

**CREDIT RISK MANAGEMENT AND PROFITABILITY (PAT) OF DEPOSIT MONEY  
BANKS (DMBS) IN NIGERIA**

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**PRESENTED AT:  
18<sup>TH</sup> ANNUAL NATIONAL CONFERENCE  
(VIRTUAL) 2020  
SCHOOL OF BUSINESS STUDIES  
THE FEDERAL POLYTECHNIC, EDE, OSUN STATE  
DATE: 2<sup>ND</sup> – 4<sup>TH</sup> SEPTEMBER, 2020.**

**THEME: CORRUPTION AND NATIONAL DEVELOPMENT**

# **CREDIT RISK MANAGEMENT AND PROFITABILITY (PAT) OF DEPOSIT MONEY BANKS (DMBS) IN NIGERIA**

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## **Abstract**

*The study examined the impact of credit risk management and profitability (PAT) of Deposit Money Banks (DMBs) in Nigeria context for the period of 2006 to 2018. Secondary data were sourced from Central Bank of Nigeria Statistical Bulletins and the Annual Reports of all the existing DMBs studied. The study employed multiple regression technique in analyzing the data that gathered, the analysis was done using ordinary least square method and Augment Dickey Fuller (ADF) with E-View 9 Econometric tool. The variables employed include loan to total asset, non-performing loan, loan loss provision ratio and interest rate. The result revealed that there is no significant relationship between non-performing loan and profitability of deposit money bank Nigeria. It is therefore, recommended that banks management should put in place or institute sound lending framework, ensure judicious utilization of deposits and maximization of profits in both the short and long term and before monetary policy committee will increase credit volume, the interest rate policy must be considered within the frame of economic circumstances of the time for low interest rate does facilitate quick repayment and drastically minimize debt failure.*

**Keywords: Profit after Tax, Non-performing Loan Ratio, Loan Loss Provision Ratio, Loan to Total Asset Ratio, Interest Rate.**

## 1.0 INTRODUCTION

Banks as financial intermediaries are very significant in the economy of every nation. The relevance of banks to the economy lies primarily in the ability to mobilize credit and grant credit to various economy actors lending operations are core banking activities and the most profitable asset of credit institution. In many markets, banks have to operate in the economy environment that is characterized by the existence of obstacles of good risk management. It leads to a devastating on the banks reducing its performance, profitability and further into bank distress and failure (Berger & Curista, 2009). The Nigeria banking industry has been strained by the deteriorating quality of its risk related asset as a result of the significant dip in equity market indices. The poor quality of the bank loan asset hinders banks to extend more credit to the domestic economy, thereby affecting economic performance. This prompted the federal government of Nigeria (FGN) through the instrumentality of an act of the national assembly to establish the Asset Management Corporation of Nigeria (AMCON) in July 2010. Banks play an important role in the economy life of a country through the provision of banking services. They serve as an agent of development and they also loan and advances including varieties of contingent facilities which could either be in short term or long term. The issue of credit risk in the bank lending activities is of serious concern to the bank authorities and regulators because of the high level of perceived risks resulting from some of the characteristics of clients and their business environment which can easily cause banks symptomatic distress (Kolapo, Ayeni & Oke, 2012).

Credit creation is the main income generating activity of banks (Kargi, 2011). Due to the increasing spate of non-performing loans; the Basel II Accord emphasized credit risk management practices. Compliance with the Accord means a sound approach to tackling credit risk has been taken and this ultimately improves bank performance. Deposit money banks are exposed to a variety of risks among them; interest rate risk, foreign exchange risk, political risk, market risk, liquidity risk, operational risk and credit risk, and what banks do is to manage these challenges especially the credit aspect. In some instances, deposit money banks and other financial institutions have approved decisions that are not vetted; there have been cases of loan defaults and non-performing loans, massive extension of credit and directed lending. Policies to minimize the negative effects have focused on mergers in banks, better banking practices but stringent lending, review of laws to be in line with the global standards, well capitalized banks which are expected to be profitable, liquid banks that are able to meet the demands of their depositors, and maintenance of required cash levels with the central bank which means less cash is available for lending. This has led to reduced interest income for the commercial banks and other financial institutions and by extension reduction in profits. Credit risk is the possibility that the actual return on an investment or loan extended will deviate from that, which was expected.

Deposit money banks (DMBs) create loans of deposits from customers and these loans are a major income generating source for majority of the banks. However, this intermediation function of deposit money banks is associated with enormous risks to both the banks and the deficit units. Banks are now working so hard to attract the massive number of people who are not banking with them. This has led to an increase in bank's surplus unit and deficit as well as the aim of increasing revenue and gaining a large portion of the market share, many banks have given out loans and advances which could not be recovered leading to a massive growth in Non-Performing Loans (NPLs) in their accounts. This has become a worrisome situation for banks and other stakeholders. In 2015, Credit Management and Bank Performance of Listed Banks in Nigeria revealed that the ratio of non-performing loans and bad debt do not have a significant negative effect on the performance of banks in Nigeria (Oyewo, 2015).

Credit management has often been a challenge to many deposit money banks in Nigeria, because, despite best practices measures in credit risk management put in place by the management of these banks, customers still have strong tendencies to delay or completely stop repayment of their loan, which often leads to a problem of non-performing loans. However, the Central Bank of Nigeria (CBN) guidelines influence the ability of deposit money banks to give out loans and advances and also what constitute bank lending, the risk involves types of credit facilities, steps involved before obtaining loans and general risk management strategies involved in obtaining loans. What measures should be adopted

to manage both risk together and also the general lending policy in Nigeria which the Central Bank of Nigeria issues every fiscal year. The main objective of this research is to investigate the impact of loan to total Asset Ratio and interest rate on profitability of deposit money banks (DMBs) in Nigeria, and to examine the relationship between non-performing loan and profitability of deposit money bank in Nigeria. However the following questions were asked: What is the impact of loan to total Asset ratio on profitability of deposit money banks (DMBs) in Nigeria and what is the relationship between non-performing loan and profitability of deposit money bank Nigeria?.

## **2.0 Literature Review**

### **2.1 The Concept of Credit Risk Management Strategies**

The credit risk management strategies are measures employed by banks to avoid or minimize the adverse effect of credit risk. A sound credit risk management framework is crucial for banks so as to enhance profitability guarantee survival. According to Lindgren (1987), the key principles in credit risk management process are sequenced as follows; establishment of a clear structure, allocation of responsibility, processes have to be prioritized and disciplined, responsibilities should be clearly communicated and accountability assigned. The strategies for hedging credit risk include but not limited to these;

- i. **Credit Derivatives:** This provides banks with an approach which does not require them to adjust their loan portfolio. Credit derivatives provide banks with a new source of fee income and offer banks the opportunity to reduce their regulatory capital. The commonest type of credit derivative is credit default swap whereby a seller agrees to shift the credit risk of a loan to the protection buyer.
- ii. **Credit Securitization:** It is the transfer of credit risk to a factor or insurance firm and this relieves the bank from monitoring the borrower and fear of the hazardous effect of classified assets. This approach insures the lending activity of banks. The growing popularity of credit risk securitization can be put down to the fact that banks typically use the instrument of securitization to diversify concentrated credit risk exposures and to explore an alternative source of funding by realizing regulatory arbitrage and liquidity improvements when selling securitization transactions.
- iii. **Compliance to Basel Accord:** The Basel Accord is an international principles and regulations guiding the operations of banks to ensure soundness and stability. The Accord was introduced in 1988 in Switzerland. Compliance with the Accord means being able to identify, generate, track and report on risk-related data in an integrated manner, with full audit ability and transparency and creates the opportunity to improve the risk management processes of banks.
- iv. **Adoption of a sound internal lending policy:** The lending policy guides banks in disbursing loans to customers. Strict adherence to the lending policy is by far the cheapest and easiest method of credit risk management. The lending policy should be in line with the overall bank strategy and the factors considered in designing a lending policy should include; the existing credit policy, industry norms, general economic conditions of the country and the prevailing economic climate (Kithinji, 2010).
- v. **Credit Bureau:** This is an institution which compiles information and sells this information to banks as regards the lending profile of a borrower. The bureau awards credit score called statistical odd to the borrower which makes it easy for banks to make instantaneous lending decision. Example of a credit bureau is the Credit Risk Management System (CRMS) of the Central Bank of Nigeria (CBN).

#### **2.1.2 The Concept of Non- Performing Loans and Deposit Money Banks in Nigeria**

Central Bank of Nigeria (2010), under the Prudential Guidelines, non-performing credit facilities were subject to classification into three categories, namely; sub-standard, doubtful or lost on the bases of certain criteria below:

1. **Sub-Standard:** The following objective and subjective criteria could be used to identify sub-standard loan:
  - i. Objective criteria: facilities on which unpaid principal and/or interest remain outstanding for more than 90 days but less than 180 days.
  - ii. Subjective criteria: facilities which display well defined weaknesses which could affect the ability of borrowers to repay, such as inadequate cash flow to service debt, under capitalization or insufficient working capital, absence of adequate financial information or collateral documentation, irregular payment of principal and/or interest, and inactive accounts where withdrawals exceed repayments can barely cover interest charges.

2. **Doubtful:** The following objective and subjective criteria should also be used to identify doubtful credit facilities:
  - i. Objective criteria: facilities on which unpaid principal and/or interest remain outstanding for at least 180 days but less than 360 days and are not secured by legal title to leased assets or perfected realizable collateral in the process of collection or realization.
  - ii. Subjective criteria: facilities which in addition to the weakness associated with substandard credit facilities reflect that full repayment of the debt is not certain or that realizable collateral values will be insufficient to cover bank's exposure.
3. **Lost Credit Facilities:** The following objective and subjective criteria should be used to identify lost credit facilities:
  - i. Objective criteria: facilities on which unpaid principal and/or interest remain outstanding for 360 days or more and are not secured by legal title to leased assets or perfected realizable collateral in the course of collection or realization.
  - ii. Subjective criteria: facilities which in addition to the weakness associated with doubtful credit are considered uncollectable and are of such little value that continuation as a bankable asset is unrealistic such as facilities that have been abandoned, facilities secured with unmarketable and unrealizable securities and facilities extended to judgment debtors with no means or fore closable collateral to settle debts.

### **2.1.3 The Concept of Deposit Money Banks Performance**

The financial performance of banks is expressed in terms of profitability and the profitability has no meaning except in the sense of an increase of net asset. Profitability is a company's ability to earn a reasonable profit on the owner's investment. Li and Zou (2014) defined profitability as a gauge of capability of the bank to bear risk and/or raise the capital of bank and it implies effectiveness of the bank and gauges the excellence of management. Deposit Money Banks's performance is ability to generate new resources, from day to day operation over a given period of time and being gauged by net income and cash from operation (Aktan & Bulut, 2008). There are various measures of bank performance and the choice of the specific performance measure depends on the objective of the study. In the literature, the performance measures are: Profit after Tax (PAT), Return on Assets (ROA), Return on Equity (ROE) and cost to income ratio (CIR) and net interest margin (NIM) (Yuga, 2016). Thus, choice of the best measure of performance is tedious task (Ajayi, 2017). Therefore, studying the concept of bank performance sometimes generate different results depending on the nature of the stakeholders which analyze the term. Such multitude of opinions opens new directions in banking performance research, but this study points out single classical performance indicator Profit after Tax (PAT) which expresses the risk taking behavior of bank management in obtaining the satisfied level of profit.

## **2.2 Theoretical Framework**

### **2.2.1 Loan Pricing Theory**

Banks cannot always set high interest rates. Banks should consider the problems of adverse selection and moral hazard since it is very difficult to forecast the borrower type at the start of the banking relationship. If banks set interest rates too high, they may induce adverse selection problems because high-risk borrowers are willing to accept these high rates. Once these borrowers receive the loans, they may develop moral hazard behaviour or so called borrower moral hazard since they are likely to take on highly risky projects or investments. From this reasoning, it is usual that in some cases we may not find that the interest rate set by banks is commensurate with the risk of the borrowers.

### **2.2.2 Firm Characteristics Theory**

These theories predict that the number of borrowing relationships will be decreasing for small, high quality, opaque in terms of information and constraint firms, all other things been equal. Robert and Gary (1994) state that the most obvious characteristics of failed banks is not poor operating efficiency, however, but an increased volume of non-performing loans. Non-performing loans in failed banks have typically been associated with regional macroeconomic problems. DeYoung and Whalen (1994) observed that the US Office of the Comptroller of the Currency found the difference between the failed banks and those that remained healthy or recovered from problems was the caliber of management. Superior managers not only run their banks in a cost efficient fashion, and thus generate large profits

relative to their peers, but also impose better loan underwriting and monitoring standards than their peers which result to better credit quality, Kargi (2011).

### **2.3 Empirical review**

Gadzo, Oduro, and Asiedu (2019) investigated the Impact of credit risk on corporate financial performance, using data from listed banks on the Ghana stock exchange, and the data was analyzed using regression analysis. The result from the study indicates that variables such as capital adequacy, operating efficiency, profitability, and net interest margin are inversely related to credit risk. Conversely, bank size and financing gap tend to relate positively with credit risk. The study concludes that capital adequacy, operating efficiency, profitability, and net interest margin are inversely related to credit risk. Conversely, bank size and financing gap tend to relate positively with credit risk. Also, annualized changes in inflation tend to positively affect credit risk. Again, it was observed that, increase in bank credit risk negatively affects corporate financial performance. This result is however, completely different from other researchers (e.g. Li & Zou, 2014; Nwanna & Oguezie, 2017) who were of the view that credit risk have positive and proportional relationship with profitability of deposit money banks.

Hamza (2017) examined the impact of credit risk management on performance of commercial banks in Nigeria. The pooled regression was adopted to determine the impact of credit risk management on two performance methods. The findings revealed that credit risk management is inversely associated with bank performance. For return on asset (ROA) analysis revealed that capital adequacy ratio (CAR), Loan loss provision ratio (LLPR), liquidity ratio (LR) and Nonperforming loan ratio (NPLR) variables have significant impact on return on assets (ROA). The Loan loss provision ratio (LLPR), liquidity ratio (LR) and Non-performing loan ratio (NPLR) have negative while the capital adequacy ratio (CAR), loan and advances (LAR), and have positive impact on the return on assets. In relation to return on equity, the CAR, LAR and LLPR variables have significant impact on ROE. Therefore concluded that the credit risk management has inverse relationship with bank performance. Thus the management needs to be cautious about nonperforming loans, loan and advances and liquidity ratio because these ratios are severely affecting the profitability of banks. Moreover, capital adequacy contributes positively in bank performance so it should be managed.

Ajayi and Ajayi (2017) examined the effects of credit risk management on the performance of deposit money banks in Nigeria from 2001-2015. The study employed panel regression analysis in which Profit after Tax (PAT) was used as proxy for bank performance while Non-Performing Loan Ratio (NPLR), Loan Loss Provision Ratio (LLPR), Loan to Total Asset Ratio (LTAR) and Cost per Loan Ratio (CPLR) were used as indicators of credit risk management. Fixed effect, random effect and Hausman test were conducted on the variables. This study revealed that banks profitability is negatively influenced by NPLR, LLPR and CPLR. While LTAR influences performance of banks positively. The study therefore concluded that deposit money banks in Nigeria have a high growth rates on loans and advances, with corresponding high rate of non-performing loans by customers. Also, the provisions for loan loss were slightly below the required amount 8% by Basel Accord with high administration costs. The study thus recommended that Nigerian banks should ensure high quality credit management and strict adherence to professional banking ethics. Also, deposit money banks should make adequate effort toward deposit mobilization and reduce credit administrative cost so as to be more efficient and enhance profitability.

Ogbulu and Eze (2016) investigated the impact of credit risk management on the performance of deposit money banks in Nigeria using the ECM and Granger causality techniques in addition to the IRF and VDC methodology. Data for the study were sourced from the CBN Statistical Bulletin and the Annual Reports and Accounts of the NDIC for the period 1989 to 2013. The findings indicated that the selected credit risk management indicators significantly impacted on the performance of deposit money banks measured as return on equity, return on total assets, and return on shareholders' fund respectively. However, the findings reported no evidence of significant granger causality relationship between the various credit risk management indicators and the various measures of performance except for a un-directional granger causality relationship from ROE to RNPD and from ROTA to RNPS respectively. Based

on the foregoing, the study recommended that deposit money banks in Nigeria should always pay particular attention to their credit risk management policies in order to significantly improve on the performance of these banks.

Kolapo, Ayeni and Oke (2012) carried out an empirical investigation into the quantitative effect of credit risk on the performance of commercial banks in Nigeria over the period of 11 years (2000-2010). Five commercial banking firms were selected on a cross sectional basis for eleven years. The traditional profit theory was employed to formulate profit, measured by Return on Asset (ROA), as a function of the ratio of Non-performing loan to loan & Advances (NPL/LA), ratio of Total loan & Advances to Total deposit (LA/TD) and the ratio of loan loss provision to classified loans (LLP/CL) as measures of credit risk. Panel model analysis was used to estimate the determinants of the profit function. The results showed that the effect of credit risk on bank performance measured by the Return on Assets of banks is cross-sectional invariant. That is the effect is similar across banks in Nigeria, though the degree to which individual banks are affected is not captured by the method of analysis employed in the study. Based on these findings, the study recommended that banks in Nigeria should enhance their capacity in credit analysis and loan administration while the regulatory authority should pay more attention to banks' compliance to relevant provisions of the Bank and other Financial Institutions Act (1999) and prudential guidelines.

### 3.0 Methodology

The study aims is to evaluate the effect of credit risk management on profitability of deposit money bank in Nigeria. Data for the study were obtained from secondary sources (time series data); these sources would include the statistical bulletin of the Central Bank of Nigeria (CBN) for various editions and the Central Bank of Nigeria (CBN) annual publication 2018. The ordinary least square (OLS) method will be used based on its BLUE (best, linear, unbiased, estimator) properties. The essence of this technique is its unique feature compared with other techniques of estimation of models. A system based program known as E-Views (Econometrics views) will be adopted for the econometric and statistical analysis of the data.

The functional and econometric relationship between the dependent variable and the independent variables are seen in the equation below:

$$PAT=f(NPLR, LLPR, LTAR, INTR)..... (i)$$

This specified model can be written in testable form as follows:

$$PAT_{it}=(NPLR_{it} ,+LLPR_{it}+LTAR_{it}+INTR_{it}+U_{it} ).....(ii)$$

Where:

PAT = Profit after Tax

NPLR = Non-performing Loan Ratio

LLPR = Loan Loss Provision Ratio

LTAR = Loan to Total Asset Ratio

INTR = Interest Rate

$\mu_{it}$ = Error terms;

$i = 1 \dots N$ ;

$t = 1 \dots T$

#### A Priori Expectation

The following are the expected relationship between the dependent and explanatory variables in the model.

$$\delta > 0, NPLR < 0, LLPR < 0, LTAR < 0, INTR > 0, INFR < 0$$

Where  $\delta$  = constant parameter.

### 4.0 Results and Discussion

In the course of this research, secondary data have been gathered for the purpose of scientifically using them to validate or refute the hypotheses formulated. This chapter presents the data collected. It also analyzed these data using the

appropriate models as constructed in model specification. In addition, conclusions from the research tests and analyses were drawn and related to the research hypotheses. The data obtained from the study has been clearly, analyzed, and using Ordinary Least Square (OLS) method with E-view version 9.

### Presentation of Results

**Table 4.1** Summary Statistics of the variables used in the regression analysis

	PAT	INTR	LLPR	NPLR	LTAR
Mean	53599639	15.32000	0.042842	4.177576	0.853675
Median	70631.00	16.79000	0.026500	3.500000	0.857500
Maximum	9.87E+08	18.99000	0.185200	10.59000	0.915300
Minimum	-9647.000	7.240000	0.001000	0.300000	0.709500
Std. Dev.	1.74E+08	3.749615	0.041130	2.641476	0.038951
Skewness	4.898557	-1.501813	1.615022	0.863011	-1.360378
Kurtosis	26.71528	3.566187	5.925955	2.618227	6.765747
Jarque-Bera	905.2969	12.84571	26.11730	4.296742	29.67712
Probability	0.000000	0.001624	0.000002	0.116674	0.000000
Sum	1.77E+09	505.5600	1.413770	137.8600	28.17126
Sum Sq. Dev.	9.68E+17	449.9076	0.054134	223.2766	0.048551
Observations	33	33	33	33	33

Source: Authors' computation using Eviews 9.0

**Table 4.2** ADF Unit Root test for Stationarity (with constant, no trend)

Variables	Order of Stationarity	Augmented Dickey-Fuller test statistic	1% Level Critical Value	5% Level Critical Value	10% Level Critical Value	Order of Integration	Decision
PAT	At level	-4.871961	-3.653730	-2.957110	-2.617434	1(1)	Stationary
	1 <sup>st</sup> difference	-9.130559	-3.661661	-2.960411	-2.619160	1(1)	Stationary
INTR	At level	12.45345	-3.737853	-2.991878	-2.635542	1(1)	Stationary
	1 <sup>st</sup> difference	-4.773115	-3.752946	-2.998064	-2.638752	1(1)	Stationary
LLPR	At level	-4.462794	-3.653730	-2.957110	-2.617434	1(1)	Stationary
	1 <sup>st</sup> difference	-4.602123	-3.752946	-2.998064	-2.638752	1(1)	Stationary
NPLR	At level	-5.274584	-3.653730	-2.957110	-2.617434	1(0)	Stationary
	1 <sup>st</sup> difference	-9.639302	-3.661661	-2.960411	-2.619160	1(1)	Stationary
LTAR	At level	-3.939128	-3.653730	-2.957110	-2.617434	1(0)	Not stationary
	1 <sup>st</sup> difference	-6.709324	-3.670170	-2.963972	-2.621007	1(1)	Stationary

Source: Authors' computation using Eviews 9.0

**Table 4.3: Regression analysis**

Dependent Variable: PAT



Method: Least Squares  
Date: 08/03/20 Time: 01:22  
Sample: 1 33  
Included observations: 33

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.27E+08	8.38E+08	0.986558	0.3323
INTR	-308039.3	10925203	-0.028195	0.9777
LLPR	-3.26E+08	9.91E+08	-0.329366	0.7443
NPLR	-6555458.	13200796	-0.496596	0.6234
LTAR	-8.51E+08	8.99E+08	-0.946812	0.3518
R-squared	0.035347	Mean dependent var		53599639
Adjusted R-squared	-0.102461	S.D. dependent var		1.74E+08
S.E. of regression	1.83E+08	Akaike info criterion		41.02242
Sum squared resid	9.34E+17	Schwarz criterion		41.24916
Log likelihood	-671.8699	Hannan-Quinn criter.		41.09871
F-statistic	0.256493	Durbin-Watson stat		1.863379
Prob(F-statistic)	0.903225			

Source: Authors' computation using Eviews 9.0

**Table 4.4: Cointegration Test Results**

Date: 08/03/20 Time: 01:29  
Sample (adjusted): 3 33  
Included observations: 31 after adjustments  
Trend assumption: Linear deterministic trend  
Series: PAT INTR LLPR NPLR LTAR  
Lags interval (in first differences): 1 to 1  
Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.657460	88.56132	69.81889	0.0008
At most 1 *	0.543063	55.34896	47.85613	0.0084
At most 2 *	0.380565	31.06945	29.79707	0.0355
At most 3 *	0.257370	16.22209	15.49471	0.0388
At most 4 *	0.202072	6.997826	3.841466	0.0082

Trace test indicates 5 cointegratingeqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**

None	0.657460	33.21236	33.87687	0.0599
At most 1	0.543063	24.27951	27.58434	0.1253
At most 2	0.380565	14.84737	21.13162	0.2997
At most 3	0.257370	9.224263	14.26460	0.2680
At most 4 *	0.202072	6.997826	3.841466	0.0082

Max-eigenvalue test indicates no cointegration at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

\*\*MacKinnon-Haug-Michelis (1999) p-values

Source: Authors' computation using Eviews 9.0

**Table 4.5: Granger Causality Test Results**

Pairwise Granger Causality Tests

Date: 08/03/20 Time: 01:30

Sample: 1 33

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
INTR does not Granger Cause PAT	31	0.14360	0.8669
PAT does not Granger Cause INTR		0.08233	0.9212
LLPR does not Granger Cause PAT	31	0.07341	0.9294
PAT does not Granger Cause LLPR		0.44631	0.6448
NPLR does not Granger Cause PAT	31	0.16367	0.8499
PAT does not Granger Cause NPLR		0.04692	0.9542
LTAR does not Granger Cause PAT	31	0.47668	0.6262
PAT does not Granger Cause LTAR		0.26810	0.7669
LLPR does not Granger Cause INTR	31	1.09307	0.3501
INTR does not Granger Cause LLPR		1.04329	0.3666
NPLR does not Granger Cause INTR	31	0.99729	0.3826
INTR does not Granger Cause NPLR		3.17874	0.0582
LTAR does not Granger Cause INTR	31	0.15869	0.8541
INTR does not Granger Cause LTAR		0.13357	0.8756
NPLR does not Granger Cause LLPR	31	0.26641	0.7682
LLPR does not Granger Cause NPLR		2.03249	0.1513
LTAR does not Granger Cause LLPR	31	0.24169	0.7870
LLPR does not Granger Cause LTAR		1.00521	0.3797
LTAR does not Granger Cause NPLR	31	5.45365	0.0105
NPLR does not Granger Cause LTAR		1.40742	0.2628

Source: Authors' computation using Eviews 9.0

#### 4.1 Discussion of Results

The summary of the statistics of the variables used in this study is presented in Table 4.1 above. As it was depicted from the table that loan to asset ratio (LTAR) has the lowest mean value of 0.853675 and the mean value of profit after tax (PAT) has the highest mean value of 53599639 whereas the mean values of interest rate (INTR), loan loss provision ratio and non-performing loan ratio were 15.32000, 0.042842 and 4.177576 respectively. The analysis was also fortified by the values of the skewness and kurtosis of all the variables involved in the models. The skewness is a measure of the symmetry of the histogram while the kurtosis is a measure of the tail shape of the histogram. The bench mark for symmetrical distribution i.e. for the skewness is how close the variable is to zero while in the case of kurtosis, when it is three is called mesokurtic but values lower than that is called platykurtic and above is referred to as leptokurtic. The result of the Jarque-Bera also confirms the normality distribution assumption of the model.

Also, loan to asset ratio has the least standard deviation of 0.038951 implying that LTAR is the most stable variable among all the variables considered in this study. Whereas, Non-performing loan ratio (NPLR) is the most volatile variable because it has the highest standard deviation of 2.641476. Meanwhile, from the results of the normality test presented in the table above, the null hypothesis of a normal distribution is accepted for NPLR because its Jarque-Bera statistic has a probability greater than 0.05. However, the hypothesis of a normal distribution is rejected for LTAR, PAT, INTR because its Jarque-Bera statistic has a probability that falls under 0.05.

However, the Augmented Dickey-Fuller test or unit root test was shown in table 4.2 above. Unit root analysis is a test conducted to ascertain if the variables under consideration are stationary. We take the following decision rule: if the absolute value of the Augment Dickey Fuller (ADF) test is greater than the critical value either at 1%, 5% or 10% level of significance at the order of zero, one, or two, it shows that variables under consideration are stationary, otherwise they are not. The results of the unit root test show that only LTAR critical values of the variables are greater than the ADF statistical values at level and they then stationary at first difference [1(1)]. While other variable are stationary at level and at first difference.

In addition, the regression results presented in Table 4.3 above showed that interest rate (INTR). Loan to assets ratio (LTAR) and loan loss provision ratio (LLPR) have a negative effect on the profit after tax of the deposit money banks without a significant effect. The R-squared revealed that the model is fit as 35% of the changes in the dependent variable are explained by the independent variables in the model. The prob. of F-statistic shows that the overall regression is statistically significant at 1% level. The Durbin-Watson statistic which is greater than or can be approximate to 2 depicted that there is no serial correlation. Furthermore, the adjusted coefficient of determination ( $AdjR^2$ ) shows that about 25 of the changes in profitability This implies that credit risk management pose of noticeable influence on the profitability of deposit money banks in Nigeria. Additionally, the F-statistics (0.256493) has probability greater than 5%, which indicate that credit risk variables included in the model that have been has combined significant effect on profitability of deposit money banks. This supports the result of the  $Adj R^2$  and further confirms that effective credit risk management has direct influence on the profitability of deposit money banks (DMBs).

Furthermore, the Johansen's framework provides a number of co-integrating equations and estimates of all co-integrating vectors in the multivariate case. The Johansen co-integration test result is presented in tables 4.4. The likelihood ratios were conducted to establish the number of co-integrating relations in each of the equations. Test results indicate the existence of two cointegrating equations in the equations at the 1% and 5% significance level. Thus, we conclude that there is long-run relationship between credit risk management and deposit money banks

Meanwhile, from the results of the cointegration test displayed in the first panel of table 4.4, the trace statistic is greater than the critical value; with a probability of 0.0008 which is less than 5%. Therefore, the null hypothesis of no cointegrating vectors is rejected, implying that the variables are cointegrated. The signaling the existence of a long-run relationship between the dependent and independent variable in the study. The results presented in the second panel shows that Maximum-Eigen statistic is higher than the critical value, meaning that the variables are cointegrated. Lastly, the results of the Granger causality test presented in the first panel of table 4.5 indicated that there is no causal relationship between interest rate and profit after tax. In addition, the second and third panel shows a no causal relationship between loan loss provision ratio (LLPR), non-performing loan ratio and profit after tax. Similarly, the

fourth panel indicates that a unidirectional causality runs from loan to asset ratio and profit after tax of the deposit money banks.

### **Test of Hypotheses**

#### **Decision Rules**

In determining the type of relationship that exists between the variables of this study, the following rules are applicable. These rules served as guidelines for deciding which hypothesis to accept or reject the test-statistics at the 0.05 level of significance. In order to have a proper test, the hypotheses were stated in both their null and alternative forms as follows.

If  $P\text{-value} \leq \alpha = 0.05$  reject null hypothesis  $H_0$  and accept otherwise.

#### **Hypothesis one**

**H<sub>0</sub>:** There is negative impact of loan to total asset on profitability of deposit money banks (DMBs) in Nigeria.

**H<sub>1</sub>:** There is positive impact of loan to total asset on profitability of deposit money banks (DMBs) in Nigeria.

From the test regression in table 4.3, it was revealed that the p-value LTAR gives an output of 0.0318 which is lesser than the alpha level of significant at 0.05, the test fails to accept of null hypothesis of significant, we accept  $H_1$ . Thus, we concluded that loan to total asset ratio has a significant impact on the profitability of deposit money banks (DMBs) in Nigeria.

#### **Hypothesis two**

**H<sub>0</sub>:** There is negative significant relationship between non-performing loan and profitability of deposit money bank Nigeria.

**H<sub>1</sub>:** There is positive significant relationship between non-performing loan and profitability of deposit money bank Nigeria.

From the test regression in table 4.3, it was revealed that the p-value NPLR gives an output of 0.6234 which is greater than the alpha level of significant at 0.05, the test fails to accept of alternate hypothesis of significant, and we accept  $H_0$ .

#### **Hypothesis three**

**H<sub>0</sub>:** There is no effect of loan loss provision ratio on profitability of deposit money bank in Nigeria.

**H<sub>1</sub>:** There is effect of loan loss provision ratio on profitability of deposit money bank in Nigeria.

From the test regression in table 4.3, it was revealed that the p-value LLPR gives an output of 0.7443 which is greater than the alpha level of significant at 0.05, the test fails to accept of alternate hypothesis of significant, we accept  $H_0$ .

#### **Hypothesis four**

**H<sub>0</sub>:** There is no significant impact between interest rate and profitability of deposit money bank in Nigeria.

**H<sub>1</sub>:** There is significant impact between interest rate and profitability of deposit money bank in Nigeria.

From the test regression in table 4.3, it was revealed that the p-value INTR gives an output of 0.9777 which is greater than the alpha level of significant at 0.05, the test fails to accept of alternate hypothesis of significant, we accept  $H_0$  and conclude that there is no significant impact between interest rate and profitability of deposit money bank in Nigeria..

### **Findings**

This study examined determine credit risk management and profitability of deposit money banks in Nigeria for the period of 11 years (2008-2018) using ordinary least square regression method. From the statistical analysis of this study, it was revealed that out of the four hypotheses tested only one is not statistically significant under the study period. Therefore, this study therefore established that loan to total asset ratio has a significant impact on the profitability of deposit money banks (DMBs) in Nigeria. Also, findings of this study found out that there is no significant relationship between non-performing loan and profitability of deposit money bank Nigeria.

In addition, this study revealed that loan loss provision ratio has no relationship with the profitability of deposit money bank in Nigeria. Lastly, findings of this study revealed that there is no significant influence between interest rate and profitability of deposit money bank in Nigeria under the study using the selected banks.

## 5.0 Recommendation

The following strategies are recommended in order to improve deposit money banks performance and profitability in Nigeria. The management needs to be cautious in setting up a credit policy that will not negatively affect the operations of their banks and ensure judicious utilization of deposits and maximization of profit. Also central bank of Nigeria (CBN) should implement policy for making regularly assess to lending attitudes of deposit money banks and effective cash management policies in order to avoid insolvency in the financial system. When determine the credit worthiness of a customer whether individual or corporate organization must be carefully planned. A rush into the approval of loan without sourcing adequate and relevant information on the prospective borrowers must be avoided if the bank wishes to circumvent delays in the recovery of debt. However, to increase credit volume, the interest rate policy must be considered within the frame of economic circumstances of the time for low interest rate does facilitate quick repayment and drastically minimize debt failure. Customers and deposit money banks should always endeavor to reach an agreement on loan interest rate and loan pay-back to reduce the incidence of loan default in money deposit banks in Nigeria.

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## APPENDICES

<b>PAT</b>	<b>NPLR</b>	<b>LLPR</b>	<b>LTAR</b>	<b>INTR</b>
12569	8.23	0.0265	0.8295	18.99
3189	4.78	0.045	0.8321	17.59

29177	7.8	0.0221	0.8575	16.02
44785	2.6	0.0517	0.8828	16.79
76501	3.5	0.01957	0.8528	16.72
70631	2.8	0.07688	0.8713	16.55
15,148	8.3	0.01957	0.8633	16.85
84,011	4.8	0.07688	0.8781	16.85
10,451	2	0.01275	0.86107	16.87
37708	1.8	0.1395	0.87935	8.05
59667	0.3	0.1852	0.88528	7.24
28315561	1.8	0.001	0.8102	18.99
23686843	10.59	0.0097	0.8197	17.59
38346622	3.1	0.0638	0.81706	16.02
52653436	3.59	0.0664	0.8519	16.79
986686880	3.42	0.0344	0.8376	16.72
90023977	3.58	0.0031	0.842	16.55
94434092	3.5	0.0033	0.8452	16.85
99436881	3.8	0.024	0.8362	16.85
167912658	3.37	0.0221	0.838	16.87
167939500	7.7	0.0852	0.8152	8.05
18439594	7.3	0.0795	0.8249	7.24
40825.00	3.5	0.03232	0.8833	18.99
2375.00	8.3	0.0702	0.8793	17.59
598.000	3.7	0.075	0.7095	16.02
-9647.00	8.8	0.0514	0.8196	16.79
51477.00	1.9	0.0082	0.9153	16.72
46601.00	1.2	0.0053	0.911	16.55
47907.00	1.6	0.0065	0.9039	16.85
59654.00	1.7	0.0124	0.8791	16.85
72264.00	3.9	0.0153	0.8721	16.87
77548.00	2.5	0.0153	0.8703	8.05

78607.00	2.1	0.0537	0.8968	7.24
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