde, 2011).

### Measures of Risk Management and Sustainability

In the banking sub-sector, the ratio of non-performing loan-to-total loans (NPPLTL) is considered as one of

the major determinants of risk management. Mwagi (2012) observes inverse relationship between banks sustainability and NPPLTL. The study established that higher level of NPPLTL will lead to lower sustainability of banks while lower levels of NPPLTL will lead to higher sustainability of bank. Muniappan (2002) shows that NPPLTL affects the sustainability of banks. This effect is due to the fact that banks must maintain their overhead cost on such loans despite that the loans are not yielding any return.

In the financial sector, the ratio of loan-loss provision-to-total loans (LLPTL) is a key factor to be considered because of its influence on the sustainability of banks. To ascertain the effect of changes in the sustainability of banks, it is necessary to evaluate and assess the overall fluctuations of LLPTL on the overall health of bank and narrow its implications on the ratio of equity-to-asset. Prior studies have shown that there is a mixed effect of LLPTL on the sustainability of banks. Louzi, Vouldis and Melaxas (2010) found out in their study on banks of Greece that LLPTL affects the viability and sustainability of banks, hence has compelled banks to become unviable to service debts especially when such debts are floating rate loans.

In the views of Sauders and Schumacher (2002), LLPTL has a positive effect on the sustainability of banks in their study on 614 banks across Europe and United States. Contrarily, Muhammad (2014) revealed that LLPTL has significant effect on the sustainability of bank. Following the conflicting findings of prior studies, loan-loss provision-to-total loans as a measure of risk management and equity-to-asset ratio as proxy for sustainability of banks were included in our study variable.

Banks are not different from other business whose primary purpose of being in existence is to make profit. This is actually the key of how banks use its funds to generate additional revenues effectively. Profits increases when banks give loans that both interest and capital are collectable as at when due. If there is proper management vetting of borrowers and recovery of funds, it will definitely reduce bad debt. Thus, there is a relationship between banks bad debt-to-total-loans (BDTTL) and the sustainability of banks (measured by equity-to-asset ratio).

On the other hand, when the borrowed funds are not effectively recovered, it results to cases of bad debt which most times have adverse effect on the sustainability of banks. Prior studies (see Mwagi, 2012; Muhammad, 2014) have shown that bad debt-to-total loans have been on the increase due to poor management of loans granted to firms and households. However, there are scanty empirical evidences that have validated the nexus between BDTTL and the sustainability of banks in Nigeria. Following the dearth of empirical evidence in this area, BDTTL and EQTAR were included in our study variable.

## **THEORETICAL FRAMEWORK**

### **Enterprise Risk Management (ERM) Theory**

The ERM theory was proposed by Nocco and Stulz (2006). According to the ERM theory, risk management brings two main advantages to firms which are at macro and micro levels. The macro benefits refer to long-run competitive advantage that a firm can gain via risk management. This becomes possible with risk management since it enables firms to transfer its non-core risks (that is, financial risks which can be transferred in a cheap way thanks to the presence of extensive and cheap derivatives market) effectively.

By reducing the exposure to these non-core risks, the firm can take up more core-risks (that is, business risks which the firm has competitive advantage in bearing). In other words, companies do business in order to take strategic and business risks; hence by increasing the ability to bear more business risk, firms can create competitive advantage in long run. This according to Nocco and Stulz (2006) can guide the firm in achieving business sustainability that can help in actualizing the profit maximization of firms. The micro benefits implies assigning carefully how and by whom risk is owned, as well as from allocating capital

based on risk-return tradeoff analyses.

A well-designed enterprise risk management system ensures that all material risks are ‘owned’ and risk-return tradeoffs carefully evaluated, by operating managers and employees throughout the firm. In summary, risk management increases business sustainability and shareholders value via careful risk-return tradeoffs on projects for capital allocation, which facilitates pursuing its strategic and business plan, as well as exploiting its business risks, leading to remain and/or improve firm’s competitive advantage.

### **Stakeholder Theory**

Stakeholder theory was propounded by Edward R. Freeman (1999). This theory outlines how management can satisfy the interest of stakeholders in order to make it sustainable. The basis of stakeholder theory defines stakeholders as “any group or individual who can affect or is affected by the achievement of the firm’s objectives.

Primary stakeholders include employees, owners (which include shareholders), consumers, government bodies, the communities and silent stakeholders. Silent stakeholders include the environment and future generations who need other bodies to represent them. According to Freeman, a business that wants to be sustainable cannot exist in a vacuum, hence it requires that there individuals who can help enhanced the level of sustainability of the business. The basic proposition of the stakeholder theory is that the firm’s success or sustainability is dependent upon the successful management of all the relationships that a firm has with its stakeholders. The purpose of the stakeholder theory is to help corporate managers understand their stakeholder and to manage more effectively within their corporate environment. This study is anchored on Stakeholder theory because it contributes to corporate sustainability concept by bringing supplementary business arguments as to why companies should work toward sustainable development.

### **EMPIRICAL REVIEW**

Onaolapo (2012), while analyzing the credit risk management efficiency in Nigerian commercial banking sector from 2004 through 2009 provides some further insight into credit risk as profit enhancing mechanism. They used regression analysis and found rather an interesting result that there is a minimal causation between deposit exposure and bank’s performance. Kithinji (2010) analyzed the effect of credit risk management (measured by the ratio of loans and advances on total assets and the ratio of non-performing loans to total loans and advances on return on total asset in Kenyan banks between 2004 to 2008). The study found that the bulk of the profits of commercial banks is not influenced by the amount of credit and non-performing loans.

Kolapo, Ayeni and Ojo (2012) using panel data regression for the period 2000 to 2010 found that the effect of credit risk on bank’s performance measured by the return on asset (ROA) of banks is cross sectionally invariant. They concluded that the nature and managerial pattern of individual firms do not determine the impact Muhammed, Shahid, Munir and Ahad (2012) used descriptive, correlation and regression techniques to study whether credit risk affect banks performance in Nigeria from 2004 to 2008. They also found that credit risk management has a significant impact on profitability of Nigerian banks. Felicia (2011) used regression analysis to investigate the determinants of commercial banks’ lending behaviour in Nigeria. The study discovered that commercial banks deposits have the greatest impacts on their lending behaviour. Meanwhile, Jackson (2011) followed the line of Fredrick (2010) by using CAMEL indicators as independent variables and return on Equity as a proxy for banks performance. His findings were also in line with that of Fredrick who also concluded that CAMEL model can be used as proxy for credit risk management. Kargi (2011) examined the nexus between credit risk management and bank performance during the period 2004-2008 by means of regression analysis. The study found a significant relationship



between banks performance and credit risk management. The study also found that loans and advances and non-performing loans are major variables that determine asset quality of a bank. Adofu and Audu (2010) used ordinary least square method to ascertain the assessment of the effects of interest rate deregulation in enhancing agricultural productivity in Nigeria. The study found out that interest rate play a significant role in enhancing economic activities and as such, monetary authorities should ensure appropriate determination of interest rate level that will break the double – edge effect of interest rate on savers and local investors. Fredrick (2010) demonstrated that credit risk management has a strong impact on bank’s financial performance in Kenya. Kithinji (2010) result provides the rationale to consider other variables that could impact on bank’s performance. Analysis of credit risk along capital requirement on bank’s performance could find solutions to the issue of bank’s performance in Nigeria. Unfortunately, only few studies have been conducted in developing countries and Nigeria in particular to examine the impact of capital requirement and bank’s performance. Few studies that examined capital requirement and performance in Nigeria and other developing countries concentrated on capital adequacy without considering credit risk in a unified framework. Hosna, Manzura and Juanjuan (2009) investigated the effect of credit risk management on profitability level of banks by means of regression analysis. The study revealed that higher capital requirement contributes positively to bank’s profitability.

## METHODOLOGY

This study adopted the *ex-post facto* research design. The population considered in this study is the total number of commercial banks listed on the Nigerian Stock Exchange A sample of fourteen (14) commercial banks was chosen for this study. The simple random sampling technique was employed in the selection of the sample. In this study, secondary data were obtained from the annual reports and accounts of the selected banks as well as the Central Bank of Nigeria Statistical Bulletin during the period under review.

### Model Specification

The following linear regression models were estimated based on the research hypotheses

$$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mu t \quad eq.1$$

Where  $\alpha$ ,  $\beta$ , and  $\mu$  are constants. In order to estimate equations (1) we can translate this into equations (2-4) as below:

$$EQTAR_{it} = \beta_0 + \beta_1 NPLTL_{it} + \beta_4 TOBINQ + \varepsilon_t \quad eq.2$$

$$EQTAR_{it} = \beta_0 + \beta_2 LLPTL_{it} + \beta_4 TOBINQ + \varepsilon_t \quad eq.3$$

$$EQTAR_{it} = \beta_0 + \beta_3 BDTTL_{it} + \beta_4 TOBINQ + \varepsilon_t \quad eq.4$$

Where: EQTAR = equity-to-asset ratio of banks as proxy for sustainability of banks; NPLTL = non-performing loan-to-total loans; LLPTL = loan-loss provision-to-total loans; BDTTL = bad debt-to-total loans to measure risk management; Tobin Q (a moderating variable to measure the market share risks of the selected banks);  $\varepsilon$  = error term (variables not captured in the model);  $it$  = time period;  $\beta_0, \beta_1, \beta_2$  = regression coefficients..

### Data Analysis

The data were analyzed using both descriptive (mean, standard deviation, minimum, maximum values, skewness, kurtosis and correlation) and inferential statistical techniques. In order to test for the relationship between risk management and the sustainability of banks, the regression analysis was employed and the

analysis was done via STATA 13.0 version.

## RESULTS AND DISCUSSION

This study investigated the nexus of risk management and the sustainability of banks in Nigeria. To achieve this, data of risk management measures (non-performing loan-to-total loans, loan-loss provision-to-total loans and bad debt-to-total loans), sustainability of banks indicator (equity-to-asset ratio of banks) and control variable (Tobin Q) were obtained from the annual reports and accounts of the selected banks and NSE Factbook for the period 2007 to 2017. The data were subjected to statistical technique (Ordinary Least Square) estimation technique and the statistical test was done via STATA 13.0 version as reported as follows;

Table 1. Descriptive Statistics of the Dependent, Independent and Moderating Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
eqtar	153	14.10987	7.007037	-23.29	30.98
npltl	152	12.43671	24.4855	-1.04	235.36
llptl	152	-4.221316	8.199782	-56.9	50.28
bdttl	153	2.592484	6.523881	-.38	47.03
tobinq	153	1.035294	.2082542	.78	2.07

Source: Secondary Data from STATA Output, 2019

Table 1 above reports the descriptive statistics of the dependent variable (equity-to-asset ratio of banks as proxy for sustainability=eqtar), independent variables (non-performing loan-to-total loans = npltl, loan-loss provision-to-total loans=llptl, and bad debt-to-total loans =bdttl to measure risk management) and moderating variables (tobinq). From the table above, the mean value of eqtar, npltl, llptl, bdttl, and tobinq were 14.10987, 12.43671, -4.221316, 2.492484 and 1.035294 with standard deviation values of 7.007037, 24.4855, 8.199782, 6.523881 and .2082542 respectively. It is clear from the descriptive statistics that npltl recorded the highest maximum value (235.36) and eqtar (-188.95) with the minimum value. Furthermore, the enormous variation of the variables over the period under investigation can be captured in the maximum and minimum values of the variables. The implication is that there were significant variations in all variables over the period under review. Also, the standard deviation is an indication that the variables are not constant over time. On the basis of the above results, the data is fit to conduct further statistical tests.

Table 2: Shapiro-Wilk W Test for Normal Data of Dependent, Independent and Moderating Variables

Variable	Obs	W	V	z	Prob>z
eqtar	153	0.86694	15.747	6.256	0.00000
npltl	152	0.44053	65.840	9.499	0.00000
llptl	152	0.58184	49.211	8.839	0.00000
bdttl	153	0.39353	71.775	9.698	0.00000
tobinq	153	0.70287	35.164	8.079	0.00000

Source: Secondary Data from STATA Output, 2019

The Shapiro-Wilk W tests of normality of dependent, independent and moderating variables are presented in table 2 Taking into consideration the Shapiro-Wilk W values, eqtar (0.86694), npltl (0.44053), llptl (0.58184), bdttl (0.39353) and tobinq (0.70287) is an indication that the variables are normally distributed

and was further supported by the Prob> Z. This implies that there is the absence of thinner tail than the normal distribution. Hence, the variables satisfy the condition of the normality.

Table 3: Correlation Matrix

	eqtar	npltl	llptl	bdttl	tobinq
eqtar	1.0000				
npltl	-0.4656	1.0000			
llptl	0.2803	-0.2279	1.0000		
bdttl	-0.3341	0.5282	0.0667	1.0000	
tobinq	-0.0150	0.2087	-0.0800	0.0543	1.0000

Source: Secondary Data from STATA Output, 2019

The result showed variables of npltl (-0.4656), bdttl (-0.3341) and tobinq (-0.0150) were negatively correlated with eqtar except llptl (0.2803) that is positively correlated with eqtar. In spite of the inverse correlation among the variables (positive/negative), none of the correlation coefficients exceeded 0.8; hence there is the absence of multicollinearity among the variables under investigation.

### Test of Research Hypotheses

In this study, three research hypotheses were formulated and tested at 0.05% level of significance.

HO<sub>1</sub>: There is no significant nexus between non-performing loan-to-total loans and equity to asset ratio of banks in Nigeria.

Table 4: Risk Management Measure of Non-Performing Loan-to-Total-Loans and Sustainability Measure of Equity-to-Asset Ratio of Selected Banks

Source	SS	df	MS	Number of obs = 152		
Model	1668.0895	2	834.044752	F( 2, 149) =	21.45	
Residual	5792.97661	149	38.8790377	Prob > F =	0.0000	
Total	7461.06612	151	49.4110339	R-squared =	0.2236	
				Adj R-squared =	0.2132	
				Root MSE =	6.2353	

  

eqtar	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
npltl	-.1390494	.0212284	-6.55	0.000	-.180997	-.0971018
tobinq	3.596127	2.52103	1.43	0.156	-1.38546	8.577715
_cons	12.13503	2.608395	4.65	0.000	6.980803	17.28925

Source: Secondary Data from STATA Output, 2019

The R-squared of 0.2132 is an indication that the risk management measure of npltl explains about 21.3% variation in sustainability measure of eqtar of the selected banks in Nigeria. Furthermore, it was shown that a statistical significant nexus exists between npltl and eqtar, although, negative (npltl t= -6.55; Prob>/t/ = 0.000). Given the f-ratio (F 2, 149 = 21.45; Prob. F = 0.0000 < 0.05), we therefore reject the null hypothesis and accept the alternative hypothesis which implies that there is significant nexus between non-performing loan-to-total loans and equity to asset ratio of banks in Nigeria.

HO<sub>2</sub>: There is no significant nexus between loan-loss provision-to-total loans and equity-to-asset ratio of banks in Nigeria.

Table 5: Risk Management Measure of Loan-Loss Provision-to-Total-Loans and Sustainability Measure of



Equity-to-Asset Ratio of Selected Banks

Source	SS	df	MS			
Model	582.287334	2	291.143667	Number of obs =	152	
Residual	6865.46267	149	46.0769307	F( 2, 149) =	6.32	
Total	7447.75001	151	49.3228477	Prob > F =	0.0023	
				R-squared =	0.0782	
				Adj R-squared =	0.0658	
				Root MSE =	6.788	

  

eqtar	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
llptl	.2396531	.0675467	3.55	0.001	.10618	.3731263
tobinq	.1031138	2.796299	0.04	0.971	-5.422411	5.628638
_cons	14.98973	2.925636	5.12	0.000	9.208633	20.77082

Source: Secondary Data from STATA Output, 2019

The R-squared of 0.0658 is an indication that the risk management measure of llptl explains about 6.58% variation in sustainability measure of eqtar of the selected banks in Nigeria. Furthermore, it was shown that a statistical significant nexus exists between llptl and eqtar, although, positive (llptl= 3.55; Prob>/t/ = 0.001). Given the f-ratio (F 2, 149 = 6.32; Prob. F = 0.0023 < 0.05), we therefore reject the null hypothesis and accept the alternative hypothesis which implies that there is significant nexus between loan-loss provision-to-total loans and equity-to-asset ratio of banks in Nigeria.

H0<sub>3</sub>: There is no significant nexus between bad debt-to-total loans and equity-to-asset ratio of banks in Nigeria.

Table 6: Risk Management Measure of Bad Debt-to-Total-Loans and Sustainability Measure of Equity-to-Asset Ratio of Selected Banks

Source	SS	df	MS			
Model	823.365498	2	411.682749	Number of obs =	153	
Residual	6639.61719	150	44.2641146	F( 2, 150) =	9.30	
Total	7462.98268	152	49.0985703	Prob > F =	0.0002	
				R-squared =	0.1103	
				Adj R-squared =	0.0985	
				Root MSE =	6.6531	

  

eqtar	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
bdttl	-.3573055	.0828473	-4.31	0.000	-.521004	-.1936071
tobinq	.5537924	2.595318	0.21	0.831	-4.574311	5.681896
_cons	14.46284	2.736862	5.28	0.000	9.05506	19.87062

Source: Secondary Data from STATA Output, 2019

The table 5, R-squared of 0.0985 is an indication that the risk management measure of bdttl explains about 9.85% variation in sustainability measure of eqtar of the selected banks in Nigeria. Furthermore, it was shown that a statistical significant nexus exists between bdttl and eqtar, although, negative (bdttl = -4.31; Prob>/t/ = 0.000). Given the f-ratio (F 2, 150= 9.30; Prob. F = 0.0002 < 0.05), we therefore reject the null hypothesis and accept the alternative hypothesis which implies that there is significant nexus between bad debt-to-total loans and equity-to-asset ratio of banks in Nigeria.

**CONCLUSION AND RECOMMENDATIONS**

Prominent among the forms of risks militating against the sustainability of deposit money banks (DMBs) among others include liquidity risks which may take the form of non-performing loans, loan losses, bad debts, etc. and market risks (e.g. interest, foreign exchange, equity and commodity prices risks). Prior

studies (see Abdelgalil, 2014; Guo & Mande, 2012; Adebisi, 2014; and Beasley, Clune & Dana, 2015) have shown that liquidity risk is the risk affecting banks the most.

In view of the above, this study investigated the nexus between risk management and the sustainability of banks in Nigeria by using sustainability measure of bank (equity-to-asset ratio and risk management measures (non-performing loan to total loans, loan loss provision to total loans and bad debt to total loans). The conclusion reached in this study is that risk management significantly affects the sustainability of banks in Nigerian context. On the basis of the findings, the following recommendations were proffered: That bank management as well as the regulatory framework of the banking subsector should devise risk management strategies or measures aimed at curbing or reducing the level of non-performing loans so as to further sustain banks and make them going concern. As a matter of fact and urgency, the loan loss provision of banks should be further reviewed such that banks are made to reduce their loan losses in every financial period. More importantly, bank management should find a way to further reduce bad-debt to total loans so as to sustain or augment the level of profitability.

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