

EFFECT OF CAPITAL ADEQUACY ON THE PERFORMANCE OF DEPOSIT MONEY BANKS IN NIGERIA

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Abstract: The study reviews the effect of capital adequacy on the performance of Nigerian deposit money banks for the period of 2000 – 2020. The objective of this study is to examine how capital adequacy has helped deposit money banks achieve an efficient performance. This study adopts an ex-post facto research design, and the sample size is all deposit money banks with international and national authorization in Nigeria. The data used are mainly secondary data collected from the audited annual publications financial statements of all the deposit money banks listed on the Nigerian Stock Exchange. The study employed ordinary least square multiple regression (OLS), descriptive statistical analysis, in addition to E-view electronic packages. According to empirical results at 5% level of significance, findings show that total capital to risk weighted assets, banks capitalization to total credits, and debt to equity ratio (the independent variables to capital adequacy) had direct and inverse linear significant effect on return on assets (dependent variable to performance) of deposit money banks in Nigeria. The study concludes that capital adequacy, one of the key factors affecting the performance of the Nigeria deposit money banks in measuring efficient performance of financial institutions in Nigeria has both direct and inverse linear relationship with efficient performance of banks, therefore, recommends that the Central Bank of Nigeria should effectively regulate the capital and the resources owned by the deposit money banks (DMBs) in Nigeria to globally acceptable standard since the current ₦25 billion and ₦50 billion minimum capital-base requirements cannot justify the banking reality of nowadays. This will help to enhance investment planning, decision making within the financial system and early prevention of systemic bank distress.

Keywords: Asset Quality, Capital Adequacy, corporate governance, Distress, Liquidity, Profitability.

1. INTRODUCTION

The global financial crisis of 2008, banking liberalization, and globalization have speed up the adequate capitalization exercise and increase the competitiveness of deposit money banks to become one-strong financial center to provide innovative financial services in order to meet the changing financial needs of customers locally and globally. This business of banking affects all aspects of the economy of the nation as the main economic function of a bank is to facilitate the flow of funds from surplus funds unit to deficit funds unit, which means that bank acts as an agent to manage the fund and also supply credit in the economy (Adeyeni, 2015), and (Harley, Afolabi, & Adegbola, 2018). Thus, adequate capital becomes an important component of reforms in the Nigeria banking industry, owing to the fact that a bank with a strong capital-base has the ability to absolve losses arising from non performing liabilities. Hence, attaining capital adequacy requirements may

be achieved through consolidation of existing banks, through mergers and acquisition or raising additional funds through the capital market (Onaolapo, and Olufemi 2012), Kanu and Isu (2013), and Adedeji, Babatunde and Adekanye (2015).

Moreover, apart from the initial capital needed at the time of establishment, bank needs capital from time to time to meet with capital adequacy requirements. Hence, one of the achievements in the financial sector of the Nigerian economy has been the upward review of the capital-base of banks which supports deposit money banks operations by providing a buffer to absorb unanticipated losses from its activities and in the event of crisis, and also enabling the bank to continue to operate in a sound and viable manner (Okoye, Amahalu, Nweze, and Obi, 2016), and (Amahalu, Emmanuel, Nweze, Obi, and Okika, 2017). This is in line with Basel Accord that stipulates a common set of rules for capital adequacy in order to minimize the risk of bank failures. Through it, a minimum capital requirement was been developed by the national regulators for the purpose of protecting the bank from insolvency or bankruptcy. This will enable the national regulators to check on bank's Capital Adequacy Ratio to ensure that banks have enough capital to absorb a reasonable level of losses such as losses of bad loans, Okwu, (2017). Thus, larger size of equity or capital means that bank has lower risk which will protect the depositors and safeguards the stability and efficiency of the financial system thereby reducing the likelihood of banks becoming insolvent because when a bank becomes insolvent it may lead to loss of confidence in the financial system, causing financial problems for other banks and businesses, and perhaps threatening the smooth functioning of financial markets (Aliyu, Abdullahi, and Bakare 2020), and (Abba, Zachariah, and Iyang, 2013). Therefore, the essence Deposit Money Banks in Nigeria for the period of 2000-2020.

Over the years Nigerian banks have experienced varying degrees of bank failures with harsh effect on the financial system stability of the economy. The Central Bank of Nigeria (CBN) as the Apex Regulator of the banking sector increased the minimum capital-base for deposit money banks to ₦25billion in 2005; and during the consolidation exercise some of the 25 banks that emerged after the exercise started to have one problem or the other. Thus, in 2010, the CBN as part of its effort to enhance the resilience of deposit money banks reviewed the minimum requirement to any such amount that CBN may be prescribed to be eligible for regulatory purposes as per the Basel III standards. Yet, some banks were still having serious capital and liquidity problems, specifically, Wema bank, Skye bank, Diamond bank, and others that led CBN to step in and approved their acquisition by other stronger banks, and replaced their top management. However, in 2019, CBN to further strengthen the resilience of deposit money banks, upgraded the minimum requirement for high quality capital of N50billion or any such amount which the CBN may be prescribed, to give the banks the leverage to absorb losses on a going concern basis, and by requiring banks to build up additional capital buffers to cushion against future unexpected losses for banks with international authorization and D-SIBs respectively, which took effect in Jan. 2020 (Ofeimun, and Akpotor, 2020).

Also, the CBN Guidelines on regulatory capital requirements demand that banks are to maintain regulatory capital adequacy ratio (CAR) of 15% and 16% respectively for banks with international authorization and Domestic-systemically important banks (D-SIBs) while a CAR of 10% is applicable to banks with national authorization. This acts as a benchmark in measuring the level of capital adequacy of deposit money banks in Nigeria (Okwu, 2017), and (CBN, 2019, 2020). The successful recapitalization of these banks in Nigeria has significantly engendered economic growth and development as a result of the soundness, healthiness and stability achieved by the entire system. Despite this achievement however, some banks like Skye bank, Diamond bank, Wema bank and others incurred losses that eroded their capital in 2017 (Ofeimun, and Akpotor, 2020). The problem being examined here is to find out how adequate capitalization has been able to help deposit money banks achieve their medium and long-term objectives of efficient performance, and why are some of these banks that appeared profitable in their published financial statements are still going distressed and liquidated? The question here is, is the primary capital-base of these deposit money banks equal to 10% and 15% threshold of their risk weighted assets respectively during the period of their existence?

The main objective of this study is to investigate the effect of capital adequacy on the performance of Nigeria deposit money banks for the period of 2000-2020. The sub objectives in the work are as follow:

1. To determine the effect of total capital to risk weighted assets on the profitability of deposit money banks in Nigeria as measured by capital assets ratio (CAR) on ROA.
2. To ascertain the effect of bank capitalization to total credit assets on the profitability of deposit money banks in Nigeria as measured by non-performing loan ratio (NPLR) on ROA.

3. To examine the effect of debt to equity ratio on the profitability of deposit money banks in Nigeria as measured by return on equity (ROE) on return on assets (ROA).

This study is to be guided by the following hypotheses in null form:

Ho₁: Total capital to risk weighted assets has no positive significant effect on the profitability of deposit money banks in Nigeria.

Ho₂: Bank capitalization to total credit assets has no significant effect on the profitability of deposit money banks in Nigeria.

Ho₃: Debt to equity ratio has no positive effect on the profitability of deposit money banks in Nigeria.

2. MATERIAL AND METHODS

2.1 Capital Adequacy Concept

The concept of adequate capital is a measure adopted by Nigerian authorities at the period of under-capitalization in order to rearrange the existing capital structure to meet up with the losses that accrued in the regime of increasing operation. It is a statutory minimum reserve of capital which deposit money banks must have available to absorb losses in case of insolvency. It shows the percentage ratio of a financial institution's primary capital to its assets (loans and investments), and it is used as a measure of its financial strength and stability (Aliyu, Abdullahi, Bakare, 2020). CBN (2004) defines adequate capital as a situation where the adjusted capital is sufficient enough to absorb all losses and fixed assets of the bank having enough surpluses for the current operations and future expansion. Its regulatory adjusted capital is made up of ordinary share capital, statutory reserves, general reserves, net provisions for non-performing loans, including other losses arising from frauds, forgeries and theft, and loan capital that satisfy certain conditions.

Hence, banks' ability to play the positive role in economic growth and development depends on the healthiness of their capital; the strength and soundness of other specific external factors like its asset's quality, management efficiency, earnings quality and sufficient liquidity, (the acronym CAMEL – Capital adequacy, Assets quality, Management efficiency, Earning quality, and Liquidity quality) - which is another major yardstick for measuring performance of banks. This approach is used by both regulatory authority and banks management to assess the level of performance of banks on their soundness, solvency and liquidity position. CAMEL works in sine qua non with capital adequacy. It serves as a major tool for assessing solvency level of banks by the monitoring authority. However, maintaining a balance between short-term assets and short-term liabilities, as well as long term assets and long-term liabilities becomes crucial for the survival of the banking system (Dang, 2011), Saheed, 2018), (Osadume and Ibenta, 2018), and (Ofeimun and Akpotor, 2020).

2.2 Capital Adequacy and Bank Performance

Performance as defined by Adeyeni, (2015) is a means of evaluating how effectively and efficiently organizations use resources to achieve their objectives in order to survive in a competitive environment. Now, a fair evaluation of any bank's performance should start by evaluating whether the bank has been able to achieve the objectives set by the regulatory authorities, the bank management, and stockholders. The main objective of efficient banks' performance is to maximize profits. This is very important for the purposes of paying corporate taxes, paying interests to depositors, salaries and wages to staff, dividends to shareholders and meeting other expenses. Profitability is essential for banks to sustain their operations and for their shareholders to obtain fair returns on their investments. Profitability is a bank's first line of defence against unusual losses as it strengthens its capital position and improves future earnings through investments of retained earnings. A good means of measuring performance of banks and other business enterprises is through the financial analysis; and financial analysis is a process of identifying the financial strengths and weaknesses of a firm by establishing relationship between the items of the balance sheet and the profit and loss account (Ezike and Oke, 2013), and (Ofeimun and Akpotor, 2020). Bank is assumed to maximize its profit by choosing an optimal ratio of capital/debt within a competitive environment. The aims of bank capitalization are to resolve the problem of unsound banking and enhance efficient management in the banking system; and the basic aim of every bank management is to maximize profit as an essential requirement for conducting business operations. Thus, deposit money bank plays an important role in maintaining good performance that leads to stability, solvency, and profitability of financial system and the economy as a whole (Kanu and Isu 2013), and Adedeji, Babatunde and Adekanye (2015).

This research work uses Return on Asset (ROA) to measure the profitability of deposit money banks in Nigeria. ROA variable is chosen because of its functions: ROA is risk sensitive; it is a medium/long term indicator and shows the medium/long term health of an institution as it takes into account of the medium/long term strategy or the damages cause by any crisis. This means that ROA shows how bank management maximizes medium/long term profits of the organization (European Central Bank, 2010).

2.3 Buffer Theory of Capital Adequacy

Capital requirements constitute the main banking supervisory instrument in Nigeria and a breach of the capital requirements is considered a major infringement of banking legislation and is not tolerated by the Central Bank of Nigeria (CBN). Buffer theory is propounded by Calem and Rob (1996), used by Ikpefan (2013), Odunga, Nyangweso and Carter (2013), Ederin (2014), and Aliyu, Abdullahi and Bakare, (2020). The theory points out that as bank approaches the minimum capital requirements; they tend to raise capital to avoid costs which may be incurred in case of breach of set regulatory capital requirements. This is because breaching the regulatory provisions will lead to penalties, thus, bank prefers to maintain capital in excess of prudential limit in order to reduce the chances of falling below statutory capital requirement. This means that banks prefer to hold a buffer capital to reduce the probability of falling under the legal capital requirements especially if the capital adequacy ratio is very volatile. According to this theory, banks may aggressively increase their loan book without increasing their capital-base, hence, the requirements for capital standards. In order to avoid this risk most banks have prudentially set their own benchmarks higher than the regulatory standard (Ini and Eze, 2018).

Supporting the theory, Gropp and Heider (2010), Volkov, (2010), and Musyoka, (2017) argued that buffer capital has several functions which are, promotional, protective, regulatory and operational. Promotional function is explains how banks ensure that they have enough capital to ensure growth and meet the expectation of stakeholders hence promoting economic growth. The protective functions in the bank's capital is seen in its ability to cushion banks against unexpected loses and ensuring business continuity and reliability. As management ensures that adequate capital is held to absorb any unanticipated losses the capital ends up playing regulatory functions hence protecting the banks from breach of capital requirements. Operational function relates to the support of banks' activities and ensuring volume which in turn leads to gains for the banks. This theory is relevant to this study as it assumes holding of excess capital which has the ability to cushion banks against unexpected losses and ensuring business continuity, reliability and dependability, hence, deposit money banks holding capital in excess of prudential limit is the buffer theory of capital adequacy. Therefore, the setting of minimum capital requirements and capital adequacy ratios for banks seem to be consistent with the buffer theory of capital adequacy as it also implies an apparent trade-off between capital adequacy and the amount of risk a bank undertakes (Hunjra, Zureigat & Mehmood, 2020).

Aliyu, Abdullahi and Bakare (2020) also examined the nexus between capital adequacy and financial performance of deposit money banks (DMBs) in Nigeria. Secondary data were obtained from the audited financial statements of all the eight (8) deposit money banks with International Authorization listed on the Nigerian Stock Exchange spanning from 2012 - 2019. Data were analyzed using panel regression techniques. Results showed that loans and advances (LAD) have a positive and significant effect on the financial performance of DMBs with international authorization in Nigeria. The study concluded that capital adequacy has positive relationship with the financial performance of DMBs in Nigeria and that the Central Bank of Nigeria need to increase the minimum capital base of deposit money banks in Nigeria, since the current ₦25 billion and ₦50 billion minimum capital base licence requirement for DMBs with national and international authorization cannot justify the banking reality of today, especially as a result of the continuous depreciation of the value of local currency naira in the foreign exchange market.

Onakoya et al (2020) in their study on Capitalization and Profitability of Listed Deposit Money Banks in Nigeria examined the impact of the recapitalization of deposit money banks on profitability covering a nine year period from 2008 to 2017. Panel data of 13 Deposit money banks using data obtained from secondary source is used. The study is based on the Buffer theory of capital adequacy, deposit insurance theory and the expense theory. The investigation was in two phases. The pre-estimation involved the descriptive analysis, correlation analysis and variance inflation factor analysis utilized to evaluate the characteristics of the series. In the estimation and model diagnostic phase, the study utilized the Hausman test to determine and select the most appropriate estimating technique amongst the pooled OLS, fixed effect and random effect analysis. The model diagnostic test was carried out to determine the appropriateness and exhaustiveness of the model. They

are the heteroskedasticity, Cross dependence, the Serial correlation and Autocorrelation tests. The result showed that recapitalization and exchange rates significantly and positively influenced the profitability performance of listed Deposit Money Banks in Nigeria.

Ugwuka and Ajuzie (2019) analyzed the capital adequacy and banks performance: evidence from deposit money banks in Nigeria. The study captured performance indicators, and employed panel data made up of one hundred and eight observations comprising of nine cross-sectional units for the period of twelve years. The collected data were estimated using Pooled regression effect estimation via Stata 2014 statistical package. Findings from the results showed a positive relationship between capital adequacy ratio (CAR) and return on assets (ROA). The study also found that there is a positive significant relationship between deposit to asset ratio and bank performance. Ukinamemen and Ozekhome (2019) explore the influence of capital adequacy on the financial performance of listed banks in Nigeria. Regression results revealed that banks' capital adequacy ratio has a positive and significant impact on the financial performance of banks in Nigeria.

3. RESEARCH DESIGN

This section critically examines the methodology adopted, and deals with the research approach and procedures use in the study, detailing the various steps adopted in the research. The study employs the ex-post facto (quantitative) research design as it relies on historical (secondary) data. It is the type of research involving events that have already taken place, and it aims at determining and measuring the relationship between one variable and another or the effect of one variable on another using secondary data from annually audited financial reports of deposit money banks published in Nigeria Deposit Insurance Corporation (NDIC) and Central Bank of Nigeria (CBN) annual reports and statistical bulletins for the period under study (Onwumere, 2009), and (Appah, 2020).

3.1 Population and Sampling

The population of the study consists of all the Deposit Money Banks in Nigeria. Using a simple random sampling method where every item in the population has equal right to be selected, thus, deposit money banks with national and international authorization were selected for the period 2000 to 2020.

3.2 Method of Data Analysis

The collected data were analyzed using descriptive statistics, diagnostic tests and multiple linear regression analysis with the use of E-view 10 electronic packages to analyze the effect of the independent variables on the dependent variables.

3.3 Model Specification

This study is anchored on the model of Edison, Mohd-Haizam, and Sinaga, (2019) with some modifications to suit this study. The performance (profitability) indicator use for this particular study is Return on Assets (ROA) and the major determinants (independent variables) are Capital Adequacy (CAR), bank capitalization to total credit assets (BCTCA), and debt to equity ratio (DER). To establish any causal relationship between the variables, linear regression equation is used: The regression model of the study is: $ROA = f(CAR, BCTCA, \text{ and } DER)$.

Where: ROA = return on capital i, t ; CAR = capital adequacy i, t .

BCTCA= bank capitalization to total credit assets i, t ; and DER = debt to equity ratio i, t ;

The model is specified in econometric form as follows:

$$ROA = b_0 + b_1 CAR + b_2 BCTCA + b_3 DER \dots + \mu t.$$

Rewritten we will have: $\hat{Y} = \alpha + b_1 X_1 + b_2 X_2 + b_3 X_3 \dots \mu t.$

Where $\hat{Y} = ROA$, $X_1 = CA$, $X_2 = BCTCA$, $X_3 = DER$;

α = Intercept (Constant term); while b_1, b_2, b_3 are Coefficients parameters, to be estimated for bank i in period t ; (coefficient of the explanatory variables or the slope, that is, the rate at which a change in the explanatory variable affects the behaviour of the dependent variable i.e. change of the dependent variables as the independent variables change by one unit); At 5% level of significance will be used in the hypothesis testing;

μ_t =Error term/unexplained variable(s) for bank i, in period t; (error term capturing other explanatory variables not explicitly included in the model). Apriori expectation = $\alpha > 0$, $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$.

4. DATA PRESENTATION AND ANALYSIS

Table 1: Descriptive Analysis

	ROA	CAR	ROE	NPLR
Mean	1.723333	15.51476	24.12286	11.75143
Maximum	4.830000	23.00000	114.2900	27.60000
Minimum	-8.900000	4.100000	-60.07000	2.810000
Std. Dev.	2.784619	4.976859	35.07671	7.240994
Observations	21	21	21	21

Source: Author’s Computations, 2023

Table 4.1 above shows the descriptive statistics of the individual variables used in the study. The individual variables have the following mean values: the mean values of Return on Asset, CAR, ROE and NPLR are 1.72, 15.51, 24.12 and 11.75, respectively. The standard deviations for the ROA, CAR, ROE and NPLR are 2.784619, 4.976859, 35.07671 and 7.240994, respectively. The highest Return on Asset is 4.83 while the lowest ROA is a loss of 8.9. CAR ranges from 23 to 4.10 while the range value of ROE is 114 to -60.07. Finally, NPLR fluctuated from 27.6 to 2.81, between the periods of 2000 - 2020. This result showed consistency and stability in performance by the deposit money banks except the unhealthy case of non-performing loan ratio.

Table 2: Augmented Dickey-Fuller Test of Unit Root

Variables	T-ADF	Lag Length	Test critical values:@ 5% Level	Remark
ROA	-5.260448	1(0)	-3.020686	Stationary
CAR	-4.469519	1(0)	-3.029970	Stationary
NPLR	-4.882545	1(I)	-3.029970	Stationary
ROE	-3.756271	1(0)	-3.020686	Stationary

Source: Author’s Computations, 2023

The decision on whether a variable has a unit root is drawn using the T-ADF and Test critical values at 5% level. If the absolute value of T-ADF is greater than the absolute value of Test critical values at 5% level, the conclusion is that the variable is stationary, that is, it got no unit root. From the **Table 4.2** above, all the variables were shown to be stationary since the T-ADFs of all the variables are greater than the Test critical values at 5% level, in absolute terms. While ROA, CAR and ROE are stationary at all levels, NPLR is stationary at the 1st difference I(0). This shows validity of result and gives some level of comfort that in the data selection, suspicion of serial correlation were minimal and we can rely on the output of this research work that the result of this work is non-spurious.

4.1 Serial Correlation

OLS assumes that the observations of the error term are uncorrelated with each other. This assumption requires that one observation of the error term does not predict the next observation. The test for serial correlation in this study is conducted using Breusch-Godfrey Serial Correlation LM Test of which result is presented in the table below:

Table 3: Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.025774	Prob. F(2,15)	0.9746
Obs*R-squared	0.071921	Prob. Chi-Square(2)	0.9647

Source: Author’s Computations, 2023

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The test result for the Breusch-Godfrey Serial Correlation LM Test above returned F -statistic = 0.025774 with a corresponding $P > |F| = 0.9746$. The null hypothesis of no serial correlation was accepted since the $P > |F| = 0.9746$ is greater than 0.05. Therefore, there is no issue of autocorrelation in the time series.

4.2 Multicollinearity Test

OLS assumes that no independent variable is a perfect linear function of other explanatory variables. In other words, there is no strong or perfect correlation between or among the predictor variables. This assumption aims at preventing a situation whereby when one of the variables changes, the other variable also changes by a completely fixed proportion. Variance Inflation Factors were used to test for Multicollinearity assumption in the study as shown below.

Table 4: Variance Inflation Factors

Sample: 2000 2020 Included observations: 21			
Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	2.177539	27.19470	NA
CAR	0.005206	17.18393	1.533737
NPLR	0.002355	5.529822	1.468548
ROE	0.0000789	1.727099	1.154013

Source: Author’s Computations, 2023

Table 4.4 shows that the value of all Centered VIF is below 10. The decision rule is that if the centered VIF is less than 10, then there is no evidence that there is multi-collinearity issue in the model. Since all the Centered VIFs are less than 10, it was concluded hereby that all the independent variables are not collinear. The result shows absence of multi-collinearity among variables.

4.3 Heteroskedasticity Test

OLS assumes that the error term has a constant variance (no heteroskedasticity). That is, the variance of the errors should be consistent for all observations so that the variance does not change for each observation or for a range of observations. This preferred condition is known as homoskedasticity or same scatter. The result of Harvey Heteroskedasticity Test that diagnoses this assumption is presented in Table 5.

Table 5: Heteroskedasticity Test: Harvey

F-statistic	2.882720	Prob. F(3,17)	0.0662
Obs*R-squared	7.080873	Prob. Chi-Square(3)	0.0694
Scaled explained SS	4.667400	Prob. Chi-Square(3)	0.1978

Source: Author’s Computations, 2023

Table 5 above shows that the value of F-statistic is 2.88720 with a probability of 0.0662 which is greater than 0.05 significant level. Therefore, there is no evidence to reject the null hypothesis of no heteroskedasticity. Therefore, the model does not face any heteroskedasticity problem. This implies that the correlation coefficients between the independent variables are relatively small. It was therefore safely concluded that the error term has a constant variance.

4.4 Normality Test

OLS assumes that the error term is normally distributed. Although, OLS does not require that the error term follows a normal distribution to produce unbiased estimates with the minimum variance. Satisfying this assumption allows one to perform statistical hypothesis testing that generates reliable confidence intervals and prediction intervals. Thus, **Table 4.6** below shows the Jarque-Bera Test for Normality of Residuals.

Table 6: Jarque-Bera Test for Normality of Residuals

Jarque-Bera Statistic	0.849223	Prob.	0.654024
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Source: Author’s Computations.2023

The Jarque-Bera Test for Normality of Residuals returns a probability value that exceeds 0.05 significant level. A non-significant result (P-value of more than 0.05) indicates that the distribution is normal while, a significant result (P-value of less than 0.05) indicates that the distribution violates the assumption of normality. Therefore, the null hypothesis that the error term is normally distributed cannot be rejected. The evidence shown in the results supports the assumption of normality.

4.5 Test of Hypotheses

The OLS is carried out to examine the effect of the predictor variables on the outcome variables at 5% level of significance. This estimation method is chosen because the assumptions of OLS are not violated as shown in the diagnostics tests carried out. Total Capital to Risk Weighted Assets is represented by CAR, Bank Capitalization to Total Credit Assets is represented by NPLR, and Debt to Equity Ratio is represented by ROE while the proxy for profitability is represented by ROA. The regression model for the test is therefore:

$$ROA_{it} = \alpha_0 + \beta_1 CAR_{it} + \beta_2 NPLR_{it} + \beta_3 ROE_{it} + \mu_{it}$$

The result of the OLS regression analysis is shown in table below.

Table 7: OLS Regression Result

Dependent Variable: ROA				
Method: Least Squares				
Date: 07/23/22 Time: 04:46				
Sample: 2000 2020				
Included observations: 21				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.025842	1.475649	0.017513	0.9862
CAR	0.099887	0.072153	1.384379	0.1841
NPLR	-0.116493	0.048527	-2.400586	0.0281
ROE	0.062875	0.008880	7.080337	0.0000
R-squared	0.815673	Mean dependent var		1.723333
Adjusted R-squared	0.783145	S.D. dependent var		2.784619
S.E. of regression	1.296733	Akaike info criterion		3.527216
Sum squared resid	28.58577	Schwarz criterion		3.726173
Log likelihood	-33.03577	Hannan-Quinn criter.		3.570395
F-statistic	25.07584	Durbin-Watson stat		1.913160
Prob(F-statistic)	0.000002			

Source: Author’s Computations, 2023

Thus, R² value of 0.815673 shows that the proportion of the variations in ROA that are accounted for by CAR, NPLR and ROE is 81.57%. The adjusted R² = 0.783145 penalized the R² for the addition of regressors which do not contribute to the explanatory power of the model for a better precision. Thus, the actual fraction of the variance of the dependent variable explained by the independent variables (CAR, NPLR and ROE) is precisely 78.31. Finally, F-test = 25.07584 and its associated Prob>|F| = 0.000 indicates that the linear regression model provides a better fit to the data than a model that

contains no independent variables. In other words, the sample data presents evidence that the independent variables in the regression model improve the fit. Therefore, there is strong evidence for concluding that R-squared is greater than zero in the population.

Now that the F-test was used to determine the likelihood that all of the coefficients equal zero, t-test is then used to examine whether each variable is predictive enough on its own to be statistically significant.

4.5.1 Hypothesis I

Ho: Total capital to risk weighted assets has no significant effect on the profitability.

Hi: Total capital to risk weighted assets has significant effect on the profitability.

The coefficient value of CAR ($\beta_1 = 0.099887$) signifies that ROA changes by 0.099887 given a one-unit shift in CAR while holding other variables in the model constant. The sign of this regression coefficient tells that there is a positive correlation between CAR and ROA. This positive coefficient implies that as the value of CAR increases, the mean of ROA also tends to increase.

The hypothesis test now assesses whether the sample provides enough evidence to conclude that the coefficient of CAR does not equal zero. The null hypothesis of zero-correlation is accepted because the $Pro>|t| = 0.1841$ is greater than 0.05. Therefore, a change in CAR does not significantly correlate to a change in ROA since the coefficient is zero. This suggests that total capital to risk weighted assets has no significant positive effect on the profitability ($\beta_1 = 0.099887$, $Pro>|t| = 0.1841$).

4.5.2 Hypothesis II

Ho: Bank capitalization to total credit assets has no significant effect on the profitability.

Hi: Bank capitalization to total credit assets has significant effect on the profitability.

The coefficient value of NPLR ($\beta_2 = -0.116493$) signifies that ROA changes by -0.116493 given a one-unit shift in NPLR while holding other variables in the model constant. The sign of this regression coefficient tells there is a negative correlation between NPLR and ROA. This negative coefficient implies that as the value of NPLR increases, the mean of ROA tends to decrease.

The hypothesis test now assesses whether the sample provides enough evidence to conclude that the coefficient of NPLR does not equal zero, in the population. The alternate hypothesis of non-zero correlation is accepted because the $Pro>|t| = 0.0281$ is less than 0.05. Therefore, a change in NPLR significantly correlates to a change in ROA since the coefficient is different from zero. This suggests that bank capitalization to total credit assets has a significant negative effect on the profitability ($\beta_2 = -0.116493$, $Pro>|t| = 0.0281$).

4.5.3 Hypothesis III

Ho: Debt to equity ratio has no significant effect on the profitability.

Hi: Debt to equity ratio has significant effect on the profitability.

The coefficient value of DER ($\beta_3 = 0.062875$) signifies that ROA changes by 0.062875 given a one-unit shift in DER while holding other variables in the model constant. The sign of this regression coefficient tells there is a positive correlation between DER and ROA. This positive coefficient implies that as the value of DER increases, the mean of ROA also tends to increase.

The hypothesis test now assesses whether the sample provides enough evidence to conclude that the coefficient of DER does not equal zero, in the population. The alternate hypothesis of non-zero correlation is accepted because the $Pro>|t| = 0.000$ is less than 0.05. Therefore, a change in DER significantly correlates to a change in ROA since the coefficient is non-zero. Thus, in line with the a priori expectation; we reject the Null and conclude that debt to equity ratio has significant effect on the financial performance of a bank. This suggests that debt to equity ratio has a significant positive effect on the profitability ($\beta_3 = 0.062875$, $Pro>|t| = 0.0000$).

The summarized regression results indicate that we can explain 81.57% of the financial performance using capital adequacy measures as determinants while 18.43% of the variation is explained by other factors outside the model and the error term showing that the constructed variables best fits the model. The result meets our a priori expectation. The Prob (F-Statistic) of 25.07 ($P < 0.05$) also indicates that capital adequacy measure is a significant determinant of financial performance of deposit money banks in Nigeria. The Durbin-Watson stat of 1.913 is considered suitable and eliminates possibility of autocorrelation in the variables chosen. The overall probability of 0.00002 indicates that the relationship between the bank performance proxy by ROA and the explanatory variables are positively significant which is quite negligible in line with the a priori expectation and hence, we reject our Null hypothesis. Thus, F- statistics value is highly significant at the 5% level of significance showing that the overall model is (positively and negatively) statistically significant.

5. CONCLUSION

Based on the findings from the analysis above, the study concludes that bank capitalization to total credit assets, and debt to equity ratio significantly affect bank profitability, while total capital to risk weighted assets does not have positive significant effect on the profitability of DMBs. This is because when regulatory authorities do not push banks to maintain adequate capital, failure becomes inevitable since banks tend to take too much risk which is not supported by their capital. Hence, efficient and effective management of deposit money banks by those at the helm of bank's affairs should stimulate and improve financial performance of deposit money banks through efficient portfolio management because banks with strong adherence to their credit policies having their non-performing loan ratio even below the stipulated rate of 5%; exercising prudence in risky investments; prudence in using depositors' funds on credit activity, while having the ability to explain why Deposit money banks maintain minimum capital beyond the amount required by the regulatory institution of 16% for D-SIBs, 15% for banks with International Subsidiaries and 10% for banks with national Subsidiaries in Nigeria are perceived to have adequate capitalization.

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