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BANK INTERMEDIATION EFFICIENCY AND NON-PERFORMING LOANS IN NIGERIA: DATA ENVELOPMENT ANALYSIS

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Abstract
This paper set out to examine the effect of non-performing loans (NPLs) on bank efficiency in Nigeria within the period, 2008 – 2017. The specific objectives were (i) to analyse the effect of non-performing loan ratio (NPLR) on bank efficiency, and (ii) to explore the effect of bank efficiency on non-performing loan ratio. In line with the specific objectives, two hypotheses were formulated. Data was gathered using purposive sampling techniques where the five big banks were chosen viz: First Bank, UBA, GTB, Zenith Bank, and Access Bank. Analysis was done, employing Data Envelopment Analysis (DEA), general least square (EGLS) and pooled panel least square (PLS). Findings from the study include: (i) NPLR had a positive and strong significant impact on bank efficiency. This implied that bank with NPLs will not relent in giving out loans, since interest from loans is the major source of income in banking industry. Rather it creates further credits with higher quality skills regarding lending activities. The price of obtaining the loans will go up, theoretically, high risky investments were compensated with high returns. (ii) Bank efficiency also had a positive and strong significant impact on NPLR, which implied that if the efficiency increases; the more the banks' rely heavily on loan creation as interest from loans contributes the major sum of revenue to their profit. Likewise, the rate of NPLs will virtually increase as the borrowers' defaults in their obligations due to the inexorable uncertainty in the economic system.
Keywords: Data envelopment Analysis, Bank Efficiency, Problem Loan, Nigerian Banks.

1. INTRODUCTION

Deposit money banks are generally known to hold the bulk of the money supply in economy via deposits collected from the public. From which they create money through the loans and advances they extend to their customers. Banks in any economy serves as a medium for growth and development and they intermediate between the surplus and deficit units, as a result of these sensitive activities of gathering of deposits and allocation of credit, banks are vulnerable to credit loss and assets quality problem. As a result bank always faced with the issue of non-performing loans risk due to its main function as a financial intermediary. Thus, credit creation is the main income generating activity of bank (Korgi, 2011). Yet, lending is not an easy task

for banks because it creates a big problem which is called Non-performing Loans. Failing bank always has high level of NPLs prior to failure. According to Hou & Dickson 2007), many researchers on the courses of bank failures found that Asset quality is statistically significant predictor of insolvency and failing bank institutions always have high level of NPLs prior to failure.

A loan is considered non-performing when the borrower is yet to pay the agreed instalments or interest at the expiration of 90 days. Non-Performing Loan (NPLs) are also called "bad debt" (European Central Bank 12th September, 2016).When a bank has too many Non-Performing Loan (NPLs) on its balance sheet, its profitability will suffer because it will no longer earn enough money from its credit business. Therefore, a vast non- performing loan disrupt the capacity of banks in making good quality profit. Besides, NPLs tie part of the bank's capital base without providing commensurate return, reducing profitability and increasing capital requirements' NPLs have a "risk weight" of 150 percent under the Basel 3 Standardized Method' (Mr. Marcus Evans & partner, ECB office, lead for Deal Advisory, KPMG Germany). The growing trend of NPLs is becoming an issue for concern, not only for the banking sector but also for the national economy at large (European Banking Authority, 2016; Azeem & Amara, 2014).

Recently, pressure was mounted on banks whose loan book have been adversely affected by the shrinking economy, the downward spiral of Naira, Foreign exchange shortage and the upsurge in cost of business. This mainly as a result of the persistent slump in crude oil prices in the international market. (Banks and Non-performing Loans, 15th June, 2016 www.sunnewsonline.com). The situation was worsened by the withdrawer of government fund from commercial banks following the implementation of the policy on Treasury single Account (TSA), the increase in the interest rate also worsen the situation for the banks. This has prompted Asset Management Corporation of Nigeria (AMCON) set up in 2010 to absorb bad loans of banks during the global economic meltdown, to say that it will no longer be buying the bank toxic loans, will from now focus on the recovering of loans already advanced by the banks to their customers. AMCON was set up in 2010 to absorb NPLs in exchange of government bonds, after the Central Bank injected $4 billion to rescue nine lenders from collapse in 2009, (REUTERS AFRICA 27th July,2015 Nigeria "bad bank" AMCON to publish list of loan defaulters). The half year statement of account released by some banks showed that

they posed low profit before taxation and high ratio of NPLs rising between nine percent and twelve percent. This is bad for the economy and even worse for the bank survival Banks and Non-performing Loans, 15th June, 2016).

It was also noted that while Nigeria's five biggest banks(Zenith, First, GTB, UBA & Access banks) share common credit challenges related to the slowdown in Nigeria oil and gas dependency, their ability to withstand economic and volatile monetary conditions varies(financial watch 2016 by Cynthia Adigwe). The Agency (moody investor's service) said the forecast rise in NPLs stems from lower oil prices, a weakening naira, slower GDP growth and rising inflation. Though, the CBN also revealed that NPLs rose to N649.63 billion as of December 31, 2015 compare with N63.31 billion recorded at the end of December 2014.And in its Financial Stability Report (FSR) for the second half of 2015, revealed that NPLs in the Nigeria baking rose by 78.8 per cent year-on-year (African Summit, GRI 2017). Also CBN attributed the rise in NPLs to the fall in oil prices which resulted in huge impairments in oil and gas doom.

The term "Efficiency" refers to ability to produce maximum outputs with minimum amounts of inputs. According to Akeem & Moses, (2014) Banking efficiency is defined as difference between observed quality of input and output variable with respect to optimal quality of input and output variable. Bank efficiency is essentially how banks were able to manage their intake (deposits) as collected from the public to produce quality loans and advances in order to generate earnings. In order words, is how efficiently banks were in carrying out their two main functions concerning their business activities; first the acceptance of deposits and second the advancement of loans.

However, the significance of banking sector in the economic and financial development of any nation is extremely important, as it is the major component of the financial sector and hence its performance efficiency is critical to the stability and development of a country. In order words, economic and financial development can be achieved only by optimal utilization of the available resources that will maximize the quality and quantity of output efficiently. For banks to operate efficiently depends on their ability to transform multiple resources into multiple services (Sathye, 2003). Therefore, efficiency remains a vital issue in Nigeria and every economy to ensure safe and sound banking practices in order to execute their crucial roles in the economy effectively.

THE ANALYSIS OF NON-PERFORMING LOANS IN NIGERIA

Table 1: Annual non-performing Loans and non-performing Loans growth in Nigeria, 2004-2017

DATE	VALUE
2017	14.8
2016	12.8
2015	4.9
2014	3.0
2013	3.4
2012	3.7
2011	5.8
2010	20.1
2009	37.3
2008	7.2
2007	9.5
2006	8.8
2005	18.1
2004	21.6
2003	20.5
2002	21.4
2001	19.7
2000	22.6

World Bank Collection of Development Indicators, compiled from officially recognized sources.

NPL is the ratio of non-performing loans to total loan

Graphic presentation of Annual Non-performing Loan in Nigeria, 2004-2017
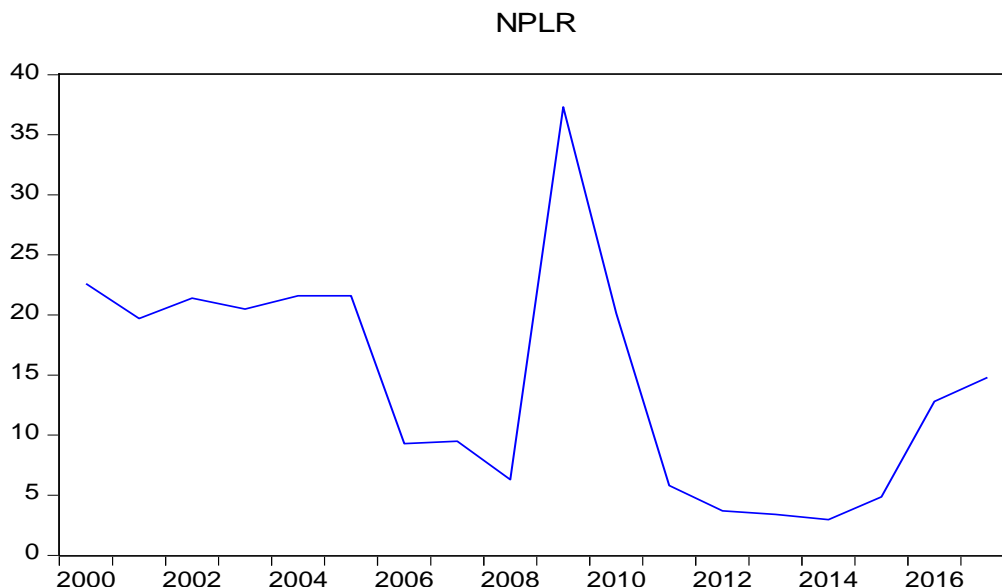
Source: Compiled by the author

As observed from the table 1 and the graphics presentations above, in Nigeria, after the 2004/2005 capital restructuring the banks through the additional capital requirement were financially empowered and thus, 2006 the rate of non-performing was reduced drastically. NPL started to increase in 2008 and was at its peak in 2009 due the severe effect of the global finial crisis. However, in 2011 and 2012 NPL decreased due to the measures applied by the government to control high the rate of NPL accumulated in the system after the 2008 global financial crisis. For instance, the establishment AMCON in 2010, which mandate was to purchase all the NPLs accumulated by banks after the global crisis, as a result the rate of NPLs was drastically reduced. Within the period 2015 to 2016, NPLs started to increase again. CBN revealed that NPLs rose to N649.63 billion as of December 31, 2015 compare with N63.31 billion recorded at the end of December 2014.And in its Financial Stability Report (FSR) for the second half of 2015, revealed that NPLs in the Nigeria baking rose by 78.8 per cent year-on-year (African Summit, GRI 2017). Also CBN attributed the rise in NPLs to the fall in oil prices which resulted in huge impairments in oil and gas doom. As recession prolonged within the end of 2017, the data by National Bureau of Statistics revealed that Bank non-performing loans were N2.36tn and non-performing loans hit N1.79tn in 2018.

Research Objective

The objective of this study was to evaluate the effect of NPLR on Banks efficiency in Nigeria.

Research Hypotheses

- **Ho:** Non- Performing Loan ratio (NPLR) did not have positive and significant impact on efficiency of the selected banks in Nigeria.
- **H$_O$:** Efficiency (EFFIC) did not have positive and significant impact on Non- Performing Loans ratio of selected banks in Nigeria.

Efficiency and NPL: Theoretical relationship

As a measure of performance, efficiency may have impact on credit loss and NPL in particular. The authors believed that efficiency is a better measure of efficiency in respect of intermediation functions of bank as compare to average ROA and ROE. previous studies had found a link between traditional measure if performance and NPLR. Some banks performed better than others. It is indisputable fact but how can we recognise high performing bank? Can one consider very profitable bank as performer or more high efficiency vice versa? In this context efficiency frontier measure level of efficiency of comparable units by employing inputs and outputs (Klimberg et al; 2009). With respect to the relationship between efficiency and NPL, it can be argued that there is theoretical relationship exist between efficiency and NPL arising from the fact that managers do not sufficiently monitor and control lending portfolio.

From the point of view of management accounting, bank asset quality and operating performance are positively related. If bank's quality is inadequate (e.g. the loan amount becomes the amount to be collected), the bank will have to increase its 'bad debt losses as well as spend more recourses on collection of non-performing loans. This increase in non-performing loan in banking industry can be due to external events, such as adverse situation in economic activities (Berger and De Young, 1997, refers to bad luck hypothesis). When bank list the amount for collection, banks will incure extra operating costs from non-value-added activities to handle and supervise the debtor's financial status, being cautious of the collateral value, discussing the amortization plan, paying expenses for contract negotiation, calculating the cost to withhold, deposit and dispose of collateral at the time the loan become non-payable.

2 REVIEW OF RELATED LITERATURE

One of the recent and important studies on the subject of bank efficiency includes Nyong, (2017). It investigated the relative efficiency of a cross section of Nigeria domestic commercial

banks and employed mathematical optimization approach rooted in data envelopment analysis (DEA). Two-stage approach is adopted; DEA and Tobit regression model. Study revealed the existent of high level of inefficiency among the banks and significant waste in resources utilization. Omankuanlan, (2013) also employed non-parametric Data Envelopment Analysis (DEA). To determine the Nigeria banks efficiency performance from 2005-2009. The findings revealed that the extent the bank's fixed assets and operating efficiency affects their profitability, and the findings of the study revealed that GTB was most efficient bank and it has the least reduction in input and most level in output. Similarly, Tango, (2008) measured and decomposes efficiency using the non-parameter approach popularity known as DEA and productivity growth sing malmquist productivity index (MPI) in a sample Nigeria commercial banks over a period of 5 years. Net fixed assets and total deposits were used as the input variables while total loans and advances, other earning assets and net operating income variables and net operating income were used as the output variables under constant return for scale assumption and the result revealed constant improvement. Equally, Othman et al, (2016) examined DEA as a tool of measuring efficiency in banking. The efficiency of banks was measured through the ability of individual bank to maximize output given a certain level of input. Measuring its efficiency, using two approaches that are production and intermediation approaches. The findings revealed that efficiency in banking with similar economic & political condition is important as banks operate in parallel. Akeem & Moses, (2014) empirically analysed the allocative efficiency of Nigeria commercial banks 2002 to 2011, using DEA approach with three input variable (deposit, operating expenses and assets) and four output variables (loan & advances, investment, interest income & non- interest income) thus, the average allocative efficiency stood at 89.6%. In so doing, Karim, Chan & Hassan, (2010) utilized stochastic cost frontier approach assuming a normal-gramma efficiency distribution to determine the relationship between Non-performing loan and banks efficiency in Malaysia and Singapore. To achieve the objective, cost efficiency was estimated using the stochastic cost frontier model and the result indicated that no significant difference in cost efficiency between banks in Singapore and Malaysia. Measuring efficiency by the ratio of non-interest expenses to net operating income, while the ratio of loan loss provision to total loans serves as a proxy for NPLs and capitalization is the ratio of equity to total assets. Quadt, & Ngugen, (2016) analysed the relationship between efficiency, NPLs & capitalization in the Nordic banking

sector (Denmark, Finland, Norway, Sweden & Iceland) based on a panel data set of banks from the period 2006-2015. The study applied the granger-causality technique and tested four hypotheses as suggested by Berger & De yong (1997), bad management, "skimping" moral hazard and bad luck and one additional the "regulatory" hypothesis and found evidence of the "bad luck" hypothesis is the only significant theory.

The study of NPLs and bank's performance efficiency, Etale, Ayunk & Ebitare, (2016) examined the relationship between NPLs and banks performance in Nigeria 199-2004. The study used multiple regression techniques to analysed data and the result of the study showed that bad loans & doubtful loans had statistical negative and significant influence on return on capital employed (ROCE), while sub-standard loans had statistically negative and non-significant impact on ROCE. Ozurumba, (2016) examined the impact of NPLs on the performance of selected commercial banks in Nigeria from 2000-2013 with special emphasis on Access bank, UBA, & Union Bank Nig plc. It specifically determined the effect of NPLs, provision for loan loss and loan and advances on performance of banks measured by ROA & ROE. Using regression analysis, the specific findings of the work showed that ROA & ROE had inverse relationship with NPLs and loan loss provision respectively while they are positively related to loan & advances.

METHODOLOGY

The study was quantitative in nature and in essence relied on *Ex post facto* research design, as it examined the effect of bank efficiency on NPL ratio and vice versa. The paper relied on holistic accounting data obtained from the financial statements and accounts of five deposit money banks in Nigeria from 2008-2017 viz: ZENITH, GTB, UBA, ACCESS and FIRST BANK. The panel data of the preferred banks were used to carry out the statistical analysis. Employed purposive sampling techniques where banks were the identified five big banks were chosen. The sample in terms of assets size represents most of the big banks in Nigeria banking industry (2014 Ranking of Banks in the World published by the Banker Magazine of Financial Times Group London). The study utilized Data Envelopment Analysis (DEA) in determining the bank's efficiency frontier level. The random effect model was used in analysis at 5% level of significance after subjecting the data to the necessary diagnostic checks. In addition, correlation analysis and granger causality tests were as well conducted on to sustain the outcomes of models employed.

Model Specification

$$(\text{PLS})\text{Efficiency} = \beta_0 + \beta_1\ \text{NPLR} + \beta_2 + (\mu + v)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 1$$

$$(\text{REM})\ \text{NPLR} = \beta_0 + \beta_1\ \text{Efficiency} + \beta_2 + (\mu + v)\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\text{II}$$

EXPLANATION OF VARIABLES

- **Efficiency (EFFIC)**

Data Envelopment Analysis (DEA)

Data Envelopment Analysis (DEA) generally called Frontier Analysis, was first put forward by Charnes, which later was modified by Chares-Cooper & Rhode (CCR) in 1978 (Klimberg et al; 2009). It is non-parametric method that utilizes linear programming to measure the level of efficiency of comparable units by employing inputs and outputs (Klimberg et al; 2009). DEA is a most accurate technique to measure efficiency given limited number of decision making units (i.e. banks) (Klimberg et al; 2009). DEA allows measurement of efficiency with inputs and outputs levels within numerous decision making units.

CHOICE OF BANKS INPUT AND OUTPUT

In literature of banking efficiency, there are only two approaches for selecting the inputs and outputs for bank; (i) the Production Approach, also called the Service provision or value added approach, and (ii) Intermediation Approach, also called the asset approach (Humphrey, 1985). Both these approach apply the traditional microeconomic theory of firm to banking activities. The intermediation approach as proposed by Sealay & Widley, (1997) treat banks as financial intermediaries channelling funds between deposit and creditors. In this approach, banks produced intermediation services through the collection of deposit and other liabilities and their application in interest earning assets, such as loan, securities and other investments and thus, the use of physical capital (labour and deposit as inputs and loan & advances, and gross earnings as output are consistent with intermediation approach. Also according to (Mokhtor et al; 2008) To measure Efficiency, the study adopted the view of (Nyong, 2017) who used the intermediation approach;

Outputs = Bank loan and gross earning

Inputs = Deposit and Labour

Data Envelopment Analysis (DEA) and its Basic Models

Efficiency   =   Weighted sum of outputs   ≥   0
                    Weighted sum of inputs

When DEA is employed to measure banks efficiency for a set of DMUs, the linear programming algorithm will calculate the efficiency of each DMU given the identical inputs and outputs variables to find weighted sum of input (most efficient DMU) and to be used as bench mark against other DMU; causing the best-practice DMUs to list on the efficient frontier line. It means best-practice units are relatively efficient and identified by DEA efficiency score as 100% (efficiency =1). Example from the study DMUs: (we have five functioning banks; A, B, C, D and E. Each bank process some outputs (loan and advances and make some earnings per year and both activities have different inputs cost (deposit & labour cost).

What made the determination easy for this study? We already knew the weights to be applied on each of the inputs variables; total amount of loan and advance and the amount of the gross earning each year from 2000-2017 and outputs variables; total amount of deposit and the total amount of the operating cost each year from 2000-2017 sourced from the financial statements and the comprehensive income statement of the selected banks. Following the illustrated figures for year end 2000 & 2017;

TABLE 2: Four years summary of efficiency frontier of five DMUs; 2014 - 2017

Banks	Efficiency, 2017	Banks	Efficiency, 2016	Banks	Efficiency, 2015	Banks	Efficiency, 2014
ZENITH	0.92	ZENITH	0.98	ZENITH	0.93	ZENITH	0.83
ACCESS	1.0	ACCESS	0.98	ACCESS	0.93	ACCESS	0.87
UBA	0.69	UBA	0.71	UBA	0.57	UBA	0.54
GTB	0.91	GTB	1.00	GTB	1.0	GTB	0.94
FIRST BANK	-	FIRST BANK	-	FIRST BANK	0.0028	FIRST BANK	0.0009

Source: Compiled by the author; **Annual Report of the banks:**

Efficiency = outputs / inputs

Total Outs/Total Inputs = Efficiency measure: Outputs variable: Loan & Advances + Gross Earning Inputs variable: Deposit + Labour (Operating Cost)

As, observed in the table 2 above, GTB falls on the efficient frontier line. It signified that, GTB is more efficient than other banks in disposing their intermediation function. Followed by Access bank; Zenith bank, UBA and First bank within the period 2017 to 2014.

- **NON-PERFORMING LOANS RATIO (NPLR)**

NPLR: Non Performing Loans ratio: this is measured with bank's Bad debt to total gross loan, the value of bad debt divided by the total value of the loan and advances to customers.

4   ANALYSES AND RESULTS DISCUSSION

4.1 Diagnostic Test

- **Unit root Test**

Null: Unit root (assumes individual unit root process)

Table 3: PP - Fisher Chi-square

	Statistics	Probability	Cross-section	Observation
NPL	32.2501	0.0004	5	45
EFFIC	25.8345	0.0040	5	45

The PP – Fisher results reject the null hypothesis. Signifying that unit not does not exist within the tested series. The series were stationary at level. If both series are stationary at level 1(0) meaning that there is no unit root, signifying the present of a short-run relationship between the variables. Therefore, a simple panel OLS/GLS will suitable for the panel estimation.

- **Normality Test**

Null hypothesis: the residuals are normally distributed

Table 4: Model I
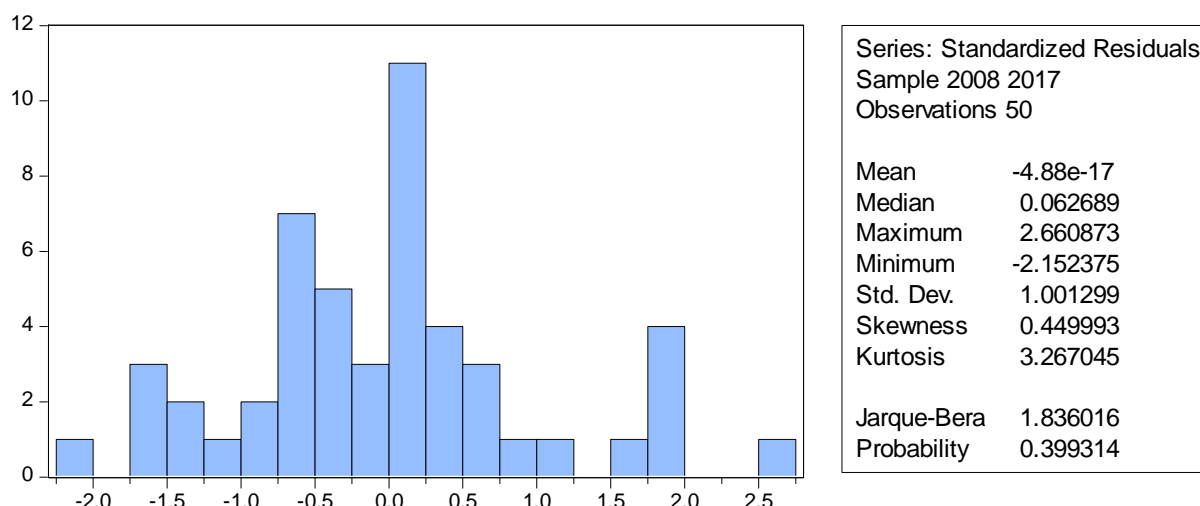
In table 4 (model I) above, the test suggests; do not reject null hypothesis. The results revealed that the error terms are normally distributed. As the p-valuue of Jargue-Bera test is greater than 5% (Jargue-Bera: p = 0.3993 > 0.05). skewness = 0 and Kurtosis close to 3. Therefore, parametric techniques will be appropriate for the estimation.

Table 5: Model II
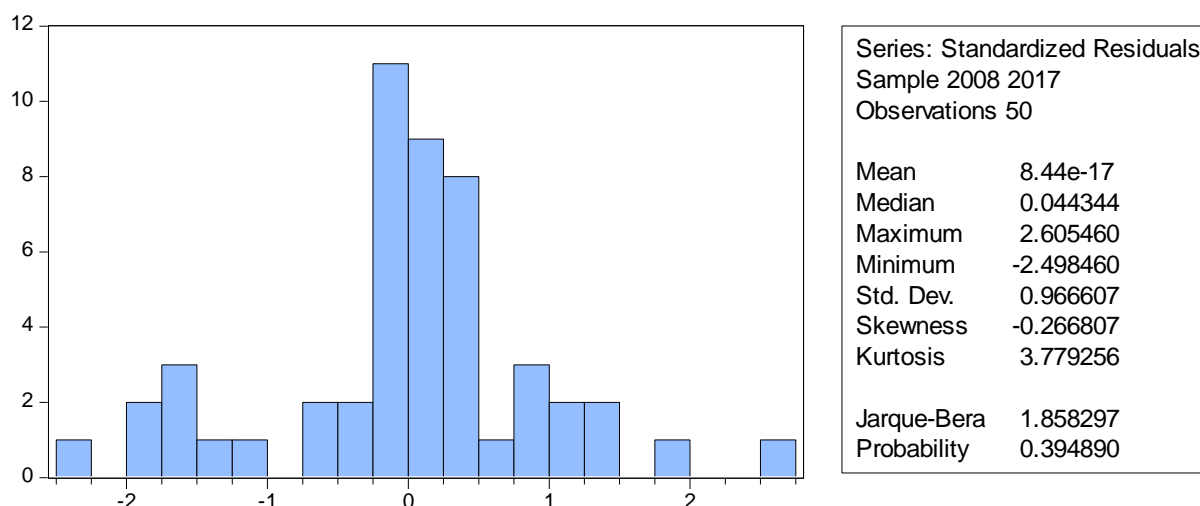
In table 5 (model II) above, do not reject null hypothesis. The results revealed that the error terms are normally distributed. As the p-valuue of Jargue-Bera test is greater than 5% (Jargue-Bera: p = 0.394890 > 0.05). skewness = 0 and Kurtosis close to 3. Therefore, parametric techniques are appropriate for the estimation.

- **Hausman Test**

Table 6: Model I

Null hypothesis Random effect is appropriate
Test cross-section and period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.763470	1	0.3822
Period random	0.024032	1	0.8768
Cross-section and period random	0.294415	1	0.5874

As observed in table 6 (model I) above, do not reject null hypothesis, thus random effect is appropriate as p = 0.5874 > 0.05. Therefore fixed effect model (FEM) is an appropriate model to use for the analysis as indicated by the Hausman test.

Table 7: Model II

Test cross-section and period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.436891	1	0.5086
Period random	0.049732	1	0.8235
Cross-section and period random	0.034822	1	0.8520

As observed in table 7(model II) above, do not reject null hypothesis, thus random effect is appropriate as p = 0.8520 > 0.05. Therefore fixed effect model (FEM) is an appropriate model to use for the analysis as indicated by the Hausman test.

Table 8: Correlation Analysis

	NPLR	EFFIC	SIZE
NPLR	1.000000	0.875883	-0.429893
EFFIC	0.875883	1.000000	-0.330894

Source: The Researcher's E-View Result

As observed in table 8 above, the results showed that there was strong upward (positive) linear relationship between non-performing loans and bank efficiency. Coefficient correlated at 88

degrees. Bank size had a moderate downward (negative) linear relationship between NPLR/Efficiency.

Table 9: Granger Causality Test

Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
EFFIC does not Granger Cause NPLR	45	3.88675	0.0553
NPLR does not Granger Cause EFFIC		15.3070	0.0003

Source: The Researcher's E-View Result

As observed in the table 9 above, bi-directional causal relationship existed between bank efficiency and non-performing loan ratio in the short-run. This implied that in the short run the past values of the variables (NPLR and EFFIC) had significant impact on current value each other. In order words, the variable efficiency can be explain by the past value of NPLR and efficiency, while the variable NPLR can as well be explain by the past value of efficiency and NPLR.

4.4: Regression Estimations

Table 7: Model I (Impact of NPLR on Efficiency)

Random Effect Model (REM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.718340	0.017033	42.17389	0.0000
NPLR	0.264604	0.015628	16.93130	0.0000
R-squared	0.889154	Mean dependent var		3.575632
Adjusted R-squared	0.876558	S.D. dependent var		4.449420
S.E. of regression	1.056660	Sum squared resid		49.12738
F-statistic	70.58948	Durbin-Watson stat		1.926711
Prob(F-statistic)	0.000000			

Source: The Researcher's E-View Result

First, the study revealed that the constant term had a positive sign and this confirms to a priori expectation. The intercept term captured the other determinants factors of bank efficiency when NPLR is zero. The results implied that every other operational activity of the banks without the cost of NPLR which emanates from lending activities would increase the bank efficiency. Thus, diversification from interest income will decrease NPLR and increases profitability.

Secondly, the study indicated that, NPLR had positive and strong significant impact on bank efficiency. This showed that a unit rise in NPLR will leads to 0.265 increases in bank efficiency. This signified that NPLR had a positive and significant impact on level of bank efficiency in the selected banks.

The adjusted R-Squared (which is the coefficient of determination) was 0.87. This implied that 87 percent of the variations in NPLR in the selected banks in Nigeria were explained by NPLR and bank size. However, the remaining 13 percent of the variations are explained by other factors not included in the model. F-statistics 70.5895 and p-value of $0.0000 < 0.05$, which implied that the entire estimated model is significant and reliable.

Finally, the Durbin-Watson value (1.9) falls with the permissible level and show that there was no presence of autocorrelation.

Table 7: Model II (Impact of Efficiency on NPLR)

Dependent Variable: NPLR

Random Effect Model (REM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.910446	0.094391	-20.23978	0.0000
EFFIC	2.894030	0.091671	31.56960	0.0000
R-squared	0.961089	Mean dependent var		-0.461672
Adjusted R-squared	0.956667	S.D. dependent var		5.030620
S.E. of regression	1.020050	Sum squared resid		45.78211
F-statistic	217.3553	Durbin-Watson stat		1.823709
Prob(F-statistic)	0.000000			

First, the study revealed that the constant term had a negative sign and this confirms to a priori expectation. The intercept term captured the other determinants of NPLR when efficiency is zero and the result implied that every other operational activity of banks outside lending

activities from which NPLs emanates will reduce the problem of NPLs in the system. Thus, diversification from interest income from loans will reduce the growth of NPLR.

Secondly, the study indicated that, bank efficiency had positive and strong significant impact on NPLR. This showed that a unit rise in bank efficiency will lead to 2.894 increases in NPLR. This signified that bank efficiency had a significant impact on level of NPL in the selected banks.

The adjusted R-Squared (which is the coefficient of determination) was 0.96. This implied that 96 percent of the variations in NPLR in the selected banks in Nigeria were explained by bank efficiency and bank size. However, the remaining 4 percent of the variations are explained by other factors not included in the model. F-statistics 217.3553 and p-value of $0.0000 < 0.05$, which implies that the entire estimated model is significant and reliable.

Finally, the Durbin-Watson value (1.8) falls with the permissible level and show that there was no presence of autocorrelation.

5. IMPLICATION OF FINDINGS, CONCLUSION AND RECOMMENDATIONS
IMPLICATION OF FINDINGS

When efficiency was used as the dependent variables, the result showed that non-performing loans (NPLR) had a positive and significant impact on banks efficiency. This implied that banks with NPLR which have not exceeded the tolerable threshold of 5 % CBN will not relent in extending further credits since interest from loans accounts for over 80% of bank earnings. But benefit cannot be achieved if loans are not properly appraised, controlled and monitored. Since, NPLR is the ratio of NPLs to total loan; banks in so doing increase its total loans and advances in order to reduce the rate of NPLs. Nonetheless, banks in the curse of creating credits and maximizing earnings often create unauthorized cost centres and debit customers accounts with higher rates. In 2017 / 2018 alone, the sum of N47.6m and N 68.3m were reported as excess bank charges that were restituted to customers accounts with CBN mandates, some of these variables are significant factors to consider for decreased NPLR or increased efficiency in the banking system.

Likewise, in the findings the results showed that when the NPLR is the dependent variable, efficiency had a positive and significant impact on NPLR. The results indicated that increase in bank efficiency increases banks' NPLR and this implied that, if the bank efficiency

increases, the more the banks rely heavily on loan creation as interest from loans accounted for more than 60% of its earnings. As a result, the rate of NPL will increase in the long-run as the customers defaulted in their obligation due to consistent uncertainty in the economic system.

CONCLUSION

A firm can be efficient in performance while maximizing its outputs with minimum inputs without being effective in achieving the desired objectives. The results showed that when the NPLR increases, the bank would want to cover the loss areas by expanding its loan portfolio provided it is still operating within the tolerable rate of 5% since credit is the primary business where they derived its revenues its revenues. In order words, increase in risk of NPLs will bring about corresponding increase in loan price (cost of acquiring loans from banks) to offset the loss associated on suspended interest on NPLs. And as the price of loan increase, banks earnings will also increase in loan price (output) with the same level of operating cost (input). Thus in carrying out its intermediation function, banks hide under the umbrella of other cost/charges to create additional cost centres not authorized by bank's tariff. The result as well revealed that coefficient of efficiency variable is greater than the coefficient of NPLR variable. This implied that the parameter at which efficiency stimulates the growth of NPLR is greater than the parameter at which NPLR stimulates growth of efficiency. Banks derived much in creating loans, so the higher the efficiency, the more the banks are will to create more loans as far as its still operating below the statutory level of 5 percent. Conversely, as NPLR increases banks minimize the size of loans creation to avoid the growth of NPLR exceeding the operating limit of 5 percent. In respect of these implications, banks attitudes towards the cost of NPLs were unveiled as well as the need for effective supervision.

RECOMMENDATIONS

Nevertheless, banks should work towards the actions that will give maximum efficiency and effectiveness in their performance. For these will promote its intermediation function and their roles in economy through guaranteeing that cash available in system is used for productive and fertile project purposes which can stimulate the economy and provision of the loans at affordable price to the customers. Therefore, efficiency and effectiveness is the best option for all the firms in making decision that will promote growth directly and indirectly to the organization and the economy at large. However, this can only be obtainable in a well regulated banking system and a stable economic system.

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