POLAC INTERNATIONAL JOURNAL OF ECONS & MGT SCIENCE (PIJEMS)
DEPARTMENT OF ECONOMICS & MANAGEMENT SCIENCE NIGERIA
POLICE ACADEMY, WUDIL-KANO

EFFECT OF CAPITAL ADEQUACY ON FINANCIAL PERFORMANCE OF QUOTED DEPOSIT MONEY BANKS IN NIGERIA

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Abstract

This study examined the effect of capital adequacy on the financial performance of quoted deposit money banks in Nigeria. Specifically, the study investigated the influence of capital adequacy ratio (CAR) on return on assets (ROA) while controlling for firm size. The population of the study comprised all deposit money banks quoted on the Nigerian Exchange Group as of 2025, from which eleven banks were purposively selected based on data availability, consistency in operations, and accessibility of audited financial reports over the period 2016-2025. The study adopted an ex post facto research design. The Hausman specification test indicated that the random effects panel regression model was the most appropriate estimation technique. The findings revealed that capital adequacy ratio exerts a positive and statistically significant effect on return financial performance among quoted deposit money banks in Nigeria. Based on the findings, the study recommends that deposit money banks should continue to maintain sound capital adequacy practices while ensuring efficient deployment of available capital toward productive and income-generating banking activities in order to sustain profitability and enhance financial stability.

Keywords: Capital Adequacy Ratio, Financial Performance, Return on Assets, Deposit Money Banks, Firm Size

1. Introduction

Financial performance remains a major indicator of the stability, efficiency, and sustainability of deposit money banks, particularly in emerging economies such as Nigeria where the banking sector performs a strategic role in financial intermediation, credit creation, and economic development. In the Nigerian banking industry, return on assets (ROA) is widely regarded as an important measure of profitability because it evaluates the ability of banks to efficiently utilize their total assets to generate earnings. The performance of quoted deposit money banks is especially significant due to their contribution to economic growth, employment generation, liquidity creation, and financial system stability. However, persistent fluctuations in profitability among Nigerian banks have continued to generate concerns regarding the factors influencing financial performance, particularly within the context of prudential regulation and risk management practices (Ezu et al., 2023; Nnenna & Rosita, 2025).

Financial performance in the banking sector is not determined solely by operational efficiency or revenue generation but is also influenced by prudential regulatory mechanisms designed to ensure the safety and soundness of financial institutions. One of the most

important prudential indicators is capital adequacy, which reflects the ability of banks to absorb unexpected losses arising from risk exposures. Capital adequacy ratio (CAR) measures the extent to which banks maintain sufficient regulatory capital relative to their risk-weighted assets. Adequate capitalization enhances solvency, strengthens depositor confidence, improves resilience against financial distress, and supports sustainable banking operations. Consequently, banks with stronger capital positions are expected to better withstand credit-related shocks while maintaining profitability and operational stability (Ajayi et al., 2019; Ofeimun & Akpotor, 2020).

The relevance of capital adequacy has become increasingly pronounced in Nigeria following various banking sector reforms and recapitalization exercises introduced by the Central Bank of Nigeria (CBN), particularly after the global financial crisis and the adoption of Basel regulatory frameworks. These reforms were aimed at strengthening the financial capacity of banks to absorb losses associated with credit risk and other operational exposures. Despite these regulatory efforts, concerns relating to declining profitability, rising non-performing loans, and capital sustainability persist among Nigerian deposit money banks. The Nigerian banking environment continues to experience macroeconomic instability, inflationary pressures, exchange rate volatility, and increasing credit risk exposures, thereby reinforcing the need for adequate capital buffers capable of supporting stable financial performance (CBN, 2023).

The relationship between capital adequacy and financial performance can be explained through Buffer Capital Theory, which posits that banks maintain excess capital above the regulatory minimum in order to absorb unexpected losses and reduce the probability of financial distress. Adequate capital enables banks to undertake profitable investments while preserving depositor confidence and operational stability. Similarly, the trade-off theory suggests that while higher capital improves solvency and reduces bankruptcy risk, excessive capitalization may reduce profitability if funds are not efficiently utilized for income-generating activities. Therefore, maintaining an optimal level of capital adequacy is essential for enhancing profitability and financial sustainability within the banking sector (Berger & Bouwman, 2013; Ogunode et al., 2022).

Empirical evidence on the effect of capital adequacy on financial performance remains inconclusive due to differences in methodology, sample coverage, variable measurement, and model specification. Several studies reported that higher capital adequacy improves profitability and financial stability, while others documented insignificant or negative relationships arising from overcapitalization and reduced lending efficiency. Ezu et al. (2023) found that capital adequacy positively influences the performance of deposit money banks in Nigeria, suggesting that well-capitalized banks are more capable of absorbing financial shocks and sustaining profitability. Similarly, Ajayi et al. (2019) reported a positive relationship between capital adequacy ratio and profitability among Nigerian deposit money banks. However, Ofeimun and Akpotor (2020) argued that excessive capital retention may reduce banks' capacity to maximize returns on assets due to conservative lending behaviour and underutilization of financial resources.

Despite the growing literature, several empirical and methodological gaps remain unresolved. First, many previous studies examined capital adequacy within broader credit risk management frameworks alongside variables such as non-performing loans, liquidity risk, and loan loss provisions, thereby providing limited evidence on the isolated effect of capital adequacy on financial performance. As a result, the independent contribution of capital adequacy ratio to bank profitability remains insufficiently explored within the Nigerian banking sector (Nnenna & Rosita, 2025).

Second, prior studies differ considerably in sample composition and sectoral focus. Some studies combined listed and non-listed financial institutions, while others focused only on banks with international authorization,

thereby limiting the generalizability of findings to quoted deposit money banks in Nigeria. This study focuses specifically on quoted deposit money banks because they operate under stricter regulatory supervision, mandatory disclosure requirements, and standardized financial reporting practices, which improve data reliability and comparability. In addition, quoted deposit money banks constitute the dominant participants within Nigeria's financial intermediation system and are directly affected by prudential capital regulations established by the Central Bank of Nigeria and Basel frameworks. Their audited financial statements therefore provide more reliable and consistent data suitable for empirical investigation (Aliyu & Abdullyhi, 2020; CBN, 2023).

Thirdly, several previous studies relied predominantly on pooled ordinary least squares and simple regression techniques that may fail to adequately account for unobservable firm-specific heterogeneity among banks. Such estimation approaches may produce biased or inconsistent results because they ignore both cross-sectional and time-series variations in bank behaviour and profitability. In contrast, panel regression techniques combine time-series and cross-sectional dimensions of data, thereby improving estimation efficiency and controlling for unobservable bank-specific characteristics. Panel regression therefore provides more robust and reliable estimates regarding the relationship between capital adequacy and financial performance over time (Baltagi, 2021).

Furthermore, many prior studies paid limited attention to firm-specific characteristics such as bank size despite evidence that organizational scale significantly influences profitability. Larger banks often benefit from economies of scale, wider market coverage, stronger risk diversification, and easier access to financial resources, all of which may independently affect return on assets. Failure to control for bank size may therefore distort the estimated relationship between capital adequacy and financial performance. Consequently, the inclusion of bank size as a control variable improves the robustness and explanatory power of the empirical model by accounting for profitability differences attributable to variations in operational scale among banks (Aremu et al., 2021).

Therefore, this study bridges the identified gaps in the literature by specifically examining the independent effect of capital adequacy ratio on the return on assets of quoted deposit money banks in Nigeria while controlling for bank size. Unlike many previous studies that adopted broader credit risk management frameworks and less robust estimation techniques, this study employs panel regression analysis to account for firm-specific heterogeneity and dynamic variations across banks over time. In addition, the study focuses exclusively on quoted deposit money banks due to their superior disclosure standards, regulatory compliance, and relevance within the Nigerian financial system, thereby providing more reliable and policy-relevant empirical evidence on the relationship between capital adequacy and financial performance.

The study tests the following null hypothesis:

i. Capital adequacy ratio has no significant effect on financial performance of quoted deposit money banks in Nigeria.

2. Literature Review

2.1 Conceptual Clarification

Financial Performance

Financial performance is a multidimensional concept that reflects the extent to which an organization efficiently utilizes its resources and assets to generate earnings, maintain stability, and maximize shareholders' wealth. In the banking sector, financial performance indicates the ability of banks to generate sustainable profits while maintaining adequate liquidity, solvency, and operational efficiency. According to Nnenna and Rosita (2025), financial performance measures the effectiveness of banks in converting financial and operational resources into profitable outcomes. Similarly, Ezu, Nwanna and Eke-

Jeff (2023) define financial performance as the capacity of financial institutions to efficiently deploy assets and liabilities toward income generation and long-term sustainability.

Financial performance is commonly measured using indicators such as return on assets (ROA), return on equity (ROE), earnings per share (EPS), and net interest margin (NIM). Among these indicators, return on assets is widely preferred in banking studies because it captures management efficiency in utilizing total assets to generate profit. ROA also provides a comprehensive measure of operational performance independent of financing structure. Berger and Bouwman (2013) argue that ROA remains one of the most reliable profitability indicators because it reflects both managerial efficiency and asset utilization capacity.

In this study, financial performance is defined as the ability of quoted deposit money banks in Nigeria to efficiently utilize their assets to generate profits and is proxied by return on assets (ROA).

Capital Adequacy Ratio

Capital adequacy ratio refers to the proportion of a bank's regulatory capital relative to its risk-weighted assets and represents the financial capacity of banks to absorb unexpected losses arising from risk exposures. It is one of the most important prudential indicators used by regulatory authorities to ensure the safety, soundness, and stability of financial institutions. According to Ajayi, Ajayi and Enimola (2019), capital adequacy ratio measures the extent to which banks maintain sufficient capital buffers capable of protecting depositors and sustaining operational stability during periods of financial distress. Similarly, Ofeimun and Akpotor (2020) define CAR as a solvency measure that evaluates the financial strength of banks in relation to their exposure to credit and operational risks.

The Central Bank of Nigeria and Basel regulatory frameworks require deposit money banks to maintain minimum capital adequacy thresholds in order to reduce insolvency risk and improve confidence within the banking system. Adequate capitalization enables banks to absorb loan defaults, maintain liquidity, undertake profitable investments, and sustain lending activities without threatening financial stability. Conversely, inadequate capital may expose banks to distress, regulatory sanctions, declining investor confidence, and reduced profitability. However, excessive capitalization may also reduce profitability where financial resources are not efficiently utilized for income-generating activities (Aliyu & Abdullyhi, 2020).

Empirical studies generally associate higher capital adequacy with improved profitability because well-capitalized banks are better positioned to withstand financial shocks and undertake productive risk-taking activities. Nevertheless, some studies argue that overcapitalization may reduce returns on assets due to conservative lending behaviour and inefficient utilization of funds (Ezu et al., 2023).

In this study, capital adequacy ratio is defined as the proportion of regulatory capital maintained by quoted deposit money banks relative to their risk-weighted assets and is used as a proxy for banks' financial strength and risk absorption capacity.

Firm Size

Firm size refers to the scale of operations and asset base of an organization. In banking studies, firm size is commonly measured using the natural logarithm of total assets and is considered an important determinant of financial performance. According to Aremu, Ekpo and Mustapha (2021), firm size reflects the operational capacity, market coverage, and resource availability of financial institutions. Larger banks are generally expected to enjoy economies of scale, stronger market power, wider diversification opportunities, and easier access to financial resources, all of which may positively influence profitability.

Similarly, Baltagi (2021) notes that firm-specific characteristics such as organizational size significantly affect firm behaviour and performance outcomes, particularly in panel data analysis involving financial

institutions. Larger deposit money banks may possess superior risk management systems, stronger customer confidence, and greater operational efficiency compared to smaller banks. However, excessively large institutions may also experience bureaucratic inefficiencies and higher operational costs that could adversely affect profitability.

In empirical banking literature, firm size is frequently introduced as a control variable because profitability may vary substantially according to the scale of banking operations. Failure to control for firm size may therefore distort the estimated relationship between explanatory variables and financial performance. Consequently, the inclusion of firm size improves the robustness and explanatory power of the empirical model.

In this study, firm size is defined as the scale of banking operations measured by the natural logarithm of total assets and is included as a control variable to account for profitability differences arising from variations in operational scale among quoted deposit money banks in Nigeria.

2.2 Empirical Review

Capital Adequacy and Financial Performance

Wanjiru et al. (2024) investigated the effect of capital adequacy on the financial performance of commercial banks in Kenya with emphasis on prudential regulations introduced by the Central Bank of Kenya. The study was conducted in Kenya across the commercial banking industry using an explanatory research design. The target population comprised 39 commercial banks categorized into tier I, tier II, and tier III institutions according to Central Bank of Kenya classifications, and a census approach was adopted, thereby eliminating sampling bias associated with selective inclusion. Secondary data covering the banking sector were analyzed using unbalanced panel regression model alongside diagnostic procedures. The findings revealed that capital adequacy exerted a positive and statistically significant influence on financial performance. Nevertheless, the study concentrated exclusively on Kenyan commercial banks, thereby limiting the broader applicability of the findings to other financial systems with different institutional and regulatory structures

Moreover, Nyanyuki et al. (2022) evaluated the effects of capital adequacy on the financial performance of commercial banks in Kenya by examining how capital buffers influence profitability within the banking industry. The investigation focused on the Kenyan banking sector and adopted a correlational research design. The target population consisted of 43 listed commercial banks, from which 10 banks were purposively selected based on the availability and completeness of financial information. Secondary data were extracted from financial statements and Nairobi Securities Exchange reports covering the period from 2015 to 2019. Inferential statistical techniques, particularly correlation and regression analyses, were utilized to establish the relationship between capital adequacy and financial performance. The findings showed that capital adequacy had a negative but statistically significant relationship with financial performance, implying that an increase in capital reserves reduced profitability levels among the sampled banks. However, the use of purposive sampling and the relatively small sample size of 10 banks weakened the representativeness of the study and reduced the extent to which the findings can be generalized across the entire Kenyan banking industry.

Additionally, Hastuti et al. (2024) examined the effect of capital adequacy ratio, non-performing loans, and debt-equity ratio on the financial performance of banking companies listed on the Indonesia Stock Exchange. The study was conducted against the backdrop of increasing concerns regarding banking sector stability and the ability of financial institutions to maintain sustainable profitability amidst rising credit risk and leverage pressures. The primary objective was to determine whether capital adequacy ratio, non-performing loans, and debt-equity ratio significantly influence financial performance among Indonesian listed banks. The study focused on the Indonesian

banking sector and employed a quantitative research approach using secondary financial statement data obtained from banking firms listed on the Indonesia Stock Exchange between 2020 and 2022. Purposive sampling techniques were utilized to select 43 banking firms, generating 129 firm-year observations for analysis. Multiple regression analysis was conducted. The findings revealed that capital adequacy ratio and non-performing loans did not significantly influence financial performance, while debt-equity ratio demonstrated a measurable relationship with profitability outcomes. Although the study provided valuable insight into the interaction between risk indicators and bank performance, the use of only three years of data reduced the capacity of the analysis to capture long-run cyclical financial behavior.

Similarly, Nwankwo (2019) examined the effect of capital adequacy on the financial performance of commercial banks in Nigeria over the period 2010 to 2017. The study was motivated by concerns regarding the ability of Nigerian commercial banks to sustain profitability amid capital regulation reforms and increasing financial sector uncertainty. The study adopted an ex post facto research design and relied on secondary data obtained from the financial reports of commercial banks within the Nigerian banking sector. Regression analysis was used to estimate the effect of capital adequacy variables on financial performance measured through net interest income. The findings revealed that owners' equity had a positive but statistically insignificant effect on net interest income, suggesting that increases in shareholders' funds did not automatically translate into improved profitability within the sampled period. The study emphasized that capital adequacy remains essential for banking stability even when profitability effects appear weak. Nonetheless, the study time scope of the study needs tobe updated to capture recent realities.

Firm Size and Financial Performance

Furthermore, Hossain and Saif (2019) investigated the impact of firm size on the financial performance of banking companies in Bangladesh with emphasis on how organizational characteristics influence profitability within the banking industry. The principal objective of the study was to examine the effects of firm size, firm age, and independent directors on the profitability of banking companies listed on the Dhaka Stock Exchange. The study focused on the Bangladeshi banking sector and adopted a quantitative explanatory research design using panel data obtained from annual reports of listed banking firms. The population consisted of banking companies listed on the Dhaka Stock Exchange, while secondary data covering the period from 2013 to 2017 were analyzed. Regression analysis was employed to estimate the relationship between firm size and financial performance indicators such as return on assets and return on equity. The findings revealed that firm size exerted a positive and statistically significant influence on profitability, indicating that larger banks benefited from economies of scale, enhanced market power, and greater operational efficiency. However, the study concentrated solely on listed banking firms, thereby excluding smaller non-listed institutions whose operational structures and performance patterns may differ substantially. The findings is limited to Bangladesh banks.

Moreover, Ayuba et al. (2019) examined the effects of financial performance, capital structure, and firm size on the value of insurance companies in Nigeria. The study was motivated by the persistent debate regarding whether larger firms possess stronger capabilities to maximize shareholder value and maintain sustainable corporate growth within the Nigerian insurance sector. The objective of the study was to determine how financial performance, leverage structure, and firm size influence the market value of insurance firms operating in Nigeria. The study adopted an ex post facto research design focusing on listed insurance companies quoted on the Nigerian Stock Exchange. The population comprised all listed insurance firms, while purposive sampling techniques were used to select firms with complete financial records over the study period from 2007 to 2016. Secondary data were extracted from

annual reports and analyzed using panel regression techniques. The findings showed that firm size exerted both positive and negative effects on firm value depending on the model specification and measurement indicators employed. Nevertheless, the study focused only on insurance companies and therefore limited the generalizability of the findings to other sectors of the Nigerian economy.

Additionally, Obaje and Abdullahi (2021) investigated the moderating effect of firm size on the relationship between board structure and firm financial performance among listed firms in Nigeria. The study was inspired by growing concerns regarding the effectiveness of corporate governance mechanisms in improving organizational profitability and whether firm size strengthens or weakens these governance-performance relationships. The study specifically examined how board size, board independence, and board gender diversity influence financial performance while considering firm size as a moderating variable. The research adopted a correlational research design and focused on listed firms within the Nigerian corporate environment. Panel regression analysis was employed to estimate both direct and moderating effects between governance variables and financial performance indicators measured using return on assets. The findings revealed that firm size significantly moderated the relationship between board structure and financial performance, implying that larger firms derived stronger governance benefits due to better resource availability, managerial expertise, and institutional structures. However, the study concentrated primarily on governance variables and treated firm size mainly as an interaction factor rather than an independent predictor of performance. Consequently, the analysis provided limited direct insight into the standalone contribution of firm size to profitability. Furthermore, the study did not sufficiently address sectoral differences among firms, thereby weakening the precision of the findings across industries with varying operational dynamics.

Likewise, Al-Hashimy (2025) examined the relationship between financial management strategies and firm financial performance with particular attention to the moderating role of firm size within the construction industry. The study focused on construction firms and adopted a quantitative research design utilizing structured financial and operational data from firms operating within the sector. Secondary and survey-based data were analyzed using structural equation modeling and regression-based moderation techniques to estimate the interaction effects between financial management practices, firm size, and financial performance indicators. The findings established that financial management strategies significantly improved firm performance and that firm size strengthened the positive relationship between strategic financial management and profitability. Larger firms were observed to possess greater financial flexibility, stronger bargaining power, and better access to external financing, thereby enabling more effective implementation of financial management strategies. The study contributed to the literature by demonstrating that organizational scale influences the effectiveness of managerial financial decisions. Nonetheless, the study concentrated exclusively on construction firms, thereby limiting the applicability of the findings to service-oriented and financial institutions. Panel regession would have proided a morerobust findings,

Husna and Satria (2019) investigated the effects of return on assets, debt-to-asset ratio, current ratio, firm size, and dividend payout ratio on firm value among publicly listed firms inIndonesia. The principal objective was to determine the extent to which profitability, leverage, liquidity, firm size, and dividend policy affect firm value. The study employed a quantitative explanatory design using secondary data obtained from annual financial statements of listed firms. Purposive sampling techniques were adopted to select firms with complete data records over the study period, while multiple regression analysis was employed to estimate the effect of the explanatory variables on firm value. The findings revealed that return on assets and firm size significantly affected firm

value, whereas debt-to-asset ratio and dividend payout ratio showed insignificant relationships with market valuation. The study explained that larger firms generally experience higher investor confidence due to stronger asset structures, greater market visibility, and perceived long-term sustainability. However, the study combined multiple financial indicators within a single regression framework without adequately accounting for possible endogeneity among variables, thereby weakening causal interpretation. The study findings is limited Indonesia and tnere is need to relate size to performance

2.3 Theoretical Framework

Buffer Capital Theory

This study is anchored on the Buffer Capital Theory, which explains why banks maintain capital above the minimum regulatory requirement as a way of protecting themselves against unexpected financial losses. The theory was developed by Calem and Rob (1999) and later expanded by Milne and Whalley (2001). It argues that banks deliberately hold excess capital buffers to reduce the risk of financial distress and ensure operational stability, especially during periods of economic uncertainty and rising credit risk exposure.

The theory suggests that capital adequacy plays a crucial role in strengthening the financial position of banks. Banks with adequate capital are better able to absorb losses arising from loan defaults and other financial risks without interrupting normal banking operations. In practical terms, maintaining sufficient capital helps banks remain stable, sustain customer confidence, and continue lending activities even during adverse economic conditions. On the other hand, banks with weak capital positions are more vulnerable to insolvency risk, liquidity challenges, and regulatory sanctions, all of which may negatively affect profitability and long-term survival.

Furthermore, the Buffer Capital Theory explains that adequate capitalization improves the confidence of depositors, investors, and regulators because well-capitalized banks are perceived as financially stronger and more capable of managing risk exposures. This confidence may enhance banks' ability to attract deposits, expand operations, and generate sustainable profits. However, the theory also recognizes that maintaining excessively high capital reserves may reduce profitability if funds are not efficiently utilized for productive and income-generating activities. Therefore, banks are expected to maintain an optimal level of capital that balances profitability with financial stability.

The relevance of the Buffer Capital Theory is particularly important within the Nigerian banking sector, where banks operate in an environment characterized by macroeconomic instability, exchange rate fluctuations, inflationary pressures, and increasing credit risk exposures. In such conditions, maintaining adequate capital buffers becomes essential for sustaining profitability and protecting banks against unexpected financial shocks. The theory therefore provides a suitable explanation for how capital adequacy ratio influences return on assets among quoted deposit money banks in Nigeria.

Thus, the Buffer Capital Theory aligns with the objective of this study because it explains how maintaining adequate capital reserves can enhance the financial performance of banks by improving their capacity to absorb losses, manage risk exposures, and sustain profitable operations.

3. Methodology

This study adopts the ex post facto research design because it relies on historical financial data obtained from the published annual reports and accounts of quoted deposit money banks in Nigeria. The variables used in the study were not manipulated by the researcher since the analysis is based entirely on already existing financial information. The ex post facto design is considered suitable for this study because it enables the examination of the relationship between capital

adequacy and financial performance using observable financial outcomes from past events.

The population of the study consists of all deposit money banks quoted on the Nigerian Exchange Group (NGX) as of 2024. According to the Nigerian Exchange Group Fact Book and publications of the Central Bank of Nigeria (CBN), thirteen (13) quoted deposit money banks operated within the period covered by the study. From this population, eleven (11) banks were purposively selected based on specific criteria. These criteria include continuous listing on the Nigerian Exchange Group throughout the study period, availability of complete audited annual reports between 2015 and 2024, consistency in banking operations, and accessibility of relevant financial data relating to return on assets, capital adequacy ratio, and total assets. The sampled banks include Access Holdings Plc, Fidelity Bank Plc, First HoldCo Plc, Guaranty Trust Holding Company Plc, United Bank for Africa Plc, Zenith Bank Plc, Stanbic IBTC Holdings Plc, Sterling Financial Holdings Company Plc, FCMB Group Plc, Wema Bank Plc, and Unity Bank Plc.

The study utilized secondary data obtained from the audited annual reports and accounts of the selected banks, publications of the Central Bank of Nigeria, and the Nigerian Exchange Group Fact Book. These sources provided data on the variables used in the study, namely return on assets (ROA), capital adequacy ratio (CAR), and firm size (SIZE), covering a ten-year period from 2016 to 2025.

Both descriptive and inferential statistical techniques were employed in analyzing the data. Descriptive statistics such as mean, minimum value, maximum value, and standard deviation were used to summarize the behaviour and distribution of the variables. In addition, correlation analysis was carried out to determine the degree of association among the variables and to identify possible multicollinearity problems among the explanatory variables.

To ensure the reliability and validity of the regression results, diagnostic tests including normality test, heteroskedasticity test, autocorrelation test, and multicollinearity test were conducted. Furthermore, the Hausman specification test was used to determine the most appropriate panel estimation technique between the fixed effects model and the random effects model.

The study employed panel regression analysis because panel data combines both cross-sectional and time-series observations, thereby providing more reliable and efficient estimates than ordinary cross-sectional or time-series regression techniques. The use of panel regression also helps to control for unobservable bank-specific characteristics that may influence financial performance over time. This makes the technique more suitable for examining the relationship between capital adequacy and financial performance among quoted deposit money banks in Nigeria. The functional relationship for the study is expressed as:

$$FP = a + \beta_1 CAR_{it} + \beta_2 FSZ_{it} + (\mu_i + \sum_{it}) \quad (1)$$

Where:

FP = Financial Performance, measured as return on assets

a = Constant term

β_1, β_2, = Coefficients

CAR = Capital adequacy ratio

FSZ: Firm Size (Control Variable)

$\sum_{it}$, μ_i = Error term

$_{it}$ = Crossectional and time series component

Table 1: Measurement of Variables

Variable	Symbol	Measurement	Source	Expected Sign
Financial Performance	ROA	Net Income ÷ Total Assets	Berger and Bouwman (2013)	

Variable	Symbol	Measurement	Source	Expected Sign
Capital Adequacy Ratio	CAR	Total Regulatory Capital ÷ Risk-Weighted Assets	Ajayi et al. (2019)	+
Firm Size	FSZ	Natural Logarithm of Total Assets	Aremu et al. (2021)	+

Source: Researcher's Computation (2026).

Table 1 presents the measurement of variables employed in the study, including their symbols, measurement techniques, sources, and expected relationships with financial performance. Financial performance is proxied by return on assets (ROA), measured as net income divided by total assets, following Berger and Bouwman (2013). ROA is used because it reflects the ability of banks to efficiently utilize their assets to generate profit.

Capital adequacy ratio (CAR) is measured as total regulatory capital divided by risk-weighted assets, consistent with the approach adopted by Ajayi et al. (2019). The variable is expected to exert a positive effect on financial performance because adequately capitalized banks are better positioned to absorb unexpected losses, sustain lending operations, and maintain depositor confidence.

Firm size (SIZE) is measured using the natural logarithm of total assets in line with Aremu et al. (2021). The variable is included as a control variable to account for differences in operational scale among banks. Firm size is expected to positively influence financial performance because larger banks often benefit from economies of scale, stronger market presence, and wider diversification opportunities.

4. Results and Discussion

4.1 Summary Statistics

Table 2: Summary Statistics

Variable	Mean	Std. Dev.	Min	Max	Observation
ROA	0.0241	0.0082	0.0097	0.0415	Return on Assets (dependent variable)
CAR	0.1746	0.0413	0.1021	0.2894	Capital Adequacy Ratio
SIZE	8.4628	0.6917	7.1024	9.8451	Firm Size (Control Variable)

Source: Researcher's Computation (2026).

Table 2 presents the descriptive statistics for return on assets (ROA), capital adequacy ratio (CAR), and firm size (SIZE) for the selected quoted deposit money banks in Nigeria over the period 2015–2024. The analysis is based on panel observations obtained from the audited financial statements of the sampled banks.

The mean value of ROA stood at 0.0241 with a standard deviation of 0.0082, while the minimum and maximum values were 0.0097 and 0.0415 respectively. This indicates that, on average, the sampled banks generated approximately 2.4% profit from their total assets during the study period. The relatively moderate standard deviation suggests some level of variation in profitability across the banks and over the years. The fluctuations in ROA may be linked to macroeconomic conditions, exchange rate volatility, regulatory reforms, and changes in credit conditions within the Nigerian banking sector, particularly during periods of economic uncertainty and post-COVID-19 recovery.

The mean capital adequacy ratio was 0.1746 with a standard deviation of 0.0413, indicating that the sampled banks maintained an average capital adequacy level of approximately 17.5% throughout the study period. The minimum and maximum values of 0.1021

and 0.2894 respectively suggest noticeable variations in capitalization levels among the banks. Nevertheless, the average CAR remained above the minimum regulatory threshold prescribed by the Central Bank of Nigeria, implying that most of the sampled banks maintained adequate capital buffers capable of absorbing unexpected financial losses and supporting banking operations. The relatively high capitalization levels also reflect the impact of regulatory reforms and prudential supervision aimed at strengthening the resilience of Nigerian deposit money banks against financial shocks and credit-related risks.

Firm size recorded a mean value of 8.4628 with a standard deviation of 0.6917, while the minimum and maximum values stood at 7.1024 and 9.8451 respectively. This suggests moderate differences in operational scale among the sampled banks. The variations in bank size indicate differences in asset base, market coverage, and operational capacity across institutions. Larger banks are generally expected to benefit from economies of scale, stronger customer confidence, wider diversification opportunities, and easier access to financial resources, all of which may contribute positively to profitability.

Overall, the descriptive statistics reveal that quoted deposit money banks in Nigeria maintained moderate profitability and relatively strong capital positions during the study period. The variations observed across the variables further suggest differences in operational efficiency, capitalization levels, and organizational scale among the sampled banks.

4.2 Correlation Analysis

Table 3: *Correlation Matrix*

Variable	ROA	CAR	SIZE
ROA (Return on Assets)	1.000	0.312	0.428
CAR (Capital Adequacy Ratio)	0.312	1.000	0.287
SIZE (Firm Size)	0.428	0.287	1.000

Source: Researcher's Computation, 2026.

Table 3 presents the correlation coefficients showing the nature of the relationship among return on assets (ROA), capital adequacy ratio (CAR), and firm size (SIZE). The result indicates that ROA has a positive relationship with capital adequacy ratio (r = 0.312), suggesting that banks with stronger capital bases tend to record better financial performance. This implies that maintaining adequate capital may enhance banks' ability to absorb unexpected losses, strengthen depositor confidence, and support profitable banking operations.

The result further reveals a moderate positive association between firm size and return on assets (r = 0.428). This suggests that larger banks are more likely to achieve improved profitability due to advantages such as economies of scale, wider market presence, stronger customer confidence, and improved operational efficiency. The positive relationship also indicates that banks with larger asset bases may possess greater capacity to diversify risks and generate stable returns.

In addition, capital adequacy ratio and firm size are positively related (r = 0.287), although the relationship is relatively weak. This indicates that larger banks may maintain slightly stronger capital positions compared to smaller banks. Overall, the correlation coefficients remain well below the commonly accepted threshold of 0.80, indicating that the explanatory variables are not excessively correlated. Therefore, multicollinearity is unlikely to pose a problem in the regression analysis.

4.3 Multicollinearity Test

Table 4: *Multicollinearity Test*

Variable	VIF	1/VIF
CAR (Capital Adequacy Ratio)	1.09	0.917
SIZE (Firm Size)	1.09	0.917
Mean VIF	1.09	-

Source: Researcher's Computation, 2026.

Table 4 presents the Variance Inflation Factor (VIF) results used to examine the presence of multicollinearity among the explanatory variables. The findings show that both capital adequacy ratio and firm size recorded VIF values of 1.09, which are far below the conventional benchmark value of 10. This indicates that the variables are not highly correlated with one another and therefore do not create multicollinearity concerns within the model.

The low VIF values suggest that each explanatory variable provides unique information relevant to the model without causing redundancy or inflating the standard errors of the regression coefficients. Furthermore, the mean VIF value of 1.09 confirms the absence of serious multicollinearity problems among the independent variables. Consequently, the variables are considered suitable for inclusion in the panel regression model for examining the effect of capital adequacy on the financial performance of quoted deposit money banks in Nigeria.

4.4 Normality Test

The normality test for the study variables is presented in Table 5. The Shapiro–Wilk test was employed to determine whether the variables followed a normal distribution.

Table 5: ***Normality Test***

Variable	W	Prob > z
ROA (Return on Assets)	0.947	0.001
CAR (Capital Adequacy Ratio)	0.961	0.002
SIZE (Firm Size)	0.972	0.004

Source: Researcher's Computation, 2026.

The results presented in Table 5 show that all the variables have probability values below the 0.05 level of significance, indicating that the variables are not perfectly normally distributed. This outcome is common in financial and panel datasets because firms often differ in size, operational structure, and financial behaviour across time. In the Nigerian banking sector, macroeconomic instability, exchange rate fluctuations, inflationary pressures, and regulatory changes may also contribute to variations in the distribution of financial data.

However, the lack of perfect normality does not pose a serious problem to the study since panel regression techniques, particularly fixed and random effects models, are robust to such deviations when large panel observations are used. Therefore, the variables are considered suitable for subsequent regression analysis.

4.5 Hausman Specification Test

Table 6: Hausman Test

Test Statistic	$Chi^2(2)$	Prob > Chi^2
Hausman	1.274	0.529

Source: Researcher's Computation using Stata 13.0, 2026.

The Hausman specification test was carried out to determine the most appropriate panel estimation technique between the fixed effects model and the random effects model. The result produced a chi-square statistic of 1.274 with a probability value of 0.529, which is statistically insignificant at the 5% level. This implies that the null hypothesis of the random effects model being appropriate cannot be rejected.

The result therefore indicates that the random effects estimator is more suitable for examining the relationship between capital adequacy ratio and financial performance of quoted deposit money banks in Nigeria. The preference for the random effects model suggests that the unobserved bank-specific characteristics are not significantly correlated with the explanatory variables included in the model. Consequently, the random effects model provides more efficient and reliable estimates for the study.

4.6 Panel Regression Results

Table 7: Panel Regression Results

Variable	Fixed Effect (1)	Random Effect (2)
Dependent Variable	ROA	ROA
CAR (Capital Adequacy Ratio)	0.064**	0.059**
	(0.028)	(0.024)
SIZE (Firm Size)	0.007*	0.006*
	(0.004)	(0.003)
Cons	0.010***	0.009***
	(0.003)	(0.002)
Observations	110	110
R^2 / Pseudo R^2	0.574	0.601
F-statistic / Wald χ^2	8.42***	12.63***

Source: Researcher's Computation using Stata 13.0, 2026.
Standard errors are in parentheses.
*** p < 0.01, ** p < 0.05, * p < 0.1

The regression results in Table 7 indicate that capital adequacy ratio has a positive and statistically significant effect on return on assets among quoted deposit money banks in Nigeria. The coefficient of CAR under the random effects model shows that increases in capital adequacy contribute positively to bank profitability. This finding implies that banks with stronger capital buffers are better positioned to absorb unexpected financial losses, sustain lending activities, and maintain stable operations, which ultimately improve financial performance.

The positive effect of capital adequacy also suggests that adequately capitalized banks enjoy stronger depositor and investor confidence, thereby enhancing their ability to undertake profitable banking activities. The finding supports the argument of the Buffer Capital Theory, which maintains that banks hold excess capital

as protection against financial distress and operational risk exposures.

Firm size was introduced into the model as a control variable to account for differences in operational scale among the sampled banks. The result shows a positive relationship between firm size and return on assets, suggesting that variations in bank size may partly influence profitability across institutions.

Furthermore, the constant term is positive and statistically significant, indicating that the sampled banks maintain a positive base level of profitability after controlling for the explanatory variables. The R^2 value of 0.601 implies that approximately 60.1% of the variations in return on assets are explained by the variables included in the model. In addition, the Wald chi-square statistic is statistically significant, confirming the overall fitness and explanatory power of the regression model.

Overall, the findings indicate that capital adequacy contributes positively to the financial performance of quoted deposit money banks in Nigeria. This implies that maintaining adequate capital buffers remains important for improving banking stability, strengthening risk absorption capacity, and sustaining profitability within the Nigerian banking sector.

4.7 Autocorrelation Test

To examine whether serial correlation exists within the panel dataset, the Wooldridge test for autocorrelation was conducted. The result of the test is presented in Table 8.

Table 8: *Autocorrelation Test*

Test Statistic	F(1, 10)	Prob > F
Wooldridge	1.864	0.233

Source: Researcher's Computation using Stata 13.0, 2026.

The result presented in Table 8 indicates that the probability value of 0.233 is greater than the 0.05 level of significance. This implies that the null hypothesis of no first-order autocorrelation cannot be rejected. Therefore, the residuals of the regression model are free from serial correlation.

The absence of autocorrelation suggests that the error terms are independent across time, thereby improving the reliability and consistency of the panel regression estimates. This further confirms the appropriateness and robustness of the random effects model adopted for the study.

4.8 Discussion of Findings

The random effects regression results presented in Table 7 reveal that capital adequacy ratio has a positive and statistically significant effect on return on assets among quoted deposit money banks in Nigeria. Based on this result, the null hypothesis which states that capital adequacy ratio has no significant effect on the financial performance of quoted deposit money banks in Nigeria is rejected.

The positive coefficient of capital adequacy ratio indicates that increases in banks' capital levels contribute positively to profitability. This suggests that banks with stronger capital positions are better able to sustain profitable operations, maintain financial stability, and operate more efficiently within the banking environment. Adequate capitalization also enhances confidence among depositors and investors, thereby strengthening the overall operational capacity of banks.

The finding supports the Buffer Capital Theory, which argues that banks maintain capital buffers above regulatory minimum requirements in order to improve financial stability and reduce vulnerability to operational uncertainties. The result further implies that adequate capitalization enhances the ability of banks to

maintain stable and sustainable financial performance over time.

The finding is also consistent with the studies of Ajayi et al. (2019), Aliyu and Abdullyhi (2020), and Ezu et al. (2023), who found that capital adequacy positively influences the profitability and performance of deposit money banks in Nigeria.

Firm size was introduced into the model as a control variable to account for possible differences in profitability arising from variations in operational scale among the sampled banks. The inclusion of the variable helps ensure that the observed effect of capital adequacy ratio on return on assets is not influenced by differences in bank size.

Furthermore, the coefficient of determination (R^2 = 0.601) indicates that approximately 60.1% of the variation in return on assets is explained by the variables included in the model. In addition, the statistically significant Wald chi-square value confirms the overall validity and explanatory power of the regression model.

Overall, the findings demonstrate that adequate capitalization contributes positively to the financial performance of quoted deposit money banks in Nigeria. The result therefore highlights the importance of effective capital management in sustaining profitability and promoting financial stability within the Nigerian banking sector.

5. Conclusion and Recommendations

This study examined the effect of capital adequacy on the financial performance of quoted deposit money banks in Nigeria using return on assets (ROA) as a proxy for financial performance. Capital adequacy ratio (CAR) was employed as the explanatory variable, while firm size was included as a control variable. Using panel regression analysis, the study found that capital adequacy ratio exerts a positive and statistically significant effect on return on assets among quoted deposit money banks in Nigeria.

The findings imply that banks with stronger capital positions are better able to sustain profitability and maintain operational stability within the Nigerian banking sector. Adequate capitalization enhances the financial strength of banks and supports sustainable banking operations over time.

Based on the findings of the study, deposit money banks in Nigeria should continue to maintain sound capital adequacy practices while ensuring that available capital is efficiently deployed toward productive and income-generating banking activities. This will help sustain profitability, strengthen operational stability, and enhance long-term financial performance within the banking sector.

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