Regulatory Reforms, Non-Performing Loans, and Financial Stability in Nigeria

Miriam Osondu-Ekekwe[1], Ibrahim Musa[2*], Rasheed Alao[3]

[1]Sustainable Development Centre University of Abuja.

[2*,3]Department of Economics University of Abuja.

* Correspondence: Ibrahim Musa

ABSTRACT: The effectiveness of regulatory reforms in improving financial stability remains a central issue in banking regulation, particularly in developing economies where institutional capacity and enforcement challenges persist. In Nigeria, the enactment of the Banks and Other Financial Institutions Act (BOFIA) 2020 represents a major regulatory reform aimed at strengthening supervision, governance, and risk management within the banking sector. This study assesses the impact of regulatory reforms and non-performing loans on financial stability in Nigeria over the period 2008-2023. Financial stability is measured using a composite banking stability index, while regulatory reform is captured through a policy dummy distinguishing the pre- and post-BOFIA 2020 periods. Non-performing loans and capital adequacy are included as key control variables. Employing regression analysis and Granger causality tests, the study finds that regulatory reforms have a positive and statistically significant effect on financial stability, indicating that enhanced supervisory powers and regulatory enforcement contribute to systemic resilience. However, non-performing loans exert a strong negative impact on financial stability, highlighting persistent asset quality challenges that weaken the

effectiveness of reforms. Capital adequacy is found to complement regulatory reforms by strengthening banks' loss-absorbing capacity. The findings contribute to institutional regulation theory by providing empirical evidence that regulatory reforms improve stability when supported by adequate capitalization and effective credit risk management. From a policy perspective, the study emphasizes the need for sustained enforcement of BOFIA 2020, improved loan recovery frameworks, and stronger coordination between regulators and the judicial system. The study concludes that while regulatory reforms have strengthened Nigeria's financial stability, addressing non-performing loans remains critical to achieving durable systemic resilience.

Introduction

Regulatory reforms are indispensable instruments for fortifying the stability and operational efficiency of banking systems, especially in emerging economies where institutional fragilities and susceptibility to external shocks amplify systemic risks (El-Yaqub et al., 2024). These reforms encompass a spectrum of measures, including enhanced supervisory frameworks, stricter capital and liquidity requirements, improved risk management protocols, and robust enforcement mechanisms (Igwe et al., 2021). By fostering prudent risk-taking and mitigating moral hazard, effective regulations can prevent the buildup of vulnerabilities that lead to financial crises (Magaji & Ahmad, 2024). Conversely, inadequately designed or weakly implemented reforms may exacerbate problems, such as asset quality deterioration and contagion effects, ultimately eroding public confidence and economic growth (Laeven & Valencia, 2018; Barth, Caprio, & Levine, 2012; Okoroafor et al., 2018). In the context of the global financial architecture, post-2008 reforms under Basel III have emphasised the use of macroprudential tools to address procyclicality and interconnectedness. However, their adaptation in developing markets often faces unique challenges, including limited regulatory capacity and political interference.

Nigeria's banking sector exemplifies the interplay between regulatory evolution and persistent vulnerabilities. The country has experienced multiple banking crises,

notably in 1991, 2004-2005, and 2008-2009, driven by factors such as rapid expansion, poor governance, and macroeconomic instability. These episodes highlighted deficiencies in regulatory oversight, prompting successive reforms to curb excessive risk-taking and enhance resilience. For instance, the 2004 banking consolidation exercise, which merged over 80 banks into 25, aimed to create larger, more stable institutions but inadvertently concentrated risks and exposed governance lapses. Subsequent interventions, including the establishment of the Asset Management Corporation of Nigeria (AMCON) in 2010 to absorb toxic assets, underscored the need for proactive regulatory measures. Despite these efforts, Nigeria's banking system remains prone to shocks from oil price volatility, exchange rate fluctuations, and fiscal imbalances, which often manifest as liquidity strains and asset quality issues (CBN, 2021; NDIC, 2022; Musa et al., 2024).

A central challenge in Nigeria's banking landscape is the persistently high levels of non-performing loans (NPLs) (Magaji et al., 2023), which have hovered around 5-10% in recent years, surpassing global averages and posing significant threats to financial stability. NPLs arise from borrowers' inability or unwillingness to service debts, often exacerbated by economic downturns, sectoral exposures (example, to oil, agriculture, and real estate), and weaknesses in credit appraisal and monitoring. High NPL ratios erode bank profitability by tying up capital, reduce lending capacity, and amplify systemic risk through potential bank runs or bailouts (Abdullahi et al., 2024). During the 2014-2016 oil price slump, NPLs surged as borrowers in the energy sector defaulted, straining capital buffers and necessitating regulatory interventions. Similarly, the COVID-19 pandemic in 2020-2021 led to loan moratoriums and forbearance measures, temporarily inflating NPL figures and testing the sector's resilience (Magaji et al., 2022). These patterns reflect broader issues, including inadequate risk management practices, legal hurdles in loan recovery, and over-reliance on collateral-based lending in a volatile economy (Adegbite & Machethe, 2020; Udom & Eze, 2021; Ismail et al., 2025).

Regulatory reforms have been pivotal in attempting to address these NPL-related vulnerabilities. The Banks and Other Financial Institutions Act (BOFIA) 2020 marks a landmark overhaul of Nigeria's banking legislation, replacing the 1991 Act with

provisions tailored to contemporary challenges. Key features include expanded supervisory powers for the Central Bank of Nigeria (CBN), such as on-site examinations, off-site surveillance, and the authority to impose corrective actions without court intervention. BOFIA 2020 introduces stricter sanctions for non-compliance, including fines, license revocation, and criminal penalties for directors. It also mandates enhanced disclosure requirements, risk-based supervision, and the integration of technology in regulatory processes. The reform aligns with international standards, such as those from the Basel Committee, while addressing Nigeria-specific issues like insider lending and connected party transactions. Proponents argue that BOFIA 2020 strengthens the CBN's toolkit to preempt crises, improve asset quality through better enforcement, and foster a culture of accountability (CBN, 2021).

However, the actual impact of BOFIA 2020 on reducing NPLs and bolstering financial stability remains empirically underexplored. While regulatory reforms are theoretically expected to enhance outcomes by deterring risky behavior and facilitating timely interventions, their effectiveness hinges on factors such as institutional capacity, enforcement credibility, and external economic conditions. In Nigeria, challenges like judicial delays in resolving distressed assets, political pressures on lending decisions, and macroeconomic volatility (example, inflation and currency depreciation) may dilute reform benefits. For instance, despite BOFIA 2020's emphasis on risk management, NPL ratios have not declined significantly, suggesting that reforms alone may not suffice without complementary measures like improved credit infrastructure or macroeconomic stabilization. Studies on similar reforms in other emerging markets, such as India's banking sector overhaul, indicate mixed results, with initial gains often offset by implementation lags (Barth et al., 2012).

The core problem this study addresses is the dearth of rigorous empirical evidence on whether recent regulatory reforms, particularly BOFIA 2020, have meaningfully curtailed NPLs and enhanced financial stability in Nigeria. Existing literature provides anecdotal insights or broad assessments but lacks comprehensive, data-driven analyses that account for reform implementation timelines, control for

confounding factors, and evaluate long-term effects. This gap impedes informed policymaking, as stakeholders cannot discern whether reforms are succeeding or require recalibration. Without such evidence, there is a risk of over-reliance on regulatory measures that may not yield desired outcomes, potentially leading to unintended consequences like reduced credit access or increased compliance costs.

Accordingly, the aim of this study is to empirically evaluate the impact of regulatory reforms--focusing on BOFIA 2020--on non-performing loans and financial stability in Nigeria. The analysis examines the extent to which strengthened regulatory oversight has improved asset quality, reduced systemic risk, and interacted with capital adequacy as a stabilizing factor. Utilizing a quantitative framework with time-series data from 2010-2023, the study employs econometric models to test hypotheses on reform efficacy, controlling for macroeconomic variables. By isolating the effects of BOFIA 2020, the research provides actionable insights for policymakers, contributing to broader debates on regulatory design in emerging economies. The findings could inform refinements to BOFIA 2020, ensuring it effectively balances stability with the need for inclusive financial intermediation in Nigeria's dynamic economic landscape. This study thus bridges theoretical expectations with empirical realities, offering a foundation for evidence-based regulatory evolution.

Literature Review

Regulatory Reforms and Financial Stability

Regulatory reforms constitute the backbone of resilient financial systems, especially in emerging economies where institutional fragilities, information asymmetries, and exposure to global shocks heighten the risk of systemic crises. Banking regulation, encompassing a suite of laws, supervisory guidelines, and enforcement mechanisms, is designed to safeguard depositors, ensure prudent risk management, and maintain overall financial soundness. These reforms aim to mitigate moral hazard, curb excessive leverage, and promote transparency, thereby preventing the accumulation of vulnerabilities that could trigger bank runs or broader economic downturns. In the aftermath of the 2007-2008 global financial crisis, international standards like Basel

III have emphasized macroprudential regulation, including countercyclical capital buffers and stress testing, to address procyclicality and interconnectedness (Basel Committee on Banking Supervision, 2010). However, the efficacy of such reforms varies significantly across contexts, with emerging markets often facing challenges like limited regulatory capacity, political interference, and weak judicial systems (Laeven & Valencia, 2018).

Non-performing loans (NPLs)--loans where borrowers fail to make required payments for a specified period (typically 90 days)--serve as a critical indicator of regulatory effectiveness. High NPL ratios signal underlying weaknesses in credit risk assessment, loan monitoring, and recovery processes, often exacerbated by economic downturns or lax oversight. Elevated NPLs erode bank profitability by necessitating higher provisions, deplete capital buffers, and constrain lending capacity, potentially leading to credit crunches and systemic instability. In extreme cases, they can precipitate bank failures, as seen in the European debt crisis where NPLs in peripheral countries reached 20-30%, straining public finances and slowing recovery (European Central Bank, 2018). Thus, NPLs act as a conduit through which regulatory failures manifest, amplifying the need for reforms that strengthen supervision and enforcement.

Theoretical Foundations

The interplay between regulatory reforms, NPLs, and financial stability is underpinned by several theoretical frameworks. Credit risk theory, rooted in asymmetric information models (example, Stiglitz & Weiss, 1981), posits that weak regulatory oversight incentivizes banks to engage in adverse selection and moral hazard, leading to poor lending practices and higher NPLs. For instance, in the absence of stringent regulations, banks may extend credit to high-risk borrowers for short-term gains, ignoring long-term solvency. Strong regulations, conversely, enforce rigorous due diligence, collateral requirements, and provisioning standards, fostering credit discipline and reducing bad loan accumulation. This theory aligns with the "lemons problem," where information asymmetries result in market failures that regulations aim to correct.

Institutional theory of regulation extends this by emphasizing that reform effectiveness depends on the broader institutional environment, including enforcement capacity, legal frameworks, and governance quality (North, 1990; Barth, Caprio, & Levine, 2012). In countries with robust institutions, reforms translate into lower NPLs and enhanced stability through credible sanctions and independent supervision. However, in weak institutional settings, reforms may be undermined by corruption, judicial delays, or political capture, leading to "regulatory capture" where banks influence policymakers. This is particularly relevant in emerging economies like Nigeria, where historical banking crises have been linked to insider lending and forbearance (Sanusi, 2011).

Agency theory further illuminates the role of reforms in aligning incentives between regulators, banks, and depositors. Reforms that enhance transparency and accountability reduce agency costs, such as those arising from hidden risks in loan portfolios. Collectively, these theories suggest that regulatory reforms are not merely technical adjustments but require complementary institutional strengthening to curb NPLs and bolster stability.

Global Empirical Evidence

Empirical research provides substantial evidence on the stabilizing effects of regulatory reforms, though results are nuanced and context-dependent. Cross-country studies consistently show that stronger regulatory and supervisory frameworks correlate with lower NPL ratios and greater financial stability. For example, Beck, Demirguc-Kunt, and Levine (2010) analyzed data from over 100 countries and found that stringent regulations, measured by indices of supervisory power and independence, reduce NPLs by 2-5 percentage points and enhance stability metrics like the Z-score. Their work highlights that reforms promoting private monitoring and market discipline are particularly effective in mitigating credit risks.

Similarly, Laeven and Valencia (2018) examined banking crises in 147 countries and concluded that weak regulations exacerbate NPL spikes during downturns, with recovery slower in poorly supervised systems. In advanced economies, post-crisis reforms under Dodd-Frank in the US and the Single Supervisory Mechanism in the

EU have been credited with reducing NPLs through enhanced stress testing and resolution frameworks (Federal Reserve, 2020). However, heterogeneity is evident: reforms yield stronger results in high-income countries with solid institutions, while in developing nations, benefits are often diluted by macroeconomic volatility or enforcement gaps. For instance, in Latin America, regulatory overhauls post-1990s crises lowered NPLs but were less effective in countries with high inflation or political instability (Barth et al., 2012).

Methodologically, studies employ panel data regressions, instrumental variables to address endogeneity, and event studies for reform impacts. Advanced techniques, like difference-in-differences, isolate causal effects, revealing that reforms reduce NPLs by 10-20% in compliant systems (Demirguc-Kunt & Detragiache, 2002). Yet, trade-offs exist: overly stringent regulations may stifle credit growth, as seen in some Eurozone banks where NPL resolutions slowed lending (International Monetary Fund, 2021). Overall, the literature underscores that reforms are most impactful when integrated with macroeconomic policies and institutional reforms.

Nigerian Context: Regulatory Reforms, NPLs, and Financial Stability

In Nigeria, the banking sector's vulnerability to NPLs and instability mirrors broader emerging market challenges, compounded by oil-dependent volatility and structural weaknesses (Magaji et al., 2025). NPL ratios have historically been elevated, averaging 5-10% in recent decades, compared to global benchmarks of 2-3%, and peaking at 14% during the 2014-2016 oil slump (NDIC, 2022). These high levels stem from sectoral exposures (example, oil, agriculture, and real estate), weak credit risk management, insider lending, and regulatory forbearance, where authorities delay interventions to avoid political fallout (Sanusi, 2011). During economic downturns, NPLs amplify liquidity pressures, erode capital, and heighten systemic risk, as evidenced by the 2008-2009 crisis where distressed assets contributed to bank failures.

Regulatory reforms in Nigeria have evolved through phases: the 1991 BOFIA established basic oversight, the 2004 consolidation aimed at scale and stability, and post-2009 measures like AMCON addressed toxic assets. The 2020 BOFIA

represents a pivotal update, replacing the outdated 1991 Act with provisions for enhanced CBN powers, including off-site surveillance, corrective actions, and sanctions for non-compliance. It mandates risk-based supervision, improved disclosure, and integration of fintech in monitoring, aligning with Basel standards while targeting Nigeria-specific issues like connected lending (CBN, 2021). Early assessments praise BOFIA 2020 for boosting regulatory credibility and deterring risky behavior, but empirical evidence on its impact remains nascent.

Nigerian-specific studies highlight persistent NPL challenges. Sanusi (2011), former CBN Governor, attributed high NPLs to governance failures and forbearance, recommending stricter enforcement. NDIC (2022) reports link NPLs to macroeconomic shocks and weak recovery mechanisms, with judicial bottlenecks delaying resolutions. Adegbite and Machethe (2020) found that regulatory gaps allow NPL accumulation, while Udom and Eze (2021) noted that capital adequacy mitigates but does not eliminate NPL risks. However, most studies predate BOFIA 2020 or focus narrowly on individual reforms, lacking integrated analyses of reforms, NPLs, and stability.

Gaps in the Literature and Contributions of This Study

Despite extensive research, significant gaps persist. Global studies often overlook Nigeria's unique context, such as dollarization and fiscal dominance, while Nigerian literature lacks post-BOFIA 2020 evaluations and unified frameworks examining reforms alongside NPLs and capital adequacy. Few studies employ rigorous econometrics to control for endogeneity or macroeconomic confounders, limiting causal inferences. Additionally, the interaction between reforms and NPL dynamics in promoting stability is underexplored, hindering evidence-based policymaking.

This study addresses these gaps by empirically examining the effect of regulatory reforms--particularly BOFIA 2020--on NPLs and financial stability in Nigeria. Using time-series data from 2010-2023 and econometric models (example, OLS with robustness checks), it assesses reform impacts while integrating capital adequacy and macroeconomic controls. By providing Nigeria-specific evidence, the study contributes to theoretical debates on institutional regulation and offers practical

insights for refining BOFIA 2020, ensuring it effectively curbs NPLs and fosters stability in an emerging economy. This fills a critical void, informing regulatory enhancements amid ongoing global and domestic challenges.

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Methodology

This section outlines the methodological approach employed to empirically evaluate the impact of regulatory reforms, particularly the Banks and Other Financial Institutions Act (BOFIA) 2020, on non-performing loans (NPLs) and financial stability in Nigeria. The framework is quantitative and policy-oriented, leveraging time-series econometrics to assess reform efficacy while controlling for key determinants. Grounded in established practices from financial economics and policy evaluation literature (example, Angrist & Pischke, 2008; Wooldridge, 2010), the methodology ensures internal validity, robustness, and relevance to Nigeria's banking context. It addresses potential biases through diagnostics and alternative specifications, facilitating causal inferences on how reforms influence NPLs and stability.

Research Design

The study adopts a policy-impact evaluation design, which is particularly suited for analyzing the effects of discrete policy interventions like regulatory reforms. This design integrates a regulatory reform dummy variable to capture the structural shift introduced by BOFIA 2020, allowing for a quasi-experimental assessment of pre- and post-reform periods. By comparing outcomes before and after the reform, the approach isolates the incremental impact of strengthened supervisory powers, enforcement mechanisms, and sanctions on financial stability indicators.

The design utilizes time-series data aggregated at the sector level to reflect systemic effects, avoiding micro-level noise and focusing on national trends. The sample period (2008-2023) encompasses 16 years, providing sufficient observations for

statistical power while including critical events like the 2014-2016 oil crisis, the COVID-19 pandemic, and the 2020 BOFIA enactment. This temporal breadth enhances the robustness of findings by accounting for macroeconomic volatility. Ethical considerations include reliance on publicly available data to maintain confidentiality and objectivity. The design mitigates confounding factors through control variables and robustness checks, aligning with best practices in impact evaluation (Imbens & Rubin, 2015).

Model Specification

The econometric model is specified as a linear regression to quantify the relationships between regulatory reforms, NPLs, capital adequacy, and financial stability. The functional form is:

$$FS_t = \gamma_0 + \gamma_1 REG_t + \gamma_2 NPL_t + \gamma_3 CAR_t + \mu_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \ 1$$

Where: (FSt) represents the Financial Stability index at time (t), serving as the dependent variable and capturing overall banking sector resilience. (REGt) denotes the Regulatory Reform dummy variable (1 for post-BOFIA 2020 periods, i.e., 2021-2023; 0 for pre-reform periods, i.e., 2008-2020), measuring the direct effect of the reform. (NPLt) indicates the Non-Performing Loans ratio at time (t), expressed as a percentage of total loans. (CARt) represents the Capital Adequacy Ratio at time (t), measured as a percentage of capital buffers relative to risk-weighted assets. (γ_0) is the intercept term, reflecting baseline stability. ($\gamma_1, \gamma_2, \gamma_3$) are the slope coefficients estimating the marginal impacts of the independent variables. (\mut) is the error term, encompassing unobserved factors and random disturbances.

This specification builds on prior models in banking stability research (example, Beck et al., 2010; Laeven & Valencia, 2018), assuming linearity and additivity for interpretability. It focuses on core variables while allowing extensions for interactions (example, REG x NPL) in sensitivity analyses.

Expected Signs and Theoretical Justification: ($\gamma_1 > 0$): The reform dummy is anticipated to have a positive coefficient, as BOFIA 2020's enhanced enforcement and supervision are expected to reduce NPLs and bolster stability, per institutional

theory (Barth et al., 2012). ($\gamma_2 < 0$): NPLs are hypothesized to negatively affect stability, reflecting their role in eroding capital and signaling distress (Stiglitz & Weiss, 1981). ($\gamma_3 > 0$): Capital adequacy is expected to positively influence stability, acting as a buffer against losses and complementing regulatory reforms (Demirguc-Kunt & Detragiache, 2002).

The model omits macroeconomic variables in the base form but incorporates them in robustness checks to isolate reform effects from external shocks.

Estimation Technique

Ordinary Least Squares (OLS) regression serves as the primary estimation technique, providing unbiased and efficient estimates under the classical assumptions (example, exogeneity, homoskedasticity). OLS is chosen for its simplicity and direct applicability to time-series data post-stationarity confirmation. The technique minimizes the sum of squared residuals, yielding coefficients that quantify the average effect of predictors on financial stability.

To explore directional causality, Granger causality tests are employed. These test whether past values of one variable (example, REG) predict another (example, FS), using F-statistics on lagged coefficients. The test equation for REG Granger-causing FS is:

$$FST_t = \alpha_0 + \sum_{i=1}^{k} \alpha_i FST_{t-i} + \sum_{i=1}^{k} \beta_i REG_{t-i} + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 2$$

Rejection of the null ($\beta_i = 0$) indicates causality. This complements OLS by addressing endogeneity concerns, ensuring reforms precede stability improvements.

Econometric Tests

A suite of diagnostic tests ensures model reliability and addresses common econometric issues in time-series analysis:

Stationarity Tests (ADF): The Augmented Dickey-Fuller test assesses unit roots, with the equation:

$$\delta Y_t = \rho Y_{t-1} + \sum_{i=1}^{p} \pi_i \delta y_{t-i} + + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 3$$

Stationarity (I(0)) is confirmed if the null ($\rho = 0$) is rejected at 5% significance. This prevents spurious regressions.

Model Significance Tests: F-tests evaluate overall model fit, with p-values < 0.05 indicating significant explanatory power. R-squared measures variance explained.

Causality Analysis: Granger tests, as described, examine temporal precedence.

Residual Diagnostics: Include Durbin-Watson for autocorrelation (values ~2 suggest no issues), Breusch-Pagan for heteroskedasticity, and Jarque-Bera for normality. Remedies like Newey-West standard errors or transformations are applied if violations occur.

These tests enhance validity, with results reported transparently.

Data Sources

The study draws on annual time-series data spanning 2008-2023, sourced from authoritative institutions to ensure accuracy, consistency, and timeliness. Key sources include: Central Bank of Nigeria (CBN) Financial Stability Reports: Provide sector-wide stability indices, capital ratios, and regulatory data. Nigeria Deposit Insurance Corporation (NDIC) Annual Reports: Offer detailed NPL statistics and banking distress metrics. Nigerian Banking Supervision Reports: Supply supervisory insights and reform implementation details.

Data were extracted manually from PDFs and Excel files, harmonized for definitions (example, aligning NPL thresholds), and cleaned for outliers or inconsistencies. Missing values (minimal) were handled via linear interpolation. The dataset comprises 16 observations, adequate for time-series inference, with no survivorship bias as it covers crisis periods.

Operationalization of Variables

Variables are defined, measured, and justified based on literature and data availability, ensuring construct validity and policy relevance.

Table 1: Variable Operationalization, Measurement Type, and Rationale

Variable	Operationalization / Measurement	Type	Rationale
FS (Financial Stability Index)	Composite index derived from Z-score (ROA + capital/assets divided by asset volatility), inverse NPL ratio, and CAR; normalized to a 0–1 scale.	Dependent	Captures multifaceted banking stability, including solvency and risk absorption capacity (Beck et al., 2010).
REG (Regulatory Reform Dummy)	Binary variable: 1 for 2021–2023 (post-BOFIA 2020), 0 for 2008–2020 (pre-reform period).	Independent	Isolates the impact of BOFIA 2020 as an exogenous policy shock (Angrist & Pischke, 2008).
NPL (Non-Performing Loans)	Ratio of non-performing loans to total loans (%), based on the 90-day delinquency threshold.	Control	Reflects asset quality and credit risk, which strongly influence banking stability (Laeven & Valencia, 2018).
CAR (Capital Adequacy Ratio)	Tier 1 capital as a percentage of risk-weighted assets (%), consistent with Basel regulatory standards.	Control	Measures banks' loss-absorbing capacity and complements regulatory reforms (Barth et al., 2012).

This operationalization balances parsimony with comprehensiveness, facilitating robust analysis and policy insights. The framework is poised to yield evidence on BOFIA 2020's effectiveness in Nigeria's banking sector.

Results

This section details the empirical outcomes from the econometric analysis examining the influence of regulatory reforms, particularly the Banks and Other Financial Institutions Act (BOFIA) 2020, on non-performing loans (NPLs) and financial stability in Nigeria. Utilizing annual data from 2008-2023, the results stem from OLS regression and Granger causality tests, with all diagnostics (example, stationarity via ADF, multicollinearity via VIF, and residual checks) validating the model's integrity. Findings are presented with statistical rigor, emphasizing economic significance and alignment with theoretical priors.

Regression Results

The OLS regression results for the model are summarized in Table 6. The model exhibits strong explanatory power (R-squared = 0.85, Adjusted R-squared = 0.82, F-statistic = 18.45, $p < 0.001$), indicating that the predictors account for 85% of the variance in financial stability. Diagnostic tests confirm no issues with multicollinearity (VIF values < 2.5), autocorrelation (Durbin-Watson statistic = 1.92, close to 2), or heteroskedasticity (Breusch-Pagan test p = 0.28), ensuring unbiased and efficient estimates. Coefficients are interpreted with a focus on their magnitude, significance, and implications for policy.

Table 6: Regression Results

Variable	Coefficient	Std. Error	t-Stat	Prob
Constant	0.255	0.083	3.07	0.009
REG	0.067	0.021	3.19	0.007
NPL	-0.028	0.006	-4.67	0.000
CAR	0.024	0.008	3.00	0.011

Source: Authors Computation, 2026

Constant: The intercept term (0.255) is statistically significant (p = 0.009), representing the baseline level of financial stability in the absence of the explanatory variables. This value suggests inherent stability from Nigeria's banking sector fundamentals, such as post-2009 reforms and market deepening, though it remains vulnerable to shocks.

REG (Regulatory Reform Dummy): The coefficient for the BOFIA 2020 dummy (0.067) is positive and significant (p = 0.007), implying that the reform enhances financial stability by approximately 0.067 units. Economically, this translates to a meaningful uplift in stability metrics post-2020, attributable to improved supervisory oversight, risk-based regulations, and deterrent sanctions. The t-statistic (3.19) exceeds the 5% critical value, confirming robustness.

NPL (Non-Performing Loans): The negative coefficient (-0.028) is highly significant (p = 0.000), indicating that a 1% increase in NPLs reduces financial stability by 0.028 units. This underscores NPLs as a potent destabilizer, with the large t-statistic (-4.67) highlighting their dominant role in eroding capital and signaling broader sector risks.

CAR (Capital Adequacy Ratio): The positive coefficient (0.024) is significant (p = 0.011), showing that a 1% rise in capital adequacy boosts stability by 0.024 units. This reflects capital's role as a shock absorber, complementing regulatory reforms by providing buffers against losses from NPLs.

Overall, the model fits well, with all coefficients aligning with expected signs, and the results provide quantitative evidence of BOFIA 2020's stabilizing impact while highlighting NPLs as a persistent challenge.

Granger Causality Test

To assess directional causality and mitigate endogeneity concerns, Granger causality tests were performed, testing whether lagged values of one variable predict another. Optimal lags (1-2, selected via AIC) were used, and the results are presented in Table 7. The tests reveal unidirectional causality from regulatory reforms and NPLs to financial stability, supporting causal interpretations.

Table 7: Granger Causality Test

Null Hypothesis	F-Statistic	Prob
REG does not Granger-cause FS	4.31	0.031
NPL does not Granger-cause FS	6.87	0.012

Source: Authors Computation, 2026

REG Granger-Causes FS: The rejection of the null hypothesis (F = 4.31, p = 0.031) indicates that regulatory reforms precede and drive improvements in financial stability. This temporal precedence validates BOFIA 2020 as a catalyst for enhanced oversight and reduced systemic risks.

NPL Granger-Causes FS: Similarly, NPLs Granger-cause stability (F = 6.87, p = 0.012), affirming that rising NPLs lead to declines in stability, rather than the reverse. This finding reinforces NPLs as a leading indicator of distress.

No reverse causality was detected (example, FS does not Granger-cause REG or NPL), reducing concerns about feedback loops and strengthening the model's causal claims.

Discussion

The empirical results affirm the effectiveness of BOFIA 2020 in promoting financial stability, aligning with institutional theory of regulation (Barth et al., 2012), which posits that strong enforcement and governance enhance regulatory outcomes. The positive REG coefficient demonstrates that the reform's provisions—such as expanded CBN powers, risk-based supervision, and stiffer penalties—have curtailed risky lending practices, improved asset quality, and bolstered confidence in Nigeria's banking system. This is particularly evident in the post-2020 period, where regulatory credibility has deterred insider abuses and encouraged prudent risk management, contributing to observed stability gains.

However, NPLs emerge as the most formidable destabilizing force, with their significant negative impact resonating with credit risk theory (Stiglitz & Weiss, 1981) and empirical patterns in Nigeria (NDIC, 2022). Despite reforms, high

NPLs—driven by economic volatility, sectoral exposures (example, oil and agriculture), and recovery bottlenecks—continue to erode profitability and capital, amplifying contagion risks. The Granger causality from NPLs to stability underscores their predictive role, suggesting that reforms must address root causes like loan appraisal weaknesses and judicial inefficiencies to fully mitigate this threat.

Capital adequacy (CAR) plays a complementary role, with its positive coefficient illustrating synergies with BOFIA 2020. Higher capital buffers enhance the reform's effectiveness by providing resilience against NPL-induced losses, consistent with global evidence (Beck et al., 2010). In Nigeria's context, this interaction is crucial, as capital injections post-crises have historically stabilized the sector.

Contextually, the findings highlight BOFIA 2020's progress but also its limitations in a challenging environment marked by macroeconomic instability and institutional constraints. Compared to advanced economies, Nigeria's reform effects are promising but tempered by NPL persistence, emphasizing the need for holistic approaches. Granger tests add causal depth, though the short post-reform window limits long-term inferences. Limitations include potential omitted variables (example, unmodeled macroeconomic shocks); robustness checks incorporating GDP growth yielded similar results. Future research could employ panel data or structural models for deeper insights.

Summary

This study empirically demonstrates that regulatory reforms under BOFIA 2020 significantly enhance financial stability in Nigeria, as evidenced by positive regression and causality results. NPLs remain the primary destabilizing factor, exerting a strong negative influence, while capital adequacy provides complementary support, amplifying reform benefits. Granger tests confirm directional causality, underscoring reforms and NPLs as key drivers of stability.

Conclusion

BOFIA 2020 has effectively strengthened Nigeria's banking sector stability through enhanced regulatory oversight and enforcement, validating the role of institutional

reforms in emerging economies. However, persistent NPL challenges necessitate ongoing efforts to address asset quality issues. This research bridges empirical gaps, offering evidence-based insights for policymakers and contributing to global debates on regulatory efficacy in volatile contexts.

Recommendations

Based on the findings, the following recommendations are proposed to sustain and build upon BOFIA 2020's gains:

Sustain Strict Enforcement of BOFIA 2020: The Central Bank of Nigeria (CBN) should maintain rigorous application of the Act's provisions, including regular audits, corrective actions, and sanctions, to prevent regulatory fatigue and ensure long-term compliance.

Strengthen Loan Recovery Frameworks: Develop efficient NPL resolution mechanisms, such as specialized tribunals or asset management firms, to expedite recoveries and reduce the burden on capital buffers.

Improve Judicial Support for Banking Regulation: Foster partnerships with the judiciary to streamline legal processes under BOFIA 2020, minimizing delays in enforcement and enhancing the credibility of regulatory interventions.

Enhance Data and Monitoring Systems: Invest in advanced analytics and real-time reporting to track NPL trends and stability indicators, enabling proactive reforms and better integration with macroprudential policies.

Promote Sectoral Diversification and Risk Education: Encourage banks to diversify lending portfolios away from high-risk sectors and provide training on credit risk management to complement regulatory reforms.

Implementing these recommendations could further fortify Nigeria's financial stability, supporting economic growth and resilience. This study underscores the transformative potential of targeted reforms while highlighting the imperative of addressing NPL dynamics for sustainable outcomes.

References

1. Abdullahi, A. I., Magaji, S. & Musa, I. (2024) Navigating technological shifts: The role of Digital Strategies in Modern Banking. *International Journal of Novel Research in Marketing Management and Economics,* 11(2). 13-28.

2. Angrist, J. D., & Pischke, J.-S. (2008). Mostly harmless econometrics: An empiricist's companion. Princeton University Press.

3. Barth, J. R., Caprio, G., & Levine, R. (2006). Rethinking bank regulation: Till angels govern. Cambridge University Press.

4. Barth, J. R., Lin, C., Ma, Y., Seade, J., & Song, F. M. (2013). Do bank regulation, supervision, and monitoring enhance or impede bank efficiency? Journal of Banking & Finance, 37(8), 2879-2892.

5. Central Bank of Nigeria. (2021). Banks and Other Financial Institutions Act (BOFIA) 2020: Implementation framework. CBN.

6. Demirguc-Kunt, A., Martinez Peria, M. S., & Tressel, T. (2015). The impact of bank regulations on financial stability. Journal of Financial Intermediation, 24(3), 318-346.

7. El-Yakub, B., Musa, I., & Magaji, S. (2024). Nexus between financial liberalisation and Economic growth in Nigeria (1987-2022). *Africa Journal of Accounting and financial research, 7(2), 16-33, Doi;10.52589/AJAFR-EPQJMLJ*

8. Igwe, G. U., Magaji, S., and Darma, N. A. (2021). Analysis of the Impact of Financial Development Indicators of the Banking, Insurance, and Pension Sectors on Economic Growth in Nigeria. FORCE: *Focus on economic research in contemporary economics, 2(2), 140-156.*

9. Ismail, Y., Musa, I., & Magaji, S. (2025). Analysis of the Impact of Financial Inclusion on Small and Medium Enterprises (SMEs) in Nigeria. *MSI Journal of Economics and Business Management.* 2(2), 10-20. DOI: 10.5281/zenodo.14907488

10. Laeven, L., & Valencia, F. (2018). Systemic banking crises revisited. IMF Working Paper No. 18/206. International Monetary Fund.

11. Magaji, S. & Ahmad, A. I (2024). Assessment of Non-Performing Loans on Deposit Money Banks' Performance During the Digitalized Banking Policy in Nigeria. International *Journal of Research Publication and Reviews* 5 (4), 9625-9634

12. Magaji, S. Musa, I. & Yusuf A.T. (2022). Impact of Covid-19 Lockdown on Savings Mobilisations in Nigeria. *Abuja Journal of Economics and Allied Fields,10(2) 17-25.*

13. Magaji, S., Musa, I. & Dogo, S.S. (2023). Analysis of the Impact of Banking Sector Credits on the Real Sector in Nigeria. *International Journal of Management and Business Applied 2 (1), 12-20.*

14. Magaji, S., Musa, I., & Ismail, Y. (2025). Evaluating the Link between Oil Price and Macroeconomic Dynamics in Nigeria. *New Advances in Business, Management and Economics,* 5(5), 96-115. eBook ISBN: 978-93-49729-26-1, DOI: https://doi.org/10.9734/bpi/nabme/v5/4860

15. Musa, I., Salisu, A., & Magaji, S. (2024). Evaluating the Correlation between specific macroeconomic performance and the price of Crude oil in Nigeria. *Journal of Economics, Innovative Management and Entrepreneurship*, 2(2)

16. Ndubuisi, P., & Eze, O. R. (2021). Non-performing loans and banking sector stability in Nigeria. African Development Review, 33(2), 238-252.

17. North, D. C. (1990). Institutions, institutional change and economic performance. Cambridge University Press.

18. Okoroafor, O.K., Magaji, S. & Eze, J.U. (2018). The Impact of Deposit Money Banks on Capital Formation in Nigeria: 1980-2015. *International Journal of Current Research in Life Sciences,* 7 (8), 2570-2577

19. Sanusi, L. S. (2012). Banking reform and macroeconomic stability in Nigeria. Journal of African Economies, 21(1), 1-20.

20. World Bank. (2020). Global financial development report: Bank regulation and supervision. World Bank Publications.