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Abstract
Increase in NPLs rate is the main reason of reduction in earnings of banks. The reason behind the bad debts was low repaying capacity of borrowers, which in turn was the result of uneconomic use of loans, low per capital, and high interest rate. Extra flexible credit rationing policy could also be the reason of high NPLs rate. Non-Performing loan rate was the most important issue for banks to survive. It was important to understand the phenomena and nature of non-performing loans; it has many implications, as fewer loan losses was indicator of comparatively more firm financial system, on the other hand high level of non-performing loans was an indicator of unsecure financial system and a worrying signal for bank management and regulatory authorities. This study examined the effect of interest rate on non-performing loan of deposits money banks listed on the Nigeria stock exchange from 2010 to 2019. The methodology of the study make use of ex-post facto research design. Thirteen (13) deposit money banks was selected based while panel regression models estimation of pooled effect model, fixed effect model and random effect model was utilized on the basis of Hausman test. The empirical findings from the first model shows that Bank’s Lending Rates has positive and significant effect on Non-performing Loan of the selected money deposit banks \[ \beta = 0.480; P_{val} = 0.045 \]. However, with the inclusion of liquidity and loan growth rate, the findings shows that Bank’s Lending Rates \[ \beta = 0.524; P_{val} = 0.034 \] becomes stronger though as it remains positive and statistically significant. In this same model, the coefficient of Loan Growth Rate (LGR) \[ \beta = -0.048; P_{val} = 0.036 \] was seen to be negative and statistically significant Conversely, the relationship between Loan – to - Deposit Ratio (LDR) and Non-performing Loan (NPL) is not found to be statistically significant though; positive \[ \beta = 0.090; P_{val} = 0.103 \]. The study recommended that by hook or by crook, bank’s management need to maintain a low level of NPLs by maintaining low Bank’s Lending Rates to avoid financial crisis to happen. Keywords: Interest rate; Banks’ Lending Rates; Non-Performing Loan

1. Introduction
The deterioration in the quality of the loan portfolio of banks was the main cause of problems facing the banking system and the financial crises in developed economies. Indeed, the increase in loans defaults, banking mortgage in the United States, underlines the links between macroeconomic and financial shocks and the relationship between the friction in the credit market and the risk of financial instability. Praet (2016) contend that the stock of non-performing loans in the Euro area banking system has rapidly increased in the aftermath of the financial crisis. One conjecture in this context was that a high stock of NPLs held by banks might impair the transmission of monetary policy or the banking system’s contribution to economic recovery. The most obvious way in which NPLs might affect the lending behavior of banks was through losses caused by loan loss reserves of banks held against the NPL stock. Raising these reserves leads to profit and loss as well as reduction in capital. However, if this was the only transmission channel, there should not be any impact of non-performing loans (NPLs) on lending behavior once the capital position was taken into account (Demertzis and Lehmann, 2017).

Bredl (2018) was of opinion that the net NPLs in euro area banking was as a result of high market rates but do not alter the sensitivity of lending rates to market rates (the evidence was rather weak, at least). It could therefore be argued that the drop in lending rates induced by an expansionary monetary policy measures the same magnitude for a bank with a high net NPL stock and a bank with a low net NPL stock. However, due to
the higher mark-up, the lending rate of the high NPL stock bank will be higher. Such a mark-up might be problematic at the zero lower bound when a further expansionary stimulus cannot be easily achieved, but lending rates are still too high from a monetary policy perspective.

In different countries like Bangladesh, India and China, regulations are different for classifying loans as non-performing. In most cases, a loan was considered to be non-performing if that loan remains in arrear for at least 90 days. To ensure financial sustainability, financial intermediaries are required to minimize their non-performing loans (NPLs). Proper credit analysis and mechanism can definitely reduce these bad loans. Increase in non-performing loan was often attributed to failure of credit policy of respective institutions to select the right borrower. The responsibility cannot be solely put on lending decision. Some loans may have all qualities of good loan in initiation, but over the period turn into bad ones (Rifat, 2016).

In Nigeria, apart from establishing a special purpose vehicle to manage the buildup of NPLs, commercial banking operations were streamlined by the Central bank of Nigeria (CBN) to provide clarity on the conduct of commercial banking activities with respect to geographical coverage, among others. The policy ushered in commercial banks with international, national and regional operational licenses. As the names imply, a commercial bank with international licenses was allowed to maintain offshore banking operation in the jurisdiction of its choice within and across the national boundaries while regional licensed banks operate within specified geographical locations in Nigeria. The repositioning ensured that banks’ operational coverage was commensurate to their paid-up share capital. These measures put in place to address the ailing capital structure attributable to NPLs impacted the banking system positively up to the end of 2014. The principal role of a central bank of Nigeria in an economy was to nurture an efficient financial system through the application of appropriate instruments to influence the levels of the monetary and credit aggregates in the pursuit of low inflation, economic growth and balance of payments viability. In developing economies, CBN usually go beyond these traditional roles to engage in developmental activities in order to speed up the economic development process and enhance the environment for the performance of their primary role. This brief highlights the functions and activities of the Central Bank of Nigeria (CBN), from its inception to date with particular emphasis on recent developments. The loan loss provision guidelines which form part of the enhanced prudential guidelines provide guidance on recognition and measurement of loans, establishment of loan loss allowances, credit risk disclosure and related matters. It sets out CBN’s views on sound loan provisioning and disclosure practices for deposit money banks in Nigeria.

The issues of non-performing loans (NPLs) have gained increasing attention in the last two decades. In spite of the 1952 Banking Ordinance and 2004 banks reforms, the Nigerian banking sector has experienced a number of bank failures; with non-performing loans becoming the precursor to eventual bank failures in Nigeria. The issue of non-performing loan has been overlooked on interest rate simply because banks charges exorbitant rate for their credit while the deposit rate has been continuously low overtime. Many researchers such as Rifat (2016) explained NPLs as bad debts whose recovery was highly doubtful because they are not being serviced as required. In the banking system, the bad loan problems consist of a stock component (old debt) that was not performing and a flow component (new lending) that may become non-performing. Loans are not necessarily annual events but happen at different periods of the year and are often affected by seasonal performance of economy but importantly by lending rates, level of risk where the economy was not doing well. Lending was considered the most important function for fund utilization of deposit money banks as major portion of their income was earned from loans and advances. Despite the fact that loan was a major source of banks income and constitutes their major assets, it was also a risky area in the industry.

Objectives of the study
i. To investigate the impact of bank’s lending rates on non-performing loans of deposit money banks listed in Nigeria.

ii. Evaluate the controlling effects of liquidity and loan growth rate on the effects of banks’ lending rate on non-performing loans in Nigeria.

Research question

i. To what extent does banks’ lending rate affects non-performing loans of deposit money banks listed in Nigeria?

ii. Do liquidity ratio and loan growth rate have effect on the effect of banks’ lending rate on non-performing loans of quoted deposit money banks in Nigeria?

Research Hypotheses

i. H₀₁: there is no significant effect of banks’ lending rate on nonperforming loan of deposit money banks listed in Nigeria.

ii. H₀₂: Liquidity ratio and loan growth rate have no controlling effect on the effect of banks’ lending rate on non-performing loans of deposit money banks quoted in Nigeria.

Literature Review/Theoretical Review

Conceptual Review

Non-Performing Loan
The concept of non-performing loans has been defined in different literatures. Rifat (2016) define non-performing loans as those financial assets which do not generate any interest or principal repayment for the lending institution. To ensure financial sustainability, financial intermediaries are required to minimize their non-performing loans (NPLs). He noted that non-performing loan was an important issue for financial institutions and regulators. The economic and financial costs of these non-performing loans are significant. Rifat (2016) posited that these loans inversely impact on a firm’s profitability as loss of interest income. Failure to generate earning from loan and recovering principal poses threat to firm's long term sustainability. Hennie and Sonja (2009) define NPLs as assets not generating income. This was when principal or interest was due and left unpaid for 90 days or more.

Loan defaults are inevitable in any lending. What banks do was to minimize the risk of defaults. Typically, loans that have not received payments for three months are considered to be non-performing though specific contract terms may differ occasionally. Thus, the amount of nonperforming loan measures the quality of bank assets (Tseganesh, 2012). Hou and Dickinson (2007) summarize the elements of NPLs as defined in many jurisdictions including Nigeria as a loan that was not earning income.

A bank is required to analyze its entire credit portfolio at the end of every month when making returns to Central Bank of Nigeria (CBN). The classification was usually in to two parts, that was performing (active accounts) and non-performing (inactive accounts). The Non-performing loans and advances are further classified into the following segments according to Ogedengbe (2014).

i. **Substandard** – where principal and interest was due and remain unpaid for 90 days but less than 180 days. For this category, provision for bad debt was made at 10%.

ii. **Doubtful accounts** – where principal and interest was outstanding for 180 days but less than 360 days. Provision was required to be made at 50%.

iii. **Lost accounts** – where the principal and interest was unpaid for one year or 360 days and more. Full provision was made at 100% (Ogedengbe, 2014).

Banks’ Lending Interest Rate

http://www.ijmsbr.com/
According to Kanwal, Abbasi, Burney and Mubin (2014) the term interest rate means any bank lending rate. Or, interest rate means any rate a lender charge, as a percentage of the principal, to anyone who borrows or use an asset. Interest rates are normally calculated on annual basis known as the annual percentage rate (APR). The assets that are borrowed could include cash, consumer goods, and assets such as car, building, and raw material.

Interest rates control the flow of money in an economy. Interest rate was the price a borrower pays for the use of money they borrow from a lender/financial institutions or fee paid on borrowed assets (Crowley, 2007). It was "rent of money" fundamental to a ‘capitalist society’ and normally expressed as a percentage rate over the period of one. Interest rate as a price of money reflects market information regarding expected change in the purchasing power of money or future inflation (Ngugi, 2001).

Lending money was perhaps the most important of all banking activities, for the interest charged on loans was how the banks earn cash flows. Banks’ lending rate was the price a borrower pays for the use of money they borrow from a lender/financial institutions or fee paid on borrowed assets (Collins & Wanjau, 2011). According to Ogundipe, Akintola and Olaoye (2020), Lending was termed as the basic business activity which all commercial banks and the loan portfolio was the principal asset and major source of income.

It measures the price at which borrowers of funds are willing to pay to the owners of capital while at the same time measures the price at which lenders are willing to lend their money to enterprise in exchange for consumption. Cost of loan includes the principal repayments and interest rates are agreed at the time of the loan application (Caporale & Gil-Alana, 2010).

Interest rate was one of the important terms in the lending decision process of commercial banks. Commercial banks are independent business entities that set their own lending rates. The lending interest rate was the percentage of the loan amount that the lender charges to lend money. When banks lend money to customers, interest was charged on it for a number of reasons, including value preservation, compensation for risk, and profits among others (Sheriff & Amoako, 2014).

According to Boudriga, Boulila and Jelouli (2009), when there were no ceilings on lending rates, it was easier for banks to charge a higher risk premium and therefore give loans to more. Bank lends a certain percentage of the customer deposits at a higher interest rate than it pays on such deposit; interest rate spread. Lending interest rate of commercial banks may be influenced by a number of factors. The classical theory argues that the rate of interest was determined by two forces. Firstly the supplies of savings, derived mainly from households, and second the demand for investable capital, coming mainly from the business sector (Rose, 2003). Moreover, the loanable funds theory considers the rate of interest as the function of four variables: savings, investment, the desire to hoard money and supply of money. Rational expectation theory posits that the best estimation for future interest rates was the current spot rate and that changes in interest rates are primarily due to unexpected information and or changes in economic factors (Irungu, 2013).

Theoretical Review and Framework
The theoretical framework of this study was based on Arbitrage Pricing Theory. The Arbitrage Pricing Theory (APT) was developed primarily by Ross (1976). Consequently, APT was been viewed from the perspective of a "supply-side" model, since its beta coefficients shows the alertness of the underlying asset to economic factors. In the same vein, structural changes in assets' expected returns will be caused by factor shocks or in the case of stocks, in firms' profitability. The arbitrage pricing theory separates out non-company factors into as many as proves necessary.

Each of these requires a separate beta. The beta of each factor was the sensitivity of the price of the security to that factor. Arbitrage pricing theory does not rely on measuring the performance of the market. Instead, APT directly relates the price of the security to the fundamental factors driving it. The problem with this was that the
theory in itself provides no indication of what these factors are, so they need to be empirically determined. Obvious factors include interest rates.

The APT theory prompts views on interest rate in banks and they stand as intermediaries in the market because they lend to borrowers at a higher rate and sell to depositors at a lower rate. The spread was what banks benefit from. However, in this case banks are faced with two types of uncertainty. First, the uncertainty in the absence of harmonization between the loans and deposits which brings about interest rates for the banks.

Second, commercial banks face default risk by its clients. Replicating the APT in banks system, this model basically postulates that commercial banks lacks knowledge about the likelihood of default by its clients in the credit market. This poses credit to the commercial banks. The implication was that when commercial banks feels to exposed to default risk, they are inclined to widen the interest rate in order to cushion themselves against the risk.

**Empirical Review**

Ogundipe, Akintola and Olaoye (2020) used selected three banks (UBA, FBN and GTB) as well as regression function to perform a descriptive, correlation and regression analysis to examine the relationship between interest rates and loan repayment. The study established that there was a significant relationship between the interest rate and loan repayment, measured by credit quality using the non-performing loan ratio. This indicates that an increase in the interest rate will likely cause a corresponding increase or decrease in the credit quality.

Zheng, Bhowmik and Sarker (2020) also investigates the influence of industry-specific and macroeconomic determinants of non-performing loans (NPLs) in the entire banking system of Bangladesh. Using a time framed from 1979 to 2018 along with autoregressive distributed lag (ARDL) modelling, the results shows that both industry-specific and macroeconomic factors influence NPLs significantly. Among the industry-specific determinants, bank loan growth, net operating profit, and deposit rates negatively impact NPLs with statistical significance while bank liquidity and lending rates have a significant positive affiliation with NPLs. Gross domestic product (GDP) growth and unemployment, among the macroeconomic variables, have a negative connection with NPLs. Whereas, domestic credit and exchange rates have a significant positive association with NPLs.

Bahruddin and Masih (2018) test the non-linear asymmetric relationships between lending interest rate and NPLs by using the NARDL approach and provides a direction of Granger causality between the lending interest rate and NPLs. Malaysia was used as a case study. The finding tends to indicate that lending interest rate and NPLs has an asymmetric relationship in the short-run and symmetric relationship in the long-run. The study suggests that banks can improve their quality credit management by streamlining their collection process and the quality of customers in order to reduce the number of NPLs in the short-run. Besides, banks can keep their total risk low by diversifying their loan portfolios.

Darmawan (2018) employs a quantitative study approach to determine the effect of Loan Interest Rate, Non-Performing Loan (NPL), Third Parties Fund (DPK) and Inflation Rate on Micro, Small and Medium Enterprises (MSME) Credit Lending Distribution of commercial banks listed in Indonesian Stock Exchange during 2013-2015 periods. The analysis technique used in this study was multiple linear regressions and used secondary data published by Indonesia Stock Exchange.

There were 39 samples in this study taken by using purposive sampling technique. The result of the study showed that Loan Interest Rate, Non-Performing Loan (NPL), Third Parties Fund (DPK) and Inflation Rate have simultaneous effect on MSME credit lending distribution of commercial banks in Indonesia. The result defines that only Third Parties Fund has positive significant effect on MSME credit loan. Third Parties Fund has the biggest effect in this study while loan interest rate, NPL, and inflation rate has no effect on MSME credit lending.
The study by Kamran et al. (2016) examined the relationship between eight (8) western countries of the world based on GDP over a period from 1998 to 2010, and advocated that there exists significant relationship between risk premium and bank’s non-performing loans. Durafe and Singh (2016) deployed multiple regression analysis and exhibited that bank specific variables have significant effect on NPLs, while macroeconomic variables were found to be insignificant in presence of bank specific variables. Nonperforming assets reduce banks’ willingness and ability to supply credit because provisioning against NPLs hamper profitability and arises operating costs, and this creates problems for SMEs with borderline credit quality (Richard, 2011). Thus comprehensive measures are required to minimize the negative impact of vicious circle of NPLs. Banks and financial institutions need to deploy specialized internal and external capability for managing nonperforming assets, keenly control their provisions, and write off their nonperforming assets (Hart & Moore, 1997).

Mwangi (2013), study establish the impact of interest rates on nonperforming loans in commercial banks in Kenya. This study adopted a descriptive research design targeting all the 43 licensed commercial banks in Kenya. Secondary data was collected on the interest rate charged by the banks, total loan and advances, total non-performing loans, total assets, total risk weighted assets, noninterest expense, total revenue for five-year period (2009 – 2013).

The data collected was analyzed using both descriptive and inferential statistics from multiple linear regression analysis using the ordinary least square method. The findings were presented in tables and figures. The study’s findings established significant, negative and good linear relationships between banks’ NPLs and interest rate; interest rate spread and total assets. Significant, positive and good linear relationships between banks’ NPLs and cost income ratio; and, capital adequacy were also adduced. The study concludes that there was a strong relationship between financial performances of commercial banks with interest rate.

Messai and Jouini (2013) in this study examined the determinants of non-performing loans for a sample of 85 banks in three countries (Italy, Greece & Spain) for the period of 2004-2008. These countries have faced financial problems after the subprime crisis on 2008. The variables used are macroeconomic variables and specific variables to the bank. The macroeconomic variables are included the rate of growth of GDP, unemployment rate and real interest rate with respect to specific variables opted for the return on assets, the change in loans and the loan loss reserves to total loans ratio (LLR/TL). After the application of the method of panel data, the study found that the problem of loans varies negatively with the growth rate of GDP, the profitability of banks’ assets and positively with the unemployment rate, the loan loss reserves to total loans and the real interest rate.

Mohammad, Ammara, Abrar and Fareeha (2012) examined economic determinants of non-performing loans using correlation and regression analysis to analyze the impact of selected independent variables and the result reveals that interest rate, energy crisis, unemployment, inflation and exchange rate has a significant positive relationship with the non-performing loans of Pakistan banking sector, while GDP growth rate has a significant negative relationship with the non-performing loans of Pakistan banking sector.

Tireito (2012) did a study on the relationship between interest rates and non-performing loans in commercial banks in Kenya. He collected financial statements for five years (2007-2011) from the 43 banks. Analysis was done using correlations, regression and coefficients. The results showed that there was no significant relationship between interest rate and non-performing loans in commercial banks in Kenya.

**Methodology**

This study will adopt an *ex-post facto* research design. This was because, the *ex-post facto* research design was based on established facts that can be manipulated. Data for this study was obtained from annual reports of selected banks covering the period of 2009 to 2018. The population of the study consists of twenty-two (22) deposit money banks in Nigerian Stock Exchange as at 31st December 2018. The purposive sampling technique was used to select thirteen deposit money banks from the population. The thirteen deposit money banks were

**Model Specification**

The econometric model for this study to determine the effect of interest rate on non-performing loan of deposit money banks in Nigeria relied on the work of Kumar & Kishore (2019). The model adopted in this study was stated in its functional form as:

\[
NPL = f(BLR) \tag{1}
\]

\[
NPL = f(BLR, LGR, LDR) \tag{2}
\]

Where:

- \(NPL\) = Non Performing loan
- \(BLR\) = Banks’ Lending Rate
- \(LGR\) = Loan Growth Rate
- \(LDR\) = Liquidity Ratio

Empirically the equations (1) to (6) was specified as;

\[
NPL_{it} = \beta_0 + \beta_1 BLR_{it} + \epsilon_{it} \tag{7}
\]

\[
NPL_{it} = \beta_0 + \beta_1 BLR_{it} + \beta_2 LGR_{it} + \beta_3 LDR_{it} + \epsilon_{it} \tag{8}
\]

\(\beta_0, \text{Constant}\)

\(\beta_{1,2,3} = \text{parameters of the variables}\)

\(\epsilon = \text{Error Term}\)

\(it = \text{cross-sectional } i \text{ and time series } t\)

**Note:**

The inclusions of Loan Growth Rate and Liquidity Ratio in the model as a control variable are as a result of modified model of Anjom and Karim (2016) who envisaged both Loan Growth Rate and Liquidity Ratio as a bank Specific Determinants of non-performing loan.

**Measurement of Variables**

The study examined the effect of interest rate on non-performing loan of deposit money banks listed in Nigeria using secondary time series data for the period 2009–2018. Thus, the measurements of the variables used were discussed below in the table 1.

**Table 1: Data Measurement**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measure</th>
<th>Notation</th>
<th>Expected Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-performing loan</td>
<td>Non-Performing Loans Total Loans</td>
<td>NPL</td>
<td>Dependent Variable</td>
</tr>
<tr>
<td>Banks’ lending rate</td>
<td>Individual Rate of the banks</td>
<td>BLR</td>
<td>+</td>
</tr>
<tr>
<td>Banks deposit rate</td>
<td>Banks Deposit rate</td>
<td>BDR</td>
<td>+</td>
</tr>
</tbody>
</table>
Interest rate spread
Average lending rate minus average deposit rate
IRS +

Loan Growth Rate
Current year loan less Previous year loan divided by the Previous year loan
LGR +

Liquidity ratio
\( \frac{\text{Total Loans}}{\text{Total Deposit}} \)
LDR +

Source: Owners Computation (2021)

Descriptive Analysis

Table 2: Descriptive Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPL</td>
<td>130</td>
<td>8.25</td>
<td>10.90</td>
<td>0.00</td>
<td>77.00</td>
</tr>
<tr>
<td>BLR</td>
<td>130</td>
<td>17.98</td>
<td>3.84</td>
<td>9.68</td>
<td>27.89</td>
</tr>
<tr>
<td>LGR</td>
<td>130</td>
<td>9.22</td>
<td>42.21</td>
<td>-343.22</td>
<td>159.38</td>
</tr>
<tr>
<td>LDR</td>
<td>130</td>
<td>64.03</td>
<td>17.56</td>
<td>3.55</td>
<td>106.35</td>
</tr>
</tbody>
</table>

Source: Author’s Computation, 2021. Note: NPL = Non-performing Loan, BLR = Bank’s Lending Rates, LGR = Loan Growth Rate and LDR = Loan-to-Deposit Ratio.

Non-performing Loan (NPL): in Table 2, the average Non-Performing Loan of the banks over the period of this study stands at 8.25% with standard deviation equals 10.9 which was an indication that values relatively varies during the years across the banks. The least and the highest NPL recorded during the period are found to be 0.00% and 77.00% as recorded by Unity Bank Plc in 2017; 2018 and 2015 respectively. The average value of 8.25% implies that the percentage of borrowed money whose scheduled payments have not been made by the debtors for at least 90 days was 8.25%. Besides, this means that the banks on average recorded above the maximum prescribed level of 5%.

Bank’s Lending Rates (BLR): as in Table 2, BLR was seen to be having an average value of 17.98% and the values range from 9.68% to 27.89%; that are observed to be widely spread from the mean given the standard deviation value of 3.84. Largely, the average value of 17.98% shows that the interest rate at which the banks lend money to customers during the year.

Loan Growth Rate (LGR): Loan growth rate as computed in this study has an average value of 9.22 with standard deviation of 42.21 that shows that these variable values are not close to the mean but are noticeably spread out. The maximum and the minimum values of are found to be 159.38% and -343.22% respectively. The average loan growth rate of 9.22% was relatively high.

Loan-to-Deposit Ratio (LDR): the average Loan-to-Deposit Ratio value was 64.03% with standard deviation of 17.56. The standard deviation indicates that series are not close to the mean. The highest and the lowest values of LDR are seen to be 106.35% and 3.55% respectively. The average value of 64.03% indicates that the volume of loans the banks give out as percentage of their total deposit was 64.01%. This was relatively close to the CBN stipulated minimum of 65 percent thus.

Correlation Matrix

Table 3: Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>NPL</th>
<th>BLR</th>
<th>LGR</th>
<th>LDR</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPL</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BLR</td>
<td>0.169</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LGR</td>
<td>-0.155</td>
<td>0.003</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>LDR</td>
<td>0.087</td>
<td>-0.104</td>
<td>0.211</td>
<td>1</td>
</tr>
</tbody>
</table>
The result of the correlation analysis in Table 3 was presented to study the nature of the association among the variables of interest particularly the variables that are included in the same model to ensure that the associations among the explanatory variables are not so strong to the point of causing multicollinearity problems. As in the table, the estimated correlation coefficients among the variables hover around -0.155 and 0.211. However, the estimated correlation coefficients among the variables that are used in the same model as explanatory variables hover around -0.104 and 0.211. According to the associations among the explanatory variables used in the same model, it was evident that multicollinearity problem doesn’t exist in the subsequent regression analysis.

Additionally, the correlation analysis result shows that Bank’s Lending Rates (BLR) exhibits positive association (correlation coefficient = 0.169) with Non-performing Loan (NPL). Similarly, The Loan Growth Rate (LGR) association with Non-Performing Loan (NPL) was negatively associated with Non-Performing Loan (NPL) having the correlation coefficient = - 0.155. On the contrary, the association between Loan – to - Deposit Ratio (LDR) and Non-Performing Loan (NPL) was positive (correlation coefficient = 0.087). These show the potential relationships among the dependent and independent variables.

Test of Hypotheses

Research Hypothesis (H₀₁): There is no significant effect of banks’ lending rate on nonperforming loan of deposit money banks listed in Nigeria.

Research Hypothesis (H₀₂): Liquidity ratio and loan growth rate have no controlling effect on the effect of banks’ lending rate on non-performing loans of deposit money banks quoted in Nigeria.

In order to achieve the objectives; the results of regression analyses estimated with Bank’s Lending Rates (BLR), Loan Growth Rate (LGR) and Loan – to - Deposit Ratio (LDR) as independent variable are presented in this sub-section. The models have been estimated using Pooled regression approach.

Hausman and Breusch and Pagan LM Tests: Bank’s Lending Rates and Non-Performing Loan

For choosing the models that correctly capture effects of bank’s lending rates on non-performing loans of deposit money banks listed in Nigeria and evaluate the controlling effects of liquidity and loan growth rate on the effects of banks’ lending rate and non-performing loans in Nigeria, the result of Hausman and Breusch and Pagan Lagrangian multiplier tests carried out in this study was presented in Table 4.3

Table 4: Hausman and Breusch and Pagan LM Tests: Bank’s Lending Rates and Non-Performing Loan

<table>
<thead>
<tr>
<th>Variable</th>
<th>Chibar2</th>
<th>Prob &gt; Chibar2</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breusch and Pagan LM Test (P_value)</td>
<td>0.98</td>
<td>0.161</td>
<td>Pooled Regression</td>
</tr>
<tr>
<td>Hausman Test (P_value)</td>
<td>15.51***</td>
<td>(0.000)</td>
<td></td>
</tr>
<tr>
<td>Breusch and Pagan LM Test (P_value)</td>
<td>1.89</td>
<td>0.185</td>
<td>Pooled Regression</td>
</tr>
<tr>
<td>Hausman Test (P_value)</td>
<td>24.40***</td>
<td>(0.000)</td>
<td></td>
</tr>
</tbody>
</table>
In Table 4, the LM test results are statistically insignificant at 5% level (P-value > 0.05) suggesting that the pooled regression technique was not obsolete for this dataset. In other words, these mean that pooled regression technique correctly capture the effects of bank’s lending rates on non-performing loans of deposit money banks listed in Nigeria and evaluate the controlling effects of liquidity and loan growth rate on the effects of banks’ lending rate on non-performing loans in Nigeria. Consequently, the pooled regression estimators are adequate and considered for investigating the effects of banks’ lending rates on non-performing loans of deposit money banks listed in Nigeria and at the same time considered for evaluating the controlling effects of liquidity and loan growth rate on the effects of banks’ lending rate on non-performing loans in Nigeria.

**Regression Analysis: Bank’s Lending Rates and Non-Performing Loan**

To capture the effects of bank’s lending rates on non-performing loans of deposit money banks listed in Nigeria and evaluate the controlling effects of liquidity and loan growth rate on the effects of banks’ lending rate on non-performing loans in Nigeria, the results from the preferred pooled regression analysis as guided by LM and Hausman tests results are presented in Table 5

Table 5: Regression Result: Bank’s Lending Rates and Non-Performing Loan

<table>
<thead>
<tr>
<th>(1) Pooled Regression</th>
<th>(2) Variable</th>
<th>(3) Pooled Regression</th>
<th>(4) Pooled Regression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coef</td>
<td>P_val</td>
<td>Coef</td>
<td>P_val</td>
</tr>
<tr>
<td>0.480**</td>
<td>(0.045)</td>
<td>BLR</td>
<td>0.524**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LGR</td>
<td>-0.048**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LDR</td>
<td>0.090</td>
</tr>
<tr>
<td>-0.378</td>
<td>(0.934)</td>
<td>Constant</td>
<td>-6.502</td>
</tr>
<tr>
<td>130</td>
<td>3.96 (0.046)</td>
<td>Observations</td>
<td>130</td>
</tr>
<tr>
<td>0.029</td>
<td></td>
<td>F-stat/Wald Chi2</td>
<td>0.073</td>
</tr>
<tr>
<td>0.021</td>
<td></td>
<td>R-squared</td>
<td>0.051</td>
</tr>
<tr>
<td>1.13 (0.317)</td>
<td></td>
<td>Adj. R-squared</td>
<td>1.37 (0.273)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heteroskedasticity Test</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Author’s Computation, 2021. ***, ** and * indicate 0.01, 0.05 and 0.10 levels of significance.

**Model (1):** In columns (1) and (2) of the Table 5., the estimates from the regression analysis that was first carried out by regressing Non-Performing Loan (NPL) on Bank’s Lending Rates (BLR) was presented. This was done to test first hypothesis in this study. From the Table, the F-stat/Wald-Chi2 (P_val) = 3.96 (0.046) shows that the model is statistically significant. Also, the R-squared of the regression model was 0.029 indicating that only Bank’s Lending Rates explains about 2.9% of changes in Non-Performing Loan (NPL). The F-statistics and R-squared values also indicate the goodness of fit.

Furthermore, a look into the coefficient of Bank’s Lending Rates (BLR) gives an impression that the variable was a significant driver of Non-Performing Loan (NPL). Specifically, the estimated parameters of BLR was
seen to be positive and statistically significant at alpha = 0.05. This means that Bank’s Lending Rates has positive and significant effect on Non-performing Loan of the selected money deposit banks during the period of this study \[ \beta = 0.480; P_{\text{val}} = 0.045 \]. It also suggests that a unit increase in BLR leads to about 0.480 units increase in NPL of the banks during the years under review.

**Model (2):** Similarly, the result of regression analysis carried out by regressing Non-Performing Loan (NPL) on Bank’s Lending Rates (BLR), Loan Growth Rate (LGR) and Loan – to - Deposit Ratio (LDR) was presented in columns (3) and (4) of the Table 4.4. This is done to test the fourth hypothesis in this study. The F-stat./Wald-Chi2 (P-val) = 3.28 (0.023) depicts that the model was statistically significant. The adjusted R-squared of the regression model was 0.051 \[ \text{R-squared} = 0.073 \]. This indicates that about 5.1% of the variations in Non-performing Loan (NPL) are jointly accounted for by the explanatory variables. Comparing the adjusted R-squared \[(\text{R-squared})\] of Model (1) to Adjusted R-squared \[(\text{R-squared})\] of Model (2), it was evident that there are some levels of improvements in the Adjusted R-squared in Model (2). In other words, the explanatory powers of the first model has increased after adding Loan Growth Rate (LGR) and Loan – to - Deposit Ratio (LDR) as control variables.

Moreover, the coefficient of Bank’s Lending Rates (BLR) \[ \beta = 0.524; P_{\text{val}} = 0.034 \] becomes stronger though; it remains positive and statistically significant at alpha = 0.05. In this same model, the coefficient of Loan Growth Rate (LGR) \[ \beta = -0.048; P_{\text{val}} = 0.036 \] was seen to be negative and statistically significant at alpha = 0.05. This implies that increase in loan growth rate reduces Non-performing Loan (NPL) of the banks. Though, this was not in line with \textit{a priori} expectation, it could mean that banks raise lending by lowering their interest rate or relaxing collateral requirements or both. Conversely, the relationship between Loan – to - Deposit Ratio (LDR) and Non-performing Loan (NPL) was not found to be statistically significant though; positive \[ \beta = 0.090; P_{\text{val}} = 0.103 \].

To check whether the chosen pooled regression models satisfy the regression assumptions and be able to rely on the results, Heteroscedasticity, Pesaran's CD was carried out. From the result in Table 4.4, the heteroscedasticity test carried out to learn whether the residual has constant variance or not, show statistically insignificant value (Pvals > 0.05) indicating that the models have constant variances. The models are free from heteroscedasticity problem. Also, since the underlying assumption in the adopted regression approach in this sub-section was that space and time dimensions do not make any distinction within the observations and the time horizon was short the study ignores Pesaran's test of cross sectional independence Serial autocorrelation tests.

**Decision:** The null hypothesis one (H\(_{o1}\)) was raised to test the effects of bank’s lending rates on non-performing loans of deposit money banks listed in Nigeria; Also, the null hypothesis two (H\(_{o2}\)) was structured as “Liquidity ratio and loan growth rate have no controlling effect on the effect of banks’ lending rate on non-performing loans of deposit money banks quoted in Nigeria”. Based on and the significant coefficient of BLR in model without control variables and the significant of the F-statistics value in the model with control variables, the null hypotheses one (H\(_{o1}\)) and two (H\(_{o2}\)) are rejected at alpha = 0.05.

As a result, the study concludes that effect of banks’ lending rate on nonperforming loan of deposit money banks listed in Nigeria was significant and Liquidity ratio and loan growth rate have controlling effect on the effect of banks’ lending rate on non-performing loans of deposit money banks quoted in Nigeria. The findings of the study corroborates with the works of Messai and Jouini (2013). According to Messai and Jouini (2013) in their study found that the problem of loans varies negatively with the growth rate of GDP, the profitability of banks’ assets and positively with the unemployment rate, the loan loss reserves to total loans and the real interest rate.
While Messai and Jouini (2013) in their study found that the problem of loans varies negatively with the growth rate of GDP, the profitability of banks’ assets and positively with the unemployment rate, the loan loss reserves to total loans and the real interest rate. Also Ogundipe, Akintola and Olaoye (2020) study indicates that an increase in the interest rate will likely cause a corresponding increase or decrease in the credit quality. It further showed that any slight change in the lending rate would increase non-performing loan. However, the study does not augur well with the findings of Mwangi (2013), who affirms that a significant negative and good linear relationships exist between banks’ NPLs and interest rate; interest rate spread and total assets.

Implications of the Findings
The study’s findings offer several policy implications. The regulatory authorities could use the results of this study to detect banks with potential for a sharp build-up of NPLs in the future. This study has implication on academic as it will assist in furthering the cause of the study and add to the ever increasing empirical work on interest rate and non-performing loan. Banks management need to streamline banks to better manage risk, taking into account the characteristics of individual banks. A better understanding of the individual factors that make some banks more resilient than others to cushion the effect

CONCLUSION AND RECOMMENDATIONS
Increases in NPLs rate are the main reason of reduction in earnings of banks. The reason behind the bad debts was low repaying capacity of borrowers, which in turn was the result of uneconomic use of loans, low per capital, and high interest rate. Extra flexible credit rationing policy could also be the reason of high NPLs rate. Non-Performing loan rate was the most important issue for banks to survive. It was important to understand the phenomena and nature of non-performing loans; it has many implications, as fewer loan losses was indicator of comparatively more firm financial system, on the other hand high level of non-performing loans was an indicator of unsecure financial system and a worrying signal for bank management and regulatory authorities.

This study examined the effect of interest rate on non-performing loan of deposits money banks listed on the Nigeria stock exchange from 2009 to 2018. The empirical findings from the first model shows that Bank’s Lending Rates has positive and significant effect on Non-performing Loan of the selected money deposit banks \( \beta = 0.480; P_{val} = 0.045 \). However, with the inclusion of liquidity and loan growth rate, the findings shows that Bank’s Lending Rates \( \beta = 0.524; P_{val} = 0.034 \) becomes stronger though as it remains positive and statistically significant. In this same model, the coefficient of Loan Growth Rate (LGR) \( \beta = -0.048; P_{val} = 0.036 \) was seen to be negative and statistically significant Conversely, the relationship between Loan – to - Deposit Ratio (LDR) and Non-performing Loan (NPL) was not found to be statistically significant though; positive \( \beta = 0.090; P_{val} = 0.103 \).

The findings of the study affirm that while bank’s lending rates has positive and significant effect on Non-Performing Loan of the selected money deposit banks, with the inclusion of liquidity and loan growth rate, the findings show that Bank’s Lending Rates becomes stronger as it remains positive and statistically significant. The findings of the study corroborate with the works of Messai and Jouini (2013), Mohammad, Ammara, Abrar and Fareeha (2012), among others.

According to Messai and Jouini (2013) in their study found that the problem of loans varies negatively with the growth rate of GDP, the profitability of banks’ assets and positively with the unemployment rate, the loan loss reserves to total loans and the real interest rate. More so the student was in tandem with the findings of Mohammad, Ammara, Abrar and Fareeha (2012) who examined economic determinants of non-performing loans. Their result reveals that interest rate, energy crisis, unemployment, inflation and exchange rate has a significant positive relationship with the non-performing loans of Pakistan banking sector.

However, the study does not augur well with the findings of Mwangi (2013), who affirms that a significant negative and good linear relationships exist between banks’ NPLs and interest rate; interest rate spread and total assets. As it was confirmed that the level of Non-Performing Loan of deposit money banks in Nigeria was
proportionately related to the Bank’s Lending Rates offered by banks. By hook or by crook, bank’s management need to maintain a low level of NPLs by maintaining low Bank’s Lending Rates to avoid financial crisis to happen.

References


viii Darmawan, A (2018). Influence of Loan Interest Rate, Non-Performing Loan, Third Party Fund and Inflation Rate towards Micro, Small and Medium Enterprises (MSME) Credit Lending Distribution at Commercial Banks in Indonesia Advances in Social Science, Education and Humanities Research 231-308.


xvii Praet, P. (2016). The ECB’s monetary policy response to disinflationary pressures’, speech at The ECB and its watchers XVII, Center for Financial Studies, Frankfurt, 7 April

