

Financial Stability, Bank Efficiency, And Economic Growth Transmission: Evidence from Nigerian Deposit Money Banks

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ABSTRACT: The paper focuses on the transmission patterns of financial stability and bank efficiency on economic growth in Nigeria through bank level panel data of Deposit Money Banks (DMBs). Based on the endogenous growth and financial intermediation theories, the study employs the econometric panel analysis based on the fixed and random effects models and diagnostic tests to capture the unobserved heterogeneity and endogeneity. The dependent variable is the GDP growth, which is chosen, as well as the stability proxies (non-performing loans ratio, capital adequacy ratio, liquidity ratio) and efficiency proxies (return on assets, return on equity, cost-to-income ratio) are the key variables, and the bank size, deposits, leverage, inflation, policy rate, Treasury bill rate, Basel dummy, and Central Bank directive dummy are the controls. Findings show that there is no significant direct impact of bank efficiency on growth, financial stability has mixed effects with capital adequacy having positive effects in fixed effects models and joint effects are not important. Bank size, inflation, policy rate, Treasury bill rate, regulatory dummies, and control variables have a major role in the transmission of growth. The results indicate that intermediation of finances by improving the efficiency of banks and their stability with specific regulations may help to sustain economic growth. The policy suggestions include the use of macroprudential reforms, managing the costs and setting them in accordance with the sustainable development objectives of the economy to reduce the inefficiencies within Nigeria banking sector.

KEYWORDS: Financial Stability, Deposit Money Banks (Nigerian), Panel Data, Non-performing Loan, Capital Adequacy Ratio, Return on Assets, Generalized Method of Moments, Endogenous Growth Theory.

1. INTRODUCTION

Banking sector contributes significantly to economic progress through their ability to transform savings into productive investments, risk management and efficiency in transactions. In less developed countries like Nigeria where financial markets are less developed, Deposit Money Banks (DMBs) are the major players in financial intermediation and therefore their performance is very fundamental in the transmission of growth. The 2008 global financial crises have highlighted the importance of banking stability and efficiency in the continued growth of the economy. High non-performing loans (NPLs), liquidity, and inefficiencies in operations are some of the problems that the banking systems in Africa and Sub-Saharan Africa (SSA) face that are impeding allocating credits and growth. The largest economy in SSA, Nigeria is a model of such problems with unstable GDP growth, multiple recapitalizations of the banking sector as well as regulation changes to strengthen the stability. However, with post-2005 banking consolidation, the Nigerian DMBs are still struggling with deterioration of their asset quality and profitability under the macroeconomic turbulence. Recent evidences show that NPL ratios have been averaged at 16, capital adequacy at 25 and efficiency indicators such as cost to income ratio at 53 which can also be improved in resource allocation. This paper looks at the role of financial stability and bank efficiency as the channels of transmission between banking performance and economic growth in response to the deficiencies in macro level studies that are not analyzed at the bank-level. Based on the SSA research that revealed financial stability is key explanation of variance of growth increase up to 71.8 percent (Ahulu et al, 2021). and negative stability-growth correlations on the basis of underutilization of assets (Njang et al, n.d) result of Nigeria, the study applies panel data to present powerful policy implications.

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1.2 Problem Statement

A major challenge facing Nigerian DMBs is low financial stability (high NPL ratios of 16.23 on average), liquidity problems with liquid assets ratios of 1.29 on average, and capital adequacy problems despite an average of 25.06. These problems compromise intermediation of credit, and limit the sector's contribution to economic growth. The efficiency of the banks is not equal with Return on Assets (ROA) of 0.02, Return on Equity (ROE) of 0.14 and CIR, cost-income of 53.48 indicating the operating costs exceeding the income in most banks. Bank-level heterogeneity is not always taken into account in macro-level studies leading to poor-complete knowledge of the mechanisms of transmission. These problems are exacerbated by volatility in the growth of GDP (mean 4.43, SD 2.17) during inflation (18.13%), policy rates (21.71%) as well as the Treasury bill rates (20.17%). The regulatory interventions that have been implemented are the Basel implementation and the CBN directives have given mixed results, and, at the bank level, panel analysis is needed to give advice on reforms to achieve greater security, efficiency, and transmission of growth.

1.3 Study Objectives

General Objective: To examine the role of financial stability and bank efficiency as transmission mechanisms through which Nigerian Deposit Money Banks influence economic growth.

- i. To assess the effect of bank efficiency on economic growth in Nigeria.
- ii. To examine the impact of financial stability indicators on economic growth.
- iii. To evaluate the joint influence of financial stability and bank efficiency on economic growth.
- iv. To determine the role of bank-specific and macroeconomic control variables in the growth transmission process.

1.4 Research Questions and Hypotheses

RQ 1: What is the effect of bank efficiency on economic growth in Nigeria?

- **H₀₁:** Bank efficiency has no significant effect on economic growth in Nigeria.
- **H_{a1}:** Bank efficiency has a significant effect on economic growth in Nigeria.

RQ 2: How does financial stability influence economic growth?

- **H₀₂:** Financial stability indicators have no significant influence on economic growth in Nigeria.
- **H_{a2}:** Financial stability indicators have a significant influence on economic growth in Nigeria.

RQ3: Do **financial stability and bank efficiency jointly** act as effective transmission mechanisms for economic growth?

- **H₀₃:** Financial stability and bank efficiency do not jointly act as effective transmission mechanisms for economic growth in Nigeria.
- **H_{a3}:** Financial stability and bank efficiency jointly act as effective transmission mechanisms for economic growth in Nigeria.

RQ 4: How do **bank-specific characteristics and macroeconomic conditions** affect the relationship between banks and economic growth?

- **H₀₄:** Bank-specific characteristics and macroeconomic conditions have no significant effect on the relationship between banks and economic growth in Nigeria.
- **H_{a4}:** Bank-specific characteristics and macroeconomic conditions have a significant effect on the relationship between banks and economic growth in Nigeria.

2. LITERATURE REVIEW

2.1 Theoretical Review

Endogenous Growth Theory

The Endogenous Growth Theory states that economic growth is due to internal factors such as human capital, innovation, and accumulation of knowledge, also financial systems are a major factor in the allocation of resources (Ahulu et al., 2021; Hasan et al., 2008). This theory was developed by such economists as Paul Romer and Robert Lucas and is a response to the neoclassical models in which growth is exogenous and instead, investments in education, research and development create the spillovers that can keep growth going even when there are diminishing returns. Stability in banking has the feature of being a pillar enabler in that there is a continued flow of credit through the economic cycles avoiding shocks that would otherwise cripple investment in human capital or innovative development. Efficiency on the other hand maximizes the utilization of resources through reduced transaction costs and better capital allocation thus increasing effects of productivity and creating long run pathways for growth. In the case of developing economies such as that of Nigeria where financial underdevelopment inhibits transfer of knowledge,

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endogenous mechanisms propose that improving the stability and efficiency of banks can internalize drivers to growth, and thus them depending on externalities such as commodity exports will be less effective. This is supported by empirical tests in the SSA settings that have shown that financial innovations that are linked to endogenous processes contribute to greater macroeconomic stability and inclusive development.

Financial Intermediation Theory

The theory of Financial Intermediation is based on the significance of banks in resolving information asymmetry, supervising borrowers, and collecting savings that is to be invested (Okosu, 2022; Njang et al., n.d.). It is based on the works of Diamond and Rajan in which a bank is viewed as an agent of deposit pooling and screening of projects, to minimize adverse selection and moral hazard risks associated with direct lending. Stable intermediaries in volatile environments like Nigeria minimize systemic vulnerability through risk diversification and effective flow of capital to productive activity directly channeled to growth by increased investment efficiency. The efficiency in this theory would be the cost-efficient monitoring and supply of liquidity that in the case of Sub-Saharan Africa can hardly work due to a high non-performing loan, and regulatory loopholes that hinder the transmission of growth. Nigerian experience shows that intermediation inefficiencies, e.g. ineffectiveness in managing credit risk, contribute to economic weaknesses, and reforms are needed to improve this conduit (Akinbola, 2024). Through incorporation of sustainability the intermediaries can also align more to the long-term growth as evident in balancing the risk and resource distribution practices.

The Quiet Life Hypothesis

According to Quiet Life Hypothesis, market power is associated with inefficiency especially in concentrated banking system like Sub-Saharan Africa, bigger bank able to leverage posture which lower efficiency and growth influence (Asongu and Odhiambo, 2019). Quiet Life Hypothesis theory discusses that in monopolistic rents, manager is free to shirk at the cost minimizing behavior, leading to X-inefficiency and resources utilization. This is reflected in African banking in terms of higher interest charges and lower innovation which is drawback to stability and contribution to growth of efficiency. Some of the empirical tests in the Sub-Saharan Africa have disfavor Quiet Life Hypothesis theory indicating that efficiency is positively correlated with market power and the market competition pressures are not always dominant (Asongu and Odhiambo, 2019). In the case of Nigeria, the problem is compounded by the existence of concentrated markets whereby the major banks are living a quiet life at the expense of the wider economic vibrancy.

Systems Thinking Theory

The Systems Thinking Theory provides a whole picture perspective, focusing on interdependence between stability, efficiency, macroeconomic variables, and growth and taking into account non-linearities and synergies as regards the growth of emerging economies (Mabeba, 2023). This approach was developed under the name of Senge and Forrester and views economies as complex adaptive systems, in which feedback loops, interdependencies lead to emergent behaviors. It shows in terms of financial the channels where the shocks of stability flow to efficiency, to macro-economic consequences and non-linear thresholds contribute to the hypersensitivity in Sub-Saharan Africa. The Nigerian applications focus on regulatory feedbacks and sustainability integrations to produce less fragility (Olowofela et al., 2025).

2.2 Empirical Review

Bank Efficiency and Economic Growth

Global and Sub-Saharan Africa research shows that cost efficiency supplements financial depth in promoting growth and thresholds in the developing economies are in the region of 70 percent (Hasan et al., 2008). This compliment is effective since with efficient banks, the intermediation costs are reduced thus allowing for more capital to be allocated efficiently and productivity to be enhanced, especially in markets that are not so deep. In Sub-Saharan Africa, financial systems are often poorly developed, so efficiency measures such as cost to income ratios can be used to identify weak points, with high operating costs eating into profits, and hence the ability to allocate credit to areas of growth. The analysis of panels in more than 100 countries, this means that mean cost efficiency has a positive effect on the Gross Domestic Product (GDP) growth, but it interacts positively with the capital market depth, with the quantity measures prevailing in developing environments (Hasan et al., 2008). The nexus of African banking is an inverted U-shaped; that initial scale advantages are replaced by diseconomies, with interest margins acting as proxies of inefficiency that cannot be attributed only to market power or economies of scale (Asongu & Odhiambo, 2019). This brings the need for policies countering the size-induced inefficiencies to improve intermediation. Nigerian banks are marked by distorted efficiency, high costs, and growth in size, which limits intermediation and growth (Oladipo, 2025). This is aggravated by inequality because Gini coefficients hurt the payoff on capital invested which is an indication that social inequalities interfere with the profitability and thereby the growth transmission function of efficiency. The cointegration panel of Nigerian DMBs is a testament

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to the long run inequality - profitability relationships where exchange rate volatility and savings has some substitutes in the face of continuing adversities (Oladipo, 2025). Methodological manuals recommend fixed/random effects to deal with this heterogeneity to return an impartial estimate in this efficiency-growth studies (Abdullah et al., 2022; Schmidheiny, 2014).

Financial Stability and Economic Growth

In Sub-Saharan Africa, stability is positively related to growth since stability is associated with efficient allocation of resources and accounts for 71.8% variation, and in volatile situations, there is over-stability and underutilization of assets (Ahulu et al., 2021; Mabeba, 2023). The important role of stability in the random effects models of Sub-Saharan Africa panels favours the notion of the need for prudent standards to be in place to avoid crises and the investments to be encouraged. In emerging economies where there are large financial markets, the causal impact of stability on growth is negative, and hence balanced policies to weaken the lure of over-regulation (Mabeba, 2023). According to the Nigerian evidence, the causality between stability and growth is uni-directional and there is co-integration across the long-run but the negative effects are not significant which means that excessive stability prevents the use of assets (Njang et al., n.d.). The stability indices that PCA generates, including NPLs and Capital/risk-weighted assets (CAR) are useful in monitoring and the reforms suggested to be taken in the macro-prudential are the ones that support long term development, not just stability. Macroprudential tools are important because determinants like profitability and capital regulation have a negative effect on stability whereas unemployment and high capital ratios have a positive and inclusion a negative effect (Two-Stage Least Squares and Fully Modified Ordinary Least Squares analyses on Nigerian data indicate that low inflation and unemployment are important to macroprudential stability) (Ozili, 2025). On the Ordinary Least Squares (OLS) results, it is found that CAR and size have a positive impact on stability and NPLs have a negative impact and the transmission of monetary policy through lending channels is important in unstable economies (Akinbola, 2024). The banking profitability and capital stability in Africa are correlated in banking profitability and capital, and the panel methods provide an evaluation of its robustness in multicollinearity (Ozili, 2022).

Joint Influence of Financial Stability and Bank Efficiency on Economic Growth

Integrated measures exhibit trade-offs and practices of sustainability (proxies of efficiency) help in reducing non-performing loans (NPL) at the expense of liquidity, mediating the impact of growth transmission (Olowofela et al., 2025). Dynamic Ordinary Least Squares of Nigerian Deposits Money Banks shows that environmental innovations decrease Non-performing loans but depresses asset growth unlike social investments which destroy stability which calls for incentives to reconcile Environmental, Social, Governance (ESG) performance. Non-linear fragility-growth relationship - efficiency mediates effect of stability and endogeneity problem are solved using instrumental variable (Nwosu et al., 2021; Okosu, 2022). Nigeria Autoregressive Distributed Lag (ARDL) models show positive deepening-growth relationships and non-linear fragile effects whereby a high growth in finance leads to instability but efficiency in resource allocations makes the effect soften. The literature evidence on stability-growth nexus is mixed with some papers supporting positive macro-prudential advantages to others showing negative ones in over-regulated contexts to underscore the moderating role of efficiency (Okosu, 2022). ESG fosters stability in individualistic cultures with context of synergies, although there is evidence of practice in Nigeria that human resource development is improving CAR and liquidity under the influence of macroeconomic pressures (Olowofela et al., 2025). Joint analysis methods like Endogenous Systems macro which applies Two-Stage Least Squares (TSLS) can cause inference on endogeneity (Daryanto, 2020).

Role of Control Variables in Growth Transmission

The negative effect of income inequality on profitability destroys the nexus between efficiency and stability, which is the reason for resorting to macroeconomic regulators (Oladipo, 2025). Nigerian bank panel Fully Modified Ordinary Least Squares (FMOLS) and Generalized Method of Moments (GMM) show that Gini has a significant negative impact on ROCE and that inflation and exchange rates make it worse which should be addressed by policies that support Sustainable Development Goals (SDG) in their objective of making profit by inclusive mechanisms. Stability is affected by sustainability and regulatory considerations and the increase in Gross Domestic Product (GDP) does not necessarily lead to an increase in assets, and inflation increases non-performing loans (NPL) (Olowofela et al., 2025; Akinbola, 2024). Purchasing power is diluted that creates inequality and reverses, while inclusion creates stability in volatility (Ozili, 2025). Digital finance increases Small and Medium Enterprises (SMEs) performance and GMM is concerned with the endogeneity of stability-growth nexuses (Daud et al., 2022). Financial structure impacts profitability, and the panel cointegration has macro controls, such as inequality (Echekoba and Ananwude, 2016).

3. RESEARCH METHODOLOGY

3.1 Research Design

In this research, empirical research design has been selected using a quantitative research design based on econometric research analysis of a panel data. The method adopted panel data of banks to examine the channels by which the performance of banking

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sector can be linked to economic growth in Nigeria using financial stability and bank efficiency as mediating variables. The panel data was utilized because of its ability to incorporate cross-sectional changes across banks as well as time-series changes within a sample to account for unobserved heterogeneity to provide more robust estimates than a cross-sectional analysis or time series analysis. The design also allowed studying within-bank and between-bank impacts, which adds to the validity of the inferences of the role of bank-specific factors in influencing macroeconomic outcomes (Abdullah et al., 2022; Schmidheiny, 2014). The approach took into consideration the bias of fixed and random effects because of bank characteristics that do not vary over time, including the form of governance; dynamic GMM took into consideration the persistence in growth variables (Syofya, 2022; Daud et al., 2022). This can be observed in the light of the endogenous growth and financial intermediation theories, which can have implications of causality on the nexuses of stability, efficiency, and growth at the aggregate levels, and at the micro-levels, the processes are usually ignored (Chandrasekar et al., 2024) as in emergent market settings such as in Nigeria.

3.2 Sample Size & Technique

The target population was the Nigerian Deposit Money Banks. The sample was found through an option of balanced/unbalanced panel records of 183 observations which is the sample size of 22 banks in the period. To be representative, stratified sampling was done according to bank sizes and bank IDs were allotted to panel estimation. Heterogeneity in the form of small tier banks to systemically important banks was used to capture the banks by the asset size to reduce selection bias (Oladipo, 2025). The panel was 2005-2023 including post-consolidation reforms, and the numeric ID assigned to each variable in SPSS by the AUTORECODE command to provide a sorting and lagging will provide a chronological integrity to dynamic models.

3.3 Data Collection & Analysis

Central Bank of Nigeria (CBN) reports, World Bank, National Bureau of Statistics (NBS) and Bank financial statements were used as source of secondary data. The statistics done (descriptive; means, SD) and inferential (panel regression, fixed/random effect) were via SPSS. Effects and potential interactions were tested using 3-step model. Frequencies were used to extract percentiles of the win scores (winsorization) and the principal components extract composite scores of EFF (ROA_wins, ROE_wins, CIR_neg) and Stability index (STAB) (NPL_neg, CAR_wins, LIQ_wins) that were verified by eigenvalues from single-component extraction (communalities >0.5). Multicollinearity had been informed by correlations, and MIXED computed Random Effects models using Restricted Maximum Likelihood (REML) as a measure of variance components.

3.4 Variable Definition and Measurement

Dependent:

GROWTH - annual GDP growth rate (%).

Independent:

Stability - NPL (non-performing loans/total loans, %), CAR (capital/risk-weighted assets, %), LIQ (liquid assets/total deposits). Efficiency - CIR (operating costs/income, %), ROA (net income/assets), ROE (net income/equity). Controls: SIZE (ln total assets), DEP (deposits/assets), LEV (liabilities/assets), EQ (equity/assets), INF (Consumer Price Index change), MPR (CBN benchmark rate), TBR (91-day Treasury bill yield), BAS (dummy for Basel implementation), CBD (dummy for CBN directives). Variables winsorized at 1%/99% to curb outliers, e.g., ROA bounds -0.05 to 0.10, ensuring econometric integrity (Ozili, 2024; Echekoba & Ananwude, 2016).

3.5 Model Specification

Three baseline models:

Model 1: assessed the direct impact of bank efficiency on economic growth:

$$\text{GROWTH}_t = \alpha + \beta_1 \text{CIR}_{i,t} + \beta_2 \text{ROA}_{i,t} + \beta_3 \text{ROE}_{i,t} + \gamma \mathbf{Z}_{i,t} + \delta \mathbf{M}_t + \epsilon_{i,t}$$

where $\mathbf{Z}_{i,t}$ represents bank-specific controls (SIZE, DEP, LEV, EQ), $\mathbf{M}_t$ includes macroeconomic and regulatory controls (INF, MPR, TBR, BAS, CBD), and $\epsilon_{i,t}$ is the error term.

Model 2 evaluated the role of financial stability in transmitting effects to economic growth:

$$\text{GROWTH}_t = \alpha + \theta_1 \text{NPL}_{i,t} + \theta_2 \text{CAR}_{i,t} + \theta_3 \text{LIQ}_{i,t} + \gamma \mathbf{Z}_{i,t} + \delta \mathbf{M}_t + \epsilon_{i,t}$$

Model 3 combined both transmission channels to test joint effects and potential interactions:

$$\text{GROWTH}_t = \alpha + \beta_1 \text{CIR}_{i,t} + \beta_2 \text{ROA}_{i,t} + \beta_3 \text{ROE}_{i,t} + \theta_1 \text{NPL}_{i,t} + \theta_2 \text{CAR}_{i,t} + \theta_3 \text{LIQ}_{i,t} + \phi(\text{EFF}_{i,t} \times \text{STAB}_{i,t}) + \gamma \mathbf{Z}_{i,t} + \delta \mathbf{M}_t + \epsilon_{i,t}$$

Where EFF and STAB are Principal Component Analysis (PCA) indices, CONTROLS include bank and macro variables, i denotes banks, t time, ϵ error (Syofya, 2022).

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3.6 Estimation Techniques

Fixed effects (FE) were used to control for bank's unobserved factors; random effects (RE) assumed uncorrelations in the effects. Dynamic panel GMM dealt with persistence with lag as instruments (Arellano-Bond). Baseline was Pooled OLS. Hausman test-guided choice and RE is preferred for the event of nullity (Abdullah et al., 2022). GMM also adopted the internal measures of endogeneity that enhances consistency (Daud et al., 2022).

3.7 Diagnostic and Robustness Tests

Hausman preferred FE; Variance Inflation Factor (VIF)<10 indicated that there was no multicollinearity; and measured heteroskedasticity and serial correlation with the help of sound SEs. Strength by means of composite indexes, size subsamples, and other degrees of winsorization (Ozili, 2022). Endogeneity diagnostics in the form of lag instrumentation were conducted using Daryanto (2020)

3.8 Endogeneity and Identification Strategy

Lags reduced the problem of simultaneity Generalized Method of Moments (GMM) lagged endogenous variables (efficiency, stability) The validity of the instruments was ensured by Sargan/Hansen and Arellano Bond tests that ensured the objective estimates when there are reverse causality risks (Daryanto, 2020; Ozili, 2024).

3.9 Ethical Considerations and Data Validity

Reliable Sources of Secondary Public Data Validity was checked by cross verification No human subjects, and hence no ethical approvals were needed. Transparency was ensured with the use of listwise deletion of missing values that was in line with non-experimental standards.

4. RESULTS

4.1 Descriptive Statistics

The descriptive statistics gives a summary of the important variables in the panel dataset, which shows that large variation is there and this fact shows that the banking industry of Nigeria and its economy are dynamic. The mean of the dependent variable, GDP growth, was 4.43 with standard deviation of 2.17 with minimum of 0.5 and maximum of 8.1. This average figure is indicative of the economic performance of Nigeria during the fluctuation in oil prices and economic structural issues which are similar to the trends in Sub-Saharan Africa where economic growth is often limited due to the financial underdevelopment (Ahulu et al., 2021). The indicators of efficiency showed that the ROA was at an average of 0.021 (SD 0.031, minimum -0.11, maximum 0.07) which is an indication of low profitability on assets, which may be attributed to the high operating cost and risk provisions. The mean ROE was 0.14 (SD 1.05, min -9.65, max 8.10), and the variability was high indicating that some of the banks can reach high returns on equity, at the expense of others, which is congruent with Asongu and Odhiambo (2019) on the differences in efficiency within African banks. Mean of CIR = 53.48 (SD = 23.54, min = 18.96, max = 182.08) suggests more than a half of income is spent on cost, this is the evidence of inefficiency in the Nigerian DMBs (Oladipo, 2025).

Non-performing loans (NPL) mean 16.23 (SD 12.57, min 0, max 75.26) means the problem of quality of assets to remain stable and high NPLs are likely to lead to solvency and credit contraction (Akinbola, 2024). CAR was 25.06 (SD 19.54, min -22.61, max 182) which is above the regulatory minimum, but with soft extremes suggesting banks with insufficient capitalization. The average of liquidity is 1.29 (SD 6.65, min 0.22, max 89.63) which shows that liquidity is sufficient in most cases, but the variance shows the existence of the risk of liquidity in some institutions (Ozili, 2022). Bank specific controls: Total assets (SIZE) mean 8.60 (SD 0.90, min 4.99, max 10.74) showing the variation in scale of assets; DEP mean 0.69 (SD 0.13, min 0.01, max 0.92) showing the dependence on deposits; LEV mean 0.84 (SD 0.09, min 0.10, max 1.01) showing high leverage; EQ mean 0.16 (SD 0.0) Macro controls: Dummies: BAS mean 0.62, CBD mean 0.30. These figures indicate a moderate development in the face of banking issues such as high costs and NPLs and the regression analysis is ready.

Table 4. Descriptive Statistics for Key Variables

Variable	N	Min	Max	Mean	SD
GROWTH	183	0.5	8.1	4.431	2.1678
ROA	183	-0.11	0.07	0.021	0.031
ROE	182	-9.65	8.10	0.14	1.05
CIR	180	18.96	182.08	53.48	23.54
NPL	179	0.00	75.26	16.23	12.57

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CAR	181	-22.61	182.00	25.06	19.54
LIQ	179	0.22	89.63	1.29	6.65
SIZE	183	4.99	10.74	8.60	0.90
DEP	183	0.01	0.92	0.69	0.13
LEV	182	0.10	1.01	0.84	0.09
EQ	182	-0.01	0.90	0.16	0.09
INF	183	8.67	40.30	18.13	10.27
MPR	183	14.00	30.00	21.71	5.57
TBR	183	12.42	32.80	20.17	7.41
BAS	183	0	1	0.62	0.49
CBD	183	0	1	0.30	0.46

4.2 Correlation Analysis

The correlation table helps understand the relationship of the variables and interpret the possible multicollinearity and associations. The correlation between ROA and CIR was found to be negative (-0.675 , $p < 0.01$) and it can be anticipated that the higher the cost will reduce the returns on assets, in accordance with the efficiency literature (Hasan et al., 2008). The positive relationship between ROA and Total assets (0.213 , $p < 0.01$) suggests that the bigger banks enjoy the economy of scale (Asongu and Odhiambo, 2019). Positively correlated with NPL (0.327 , $p < 0.01$) which is the risk taking to gain more equity returns, but issues of stability (Ozili, 2025). NPL has a negative relationship with CAR (-0.339 , $p < 0.01$) due to high NPLs depleting the capital buffers (Akinbola, 2024). Total assets (SIZE) have a negative relationship with CIR (-0.450 , $p < 0.01$), scale efficiencies and a positive relationship with DEP (0.439 , $p < 0.01$), funding structure of larger banks. Inflation (INF) has a positive correlation with SIZE (0.345 , $p < 0.01$), perhaps due to the nominal growth in the asset bases in the inflationary conditions, but a negative correlation with CBD (-0.498 , $p < 0.01$), the showing of directives in low inflation settings. Inversely correlated with INF (-0.256 , $p < 0.01$) which is as is expected considering the eroding impact of inflation on growth (Syofya, 2022) while positively with CBD (0.740 , $p < 0.01$) indicating directives are beneficial to growth. There are strong correlations between the macro variables e.g. inflation (INF) and Treasury bill yield (0.942 , $p < 0.01$), which means that there is a probability of multicollinearity among the policy indicators, which is overcome with the help of diagnostics.

Table 4.2: Correlation

Matrix GROWTH and INF -0.256 ($p < 0.01$), GROWTH and CBD 0.740 ($p < 0.01$), ROA and CIR -0.675 ($p < 0.01$), ROA and SIZE 0.213 ($p < 0.01$), ROE and NPL 0.327 ($p < 0.01$), NPL and CAR -0.339 ($p < 0.01$), SIZE and CIR -0.450 ($p < 0.01$), SIZE and DEP 0.439 ($p < 0.01$), SIZE and LEV 0.585 ($p < 0.01$), INF and SIZE 0.345 ($p < 0.01$), INF and CBD -0.498 ($p < 0.01$), INF and MPR 0.874 ($p < 0.01$), INF and TBR 0.942 ($p < 0.01$), MPR and TBR 0.910 ($p < 0.01$), and other pairs as per SPSS output (appendix 1).

4.3 Regression Analysis

The regression analyses test the models using pooled OLS, fixed effects (FE), and random effects (RE). Pooled OLS Model 1 (Efficiency) yielded $R^2 = 0.712$, $F = 37.598$ ($p < 0.001$), explaining 71.2% variance. Significant coefficients included SIZE 0.400 ($t = 2.372$, $p = 0.019$), INF -0.114 ($t = -3.878$, $p < 0.001$), MPR 0.535 ($t = 8.090$, $p < 0.001$), Treasury bill yield (TBR) -0.227 ($t = -4.073$, $p < 0.001$), BAS 1.926 ($t = 5.633$, $p < 0.001$), CBD 3.369 ($t = 12.493$, $p < 0.001$). Efficiency variables ROA -2.278 ($p = 0.600$), ROE -0.068 ($p = 0.433$), CIR 0.002 ($p = 0.765$) were insignificant, suggesting no direct efficiency-growth link.

Model Summary: $R = 0.844$, $R^2 = 0.712$, Adjusted $R^2 = 0.693$, Standard Error (SE) = 1.1897

Analysis of Variance (ANOVA): Regression SS = 585.367, df = 11, MS = 53.215, $F = 37.598$, $p < 0.001$; Residual SS = 236.370, df = 167; Total SS = 821.737, df = 178

Table 4.3.1: ANOVA

Source	SS	df	MS	F	p
Regression	585.367	11	53.215	37.598	0.000
Residual	236.370	167	1.415		
Total	821.737	178			

Regression Coefficients: Constant -5.954 ($t = -3.371$, $p = 0.001$), ROA -2.278 ($t = -0.526$, $p = 0.600$), ROE -0.068 ($t = -0.786$, $p = 0.433$), CIR 0.002 ($t = 0.300$, $p = 0.765$), SIZE 0.400 ($t = 2.372$, $p = 0.019$), DEP -0.606 ($t = -0.612$, $p = 0.542$), EQ 0.906 ($t = 0.616$, $p = 0.539$), INF -0.114

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($t=-3.878$, $p=0.000$), MPR 0.535 ($t=8.090$, $p=0.000$), Treasury bill yield (TBR) -0.227 ($t=-4.073$, $p=0.000$), BAS 1.926 ($t=5.633$, $p=0.000$), CBD 3.369 ($t=12.493$, $p=0.000$).

Table 4.3.2: Coefficients

Variable	B	SE	Beta	t	p
Constant	-5.954	1.766		-3.371	0.001
ROA	-2.278	4.333	-0.033	-0.526	0.600
ROE	-0.068	0.087	-0.034	-0.786	0.433
CIR	0.002	0.006	0.019	0.300	0.765
SIZE	0.400	0.169	0.166	2.372	0.019
DEP	-0.606	0.990	-0.036	-0.612	0.542
EQ	0.906	1.470	0.040	0.616	0.539
INF	-0.114	0.029	-0.549	-3.878	0.000
MPR	0.535	0.066	1.399	8.090	0.000
TBR	-0.227	0.056	-0.787	-4.073	0.000
BAS	1.926	0.342	0.432	5.633	0.000
CBD	3.369	0.270	0.714	12.493	0.000

Pooled OLS Model 2 (Stability): $R^2=0.724$, $F=38.178$ ($p<0.001$). Significant: SIZE 0.341 ($t=2.142$, $p=0.034$), INF -0.111 ($t=-3.726$, $p<0.001$), MPR 0.535 ($t=8.183$, $p<0.001$), TBR -0.229 ($t=-4.118$, $p<0.001$), BAS 1.948 ($t=5.707$, $p<0.001$), CBD 3.385 ($t=12.471$, $p<0.001$). Stability NPL 0.005 ($p=0.501$), CAR 0.008 ($p=0.434$), LIQ 0.008 ($p=0.703$) insignificant.

Pooled OLS Model 3 (Joint): $R^2=0.720$, $F=36.911$ ($p<0.001$). EFF -0.097 ($t=-0.828$, $p=0.409$), Stability index (STAB) -0.010 ($t=-0.063$, $p=0.950$), Interaction term (INTER) -0.010 ($t=-0.119$, $p=0.905$), controls similar to prior models.

Fixed Effects Model 1: $R^2=0.754$, $F=13.985$ ($p<0.001$). Bank dummies significant (e.g., Bank_Dummy_8 2.881, $p<0.001$), indicating heterogeneity; efficiency insignificant (ROA -0.096, $p=0.923$; ROE -0.073, $p=0.434$; CIR 0.001, $p=0.821$).

Fixed Effects Model 2: $R^2=0.763$, $F=13.968$ ($p<0.001$). Stability insignificant (NPL -0.003, $p=0.802$; CAR -0.005, $p=0.668$; LIQ 0.011, $p=0.657$); controls and dummies drive results.

Fixed Effects Model 3: $R^2=0.762$, $F=13.739$ ($p<0.001$). EFF -0.107 ($p=0.380$), STAB -0.024 ($p=0.869$), Interaction term (INTER) -0.009 ($p=0.910$); joint effects insignificant.

Random Effects (REML): Model 1 variance component 0 (redundant), residual 1.415. Coefficients: EFF -0.097 ($p=0.409$), other insignificant core variables. Similar for Models 2 (residual 1.418) and 3 (residual 1.414).

Diagnostics: VIF<10 (e.g., INF 11.635, but below threshold for severe issues); condition indices up to 71.640 in pooled, 105 in FE, with proportions showing macro variable collinearity, corrected via robust SEs.

5. SUMMARY OF STUDY FINDINGS

The empirical results of this panel model analysis of Nigerian Deposit Money Banks (DMBs) have given subtle insights into the mechanisms of transmission that connects banking performance and economic growth in that core banking factors such as efficiency and stability have minor direct effects, with control variables ruling most of the relationships. This summary explains the findings in the context of the research aims, hypotheses, and available literature and provides implications to the theory and practice.

Efficiency of the banks and economic growth:

Analysis showed that there were no significant efficiency metrics (return on assets (ROA), return on equity (ROE), and cost to income ratio (CIR) on GDP growth in all the models, including pooled OLS (ROA $\beta = -2.278$, $p = 0.600$; ROE $\beta = -0.073$, $p = 0.434$; CIR $\beta = 0.002$, $p = 0.765$), fixed effects (ROA $\beta = -0.096$, $p = 0$). This lack of importance is reflected in Asongu and Odhiambo (2019), who found that the size of the bank in the African settings is the cause of inefficiency due to the expansion of the interest margins without apparent control or scale effects on the market, thereby not being efficient in the efficiency-growth nexus. In Nigeria where the CIR is 53.48 with large variance (SD 23.54), the cost of operation to profitability appears to be waste without converting to a greater economic growth perhaps due to undeveloped financial systems that limit the effectiveness of intermediation (Hasan et al., 2008). This is supported by descriptive statistics revealing low level of ROA (mean value of 0.021) and unstable level of ROE

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(SD 1.05), which implies the inefficiency of efficiency (it is not well directed in productive investment due to the structural limitations).

Financial Stability and Economic Growth:

The stability indicators also revealed a general lack of significance to influence growth that lead to acceptance of H 0 2. The non-significance of the non-performing loans ratio (NPL) ($\nu = 0.005$, $P = 0.501$), capital adequacy ratio (CAR) $\nu = 0.008$, $P = 0.434$, and liquidity ratio (LIQ) $\nu = 0.008$, $P = 0.703$ was found in pooled OLS. The CAR between fixed effects was weakly positive but insignificant (0.005 , $p = 0.668$ in general), whereas the pattern was substantiated with random effects (STAB_index 0.010 , $p = 0.950$). This is in line with what Njang et al. (n.d.) who discovered non-significant negative stability-growth impacts in Nigeria due to over-stability leading to underutilization of financial assets, and Ozili (2022) also pointed out that high capital regulation can restrain lending in unstable settings. This is supported by correlations with NPL negatively related to CAR (-0.339 , $p < 0.01$), indicating the problems with asset quality (mean NPL 16.23, SD 12.57) do not contribute to stability without growth advantages. Stability in SSA environments explain significant growth variation (Ahulu et al., 2021), but the country (Nigeria) has a significant mean of CAR (25.06) and extremes of this indicator (min -22.61) which implies that regulatory compliance is not consistently transmitted to macroeconomic outcomes, perhaps due to variability in liquidity (LIQ SD 6.65).

Joint Influence of Financial Stability and Bank Efficiency:

Significant influence of the interaction term (EFF*STAB) was not found in both specifications (pooled OLS 0.100 , $p = 0.905$; fixed effects 0.100 , $p = 0.910$; random effects 0.100 , $p = 0.905$) which supports the acceptance of H 0 3. The result implies that they do not have strong synergistic effects which is also observed with Hasan and others (2008) who found out that efficiency complements financial depth, but the growth effect is marginal in developing economies where efficiency limits are not met. Indices derived using PCA (EFF) which explained 67.36% variance; STAB 61.18%) did not show joint transmission, possibly due to endogeneity or non-linearities, which are not considered in this case (Daryanto, 2020). Correlations show the efficiency-stability relations such as ROA and CAR (-0.008 , ns), but no amplification in the regressions, which is similar to the results of Olowofela et al. (2025) on sustainability trade-offs as mediators between stability-efficiency interactions.

Role of Control Variables

Controls significantly influenced growth, rejecting H_{04} . Bank size (SIZE) was positive (pooled $\beta = 0.400$, $p = 0.019$; FE $\beta = 1.640$, implying larger assets enhance credit capacity). Macro variables: inflation (INF) negative ($\beta = -0.114$, $p < 0.001$), eroding purchasing power; monetary policy rate (MPR) positive ($\beta = 0.535$, $p < 0.001$), signaling tight policy supports stability; Treasury bill rate (TBR) negative ($\beta = -0.227$, $p < 0.001$), crowding out private investment. Regulatory dummies: Basel (BAS) positive ($\beta = 1.926$, $p < 0.001$), aiding resilience; CBN directive (CBD) strongly positive ($\beta = 3.369$, $p < 0.001$), boosting growth during interventions. These underscore macro and regulatory dominance in transmission (Ozili, 2025; Oladipo, 2025), with correlations like inflation (INF) and TBR (0.942 , $p < 0.01$) highlighting interdependencies.

Controls had a major impact on growth and reject H_{04} . Bank size (SIZE) had positive correlation (pooled $\beta = 0.400$, $p = 0.019$; FE $\beta = 1.640$, which means that higher the assets, the greater the credit capacity). Macro variables: The inflation had a negative impact ($\beta = -0.114$, $p < 0.001$) diluting Purchasing power. Variables such as Monetary Policy rate (MPR) had a positive relationship ($\beta = 0.535$, $p < 0.001$) leading to stability. Treasury bill rate (TBR) had a negative impact ($\beta = -0.227$, $p < 0.001$) crowding out private investment.

Regulatory dummies such as Basel (BAS) had a positive influence ($\beta = 1.926$, $p < 0.001$), which is helpful in resilience; CBN directive (CBD) had strongly positive impact ($\beta = 3.369$, $p < 0.001$), which is helpful in growth in case of intervention. These accentuate macro and regulatory hegemony in transmission (Ozili, 2025; Oladipo, 2025) and that correlations such as inflation (INF) and TBR (0.942 , $p < 0.01$) show dependencies.

In general, the transmission of growth is dependent on the controls and not core banking factors meaning that stability and efficiency would not be facilitated by the supportive policies. The strength is proved by diagnostics ($VIF < 10$, redundant variance in RE) but macro collinearity is a cause for concern. The thresholds and dynamics could be investigated with future research with non-linear models or future and longer post-Covid-19 data (Nwosu et al., 2021; Syofya, 2022).

5.4 Recommendations for Practice and Policy

Advanced credit risk systems and full adoption of Basel III by the banks should be the most preferable solution to promote stability by increasing the CAR and also lower underutilization risks (Akinbola, 2024). CIR can be lowered through efficiency gains through digitalization and cost optimization through the use of fintech to generate increased ROA/ROE (Daud et al. 2022). CBN-Nigerian Deposit Insurance Corporation cooperation should be encouraged by policymakers in order to be able to through inflation and rate fluctuations to reinforce transmission through macroprudential controls (Ozili, 2022). The implementation of SDGs, e.g., less

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inequality, will help increase profitability and sustainable growth and convert banking to more general development (Oladipo, 2025; Olowofela et al., 2025). The measures would help to turn the banking industry in Nigeria to become a more efficient growth engine.

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Appendix

Table 4.2: Pearson Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. GDP_Growth	—	.02	-	.10	.08	.06	-	.00	-	-	.036	-	-	-	-
		8	.05	0	5	7	.07	3	.07	.036		.25	.07	.29	.18
			0				2		6			6**	5	9**	7*
2. ROA	.02	—	.10	-	-	-	-	.21	.02	-	.004	-	-	-	-
	8		1	.67	.10	.00	.12	3**	3	.004		.23	.19	.20	.05
				5**	8	8	4					0**	7**	3**	3
3. ROE	-	.10	—	-	.32	-	-	.08	.00	.021	-	.05	.00	.01	-
	.05	1		.13	7**	.02	.01	1	4		.021	6	9	1	.01
	0			9		5	2								6
4. Cost_to_Income_Ratio_percent	.10	-	-	—	.14	.20	.08	-	-	-	.193	-	.02	-	-
	0	.67	.13		2	6**	7	.45	.14	.193	**	.09	8	.09	.17
		5**	9					0**	6	**		6		2	5*

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5.	.08	-	.32	.14	—	-	-	-	.19	.188	-	.05	.11	.05	-
NPL_Ratio_percent	5	.10	7**	2		.33	.10	.02	3**	*	.188	0	5	3	.10
		8				9**	0	6			*				7
6. CAR_percent	.06	-	-	.20	-	—	.27	-	-	-	.831	-	-	-	-
	7	.00	.02	6**	.33		6**	.43	.57	.831	**	.23	.27	.26	.05
		8	5		9**			9**	2**	**		8**	1**	5**	3
7.	-	-	-	.08	-	.27	—	-	-	-	.598	-	.01	.02	-
Liquid_Assets_Ratio	.07	.12	.01	7	.10	6**		.30	.42	.598	**	.01	1	8	.09
	2	4	2		0			8**	3**	**		3			4
8. Bank_Size	.00	.21	.08	-	-	-	-	—	.43	.585	-	.34	.19	.31	.51
	3	3**	1	.45	.02	.43	.30		9**	**	.585	5**	9**	2**	9**
				0**	6	9**	8**				**				
9. DEP	-	.02	.00	-	.19	-	-	.43	—	.677	-	.32	.34	.32	.09
	.07	3	4	.14	3**	.57	.42	9**		**	.677	7**	1**	9**	0
	6			6		2**	3**				**				
10. LEV	-	-	.02	-	.18	-	-	.58	.67	—	-	.26	.27	.26	.11
	.03	.00	1	.19	8*	.83	.59	5**	7**		1.00	8**	5**	9**	4
	6	4		3**		1**	8**				0**				
11. Eq_Ratio	.03	.00	-	.19	-	.83	.59	-	-	-	—	-	-	-	-
	6	4	.02	3**	.18	1**	8**	.58	.67	1.00		.26	.27	.26	.11
			1		8*			5**	7**	0**		8**	5**	9**	4
12. Inflation	-	-	.05	-	.05	-	-	.34	.32	.268	-	—	.87	.94	.30
	.25	.23	6	.09	0	.23	.01	5**	7**	**	.268		4**	2**	2**
	6**	0**		6		8**	3				**				
13. Policy_Rate	-	-	.00	.02	.11	-	.01	.19	.34	.275	-	.87	—	.91	-
	.07	.19	9	8	5	.27	1	9**	1**	**	.275	4**		0**	.05
	5	7**				1**					**				8
14. TBill_91Day	-	-	.01	-	.05	-	.02	.31	.32	.269	-	.94	.91	—	.24
	.29	.20	1	.09	3	.26	8	2**	9**	**	.269	2**	0**		9**
	9**	3**		2		5**					**				
15. Basel_Dummy	-	-	-	-	-	-	-	.51	.09	.114	-	.30	-	.24	—
	.18	.05	.01	.17	.10	.05	.09	9**	0		.114	2**	.05	9**	
	7*	3	6	5*	7	3	4						8		
16.	.74	.07	.01	.14	.06	.18	-	-	-	-	.195	-	-	-	-
CBN_Directive_Dummy	0**	7	4	9*	2	9*	.03	.24	.22	.195	**	.49	.36	.57	.36
							9	2**	5**	**		8**	8**	1**	2**

Note. N ranges from 170 to 183. *p < .05. **p < .01.



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