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## Article

# Central Bank of Nigeria prudential guideline and the financial performance of deposit money banks in Nigeria

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Original Research Article

## Central Bank of Nigeria Prudential Guideline and the Financial Performance of Deposit Money Banks in Nigeria

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### Abstract

*The study investigates the impact of Central Bank of Nigeria Prudential Guidelines and the Financial Performance of Listed Deposit Money Banks in Nigeria for the period 2008-2019. The proxies for Prudential Guidelines are Capital Adequacy Regulation (CAR), Liquidity Regulation (LR), and Credit Risk Regulation (CRR) while for Financial Performance are Return on Asset (ROA) and Return on Equity (ROE) to identify the gaps that underpin the problem under investigation. Secondary data were sourced from the Nigeria Stock Exchange (NSE) factbook for the filter sample of Listed Deposit Money Banks (DMBs) that met some criteria. The study employed multiple regression techniques in analyzing the data that were gathered using Ordinary Least Square (OLS) with Eviews-10. The study revealed that CAR has a negative but insignificant effect on ROA but positively and significantly correlated with the ROE while a negative relationship of LR is insignificant on ROA but insignificant on the ROE. However, a negative relationship of CRR is significant on ROA but insignificant on the ROE of DMBs in Nigeria. The study recommends that the minimum capital requirement of DMBs in Nigeria should be reviewed regularly to ensure it remains at an optimal level, adjust their credit policies to reduce impaired loans and maintain a minimum liquidity requirement of 30%.*

**Keywords:** Prudential guidelines, financial performance, deposit money bank, capital adequacy regulation, liquidity regulation, and credit risk regulation

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**INTRODUCTION**

The Nigerian banking sector has witnessed a boom leading to many changes in the areas of regulations and reforms; the number of institutions, the structure of ownership, and depth and breadth of operations in an attempt to reposition the industry to play its financial intermediation role efficiently and profitably. The factors that led to the conception of a fragile financial system that extremely ends in crisis to the global financial collapse include macro-economic instability, major failures in corporate governance at banks, lack of investor and consumer sophistication, inadequate disclosure and transparency about the financial position of banks, and uneven supervision and enforcement (Sanusi, 2010). To avoid incessant liquidation of Deposit Money Banking-DMBs, the Central Bank of Nigeria-CBN focuses on evaluating various bank financial performance indicators which are tailored toward ensuring a stable, safe and sound system and serve as a guide to ensure a prudent approach in the creation of high-quality loans assets and it's associated earning streams.

As part of the initiative to enhance the quality of banks, the CBN undertook a review of the 1990 PG in July 2010 which aim is to address various aspects of DMBs

operation such as Risk Management, Corporate Governance, Know your customer (KYC) and Anti-money Laundering, project financing, object financing, real estate and commercial estate, Small and Medium Enterprises financing, Agriculture financing, Microfinance loans, retail financing, loan loss provisioning and peculiarities of different loan type and finance to different sectors using different financial soundness indicators which involves Liquidity, Capital Adequacy, Asset Management, earnings/ profitability, exposure to foreign Exchange Risk, leverage and debt service capacity among others.

However, the CBN PG outlines seven (7) financial soundness indicators used to measure the true health of each financial institution as Capital Adequacy Regulations, Asset Quality Regulation, Earnings/ Profitability regulation, Liquidity Regulation, Exposure to FX Risk Regulation, Leverage Regulation, and Debt Service Capacity Regulation. DMBs in Nigeria have faced numerous challenges such as under-capitalization, slow branch expansion and weak management, insider fraud abuse and imprudent lending, lack of technical skill, banking knowledge and illiquidity related to their inability to meet

customer cash withdrawals. Thus government, shareholders and other stakeholders continue to show considerable concern about how they are performing.

The financial performances of DMBs are affected by inadequate capital, illiquidity, and Non-Performing Loan-NPL, Thus, making it difficult to attract investors and lenders thereby affecting their ability to purchase other financial resources. Illiquidity affects a bank's earnings, and working capital and in extreme circumstances may result in distress, high impaired loans, and poor investment portfolios. Banks are expected to maintain adequate capital to meet their financial obligations, operate profitably and contribute to promoting a sound financial system. Inadequate capital was attributed to the low level of initial capital, affected inflation and the large portfolio of NPL maintained by some banks. Thus, the introduction of PG requires suspending interest due but unpaid on classified assets and provisions for non-performing credit facilities (Babalola, 2011). Hence, despite the large number of stakeholders' interest that is involved after the implementation of recent DMBs PG, there seems not to be any quantitative research specifically on the impact of PG on the Financial Performance of DMBs in Nigeria as it relates to capital adequacy regulation, liquidity regulation and credit risk regulation.

## **LITERATURE REVIEW**

### **Prudential Guidelines**

Prudential guidelines (PG) are established laws, rules and regulations designed to minimize bank risk; ensure the safety and soundness of both individual institutions and the banking system, the guideline establishes limits and constraints on the

banking sector, and the element in preventing, limiting or stopping the damage caused by poor management. The Guideline serves as part of the minimum rules that are set out by the CBN for the conduct of banking businesses whose need is to prevent banks from illiquidity, capital inadequacy, and poor asset quality. Specifics for PG is to avoid bank failure by launching policies, procedures, disciplines, and practices that would ensure the easy and reliable valuation of banks. Sauda, et al. (2017) observed that PG are forms of government procedures that subject banks to certain requirements, boundaries and strategies that create transparency between the banks, their customers and the government, the absence of these regulations can affect the banking system, but good rules can impact the banking system drastically, Kiplagat and Kalui (2020) asserted that prudential regulation forms a critical part of the operations of banks as it protects investors, consumers and ensures systemic stability they are required to maintain adequate capital, liquidity, asset quality, credit risk and management efficiency. The CBN require the DMB in their PG to exercise particular care in their operations so that specified outcomes are realized by removing some discretion from bank management and replacing it with strategic rules in decision making. The current PG was endorsed in July 2010 to deal with the management of risk assets, classification of credit facilities, agricultural financing, interest, and provisions among others which licensed banks are required by the guidelines to manage. The justification for the review of this guideline is to ensure a high degree of comparability of bank performance across national borders.

### Deposit Money Banking and Financial Performance

Deposit Money Banking was adopted from all Commercial and Merchant banks operating in Nigeria during the universal banking era of 2001. These banks owe some basic responsibilities in form of financial intermediation which must be efficiently delivered to retain the confidence of their customers and ensure a smooth financial system. These banks provide retail and wholesale financial services to their customers which could comprise the opening of accounts, insurance, pension, mobilizing savings and investments, lending for investments, and financing economy activities to mention but few. These banks play a significant role in providing an efficient payment system and facilitating the implementation of monetary policies of the government, hence to encourage competition among DMBs, protection against systemic risk, unprecedented collapse and effectiveness, these banks must be regulated and supervised to protect both shareholders, government and bank customers via financial measurement. Financial measurements are tools that revealed the strength, weaknesses, opportunities and threats of banks. The examination and supervision of the performance of DMBs are essential for managerial and regulatory purposes. The CBN is concerned with the safety and soundness of banks and depositors' funds while shareholders are interested in the financial performance of their banks as per their liquidity and profitability levels. Ongore and Kusa (2013) explained that the poor financial performance of DMBs can lead to failure and financial crunch which have undesirable impacts on economic growth while Mishkin (1992) as cited in Lisa and Sandy (2016) argued that the financial performance of banks can be

measured in various ways including ROI, ROA as well as an estimation based on value addition. For this study, financial performance is measured as ROA and ROE.

$$ROA = \text{Net income} \div \text{Average total assets}$$

While

$$ROE = \text{Net Income Average} \div \text{Shareholders' Equity}.$$

Whereas:

$$\text{Net Income} = \text{Total Revenues} - \text{Total Expenses}$$

$$\text{Average Total Assets} = \frac{\text{Total Asset}_{p_i} + \text{Total Asset}_{p_{ii}} + \text{Total Assets}_{p_n}}{N}$$

$$\text{Net Income Average} = \frac{(\text{TR} - \text{TE}_{p_i}) + (\text{TR} - \text{TE}_{p_{ii}}) + (\text{TR} - \text{TE}_{p_n})}{N}$$

$$\text{Shareholder equity} = \text{Share Capital} + \text{Retained Earnings} - \text{Treasury Stock}$$

Where:

TR      total revenue  
TE      total expenditure  
P<sub>i-n</sub>    period in

### Liquidity Regulation (LR)

LR are financial regulations designed to ensure that banks have necessary assets in hand to prevent liquidity disruptions due to changing market conditions that are related to reserve requirements but focus on specific liquidity risks of assets that are held and it was imposed to negate liquidity risks of banks that played a prominent role in financial crises. Liquidity regulation is useful since it is effective in managing liquidity stress and its macroeconomic costs.

$$LR = \text{HQLA} \div \text{TNCFA}$$

$$\text{Hence, HQLA} = L_1 \text{LAM} + L_{2A} \text{LAA} + L_{2B} \text{LAA} - \max(\text{Unadjusted excess HQLA amount; Adjusted excess HQLA amount})$$

$$\text{And TNCFA} = \text{TECI} - \text{TECO}$$

*Where:*

TECI - Total expected cash inflows  
TECO - Total expected cash outflows  
L<sub>1</sub>LAM - Level 1 liquid asset amount  
L<sub>2A</sub>LAA - Level 2A liquid asset amount  
L<sub>2B</sub>LAA - Level 2B liquid asset amount  
TNCFA - Total net cash flow amount  
HQLA - High-Quality Liquid Asset Amount

The Pointers for CBN PG LR are Liquid Assets to Total Assets (LATA), Liquid Assets to Short-term Liabilities (LASL), Spread between Highest and Lowest Inter-bank Rate (SHLIR), and Customer Deposits to Total Non-interbank Loans (CDTL).

LATA and LASL assess the vulnerability to loss of access to market sources of funding or a run-on deposit while SHLIR revealed the market indicator of counterparty dangers in the inter-bank market. Statistically, SHLIR is computed as the Highest interbank rate- lowest interbank rate

Similarly, CDTL assesses the vulnerability to loss of access to customer deposits which is computed as  $\text{Customer Deposits} \div \text{Loans and advances to customers} \times 100$

### **Credit Risk Regulation (CRR)**

CRR are rules that identify risk issues, assessment of risks by using borrowers' financial and sophisticated models, monitoring the activities of defined risk issues and implementation of controlling measures by bank management to avoid or reduce the undesirable consequences of risks. The process is implemented within the operational and strategic structure of banks (Tafri *et al.*, 2011). The Expected Loss (EL) model is adopted in computing the CRR of banks, hence,

Wallstreetmojo Editorial Team (n.d) revealed that CRR is measured as:

$$PD \times EAD \times (1 - LGD)$$

*Whereas:*

$$PD = \text{Spread in CDs Market} \div LGD$$

EAD = The Current exposure + scheduled payments next 6 months -scheduled repayments next 3 months + 3 months of missed interest payments;

$$LGD = PR \times \text{zero loss} + (1-PR) \times \text{average loss if not recovered}$$

*Where:*

PD probability of default

EAD exposure at default

LGD Loss given default

CDs Credit Default Swaps

PR Probability of Recovery

The Pointers for CBN PG CRR are NPL to Total Gross Loans (TGL): which indicates the credit quality of banks' loans, Sectoral Distribution of Loans (SDL) to Total Loans (TL) identifies exposures concentrations to particular sectors, Large Exposures to Capital (LEC) which pinpoints credit exposure to large borrowers (Credit exposures are a credit to a customer or borrowers that is at least 10% of a bank's shareholders fund unimpaired by losses) and Geographical Distribution of Loans (GDL) to Total Loans (TL) categorizes credit exposure concentrations to a particular region by banks. The basis for computation are:

$$NPL/TGL = \text{Non-Performing Loans} \div \text{Gross Loans} \times 100$$

$$SDL/TL = \text{Loans per Sector} \div \text{Gross Loans} \times 100$$

$$LEC = \text{Aggregate Large Exposure} \div \text{Total Qualifying Capital} \times 100$$

$$GDL/TL = \text{Loans per Defined Geographical area} \div \text{Gross Loans} \times 100$$

### Capital Adequacy Regulation (CAR)

CAR is an international standard established to safeguard banks by setting risk-sensitive minimum capital requirements aimed at minimising bank failure and insolvency. CAR ascertained that minimum capital should be high enough to absorb the potential losses as it acts as a buffer for banks in the distressing period hence, the higher the buffer, the lower the market, operational and credit risk default. CAR is measured as adopted in the study of Thakur, and Vaidya, (n. d) as per:

$$\frac{\text{Tier}_1 + \text{Tier}_2 - \text{Deductions} + \text{Tier}_3}{\text{CrRWA} + \text{OperRWA} + \text{MktRWA}} \geq 8\%$$

Where:

Tier <sub>1</sub>	Core capital
Tier <sub>2</sub>	supplementary capital
Tier <sub>3</sub>	short-term subordinated debt covering market risk
CrRWA	Credit risk-weighted asset
MktRWA	Market risk-weighted asset
OperRWA	Operational risk-weighted asset

BCBS advises that the Minimum capital requirement for Banks must be 8% and the Core capital should include equity capital of banks; retained earnings and other reserves while supplementary capitals shall encompass: undisclosed and unpublished reserves; revaluation reserves of certain assets; general provision/ general loan-loss reserves; hybrid debt capital instruments and subordinated term debt and supplementary capital is short-term subordinated debt covering market risk.

The Pointers for CBN PG CAR are Regulatory Capital to Risk-Weighted Assets (RCRA); which assesses broad measures of capital including items giving less

protection against losses, such as subordinated debt, tax credits, unrealized capital gains, Regulatory Tier<sub>1</sub> Capital to Risk-Weighted Assets (RT<sub>1</sub>CRA); evaluates the highest quality capital relative to risk-weighted assets, Regulatory Tier<sub>2</sub> Capital to Risk-weighted Assets (RT<sub>2</sub>CRA), NPL Net of Provision to Capital (NNPC); indicates the potential size of additional provisions that may be needed relative to capital and Capital to Assets (CA); assesses broad measure of capital adequacy which is a buffer for losses.

The basis for the computation for the pointers are:

RCRA	Total Qualifying Capital ÷ Risk-Weighted Assets × 100
RT <sub>1</sub> CRA	Total tier 1 Capital ÷ Risk-Weighted Assets × 100
RT <sub>2</sub> CRA	Total tier 2 Capital ÷ Risk-Weighted Assets × 100
NNPC	NPL- Provision ÷ Total qualifying capital × 100
CA	Total qualifying capital ÷ Total assets × 100

### REVIEW OF EMPIRICAL STUDIES

Kiplagat and Kalui (2020) evaluate the effect of prudential regulations on the FP of commercial banks (CBs) in Kenya within the scope of 43 CBs operating in Kenya for the period 2013 and 2017. The result revealed that liquidity management, credit risk management and management efficiency have a significant effect while capital adequacy and asset quality have no significant effect on the performance of CBS in Kenya, whereas Mugo and Shiundu (2020) examine the consequence of the prudential system on the performance of Kenyan banks leveraging capital adequacy, liquidity and credit risk regulation and a

population target of 42 banks from 2013 to 2018. Secondary data was used and the empirical result revealed that regulation of capital adequacy had a statistically significant influence on p-value, regulation of liquidity had a statistically significant p-value, credit risk is a significant determiner of the financial performance of commercial banks in Kenya and it is founded that bank size did not significantly influence the relationship between prudential regulations and financial performance.

Cyrus (2018) investigates the impact of a prudential regulatory framework on the financial performance of Saving and Credit Cooperatives (SACCOs) in Kenya. The study adopted secondary data and analyzed using quantitative data analysis techniques. The empirical result revealed that loan provisioning requirement was highest in influencing the financial performance of SACCOs in Kenya. Hence, the four independent variables were found to have a positive relationship with ROI while David, Kithinji, and Njeru (2018) examined the effect of Central Bank of Kenya (CBK) prudential guidelines on the financial performance of CBs in Nairobi sampling 43 managers of licensed CBs in Nairobi. Hence, SPSS was used to analyze primary data collected. The study revealed that the Rate Capping Law was not achieving its primary objective of making credit accessible to low-income earners at an affordable price, capital adequacy and liquidity management positively affect the financial performance of CBs in Nairobi. Primary data is not a pointer for evaluating the FP of CBS, particularly in Nigeria where CBs maintain a signal and centralized account for their commercial activity; managed by CBN therefore, the study for David, Kithinji, and Njeru is null and inconsistent, similarly, Diana (2018)

investigated the influence of Central Bank prudential guidelines on the performance of CBs in Kenya, the sampled population was 43; Primary data was collected using questionnaires. The regression coefficient showed that loan-loss prudential guidelines, risk management guidelines and corporate governance guidelines have an impact on the FP of CBs in Kenya, thereto, loan-loss prudential guidelines increase the FP of CBs by 0.605, corporate governance guidelines increase the FP of CBs by 0.576 and risk management guidelines increases CBs FP by 0.638 units. Unlike Diana which focused on Kenya with the adoption of primary data, the current study seeks to focus on Nigeria using audited financial statements of listed DMBS, equally, Wakarindi (2018) investigates the effect of prudential guidelines on the FP of Listed CBs in Kenya. The study used a descriptive research design, and a multiple regression analysis using STATA to analyse collected secondary data. The study revealed that liquidity had a negative, capital adequacy had a positive, credit risk was found to have a negative and firm size was found to have a positive effect on the FP of CBs in Kenya. The study was done for Kenya, therefore due to different economic conditions of countries, the findings don't apply to Nigeria banks.

Sauda et al. (2017) investigates the CBK prudential guidelines on the performance of CBs, adopting secondary data and it is founded that the performance of CBs is highly affected by corporate governance, Capital requirement, Credit risk Management, Liquidity Management however Aigbogun (2011) investigates the impact of prudential guidelines on services and performance of CBs in Nigeria, the study employed both primary and secondary sources of data from samples derived from



the populations of selected CBs and data were analyzed using the Chi-Square (X<sup>2</sup>) analytical technique. Findings revealed that there is an increased need for bank supervision by the regulatory bodies and also prudential guidelines have helped to check NPL, ensure proper scrutiny of loan proposals and enhance regulatory activities in the banking industry. Similarly, Alhassan (2008) investigated the impact of the implementation of prudential Guidelines on banks' credit risk management in Nigeria with an examination of the post-guideline era (1990 -2008). The study adopted a descriptive and survey design whose population was based on the bank aggregate data on loan assets, NPL assets and provision for bad and doubtful debts and employees of banks as well as the regulatory authority. The empirical result revealed that the implementation of Prudential Guidelines has not significantly improved the quality of loan assets and earnings as a result of which a substantial proportion of recorded profits of banks are mere paper profits and the policy implication is that the implementation of prudential guidelines has not significantly minimized the credit risk in Nigeria banks requiring the operation and regulatory authorities to rigorously ensure good corporate governance through accurate reporting and compliance with statutory regulations.

Gabriel et al (2018) investigates the determinants of capital adequacy of DMBs in Nigeria, the study analyzed the bank-specific determinants using balanced panel data collected from financial statements of 12 selected quoted banks for ten years 2005-2014. ROA was found to be the most important determinant of CAR, having recorded the highest coefficient in the multiple regressions result indicated that

Nigerian banks' risk portfolio is quite high, and ROA is quite low, however, Morshedur, Ali and Mouri (2018) investigates the relationship between risk-taking, capital regulation and bank performance in Bangladesh. The study used the Generalized Method of Moments in an unbalanced panel data using 38 CBs of Bangladesh for the period 2007-2016. The results showed a negative relationship between risk-taking and capital regulation and positive relation between capital regulation and performance and negative relation between risk and performance. Josephat (2018) empirically analyse bank capital regulations on operating efficiency in Tanzania which employed bank-level data for the period 2009 and 2015. The findings revealed a positive relationship between capital ratio and bank operating efficiency with more stringent capital regulations in Tanzania. This implies that the increased regulations on capital requirements influence the banks' decision to revisit their internal operations strategy in terms of strong corporate governance, risk assessment methods, credit evaluation procedures, employment of more qualified staff, and enhanced internal control procedures.

Amahalu et al . (2017) investigate capital adequacy on the FP of quoted DMBs in Nigeria for a period 2001-2015 using secondary data obtained from fact books, annual reports and accounts of the sampled DMBs. The empirical result revealed a positive and significant relationship between capital adequacy and FP and it was empirically verified that capital adequacy has a statistically significant effect on FP on DMBs at a 5% level of significance, while Jalloh (2017) examines capital adequacy on the performance of Nigeria Banks using the Basel Accord Framework. Data were collected using the cross-panel methodology

from nine DMBs with significant foreign operations, the empirical result of the Ordinary Least Square regression showed that 76% of the variations in Profit After Tax were caused by capital adequacy and unit change in Total Assets, Loans and Advances, Customer Deposits and Owners' Capital led to 4.1, 1.6, 3.7 and 1.7% in PAT respectively. Badar et al (2016) investigate capital regulation and bank risk-taking behaviour evidencing Pakistan's risk-based capital requirements and bank assets portfolio risk using a rich data set of listed CBs using an unbalanced panel dataset of 21 listed CBs for the period 2005 and 2012 to examine the relationship between risk-based capital requirements and bank assets portfolio risk. The empirical result found that CBs in Pakistan have reduced assets portfolio risk in response to stringent risk-based capital requirements and are robust to alternative proxies of bank risk-taking, alternative estimation methods, and alternative samples. Conversely Josephat (2016) investigates the efficiency of capital adequacy requirements in reducing the risk-taking behaviour of Tanzanian CBs during the period 2009 to 2014 using the Two-Stage Least Square (2SLS) method of estimation. The empirical findings revealed a direct relationship between capital ratios and bank risk-taking behaviour and a positive relationship between regulatory pressure and capital and further shows a positive association between profitability and bank capital implying that as the profitability of banks increases, they retain more earnings to raise the level of their capital. Barno and Odonkor (2012) examined the relationship between capital adequacy and performance of Ghanaian banks, the study used panel data constructed from the financial statements of sampled 21 CB covering the periods of ten years (2001-2010). The study indicated a negative and

insignificant relationship between capital adequacy and ROA but a negative and significant relationship between capital adequacy and ROE. The negative relationship implies that as more capital is set aside as a buffer for banks' safety; it affects the performance of Ghanaian banks which implies that the negative relationship between capital adequacy and performance emphasizes that various efforts by the regulators to often review the capital base of the banking sector are not borne out of the aim to improve the profitability of the banks.

Calistus et al . (2018) investigate liquidity management and firms' performance using a sample of five sugar firms for the period 2006 and 2016. The random-effects regression model revealed a negative relationship between liquidity management and a firm's performance and the results revealed that liquidity current liability coverage ratio is negatively correlated with a firm's performance. The study indicates that a higher value of liquidity current liability invariably influences a firm's financial position, although Waswa, Mukras, and Oima, (2018) investigate the effect of liquidity on the financial performance of the sugar industry in Kenya targeting the determinate of liquidity position, firm size, and ROA of industries under investigation and a cross-sectional retrospective research design was adopted using a sample of five sugar firms for the period 2005 to 2016. The study estimates a random-effects regression model where the results suggest a negative relationship between liquidity management and firm performance though Ryan and Hitoshi (2018) investigate liquidity regulation in banks where an examination is done on the causal effect of this regulation on bank balance sheets. The empirical result

revealed that banks adjust the composition of both assets and liabilities, increasing the share of high-quality liquid assets and non-financial deposits while reducing intra-financial loans and short-term wholesale funding. The study debunks the assumption that the tightening of liquidity regulation caused banks to shrink their balance sheets, or reduce the amount of lending to the non-financial sector similarly, Tafirei, (2018) investigates Basel III liquidity regulations on banks' profitability, a system GMM estimator was employed with a sample of 40 banks operating in 11 emerging markets for the period 2011 to 2016, the result revealed that regulatory pressure stemming from Liquidity Coverage Ratio requirement increased instead of diminishing the profitability of banks in emerging markets, however, Uche et al (2018) appraised the effect of liquidity on the financial performance of DMBs in Nigeria with the sample of five banks using Secondary data collected for period 2011 and 2016 using multiple regression analysis. Results revealed that Liquidity has a positive and significant effect on banks' profitability ratios and has a positive and significant effect on Return on Capital Employed (ROCE).

Giami and Obari (2017) investigated the interrelationship between liquidity and corporate performance of banks in Nigeria from 1984 to 2014, Cash Reserve Ratio, Liquidity Ratio and Loan-to-Deposit Ratio were proxies for liquidity; Return on Shareholders' funds as the proxy for performance. These were subjected to OLS Regression, Johanson Cointegration, Granger Causality test and Error Correction Model and the study revealed that banks' reserve ratio and loan-to-deposit ratio negatively impacted the banks' performance within the period under review and the

DMBs' performance maybe because of the industry structure.

Ahmad (2016) examines liquidity and solvency on banks' profitability with listed banks in Amman exchange for the period of two years to 2014. The empirical results revealed that liquidity has a significant and negative impact on profitability, whereas solvency has no impact on profitability, in the same vain, Kartal, (2016) analyzes liquidity on financial performance using time-series data of the Turkish retail industry Listed for the period 1998-2015. The empirical results revealed that the series are co-integrated in the long run while long-run parameters estimated posit a significantly positive relationship between financial performance and liquidity, the causality test does not indicate any direction of causality between the series while Okaro and Nwakoby (2016) investigates liquidity management and the performance of DMBs in Nigeria for period 2000 to 2015, the OLS result shows a negative and significant relationship between liquidity ratio and DMBs' profitability and a positive and significant relationship between cash to deposit ratio and profitability of the DMBs similarly, Patty and Peter (2016) examines liquidity regulation on bank assets and liabilities, the study shows that macro-prudential regulation has not prevented an aggregate liquidity cycle characterized by a pro-cyclical pattern in the size of balance sheets and risk-taking, hence, the error correction regressions in the study indicate that adjustment in the liquidity ratio is balanced towards the liability side, especially when the liquidity ratio is below its long-term equilibrium and Radhe and Deepanjo (2016) examines the liquidity and the performance of Nepalese CBs using secondary data of 16 CB within the scope of eight years to 2014. The study revealed a

correlation between the capital ratio and ROE to be positive indicating that the higher the capital ratio the higher would be the ROE, and the Correlation between ROE and liquidity ratio is negative indicating the higher the liquidity in the bank the lower would be the ROE, beta coefficients for investment ratio and capital adequacy are positively significant with bank performance which indicates that increase in investment ratio and capital ratio leads to an increase in the performance of the banks, and beta coefficients for liquidity ratio and QR are negative with ROA and ROE indicating increased liquidity ratio and QR decreases the ROA and ROE of the bank.

Ryan and Hitoshi (2015) investigate liquidity regulation and sampled banks in the United Kingdom, the study takes advantage of the heterogeneous implementation of tighter liquidity regulation by the UK Financial Services Authority (FSA). The study found that banks adjust the composition of both assets and liabilities, increasing the share of high-quality liquid assets and non-financial deposits and reducing intra-financial loans and short-term wholesale funding and do not find evidence that the tightening of liquidity regulation caused banks to shrink their balance sheets, nor reduce the amount of lending to the non-financial sector.

Kurawa and Abubakar (2014) examine liquidity and banks' profitability in Nigeria, a systematic random sampling method was adopted to select five banks over nine years (2004-2012) and the linear regression analysis used revealed the absence of a significant impact between liquidity and profitability among banks in Nigeria.

Bonner et al. (2013) examine liquidity regulation substitutes or complements bank

incentives to hold liquid assets using data from 30 OECD countries, findings from the study suggested that liquidity regulation substitutes bank incentives to hold highly liquid assets De Haan and Van (2013a) examines the liquidity management of Dutch banks, the modelled the stock of liquid assets as a function of the stock of liquid liabilities and the future cash inflows and outflows, a key finding revealed that banks keep liquid assets as a buffer against both the stock of liquid liabilities and against net cash outflows, using data on U.S. CBs, and De Haan and Van (2013b) studied banks' responses to negative funding liquidity shocks, using data for Dutch banks. Using a panel Vector Auto-regression (p-VAR) approach. The findings revealed that in response to negative funding liquidity shocks, Dutch banks reduce wholesale lending, hoard liquidity in the form of liquid bonds and central bank reserves, and conduct fire sales of securities, especially equities. Ibe (2013) investigates liquidity management and the profitability of banks in Nigeria. The result showed that liquidity management is indeed a crucial problem in the Nigerian banking industry while Lartey et al (2013) investigates the relationship between liquidity and profitability of Listed banks on the Ghana Stock Exchange. Filter sampling was used to select seven out of nine banks listed on the GSE for the five years (2006-2010), Quantitative Analysis technique was employed to study profitability and liquidity ratio analysis, time series analysis, regression, and correlation analysis. The result found a weak positive relationship between Profitability and Liquidity.

Munteanu, (2013) investigates optimizing bank liquidity in Central and Eastern Europe to offer a model for optimization of bank liquidity levels by identifying the marginal

impact of bank liquidity ratio on bank profitability with the adoption of GMM. The empirical results indicated a slight positive and negative impact of liquidity on ROAE and ROAA deciphering the non-linear relationship between the variables, while Osuji and Andrew (2013) investigates liquidity management on banking performance in Nigeria particularly in the aftermath of several banking reforms, rescue missions by the CBN and the attendant Merger and Acquisitions. The research adopted a survey design accomplished through the administration of structured questionnaires. The findings revealed a significant relationship between efficient liquidity management and banking performance and that efficient liquidity management enhances the soundness of the bank.

Berrospide (2012) studied the behaviour of banks' liquid assets as a function of banks' size, their capital ratio, their unused commitment ratio, and their share of core deposits. The study revealed that stable sources of funding, such as deposits and bank capital, are key determinants of the holdings of liquid assets. Shahchera, (2012) investigated liquidity assets on Iranian Bank profitability within the period of seven years (2003-2009). A Sample Size of Seventeen Listed banks used secondary data, the empirical result found that the business cycle and loan asset ratio has a positive and statistically significant effect on bank profitability. Bordeleau and Graham (2010) comparatively examine liquidity and bank profitability in Canada and the United States of America for a period of twelve years to 2009. The study revealed that a nonlinear relationship exists between profitability and liquidity of banks and a relationship exists between liquid assets and profitability which depends on banks' business model

and the risk of funding market difficulties. Elijah and Jaya (2007) examine liquidity management and the financial performance of CBs in Rwanda. The study adopts a descriptive research design and multiple regression analysis was employed to determine the relationship between liquidity management and FP of CBs in Rwanda. Adegbie and Otitolaiye, (2020) examine credit risk and the financial performance of DMBs in Nigeria for a period of 2006 and 2018 with a sample of 19 DMBs. The study revealed that credit management had a positive significant effect on the FP of the DMBs and similarly, credit risk with bank size has a stronger significant effect on the FP of MDB in Nigeria.

Kajola, Babatunji, Olabisi and Babatolu (2019) worked on credit management and the FP of ten Listed DMBs in Nigeria for the period 2005 to 2016. The study revealed that all three credit risk parameters have a significant relationship with ROA and ROE, and Oduro, Asiedu and Gadzo (2019) studied the effect of credit risk on the corporate financial performance of Listed banks in Ghana for period 2003 and 2017. The empirical result revealed that capital adequacy, operating efficiency, profitability, and net interest margin are inversely related to credit risk while bank size and financing gap tend to relate positively with credit risk. Therefore, an increase in bank credit risk negatively affects corporate financial performance under the Basel accord.

Collins, Mepbari, Sira and Grend (2018) examine credit management and bank performance in Nigeria with the adoption of a systematic technique and cross-sectional survey design with a sample of eleven selected CBs. Multiple regression results revealed that credit management has a significant effect on bank performance in

Nigeria, similarly, among the credit management variables considered, credit risk control has the highest driving force, Mogga, Felix and Moses (2018) explore credit risk management procedures adopted by CBs on performance in South Sudan. The study revealed that most of banks consider risk identification as a process in credit risk management that affects performance, risk identification has an insignificant effect on the financial performance of banks, risk analysis and appraisal insignificantly affect the financial performance of CBs, risk monitoring significantly affects financial performance, and credit approval is a significant factor affecting the financial performance of CBs. Ndubuisi and Amedu (2018) analysed the relationship between credit risk management and bank performance in Nigeria focusing on Fidelity Bank Nigeria PLC from 2010 to 2016. The result revealed no significant relationship between credit risk management and banks' performance in Nigeria. However, there were traces of weak negative relationships in which keen interest should be given because of the sensitive nature of the banking sector.

Juliana (2017) examines the impact of credit risk on the financial performance of Chinese banks for the period 2008 and 2014 and the study revealed that NPL and Capital adequacy have a significant impact on the financial performance of Chinese CBs. Patrick, Ikenna, and Ekemezie (2017) investigates credit risk management on the performance of CBs in Nigeria with the aid of financial reports of seven commercial banking firms that were used to analyze for seven years to 2011. In the model, ROE and ROA were used as the performance indicators while NPL and Capital Adequacy Ratio (CAR) as credit risk management indicators. The findings revealed that credit

risk management has a significant impact on the profitability of CBs in Nigeria, while Taiwo, et al (2017) investigates the quantitative effect of credit risk management on the performance of DMBs and Bank lending growth throughout 1998-2014. The findings revealed that credit risk management has an insignificant effect on the growth of total loans and advances by Nigerian DMBs and the result showed that sound credit management strategies can boost investors' and savers' confidence in banks and lead to a growth in funds for loans and advances which leads to increased bank profitability.

Aykut (2016) assesses credit and market risk on bank performance of quoted Turkish banks for the period 2002 and 2015 the results suggested that credit risk has an inverse and foreign exchange has a direct effect on banking sector profitability, while Muriithi, Waweru and Muturi (2016) studied the relationship between credit risk and profitability of 43 Kenyan CBs for the year 2014, the empirical results revealed that the credit risk variable has a negative and significant relationship with the financial performance of the sampled banks. Alalade, Agbatogun, Cole and Adekunle (2015) examine credit risk management in the value creation process among CBs in Nigeria. The study analyzed the impact of loan and advance loss provision, total loan and advances, non-performing loans and total assets on ROE and ROA and panel data 10 CBs Listed on NSE between 2006 and 2010 was used. The results revealed that credit risk management has a significant effect on the financial performance of CBs and revealed those banks' understudies need to maintain a minimum level of NPL. Asfaw and Veni (2015) investigate the level of credit risk management practice of Ethiopian public and private CBs using a

descriptive survey research approach. The study revealed that four aspects of Basel's credit risk management principles significantly explain the level of variation in credit risk management practice of banks in Ethiopia. Benjamin (2015) researched the credit risk management practices of ADB Bank Ltd for the period of three years to 2014), the findings proved that ADB Bank Ltd has good credit risk management practices as reflected in its loan granting, evaluation and monitoring processes and revealed that loan applicants are assessed by credit officers based on their five Cs of credit, Kayode, Obamuyi, Owoputi and Adeyefa (2015) investigates credit risk and banks' performance in Nigeria using six selected banks randomly. The result revealed that credit risk has a significantly negative effect on bank FP and total loan has a positive and significant effect on bank FP., while Kipngetich and Muturi (2015) assesses credit risk management and the financial performance of SACCOs in Kenya with a sample of 18 SACCOs. The empirical study revealed that all the independent variables proxies (CAR, and ME) had a positive relationship with FP which affirmed that there is a statistically significant influence of CAR on the FP of SACCOs. Osuka and Amako, (2015) used time series data from 2001 to 2011 to appraised credit risk management in banks' financial performance in Nepal. The empirical result indicated that credit risk management is an important predictor of banks' profitability and financial performance.

Engdawork (2014) examines credit risk and the performance of CBs in Ethiopia over 5 years (2008-2012), The study found that the provision to total loans, loan to total assets, credit administration and size have a significant effect on the performance of

Banks, However, there is a certain variation in the magnitude and direction of their effect on the selected profitability measure, ROA while Kurawa and Garba (2014) studied the effect of credit risk management on the profitability of 6 Nigerian banks for the period 2002 to 2011, the study established a positive and significant relationship between two credit risk variables and profitability (ROA) of Nigerian banks. Kolapo, Ayeni and Oke (2012) investigate credit risk and the performance of CBs in Nigeria over the period 2000 to 2010. The results revealed that the effect of credit risk on bank performance measured by the ROA of banks was cross-sectional invariant while Muhammad et al. (2012) investigates credit risk and the performance of Nigerian banks from 2004 to 2008. The findings revealed that credit risk management has a significant impact on the profitability of Nigerian banks. Kargi (2011) evaluates credit risk on the profitability of Nigerian Banks for the period of five years (2004-2008), the findings revealed that credit risk management has a significant impact on the profitability of Nigerian Banks. Kithinji (2010) assesses credit risk management on the profitability of CBs in Kenya for the period 2004 to 2008. The findings revealed that the bulk of the profits of CBs are not influenced by the amount of credit and non-performing loans, while Achou and Tenguh (2008) conducted a study to find out how credit risk is managed by banks in Qatar, The empirical results revealed showed that credit risk management and bank performance have a significant relationship and the ratio of NPL/Total Loans has a significant negative association with profitability which was measured by ROA and ROE.

It is empirically clear that none of the few prior empirical studies on PG leverages CAR, LR, and CRR despite they are major in the determining financial performance of banks. It is against this background that the present investigation is being carried out to fill the research gaps.

## METHODOLOGY

The study adopts an ex-post facto research design which assists to obtain background information about the problem and explains the reasons behind the statistical differences in data obtained to test the formulated hypotheses, this design relies on secondary data because this event has already occurred and is not subject to manipulation. The population comprises sixteen DMBs in Nigeria that are Listed on the floor of the Nigeria Stock Exchange (NSE) as of 31<sup>st</sup> December 2019. The study focuses on DMBs because of their immense contribution to the growth of the Nation at large. Data is collected for the period of twelve years to 2019 forming a panel data one hundred and twenty bank-year observations. The methodology requires the use of empirical analysis of multivariate regression estimation analysis, correlation analysis and descriptive statistics, Hence, the sample consist of ten (10) filtered DMBs (five each with national and international

authorization Listed on the NSE) Thusly, the Multivariate regression model for the study is specified as:

$$\text{Model 1: } ROA_{1it} = \beta_{01} + \beta_1 CAR_{1it} + \beta_2 CRR_{1it} + \beta_3 LDR_{1it} + e_{1it}$$

$$\text{Model 2: } ROE_{2it} = \beta_{02} + \beta_1 CAR_{2it} + \beta_2 CRR_{2it} + \beta_3 LDR_{2it} + e_{2it}$$

Where:

$ROA_{1it}$  Return on Asset for DMBs i in time t

$ROE_{2it}$  Return on Equity for DMBs i in time t

$CAR_{it}$  capital adequacy regulation for DMBs i in time t

$CRR_{it}$  credit risk regulation for DMBs i in time t

$LDR_{it}$  Liquidity regulation for DMBs i in time t

$e_{it}$  Error terms

$\beta_{01}$  Intercept

$\beta_1-\beta_2$  Model coefficient

To determine the overall significance of the model T-significant test will be observed for the formulated hypotheses with the Levin-Lin-Chu unit root test in Stata which is measured at a 0.05 significance level thus rejecting the Null hypothesis ( $H_0$ ) if Alternative ( $H_1$ ) T-calculated excess T-tab value otherwise accept  $H_0$ .

## ESTIMATION RESULTS AND DISCUSSION OF FINDINGS

### Descriptive Statistics

**Table 1: Descriptive Statistics**

	<b>ROE</b>	<b>ROA</b>	<b>LDR</b>	<b>CRR</b>	<b>CAR</b>
Mean	0.138194	0.022191	0.620380	1.801334	0.313591
Median	0.144900	0.021400	0.852600	1.118693	0.160000
Maximum	0.394500	0.226519	62.04310	9.531753	2.184775
Minimum	-0.260800	-0.095318	0.309900	0.000000	0.050000



	ROE	ROA	LDR	CRR	CAR
Std. Dev.	0.109717	0.028390	6.080533	2.281580	0.424535
Skewness	-0.063100	2.396255	9.008818	1.639119	2.663376
Kurtosis	3.545222	7.098101	86.80786	5.541999	9.553901
Sum	16.16868	2.596342	189.5845	210.7560	36.69010
Sum Sq. Dev.	1.396376	0.093497	4288.854	603.8507	20.90668
Observations	117	117	117	117	117

*Source: Author's computation from E-views 10 output, 2021*

The table indicates the minimum and maximum values for ROE during the study period are -0.26 and 0.39 respectively. The mean score (13.8%) for ROE revealed that for every N100 invested in the DMBs the shareholders made an average ROI of N13.8 within the study period. The maximum and minimum values were -9.5% and -22.7% respectively. The mean score (2.21%) indicates that for every N100 invested in an asset generated an average of N2.21k earned for the sampled DMBs for the period under investigation. It is further indicated a mean value of 0.62 for LDR and a minimum and maximum value during the study period are 0.31 and 62.04 respectively. The CBN maintained that all DMBs will have to maintain a minimum liquidity ratio of 30% in line with regulatory requirements. However, since the selected DMBs have a liquidity ratio mean value of 62% it implies that the selected DMBs LDR are adequate and show the ability of the banks to meet their financial needs when falling due without the occurrence of unforeseen losses.

Similarly, it is revealed that CAR has a mean value of 0.31 which implies that on the average of period 12 years the CAR stood at 31%. The result for the CAR revealed that the selected DMBs are strong and stable since the mean CAR (31%) is above the CBN PG requirement of 10% to

15%. However, DMB's capital is enough and acts as a buffer to absorb potential losses and be able to meet depositors' demands for their money. The CRR is observed to have a mean of 1.80% with maximum and minimum values of 2.18% and 0.05% respectively. This result indicates that the selected DMBs have a good credit rating of A+ status. This further revealed that the credit risk in the selected DMBs is very low and adverse consequences of undesirable risk are hereby reduced.

Confirming the normality of the data set, both skewness and kurtosis values are above the tolerable range of +1 to -1, establishing the fact that the data were normally distributed in each construct. According to Park (2008), a normal distribution should have a skewness of zero or very close to zero. However, the skewness for all the variables ROE, ROA, CAR and CRR were all close to +1 or -1 with values of -0.06, 2.40, 1.64 and 2.66 respectively. However, the dataset for ROE, ROA, CAR and CRR are normally distributed therefore signifying the absence of outliers in the data set.

Confirming this result the Kurtosis values for ROE, ROA, CAR and CRR were all below the threshold of 10 with values of 3.54, 7.10, 5.54 and 9.6 respectively.

Similarly, the skewness and Kurtosis values for LDR are 9 and 86.8 respectively. However, this signifies the presence of outliers in the data set.

Therefore, to reach the normal distribution, the high values of skewness and kurtosis for

LDR which signify the presence of outliers in the data set were resolved through data transformation using the reciprocal of the variable ( $1/LDR$ ). The transformation of data was necessary to take care of outliers in the data that could produce spurious regression results.

**Table 2: Correlation Matrix of Dependent and Independent Variables**

Correlation	ROA	ROE	LDR	CAR	CRR
ROA	1.000000				
ROE	0.533198	1.000000			
LDR	-0.166188	-0.014030	1.000000		
CAR	-0.090890	0.458173	0.082943	1.000000	
CRR	-0.058047	-0.192841	-0.316281	-0.127282	1.000000

**Source: E-views 10 output, 2021**

Table 2, revealed that the independent variables correlate perfectly well (between -0.32 and 0.53). There is no relationship among the independent variables that is large enough (greater than 0.7) to pose the problem of the singularity of data. The result revealed a low magnitude of correlations among the independent variables, with all the correlation coefficients far below the threshold of 0.8 indicating an absence of multicollinearity in the sampled dataset.

**Table 3: Hausman Test**

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.072922	3	0.5574

**Source: E-views 10 Output, 2021**

The result from Table 3 shows that the error terms are correlated with the regressors as the chi-square probability is insignificant at 5% (0.5574). The result suggests that the

### **Panel Regression Analysis**

The Hausman test was conducted to make a choice between Fixed Effect-FE and RE Model estimates. The study has two regression models, the ROA model and the ROE model and will be presented in the two-fold analysis.

### **ROA Regression Model**

Results of the Hausman test for the ROA model are given in Table 6 below.

RE regression model is most appropriate for the sampled data. Consequently, the regression result presented in Table 4 is based on the RE Model.

**Table 4: ROA Regression Analysis (Random Effect Model)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.045049	0.009767	4.612188	0.0000
LDR	-0.012151	0.004954	-2.452783	0.0157
CAR	-0.000523	0.000778	-0.671800	0.5031
CRR	-0.002028	0.001182	-1.716566	0.0888
R-squared	0.261212	Mean dependent var		0.014084
Adjusted R-squared	0.236288	S.D. dependent var		0.027223
S.E. of regression	0.026711	Sum squared resid		0.080620
F-statistic	2.855982	Durbin-Watson stat		1.940199
Prob(F-statistic)	0.046702			

**Source: E-views 10 Output, 2021**

Table 4 reveals an  $R^2$  value of 0.26. The  $R^2$ , which represents the coefficient of multiple determination implies that 26% of the total variation in ROA of Listed DMBs in Nigeria is jointly explained by the explanatory variables- LDR, CAR, and CRR. Though the  $R^2$  of 0.26 may appear low, it does not constitute a problem for the study because the F- statistics value of 2.86 (Prob.>F = 0.047) indicates that the model is fit to explain the relationship expressed in the model. This suggests that apart from PG indicators, other factors that mitigate the financial performance-ROA of the sampled DMBs in Nigeria constituted 74% (i.e., 100-26) not considered in this model. The adjusted R-square compensates for the model complexity to provide a fairer comparison of model performance. The result is supported by the value of the

adjusted  $R^2$  which is to the tune of 23% showing that if the entire population was used, the result will deviate by 3% (26% - 23%). The Durbin-Watson statistics of 1.940 implies the absence of an auto-correlation problem in the residuals of RA.

The regression constant is 0.05, giving a predictive value of the dependent variable when all other variable is zero. The regression result revealed that LDR, CAR and CRR have a negative effect on the ROA of the DMBs in Nigeria. This implies that a percentage increase in LDR, CAR and CRR will decrease the ROA of the selected DMBs by 1.2%, 0% and 0% respectively.

#### **ROE Regression Model**

Results of the Hausman test for the ROE model is given in Table 5 below.

**Table 5: Hausman Test**

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.665678	3	0.8812

**Source: E-views 10 Output, 2021**

The result from Table 5 shows that the error terms are correlated with the regressors as

the chi-square probability is insignificant at 5% (0.8812). The result suggests that the

RE regression model is most appropriate for the sampled data. Consequently, the regression result presented in Table 6 and

analysed in this study is based on the RE model.

**Table 6: ROE Regression Analysis (Random Effect Model)**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.087505	0.035665	2.453501	0.0157
LDR	-0.019922	0.016713	-1.191966	0.2358
CAR	0.014299	0.002681	5.332596	0.0000
CRR	-0.008769	0.003890	-2.254249	0.0261
R-squared	0.240634	Mean dependent var		0.060193
Adjusted R-squared	0.220473	S.D. dependent var		0.098286
S.E. of regression	0.086628	Sum squared resid		0.847989
F-statistic	11.93609	Durbin-Watson stat		1.465040
Prob(F-statistic)	0.000001			

**Source: E-views 10 Output, 2021**

The regression result revealed that LDR and CRR have a negative effect on the return on equity of the DMBs in Nigeria. This implies that a percentage increase in LDR and CRR will decrease the ROE of the selected DMBs by 2% and 1% respectively. However, the CAR has a positive effect on the ROE of the DMBs in Nigeria. This implies that a percentage increase in CAR will decrease the ROE of the selected DMBs by 1.4%.

#### **Test of Hypotheses**

***H<sub>0i</sub>:*** Capital adequacy regulation has no significant impact on the financial performance of DMBs in Nigeria

**Interpretation:** The strength of the relationship between CAR and the financial performance of selected DMBs in Nigeria is measured by the calculated p-value of 0.50 and 0.00 for ROA and ROE models respectively and a significance level ( $\alpha$ ) of 0.05. However, since the computed p-values

of 0.50 for the ROA model are greater than the significance level ( $\alpha$ ) of 0.05, thus, the  $H_0$  is accepted. However, the computed p-values of 0.00 for ROE is less than  $\alpha$  of 0.05, thus, the  $H_0$  is rejected for the ROE model. Therefore, specifically CAR has no significant effect on ROA but significantly affects the ROE of DMBs in Nigeria.

***H<sub>0ii</sub>:*** Liquidity regulation has no significant impact on the financial performance of DMBs in Nigeria

**Interpretation:** The strength of the relationship between LDR and financial performance of selected DMBs in Nigeria is measured by the calculated p-value of 0.02 and 0.24 for ROA and ROE models respectively and  $\alpha$  of 0.05. However, since the computed p-values of 0.02 for the ROA model are less than the significance level ( $\alpha$ ) of 0.05, thus, the  $H_0$  is rejected. However, the computed p-values of 0.24 for ROE is greater than  $\alpha$  of 0.05, thus, the  $H_0$  is accepted for the ROE model. Therefore, specifically, LR has a significant effect on

ROA but insignificantly affects the ROE of DMBs in Nigeria.

*H<sub>0iii</sub>: Credit risk regulation has no significant impact on the financial performance of DMBs in Nigeria.*

**Interpretation:** The strength of the relationship between CRR and financial performance of selected DMBs in Nigeria is measured by the calculated p-value of 0.09 and 0.03 for ROA and ROE models respectively and  $\alpha$  of 0.05. However, since the computed p-values of 0.09 for the ROA model is greater than  $\alpha$  of 0.05, thus, the  $H_0$  is accepted. However, the computed p-values of 0.03 for the ROE model is less than  $\alpha$  of 0.05, thus, the  $H_0$  is rejected for the ROE model. Therefore, specifically, CRR has no significant effect on ROA but significantly affects the ROE of DMBs in Nigeria.

### Discussion of Results

The study revealed that CAR has a negative but insignificant effect on ROA but positively and significantly correlated with the ROE of DMBs in Nigeria. The negative relationship between CAR and the ROA is consistent with the findings of Morshedur, Ali and Mouri (2018), Barno and Odonkor (2012), and Goddard et al. (2004). This implies that as more capital is set aside as a buffer for banks' safety, it affects bank performance, implying that the negative relationship between CAR and ROA emphasizes that various efforts by regulators to review the capital base of the banking sector are not always motivated by a desire to improve bank profitability. However, the positive and significant relationship between CAR and the ROE is consistent with the documentation of Agbeja, Adelakun and Olufemi, (2015), and Ndifon and Ubana (2014). This further implies that banks with more equity capital

are perceived to have more safety and such advantage can be translated into higher ROE. The higher the capital ratio, the more profitable a bank will be.

The study also revealed that liquidity regulation is negatively correlated with the financial performance of DMBs in Nigeria. However, the negative relationship of liquidity regulation is significant on ROA but insignificant to the ROE of DMBs in Nigeria. The result of the study is consistent with the findings of Calistus et al (2018), Ahmad (2016), Okaro and Nwakoby (2016), and Lartey et al (2013) that the LR has a negative impact on profitability. This means that LR decreases profitability, which may be explained by the fact that banks with a higher financing gap ratio lack steady and cheap funding and must consequently rely on costly external sources to satisfy their funding needs. As a result, the banks' profitability suffers. (Arif and NaumanAnees, 2012; Chen et al., 2018, Nguyen et al., 2017).

The study further revealed that CRR has a negative effect on the financial performance of DMBs in Nigeria. However, the negative relationship of CRR is significant on ROA but insignificant on the ROE of DMBs in Nigeria. The study findings are supported by the documentation of Wakarindi (2018), Oduro, Asiedu and Gadzo (2019), Ndubuisi and Amedu (2018), Kayode, Obamuyi, Owoputi and Adeyefa (2015), Dietrich and Wanzenried (2011), Ongore and Kusa (2013), and Islam and Nishiyama (2016) that credit risk has a negative effect on bank financial performance. This might imply that when the quality of lending is not good in a given market, high loan loss provisions could occur, which could lead to higher NPL, eventually leading to lower bank profitability.

## RECOMMENDATIONS

The following recommendations should be looked into:

- i. The minimum capital requirement of DMBs in Nigeria should be reviewed on a regular basis to ensure that it remains at an optimal level, this would go a great way toward restoring public trust in banks, as the latter would be better equipped to provide consumers' credit demands while also safeguarding depositors' funds.
- ii. This empirical study also suggests that banks adjust their credit policies in order to reduce credit risk and ensure that they are protected against NPL; good credit policies, on the other hand, lead to lower poor credit in banks and hence greater profitability.
- iii. Furthermore, the CBN should maintain the minimum liquidity requirement for DMBs at 30%, since this has an insignificant negative effect on DMBs' profitability and, as a result, the long and short-term stability of the whole system is crucial. DMBs' survival is dependent on liquidity management and profitability, thus focus on implementing steps to assure successful liquidity management. The actions will help to reduce or eliminate the negative consequences of excess and insufficient cash.

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