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Determinants of bank stability in an emerging market: A dynamic panel evidence from Nigeria

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ABSTRACT

Banks are a key driver of economic activities, especially in emerging markets, where capital markets are not well developed. Thus, this study examines the factors that determine the stability of banking in an emerging market. We have employed the fixed-effects and dynamic System-GMM techniques to analyze panel data collected from the annual reports of the banks, the bulletin of the Central Bank of Nigeria (CBN), and the World Bank database from 2014-2023. These estimators address heterogeneity, measurement error, endogeneity, and unobserved biases. The results indicate that capital adequacy ratios, liquidity ratios, efficiency, bank size, quality of governance, and profitability are important in enhancing bank stability in Nigeria. Although past stability has a positive influence on present stability, GDP growth has a positive but statistically insignificant effect on resilience. Bank stability is adversely impacted by non-performing loans, inflation, the quality of institutions, and interest rates. These findings suggest that banks should be regulated on bank-specific variables, including non-performing loans. The Central Bank should further strengthen its control over the Nigerian banking industry to foster resilience and sustainability. Policymakers should improve the level of governance and policies that promote stability.

Contribution/ Originality: The research makes sufficient contributions to the literature by exploring the factors that determine the stability of the banks within an emerging market environment where there is a weak governance and institutional framework, as opposed to research in developed economies.

1. INTRODUCTION

Banking is a crucial economic activity that fosters growth through intermediation, especially in developing nations with underdeveloped capital markets. To increase public trust in the financial system and ensure financial stability for the benefit of the economy, policymakers are beginning to realize the need to devote sufficient attention to banking stability, a vital component of the architecture of the financial system. Economic growth and development are supported by the banking system's intermediation capabilities, which facilitate the effective transfer of financial resources from surplus to deficit units (Pham, Dao, & Nguyen, 2021). Furthermore, Sustainable Development Goal (SDG) 8 in the 2015 United Nations Development Agenda emphasizes the importance of the banking industry in driving economic performance by 2030. Consequently, the banking role of financial intermediation has placed enormous responsibility on regulators to ensure system stability, requiring banks to absorb shocks without compromising their solvency and operations (Aniemeke, 2024; Olawale, 2024). Similarly, since the 2007/2008 global

financial crisis that took the world by storm, and the bank failures between 2009 and 2012, there have been concerns about the ability of the banking system to maintain financial stability and support sustainable economic development, particularly in emerging economies (Yitayaw, Mogess, Feyisa, Mamo, & Abdulahi, 2023). However, despite industry regulation, the persistent instability in Nigeria's banking system, particularly since the global financial crisis, raises questions about what determines banking stability. Moreover, there is concern about whether capital adequacy regulations provide sufficient support for the soundness of banks in the country. Theoretically, regulators perceive that regulatory capital requirements can prevent bank instability. However, there are indications that meeting capital thresholds set by regulators may not be enough to ensure financial stability, due to poor risk management, macroeconomic shocks, and weak governance and institutional structures that continue to challenge emerging economies, such as the Nigerian financial system (Yitayaw et al., 2023). In a similar manner, Oseni (2024) utilized the bankometer model created by the International Monetary Fund to determine the soundness of banks and found that a majority of banks in Nigeria have met the minimum solvency ratios, yet some are in distress. This suggests that, beyond capital adequacy, other factors determine the stability of the Nigerian financial system.

Due to the importance of banking stability in development, studies in developed and developing economies have investigated the determinants of banking stability (Ali & Puah, 2018). Yet, there is limited research on the stability of banks in the developing world, especially Nigeria, with mixed results. Therefore, further analysis is necessary due to shifting circumstances and time. Understanding these determinants is crucial for developing a stable banking system capable of weathering shocks, absorbing losses, and fostering growth. Since 1999, Nigeria has experienced numerous banking reforms and economic recessions. The ongoing recapitalization underscores the weak understanding in the literature regarding which intervening variables influence banking stability, particularly in emerging markets. Recent bank failures and financial crises emphasize the need to identify key determinants within the Nigerian context.

The Nigerian financial structure is similar to that of other developing countries, which is less sophisticated compared to developed economies. Therefore, examining the impact of factors that determine banking system stability is essential for policy guidance toward economic self-reliance and supporting the achievement of the SDGs. To address endogeneity issues and ensure reliable analysis, the study employs the two-step system Generalized Method of Moments (GMM) approach with Windmeijer's finite-sample correction estimator. For alternative analysis, the fixed-effects estimator with Driscoll–Kraay standard errors was used to ensure reliable and consistent parameter estimates. These techniques can handle sample size limitations and address concerns related to multicollinearity, heteroscedasticity, unobserved variables, autocorrelation, and measurement biases. The findings demonstrate how regulatory capital adequacy, liquidity ratios, institutional quality, non-performing loans, inflation, interest rates, and governance structure all influence banking stability in Nigeria.

This study has added value to the extant literature on bank stability and the factors that affect it, especially in the Nigerian context, in several ways. First, this study explores the effect of bank-specific factors and external influences on bank soundness in the context of an evolving market economy characterized by weak governance and institutional structures, as compared to studies done in advanced countries. The findings will help inform policy initiatives aimed at enhancing financial stability and driving economic growth and development in developing economies. Second, the study examines how macroeconomic variables during periods of economic recession can have a profound impact on financial soundness in a growing economy. This is important since studies on the factors that determine financial system resilience are scarce in Nigeria, particularly since the 2016 and 2020 economic recessions. The remaining part of the study is structured into four sections as follows: In Section 2, the study reviews the extant literature on bank stability and its determinants. While Section 3 focuses on methodology, Section 4 presents the results of the analysis and discusses policy implications. The final section reports the conclusion and recommendations, particularly for policymakers.

2. REVIEW OF RELATED LITERATURE

The health of the banking system has been a major issue of concern for economic agents in recent years. This is partly due to systemic banking crises that have occurred in most countries, and the key role the banking sector has in the economy by channelling surplus funds to sectors of the economy with investment opportunities (Jabra, 2020). The banking industry is one of the most heavily regulated sectors, and this is so to ensure public confidence and contribute towards the economy through efficient allocation of resources, risk management and other activities. According to Jabra (2020), banking system resilience refers to a situation in which no form of banking crisis affects the banks' ability to carry out their role as financial intermediaries effectively. The importance of banks in promoting economic growth, especially in developing nations, is highlighted in Sustainable Development Goal 8.

Several theories have been used to examine the significance of bank soundness. For instance, Marcus (1984) argued in the capital buffer theory that banks need to maintain excess capital to withstand shocks and losses. According to the theory, banks with low capital adequacy may engage in economic activities that endanger stability. Jokipii and Milne (2011) argued that due to deposit insurance, excessive risk-taking is a common characteristic for banks with low capital, which can lead to instability. In a similar vein, the financial intermediation theory was advanced by Diamond (1984) to explain bank stability. The theory opined that banks play a crucial role in connecting savers with borrowers, thereby ensuring an effective distribution of capital while lowering transaction and information costs in the economy. The theory argued that the presence of banks in the process of monitoring borrowers is essential for limiting loan defaults and moral hazard, as they determine creditworthiness and provide liquidity (Hossain, Rahman, & Hossain, 2019). There is mixed empirical evidence on factors that define the stability of the bank. Karim, Al-Habshi, and Abduh (2016) investigated the effects of macroeconomic indices on the soundness of banks and discovered that inflation and interest rates have an impact on the soundness of banks in Indonesia. Mutarindwa, Schäfer, and Stephan (2020) demonstrated that African commercial banks that meet Basel III requirements, especially the risk-weighted capital ratio and the net stable financing ratio, are more stable, and their non-performing loans are reduced. In their study, Pessarossi, Thevenon, and Weill (2020) employed logit models to test the hypothesis on whether strong earnings decrease European bank failure. Their result was that high profitability only has a weak impact. According to Kasri and Azzahra (2020), an increase in interest rates has a negative power to influence the resilience of Indonesian banks. Koskei (2020) examined the influences on the banking system in Kenya in the period between 2015 and 2019. Bank stability was positively influenced by loan growth and return on equity, whereas inflation, liquidity ratio and lending rate had negative impacts. Mir and Shah (2022) studied the performance of banks that operated between 2009 and 2018, and established that capital adequacy has a significant influence on the performance. Itibi, Wafula, and Kariuki (2023) applied Feasible Generalised Least Squares to study commercial banks in Kenya from 2010 to 2020. They discovered that capital adequacy, management quality, and earning potential increase stability. However, the study reported that the stability of Kenyan banks is not significantly impacted by asset quality or liquidity. Yitayaw et al. (2023) evaluated the banking system in Ethiopia (2014-2020) with the help of GMM. The stability is affected by both external and bank-specific factors. It was revealed that inflation, GDP growth, and loan rates are strong indicators. Orando, Nyangau, and Maobe (2025) examined the role of capital adequacy on Kenyan listed commercial banks and discovered that it had a significant power to influence the financial performance. Ozili (2019) studied the factors that facilitate banking soundness in Africa and found that profitability, sector size, government efficiency, concentration, regulatory excellence, efficiency, political stability, investor safety, corruption control, and credit supply have a positive impact on resilience in Nigeria. But stability is adversely affected by inflation, the level of foreign bank presence, unemployment and GDP growth. The research by Adaramola and Adejayan (2020) examined the deposit-mobilising banks in Nigeria and found that capital ratio and loan ratio were some of the major determinants. Olawale (2024) examined capital adequacy and the outcome of deposit banks in Nigeria between 2000 and 2020. The results indicate that the ratio of capitalisation to total credits had a significant linear relation with the performance. Aniemeke (2024) examined the stability of Nigerian banks from 2000-

2021. The study concluded that the loan-to-deposit ratio and concentration indicate resilience, whereas the regulatory capital ratio, nonperforming loans, and cost-to-income ratio were found to have a negative impact on resilience.

3. MATERIALS FOR ANALYSIS AND METHODS

3.1. Data Source

The study utilized data from 13 deposit-mobilizing banks in Nigeria as of December 31, 2023, to explore factors influencing the health of the country's banking system. However, one bank was excluded from the sample since it lacked sufficient records for analysis. The final 12 banks listed on the Nigerian Exchange Group (NGX) are subject to the same regulations and regularly publish their financial reports. Besides data availability, listed banks hold a significant market share and account for a large portion of the sector's total assets. The data span from 2014 to 2023 and were collected from the banks' annual reports, the Central Bank of Nigeria (CBN) bulletin, and the World Bank database. The period includes Nigeria's economic recessions in 2016 and 2020, as well as the recent global pandemic. It is essential to observe the banks' stability during the economic downturn caused by declining oil prices, reduced oil production, and the global economic slowdown resulting from COVID-19.

3.2. Model Specification and Measurement of Variables

Following the extant literature by Ozili (2019), Pham et al. (2021), Kharabsheh and Gharaibeh (2022), Yitayaw et al. (2023), and Gwachha (2023), this study expresses the functional form as follows:

$$BStab = f(RCAR, NPL, EFF, LIQ, PROF, SIZE, CONC, GDP, INFL, INTR, INSTQ, INDD) \quad (1)$$

Taking into consideration the persistence in bank stability, the econometric model to examine the determining factors of bank stability in Nigeria is stated as:

$$BStab_{i,t} = \alpha_0 + \beta_1 BStab_{i,t-1} + \beta_2 RCAR_{i,t} + \beta_3 NPL_{i,t} + \beta_4 EFF_{i,t} + \beta_5 LIQ_{i,t} + \beta_6 PROF_{i,t} + \beta_7 BSIZE_{i,t} + \beta_8 BCONC_{i,t} + \beta_9 GDP_{i,t} + \beta_{10} INFL_{i,t} + \beta_{11} INTR_{i,t} + \beta_{12} INSTQ_{i,t} + \beta_{13} INDD_{i,t} + \eta_i + \delta_t + \varepsilon_{i,t} \quad (2)$$

Where BStab is used to represent bank stability, and it is measured as the Z-score, which is estimated as (ROA + CAR)/δROA, where ROA stands for return on assets, CAR for capital to asset ratio, and δROA is the standard deviation of the return on assets. Boyd and De Nicolo (2005) posit that banks with a Z-score of one or above are considered sound enough to withstand shocks and absorb losses, while those with a negative Z-score are deemed insolvent. Banks with a Z-score above zero but less than one tend to be unstable. While the α signifies the intercept, β_1- β_{13} denote the regression coefficients of the predictor variables in the model, η_i denotes the unobserved bank-specific effects, δ_t represents time effects, and ε_{it} is the error term. The $BStab_{t-1}$ represents the level of bank stability in the preceding year, and the RCAR is the regulatory capital adequacy ratio. The NPL is the nonperforming loan that is measured as the proportion of nonperforming loans to gross loans. The EFF is a measure of bank efficiency, calculated as the ratio of cost to income, while LIQ is a measure of liquidity, defined as the total liquid assets divided by the total customer deposits with the bank. The profitability of the bank is denoted as PROF and measured as return on assets, while BSIZE represents bank size. It is estimated as the natural logarithm of the total assets. Market structure is proxied by bank concentration (BCONC), measured as the share of total assets held by the top five banks. The level of economic activity is denoted as the GDP, measured as the growth rate in real Gross Domestic Product. While INFL denotes the inflation rate, which is measured by the consumer price index, INTR denotes the bank's cost of capital to the private sector. The INSTQ is the institutional quality, denoted by the regulatory quality index, while INDD is the governance structure, measured by the number of independent directors on a bank's board.

Furthermore, the variables for the study were selected based on previous studies by Boyd and De Nicolo (2005), Ozili (2019), Pham et al. (2021), and Yitayaw et al. (2023), and for their relevance to examine banking system stability in the Nigerian context. The banking system is a crucial component of the economy that channels financial resources from surplus units to the productive sectors of the economy. Thus, stability is vital for banks to fulfil their financial intermediation effectively. The capital adequacy of the bank ratio is a measure that indicates the level of a bank's

health and its ability to engage in risky activities (Koskei, 2020). The Basel III and the Central Bank of Nigeria require deposit money banks to maintain minimum capital ratios for stability and to deal with external shocks. Consequently, banks with raised capital ratios are considered to have capital buffers to bear losses and endure shocks. According to Gwachha (2023), a high regulatory bank capital ratio is anticipated to have a positive and significant influence on bank safety and soundness. This study expects soundness from well-capitalised banks, that is, banks with a raised capital adequacy requirement, to enhance bank stability. Banks are known to be in the business of making loans, and high-performing loans suggest that banks have low bad debt to write off, thereby improving their profit and return on investment for shareholders. However, a high ratio of non-performing loans can have a significant adverse impact on the bank's stability and its ability to withstand shocks (Khan, Siddique, & Sarwar, 2020). Thus, this study expects a high nonperforming ratio to have a negative effect on bank stability due to the effect such a high ratio would have on the bank's income and capital, particularly when written off. Efficient bank management practice is a critical factor that determines a bank's stability and its ability to resist threats (Partovi & Matousek, 2019). This means that whenever there are poor management practices, especially in asset allocation and the ratio of cost to income, the stability and solvency of the bank may be threatened. The bank's liquidity ratio is expected to have an undesirable impact on stability. An increase in liquidity risk decreases the capacity of a bank to fulfill its immediate commitments, and this may pose a threat to stability (Kharabsheh & Gharaibeh, 2022; Ozili, 2019). Banks require resources to grow and address environmental issues, which is why profitability is one of the critical elements of staying afloat as a going concern. This study, thus, anticipates that profitability (PROF, which is a ratio of return on assets) will positively impact the stability of banks in Nigeria. It is also predictive that the larger the bank size, particularly in terms of assets, the more stability will be enhanced. Bigger banks benefit from economies of scale and the capacity to absorb shocks, but smaller banks incur more costs when running the banks, and hence they are prone to economic crises. Banks that are resilient would survive in a growing or healthy economy, especially when they are able to adapt rapidly to the dynamics of the economic environment. It is suggested that inflation will adversely affect banks' soundness, since high inflation will diminish the purchasing power of customers, decrease spending, and deteriorate the ability of banks to create cash flow to increase liquidity and absorb any loss.

Similarly, interest rates will negatively impact stability. This is because raised interest rates lead to a higher cost of funds and reduce borrowers' ability to repay loans on time. Additionally, high interest rates can discourage borrowing, potentially stifling the economy and reducing the bank's liquidity position. Institutional quality, such as regulatory quality and governance structure, can support bank stability. High regulatory quality, in terms of policies and regulations that promote private sector expansion, helps banks perform well. Also, a good governance structure enables banks to prosper through quality decision-making, monitoring, and supervision of agents, which reduces opportunistic behavior. The study expects high institutional quality and a strong governance structure, indicated by the regulatory quality index and the presence of independent directors, to positively influence bank stability.

3.3. Technique of Data Analysis

This study employs the two-step system GMM estimator with Windmeijer's finite-sample correction estimator due to the dynamic nature of the model and to address concerns about endogeneity and unobserved heterogeneity among the banks in the study (Arellano & Bover, 1995; Blundell & Bond, 1998). To avoid having too many instruments in the analysis due to the sample size, the study limited the lag depth to two to three lags and collapsed the instruments. According to Ullah, Akhtar, and Zaefarian (2018), the system GMM technique introduces additional instruments for controlling the lagged explained variable, addressing endogeneity and the unobserved panel heterogeneity. The technique also addresses issues like omitted variable bias, autocorrelation and measurement errors. It is capable of yielding more precise findings. The use of this technique also helps to check the robustness of the study necessary for recommendations. Furthermore, for alternative analysis, the panel regression techniques involving the Fixed Effects Model (FEM) were considered to examine the determinants of bank stability in Nigeria.

This was based on the outcome of analysis using suitable techniques such as the Breusch-Pagan LM test to compare the Pooled Ordinary Least Squares (POLS) with the FEM. Similarly, if the FEM is preferred over the POLS, a further step is taken to compare the FEM with the REM using the Hausman specification test, and the most appropriate model is utilized in the analysis. The null hypothesis is that the random effects model is more suitable.

4. RESULTS FROM ANALYSIS AND DISCUSSION

4.1. Initial Analysis

Table 1 reports the descriptive statistics for the variables utilized in the study. The Z-score, which proxies for bank stability, indicates a mean of 15.94 and a standard deviation of 3.59, implying that stability has considerable variation from its mean value. This result suggests that Nigerian banks are relatively stable, as indicated by the high Z-score. Moreover, the result demonstrates confidence since the probability of insolvency is low. The bank stability ranges from 12.13 to a maximum value of 21.15. The RCAR has a mean value of 15.56, which is higher than the regulatory requirement of 8.0 percent in the case of Basel Accords and 15 in the case of CBN for banks operating internationally. This result confirms the earlier result from the Z-score and implies that the banks are stable. Generally, the RCAR is expected to be high to boost confidence and ensure the bank's going concern. The average bank size is 18.02, with a standard deviation of 3.83, a minimum value of 13.62, and a maximum value of 22.16. The nonperforming loans in Nigerian banks have a mean value of 10.04. Moreover, the average values of governance quality, measured as the number of independent directors and institutional quality, are 6.53 and -0.93, with standard deviations of 2.10 and -0.26, respectively. The GDP growth has a mean value of 3.37 and a range of -1.64 to 6.38, while the interest rate has a mean value of 15.16 and a range of 6.00 to 31.65.

Table 1. Descriptive statistics.

Variables	Obs.	Mean	Std Dev.	Min.	Max.
BSTAB	120	15.94	3.59	12.13	21.15
RCAR	120	15.56	3.14	1.94	23.39
NPL	120	10.04	4.64	2.74	39.63
EFF	120	63.17	7.63	52.03	103.11
LIQ	120	45.23	9.12	12.34	81.73
PROF	120	3.64	1.53	-6.38	5.11
BSIZE	120	18.02	3.83	13.62	22.16
BCONC	120	36.94	3.55	13.07	92.22
GDP	120	3.37	1.32	-1.64	6.38
INFL	120	14.70	3.09	6.15	29.10
INTR	120	15.16	4.30	6.00	31.65
INSTQ	120	-0.93	-0.26	-1.29	-0.68
INDD	120	6.53	2.10	4.00	9.00

The variables' correlation matrix is reported in Table 2. The correlation results indicate that the regulatory capital ratio, bank size, and profitability coefficients reveal significant and positive links with the stability of the banking segment in Nigeria. This result suggests that higher regulatory capital ratios, bank size, and profitability are correlated with banking stability in Nigeria. Similarly, the correlation coefficients reveal that institutional quality, gross domestic product, efficiency, and independent directors are positively associated with banking resilience in Nigeria. The relationship between institutional quality, GDP, and efficiency is not significant, which means that these factors do not have a significant impact on the stability of Nigerian banks. This result indicates that the government would need to enhance institutions and foster a favorable business climate to drive economic growth. The correlation coefficient between bank resilience and the capital adequacy ratio (0.191) is the highest one. There are no concerns of multicollinearity as indicated by the low level of interrelationship between the explanatory variables. As argued by Nguyen (2020), multicollinearity is problematic when the correlation coefficient is more than 0.8. The variance inflation factors (VIF) equals 1.95, which is lower than the standard of 10, which proves that there is no problem of multicollinearity

Table 2. Correlation analysis.

Variables	BSTAB	RCAR	NPL	EFF	LIQ	PROF	BSIZE	BCONC	GDP	INFL	INTR	INSTQ	INDD
BSTAB	1.000												
RCAR	0.191	1.000											
NPL	-0.076	-0.020	1.000										
EFF	0.068	0.014	0.074	1.000									
LIQ	0.076	0.049	-0.057	0.042	1.000								
PROF	0.167	0.052	-0.063	0.056	0.041	1.000							
BSIZE	0.056	0.036	-0.011	0.042	0.081	0.040	1.000						
BCONC	0.048	0.016	0.025	0.006	0.019	0.044	0.028	1.000					
GDP	0.093	0.046	-0.007	0.042	0.026	0.004	0.006	0.013	1.000				
INFL	-0.187	0.017	-0.031	-0.052	0.018	0.087	0.017	0.034	0.033	1.000			
INTR	-0.068	-0.011	-0.055	-0.050	-0.031	-0.026	0.046	0.061	0.007	0.017	1.000		
INSTQ	-0.094	-0.040	-0.035	0.021	0.037	0.013	0.014	0.039	-0.031	-0.026	0.043	1.000	
INDD	0.104	0.017	0.031	0.026	0.028	0.039	0.016	0.044	0.034	0.009	0.033	0.014	1.000

4.2. Estimation Result

This study accounts for the nature of data employed and addresses the potential challenge of endogeneity, particularly when the predictor variable correlates with the error terms. The system GMM was utilized to model the dynamic nature of the data, given the linkage between current and previous bank stability. This approach is also useful for addressing endogeneity, conducting robustness checks, and performing diagnostic tests. Blundell and Bond (1998) highlight the need for additional instruments to enhance efficiency. The system GMM addresses the issue of endogeneity by placing instruments for the lagged response variable and other outcome variables, which results in increased model efficiency. However, to avoid having too many instruments that may lead to biased estimates due to the sample size and study period, the lags of the response variables serving as instruments are collapsed. The GMM transforms the introduced instrumental variables to make them unconnected with fixed effects. Besides endogeneity, the GMM estimator can control for measurement errors, heterogeneity, unobserved panel effects, autocorrelation, and omitted variable bias (Ullah et al., 2018). The ability to self-carry out diagnostic tests, such as heteroscedasticity and autocorrelation, is another merit of GMM over other techniques.

To address potential endogeneity concerns, the study treated the lag dependent variables CAR, NPL, ROA, EFF, and LIQR as endogenous, while bank size was considered predetermined. Meanwhile, RGDP, INFL, INTR, and year dummies were handled as exogenous. In Table 3, the results show that the number of instruments in the estimate is 18, which is below the number of cross-sectional units often used as a rule of thumb. This suggests that the estimate is unlikely to suffer from overfitting of endogenous variables and biased standard errors. The Hansen test, with a p-value of 0.381, and the AR(2) p-value of 0.284, further confirm the validity of the instruments and the absence of second-order autocorrelation. Similarly, the Sargan test, with a p-value of 0.782, indicates that the restrictions for overidentification in the GMM estimate are acceptable. This suggests that the residuals are not associated with the instrumental variables in the model.

Table 3. System GMM (Windmeijer) estimation results.

Variables	Coefficient	Std. Error	z-Statistic	Prob. value
$BSTAB_{-1}$	0.1513***	0.0408	3.7083	0.0000
RCAR	0.1571***	0.0319	4.9247	0.0010
NPL	-0.0928***	0.0214	-4.3364	0.0000
EFF	0.1101***	0.0307	3.5863	0.0063
LIQ	0.0629**	0.0338	1.8609	0.0421
PROF	0.0736**	0.0298	2.4697	0.0216
BSIZE	0.0519**	0.0311	1.6688	0.0302
BCONC	0.0910*	0.0282	3.2270	0.0330
GDP	0.0548*	0.0213	2.5727	0.0217
INFL	-0.0710***	0.0249	-2.8514	0.0031
INTR	-0.1014***	0.0417	-2.4316	0.0000
INSTQ	-0.0967	0.0372	-2.5995	0.0031
INDD	0.1140***	0.0299	3.8127	0.0020
Constant	8.4119	1.0984	7.6583	0.0462
Obs.	120			
F-statistics	856.69 ***		AR(1)	0.003
Groups	12		AR(2)	0.284
No of Instruments	18 (collapsed)		Sargan test	0.782
			Hansen test	0.381

Note: ***, **, * represent 0.01, 0.05 and 0.10 significant levels.

The results demonstrate that the capital adequacy ratio has a positive and statistically significant impact on bank resilience. This result implies that as the RCAR increases, the bank's level of resilience will improve. This is important to boost confidence, as well-capitalized banks are better prepared to absorb any losses and endure shocks from the environment, thereby preventing them from the risk of bankruptcy. This result supports the studies by Pham et al.

(2021) and Kharabsheh and Gharaibeh (2022) and the capital buffer theory. However, the result is contrary to the study of Ozili (2019), who noted a significant negative coefficient of CAR on stability. Similarly, the result demonstrates that the lagged value of bank stability is positive and it is statistically significant. The result indicates persistence in bank resilience and supports the study by Yitayaw et al. (2023). This result suggests that prior-year bank stability has a positive explanatory power in impacting current-year bank stability in Nigeria. This result suggests the necessity for regulators and bank managers to ensure a stable banking system in Nigeria.

Bank management efficiency is positively associated with bank stability. This indicates that increased efficiency enhances performance and stability in Nigeria, which is in line with the results of Ozili (2019) and Phan, Anwar, Alexander, and Phan (2019). It is, however, different from the report of Yitayaw et al. (2023), who found a negative impact of efficiency. The negative and significant coefficient of non-performing loans (NPLs) as a reflection of asset quality and credit risk management means that there is poor asset quality management, which increases credit risk and endangers stability. This result aligns with Kharabsheh and Gharaibeh (2022), though it is not in tandem with the finding of Ozili (2019), who reported NPLs as having a positive effect.

Moreover, the analysis reveals that profitability, liquidity ratio, and bank size have a positive influence on banking stability in Nigeria, and the results are statistically significant. Greater profitability and a high liquidity ratio are the major stability drivers. This means that effective liquidity management can enhance stability, underscoring the need for bank managers to maintain optimal liquidity levels. Banks with sufficient liquidity are more stable because of their ability to cover withdrawal needs. The results suggest that bigger banks also tend to perform better and be more stable because of their economies of scale, ability to attract talented employees, diversify investments, and enjoy a stronger market presence. Interestingly, these results are consistent with the reports by Nguyen (2020) and Kharabsheh and Gharaibeh (2022), who concluded that bigger banks incur lower bankruptcy costs and have greater growth potential. The size of assets and capital will cushion against losses and dissipate shocks. This is contrary to the report of Ali and Puah (2018).

The insignificant positive association between GDP growth and bank resilience could be attributed to the 2016 Q2 and 2020 Q3 recessions and macroeconomic volatility. The harsh business environment, currency devaluation, and insecurity may have affected growth and bank soundness. A healthy economy will provide banks with opportunities to enhance performance and stability. The research also established that increased interest rates and inflation were detrimental to bank stability. A similar negative effect was reported by Weill (2011). However, our research revealed that increased lending rates enhanced performance and stability by Boyd and De Nicolo (2005), Koskei (2020), Phan et al. (2019), and Yitayaw et al. (2023). High rates and inflation increase the credit risk and decrease the economic activity and, therefore, the level of instability. Nigerian banks might be offering high rates, which brings about adverse selection and causes banks to lend to risky borrowers, which is detrimental to stability.

The research indicates that institutional quality, a key factor in bank resilience, has an undesirable effect on resilience, whereas board governance quality has a positive correlation to stability in Nigeria. The results demonstrate the government's failure to reinforce the banking system using sound policies and regulations. The positive result of governance quality implies that independent directors enhance transparency, accountability, and disclosure to ensure that banks do not take unnecessary risks that may lead to bankruptcy by monitoring and supervising the activities of the banks. Expectedly, the results indicate that good governance mitigates moral hazard and has a positive effect on bank resilience. The result reveals an adjusted R-squared value of 0.6613, indicating that the explanatory variables account for 66% of the disparity in bank stability in Nigeria. The p-value of the F-statistic is less than 0.05 and demonstrates that the model is appropriate for the study.

4.3. Robustness Checks

The study performed the Breusch-Pagan LM test to compare the POLS with the REM. The results in Table 4 indicate that the chi-square test is 16.3011, and the p-value is less than 0.05, which implies that it is significant and

we reject the null hypothesis. Since the REM is preferred to the POLS, we now compare REM with the FEM using the Hausman specification test.

The result of the Hausman test in Table 3 indicated a p-value of 0.0372, which is less than the 0.05 significance level, indicating that the unobserved bank-specific factors are correlated with the explanatory variables. Thus, the FE technique is considered a more suitable model to explain the determinants of bank resilience in Nigeria. The fixed-effect estimator is used in conjunction with Driscoll–Kraay standard errors to address concerns due to the sample size.

Table 4. Model specification test.

Test type	Chi-Square Statistic	Degrees of Freedom	p-value	Decision
Breusch-Pagan LM	16.3011	11	0.0184	The null hypothesis is not accepted
Hausman specification	12.0452	11	0.0372	The null hypothesis is not accepted

The results in Table 5 do not show statistically significant differences from those in Table 3. As can be observed, the results indicate that the capital adequacy ratio, liquidity ratio, profitability, bank size, and governance quality all have a positive and statistically significant impact on bank stability in Nigeria. In contrast, nonperforming loans, institutional quality, inflation, and interest rates have an adverse and significant influence on bank soundness in Nigeria, which is consistent with Aniemeke (2024).

Table 5. Panel estimation using FE with DK standard errors.

Variables	Coeff.	Std Error	t-stat	Prob. value
RCAR	0.0844***	0.0306	2.7601	0.0000
NPL	-0.1291***	0.0426	-3.0326	0.0000
EFF	0.0911**	0.0320	2.8441	0.0209
LIQ	0.0801***	0.0400	2.0036	0.0000
PROF	0.0311**	0.0150	2.0761	0.0291
BSIZE	0.0614***	0.0239	2.5740	0.0000
BCONC	0.0311*	0.0147	2.1104	0.1630
GDP	0.0410*	0.0166	2.4760	0.0917
INFL	-0.0927**	0.0263	-3.5201	0.0391
INTR	-0.0729***	0.0197	-3.7034	0.0000
INSTQ	-0.0639**	0.0210	-3.0422	0.0206
INDD	0.1101***	0.0279	3.9515	0.0001
Constant	0.0479	0.0238	2.0142	0.1596
Obs.	120			
R-squared	0.5404			
Adj. R-squared	0.4613			
F-statistics	48.2264			0.0016
Durbin Watson	2.0182			
Mean VIF	1.95			

Note: ***, **, * represent 0.01, 0.05, and 0.10 significant levels.

5. CONCLUDING REMARKS AND POLICY IMPLICATIONS

This study examines the determinants of banking stability in an emerging market economy, Nigeria. Using the two-step system GMM estimator with Windmeijer's finite-sample correction estimator and the fixed-effect estimator in conjunction with Driscoll–Kraay standard errors technique, it analyzes panel data from deposit-mobilizing banks from 2014 to 2023.

The study reveals that capital adequacy ratios, liquidity ratios, management efficiency, bank size, governance, and profitability have a statistically significant and positive effect on bank stability in Nigeria. Interestingly, the

results indicate that previous bank stability tends to promote a positive influence on current bank stability. However, the findings show that non-performing loans, inflation, institutional quality, and interest rates have a statistically significant and negative effect on sustainable bank stability in Nigeria.

There are implications from the findings of this study for bank policymakers and managers who drive the affairs of Nigerian banks. The regulator should monitor non-performing loans and strengthen the regulation of the Nigerian banking sector to ensure compliance and promote bank resilience and sustainability. In the same vein, banks are supposed to encourage good lending, carry out proper credit analysis, and make provisions to reduce excessive credit risk and enhance their soundness.

Moreover, banks are supposed to have a capital adequacy ratio and a liquidity ratio that support stability. The apex bank is also advised to continue overseeing Basel II operations and the implementation of Basel III, which promote high-quality capital sufficiency to maintain sustainable banking practices. Lastly, the government should drive policies and regulations that stabilize macroeconomic variables and encourage the growth of the banking sector.

This study provides insights into policies crucial to enhancing bank stability. The study, however, is limited by its small sample size and focus on a single country. These issues should be considered in future research. Finally, future research should determine the optimal level of capital adequacy that promotes stability and avoids excessive capital holdings.

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