

Credit Risk Management and Interest Income of Banks in Nigeria

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Abstract

This study examines the impact of credit risk on the interest income of banks in Nigeria between the period of 2000 and 2014. Unbalanced panel data analysis was used to estimate the model with unit root test, Breusch Pagan test, trend analysis, descriptive statistics, Perasan CD Test, heteroskedasticity test, heterogeneity test, serial correlation test, Jarque-bera, F-statistics, random effect, fixed effect, time effect, Prob value, Hausman test and rho as the estimation parameters. The study discovered that NPL, LLP and LA are statistically significant in explaining the variation in interest income across banks in Nigeria, while LA/TD is not statistically significant in explaining the variation in interest income across banks in Nigeria. Based on this, the study recommends that regular update of credit policy and adequate measures to monitor loans should be put in place by banks in Nigeria, as these measures will reduce bad loans and ultimately cause a reduction in loan loss provisions.

Keywords: *Credit risk, non-performing loans, interest income, return on asset, risk management*

JEL Classification Codes: G11, G12, G21

Introduction

Credit risk management is a vital concept receiving crucial attention all over the world most especially in the financial institutions. The salient goals of corporate organization are to maximize profits, achieve high level of liquidity with the aim of guaranteeing organizations safety and also attain highest level of shareholder's net worth. The relevance of banks to the economy lies primarily in their ability to mobilize credit and grant loans to various sectors in the economy and also ensuring that it does not suffer from lack-of or excess liquidity. Lending operations are core banking activities and the most profitable asset of financial institutions. In many markets, banks have to operate in the economic environment that is characterized by the existence of obstacles to good credit management. When credit are not properly channeled, controlled and administered, it reduces interest income and banks profitability and also leads to bank distresses and failures (Berger and Christa, 2009; Eljelly, 2004).

Risk increases when credit principles are violated and sound banking practices require that bank management put in place standards for appraising and approving individual credit application to ensure that loans granted are repaid. However, due to poor credit administration caused by loopholes and violation in risk assessment and control techniques, bad and doubted debts still claim a bulk charge on bank performance causing many banks to witness institutionalized distress and some, total unexpected collapse. Since lending carries a reasonable portion of resource exposure of banks, the ability of a bank to generate much profit is largely a function of effective and efficient management of its lending portfolio (Aruwa and Musa, 2014). The major issues surrounding the study centers on the looming failures of financial institutions in which lack of adequate credit and liquidity management seems to be the major causes of banks distress in Nigeria and diaspora.

According to Ahmad and Ariff (2007), most banks in economies such as Thailand, Indonesia, Malaysia, Japan and Mexico experienced high non-performing loans and significant increase in credit risk during financial and banking crises, which resulted in the closing down of several banks in Indonesia and Thailand. 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, forty eight (48) Deposit Money Banks (DMBs) were liquidated (NDIC, 2011). In 2005, the number of licensed banks operating in Nigeria were reduced to twenty

four (24) 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 2014 are twenty one (21). The major causes of the above banks failure can be attributed to poor risk management (Hamisu, 2011).

The crises in the banking sector led to the establishment of Nigeria Asset Management Corporation of Nigeria (AMCON) which commenced operation in the year 2010 to take over the management of the toxic assets in the books of the banks and also the management of failing banks in Nigeria such as Keystone banks, Enterprise Bank and Mainstreet Bank.

In spite of the measures put in place aimed at protecting depositors and other public interest, the incidence of bank distress and failure has been on the high increase in Nigeria. High rate of non-performing loans, increased in loan loss provisions, increases in the probability of bank default and reduction in interest income which serves as the bulk revenue portfolio for banks can be ascribed to the ineffectiveness of the Credit risks management of Nigerian banks.

Business conditions are often unpredictable and can lead to changes in the borrower's financial position and affects their ability to repay the loans at the date of maturity. With the above scenario, bank faces a credit risk of losing part or the entire loan including the interest receivable on such loans. This negatively affects the interest income accruing from such loans, reduces bank performance and also reduces its' capabilities to meet its' financial obligations as they fall due. As these conditions remain unchecked, the liquidity of the bank is also threatened (Bhunja, 2012).

Non-performing loans posed a great threat to the success of a bank and also reduced the profit channel of banks in Nigeria such as the interest income. Loan loss provision is also another credit risk management techniques which reduces funds to be channeled in viable investment by banks which ultimately affects its performance and survival. Inefficient credit management posed a great threat to the liquidity positions of a bank, as it affects the amount of cash balances, bank balances and treasury bills representing short term cash management which ensures the day-to-day running of the bank. Efficient credit management policies ensure high and constant interest income from loans and advances given to various individuals', firms, corporate bodies and government institutions. It is expedient that low credit management policies will drastically affect interest income.

Several studies such as (Hosna, Manzura and Juanjuan 2009; Kithinji, 2010; Simiyu, 2012; Madishetti and Rwechungura, 2013; Kargi, 2011; Idowu and Awoyemi, 2014) focused on credit risk management and banks performance, and it appears that no studies has examined the impact of credit risk management on interest income of banks in Nigeria. It is against this setback that the study examined the impact of credit risk management on interest income of banks in Nigeria using some selected quoted banks on the Nigerian stock exchange as at December 2015 as the case study. This study excludes those banks acquired by Asset Management Corporation of Nigeria (AMCON) such as the Keystone Bank, Enterprise Bank and Mainstreet Bank and also international banks in Nigeria such as Citi Bank, EcoBank, Standard Chartered Bank and it covers the period from 2000 to 2014, due to the fact that some banks in Nigeria are yet to publish their annual report for 2015 as at the time data is gathered for the study. The choice of this period was based on the fact that Nigerian banking industry experienced tremendous expansion when Universal Banking was introduced in 2000 and when consolidation reforms was also introduced in 2005.

The rest of this article is organised into four sections. Section two discusses the concepts of credit risk management and various empirical evidences related to the study. Section three provides the exposition of theoretical framework, conceptual framework, model specifications, estimation techniques and sources of data. Section four includes analysis of data and discussion of results while section five summarises the paper with some concluding remarks.

Literature Review

Conferring to Ingham (2002), credit can be described as the provision of loans by one party where the second party does not reimburse the first party immediately, thereby generating a debt, and instead arranges either to repay or return those resources or materials of equal value at a later date. Agreeing to Ejoh, Okpa and Egbe (2014), credit risk is a serious threat to the performance of banks which when unchecked would lead to the total

collapse of banks while, liquidity risk also act as a snare to banks with an unsound risk assessment and control policy.

In addition, Henderson (2011) opined that credit risk occurs when there is a loss in value as a result of a debtor's non-payment of a loan or other line of credit, either the principal or interest (coupon) or both. Credit risk according to Basel Committee of Banking Supervision BCBS (2001) is the possibility of losing the outstanding loan partially or totally, due to credit events (default risk). Campbell (2007) defined credit risk as the risk of loss due to debtor's non-payment of a loan or other line of credit. He further explained that credit risk management is very important in banks because it forms an integral part of loan process while, Nwankwo (2000) opined that credit constitutes the largest single income-generating asset in the portfolio of most banks and this explains why banks spend enormous resources to estimates, monitor and manage credit quality.

According to Kolapo, Ayeni & Oke (2012), credit management financial tools are loan loss provisions, loans and advances to total deposits ratio, non-performing loans, loans and advances while the non-financial tools are Capital Adequacy, Asset Quality, Management Quality, Earnings, Liquidity and Sensitivity to Market Risk (CAMELS).

Ejoh *et al.*, (2014) further explained that credit management policy is a comprehensive process that deals with identifying the target markets, credit extension, credit monitoring and identifying the proceeds while, Appa (1996) opined that credit management policy entails the mechanisms, standards and parameters that guide the bank officers in granting loans and managing the loan portfolio under the banking discipline. He further explained that it is a set of guidelines designed to maximize cost associated with credit while maximizing benefits from it.

Theoretical Framework

There are various theories on credit risk management and they are: liquid asset theory, anticipated income theory, commercial loan theory, shiftability theory, liability management theory. The theoretical framework that serves as the basis for the study is the anticipated income theory.

Anticipated Income Theory

Anticipated income theory was propounded by Prochanow in 1949, at the end of world war 11 as a result of the fact that the compositions of the earnings assets of commercial banks began to change as resources shifted back from the government to the private sector. The spectacular rise in the loan demand of the immediate postwar years provided commercial banks with strong incentives to expand their loan portfolios, and hence to increase bank earnings. After the postwar, commercial banks began to make loans that were of longer maturity, covered a much wider variety of borrowers, and extended to many more purposes than originally envisaged.

Bank's management had acquired more experience in meeting deposits withdrawals and had found that through prudent asset management, a mixture of very liquid and not-so-liquid assets could achieve the desired degree of overall liquidity. Thus, the loan portfolios of commercial banks in the postwar years have included such items as intermediate and long-term loans to customers, home owners, and business firm that would not qualify as liquid assets under the traditional theory of bank liquidity and would qualify only in part, if at all under the shiftability theory. However, loans of this type qualify under the anticipated income theory.

This theory is superior to the real bill doctrine and the shiftability theory because it fulfills the three objectives of liquidity, safety and profitability. Another importance of anticipated income theory is that, it is a method to analyze borrower's credit worthiness. It gives the banks criteria for evaluating the potentials of a borrower to successful repayment of loan on time.

According to Prochanow (1949), anticipated income theory argues that a bank can maintain its liquidity if loan repayments are scheduled on the basis of the anticipated income of the borrower rather than the use made of the funds of the collateral offered. This theory also suggests that banks should rely on debtors' income and its coverage is determined on the basis of inclusive cash-flow projections which ordinarily provide a reliable indication of the quality of the loan being financed. Hence, the future cash flows of the borrowers, rather than the nature of particular transactions being financed, assures the self-liquidating character of a loan because it will

determine a borrower's overall ability to meet interest and principal payments as they fall due. If the borrower's anticipated income is estimated correctly, the bank will have a flow of funds that can be used to meet depositor's claims and/or other loan demand.

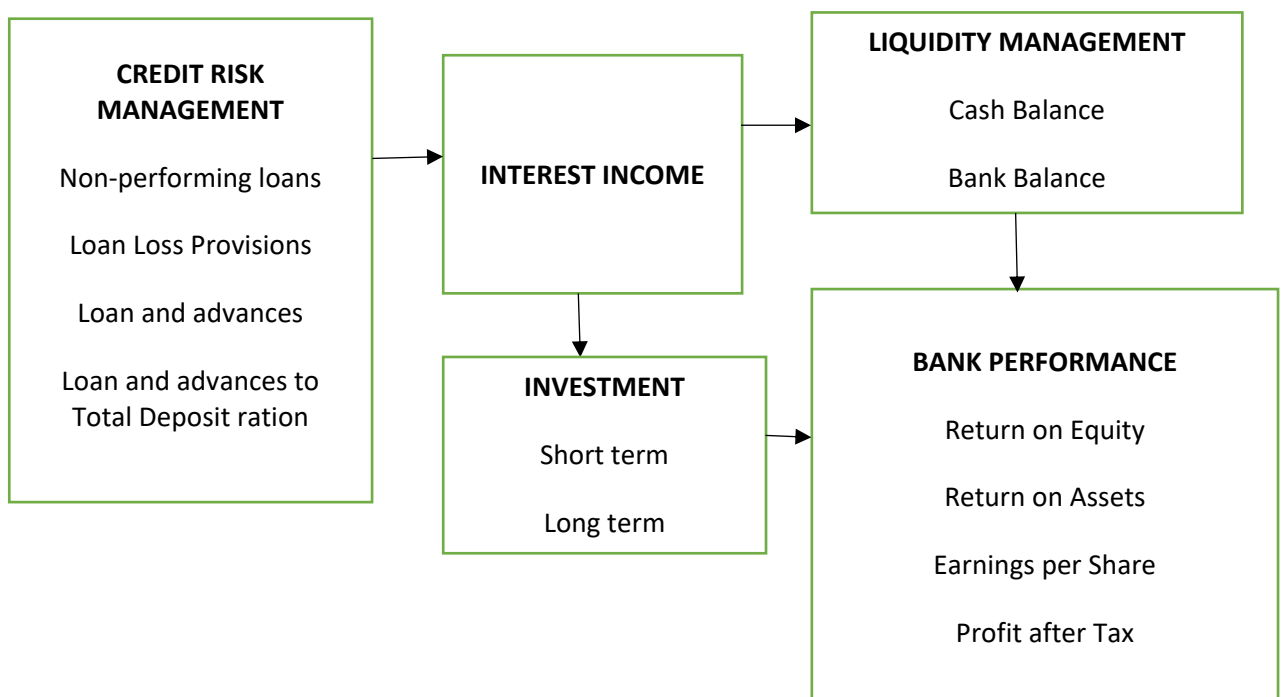
According to Ibe (2013), anticipated income theory holds that a bank's liquidity can be managed through the proper phasing and structuring of the loan commitments made by a bank to the customers. Here the liquidity can be planned if the scheduled loan payments by a customer are based on the future of the borrower. According to Nzotta (1997), the theory emphasizes the earning potential and the credit worthiness of a borrower as the ultimate guarantee for ensuring adequate liquidity.

Alshatti (2015) stated that the bank can manage its liquidity through the appropriate directing of the granted loans, and the ability to collect these loans when due in a timely manner and to reduce the possibility of delays in repayment at the maturity time. This theory posts 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 borrower's expected income to be paid in a periodic and regular premiums, and that will enable the bank to provide high liquidity, when the cash inflows are regular and can be expected.

Conferring to Ngwu (2006), anticipated income theory of liquidity of commercial bank holds the view that bank's liquidity can be estimated, and met if scheduled payments are based on the income of the borrowers. This theory does not deny the applicability of self-liquidating and suitability theories. It emphasizes on relating loan repayment to income rather than relying heavily on collaterals. It also holds that, bank's liquidity can be influenced by the maturity pattern of the loans and investment portfolios, short-term business and customer installment loans which would have more liquidity than those secured by real estate. Thus, appropriate credit risk management policies of a bank will increase interest income and ultimately ensure adequate liquidity.

In conclusion, anticipated income theory serves as the theoretical underpinning because it incorporates credit and liquidity management policies because it analyzes borrower's credit worthiness. It gives the banks criteria for evaluating the potentials of a borrower to successful repayment of loan on time which ultimately affect the interest income which can be used to influence the liquidity positions of banks.

Theoretical Model



Source: Prochanow (1949)

Anticipated income theory holds the views that if credit were adequately managed, interest income will be influence, which will affect the investment opportunities and ultimately increase the liquidity position of the firm by ensuring the day to day operation of the firm and ultimately increase the organizational performance.

Empirical Review

Hosna, Manzura and Juanjuan (2009) examined credit risk management and profitability in commercial bank in Sweden over the period of 2000 to 2008. The study used quantitative approach and focused majorly on the descriptive statistics. Regression analysis was also used in the study. ROE being the function of NPLR and CAR. The findings revealed that credit risk management has effect on profitability in all 4 banks. NPLR has a significant effect more than CAR on profitability (ROE) at 1 percent level of significance and it was recommended that a qualitative study of credit risk management which will make the findings more objective and informative and profitability indicators could be developed by adding other dependent variables to grasp the whole variations in profitability.

Kithinji (2010) surveyed credit risk management and profitability of commercial banks in Kenya over the period of 2004 to 2008. A regression model was used to establish the relationship between amount of credit, Non-performing loans and profit. The amount of credit was measured by loans and advances to customers divided by total assets while, the Non-performing loans was measured using non-performing loans divided by total loans and profits was measured using return on total asset (ROTA). The result showed that there is a positive relationship between the amount of credit and profit while, there is a negative relationship between the level of non-performing loans and profit at 10 percent level of significance and the study recommends that commercial banks that are keen on making high profits should concentrate on other factors other than focusing more on amount of credit and non-performing loan.

Simiyu (2012) investigated the impact of credit risk management on profitability of commercial bank: A study of Europe. In the research model, Return on Equity (ROE) and Return on Assets (ROA) were defined as proxies for profitability while NPLR and CAR are defined as proxies for credit risk management. The research collects data from the largest 47 commercial banks in Europe. The findings revealed that credit risk management have a positive effect on profitability of commercial banks i.e NPLR has a significant effect on both ROE and ROA while CAR has an insignificant effect on both ROE and ROA at 5 percent level of significance. The study recommended that bank managers should put more efforts to the credit risk management, especially to control the NPLR.

Madishetti and Rwechungura (2013) determined the impact of credit risk on the performance of Tanzanian commercial banks over the period of 2006 to 2013 and the study used only secondary data which were sourced mainly form the annual reports of eight largest Tanzanian commercial banks were used in the study. Return on Assets (ROA) being a function of ratio of non-performing loans to loan and advances and ratio of loans and advances to total deposits. Multiple regression was used to estimate the relationship. The result of the study revealed that there is a negative relationship between credit risk and bank performance in Tanzanian and also that the relationship is statistically significant at 10 percent and the study also recommends that Tanzanian commercial banks management should put in place adequate credit policy which will ensure that credit risk is reduced and banks profitability level is improved.

Kargi (2011) also investigated the impact of credit risk on the profitability of Nigerian banks over the period of 2004 to 2008. Financial ratios as measure of banks performance and credit risk were collected from annual reports study used descriptive, correlation and regression techniques while the findings revealed that credit risk management has a significant impact on the profitability of Nigerian banks at 10 percent level of significance.

Idowu and Awoyemi (2014) examined the impact of credit risk management on the commercial banks performance in Nigeria over the period of 2005 to 2011. The panel regression model was employed for the estimation in the model. Return on equity and Return on Asset were used as the performance indicators while non-performing loans (NPL) and capital adequacy ratio (CAR) as credit risk management indicators and it was revealed that credit risk management has a significant impact on the profitability of commercial banks in Nigeria at 5 percent level of significance. The study recommends that commercial banks are recommends to establish sound and competent credit risk management units which are run by best practices in risk management.

Ogboi and Unuafe (2013) inspected the impact of credit risk management and capital Adequacy on the financial performance on commercial banks in Nigeria over the period of 2004 to 2009. Panel data model was used to estimate the relationship that exists among loan loss provisions (LLP), loans and advances (LA), non-performing loans (NPL), Capital adequacy (CA) and return on asset (ROA), using a time series and cross sectional data from 2004 to 2009. The result showed that sound credit risk management and capital adequacy impacted positively on banks financial performance with the exception of loans and advances which was found to have a negative impact on banks at 5 percent level of significance and the research recommends that Nigerian banks should institute appropriate credit risk management strategies by conducting rigorous credit appraisal before loan disbursement and drawdown.

Model Specification

The model used to achieve the objective was adopted from the study of Ogboi and Unuafe (2013) which was specified as:

$$ROA = f(NPL, LLP, LA, \frac{LA}{TD}) \dots\dots\dots\text{equation (i)}$$

$$ROA_{it} = \beta_0 + \beta_1NPL_{it} + \beta_2LLP_{it} + \beta_3LA_{it} + \beta_4 \frac{LA}{TD}_{it} + \mu_{it} \dots\dots\dots\text{equation (ii)}$$

Where:

β_0 = Constant

ROA = Return on Asset

NPL = Non performing loan

LLP = Loan loss provision

LA = Loans and Advances

TD = Total Deposits

μ_{it} = Error term

The model was re-modified to capture interest income of banks as the dependent variables being a function of credit management financial indicators and it was re-modified as:

$$INTINC = f(\text{Credit Management Financial Indicators})$$

$$INTINC = f(NPL, LLP, LA, \frac{LA}{TD}) \dots\dots\dots\text{equation (iii)}$$

$$INTINC_{it} = \beta_0 + \beta_1NPL_{it} + \beta_2LLP_{it} + \beta_3LA_{it} + \beta_4 \frac{LA}{TD}_{it} + \mu_{it} \dots\dots\dots\text{equation (iv)}$$

When transformed to normalize the data, it becomes:

$$LOGINTINC_{it} = \beta_0 + \beta_1LOGNPL_{it} + \beta_2LOGLLP_{it} + \beta_3LOGLA_{it} + \beta_4LOG \frac{LA}{TD}_{it} + \mu_{it} \dots\dots\dots\text{equation (v)}$$

Where:

LOGINTINC =Logarithm of Interest Income

LOGNPL = Logarithm of Non-performing loans

LOGLLP = Logarithm of Loan loss provisions

LOGLA = Logarithm of loans and advances

$\text{LOG} \frac{LA}{TD}$ = Logarithm of Ratio of Loans and Advances to Total Deposits

μ_{it} = error term

The subscripts i and t refers to the cross-dimension and time series dimension of the model respectively, explaining the panel nature of the model.

Population/Sample Size of the Study

The population of the study comprises of the quoted twenty one (21) banks in Nigeria stock market. The sample size comprises of fourteen banks in Nigeria and these were selected based on some criteria which are: (i) Banks that are wholly or majorly owned by Nigerians; (ii) Banks that retained their brand names over time; (iii) Banks that experienced either universal reform or consolidation reform in Nigeria and (iv) Banks that also experienced merger and acquisitions in Nigeria.

Based on this criteria, the fourteen banks selected are: First Bank PLC, United Bank of Africa (UBA), Guaranteed Trust Bank (GTB), Union Bank, Unity Bank, First City Monument Bank (FCMB), Fidelity Bank, Access Bank, SKYE Bank, Sterling Bank, Wema Bank, Stanbic IBTC Bank, Zenith Bank and Diamond Bank.

Sources of Data

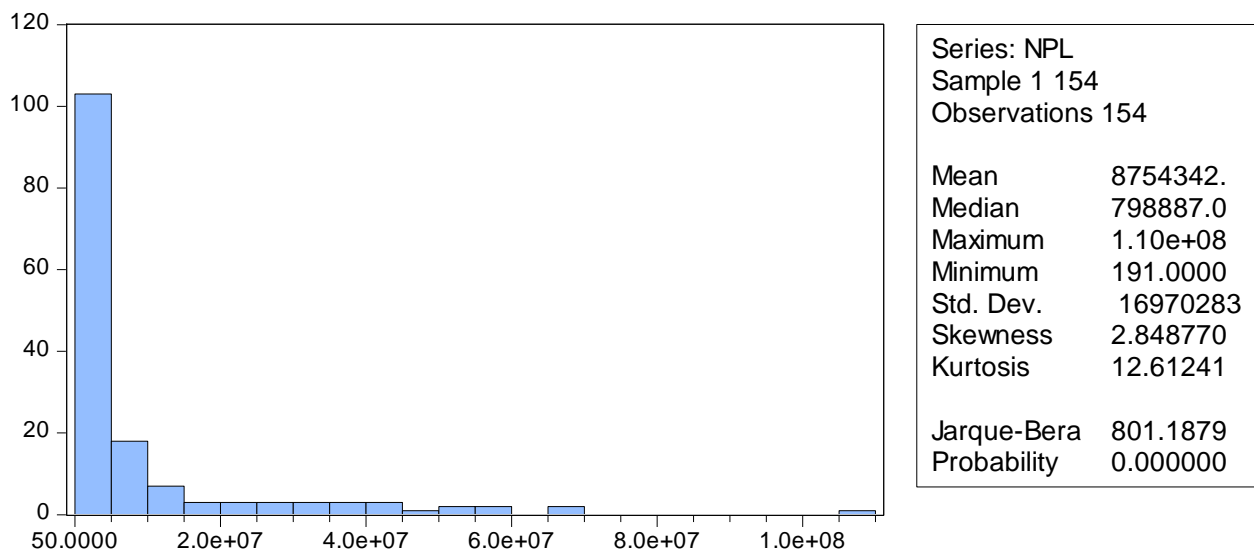
The data needed for the study are secondary in nature implying that data will be obtained from annual report for all the fourteen quoted banks. Other sources are journal and Nigerian stock exchange fact book 2000, 2005 and 2010 and 2014.

Method of Data Analysis

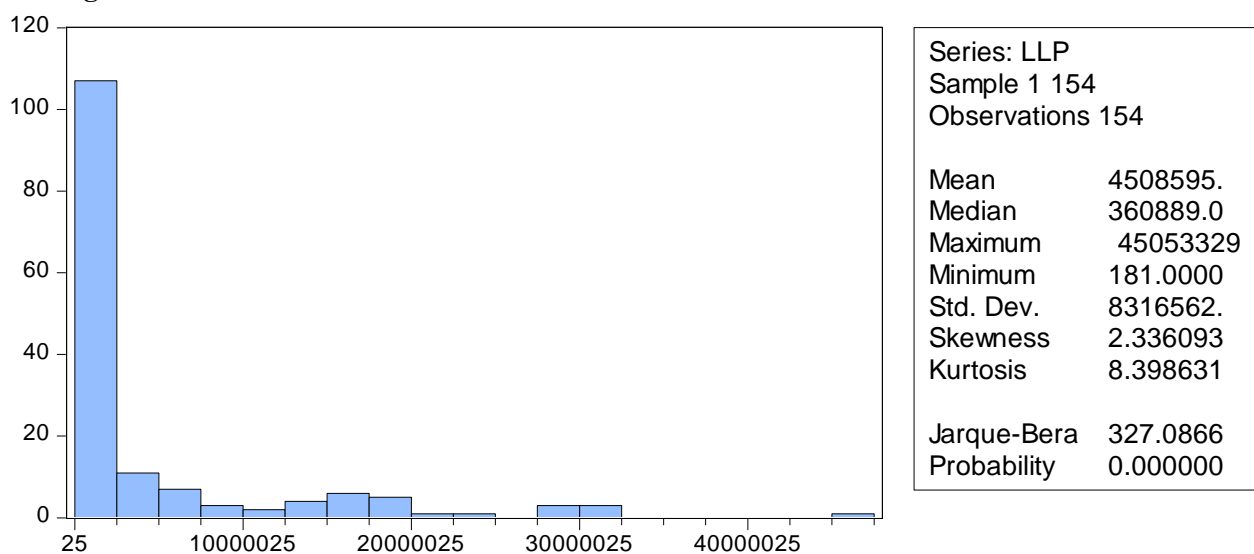
The model is estimated using unbalanced panel data analysis for the period 2000-2014 and the estimation parameters used for decision making in the study were unit root test, Breusch Pagan test, trend analysis, descriptive statistics, Perasan CD Test, heteroskedasticity test, heterogeneity test, serial correlation test, Jarque-bera, F-statistics, random effect, fixed effect, time effect, Prob value, Hausman test and rho. The study used Stata 11 statistical software version for its analysis.

Result

Descriptive Statistics of Variables

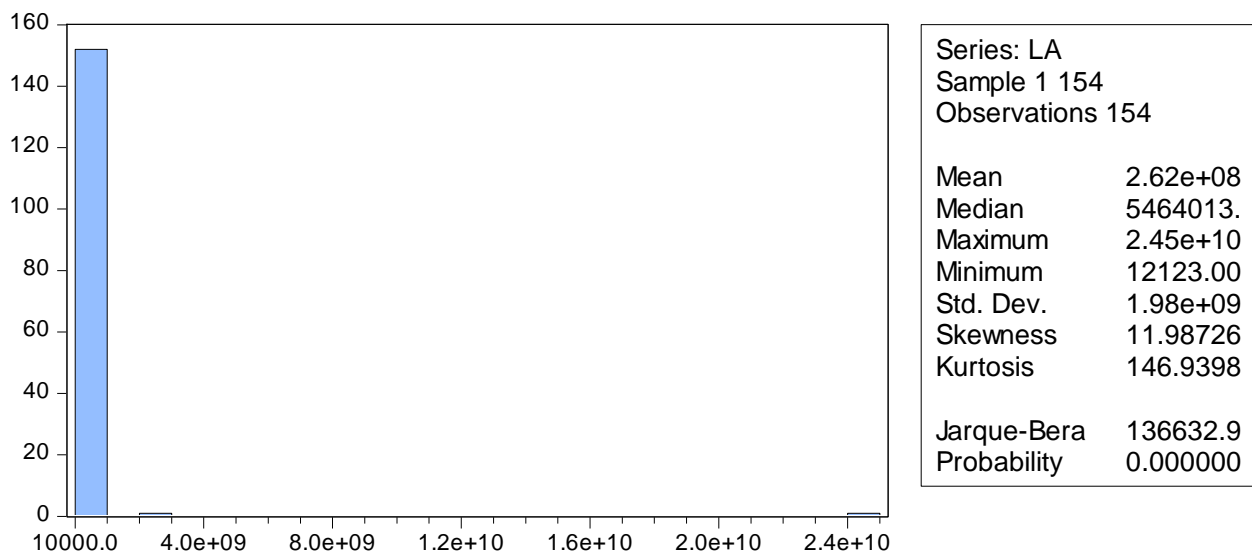
Figure 1: Non-Performing Loans

The diagram above shows the descriptive statistics of Non-Performing loans (NPL) across banks in Nigeria. It was revealed that Non-Performing Loans (NPL) across banks has a mean value of 8754342, a median value of 798887, a minimum value of 191.00 and also standard deviation value of 16970283 from mean value. The diagram also shows that the skewness is greater than 0 with a value of 2.8448. This indicates a right skewed distribution, while the kurtosis is also greater than 3, with a value of 12.612. This also indicates a leptokurtic distribution. This implies that Non-performing loans (NPL) across banks has a sharper normal distribution with values concentrated around the mean and thicker tail.

Figure 2: Loan Loss Provisions

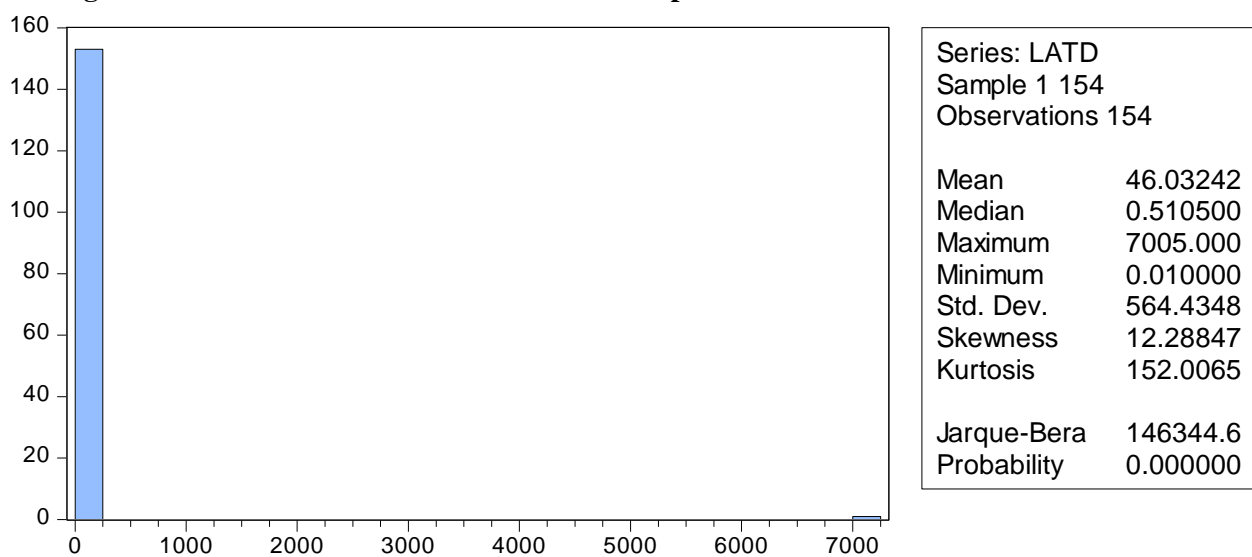
The diagram above shows the descriptive statistics of Loan Loss Provisions (LLP) across banks in Nigeria. It was revealed that Loan Loss Provisions (LLP) across banks has a mean value of 4508595, a median value of 360889, a minimum value of 181.00 and also standard deviation value of 8361562 from mean value. The diagram also shows that the skewness is greater than 0 with a value of 2.336. This indicates a right skewed distribution, while the kurtosis is also greater than 3, with a value of 8.398. This also indicates a leptokurtic distribution. This implies that Loan Loss Provisions (LLP) across banks has a sharper normal distribution with values concentrated around the mean and thicker tail.

Figure 3: Loans and Advances



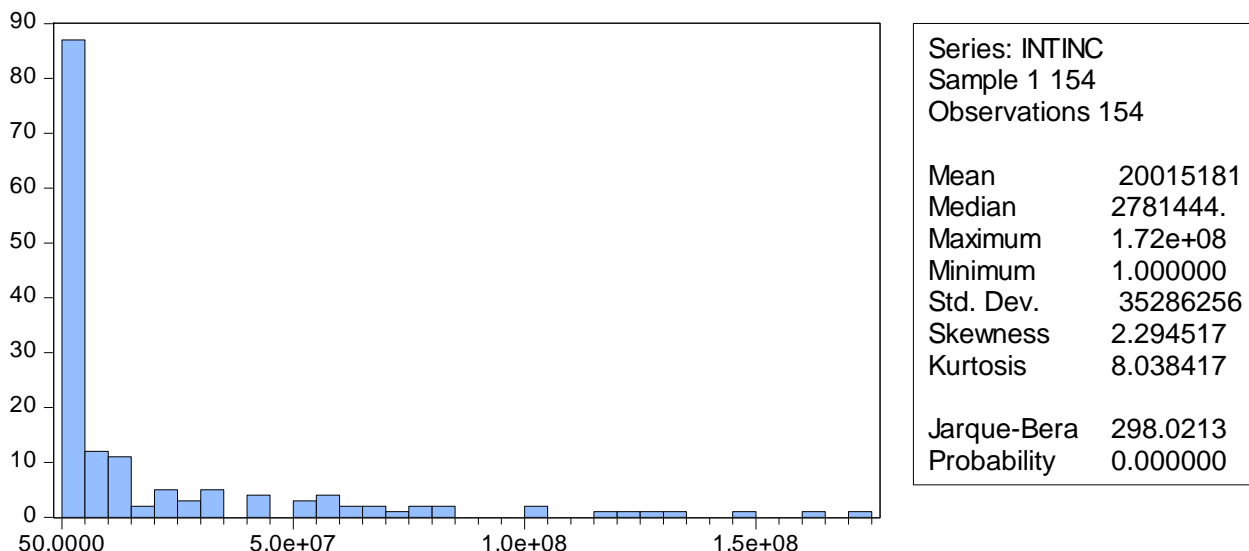
The diagram above shows the descriptive statistics of Loan and advances (LA) across banks in Nigeria. It was revealed that Loan and advances (LA) across banks has a mean value of 2.62, a median value of 5464013, a minimum value of 12123.00 and also standard deviation value of 1.98 from mean value. The diagram also shows that the skewness is greater than 0 with a value of 11.98. This indicates a right skewed distribution, while the kurtosis is also greater than 3, with a value of 146.93. This also indicates a leptokurtic distribution. This implies that Loan and advances (LA) across banks has a sharper normal distribution with values concentrated around the mean and thicker tail.

Figure 4: Ratio of Loan and Advances to Total Deposits



The diagram above shows the descriptive statistics of ratio of Loan and Advances to Total Deposits (LA/TD) across banks in Nigeria. It was revealed that Loan and Advances to Total Deposits (LA/TD) across banks has a mean value of 46.032, a median value of 0.5105, a maximum value of 7005, a minimum value of 0.0100 and also standard deviation value of 564.43 from mean value. The diagram also shows that the skewness is greater than 0 with a value of 12.288. This indicates a right skewed distribution, while the kurtosis is also greater than 3, with a value of 152.006. This also indicates a leptokurtic distribution. This implies that Loan and Advances to Total Deposits (LA/TD) across banks has a sharper normal distribution with values concentrated around the mean and thicker tail.

Figure 5: Interest Income



The diagram above shows the descriptive statistics of ratio of Interest Income (INTINC) across banks in Nigeria. It was revealed that Interest Income (INTINC) across banks has a mean value of 20015181, a median value of 2781444, a maximum value of 1.72, a minimum value of 1.0000 and also standard deviation value of 35286256 from mean value. The diagram also shows that the skewness is greater than 0 with a value of 2.2945. This indicates a right skewed distribution, while the kurtosis is also greater than 3, with a value of 8.0384. This also indicates a leptokurtic distribution. This implies that Interest Income (INTINC) across banks has a sharper normal distribution with values concentrated around the mean and thicker tail.

Table 1: Variables Cross-Sectional Dependence

Variables	C-D Test	P-Value	Remarks
LOGINTINC	3.90	0.0000	Cross sectional Dependence
LOGNPL	1.38	0.167	No Cross sectional Dependence
LOGLLP	3.74	0.000	Cross sectional Dependence
LOGLA	7.75	0.000	Cross sectional Dependence
LOGLA/TD	2.15	0.032	Cross sectional Dependence

Source: Author’s Computation, (2016)

The table above revealed that variables such as LOGINTINC, LOGLLP, LOGLA and LOGLA/TD, strongly reject the null hypothesis of no cross sectional dependence of variables across banks at 1 percent level of significance, while LOGNPL do not reject the null hypothesis of no cross sectional dependence of variables across banks in Nigeria.

Table 2: Cross Sectional Dependence

C-D	-0.817
Test	
Pr	0.4142
Abs	0.281

Source: Author’s Computation, (2016)

The table above revealed that the null hypothesis of no cross sectional dependence should not be rejected for the model, since the Pr value of 0.4142 is greater than 1 percent, 5 percent and 10 percent level of significance. This implies that the residuals are not correlated.

Table 3: Heteroskedasticity Test

Chi2(14)	1776.49
Prob >	0.0000
Chi2	

Source: Author’s Computation, (2016)

The table above revealed that there is presence of heteroskedasticity in the model since the Prob>chi2 value of 0.0000 is significant at 1 percent. The null hypothesis of homoskedasticity should be rejected, implying that there is presence heteroskedasticity in the model. This implies that Pooled OLS is inappropriate, thus there is evidence of significant differences across banks in Nigeria.

Table 4: Test of Serial Correlation

F(1, 13)	0.787
Prob>F	0.3912

Source: Author’s Computation, (2016)

The table above test for serial correlation in the model. It was revealed that the null hypothesis of no serial correlation should not be rejected and therefore concludes that the variables do not have first-order autocorrelation.

Table 5: Heterogeneity Test

Chi2(1)	19.85
Prob > Chi2	0.0000

Source: Author’s Computation, (2016)

In table above, the Prob > chi2 gives a value of 0.000, implying that the null hypothesis should be rejected and it revealed that the random effect is appropriate due to the fact that there is evidence of significant differences across banks and this also implies that the variables cannot be pooled together, signaling that the Pooled OLS method is inappropriate.

Table 6: Summary Statistics of Panel Result

Independent Variables	Pooled OLS Coefficient	-val	Random Effects		Fixed Effects		
			P	Coefficient	P-val	Coefficient	P-val
Constant	0.4736	.446	0	1.1851	0.185	2.5288	0.060
LOGNPL	0.1567	.075	0	-0.1945	0.026	0.1934	0.039
LOGLLP	0.4552	.000	0	-0.4542	0.000	0.4382	0.000
LOGLA	0.3732	.000	0	0.2966	0.0	0.2224	0.008
LOGLA/T	-0.0684	.000	0	-0.0901	0.5	-0.0812	0.583
D		.633			22		
						Corr (u_i, Xb)	0.352
							9
2	Prob>Chi	0.0000		0.0000		0.0000	
	R²	0.7893		0.7877		0.7844	
	Rho			0.1838		0.2684	
	Sigma_u			0.6689		0.8538	
	Sigma_e			1.4094		1.4094	
Hausman						0.09	

Source: Author’s Computation, (2016)

$$\text{LOGINTINC} = 1.1851 - 0.1945\text{LOGNPL}_{it} - 0.4542\text{LOGLLP}_{it} + 0.2966\text{LOGLA}_{it} - 0.0901\text{LOGLA/TD}_{it} + 0.6689\mu_{it} + 1.4094e_{it}$$

The result generated from using the random effect estimator is used to describe the impact of credit management financial indicators on interest income of banks in Nigeria. The presence of heterogeneity in the model also signals that the data cannot be pooled together. This therefore implies that the Polled OLS method is inappropriate for the model. The Corr (u_i, Xb) value of 0.3529 produced from the Fixed Effect (FE) model also shows that there is a weak correlation with the explanatory variables. A weak correlation usually indicates that random effect model is appropriate.

Furthermore, the Hausman test gives a Prob value of 0.09 and this implies that the probability value is not significant at 5%, therefore random effect is appropriate for the study. The R² was used to test the fitness of the model, it gives a value of 0.7877. This implies that the independent variables such as Non-performing loans

(NPL), Loan Loss Provisions (LLP), Loans and Advances (LA) and Ratio of Loans and Advances to Total Deposits (LA/TD) captures 78.77% variation in the dependent variables while the smaller percentage which is 21.23% was not represented in the model.

The result from the Random Effect (RE) model revealed that the Prob>chi2 gives a value of 0.0000, and this indicates that the model is statistically significant at 1%. The result also revealed that coefficients such as LOGNPL, LOGLLP and LOGLA are statistically significant in explaining the variation in interest income across banks in Nigeria, while LOGLA/TD is not statistically significant in explaining the variation in interest income across banks in Nigeria. The estimate of rho gives a value of 18.38%, and this explains that 18.38% of the variance is due to differences across panel.

Inferring from the result above, the coefficient of LOGNPL is statistically significant at 5 % and it also has a value (-0.1945). This implies a percent change in Non-performing Loans (NPL) would lead to 0.1945% change in interest income across banks. The negative relationship between LOGNPL and LOGINTINC indicated that as Non-Performing Loans (NPL) increases, interest income will also decrease and vice versa. The coefficient of LOGLLP is also statistically significant at 1% with a value of (-0.4542). This also implies that a percent change in Loan loss Provisions (LLP) would lead to 0.4542% change in interest income across banks. The negative relationship between LOGLLP and LOGINTINC indicated that as Loan Loss Provisions (LLP) increases, interest income will also decrease and vice versa.

The coefficient of Loans and Advances is also statistically significant at 1% with a value of 0.2966. This implies a percent change in Loans and Advances (LA) would lead to 0.2966% change in interest income across banks. The positive relationship between LOGLA and LOGINTINC indicated that as Loan and Advances (LA) increases, interest income will also increase and vice versa.

Discussion of Findings

The study discovered that NPL, LLP and LA are statistically significant in explaining the variation in interest income across banks in Nigeria, while LA/TD is not statistically significant in explaining the variation in interest income across banks in Nigeria. The null hypothesis which states that Credit management financial instruments do not significantly affect interest income of banks in Nigeria should not be accepted. This is because credit financial instrument such as NPL and LLP have a significant negative relationship with interest income across banks in Nigeria while LA has a significant positive relationship with interest income across banks in Nigeria. The study revealed that adequate credit management measure were not put in place by banks to reduce the volume of Non-performing loans of banks in Nigeria and this has ultimately increase the amount of money set aside as the provision for loan losses. This inadequacy negatively affects interest income of banks in Nigeria.

In addition, the study also revealed that loans and advances have a positive impact on interest income of banks in Nigeria. Based on the following conclusions, the study recommends that regular update of credit policy and adequate measures to monitor loans should be put in place by banks in Nigeria, this measures will reduce bad loans and ultimately cause a reduction in loan loss provisions; banks should improve on their credit management financial indicators such as reduction in Non-performing loans (NPL), reduction in Loan Loss provisions (LLP) and also increase in Loans and Advances (LA), as this indicators affect interest income across banks in Nigeria and also banks in Nigeria should increase loans and advances to individuals, corporate organization and various government institutions, but adequate measures should be put in place to cushion the incidence of bad loans, as loans and advances increases interest income, which also ultimately enhance banks liquidity.

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