Covenant Journal of Business & Social Sciences (CJBSS) Vol. 15, No.1, June 2024

ISSN: p. 2006- 0300 e. 2334-5708 DOI: XXX

An Open Access Journal Available Online

Impact of Banking Regulation and Supervision on the Financial Performance of Listed Deposit Money Banks in Nigeria

OBADIMU Gafar Akolawole
Department of Accounting, University of Lagos;
obadimugafar22@gmail.com; 23487039610971

OBOH Collins Sankay
Department of Accounting, University of Lagos;
coboh@unilag.edu.ng; 2348069561340

Received: 22.5.2024 **Accepted: 24.6.2024**

Date of Publication: June 2024

ABSTRACT

This study aims to provide empirical evidence that reveals how the regulation and supervision of the Central Bank of Nigeria (CBN) affect the financial performance of deposit money banks (DMBs). Specifically, the study examines the impact of the capital adequacy ratio (CAR), loan-to-deposit ratio (LDR), and asset quality ratio (AQR) on the financial performance of DMBs in Nigeria. The study obtained data from the annual reports and accounts of ten DMBS purposefully selected, covering a period of 2011 – 2020. The data were analyzed using an estimated generalized least square (EGLS) two-way random-effects panel regression analysis. The results suggest that, to a large extent, the sampled DMBs complied with the CBN requirements on CAR, LDR, and AQR. The study found that LDR positively impacted the financial performance of the DMBs, while the impact of CAR and AQR on the financial performance of the DMBs was insignificant. The study recommends that while DMBs pursue their profit-making objective, they should comply with the regulatory and supervisory guidelines of the CBN to avoid regulatory fines and penalties.

Keywords: Asset quality ratio, Banking, Capital adequacy ratio, Loan-to-deposit ratio, Profitability

1. Introduction

Financial institutions, particularly banks, are essential to the economic growth of a nation (Mbatabbey, 2019). They mobilize idle funds from surplus units (savers) to deficit spending units (borrowers) and facilitate savings and investments through financial intermediation (Ikpesu & Oke, 2022). They maintain national banking stability and foster global commerce through intercontinental banking (Udeh, 2015). Though the banks are pivotal in aiding financial prosperity and economic growth, they are highly regulated by the apex bank of a country due to perceived risks associated with the industry and to promote and maintain trust and goodwill between the banks and the public. At the global level, international laws, to a great extent, regulate banking activities. For example, in 1987, the Basel Committee of Banking Supervision (BCBS) established the Basel I Accord to promote uniform capital standards in the banking sector across nations and to manage and regulate credit risk in member countries. Basel II was introduced in 2004 to regulate banking capital and to capture market and operational risks, while

Basel III, introduced in 2010, emphasizes the quality and transparency of the capital base of banks in member countries (Mehta & Bhavani, 2017).

In Nigeria, the Central Bank of Nigeria (CBN) Act 2007 empowers the CBN to regulate and oversee the affairs of the banking industry. The Act authorizes the CBN to develop and administer guidelines and policies and to perform supervisory and control functions on banks in Nigeria (Ennis & Walter, 2016; Mbatabbey, 2019). The Act mandates the CBN to set the banking policies of deposit money banks (DMBs), which they must follow to maintain stability, safety, and confidence in the industry. Also, to reduce risks and ensure minimal resources to meet the liquidity needs of customers, DMBs are required by the CBN to maintain a level of capital adequacy, lower-level non-performing loans, and limit the volume of customers' loans to their total deposits (Disalvo & Johnston, 2017). In 2013, the CBN announced that all DMBs must implement and maintain a capital adequacy ratio (CAR) of 10% for regional/national banks and 15% for banks licensed to operate internationally and to maintain a minimum loan-to-deposit ratio (LDR) of 65% and retain a maximum of 5% non-performing loan ratio, which are meant to encourage small and medium-scale enterprises (SMEs) and improve lending (Thi, 2020; Obioma & Charles, 2018).

Though the regulations and guidelines of the CBN are well-intended, they limit the profit-making drive of DMBs (Abba, Okwa, Soje, & Aikpitanyi, 2018; Abata, 2014; Tuškan & Stojanović, 2016). According to Abba et al. (2018), profit-making is the primary objective of the DMBs, which they earn from loans and advances. But the regulations of the CBN on LDR, interest rate, and other oversight functions cap the operation and profit-making objective of the DMBs (Akinjobi, 2022; Aldhaheri & Nobanee, 2020; Obateru, 2021; Obioma & Charles, 2018). Previous studies suggest that the regulations and oversight policies of the CBN impact the profitability of DMBs, which directly or indirectly impact the economy (Olabisi, 2021; Trefis, 2016). The failure of many DMBs between 2009 and 2012 is believed by some scholars to be occasioned by poor management of their loan assets in line with the guidelines and regulations of the CBN. Besides, some DMBs make irregular provisions and use different impairment assumptions to manage their loan assets to meet the regulatory requirements of the CBN and remain in business (Thi, 2020).

Reflecting on the liquidity challenges DMBs face in complying with the CBN regulations at the expense of their core motive of profit making, it becomes necessary to investigate the impact of the regulatory and supervisory roles of the CBN on the financial performance of DMBs because, as Nwanna and Odia (2018) observed, too many regulations limit the operations and extent to which DMBs can maximize shareholders' wealth and stay competitive in the financial market. Besides, many DMBs struggle to comply with the many regulations and guidelines of the CBN, some of which have been the cause of conflicts between the DMBs and their customers. A classic example of how banking regulations and policies can affect the operations and possibly profitability of DMBs is the recent fallout of the naira redesign policy of the CBN, where DMBs were mandated to implement the directives of the CBN on the stoppage of the old naira notes, which led to the destruction of properties and harassment of bank officials by angry customers. Though some scholars disagree with the dictatorial regulations of the CBN (Abba et al., 2018), some believe the CBN must regulate the operations of DMBs to ensure financial soundness and

stability to protect depositor's funds and ensure an effective and efficient banking system that can compete with its sphere in the globe (Ikpesu & Oke, 2022).

Considering the importance of capitalization decisions and the oversight functions of the apex bank to the success of the banking industry of a country (Akinjobi, 2022; Olabisi, 2021; Singhal et al., 2022), the current study is undertaken to shed light on the possible effects of the regulations and supervision of the CBN on the financial performance of DMBs. Specifically, the study adds to the small stock of literature on banking regulations within a developing country context by investigating the impact of capital adequacy ratio (CAR), loan-to-deposit ratio (LDR), and asset quality ratio (AQR) on the financial performance of DMBs in Nigeria. Previous research suggests that capital adequacy and asset quality are necessary for the survival of DMBs and to assess their ability to cover operational expenses, meet customers' withdrawal needs and protect depositors against loss in the event of financial distress (Onuh, 2002; Ikpesu & Oke, 2022), but some scholars are in doubt of the effect of the overbearing oversight functions of the CBN on the financial performance of DMBs (Nwanna & Odia, 2018; Olabisi, 2021).

Thus, the current study adds to the growing literature on banking regulations and provides new information to promote sustainable banking guidelines in Nigeria and other developing countries. Also, the findings will serve as a benchmark for future research on banking regulations in other developing countries. The other parts of the study are arranged as follows: section two presents the theoretical background and hypotheses development. Section three discusses the methodology adopted for the study. The results are presented in section four and the findings are discussed in section five. The conclusion and implication are presented in section six, while section seven discusses the limitations and suggestion for future studies.

2. Theoretical Background

This study employs the liquidity preference theory (Keynes, 1936) and capital adequacy theory (Berger & DeYoung, 1997) as complementary means of examining the impact of banking regulations and supervision on the financial performance of DMBs.

In 1936, John Maynard Keynes introduced the liquidity preference theory as a novel way of understanding the connection between interest rates and the supply-demand of liquidity. The theory asserts that holding liquid assets is desirable to expedite transactions, act prudently, and take advantage of investment opportunities in the financial market (Lavoie & Reissl, 2019; Ugwu et al., 2020). Keynes notes that focusing on interest rates alone as a reward for saving is improper (that is, the interest rate is not the motive) because a person can hoard his savings in cash in a piggy bank without any interest and yet would have refrained from consuming all his current and available income (Culham, 2020; Keynes, 1936; Ugwu et al., 2020). Liquidity in the context of Keynes (1936) is based not on the demand for money or the most tradable asset but on price-protected (capital-safe) assets, most directly inside and outside money (Culham, 2020). The theory assumes that the public is willing to forgo interest income for short-term price-protected assets due to capital and price uncertainties associated with market liquidity. It holds that the interest rate is a monetary phenomenon determined independently of saving and investment (Bonizzi & Kaltenbrunner, 2020; Culham, 2020; Keynes, 1936).

In keeping with the liquidity preference theory, this study holds that DMBs enable clients to access liquid cash for transactional, speculative, and preventative objectives, and the capacity to generate credit and increase liquidity boosts the competitive position of DMBs (Sugeng, 2018). The study expects DMBS to understand the rationales for tying down liquid capital and the implications on their profitability. And since the CBN regulates the liquidity position, capital requirement and LDR of DMBs, they must consider that low liquidity jeopardizes their ability to meet the liquidity requirements of their clients (Thi, 2020). Though excess liquidity may expose DMBs to fraud risk, being liquid helps them deal with and survive financial difficulties (Godwin & Comfort, 2015). On account of the liquidity preference theory, this study argues that though the CBN regulations may aim to promote a sound financial system with sufficient liquid assets, they may limit the profit-making drive of DMBs. Thus, with the CBN liquidity regulations, DMBs must consider the risks of low or excess liquidity and the effects on their profitability.

The capital adequacy theory is also a valuable theoretical lens through which to assess the impact of bank regulations on the profitability of DMBs. The theory requires DMBs to have certain assets, which can be shifted to the central bank when liquidity needs arise (Aliyu, Abdullyhi, & Bakare, 2020). Therefore, compliance with regulatory requirements may affect the financial performance of DMBs (Milne & Wiley, 2001; Simeneh, 2020; Sugeng, 2018). In keeping with the capital adequacy theory, this study assumes that holding large capital allows DMBs to explore future investment opportunities, boost performance, and avoid regulatory penalties (Berger & DeYoung, 1997). Therefore, it is expected that DMBs would increase their capital to avoid compliance penalties by the regulators when their CAR falls below the required ratio (Ezike & Oke, 2013; Ikpesu & Oke, 2022; Sugeng, 2018). As noted by Simeneh (2020), during the financial crisis, banks with low capital may increase systemic risk and undermine financial stability, which could prompt the regulators to modify the capital requirements. Hence, complying with the required minimum capital and keeping excess capital will reduce the likelihood of bank capital falling during a general economic or financial crisis (Ugwu et al., 2020). Akin to the capital adequacy theory, this study expects an association between the CBN regulation on capital adequacy and the financial performance of DMBs.

2.1 Hypotheses Development

Capital adequacy ratio and financial performance

The capital adequacy ratio (CAR) is an important parameter used by the apex bank of a country to measure and regulate the capital adequacy of banks operating in the country. In Nigeria, in line with the Basel Accord guidelines and recommendations of the BCBS, the CBN requires DMBs to increase and maintain a certain level of capital adequacy to ensure stability in the banking industry (Asikhia & Sokefun, 2013; Ikpesu & Oke, 2022). However, when a bank cannot meet the specified capital adequacy level, it would be required to reduce its loan assets (Abba et al., 2018; Leila, Hamidreza & Farshid, 2014). But reducing the loan assets of DMBs may affect their profitability negatively since they earn interest income from their loan assets (Abba et al., 2018; Aldhaheri & Nobanee, 2020). Previously, Abdul (2017) argued that adequate capital directly and automatically influences the amount of funds available for loans, which invariably affects the level and degree of risk DMBs can absorb. Following Abdul's (2017) submission on capitalization, Aliyu, Abdullyhi, and Bakare (2020) and Ikpesu and Oke (2022) found a positive

association between capital adequacy and profitability, indicating that capital adequacy could invariably translate to improved earnings and performance of DMBs. However, an earlier study by Onaolapo and Olufemi (2012) reported an adverse effect of capital adequacy on profitability. In a comparative study on the interrelationship between capitalization and profitability in the banking sector of BRICS countries, Singhal et al. (2022) reported that capitalization has a detrimental effect on profitability in China and South Africa when considered in light of the agency theory and not in Brazil, Russia, and India when considered in light of the signalling and bankruptcy cost hypotheses. Theoretically, many scholars regard capital adequacy as a significant factor in fostering risk management efficiency. However, there is no consensus in the literature on its effect on the financial performance of DMBs. Therefore, there is a need to provide further insight into the ongoing capitalization-profitability debate. In light of previous empirical literature and the theoretical discussion on capital adequacy, this study hypothesizes that:

H1: CAR and the financial performance of DMBs are positively associated.

Loan-to-deposit ratio and financial performance

The loan-to-deposit ratio (LDR) is another significant measure used by central banks of countries to assess the liquidity position and associated risks of DMBs and their ability to meet the liquidity needs of depositors (Iwedi, 2017; Trefis, 2016). It indicates the capacity of the banks to meet customers' cash demands with minimal or no loss. As earlier argued, banks make credit facilities available to borrowers from depositors' funds to earn interest income (Ikpesu & Oke, 2022). Previous research suggests that DMBs give more credit facilities to investors from whom they can get a high-interest income, not minding the associated risks (Aldhaheri & Nobanee, 2020; Ennis & Walter, 2016). But to keep depositors' funds safe and reduce the risk of illiquidity, central banks of many countries determine and regulate the LDR of banks. In Nigeria, the CBN requires DMBs to maintain a minimum LDR of about 65% (Obioma & Charles, 2018) and to make more credit facilities available to the real sector and small businesses at a regulated interest rate determined by the CBN. Though some economic experts argue that higher credit facilities could translate to higher profitability (Ikpesu & Oke, 2022), critics believe higher credit facilities expose DMBs to illiquidity risks, not having enough liquid resources to cover unforeseen fund requirements, which could invariably affect their financial performance adversely. Hitherto, the association between LDR and profitability has remained controversial among economic experts. For example, Hadian (2021) reported that LDR has a positive effect on profitability, which contrasts the negative impact on profitability documented by Ajayi and Lawal (2021) and Suroso (2022) and the insignificant effect reported by Anggari and Dana (2020) and Saleh and Winarso (2021). Based on previous literature and the theoretical discussion on liquidity preference, the current study intends to provide further insight into the possible interaction between LDR and profitability by hypothesizing that:

H2: LDR and the financial performance of DMBs are positively associated.

Asset quality ratio and financial performance

Besides having adequate capital, asset quality is essential for survival since asset quality involves the examination of the bank asset in a bid to ascertain the size and level of credit risk linked with its activities (Ikpesu & Oke, 2022). Regulators are concerned about the asset quality of DMBs since a weak asset quality not only affects profitability and operations but also affects the

financial stability of the economy (Ikpesu & Oke, 2022; Richard & Prakash, 2019). Unlike non-financial companies, where loans are regarded as liabilities, bank loans to customers are categorized as loan assets. The interest earned on loan assets forms a significant part of the income of DMBs, referred to as interest income. But while DMBs may aim at giving out more loans, they are confronted with the risk of default and failure of borrowers to pay back the loans (Rostami, 2015). According to Trefis (2016) and Obioma and Charles (2018), when the credit risk of a DMB increases, its loan quality or asset quality deteriorates due to upward movement in the ratio of non-performing loans. Accordingly, a decreasing asset quality compels DMBs to hold more capital and make provisions for losses (Rostami, 2015). Previous literature suggests that a low liquidity ratio and even poor asset quality could lead to the failure of DMBs (Mehta & Bhavani, 2017). For example, between 2009 and 2010, many DMBs in Nigeria failed due to poor asset quality management, high non-performing loans and insider lending (Obioma & Charles, 2018; Udeh, 2015). Though previous studies suggest a strong correlation between AQR and financial performance, Trefis (2016) argues that since the activities of DMBs are now diversified, asset quality alone should not be a key determinant of their financial performance. However, because of the need to remain in business and to meet regulatory requirements, some bank managers make irregular provisions and use different impairment models to manage the quality of their loan assets to conform with the regulatory guidelines (Kyari, 2015; Lucky & Nwosi, 2015; Obioma & Charles, 2018). Considering the possible interaction between AQR and profitability, as previous literature suggests, the current study provides further insight into the ongoing debate on the effect of AQR on the financial performance of DMBs. Thus, the study hypothesizes that:

H3: AQR and the financial performance of DMBs are positively associated.

3. Research Methods and Data

3.1 Design, Sample and Procedure

This study adopts the panel analysis designs to examine the impact of banking regulations on capital adequacy ratio (CAR), loan-to-deposit ratio (LDR), and asset quality ratio (AQR) on the financial performance of DMBs in Nigeria. As of January 2022, when this study was conducted, there were fourteen (14) DMBs listed on the Nigeria Exchange Group (Nigeria Exchange Group, 2022). However, using purposive sampling, the study excluded DMBs with incomplete annual reports for the period (2011 – 2020), reducing the sample to ten (10) DMBs with 100 observations. The study constructed a panel dataset from the publicly available annual reports of the sampled DMBs for ten years (2011 – 2020).

3.2 Operationalisation and Measurement of Variables

This study operationally defines its variables into two - the dependent and independent variables. The dependent variable is the financial performance of the DMBs, measured using return on assets (ROA), the value of net profit after tax divided by the total assets (Leila et al., 2014). It indicates how efficiently a bank uses its assets to generate income (Petersen & Schoeman, 2008). The independent variables are capital adequacy ratio (CAR), loan-to-deposit ratio (LDR) and asset quality ratio (AQR), proxies of banking regulation and supervision. CAR is the total capital of a bank to its risk-weighted assets (Abba, Zachariah, & Inyang, 2013). LDR is the year-end total loans divided by the year-end total deposits (Obioma & Charles, 2018), and AQR is the value of non-performing loans (NPL) divided by the gross value of the loan in a given period.

AQR assesses the risk associated with the loan and investment assets of DMBs (Abba et al., 2018; Iwedi, 2017; Mbatabbey, 2019). When it is low, the quality of loan assets increases and when it is high, the quality of loan assets decreases.

3.3 Model Specification and Data Analysis

The following regression model is estimated to test the three hypotheses of the study using an estimated generalized least square (EGLS) (two-way random-effects) panel regression method:

$$FINPERF_{it} = \beta 0 + \beta_1 CAR_{it} + \beta_2 LDR_{it} + \beta_3 AQR_{it} + \varepsilon_{it}$$

Where $FINPERF_{it}$ is the financial performance of bank *i* at period *t*. It is the dependent variable, measured as return on assets (ROA). CAR_{it} is the capital adequacy ratio of bank *i* at period *t*, LDR_{it} is the loan-to-deposit ratio of bank *i* at period *t*, AQR_{it} is the asset quality ratio of bank *i* at period *t*, and ε is the error term. The study conducted a descriptive statistical analysis and performed a Pearson correlation to examine the association between the dependent and independent variables and to check for multicollinearity concerns among the independent variables to further augment the Durbin-Watson test of autocorrelation between the errors (Field, 2009; Alshatti, 2015). The study employed the Swamy and Arora estimator of component variances (EGLS - two-way random-effects) to estimate the regression model and test the hypotheses developed for the study. All the analyses were performed using the Eviews statistical analysis software version 9.

4. Analysis and Results

4.1 Descriptive Statistics

This study computed the mean, standard deviation, Skewness, and Kurtosis distributions for the dependent and independent variables. To account for the Skewness of the distribution, a right-tailed position suggests a positively skewed distribution, while a left-tailed indicates a negatively skewed distribution. The Kurtosis statistic is either flatter or substantial peak distributions. Table 1 reports the results of the analysis.

Table 1: Descriptive Statistics

	FINPERF	**CAR**	**LDR**	**AQR**
Mean	0.0140	14.264	0.6375	4.5444
Median	0.0131	18.175	0.6223	3.7700
Maximum	0.0613	30.000	0.9916	35.240
Minimum	-0.0788	-201.59	0.0832	0.0001
Std. Dev.	0.0196	26.011	0.1749	4.2026
Skewness	-1.2046	-6.7205	-0.2078	4.8134
Kurtosis	8.8062	52.454	3.0442	32.408
Jarque-Bera	164.6497	10943.05	0.7276	3989.60
Probability	0	0	0.6950	0
Sum	1.3969	1426.42	63.751	454.437
Sum Sq. Dev.	0.0382	66980.33	3.0276	1748.48
Observations	100	100	100	100

Source: *Authors' computation with the aid of Eviews 9 (2023)*

As presented in Table 1, the mean score (0.0140) for FINPERF indicates low profitability across the sampled DMBs compared to the minimum value of -0.0788 and maximum value of 0.0613, having a left-tailed Skewness (-1.2046) with a substantial peak value of 8.8062. The standard deviation (1.96) indicates a slight variation in the ROA of the sampled DMBs. Also, the mean score (14.264) for CAR suggests that the CAR of the DMBs is moderately higher than the CBN minimum requirement (10%) for regional/national banks and a little less than the 15% requirement for DMBs licensed to operate internationally. While this variable is Skewed toward the left (-6.7205) and has a substantial peak value of 52.454, the minimum value is -201.59, while the maximum value is 30.00. The standard deviation (26.01) compared to the mean indicates a moderate variation in the CAR of the sampled DMBs. The mean score (0.6375) for LDR indicates that the LDR of the DMBs for the period is a little less than the 65% minimum requirement of the CBN. The minimum value is 0.0832 and the maximum value is 0.9916. This variable is Skewed toward the left (-0.2078) and has an average peak value of 3.0442. The average of 63.75% suggests that DMBs in Nigeria are progressing toward the minimum LDR requirement of the CBN (Mbatabbey, 2019). The standard deviation (0.1749) compared to the mean indicates a high variation in the LDR of the sampled DMBs. Lastly, the mean score (4.5444) for AQR indicates that the AQR of the DMBs is about the limit of 5% for non-performing loans (CBN, 2019), Skewing toward the right (4.8134) with a substantial peak value of 32.408. The minimum value is -0.0001, while the maximum value is 35.240. The standard deviation (4.20) compared to the mean suggests a slight variation in the AQR of the sampled DMBs.

4.2 Correlation Analysis

This study computed Pearson correlation to establish an association among the variables and test for any collinearity problem. The outcome of the correlation is displayed in Table 2.

Table 2: Pearson Correlation Matrix

Covariance Analysis: Ordinary
Date: 09/14/23 Time: 01:11
Sample: 2011 2020
Included observations: 100

Correlation t-Statistic Probability	**FINPERF**	**CAR**	**LDR**	**AQR**
FINPERF	1.0000 ----- -----			
CAR	0.1697 1.7049 0.091	1.0000 ----- -----		
LDR	0.3099 3.2272 0.002**	0.1181 1.1779 0.242	1.0000 ----- -----	
AQR	0.0505 0.5010 0.618	-0.0054 -0.0535 0.958	0.2270 2.3069 0.023*	1.0000 ----- -----

**Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed) Dependent Var. FINPERF

Source: *Authors' computation with the aid of Eviews 9 (2023)*

As seen in Table 2, among the independent variables, only LDR correlates positively and significantly with the dependent variable - FINPERF ($p = 0.001$; $r = .3099$). No significant correlation is seen among the independent variables except for LDR and AQR ($p = 0.023$; $r = .2270$). However, the correlation between LDR and AQR is limited and does not pose a significant collinearity concern.

4.3 Panel Regression Analysis

According to Gurajati (2004), estimating a panel regression could pose a challenge for researchers, especially when choosing between using the fixed-effects panel model or the random-effects panel model. On the one hand, the fixed-effects model controls for omitted variables that differ between cases but are constant over time. The model allows the use of the changes in the variables over time to estimate the effects of the independent variables on the dependent variable (Ajibolade & Sankay, 2013). On the other hand, the random-effects model is used when there are reasons to believe that some omitted variables may be constant over time but vary between cases and others fixed between cases but vary over time. Thus, to justify the choice of model, scholars mostly suggest the Hausman specification test (Ajibolade & Sankay, 2013; Gujarati, 2004). Accordingly, this study performed the Hausman test to check for a more efficient model between the fixed-effects and random-effects models. The test assumes a null position that the fixed-effects and random-effects models give the same efficient outcomes. However, if the p-value is more than .05, the random-effects model is more efficient, but if the p-value is less than .05, the fixed-effects model should be adopted (Gujarati, 2004; Oyewumi, Ogunmeru, & Oboh, 2018). The outcome of the Hausman test is presented in Table 3.

Table 3: Correlated Random Effects - Hausman Test

Test cross-section and period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	2.305039	3	0.5116
Period random	0.401066	3	0.9400
Cross-section and period random	1.354897	3	0.7161

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
CAR	-0.000064	-0.000042	0.000000	0.1738
LDR	0.018157	0.020266	0.000006	0.3824
AQR	0.000625	0.000538	0.000000	0.2555

Source: *Authors' computation with the aid of Eviews 9 (2023)*

As seen in Table 3, no statistically significant correlation was found between the unobserved person-specific random effects and the regressors, as the p-values for the cross-section random (0.5116), period random (0.9400), and cross-section and period random (0.7161) are all greater than .05. Therefore, the random-effects model is adopted to test the hypotheses developed for the study, as it gives a more robust estimation of the model. Based on the choice of model to adopt, this study employed the Swamy and Arora estimator of component variances to estimate the regression model and test the hypotheses developed for the study. The results of the EGLS (Two-way random effects) are presented in Table 4.

Table 4: Panel Regression Analysis: $FINPERF_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 LDR_{it} + \beta_3 AQR_{it} + \varepsilon_{it}$

Dependent Variable: **FINPERF**
Method: Panel EGLS (Two-way random effects)
Date: 09/14/23 Time: 01:47
Sample: 2011 2020
Periods included: 10
Cross-sections included: 10
Total panel (balanced) observations: 100
Swamy and Arora estimator of component variances

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
CAR	-4.157460	6.210526	-0.669422	0.5048
LDR	0.020266	0.009935	2.039901	0.0441
AQR	0.000538	0.000342	1.571886	0.1193
C	-0.000803	0.007889	-0.101793	0.9191
	Effects Specification			
			S.D.	Rho
Cross-section random			0.014637	0.5260
Period random			0.006192	0.0941
Idiosyncratic random			0.012438	0.3798
	Weighted Statistics			
R-squared	0.091636	Mean dependent var		0.003356
Adjusted R-squared	0.063249	S.D. dependent var		0.012707
S.E. of regression	0.012298	Sum squared resid		0.014520
F-statistic	3.228162	Durbin-Watson stat		1.573979
Prob(F-statistic)	0.025861			
	Unweighted Statistics			
R-squared	0.048800	Mean dependent var		0.013969
Sum squared resid	0.036316	Durbin-Watson stat		0.796489

Source: *Authors' computation with the aid of Eviews 9 (2023)*

From Table 4, it is seen that LDR significantly predicts FINPERF, as the p-value (.0441) is less than .05. The impact of LDR on FINPERF is positive (β = 0.020266), indicating that the higher the loan-to-deposit ratio, the higher the profitability of DMBs. While the association between CAR and FINPERF is negative (β = -4.157460) and the association between AQR and FINPERF is positive (β = 0.000538), the impact of CAR on FINPERF (p = .5048 > .05) and AQR on FINPERF (p = .1193 > .05) is not significant. However, combining all the independent variables achieved statistical significance, as indicated by the F-ratio (3.228) and its associated p-values (0.026). The outcomes of the combined effect of CAR, LDR, and AQR on FINPERF, representing about 9.2% (R^2) and 6.3% (Adj. R^2) variation, suggests that the regulations of the CBN on CAR, LDR, and AQR have a significant effect on the financial performance of DMBs in Nigeria. The Durbin-Watson test (1.574) suggests that the model did not violate the independence of residual assumptions (i.e. no collinearity problem) (Field, 2009; Kohler, 1994).

Thus, based on the results of the panel regression analysis, the decisions concerning the hypotheses developed for the study are summarized in Table 5.

Table 5: Summary of the test of hypotheses

Hypothesis	Nature of Relationship	Impact	Decision
CAR and the financial performance of DMBs are positively associated.	Negative	Not significant	Not supported
LDR and the financial performance of DMBs are positively associated.	Positive	Significant	Supported
AQR and the financial performance of DMBs are positively associated.	Positive	Not significant	Not supported

5. Discussion

Considering the importance of banking regulations and supervision to the success of the banking industry (Akinjobi, 2022; Iwedi, 2017; Mbatabbey, 2019), this study examined the impact of the CBN's regulations on the capital adequacy ratio (CAR), loan-to-deposit ratio (LDR), and asset quality ratio (AQR) on the financial performance of DMBs in Nigeria. The findings from the descriptive analysis revealed the extent to which DMBs comply with the CBN guidelines on CAR, LDR, and AQR. Specifically, the study found that the CAR of the sampled DMBs ranges from a minimum of -201.59% to a maximum of 30%, averaging about 14.26%, which is higher than the CBN guidelines of 10% for regional/national banks, and a little bit lower than the 15% for banks licensed to operate in the international banking business. On examining the data extracted from the annual reports of the DMBs, while the sampled DMBs complied with the minimum capital adequacy requirement of the CBN, Unity Bank Plc repeatedly reported a negative CAR during the period, which the directors linked to uncertainties over the timing of the recapitalization of the bank.

As to LDR, the study found that the average LDR for the sampled DMBs stood at 63.75%, which is about the minimum requirement of the CBN, with a minimum value of 8.32% and a maximum value of 99.16%. The results suggest that, despite being a new requirement (CBN, 2019), the sampled DMBs are progressing toward achieving full compliance with the LDR guideline of the CBN. As to AQR, the study found that the average AQR of the sampled DMBs is 4.54%, with a minimum value of 0.0001% and a maximum value of 35.24%. The results suggest that the average AQR is less than the CBN's minimum recommendation of a 5% limit on non-performing loans, indicating that the asset quality of the sampled DMBs, on average, is within the required limit (CBN, 2019). Overall, the findings from the descriptive analysis suggest that during the period, to a large extent, the sampled DMBs complied with the CBN regulatory requirements on CAR, LDR, and AQR.

In addition, the study found statistical support for hypothesis two, indicating that LDR positively impacted the financial performance of DMBs. That is to say, not only does the CBN regulation on LDR keep depositors' funds safe and reduce the risk of illiquidity, but compliance with the

LDR regulation positively impacts the overall financial performance of DMBs in Nigeria. This finding agrees with Hadian (2021) on the positive impact of LDR on the financial performance of DMBs but disagrees with Ajayi and Lawal (2021) and Suroso (2022), who found LDR to have a negative impact on profitability and Anggari and Dana (2020) and Saleh and Winarso (2021), who found the effect of LDR on the financial performance of DMBs to be insignificant. While critics believe higher credit facilities could expose DMBs to illiquidity risks, the findings of this study suggest that DMBs could improve their financial performance by complying with the CBN requirement on LDR.

Furthermore, the study found no statistical support for hypotheses one and three contrary to expectations. While CAR appears to have a negative relationship and AQR appears to have a positive association, their impact on financial performance is insignificant. The finding on CAR agrees with Mehta and Bhavani (2017) and Rufai and Olayide (2018), who found no significant association between CAR and profitability but contradicts Aliyu et al. (2020) and Ikpesu and Oke (2022), who reported a positive association between capital adequacy and profitability. Though previous research argues that adequate capital could translate to improved earnings, the finding of this study suggests that compliance with the CBN regulation on CAR has no significant impact on the financial performance of DMBs in Nigeria. While the effect is insignificant, the negative association between CAR and profitability suggests CAR has an adverse influence on profitability, an assertion that aligns with Singhal et al. (2022) that capitalization has a detrimental effect on profitability in China and South Africa when considered in light of the agency theory. As to the regulation of the CBN on AQR, previous research suggests a strong correlation between AQR and profitability (Ikpesu & Oke, 2022; Obioma & Charles, 2018; Richard & Prakash, 2019).

However, the finding of this study suggests that compliance with the AQR regulation has no significant impact on the financial performance of DMBs in Nigeria. While this finding aligns with Trefis (2016) that asset quality alone should not be a key determinant of financial performance, it did not support the claims of Obioma and Charles (2018) and Udeh (2015) that many DMBs failed in Nigeria between 2009 and 2010 because of poor asset quality management and high non-performing loans. Overall, while LDR alone shows a significant impact, the combined effect of CAR, LDR, and AQR explains about 9.2% (R2) and 6.3% (Adj. R2) variation in the financial performance of the sampled DMBs.

6. Conclusion and Implications

This study undertakes to shed light on the impact of the regulations and supervision of the CBN on the financial performance of DMBs. Based on its findings, the study concludes that, to a large extent, the sampled DMBs complied with the regulatory requirements of the CBN on CAR, LDR, and AQR within the period. The CAR stood at 14.26% against 10% for regional/national banks and 15% for banks licensed to operate internationally. The LDR stood at 63.75%, as against the required 65%, and the AQR was 4.54%, against the minimum recommendation of a 5% limit of non-performing loans. With the evidence from the panel regression analysis, it is safe to conclude that the CBN regulation on LDR positively impacts the financial performance of DMBs. However, the impact of CAR and AQR on the financial performance of the DMBs is insignificant. The evidence provided in this study has some implications. The study adds to the small literature on banking regulations in a developing country context. It sheds more light on

the effects of banking regulations and supervision on the financial performance of DMBs, as it affirms that the current CBN regulations on CAR and AQR do not necessarily translate to higher financial performance for DMBs. However, the DMBs are encouraged to comply with the regulatory requirements of the CBN to avoid regulatory fines and non-compliance sanctions. The findings of this study will serve as a benchmark for future research on banking regulations in other developing countries.

7. Limitations and suggestions for future studies

Like in previous research, this study has some limitations. The scope is limited to only DMBs. Future research could consider including mortgage, merchant, and microfinance banks in the sample. Also, the study relied solely on secondary data to conclude the impact of CAR, LDR, and AQR on financial performance. Future research may consider adding primary data to confirm the association between these variables. Bank managers and regulators could be surveyed via a questionnaire or interview to obtain first-hand information on the impact of banking regulations and supervision on the financial performance of DMBs. Finally, this study used CAR, LDR, and AQR as proxies for banking regulation and supervision and ROA as a proxy for financial performance. Future research could benefit from alternative variable measurements like deposit ratio and return on equity.

References:

Abata, M. A. (2014). Asset quality and bank performance: A study of commercial banks in Nigeria. *Research Journal of Finance and Accounting, 5*(8), 39-44.

Abba, G. O., Okwa, E., Soje, B., & Aikpitanyi, L. N. (2018). Determinants of capital adequacy ratio of deposit money banks in Nigeria. *Journal of Account Marketing,* 7(2), 233-271.

Abba, G. O., Zachariah, P., & Inyang, E. E. (2013). Capital adequacy ratio and banking risks in the Nigeria money deposit banks. *Journal of Finance and Accounting, 4*(17), 17-26.

Abdul, J. M. (2017). Impact of capital adequacy on the performance of Nigerian banks using the Basel Accord framework. *East Africa Research Papers in Business, Entrepreneurship and Management, 7*, 1-15.

Acep, E., Mohd, H., & Obsatar, S. (2019). Capital adequacy ratio, loan-to-deposit ratio, operational costs on operational income, and the influence on return on equity. *Journal of Advance Research in Dynamical & Control Systems, 11*(3), 154-160.

Agbeja, O., Adelakun, O. J., & Olufemi, F. I. (2015). Capital adequacy ratio and bank profitability in Nigeria: A linear approach. *International Journal of Novel Research in Marketing Management and Economics, 2*(3), 91-99.

Ajayi, J. A., & Lawal, Q. A. (2021). Effect of Liquidity Management on Bank Performance. *Izvestiya Journal of Varna University of Economics, 65*(2), 220-237.

Ajibolade, S. O., & Sankay, O. C. (2013). Working capital management and financing decision: Synergetic effect on corporate profitability. *International Journal of Management, Economics and Social Sciences*, *2*(4), 233-251.

Akinjobi, T. A. (2022). Loan to deposit ratio as liquidity and impact on bank performance. *Journal of Finance & Business Management, 12*(1), 14-35.

Aldhaheri, A., & Nobanee, H. (2020). Financial stability and sustainable finance. *Accounting and Finance Journal, 4*(5), 3-27.

Aliyu, A. A., Abdullyhi, N. A., & Bakare, T. O. (2020). Capital adequacy and financial performance of deposit money banks with international authorization in Nigeria. *Accounting and taxation review, 4*(4), 78-91.

Alshatti, A. S. (2015). The effect of credit risk management on the financial performance of the Jordanian commercial banks. *Investment Management and Financial Innovations, 12*(1), 338 – 345.

Anggari, N. L. S., & Dana, I. M. (2020). The effect of capital adequacy ratio, third party funds, loan to deposit ratio, and bank size on profitability in banking companies on IDX. *American Journal of Humanities and Social Sciences Research (AJHSSR), 4*(12), 334-338.

Asikhia, O., & Sokefun, A. (2013). Capital adequacy and banks profitability of deposit-taking: An empirical from Nigeria. *Far East Journal of Psychology and Business*, *13*(4), 32-41.

Berger, A. N., & DeYoung, R. (1997). Problem loans and cost efficiency in commercial banks. *Journal of Banking and Finance, 21*(6), 849-870.

Boahene, S. H., Dasah, J., & Agyei, S. K. (2012). Credit risk and profitability of selected banks in Ghana. *Research Journal of Finance and Accounting, 3*(7), 2-23.

Bonizzi, B., & Kaltenbrunner, A. (2020). Critical macro-finance, Post Keynesian monetary theory and emerging economies. *Finance and Society, 6*(1), 76-86.

Culham, J. (2020). Revisiting the concept of liquidity in liquidity preference. *Cambridge Journal of Economics, 44*(3), 491-505.

Disalvo, J., & Johnston, R. (2017). The rise in loan-to-deposit ratios. *International Journal of Banking and Finance, 5*(1), 3-12.

Elisa, M., & Guido, P. (2016). Factors affecting bank profitability in Europe: An empirical investigation. *African Journal of Business Management, 10*(17), 410-420.

Ennis, H. M., & Walter, J. R. (2016). Do net interest margins and interest rates move together? *Journal of Business and Finance, 6*(2), 21-29.

Ezike, J. E., & Oke, M. (2013). Capital adequacy standards, Basle accord and bank performance: The Nigerian experience (a case study of selected banks in Nigeria). *Asian Economic and Financial Review, 3*(2), 146-159.

Field, A. (2009). *Discovering statistics using SPSS* (3rd ed.). London: SAGE.

Godwin, E. B., & Comfort, E. M. (2015). Bank profitability and liquidity management: A case of study of selected Nigerian deposit money banks. *International Journal of Economics, Commerce and Management, 3*(4), 1- 24.

Gujarati, D. N. (2004). *Basic econometrics* (4th ed.). New York: The McGraw-Hill Companies Inc.

Hadian, N. (2021). The effect of non-performing loans and loan to deposit ratio on return on assets in the banking industry. *Turkish Journal of Computer and Mathematics Education (TURCOMAT), 12*(8), 791-798.

Ikpesu, F., & Oke, B. O. (2022). Capital adequacy, asset quality and banking sector performance. *Acta Universitatis Danubius. Œconomica, 18*(3), 22-32.

Iwedi, M., (2017). Bank failure in Nigeria: evidence of prudential regulator laxity. *Frontiers in Management Research, 1*(4), 141-150.

Keynes, J. M. (1936). The general theory of employment, interest, and money. *International Relation and Security Market*, 1-190.

Khalid, A. (2012). The impact of asset quality on the profitability of private banks in India: A case study of JK, ICICI, HDFC & YES Banks. *African Macroeconomic Review, 2*(1), 1-23.

Kohler, H. (1994). *Statistics for business and economics* (3rd ed.). New York: Harper Collins College Publishers.

Kyari, G. V. (2015). An evaluation of the impact of monetary policy on the real sector in Nigeria. *Mediterranean Journal of Social Sciences, 6*(2), 361-369.

Lavoie, M., & Reissl, S. (2019). Further insights on endogenous money and the liquidity preference theory of interest. *Journal of Post Keynesian Economics, 42*(4), 503-526.

Leila, B., Hamidreza, V., & Farshid, A. (2014). The influential factors on capital adequacy ratio in Iranian banks. *International Journal of Economics and Finance, 6*(11), 108-116.

Lucky, A. L., & Nwosi, A. A. (2015). Asset quality and profitability of commercial banks: evidence from Nigeria. *Research Journal of Finance and Accounting, 6*(18), 26-34.

Marc, S., & Til, S. (2003). The new Basel Capital Accord and questions for research. *Federal Reserve Bank of New York*, 1-34.

Mbatabbey, J. O. (2019). Asset quality and deposit money banks performance in Nigeria. *American International Journal of Business and Management Studies, 1*(1), 38-47.

Mehta, A., & Bhavani, G. (2017). What determines banks' profitability? Evidence from emerging markets-the case of the UAE banking sector. *Accounting and Finance Research, 6*(1), 77-88.

Milne, A., & Wiley, E. (2001). Bank capital regulation and incentives for risk-taking. *Cass Business School Research Paper, 6*(4), 1-34.

Nigerian Exchange Group (2022). *Report on the Listed Companies on the Nigerian Exchange Group Plc.*

Obateru, P. O. (2021). Risk asset management and bank performance. *Banking and Finance Research, 2*(1), 2-33.

Obioma, J. (2015). Evaluation of the financial performance of the banking sector in Ethiopia: The case of Zemen Bank. *Global Journal of Management and Business Research & Finance,15*(9), 2-12.

Obioma, J., & Charles, O. (2018). Asset quality performance among Nigerian banks - The role of monetary policy international. *Journal of Banking and Finance Research, 4*(1), 1-31.

Onaolapo, A. A. & Olufemi, A. E. (2012). Effect of capital adequacy on the profitability of the Nigerian banking sector. *Journal of money, investment and banking, 24*(1), 62-72.

Oni, S. A. (2015). *Circular on the review of the universal banking mode*l, 1-13.

Onoh, J. K. (2002). *Dynamics of money, banking, and finance in Nigeria: An emerging market.* Aba: Astra Meridian Publishers.

Oyewumi, O. R., Ogunmeru, O. A., & Oboh, C. S. (2018). Investment in corporate social responsibility, disclosure practices, and financial performance of banks in Nigeria. *Future Business Journal*, *4*(2), 195-205.

Petersen, M. A., & Schoeman, I. (2008). Modelling of banking profit via return-on-assets and return-on-equity. *Proceedings of the World Congress on Engineering*, *2*(5), 1-6.

Peterson, K. O. (2015). Determinants of bank profitability and Basel capital regulation: Empirical evidence from Nigeria. *Research Journal of Finance and Accounting, 6*(2), 1-13.

Richard, V. R., & Prakash, N. (2019). Impact of asset quality on the financial performance of banks in India: A comparative study of public and private sector bank. *International Research Journal of Commerce, Arts and Science*, *10*(7), 39-50.

Rostami, M. (2015). Determination of Camels model on bank's performance. *International Journal of Multidisciplinary Research and Development*, *2*(10), 652-664.

Rufai, A., & Olayide, O. C. (2018). Impact of asset quality on the performance of banks in Nigeria. *Journal of Business Finance, 2*(6), 1-11.

Saleh, D. S., & Winarso, E. (2021). Analysis of non-performing loans (NPL) and loan-to-deposit ratio (LDR) towards profitability. *International Journal of Multicultural and Multireligious Understanding, 8*(1), 423-436.

Shintya, N. A., & Dana, M. (2020). The effect of capital adequacy ratio, third party funds, loan to deposit ratio, and bank size on profitability in banking companies on IDX. *American Journal of Humanities and Social Sciences Research (AJHSSR), 4*(12), 334-338.

Simeneh, A. (2020). The effect of bank regulation on the banks' performance: A literature review approach. *Global Scientific Journal, 8(*7), 1359-1369.

Singhal, N., Goyal, S., Sharma, D., Kumari, S., & Nagar, S. (2022). Capitalization and profitability: applicability of capital theories in BRICS banking sector. *Future Business Journal, 8*(1), 30.

Sugeng, R. (2018). The effect of third-party funds, non-performing loans, capital adequacy ratio, loan-to-deposit ratio, return on assets, net interest margin and operating expenses operating income on lending. *Proceedings of the International Conference on Industrial Engineering and Operations Management Bandung, Indonesia,* 6(8), 1015-1026.

Suroso, S. (2022). Analysis of the effect of capital adequacy ratio (CAR) and loan to deposit ratio (LDR) on the profits of public banks in the Indonesia Stock Exchange (IDX) period 2016–2021. *Economic Journal: Scientific Journal of Accountancy, Management and Finance*, *2*(1), 45-53.

Syed, M.H. (2017). Impact of credit risk management on banks performance: a case study in Pakistan banks. *European Journal of Business and Management, 9*(1), 57-64.

Syinta, J., Panji, D. J., Faiz, I. P., & Erry, R. (2018). Effect of capital adequacy ratio, operational costs on operational revenues and loan to deposit ratio to return on assets pd bank pasar Bogor city. *Journal of Economics and Finance, 3*(5), 1-23.

Central Bank of Nigeria (2019). *Publication on Management of Banks Risk Assets*.

Thi, H. N. (2020). Impact of bank capital adequacy on bank profitability under Basel II accord: evidence from Vietnam. *Journal of Economic Development, 45*(1), 31-46.

Trefis, T. (2016). What is the current loan-to-deposit ratio for the largest U.S. banks? *Finance Journal, 6*(5), 2-13.

Tuškan, B., & Stojanović, A. (2016). Measurement of cost efficiency in the European banking industry. *Croatian Operational Research Review, 7*(1), 47-66.

Udeh, S. N. (2015). Impact of monetary policy instruments on the profitability of commercial banks in Nigeria: Zenith bank experience. *Research Journal of Finance and Accounting, 6*(10), 190-206.

Ugwu, O. C., Ugwoke, R. O., Egbere, M. I., Asogwa, C. I., & Orji, A. N. (2020). Effect of liquidity management on the performance of deposit money banks in Nigeria. *The Journal of Social Sciences Research, 6*(2), 300-308.

Appendix I: Listed Deposit Money Banks in Nigeria

S/N	Banks	Ticker	Sector	Date of Incorporation
1	Access Bank Plc	ACCESS	Financial Services	February 8, 1989
2	Ecobank Transnational Incorporated	ETI	Financial Services	October 3, 1985
3	FBN Holdings Plc	FBNH	Financial Services	August 13, 2012
4	FCMB Group Plc	FCMB	Financial Services	November 20, 2012
5	Fidelity Bank Plc	FIDELITYBK	Financial Services	November 19, 1987
6	Guaranty Trust Holding Company Plc	GTCO	Financial Services	July 24, 2020
7	Jaiz Bank Plc	JAIZBANK	Financial Services	April 1, 2003
8	Stanbic IBTC Holdings Plc	STANBIC	Financial Services	March 14, 2012
9	Sterling Bank Plc.	STERLNBANK	Financial Services	November 25, 1960
10	Union Bank Nig. Plc	UBN	Financial Services	May 30, 1969
11	United Bank for Africa Plc	UBA	Financial Services	February 23, 1961
12	Unity Bank Plc	UNITYBNK	Financial Services	April 27, 1987
13	Wema Bank Plc	WEMABANK	Financial Services	May 2, 1945
14	Zenith Bank Plc	ZENITHBANK	Financial Services	May 30, 1990

Extracted from the Nigerian Stock Exchange now Nigerian Exchange Group Website (2022)