

Empirical Investigation of Financial Performance Determinants: Evidence from Deposit Money Banks in Nigeria

By

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Abstract

This study assessed the main determinants of financial performance of the Deposit Money Banks (DMBs) in Nigeria. This study considered bank specific variables, macro-economic variables in addition to some other control variables over the period from 2009 to 2021. The study employs Fixed Effects Model and Random Effects Model for panel data regression analysis. In examining these, the study explored multiple regression analysis. This paper concludes that bank-specific factors, such as credit risk, liquidity risk, management quality, capital adequacy ratio, asset utilization, firm size leverage and Firm age revealed significant effect on financial performance, while GDP and inflation as macroeconomic factors play a significant role in determining the financial performance of the DMBs in Nigeria. Driven by need to avoid bank instability and failure, the regulatory authorities should pay close attention to the compliance of banks to relevant provisions of the Central Bank of Nigeria (Establishment) Act 2007, Bank and other Financial Institutions Act 2020 (BOFIA) and other provisions in enhancing the efficiency, performance and resilience of banks in Nigeria.

Keywords: bank-specific determinants, financial performance, macroeconomic determinants, panel regression analysis

Introduction

Deposit Money Banks (DMBs), previously known as commercial banks in Nigeria, is critical to the expansion of the nation's economy through the pivotal role of channeling funds by way of resource allocation to diverse sectors. The importance of the DMBs in

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the soundness of the economy has spawned several reforms in the past decades in Nigeria. The intermediation function between lenders and borrowers, which banks coordinate, also lend credence to their relevance to the economy (Anande-Kur, Faajir and Agbo, 2020). To continually ensure the financial stability of the DMBs, which Gautam (2018) opined that it is the backbone of the economy of nations, governments, through the various agencies, monitor their internal and external activities in ensuring sustainable performance.

Deposit Money Banks are also critical intermediaries in the Nigeria financial system, mobilizing deposits and providing credit to households, businesses, and the government. Banking industry in Nigeria had undergone significant reforms in the prior years, including the adoption of risk-based supervision, the introduction of the Asset Management Corporation of Nigeria (AMCON), and the development of corporate governance codes for the banks (Olufemi & Odusanya, 2015). The reforms were targeted at enhancing the stability of the banking industry and improving access to finance for households and businesses. Despite these reforms, the Nigerian banking sector faces several challenges, including weak corporate governance, inadequate risk management, and low capitalization. These challenges have contributed to the deterioration of the financial performance of some DMBs, which has raised concerns about the sector's contribution to the Nigerian economy (Akintola & Adesanya, 2021; Adegbaaju & Olokoyo, 2012).

Recently, the Nigerian banking industry had undergone some changes, which includes technological advancements and regulatory reforms. Despite these changes, some DMBs have recorded poor financial performance, while others have remained profitable. The issue is figuring out what influences DMBs' financial performance in Nigeria, which can provide insights into strategies for improving their financial performance. Previous studies have scrutinized the determining factor of the financial performance of DMBs in Nigeria, including Adegbaaju and Olokoyo (2012), Oyinlola et al. (2020), and Usman and Idris (2015). These studies have identified variables such as liquidity, asset quality, capital adequacy and operational efficiency as key determinants of DMBs' financial performance in Nigeria. Few studies, however, have considered the firm specific variables and the macro-economic variables especially in the Nigerian DMBs, more so with mixed findings. However, additional study is required in identifying the crucial indicators that influences the financial performance of Nigerian DMBs and to provide insights into how these factors can be addressed. This study aims at filling this gap by exploring the factors that influences financial performance of Nigerian DMBs and providing recommendations for policymakers, regulators, and other stakeholders in the banking sector.

Literature Review

Empirical Review

Several variables that affect the financial performance of Nigerian DMBs had been considered by prior studies. One critical determinant is capital adequacy, which regarded as the bank's ability in absorbing losses and uphold its financial stability. According to research by Afolabi and Olaniyi (2019), capital adequacy and financial performance of Nigerian DMBs in are significantly and positively significant. Other factors that had also

been discovered to affect the financial performance of Nigerian DMBs is include liquidity and, profitability. The capacity of banks to fulfil their immediate obligations is known as liquidity. Research has shown that liquidity affects the financial performance of banks positively or negatively. A higher liquidity ratio is associated with lower profitability, whereas a lower liquidity ratio is related with higher profitability (Bhagat & Tiwari, 2021).

Numerous studies have discovered positive relationship between the bank size and performance (Pasiouras & Kosmidou, 2007; Demirgüç-Kunt & Huizinga, 2010). A larger bank can achieve economies of scale, which tends to reduce cost of production, leading to higher profits. Moreover, a large bank has a more diversified portfolio, which reduces the risk of default, resulting in higher credit ratings. Capital adequacy is a regulatory requirement that banks must meet. It measures the ability of banks to absorb losses without facing bankruptcy. Studies have found that a greater capital adequacy ratio (CAR) positively affect the performance and stability of banks (Houcine & Sonda, 2019; Mahmood & Saeed, 2020). The determining factor of financial performance in the banking sector are complex and interrelated. The key determinants include bank size, CAR, liquidity and efficiency. These factors affect bank profitability and growth, and therefore, banks must manage them effectively to achieve sustainable financial performance. In the study of Akintola & Adesanya (2021), however, the contributions of DMBs to the economic growth in Nigeria using money supply, bank credit and interest rate to regress against real gross domestic product was investigated. The study, meanwhile, established that these controlling variables impact significantly on economic growth in Nigeria. Regarding the articles reviewed, the bank specific variables, macro-economic variables including other selected control variables for a decade and three years with 2009 as the base year, which were not considered by the previous researchers, became the gap filled by this study.

Theoretical Review

Agency Theory

According to this theory, banks are complex organizations in which managers act as agents on behalf of shareholders, who are the principals. The theory suggests that the banks financial performance could be improved by aligning the interests of managers and shareholders through incentives such as performance-based compensation, monitoring by independent directors, and effective corporate governance. Jensen and Meckling (1976) are credited with developing agency theory as it relates to the firm. In their seminal article, they argued that agency cost arises from conflicts of interest that exist amongst the shareholders and managers, and that these costs can be minimized by aligning the incentives of managers with those of shareholders. They also believed that monitoring by independent directors can help reduce agency costs, as can effective corporate governance indicators such as board independence and executive compensation. Research has, thus, shown that financial institution which has independent board of directors and higher levels of executive compensation tend to have better financial performance (Mehran & Thakor, 2011). In conclusion, agency theory offers a helpful framework for comprehending the factors that affect banks' financial performance. Banks can enhance their financial performance and lower agency costs by developing efficient corporate governance mechanisms and aligning the objectives of managers with those of shareholders.

Efficiency Theory

Efficiency theory is a theoretical perspective in finance and economics that posits that firms can improve their financial performance by maximizing their use of resources. In other words, efficiency theory argues that firms can enhance their profitability by minimizing their expenses, reducing waste, and improving the allocation of resources. One study that provides empirical evidence on the relationship that exists between the efficiency theory and banks' performance is the work of Pasiouras et al. (2006). The authors examined the relationship that exists between efficiency and financial performance utilizing the data from a sample of European banks. They discovered that the banks with greater level of efficiency perform financially better, as shown by return on equity and return on asset. Moreover, they found that the level of efficiency is positively associated with size and scope of the bank's activities. For this study, therefore, the two theories reviewed are relevant to it, and, thus, are what it is underpinned.

Methodology

Population, Sampling Technique and Sample Size

The Deposit Money Banks (DMBs) listed in Nigeria seems to be the focus of this paper. This study's population consist of 22 DMBs on the Nigerian Exchange Group as of 2021. This study adopted purposive sampling techniques in selecting the DMBs. Twelve Deposit Money Banks were included in this group of those whose stocks were traded on the stock market throughout the sampling time period. Data covering the years 2009 to 2021 were obtained from the annual reports of the selected DMBs.

Model Specification and Measurement of Variable

In examining the financial performance determinants of the selected DMBs in Nigeria, this study explored multiple regression analysis. On the basis of earlier research (Petria et al, (2013), Yesmine & Bhuiyah (2015), Moussa et al (2022), we constructed the relationship below;

$$\begin{aligned}
 \text{Return on Asset} = f(\text{Bank Specific Variables, Macro Economic Variables, Control Variables}) \\
 ROA_{it} = \beta_1 CRR_{it} + \beta_2 LQR_{it} + \beta_3 MAQ_{it} + \beta_4 ASQ_{it} + \beta_5 CAR_{it} + \beta_6 AUT_{it} + \\
 \beta_7 GDP_{it} + \beta_8 INF_{it} + \beta_9 FSZ_{it} + \beta_{10} AGE_{it} + \beta_{11} LEV_{it} + \varepsilon_{it}
 \end{aligned}
 \tag{i}$$

Where:

ROA = Returns on Asset
 CRR = Credit Risk
 LQR = Liquidity Risk
 MAQ = Management Quality
 ASQ = Asset Quality
 CAR = Capital Adequacy Ratio
 AUT = Asset Utilization
 GDP = Gross Domestic Product
 INF = Inflation
 FSZ = Firm Size
 LEV = Leverage
 AGE = Age

Table 1: Measurement of Variables

Variables	Variable Definition	Expected relation (+/-)	Sources
Dependent Variable			
Return on Asset	It reveals bank's ability in achieving return on its assets in generating profit.	+/-	Ghodrati & Ghasemi (2014); Yesmine & Bhuiyah, (2015), Petria et al (2015), Anande-Kur et al (2020)
Independent Variables			
Bank-Specific Variables			
Credit Risk	This is the ratio of the amount of non- performing loans in relation to the total amount loans the bank holds.	-	Djalilov and Piesse (2016), Petria et al (2015), Yesmine & Bhuiyah, (2015)
Liquidity Risk	It is the ratio that evaluate the overall liquidity of a bank in relation to total asset. is measured as loan-to-deposit ratio.	-	Sufian, (2009); Petria et al, 2(015); Yesmine et al (2015); Antoun et al (2018)
Management Quality	Total Expense in relation to Total Income	-	Petria et al, (2015); Antoun et al (2018); Dang, (2011)
Asset Quality	Non-Performing Loan in relation to Total Asset	-	Dang, (2011); Ongore and Kusa (2013)
Capital Adequacy Ratio	It measures the amount of a bank's core capital expressed of its risk-weighted assets	+/-	Soni, (2012); Petria et al (2015); Yesmine et al (2015), Antoun et al (2018)
Asset Utilization	The asset utilization ratio is computed by dividing total operating income by average total assets	-	Yesmine et al (2015)
Macro Economic Variables			
Gross Domestic Product	Real GDP as stated by the International Monetary Fund	+	Lawa et al (2017); Anande-Kur et al, (2020); Moussa et al (2022)
Inflation	Inflation is the general price level of good and services.	+	Petria et al, (2015); Antoun et al (2018); Moussa et al (2022)
Control Variables			
Firm Size	It is measured as a logarithm of the banks' total asset	+	Petria et al, 2015, Nassreddine, 2013, Antoun et al 2018
Age	The duration of time since the business' incorporation	+	Ghodrati and Ghasemi (2014)
Leverage	This is the Ratio of Total Debt to Equity	-	Abubakar, (2015); Lestari, (2021)

Source: Authors' Compilation (2023)

Results and Discussion

Correlation Matrix & Variance Inflation Factor

The essence of carrying out the correlation analysis prior to the model estimation is in a bid to identify the extent of correlation amongst the independent variables of the model. The presence of high correlation among the explanatory variables can lead to biased inference of the t-value and also violate the assumptions of no multicollinearity of the least square model. The correlation analysis in Table 4.1 and 4.2 exhibited the extent of multicollinearity among the regressors of Equation 1. The result showed that the highest pairwise correlation was between the Leverage (LEV) and Liquidity Risk (LQR) with a pairwise correlation $r = 0.74$ at probability value of 0.0000, which tends to be significant at 1 per cent significance level while the next in line is between Capital Adequacy Ratio and Credit Risk with a pairwise correlation $r = 0.5800$ at probability value of 0.00, which is significant at 1% significance level. The highest pairwise correlation statistics revealed a less likelihood of the problem of multicollinearity, less than 0.8 is the correlation between the variables. As a result, it shown that the data do not potentially have a multicollinearity problem.

The Variance Inflation Factor (VIF) values in Table 4.2 were similarly less than 10. VIF can identify multicollinearity, and a result of 10 or higher indicates a multicollinearity issue (Field, 2014). The threshold for VIF values was suggested by Hair et al. (2006) to be 10. There is no evidence of multicollinearity because all of the variables explored in this study, including the control variables, range from 1.1586 to 5.2283.

Table 4.1 Correlation Matrix

Covariance Analysis: Ordinary											
Sample (adjusted): 2009 2021											
Correlation											
Prob	CRR	LQR	MAQ	ASQ	CAR	ASU	FSZ	AGE	LEV	GDP	INF
CRR	1.000										

LQR	-0.116	1.000									
	0.185	-----									
MAQ	0.266	-0.403	1.000								
	0.002	0.000	-----								
ASQ	0.332	0.304	0.287	1.000							
	0.000	0.000	0.001	-----							
CAR	-0.580	0.100	-0.248	-0.036	1.000						
	0.000	0.254	0.004	0.687	-----						
ASU	0.136	0.351	0.126	0.386	-0.051	1.000					
	0.122	0.000	0.152	0.000	0.566	-----					
FSZ	-0.169	-0.323	-0.144	-0.454	0.180	-0.251	1.000				
	0.054	0.000	0.102	0.000	0.039	0.004	-----				
AGE	-0.105	-0.116	0.145	-0.166	0.070	-0.054	0.204	1.000			
	0.233	0.187	0.098	0.059	0.426	0.542	0.020	-----			
LEV	0.254	-0.744	0.376	-0.360	-0.489	-0.133	0.310	0.032	1.000		
	0.004	0.000	0.000	0.000	0.000	0.131	0.000	0.716	-----		
GDP	0.051	-0.157	0.188	0.158	0.139	0.048	-0.263	-0.049	-0.012	1.000	
	0.559	0.072	0.032	0.072	0.112	0.589	0.002	0.579	0.891	-----	
INF	0.185	-0.047	0.029	0.099	-0.127	0.049	0.044	-0.020	0.031	-0.356	1.000
	0.034	0.590	0.738	0.261	0.147	0.575	0.619	0.821	0.722	0.000	-----

Source: Authors' Computation (2023)

Table 4.2 *Variance Inflation Factor*

Variable	Centered VIF
CRR	1.9282
LQR	4.1739
MAQ	1.8604
ASQ	2.2059
CAR	2.8814
ASU	1.4887
FSZ	1.7552
AGE	1.1586
LEV	5.2283
GDP	1.5013
INF	1.2708

Source: *Authors' Computation (2023)*

Descriptive Statistics

Table 4.3 displays the mean, median, maximum and minimum value, standard deviation, skewness, kurtosis, Jarque-Bera and probability values of variables in the model to identify factors influencing financial performance of the Deposit Money Banks.

Table 4.3: *Descriptive Statistics*

	CRR	LQR	MAQ	ASQ	CAR	ASU	SIZ	AGE	LEV	GDP	INF
Mean	0.121	0.165	0.847	0.063	0.124	0.120	20.629	46	0.836	0.048	0.111
Median	0.055	0.132	0.850	0.024	0.177	0.115	20.721	29	0.853	0.052	0.115
Maximum	0.969	0.960	1.671	0.824	0.550	0.590	22.884	125	2.033	0.113	0.165
Minimum	0.006	0.000	0.054	0.001	-2.000	0.019	18.485	1.000	0.001	-0.02	0.053
Std. Dev.	0.168	0.149	0.200	0.108	0.356	0.048	1.059	33.178	0.215	0.033	0.030
Skewness	2.661	2.740	0.103	4.322	-4.994	5.923	-0.188	0.910	-0.025	-0.07	0.067
Kurtosis	10.363	12.377	7.717	25.471	29.269	59.013	2.281	2.703	18.480	2.555	2.523

Source: *Authors' Computation (2023)*

Hausman's Specification

Hausman's (1978) specification test was used to evaluate which of the two regression findings (Random effects and Fixed effects models) is acceptable for valid inference. The Fixed Effects Model, according to Gujarati and Porter (2009), is better suited for valid conclusions when the p-value is significant at the 5% level. However, if p-value is not significant at 5%, the Random Effects Model can be utilized for inference. The p-values for the two models, as indicated in Table 4.2, are less than 5%, thus the discussion of regression findings was done using the Fixed Effects Model results. Table 4.3 displays the outcomes of Hausman's specification test.

Table 4.4 *Hausman Test*

Correlated Random Effects - Hausman Test				
Test cross-section random effects				
Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random		40.083334	11	0

Source: *Authors' Computation (2023)*

Discussion of Regression Result

According to the regression analysis in Table 4.5, the explanatory (bank-specific, macroeconomic, and control) variables account for 78.08% of the variations in the dependent variable (ROA) with coefficients of determination (R-square) of 0.8179 (81.79%) and an adjusted R-square of 0.7808 (78.08). Both the fixed effect and random models have probabilities (F statistics) of 0.000, which indicates that they are statistically significant at 5 percent level. The F-statistic for the fixed effect model is 22.045 and it is statistically significant at 1% level ($p = 0.000$). This confirms that the model as a whole is jointly fitted. As a result, the explanatory values are significantly related to the dependent variable. Regression analysis of the Fixed Effects Model revealed that Asset Utilization, Size, Inflation and GDP had positive and significant effects on the financial performance of DMBs whereas credit risk, management quality, liquidity risk, capital adequacy ratio, leverage and firm age revealed negative and significant effects on firm's financial performance.

The possibility that a debtor may fail to fulfill its obligations to the bank is known as credit risk. Credit risk revealed a negative and statistically significant effect on DMBs financial performance. This is consistent with Petria et al 2015; Yesmine & Bhuiyah, 2015. Credit risk is the likelihood that the borrower won't be able to pay back the sum that was promised. It is anticipated that the credit risk will have a detrimental effect on bank performance. In this study we discovered a negative significant effect of Credit Risk with Return on Asset for ($t = -2.5270, p < 0.05$). Credit risk has a negative significant relationship with financial performance as expected. This is as a result of banks' inability to manage non-performing loans in relation to the total loan. As a result, banks can perform better by limiting their exposure to credit risk. To do this, credit risk policies' screening and effective monitoring need to be improved. When banks are unable to pay their debts, liquidity risk arises. Even in difficult situations, such as bank runs, a bank that has an adequate level of liquidity will be able to meet its obligations. Low returns from liquid assets may result in a drop in performance. Liquidity risk revealed a negative and statistically significant effect as expected on the performance of the DMBs ($t = -0.0348, p < 0.05$). The result is consistent with Petria et al (2015).

Profitability is influenced by management quality, which also controls the level of operational expenses (Athanasoglou et al., 2005). An adverse relationship is predicted because the bank's financial performance will be weaker if operating costs rise relative to bank incomes (Akbas, 2012). The cost to income ratio is statistically significant in this instance and has a negative sign. The findings revealed that management efficiency is negatively and significantly affecting the financial performance of DMBs in Nigeria ($t = -13.988, p < 0.05$). A crucial element in guaranteeing a bank's strong financial condition is the capital adequacy ratio. In addition to promoting stability and effectiveness of the financial system of an economy, the ratio serves to safeguard depositors. The capital adequacy ratio (CAR), according to Dang (2011), is the basis for determining whether or not capital is adequate. The CAR demonstrates the bank's capacity to endure losses during a crisis. The result revealed that Capital Adequacy Ratio (CAR) revealed a statistically significant and negative effect on the financial performance of DMBs ($t = -5.1050, p < 0.05$). The result is consistent with Moussa et al (2022).

The way an organization uses its resources affects its financial performance since efficient utilization of assets typically results in higher profits for businesses. And thus, asset utilization revealed a positive and significant effect on ROA ($t = 7.7999, p < 0.05$). According to the study, there is a positive and significant relationship between a bank's asset utilization and its financial performance, which is in line with previous research by Ahmed (2011), Karim and Alam (2013), Yesmine, and Bhuiyah (2015). The regression reveals that asset utilization has a positive and significant effect on DMB's financial performance. Bank size being considered as a factor that influences bank

performance. The larger size could lead to economies of scale, which would improve performance. The natural logarithm of total bank assets serves as a measure for this variable. Result revealed that size has a positive and significant effect on performance of bank ($t = 4.238537, p < 0.05$). The result is consistent with Bikker & Hu (2002) and Pasiouras & Kosmidou (2007). Large banks can also raise capital at a lower cost, hence, enhance financial performance. In response to the claim of economies of scale, Berger et al. (1987) claim that some costs can be decreased by simply growing the size. It is anticipated that size will improve bank performance by capturing the benefits of economies of scale through improved operational efficiency (Lee & Kim, 2013; Menicucci & Paolucci, 2016). Larger banks have tendency to raise capital at a lower cost, thereby experiencing economies of scale and enhance financial performance. Age was found to exert significant but negative effect on financial performance ($t = -2.911, p < 0.05$). This agrees with Ghodrati and Ghasemi's (2014) findings. Leverage also revealed negative and significant effect with Return on Asset ($t = -3.6399, p < 0.05$). To improve their ROA, DMBs must minimize their leverage.

Both the Gross Domestic Product and inflation were examined in the study as macroeconomic variables. Gross Domestic Product (GDP) has a positive and statistically significant effect on financial performance (ROA). This shows that financial performance of Nigerian DMBs is significantly influenced by economic growth. The GDP result, as expected, revealed positive and significant effect on bank financial performance ($t = 2.4878, p < 0.05$). The result agrees with consistent with Lawa et al (2017), Chouikh and Blagui (2017); Anande-Kur et al (2020), Also, inflation rate being another macroeconomic factor is positively related to the bank performance ($t = 2.3991, p < 0.05$). Higher (expected) inflation rates cause loan interest rates to rise, which in turn increases bank profitability. The findings agrees with is Chouikh and Blagui (2017) and Moussa et al (2022).

Table 4.5: Regression Result

Dependent Variable: ROA				
Method: Panel Least Squares				
Sample (adjusted): 2009 2021				
Periods included: 13				
Cross-sections included: 12				
Variable	Fixed Effect Coefficient	Prob.	Random Effect Coefficient	Prob.
C	-0.238	0.008	-0.006024	0.2473
Credit Risk	-0.014	0.013	-0.042896	0.0007
Liquidity Risk	-0.035	0.027	-0.101211	0
Management Quality	-0.109	0.000	-0.037475	0.1969
Asset Quality	-0.060	0.083	-0.01516	0.0347
Capital Adequacy Ratio	-0.050	0.000	0.108861	0
Asset Utilization	0.122	0.000	0.007231	0.0001
Firm Size	0.026	0.000	-0.0000334	0.4125
Firm Age	-0.003	0.004	-0.019716	0.1384
Leverage	-0.059	0.000	0.181166	0.0001
GDP	0.163	0.014	0.108748	0.0442
Inflation Rate	0.133675	0.0181	-0.051984	0.1744
	R-squared	0.81787	R-squared	0.75028
	Adjusted R-squared	0.78078	Adjusted R-squared	0.7272
	S.E. of regression	0.01457	S.E. of regression	0.01625
	F-statistic	22.0453	F-statistic	32.503
	Prob(F-statistic)	0	Prob(F-statistic)	0

Source: Authors' Computation (2023)

Conclusion and Recommendations

Using panel data from twelve banks between 2009 and 2021, this study examined the factors that affect the financial performance of Nigerian Deposit Money Banks (DMBs). An analysis of the theoretical and empirical literature is used to carry out the investigation. The primary factors influencing the financial performance of Nigerian deposit money banks were examined, and we came to the conclusion that the empirical facts support the predictions.

Thus, credit risk, management quality, liquidity risk, capital adequacy ratio, leverage and Firm age revealed negative and significant influence on the financial performance whereas asset utilization, firm size, gdp and inflation possess positive and significant effect on bank financial performance. We urge improved supervision and monitoring of banks' credit and liquidity risk as a policy recommendation to the regulatory authorities. Capital Adequacy ratio and other variables that are significant. According to the study's findings and driven by the need to avoid instability of banks and bank failures It is recommended that deposit money institutions should also take macroeconomic factors into account when evaluating their financial performance in Nigeria in addition to bank-specific variables. Likewise, banks should manage their liquidity well, with sufficient levels of cash and liquid assets, in a bid to enhance its financial performance. The regulatory body should also focus more on how well banks adhere to relevant provisions of the Central Bank of Nigeria (Establishment) Act 2007 and the Bank and Other Financial Institutions Act 2020 (BOFIA), as well as prudential guidelines, in a bid to enhance the effectiveness, performance, and resilience of banks in Nigeria.

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