AN ANALYSIS OF NON-PERFORMING LOANS IN NIGERIAN DEPOSIT MONEY BANKS

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ABSTRACT

The causes of Non-Performing Loan (NPL) in both developed and emerging nations depend on the peculiarities that classify such nations and have a multidimensional aspect. This study examined non-Performing Loans in Nigerian Deposit Money Banks (from 1999-2019). Panel data were obtained from annual reports of listed DMB and analyzed. The panel data technique adopted the random effect model through the Hausman test. Findings showed that the Loan-to-Total Assets Ratio (LTAR) has a significantly positive relationship with NPLs of banks and the Capital Adequacy Ratio (CAR) has an insignificant relationship with NPLs of banks. The study presented recommendations that Loan to total assets ratio should be reduced, Banks are advised not to be carried away by high lending interest rates, they should be cautious and also, the Central Bank of Nigeria (CBN) should encourage bank managers to invest more on less risky investments with fixed interest income such as government bonds; this will enable the bank to minimize the level of the bank risky assets and losses that may arise from NPL.

Keywords: Capital Adequacy Ratio (CAR), Deposit Money Banks (DMB), Non-Performing Loan (NPL), Loan to total assets ratio, and Financial performance.

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BACKGROUND TO THE STUDY

Financial Institution focuses largely on the acceptance of money in form of deposit from members of the public (i.e bank customers) and making the deposit accessible to borrowers in form of loans for investments, consumptions, and other purposes best known to the borrower. Overdrafts, business funding arrangements, loans & advances, and domestic purchasing-order financing are all examples of credit facilities. As a result, lending is one of the most important functions of DMBs all over the world (NDIC Report, 2019).

To ensure long-term viability and profitability, banks obtain less expensive loanable funds from customer deposits and lend these funds to borrowing customers at a slightly high rate of interest (lending rate) than that paid to depositors (depositors interest rate). However, one of the challenges in lending is predicting whether a loan and its accrued interest will be repaid in full on time. This implies that lending entails credit risk, particularly the risk of default. To reduce the level of loan default, banks use a variety of internal techniques such as loan appraisal and client screening (NDIC Report, 2019).

The causes of NPL in both developed and emerging nations depend on the peculiarities or critical factors that classify such nations and have a multidimensional aspect. There are so numerous reasons to back the failure of loan performance which may be in terms of endogenous (internal) factors such as; Inadequacy of capital, managerial ineptitude, and insider lending among other factors (NDIC Report, 2019). All the factors highlighted above are within the control of the bank. Other External factors (i.e factors that cannot be manipulated by the bank that affect the performance of loans include: Lending rate, Gross domestic product, Crude oil price, and Inflation rate among others (Amah, 2017., Kjosevski, Petkovski & Naumovska, 2019., Kumar & Kishore, 2019.Ogundipe, Akintola & Olaoye, (2020). The financial system plays a critical role in an economy's growth and development (particularly by acting as a pivot point for intermediation between the surplus and deficit units of the economy). A robust financial system that imbibes the smooth and efficient flow of the investment process lays a foundation for financial stability and

sustainable economic development of a country (CBN, 2019). The economic growth will be a mirage for any country with no sound financial sector that is made up of financial institutions such as DMB, insurance firms, and investment banking.

These financial institutions not "only ease the credit flow in the economy but also enhance productivity by revitalizing investments" (Innocent, Olukotun & Elam, 2019). Likewise, "good performance of these financial institutions is the symbol of prosperity and economic growth in any country and their poor performance may be traceable to a damaged economic structure which will not only affect that particular country but hurt other countries" (Rifat, 2016) that is to say, the relationship existing between any financial system and macroeconomic indicators (Inflation rate, crude oil price, among others) is symbiotic and mutually supportive.

The advent and accumulation of NPLs have become a systemic issue affecting a significant portion of the financial system; challenging its stability and/or hampering its core role of fostering financial intermediation (Ozili, 2019). A large rise in NPLs across the system can have an adverse effect on the banking sector's resilience to shocks (rising systemic risk). NPLs can also be linked to increased borrowing costs as well as a decrease in 'credit supply' to the 'real economy'. This may occur due to negative 'market sentiment' against banks with high rates of NPLs, which reduces 'banks' access to liquidity' and 'capital markets' (possibly resulting in credit-supply constraints (CBN, 2019).

The non-performing loan has posed a major threat to the stability of the Nigerian financial sector. This is because the banking industry is always at the apex of any financial system. The failure of which tends to have a negative multiplier effect on the entire economy (Ozili, 2019), Clementina and Isu (2014), found that the risk that loans may not be paid back is one of the serious and prominent issues facing Nigeria's banking industry. The stress test conducted by the CBN in 2016 revealed that the industry is still faced with Loan assets ratio(which is the total loan outstanding as a percentage of total assets Ibrahim2019), poor corporate governance, poor capital adequacy ratio (CAR) which is the measure of how much capital a bank has available, reported as a

percentage of a bank's risk weight exposure (Abbas 2018), poor risk management and liquidity related challenges among others (CBN Financial Stability Report, 2016)

FINANCIAL PERFORMANCE

Managing loans in a proper way not only has a positive effect on the bank's performance but also on the borrower, firm, and the country as a whole. Failure to manage loans which make up the largest of non-performing loans will eventually affect the financial performance of deposit money banks. The efficiency of a bank is evaluated based on profitability and the quality of assets it possesses. Loans however express the banks to the greatest level of credit risk. (Nyaiiet,2017). Non-performing loans affect economic growth. Therefore, causes of loan default should be established to reduce the level of non-performing loans. Murithi, 2013.

The following research questions were developed in response to the above issues:

1. What has been the effect of loan-to-total-asset on the NPL in Nigerian DMB?
2. To what extent is the effect of the Capital Adequacy Ratio on the NPL in Nigerian DMB?

OBJECTIVES OF THE STUDY

The broad objective of the study is to assess the NPLs in Nigeria's deposited money in banks from 1999 to 1019 (Twenty years). However, the specific objectives of this study are to:

1. Determine the effect of loan to total asset ratio on the NPL of Nigerian DMB
3. Find out the effect of the capital adequacy ratio on the NPL of Nigerian DMB

LITERATURE REVIEW

Conceptual Review

Non-Performing Loans (NPLs)

A loan is said to be non-performing when payments of interest and/or principal are past due by 90 days or more, or interest payments equal to 90 days or more have been capitalized, refinanced, or delayed by agreement, or payments are less than 90 days overdue, but there are other good reasons such as a debtor filing for bankruptcy to doubt that payments will be made in full (IMF 2015)

Determinants of non-performing loans

The loan-to-total asset ratio

The loan-to-total asset ratio calculates the total volume of unpaid loans as a proportion of the bank's total assets. The higher the percentage, the lower the bank's liquidity; it also indicates the degree to which the bank is loaned. Similarly, the higher the ratio, the more vulnerable a bank is to increased defaults. Ofori-Abebrese, *et al* (2016) found "a negative insignificant relationship between Loan to Total Asset Ratio and NPLs of Ghana bank". Also, the finding of Sheefeni (2015) revealed that "loans to total asset ratio is one of the major determinants of non-performing loan".

Capital adequacy ratio

The capital adequacy ratio is the measure of how much capital a bank has available, reported as a percentage of a bank's risk weight exposure (Abbas 2018). The capital adequacy ratio is one of the most important indicators of a bank's strength and well-being. Abba, *et al* (2018), and Abba, *et al* (2013) examined "the relationship between capital adequacy ratio and banking risks in Nigeria, concluding that the capital adequacy ratio is an important measure of safety and soundness for banks and depository institutions because it functions as a buffer or cushion to absorb losses". Capital adequacy is known in the banking industry by the letter 'C' as the very first letter in the acronym 'CAMELS'.

THEORETICAL FRAMEWORK

This study provides an analysis of the theory that describe the causes of NPLs which is the Bad Luck Hypothesis. Berger and DeYoung (1997) proposed the Bad Luck Hypothesis, which claimed that external

factors affecting the economy similarly affect NPLs, resulting in banks incurring additional costs in handling these loans, thus weakening the banks' cost efficiency. Under this hypothesis, external events lead to an increase in problem banks' loans. When a loan repayment installment is missed or there is a breach in the original terms of the agreement, the bank incurs additional managerial costs and effort in coping with the problem loan. As a consequence, the bad luck theory predicts that an increase in NPLs would result in a decrease in cost performance. Importantly, the "extra expenses associated with problem loans create the appearance, but not necessarily the reality, of lower cost efficiency" (Rajha, 2016).

According to Dimitrios, Louri, and Tsionas (2016), the bad luck theory presuppose that external factors increase bank NPLs. As a result of this, banks incur higher operating costs when dealing with problem loans which reduces banks' efficiency. Additional operating costs can result from a variety of factors, including moral hazard monitoring, borrower and collateral valuation, and the cost of recovering and selling collateral in the event of non-payment (Podpiera & Weill, 2008).

The bad luck theory suggests that NPLs are caused solely by bad luck, such as bad weather or sudden increases in the price of a particular commodity, among other things. The underpinning theory for this research is the Bad Luck Hypothesis because it provides a more credible explanation for DMB NPLs and the factors affecting them. Specifically, the theory suggested how external factors affect the economy and NPLs of the banking industry. The study will adopt this theory because it provides a compendious platform for NPLs and their determinants.

EMPIRICAL LITERATURE REVIEW

A Series of studies have been conducted with the clime of sub-Saharan Africa and developed nations of the world on the determinants of NPLs of DMB. This section reviewed some of the previous literature to bring out areas of divergence and convergence.

Ogundipe, Akintola, and Olaoye (2020) investigated the interest rates and loan performance of DMB in Nigeria for the period 2010 to 2015. Dependent variables were proxied as bank loan repayment, credit

quality, and loan loss provision while independent variables include interest on loans, monetary policy rate, liquidity ratio, non-interest fee income, capital adequacy, and NPL. The research used descriptive, correlation, and regression analysis to investigate the nexus between dependent and independent variables. The study found a substantial association between interest rates and loan repayment, as measured by credit quality (through the use of the NPL ratio). This means that a rise in interest rates would almost certainly result in an increase or decrease in credit quality. It also demonstrated that any small improvement in the lending rate would result in a rise in NPLs. The study discovered a positive but insignificant correlation between bank CAR and NPLs.

Ayunku and Uzochukwu (2020) reported on credit management and bad debt issues of listed Nigerian DMBs. The study's independent variables comprised loan loss allowance, loan-to-deposit ratio, equity-to-asset ratio, and loan write-off. The study's focus was confined to a five-year duration from 2014 to 2019. They used descriptive statistics, correlation, and the ordinary least square regression method. In both the return on asset and Tobin-Q models, the random effemodels developed that NPL, loan loss provision, and equity to asset influence bank performance.

In a study by Mustafa and Jeffery (2020) on NPLs and loans and advances of commercial banks in Nigeria. Data were collected while the econometric statistical technique was used preceding the co-integration analysis. From the analysis, the variable NPLs, capital adequacy, and GDP positively signed, indicating that there is a direct relationship between NPLs and banks' loans and advances while the variable interest rate has a negative sign which means that the relationship between interest rate and bank loan and advances is inverse and it is statistically significant. Furthermore, the result shows that total deposit is positive but insignificant statistical effect on bank loans and advances. It is recommended that there is a need for government to promulgate appropriate financial policies that will have a positive impact on NPLs.

Ozili (2019) investigated NPLs and financial growth in Nigeria: new facts. The technique of multiple linear regression was used. According to the findings, financial growth, as measured by foreign

bank presence and financial intermediation, is positively correlated with NPLs. Furthermore, bank efficiency, loan loss coverage ratio, competitiveness, and banking system stability are inversely related to NPLs, while NPLs are positively related to banking crises and bank concentration. According to the regional review, NPLs are inversely correlated with regulatory capital and bank liquidity, meaning that banking sectors with higher regulatory capital and liquidity have less NPLs.

Ademola (2018) conducted a study on the determinants of NPLs of listed DMBs in Nigeria. The scope of the study was limited from 2006 to 2016. A secondary source of data was used. The dependent variable was proxied as NPL while explanatory variables include: capital adequacy ratio, loan-to-total asset ratio, loan loss provision of banks, crude oil price, and exchange rate. Panel regression estimate was adopted by the study. Findings from the study revealed that loan loss provision ratio, loan to asset ratio, and crude oil price have a positive and significant impact on the NPLs of banks while capital adequacy ratio and exchange rate show a positive but insignificant impact on the NPLs. The study, therefore, recommends that bank management and loan officers should always give serious attention to the health of asset quality of banks specifically loan performance for the prevention of loan loss that could arise as a result of default in repayment of the loan from the bank loan customers.

From 1994 through 2014, Etale, Ayunku, and Etale (2016) examined the relationship between NPLs and bank performance in Nigeria. To evaluate data obtained for the analysis from the CBN, NDIC, and annual reports of listed banks. The study used the ADF Unit Root test, descriptive statistics, and multiple regression techniques. According to the study's findings, bad loans and doubtful loans had a statistically significant negative effect on ROCE, while sub-standard loans had a statistically insignificant negative influence on ROCE. These findings indicate that a high level of NPLs would decrease bank efficiency in Nigeria in the long run. As a result, the study suggests that credit reporting agencies and supervising authorities be improved to decrease the level of NPLs in Nigeria's banking sector. The research,

however, failed to conduct some residual tests, such as multicollinearity and model specification tests, among others. Also, there is the presence of first-order serial autocorrelation in the study given the value of Durban Watson statistics value of 0.95, this implied that the value of standard error could be inflated.

Prasanth, Nivetha, Ramapriya, and Sudhamathi (2020) investigated the factors influencing NPLs in India from 2015 to 2019. Secondary time series statistics were gathered from the bank's audited yearly reports and performance reports. The model was created using a multiple linear regression equation. The regression output established that among the estimated variables, loan-to-deposit ratio; financial efficiency measured in return on equity; and capital adequacy remained statistically significant determinants of NPLs. Diversely, loan growth, cost-effectiveness, and bank size were all found to be analytically insignificant in influencing NPLs. According to the findings, variables such as weak credit risk assessment, a focus on collateral-based lending, bad loans monitoring and follow-up, a banker's inability to begin with lending matters, undiversified loan items, limited loan life, and a lack of credit advisory practices are all bank-specific factors affecting NPLs.

Atio (2018) examined NPL and its effects on the stability of Nigerian banks with national and international operational licenses from 2014: Q2 to 2017: Q2. To estimate the macroeconomic and bank-specific drivers of NPLs for each licensed group, a "restricted" dynamic GMM was used. The Z-Score was developed as a proxy for banking stability, and its reaction to NPL shocks was investigated in a panel vector autoregressive context. The findings show that the drivers of NPLs differ between the two types of banks, but the weighted-average lending rate is a critical macroeconomic trigger of NPLs for both. The findings also support the moral hazard hypothesis and the risk-reward trade-off proposed by the efficient market theory. Furthermore, foreign banks can withstand NPLs shocks in the long run, amidst temporary fluctuations in the short term; while national banks' long-term stability is vulnerable to NPLs shocks.

Idewele (2016) examined the factors that contribute to NPLs in Nigeria. Secondary data were gathered from the CBN's Statistical

Bulletin and all commercial banks' annual reports. The research used ordinary least squares (multiple regression analysis) because the data were cross-sectional and time series in nature. According to the study's findings, the GDP is not a major determinant of the bad debt ratio, and weak credit risk management leads significantly to NPLs in the Nigerian banking sector.

METHODOLOGY

For this study, a cross-sectional research design was used. Twenty-four (24) DMBs operating in Nigeria as of June 2020 were the core population for the study. These commercial banks are considered to be a fair representation of the entire banking industry because they are known to contribute the largest market share in terms of assets and liabilities among financial institutions as they rightly accounted for a total asset value of ₦35.40 trillion as of December 2018 (NDIC 2018). This study purposely considers the fourteen (14) DMBs that are listed on the NSE (NSE) as of 2020. "The study selected the banks as they represent Strategic Positions in the entire banking industry based on their approved criteria of size, interconnectedness, complexity, and substitutability. Therefore, the sampled banks are of interest to this study because their failure could have a multiplier effect on the entire economy by posing a severe systematic risk to the entire banking industry and subsequently causing financial instability and total collapse of the financial system.

This study makes use of the secondary source of data collected from the annual reports and accounts of the 14 sampled banks. Likewise, data on macroeconomic variables were obtained from the statistical bulletin of the Central Bank of Nigeria.

To examine the determinants of NPLs in Nigerian DMB which are capital adequacy and loans to total assets used, this study made use of panel data analysis. Panel data analysis consists of cross-sectional units denoted by i=1……N, observed at each of T time periods t=1……...T. Panel data analysis is usually estimated through either fixed effect or random effect models. In the fixed effect model, the individual-specific effect is a random variable that is allowed to be corrected with

explanatory variables while the random effect model is uncorrelated with explanatory variables. Panel data has the potential to improve the accuracy of econometric predictions (Xiao, 2005). It can also capture the dynamics of human activity better than a single cross-sectional or time-series data set (Umer, 2015). For analysis, the STATA statistical software was used to analyze the data gathered for this study.

To properly determine the determinants of NPLs in Nigerian DMB, the model was adopted from studies such as Dey (2019), Kurti (2016), and Idewele (2016) among others. The model is presented below:

$Y_{it} = \beta_{it} + B1\beta S_{it} + B2macro_{it} + \varepsilon_{it}$.....(1)

Where:

Y_{it} = dependent variable

β_{it}= intercept term

β = coefficient of the slope of variables.

BS_{it} = Banks Specific factors.

$Macro_{it}$ = macroeconomic factors

ε_{it} = error term

Therefore, the modified model used for this study is presented below:

$NPL_{it} = _{it} + \beta_1 LTAR_{it} + \beta_2 CAR_{it} + \varepsilon_{it}$ ….(2)

Where: β_1, and β_2, are the coefficient of the explanatory variables.

NPL =NPL

LTAR = Loan to Asset Ratio

CAR = capital adequacy ratio

Result and Discussion

The mean, standard deviation, maximum, and minimum values for each dependent and independent variable are shown in the descriptive statistic table. The analysis of descriptive statistics can be found in Table 1.

Table 1 Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum	OBS
NPL	0.68	0.46	0	1	280
LTAR	0.20	0.43	0.00	5.13	280
CAR	1.24	2.99	0.00	21.51	280

Source: Output obtained from STATA, 2020.

The above table reports the descriptive statistics for the dependent and explanatory variables. "The mean value of all the variables as shown in the table above ranges from a minimum of -0.66 of determinants of NPLs to a maximum of 20.96 of NPLs itself. The average NPLs (NPL) for the listed DMB during the study period is about 0.68 with a standard deviation of 0.46; this implies that there exists significant variation among the determinable factors influencing NPL by most banks in Nigeria. Loan to total Asset ratio (LTAR) which shows an average of 0.20, a minimum value of 0.000, and a maximum value of 5.13 has a standard deviation of 0.43 which explains the level of variability in loan/ total assets being generated by the DMB, and the rate at which it is influencing the NPL is high. Capital adequacy (CAR) which has a minimum value of 0.00, a maximum value of 21.5, and an average value of 1.23 with an equivalent standard deviation of 2.98 have the highest maximum value affecting the growth of NPLs in Nigerian DMBs.

CORRELATION MATRIX

The correlation matrix reveals the direction and intensity of the nexus between the dependent and independent variables. When the "correlation between two or more independent variables is (too) high, the problem of multicollinearity occurs" (Williams & Rast, 2020). The problem of "multicollinearity may lead to less accuracy of results in the analysis; the coefficients may have very high standard errors and perhaps even incorrect signs or implausibly large magnitudes"

(Lindner, Puck & Verbeke, 2020). Table 2 presented the correlation matrix of the response variable (NPLs) and independent variables (loan-to-total asset ratio and capital adequacy ratio).

Table 2 Correlation Matrix of Variables

	NPL	LTAR	CAR
NPL	1.0000		
LTAR	0.0115	1.0000	
CAR	-0.2806	0.2583	1.0000

Source: Output obtained from STATA, 2020.

The correlation result in Table 2 shows that the capital adequacy ratio (CAR) is negatively correlated to NPLs (NPL) while the loan to total assets (LTAR) has a positive correlation with NPLs (NPL) of Nigerian DMB.

In general, while correlation analysis reveals the strength and direction of relationships between variables, it does not enable the researcher to draw causal inferences about the relationship that exists between the variables. According to Kothari & Garg (2014), if it is stated that "y and x are correlated, it means that y and x are being treated in a completely symmetrical way". As a result, there is no implication that changes in x cause changes in y. It states that there is justification for a linear relationship between the two variables and that shifts in the variables are on average linked to the correlation coefficient to a certain degree. Thus, in examining the effects of selected independent variables (loan to total asset ratio and capital adequacy) on NPLs, the economic regression analysis (post-estimation tests) which is discussed in the forthcoming section gives assurance to overcome the shortcomings of correlation analysis.

MULTICOLLINEARITY TESTS

Where a linear relationship exists between independent variables; multicollinearity occurs and it can cause the regression model to be biased. According to Folli, Nascimento, de Paulo, da Cunha, Romao & Filgueiras (2020), the "standard statistical method for testing data for multicollinearity is analyzing the variance inflation factor (VIF)". Therefore, in this study, VIF for the two independent variables is shown in Table 3 below. A VIF figure greater than or equal to 5 (≥ 5) shows serious multicollinearity (Kothari & Garg, 2014).

Table 3 Variance Inflation Factor and Tolerance Level

Variables	VIF	1/VIF
LTAR	3.01	0.33
CAR	1.69	0.59
Mean VIF	**2.976**	

Source*:* Output obtained from STATA, 2020.

Table 3 above revealed that the VIF and TV of the independent variables are within the acceptable limit as established by Kothari & Garg (2014). This, therefore, means the variables (LTAR and CAR) are free from multicollinearity which might lead to spurious regression results.

NORMALITY TEST

The normality test was used to ascertain whether or not the data set is adequately modeled through normal distribution and to calculate the likelihood that an underlying random variable is normally distributed. Thus, this study applied the statistical method of Shapiro-Wilk (Tabachnick & Fidell, 2013). The Shapiro-Wilk method was adopted to check the null hypotheses that the residual distribution was normal. The decision rule is when the P-value is greater than a 5% level of significance; it means the data are normally distributed. This is presented in Table 4 below:

Table 4 Shapiro- Wilk Test for Normality

Variables	Obs	W Prob>Z	V	Z
Residual	280	0.76 0.92	0.66	-0.82

Source*:* Output obtained from STATA, 2020.

The result shown in Table 4 above indicates a p-value of 0.92. The p-value is greater than the conventional level of significance of 0.05 indicating normality. As a result, the analysis failed to reject the null hypothesis that residual values are normally distributed (at a 95% confidence level) and concluded that the residuals responded normally.

Hausman Specification Test

According to Verbeek (2012) and Ait- Sahalia & Xiu (2019), "it is often said that the Random effect model (REM) is more appropriate when the entities in the sample can be thought of as having been randomly selected from the population, but a fixed effect model (FEM) is more plausible when the entities in the sample effectively constitute the entire population/sample frame". Verbeek (2012) stated that "if T (the number of time series data) is large and N (the number of cross-sectional units) is small, there is likely to be little difference in the values of the parameters estimated by fixed effect model and random effect model". As a result, the decision here is centered on computational ease. Consequently, the Hausman Test is used to check if the random-effects model is preferable to the fixed-effects model. This is presented in Table 5 below:

Table 5 Hausman Test

Test Summary	Chi-sq statistics	Prob
Cross-section	0.457	0.857

Source*:* Output obtained from STATA, 2020.

According to Table 5, the random-effects model outperforms the fixed-effects model, as the Chi-Square value of 0.457 is significant at a confidence interval greater than 5%. In terms of the Hausman test, the

null hypothesis that the random-effects model is the right specification was confirmed since the cross-section random is greater than a 5% confidence interval, giving more confidence that random-effects model outcomes are accurate.

PRESENTATION AND ANALYSIS OF REGRESSION RESULTS

In this section, the regression results were presented using the pooled (OLS) estimate, fixed-effect model (FEM), and random-effect model (REM) for the cross-sectional data set of each of the NPL determinants and for the full sample of observations within the period of 1999 to 2019 having properly accounted for all post- estimation tests. Table 6 below presented the regression results showing the coefficient values and p-value of both the dependent (NPL) and independent variables (loan-to-total asset ratio and capital adequacy ratio).

Table 6: Summary of Regression Results (Pooled, FEM, and REM)

	OLS		**Fixed Effect Model**		**Random Effect Model**	
Variables	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
Constant	17.01	0.000***	35.88	0.001***	15.88	0.01***
LTAR	0.10	0.004***	0.10	0.004***	0.10	0.004***
CAR	0.020	0.874	0.021	0.689	0.021	0.689
R-squared	0.8169		0.8217		0.7892	
Adjusted R-square	0.8063		0.8047		0.7648	
F-statistic	326.31		121.11		88.74	
Prob (f-stat)	0.001		0.000		0.000	
Hausman test	0.857					
LM test of Random effect	chi-squ	0.429	prob<0.559			
Ramsey RESET	chi2	20.81	0.4310			

Source*:* Output obtained from STATA, 2020.

The analysis of the table above began with the interpretation of the combined effect of both the explanatory variables and the explained variable using the random effect model for interpretation. The R^2 which is the multiple coefficients of determination gives the percentage or proportion of total variation in the dependent variable measured by NPLs by listed DMB in Nigeria which is explained by the independent variables jointly (LTAR and capital adequacy ratio). Hence, the result of R^2 signifies that 78.92% of the total variation in NPL of listed DMB in Nigeria is caused by LTAR and capital adequacy ratio of listed DMB in Nigeria. The adjusted R^2 of 76.48% also buttresses the position of R^2. The cumulative result is the F-statistics of 88.74 with a significant value of 0.0000. This indicates the fitness of the model and means that the selected attributes are the main determinants of NPLs of the listed DMB in Nigeria.

Also, Table 6 above shows that Loan- to- total assets of banks (LTAR) have a positive relationship with NPLs in Nigerian DMB. This is based on a coefficient value of 0.10. This implies that a 1% increase in Loan to total assets of banks (LTAR) will lead to an increase in NPLs in Nigerian DMB by 0.10% and vice versa. The p-value of 0.004 which is less than the conventional alpha value of 0.05 shows that is very significant. This means that the null hypothesis that states that there is no significant effect of loan to total asset ratio on the NPL of Nigerian DMB was completely rejected. The rejection of the null hypothesis implies that there is a significant effect of loan to total asset ratio on the NPL of Nigerian DMB. Also, Table 6 revealed that the relationship between LTAR and NPL in Nigerian DMB is positive.

Table 6 also indicates that CAR has a coefficient of approximately 0.020 which implies that a 1% increase in CAR will lead to an increase in NPL in Nigerian DMB by 0.02% and vice versa. Also, the result further revealed a corresponding p-value of 0.689 which is more than the conventional alpha value of 0.05 suggesting that the null hypothesis that there is no significant effect of capital adequacy ratio on the NPL of Nigerian DMB could not be rejected at the 5% level of significance. The failure to reject the null hypothesis implies that there is no significant effect of the capital adequacy ratio on the NPL of

Nigerian DMB. From Table 6, it can be observed that this significant effect of CAR is positive in nature.

Test of Hypotheses

As the above section presents a brief discussion of the regression results, this section of the study gives a detailed hypothesis testing by pointing out which of the null hypothesis is either rejected or accepted after matching the regression results with the expected signs of a relationship between NPLs and its determinants. The hypotheses made by this study state that the determinable factors LTAR and capital adequacy ratio) have no significant effect on NPLs in Nigerian DMB. Table 7 below presented the hypotheses of this study.

Table 7 Summary of Hypothesis Testing

Relationship	Expected sign	Reported sign	P-value	Observation	Decision
LTAR	Positive sign	Positive sign	0.004***	P-value<0.05	**Reject null**
CAR	Negative sign	Positive sign	0.689	P-value>0.05	**Accept null**

Source: Researcher's compilation from STATA output, 2020.

RESULT AND DISCUSSION

The results revealed that there is a positive and significant relationship between LTAR and NPLs with a coefficient value of 0.004 and a p-value of 0.978 which signifies that loan-to-total asset is significantly influencing NPLs of DMB in Nigeria. The finding is consistent with the expectation of the study that NPL is highly correlated with LTAR and in line with that of Ademola (2018) who found a positive and significant impact of LTAR on NPLs.

The results showed that CAR has a coefficient value of 0.021 and a p-value of 0.689 which indicates a positive but insignificant relationship between CAR and NPLs of listed DMB in Nigeria. This finding signified that capital adequacy is not significantly influencing NPLs and it is not in agreement with the a priori expectation of the study. Consistent with this finding is the findings of Ogundipe, Akintola, and Olaoye (2020), Mustafa and Jeffery (2020), and El-Maude, Abdul-Rahman, and Ibrahim (2017) who found a positive but insignificant relationship between CAR and NPLs. However, the findings of this study are not in line with researchers such as Prasanth, Nivetha, Ramapriya, and Sudhamathi (2020) who established a positive and significant relationship between capital adequacy and NPLs of banks.

CONCLUSION

The study evaluated the determinants of NPLs of Listed DMB in Nigeria. Based on the findings of the study, the following conclusions are drawn.

The study reveals that Loan-to-total assets (LTAR) have a significant and positive effect on NPLs of Listed DMB in Nigeria. Based on the above finding, the study, therefore, concludes that LTAR has a significant positive effect in influencing non-performing Listed DMB in Nigeria.

The study also found that CAR has no significant effect on the NPL of Listed DMB in Nigeria. This means Capital Adequacy does not play a significant role in explaining NPLs of Listed DMB in Nigeria. Thus, the study concludes that CAR is not a significant determinant of NPLs of Listed DMB in Nigeria.

In the conclusion, it is recommended that the Loan to Total Asset Ratio should be reduced. Here, banks are advised not to be enticed by the high lending interest rate and the quest for profitability and grant more loans. In granting loans, they should always be cautious of the value of their assets. Reducing the ratio of loan-to-asset would help banks generate greater profitability and enhance loan performance. This will help to prevent the losses that could arise as a result of NPL in the banking industry.

The CBN should encourage bank managers to invest more in less risky investments with fixed interest income such as government bonds, this will enable the bank to minimize the level of the bank's risky assets and losses that may arise from NPL. More importantly, the banks themselves need to create a situation of relief from significant dependence on interest-based income and cushion their performance from movements in interest rate policy which mainly affects interest-based income. To attain this position, the banks should diversify their revenue sources by having an appropriate mix of interest and non-interest bearing assets in their portfolios. This will improve the asset quality of the bank since decreases in NPL means that bank management has recorded a good performance.

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