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# Effects of Macroeconomic Variables, Banks' Specific Factors, and Institutional Quality on Capital Adequacy Ratio in Deposit Money Banks in Nigeria

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# Abstract

The capital adequacy ratio (CAR) is a vital indicator of banks' financial soundness and resilience, as it ensures they hold sufficient capital to absorb potential losses, protect depositors' funds, comply with regulatory requirements, and maintain public confidence in the banking sector. Despite its importance, Nigerian banks face difficulties meeting CAR benchmarks, resulting in increased vulnerability, capital shortfalls, and underperformance. Previous studies suggest that robust macroeconomic conditions, bank-specific characteristics, and strong institutional frameworks can positively influence CAR levels. This study investigated macroeconomic variables, banks' specific factors, institutional quality, and capital adequacy of deposit money banks with national authorization in Nigeria for 16 years (2008–2023), employing panel data regression analysis based on audited financial statements. The credibility of the data was premised on the statutory audit processes and validation by regulatory authorities. The results revealed that macroeconomic variables, banks' specific factors, and institutional quality significantly influence CAR. Consequently, the study recommends enhancing macroeconomic stability, strengthening managerial capacity, and reinforcing institutional structures to improve capital adequacy and overall bank performance.

**Keywords**: Banks' specific factors, Capital adequacy ratio, Institutional quality, Macroeconomic Net interest margin, non-interest income. Operating efficiency

# 1. Introduction

Capital adequacy in Nigerian banks is of critical importance as it serves as a safeguard against financial instability. It ensures that banks maintain sufficient capital reserves to absorb potential losses, support sustainable growth, and protect depositors' funds. This, in turn, fosters confidence in the financial system and contributes to the overall stability and resilience of the nation's economy. For instance, Osunkoya et al. (2023) opined that the capital adequacy ratio (CAR) provides a framework for assessing banks' capacity to meet obligations and manage operational and credit risks. A bank with a high CAR is deemed to have sufficient capital to absorb losses and is therefore less likely to become insolvent or jeopardize depositors' funds. Following the 2008 financial crisis, the Bank for International Settlements (BIS) enforced more stringent capital adequacy regulations to safeguard depositors and enhance financial stability. According to

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Anita et al. (2022), CAR is a vital measure for Nigerian banks, ensuring they maintain enough capital to absorb losses, uphold financial stability, protect depositors' funds, and meet regulatory standards, thereby promoting trust and resilience in the sector. However, despite its significance, Nigerian banks continue to struggle to meet CAR requirements comparable to their global counterparts (Ogbebor et al., 2020; Adegbie et al., 2022).

The issue of CAR in Nigerian banks is multifaceted, primarily hindered by challenges related to maintaining adequate capital in Nigeria's volatile economic environment (Ogbebor & Siyanbola, 2018; Ikue et al., 2022). In recent years, despite restructuring policies and regulatory efforts to enforce minimum capital requirements, many Nigerian banks have struggled to meet these thresholds due to inconsistent profitability, poor asset quality, high levels of non-performing loans (NPLs), and exposure to macroeconomic shocks such as fluctuating oil prices and currency devaluation. Moreover, limited access to long-term capital and the high cost of raising funds in financial markets further exacerbate the difficulty of maintaining a robust CAR. Regulatory pressures, coupled with weak corporate governance and risk management practices in some banks, further compound the problem (Ibitomi & Micah, 2021). These challenges hinder banks' ability to absorb financial shocks, constrain their lending capacity, and weaken public confidence in the stability of the financial system.

Studies have shown that effective management of macroeconomic variables, bank-specific factors, and institutional quality can significantly improve the CAR of Nigerian banks. Macroeconomic variables such as GDP, inflation rate, interest rate, debt levels, and exchange rate are vital indicators of a nation's economic health. Historical trends of these variables assist in forecasting and policy decision-making. Ibrahim et al. (2021) emphasized that historical data series are crucial for understanding and predicting macroeconomic dynamics. Through such data, mathematical models can be developed to explain and project economic conditions (Antony-Orji et al., 2021). Macroeconomic variables are external factors beyond the control of individual banks and pertain to the broader economic, industrial, and legal environment (Bektas et al., 2022; Haynes et al., 2021). These include variables such as inflation, interest rates, and exchange rates. Additionally, external political, economic, and regulatory conditions can influence the banking sector (Al-Faryan & Alokla, 2023). Conversely, internal or bank-specific factors such as liquidity, size, efficiency, risk exposure, and asset quality are within the control of banks and also play a crucial role in capital adequacy.

Furthermore, institutional quality significantly affects banking performance and CAR. Research has shown that weak institutional frameworks negatively impact credit performance, increase instability, raise NPLs, and reduce overall bank soundness (Ibrahim et al., 2021; Egiyi, 2022). For example, Bashiru et al. (2023) reported that poor institutional characteristics such as political unrest, corruption, and government inefficiencies can severely impair banks' credit risk profiles, profitability, liquidity, and asset quality. This study seeks to investigate the determinants and effects of macroeconomic variables, bank-specific factors, and institutional quality on the capital adequacy ratio of banks in Nigeria. It uniquely combines multiple variables in a single study to assess their collective and individual impact on the CAR of listed Nigerian banks. This research

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offers several contributions to the literature. First, there is a scarcity of empirical studies that comprehensively examine the combined influence of these variables. Second, the study covers an extended analysis period, enhancing the robustness of findings despite the volatility of the underlying variables. Third, it addresses the existing gap in empirical evidence on the impact of each factor and their collective effect on CAR. Finally, it responds to the inconsistent and inconclusive results found in previous studies on the capital adequacy of listed banks in Nigeria. In addressing these gaps and contributing to the body of knowledge, this study is motivated to examine the effects of macroeconomic variables, institutional quality, and bank-specific factors on the capital adequacy of listed Nigerian banks. Accordingly, the study proposes the following research hypothesis:

**Research Hypothesis (Ho1):** Macroeconomic variables, banks' specific factors, and institutional quality do not significantly affect the capital adequacy ratio of Deposit Money Banks in Nigeria.

The result of the study was structured in this way: In section 2, the study considered the literature review and the theoretical framework. Section 3 considered methodology, and in Section 4, the data analysis, results, and discussion. Finally, in section 5, the conclusion and recommendations were presented.

#### 2.0 Literature Review and Theoretical Framework

#### 2.1 Conceptual Review

This section presents the definition and explanations of the concepts of the variables used in this study.

#### 2.1.1 Capital Adequacy Ratio

The Capital Adequacy Ratio, otherwise known as weighted capital to risk, is another measure that assesses the liquidity strength of financial institutions, particularly the banking institutions that are associated with risks. According to Chimkono et al. (2016), the capital adequacy ratio of a bank is monitored by national regulators to make sure it meets statutory capital requirements and can withstand a reasonable amount of loss, and this indicates the capital of a bank, and a bank's risk-weighted credit exposures are stated as a percentage of this amount. In addition to promoting the stability and effectiveness of financial institutions worldwide, the implementation of prescribed levels of this ratio is meant to safeguard depositors, and layer one capital is measured, which allows a bank to withstand losses without having to stop operating, and layer two capital is measured in case of a winding-up (Bhowmik & Sarker, 2021, Aguguom, 2020). The capital adequacy ratio is a metric used to assess a bank's ability to cover its liabilities, including credit and operational risk, as well as other hazards. Put simply, a bank's capital serves as a "cushion" against possible losses, safeguarding both the bank's depositors and other lenders (Bollen et al., 2015; Corbet & Larkin, 2022).

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# 2.1.2 Macroeconomic Variables

The concept of macroeconomic variables is regarded as the study of the macroeconomic variables that govern the macroeconomics and the economy as a whole. It is known as the examination of governmental measures designed to lessen economic volatility and stabilize the economy over time. Foglia (2022) posited that a study of macroeconomic variables is the examination of supply-side economics, monetary policy, and fiscal policy. These are the kinds of variables that assist us in determining the characteristics or patterns of a state, a nation, an association of nations, or the entire globe. The GDP, balance of payments, and inflation are a few key macroeconomic variables. Alfadli and Rjoub (2020) stressed that the macroeconomic variables play a significant role in the performance and asset quality of the banks. The extent of the economic and the working dynamics of the economy of a country are important in contributing to the accumulation of non-performing loans of banks (Bashiru et al., 2023).

#### 2.1.3 Bank-Specific Factors

Bank-specific factors are defined as those factors within the managerial ability and corporate competence of banks to mitigate non-performing loans. Ikue et al. (2022) opined that bank-specific factors of bank expansion, managerial incentives to productivity, managerial inefficiency, portfolio composition, skills, and level of technology application have an individual and collective effect on the level of non-performing loans of banks (Ogbebor et al., 2020; Ibitomi & Micah, 2021; Ozili, 2019). The size and market efficiency, transparency, and effective disclosure to existing and legal and regulatory compliance to sustainability reporting expectations of bank stakeholders have a contributory effect on the non-performing loans. There is a significant link between bank-specific factors and non-performing loans in the banking sector, as the growth, expansion, and diversification of the banks rest on the shoulders and strategic direction and the sustainability of the banks management (Foglia, 2022; Ahmed et al., 2021).

# 2.1.4 Institutional Quality

Institutional quality is defined as the efficiency and dependability of a nation's social, political, and economic institutions (Sodokin et al., 2023). It includes elements like political rights, democratic procedures, the rule of law, and corruption control. Better economics and social outcomes are linked to high institutional quality. These outcomes include luring international debt portfolio investment, producing social and economic benefits, increasing the effectiveness of innovation inputs, and influencing the standard and suitability of healthcare services. Various definitions of institutional excellence, based on game theory, have been put forth. These include the maximization of utility, credible commitment, and length of foresight. According to Koffi et al. (2023), all things considered, the quality of an institution has a significant impact on how different sectors within a nation perform and turn out.

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#### 2.2 Theoretical Review

2.2.1 Stakeholder Theory

Edward Freeman, in the year 1984, expanded the scope of stakeholders' theory after it was first introduced in 1970 in order to include a larger variety of stakeholders. Stakeholder theory, according to Adusie (2018), implies and maintains that a company has a stewardship obligation towards a range of stakeholders, which include customers, suppliers, employees, the government, the community, the environment, and future generations. These stakeholders are separate from the shareholders. According to Namazi (2013), integrated sustainability reporting is crucial for fostering a company's relationship with the community in which it operates. Neglecting to consider stakeholders' interests can damage a company's reputation, which can have a negative impact on both operational and financial performance. Stakeholder theory views organizations as a system that accommodates not only the interest of the owners but also the interest of other groups within the environment in which the organization operates (Ebbinghaus & Flum, 2005; Denis & Mishra, 1995). The assumptions of stakeholder theory, as illustrated in the literature, are premised that, in addition to shareholders, there exist additional groups with vested interests in the successes and failures of corporate entities. The government, with regards to tax revenue, employees and wages, lenders in terms of financing interest, suppliers in terms of payments, trade unions in terms of wage negotiations, and the public in terms of high-quality goods and services are examples of known stakeholders (Herman & Renz, 2008). The stakeholders have a significant gain or loss at the expansion and/or liquidation of corporate organization. Managers are responsible for the transparency, honesty, and accurate financial reporting disclosure of the stakeholders (Rainey & Steinbauer, 1999).

#### 2.2.2 Institutional Theory

Meyer and Roland proposed the institutional theory in 1970 as a means of investigating the ways in which various systems interact, relate, and are arranged by their surroundings, the social, state, national, and external bodies to a successful performance (Zucker, 1989). The legitimacy and functions of the political, social, and economic systems that govern the lives of individuals and corporate entities are all addressed by institutional theory. Manjula and Jones (2011) see institutional theory as the requirement for social acceptance as well as the connection between the dynamics of political, social, and economic structures that call for mutually beneficial interactions and coexistence, while McKinley and Mone (2003) claim that corporate bodies obtain legitimacy and acceptability from society. This legitimacy is derived from the corporate organizations' capacity to acknowledge and adhere to cultural norms, values, and beliefs. Strong institutions are important for the harmonious coexistence of society, according to the institutional theory. Some of the assumptions of institutional theory have been presented in the literature. The institutional theory assumes that corporate organizations have an ultimate responsibility to adhere to societal norms and traditional established values. This responsibility extends beyond the prepositions made by previous studies by Lyn and Robichau (2013), Meyer and Hollerer (2014), and Bazrafshan et al. (2021). It also suggests that laws and regulations must be effective in preventing unethical behavior and the oppression of people by those in positions of authority.

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The theory went on to say that for there not to be lawlessness and anarchy to rule, institutions must be designed to ensure homogeneity within social, political, and economic activity.

# 2.3 Empirical Review

Sodokin et al. (2023) with an emphasis on institutional quality examined the connection between banking risk and prudential regulation in the West African Economic and Monetary Union. Panel data collected between 2006 and 2019 from 63 banks were used in the empirical analysis. The main conclusions show that strict banking laws and oversight improve banks' stability. The risk of bank insolvency is decreased by capital rules, activity limitations, and supervisory bodies. The findings indicated that strong oversight and strict adherence to regulations are encouraged by a positive institutional environment, which increases the effectiveness of these measures. Overall, this analysis finds that, in West African Economic and Monetary Union countries, prudential measures have a moderating effect on risk, provided that they are implemented within strong institutional frameworks. The result as obtained in this study conducted by Sodokin et al. (2023) is found to be consistent with some previous studies documented by Okechukwu (2023); Yen et al., 2023; Ashikuzzaman (2022); Ikue et al. (2022; Ibrahim et al. (2021) who found significant effects. However, on the contrary, the study of Sodokin et al. (2023) was not consistent with some other studies as carried out by Bashiru et al. (2023); Foglia (2022); Avkiran (2022) who documented negative effects.

Belanova (2023) studied the effect of inflation rates and other macroeconomic variables on the performance of businesses. An ex-post facto research design was adopted for the study using data obtained from the financial records of the businesses selected for the study. A regression analysis showed that macroeconomic variables of inflation rates, exchange rates and interest rates had a negative effect on the performance of businesses as firms found these variables eat deep into the overheads of the businesses tested in the study. The result as obtained in this study conducted by Belanova (2023) was found to be consistent to some previous studies documented by Anita et al, 2022; Ashikuzzaman, 2022; Shehzadi et al., 2022; Anthony-Orji et al., 2021). However, on the contrary, this study is not consistent with some other studies as carried out by Zulkifli and Ahmad (2022); Harimurti et al. (2022); Zunic et al. (2021); Gakpo et al. (2021) who reported negative effects.

Egiyi (2022) sought to determine the extent of impact of non-performing loans, macroeconomic variables on the credit performance of banks in Nigeria. An ex-post facto research approach was employed for the study, using secondary data extracted from the financial statements of the banks selected for the study. Purposive sampling technique was used for the sample determination of 10 banks listed in Nigeria. The descriptive statistics established the mean, median and standard deviation of the study, while regression analysis confirmed that each of the macroeconomic variables of interest rates and inflation rated had a negative influence on the banks' credit performance, while banks specific factors had a positive and significant effect on banks' credit performance for the banks selected and tested. The result as obtained in this study conducted by Egiyi (2022) is found to be consistent to some previous studies documented by Foglia (2022); Engle (2022); Ashogbon et al. (2023); Corbet and Larkin (2022); Ibitomi and

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Micah (2021; Aysan and Disli (2019); Mpofu and Nikolaidou (2018) who documented negative effects. However, on the contrary, this study is not consistent with some other studies as carried out by Zhen et al. (2017); Faroq and Nasir (2017); Azhari and Kadir (2018); Bustamante et al. (2019); Avkiran (2022) who also reported significant effects.

Wang (2019) studied the influence of nonperforming loans of the listed commercial banks and business management on foreign direct investment in China. The idea was to investigate comparatively business operations in China from the point of nonperforming loans effect on obtaining loans for future business operations funding by the banks and the likely implications on foreign direct investments. The study used an expo facto method, as past records of financial and annual record of nonperforming loans profile of the banks were sourced from the Chinese database. The regression analysis showed that nonperforming loans had a negative influence on banks performance and foreign direct investment in the commercial banks in China. The result as obtained in this study conducted by Wang (2019)) was found to be consistent to some previous studies documented by Anita et al. (2022); Ashikuzzaman (2022); Shehzadi et al. (2022); Barzrzfshan et al. (2021); Anthony-Orji et al. (2021). However, on the contrary, this study is not consistent with some other studies as carried out by Zulkifli and Ahmad (2022); Harimurti et al. (2022); Zunic et al. (2021); Gakpo et al. (2021) who reported negative effects.

Azhari and Kadir (2018) studied bank specific factors, profitability, board characteristics and debt restructuring among banks listed in Malaysia. The aim of the study was to examine the impact of bank specific factors and macroeconomic variables on the performance of the banks. An ex-post facto research approach was adopted, and data were sourced from the database of the sectorial performance in Malaysia. The ordinary least squared model adopted was regressed and the regression analysis showed that bank specific factor had a significant effect on the performance of the banks investigated. The result as obtained in this study conducted by Azhari and Kadir (2018) is found to be consistent to some previous studies documented by Foglia (2022); Engle (2022); Ashogbon et al. (2023); Corbet and Larkin (2022); Ibitomi and Micah (2021; Aysan and Disli (2019); Mpofu and Nikolaidou (2018) who documented negative effects. However, on the contrary, this study is not consistent with some other studies as carried out by Zhen et al. (2017); Faroq and Nasir (2017); Azhari and Kadir (2018); Bustamante et al. (2019); Avkiran (2022) who also reported significant effects.

Asafo (2018) empirically investigated macroeconomic variables and banks specific factors and non-performing loans on the performance of banks in Ghana. An ex-post facto model was explored by the study whereas data were extracted from the financial records of the study for a spanning period of 10 years. The panel data estimation demonstrated an empirical evidence that macroeconomic variables of inflation rates and interest rated had a negative and insignificant effects on the performance of banks while bank specific factor had a positive and significant effect on the performance of banks in Ghana for the time investigated. The result as obtained in this study conducted by Asafo (2018) was found to be consistent with some previous studies documented by Okechukwu (2023); Yen et al., 2023; Ashikuzzaman (2022); Ikue et al. (2022; Ibrahim et al. (2021) who found significant effects. However, on the contrary, the study of Asafo

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(2018) was not consistent with some other studies as carried out by Bashiru et al. (2023); Foglia (2022); Avkiran (2022) who documented negative effects.

Adusei (2018) examined the possible determinants of non-performing loans and banks specifics factors on performance of banks listed in Ghana. The study employed secondary data sourced and extracted from the financial and accounting performance of the banks for the period of 16 years covering 1998 to 2013. The aim of the study was to examine the likely implications and effect of non-performing loans and banks specific factors on the performance of banks in Ghana. Inferential (multiple regression analysis was adopted for the study and the result showed that non-performing loans exerted a negative influence on performance of the banks. The result as obtained in this study conducted by Adesei (2018) is found to be consistent to some previous studies documented by Foglia (2022); Engle (2022); Ashogbon et al. (2023); Corbet and Larkin (2022); Ibitomi and Micah (2021; Aysan and Disli (2019); Mpofu and Nikolaidou (2018) who documented negative effects. However, on the contrary, this study is not consistent with some other studies as carried out by Zhen et al. (2017); Faroq and Nasir (2017); Azhari and Kadir (2018); Bustamante et al. (2019); Avkiran (2022) who also reported significant effects.

Bordalo et al. (2018) studied credit cycles and banks specific factors and their influence bank performance of selected banks. The study employed an ex-post facto research method and employed data collected from the secondary sources extracted from the financial statements of the banks for a period of 5 years. Multiple regression analysis was used and the estimation showed that banks' specific factors exerted a significant effect on the performance of the banks investigated. The result as obtained in this study conducted by Bordalo et al. (2018) is found to be consistent to some previous studies documented by Foglia (2022); Engle (2022); Ashogbon et al. (2023); Corbet and Larkin (2022); Ibitomi and Micah (2021; Aysan and Disli (2019); Mpofu and Nikolaidou (2018) who documented negative effects. However, on the contrary, this study is not consistent with some other studies as carried out by Zhen et al. (2017); Faroq and Nasir (2017); Azhari and Kadir (2018); Bustamante et al. (2019); Avkiran (2022) who also reported significant effects.

Abugamea (2018) investigated the implications of banks specific factors and macroeconomic variables on the performance of banks in Palestine. Secondary documented panel related data was employed for the study as data were extracted from the database for 21 years covering 1995 to 2015. Multiple regression analysis using panel data analysis and fixed effect model were adopted for the study. The multiple regression analysis showed that macroeconomic variable of inflation rates, exchange rated had negative effects on the bank performance. However, banks non-interest income and operational efficiency had a significant effect on banks performance. The result as obtained in this study conducted by Abugamea (2018) is found to be consistent to some previous studies documented by Foglia (2022); Engle (2022); Ashogbon et al. (2023); Corbet and Larkin (2022); Ibitomi and Micah (2021; Aysan and Disli (2019); Mpofu and Nikolaidou (2018) who documented negative effects. However, on the contrary, this study is not consistent with some other studies as carried out by Zhen et al. (2017); Faroq and Nasir (2017);

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Azhari and Kadir (2018); Bustamante et al. (2019); Avkiran (2022) who also reported significant effects.

# 3.0 Methodology

The study employed an ex-post facto research design, and the population of the study was the 30 licensed deposit money banks operating in Nigeria as of 31st December 2023. Using the purposive sampling technique, 12 DMBs listed on the Nigerian Exchange Group were selected. Validated data, covering a period of 16 years (2008–2023), was extracted from the published financial statements of the selected DMBs. The reliability of the data was premised on the statutory audit of the financial statements and the certification of regulatory agencies. A panel data regression analyses were used to analyze the data at a 5% significance level.

#### 3.1 Model Specification

In determining the effect of macroeconomic variables, banks' specific factors, and institutional quality on the capital adequacy of deposit money banks in Nigeria, independent variables were proxied by the exchange rate, inflation, net interest margin, operating efficiency, non-interest margin, and institutional quality. The functional relationship was modelled below.

# CAR = *f*(EXR, IFR, NIM, OPEF, NII, IQT) ------(i) The econometric model was shown below.

 $CAR_{it} = \alpha_0 + \beta_1 EXR_{it} + \mho_2 IFR_{it} + \phi_3 NIM_{it} + \bigvee_4 OPEF_{it} + \lambda_5 NII_{it} + G_6 IQT_{it} + \mu_{it}$  ------ (ii) Where: CAR= Capital adequacy, EXR = Exchange Rate, IFR = Inflation Rate, NIM = Net Interest Margin, OPEF = Operating Efficiency, NII = Non-interest Income, IQT = Institutional Quality, i = cross-sectional, t = time series,  $\alpha$  = constant,  $\beta$ ,  $\mho$ ,  $\phi$ ,  $\heartsuit$ ,  $\lambda$ , G are the coefficients,  $\mu$  = Error terms.

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Variable	Type of	Measurements	Sources
	Variable		
Capital Adequacy	Dependent	<u>Tier<sub>1</sub> + Tier<sub>2</sub> Capital</u>	Ikue et al., (2022);
Ratio	variable	Risk-Weighted Assets	Chimkono et al., 2016
Exchange Rate	Independent	The annual exchange rates for the	Khan et al. (2020)
	variable	fiscal period of the years involved.	Mehmood et al. (2021)
Inflation Rate	Independent	Inflation Rates for the fiscal years	Ozili (2019). Ahmed et
	variable	involved	al. (2021).
Net Interest Margin	Independent	Net Interest Income	Ikue et al. (2022);
	variable	Total Earnings	Mehmood et al. (2021)
Operating	Independent	Non-interest Expense	Khan et al. (2020)
Efficiency	variable	Total Assets	Mehmood et al. (2021)
Non-Interest	Independent	Summation of total Non-Interest	Ikue et al. (2022); Koffi
Income	variable	Income	et al. (2023
	Independent	Indexes of control of corruption,	WDI, IMF
Institutional	variable	rule of law, regulatory quality,	
Quality		government effectiveness, political	
		stability, and absence of	
		violence/voice and accountability	

 Table 1: Measurement of Variable

Source: Researcher compilation (2024)

# 4. Data Analysis, Results, and Discussions

4.1 Stylized Fact on Effect of Macroeconomic Variables, Bank-Specific Factors and Institutional Quality on Capital Adequacy Ratio

In Figure 4.1. The trends in Capital Adequacy Ratio (CAR) among banks with national authorization reveal notable responses to macroeconomic and institutional quality factors. CAR began robustly at 21.38% in 2008 but plummeted to -11.42% by 2023, reflecting severe financial strain, possibly exacerbated by the exchange rate's dramatic rise, on the affected banks' internal problems and a persistent high inflation rate. Despite improvement in operating efficiency (OPEF) and rising non-interest income (NII), these banks struggled with a consistently high exchange rate and deteriorating capital adequacy.

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4.2 LM and Hausman Test for Capital Adequacy Ratio Model - Banks with National Authorization

Table 2 reports the results of the LM (Breusch-Pagan) and Hausman tests for the CAR (Capital Adequacy Ratio) model of banks with national authorization.

Variables	(1)	(2)	(3)	
	Chi2	Prob>chi2	Decision	
BP LM test	0.00	1.000	Choose Pooled	1
Hausman test	2.88	0.201	Regression	

Table 2: LM Test for CAR Model - Banks with National Authorization

**Source**: Author's Computation (2024). Note: The table reports Breusch and Pagan Lagrangian Multiplier and Hausman Tests results for CAR Model - Banks with National Authorization. The data were sourced from the annual reports of the banks and the Central Bank of Nigeria's statistical bulletin. The standard errors are adjusted for heteroskedasticity and autocorrelation. \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1

As in Table 2, the LM test shows a Chi2 value of 0.00 with a probability of 1.000, indicating no significant difference between the Pooled Regression and Random Effects models. This result favors the Pooled Regression model as the appropriate choice. The Hausman test, with a Chi2 value of 2.88 and a probability of 0.201, suggests no significant difference between the Random Effects and Fixed Effects models. This also confirms that panel effect does not exist. Therefore, based on the LM test outcome, the Pooled Regression model is chosen for analyzing the Capital Adequacy Ratio in banks with national authorization.

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# 4.3 Capital Adequacy Ratio Model

This table presents the results of a panel data regression model where the dependent variable is CAR (Capital Adequacy Ratio) for banks with national authorization, using data from 2008 to 2023. The independent variables included in the model are EXR (Exchange Rate), IFR (Inflation Rate), NIM (Net Interest Margin), OPEF (Operating Efficiency), NII (Non-Interest Income), CPI (Corruption Perception Index), and IQT (Institutional Quality). The standard errors have been adjusted using Driscoll-Kraay to account for heteroskedasticity and autocorrelation.

Table 3: CAR Model for - Banks with Na	ational Authorization
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Variables	(1)	(2)	(3)	(4)	
	CAR -Pooled with Drisc/Kraay Standard Error	Se	Tstat	Pval	
EVD	0.2624***	0.0907	2.0229	0.0050	
EXR	-0.2624***	0.0897	-2.9238	0.0050	
IFR	6.1730*	3.3349	1.8510	0.0694	
NIM	-1.0663	3.1641	-0.3370	0.7374	
OPEF	-4.6787	2.8769	-1.6263	0.1095	
NII	52.9897***	13.9858	3.7888	0.0004	
CPI	-23.2248	35.7722	-0.6492	0.5188	
IQT	-233.7838*	124.7978	-1.8733	0.0662	
Constant	-722.1384***	258.9205	-2.7890	0.0072	
Observations	64				
Number of groups	4				
R-squared	0.381				
Adjusted R-squared	0.304				
F-test	2.947				
Prob < F	0.011				

**Source**: Author's Computation (2024). Note: The table reports panel data regression results with the dependent variable being NLT = Non-Performing Loans to Total Loans, LDR = Loans to Deposit Ratio, CAR = Capital adequacy ratio, RAR = Risk Asset Ratio for 4 Money Deposit Banks in Nigeria over the period 2008–2023. The independent variables are EXR = Exchange Rate, IFR = Inflation Rate, NIM = Net Interest Margin, OPEF = Operating Efficiency, NII = Non - interest income, CPI = Corruption Perception Index and IQT = Institutional Quality. The data were sourced from the annual reports of the banks and the Central Bank of Nigeria's statistical bulletin. The standard errors are adjusted for heteroskedasticity and autocorrelation. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Focusing on macroeconomic indicators, the coefficient for Exchange Rate (EXR) is -0.2624, with a standard error of 0.0897, a t-statistic of -2.9238, and a p-value of 0.0050. This result is

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significant at the 1% level, indicating that an increase in the exchange rate (i.e., depreciation of the domestic currency) leads to a significant reduction in the capital adequacy ratio of banks with national authorization. This suggests that currency depreciation may place additional stress on banks, reducing their ability to maintain a strong capital base. On the contrary, the coefficient for Inflation Rate (IFR) is 6.1730, with a standard error of 3.3349, a t-statistic of 1.8510, and a p-value of 0.0694. This result is marginally significant at the 10% level, indicating a positive relationship between inflation and CAR. An increase in inflation may slightly improve the capital adequacy of these banks, possibly due to higher nominal asset values during inflationary periods.

Moving to bank-specifics, the coefficient for Net Interest Margin (NIM) is -1.0663, with a standard error of 3.1641, a t-statistic of -0.3370, and a p-value of 0.7374. This result is not statistically significant, implying that changes in net interest margin do not significantly affect the capital adequacy of banks with national authorization. The insignificance of this variable suggests that the profitability from lending operations does not have a direct impact on the capital buffer of these banks. Similarly, the coefficient for Operating Efficiency (OPEF) is -4.6787, with a standard error of 2.8769, a t-statistic of -1.6263, and a p-value of 0.1095. Although not significant at the conventional 5% level, the result suggests a potential negative relationship between operating efficiency and capital adequacy, implying that more efficient banks may have slightly lower capital adequacy ratios. However, the lack of statistical significance means this relationship is weak and requires further investigation. In contrast, the coefficient for Non-Interest Income (NII) is 52.9897, with a standard error of 13.9858, a tstatistic of 3.7888, and a p-value of 0.0004. This result is highly significant at the 1% level. indicating a strong positive relationship between non-interest income and capital adequacy. Banks that generate more income from non-lending activities tend to have significantly higher capital adequacy ratios, suggesting that diversified income sources contribute positively to maintaining a strong capital base.

For Institutional Quality indicators, the coefficient for Corruption Perception Index (CPI) is - 23.2248, with a standard error of 35.7722, a t-statistic of -0.6492, and a p-value of 0.5188. This result is not statistically significant, indicating that corruption perceptions do not significantly affect the capital adequacy of banks with national authorization. The insignificance of this variable suggests that, in this context, corruption is not a major factor influencing the capital strength of these banks. Also, the coefficient for Institutional Quality (IQT) is -233.7838, with a standard error of 124.7978, a t-statistic of -1.8733, and a p-value of 0.0662. This result is marginally significant at the 10% level, indicating a negative relationship between institutional quality and CAR. A decline in institutional quality is associated with a reduction in the capital adequacy of these banks, suggesting that weaker institutions may affect maintenance of strong capital buffers

# Model Fit and Overall Significance

The overall model explains 38.1% of the variance in capital adequacy, with an adjusted R-squared of 30.4%. The significant F-test result (p = 0.011) indicates that the model as a whole is

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statistically significant. Key findings include the significant negative impact of the exchange rate and institutional quality on capital adequacy, and the positive effects of non-interest income and inflation. Net interest margin, operating efficiency, and corruption perception index did not show significant effects

4.3: Heteroskedasticity and Autocorrelation Tests for CAR Model - Banks with National Authorization

Table 4 presents the results of heteroskedasticity and autocorrelation tests for the Capital Adequacy Ratio (CAR) model applied to banks with national authorization.

Table 4: Heteroskedasticity and Autocorrelation Tests for CAR Model - Banks with National Authorization

Variables	(1)	(2)	(3)
	Chi2/F-stat	Prob>chi2/F-stat	Decision
Heteroskedasticity	59.09	0.000	Use Regression
Test			with Robust
Autocorrelation Test	6.424	0.114	Standard Error

**Source**: Author's Computation (2024). **Note**: The table reports Heteroskedasticity and Autocorrelation tests results for CAR Model - Banks with National Authorization. The data were sourced from the annual reports of the banks and the Central Bank of Nigeria's statistical bulletin. The standard errors are adjusted for heteroskedasticity and autocorrelation. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The heteroskedasticity test shows a chi-squared statistic of 59.09 with a p-value of 0.000, indicating significant heteroskedasticity in the model. As a result, it is necessary to use robust standard errors to address this issue. On the other hand, the autocorrelation test yields an F-statistic of 6.424 with a p-value of 0.114, suggesting that autocorrelation is not statistically significant. Therefore, adjustments for heteroskedasticity are required, but no further correction for autocorrelation is needed in the regression analysis.

# **Discussion of Findings**

In this model, the researcher also found mixed results judging from the individual parameters of the model that investigated the effect of macroeconomic variables, bank-specific factors, and institutional quality on the capital adequacy ratio of deposit money banks in Nigeria. However, the joint statistics of the Wald test of the combined explanatory variables of the model found macroeconomic variables, bank-specific factors, and institutional quality had a significant effect on the capital adequacy ratio of deposit money banks in Nigeria. This result is in tandem with some previous studies that have found similar significant effects, as carried out by Olanrewaju (2021), Ari et al. (2021), Ozili (2021), Bunyamin et al. (2021), Zerihun (2021), Talumantak (2021), and Debali (2022), which were found to be consistent with some previous studies

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documented by Cug and Cugova (2021), Ozili (2021), Zerihun (2021), Adetokun et al. (2021), Arif (2020), Leviticus et al. (2020), and Adepoju and Adibe (2020), who reported significant effects. For instance, Derbali (2022) sought to investigate the implications and effects of performance indicators of banks specific factors and macroeconomic factors on the banks' performance of quoted banks in Morocco. The findings showed that bank performance indicators of return on assets and growth rates. The study further demonstrated that earnings growth was significantly impacted by macroeconomic factors.

On the contrary, some other studies have documented insignificant results that were not in tandem with the result found in this model. The studies by Asafo (Asafo, 2018; Foglia, 2022; Abugamae, 2018; Belanoya, 2023; Bashiru et al., 2023; Harimurti et al., 2022; Zulkifli & Ahmad, 2022; Asima et al., 2022; Ashogbon et al., 2022; Adusei, 2018; Anthony-Orji et al., 2021). For instance, Foglia (2022) investigated non-performance loan characteristics and macroeconomic factors and their influence on banks performance among listed banks in the Italian Stock Market. An ex post facto research model was adopted, while the ordinary least squares method was employed. The regression analysis conducted showed that macroeconomic variables of inflation rates and interest rates had a negative effect on the performance of the banks.

#### **5.** Conclusion and Recommendations

#### 5.1 Conclusion

This study examined the effect of macroeconomic variables, banks' specific factors, institutional quality, and the capital adequacy ratio of deposit money banks with national authorization in Nigeria. In addressing the issue of capital adequacy, the study employed CAR as the dependent variable, while the independent variables, macroeconomic variables, bank-specific factors, and institutional quality, were measured using exchange rate, inflation rate, net interest margin, operating efficiency, non-interest income, and institutional quality index. Based on the panel data regression analyses conducted, the findings revealed that banks with national authorization had a negative mean CAR of -1.60%, indicating potential undercapitalization or negative equity concerns, with high variability (standard deviation of 54.07%), which contrasts, banks with international authorization that have positive and stable mean CAR of 21%, with lower variability (standard deviation of 8%). This stability can be attributed to higher non-interest income and relatively stronger institutional quality measures.

#### 5.2 Implications for Practice

The result of the inflation rate from the study has implications for the management of deposit money banks and investors. The coefficient for the inflation rate in the model had implications for the capital adequacy ratio and credit performance, and on the existing and potential investors of the deposit money banks. Higher macroeconomic variables like inflation rates are associated with increased credit risk, which could be due to higher borrower defaults or increased costs of lending during inflationary periods. This indicates higher weighted risk assets of banks with national authorization and a lower capital adequacy ratio, which could have serious negative

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implications for the financial system's stability. The exchange rate and institutional quality are significant but have negative implication on capital adequacy ratio of banks with national authorization.

# 5.3 Contribution to Knowledge

This study offers valuable insights for current, future, and potential depositors, helping them understand the financial strength and vulnerability of banks in the context of rising NPLs and impairment charges. These insights can serve as a guide for depositors when making decisions about where to place their funds. Understanding the growth constraints and lending limitations faced by banks is essential for depositors who are concerned not only about the safety of their deposits but also about the strategic direction and sustainability plans of bank management. Since knowledge of the capital adequacy ratio and the effects of macroeconomic drivers is critical, depositors will benefit from the empirical evidence provided by this study.

#### 5.4 Recommendations

Policymakers and financial regulators should ensure effective monitoring of loans and applications, aligning them with regulatory guidelines and the prevailing fiscal space to enhance their utilization and impact. The study found that institutional quality had an insignificant effect on the loans-to-deposit ratio, suggesting that weak institutional frameworks may be directly or indirectly affecting banks' lending capacity. Therefore, regulatory bodies should be more responsive to legal and regulatory requirements guiding banks' operational policies related to loans and deposits. They should also review and strengthen relevant policies while enforcing strict compliance with loan disbursement and repayment procedures to improve credit performance among deposit money banks in Nigeria. Additionally, the Central Bank of Nigeria should intensify its regulatory functions to enhance credit risk management systems and, by extension, the overall credit performance of DMBs in the country.

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