


BANK GOVERNANCE, ASSET QUALITY, AND RISK. DO MACRO-PRUDENTIAL POLICY AND MACROECONOMIC FACTORS MATTER? EVIDENCE FROM NIGERIA'S BANKING SECTOR

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ARTICLE INFO	ABSTRACT
<p>Article history:</p> <p>Received 01 May 2023</p> <p>Accepted 28 July 2023</p>	<p>Purpose: This study examines the nexus between bank governance, asset quality, and banking risk measured by the distance to default (DTD) and their interactions with prudential policy and macroeconomic factors.</p> <p>Theoretical framework: This study uses the Resource Based View (RBV) lens to examine how banks use their unique resources, asset, competencies, and governance framework to mitigate the adverse impact of risks and navigate regulatory policies and macroeconomic variables. The RBV provides context on banks' unique resources to optimise their long-term objectives in a complex economic landscape.</p> <p>Design/Methodology/Approach: The study analyses panel data from 12 listed banks on the Nigeria Stock Exchanges (NGX) from 2008 to 2021. This study tests autocorrelation, heteroskedasticity, and cross-sectional dependence to validate the study's analysis. Based on various diagnostic tests, the Feasible Generalised Least Squares (FGLS) are suitable for hypothesis testing.</p> <p>Findings: The findings revealed that bank governance interaction with asset quality has a negative and insignificant impact on bank risk. And liquidity, interest rate, inflation and gross domestic product are significant determinants of banking risk.</p> <p>Research, practical & social implications: Maintaining effective bank risk management requires adherence by all stakeholders to macro-prudential policies by monetary policymakers and macroeconomic factors from the fiscal policymakers.</p> <p>Originality/Value: This study empirically examines bank governance, asset quality, and banking risk in a developing country, incorporates macro-prudential policies and macroeconomic factors, and uses the DTD metric for risk assessment rarely used in related studies in developing countries.</p>
<p>Keywords:</p> <p>Asset Quality; Corporate Governance; Bank Risk; Prudential Policy; Macroeconomic Factor.</p> <div data-bbox="172 1021 480 1267" style="text-align: center;">  </div>	<p>Doi: https://doi.org/10.26668/businessreview/2023.v8i8.3054</p>

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CONTROLE BANCÁRIO, QUALIDADE DE ATIVOS E RISCO. A POLÍTICA MACROPRUDENCIAL E OS FATORES MACROECONÔMICOS SÃO IMPORTANTES? PROVAS DO SETOR BANCÁRIO DA NIGÉRIA

RESUMO

Objetivo: Este estudo analisa a relação entre a governança bancária, a qualidade dos ativos e o risco bancário medido pela distância ao incumprimento (DTD) e suas interações com a política prudencial e os fatores macroeconômicos.

Estrutura teórica: Este estudo usa a lente RBV (Resource Based View) para examinar como os bancos usam seus recursos exclusivos, ativos, competências e estrutura de governança para mitigar o impacto adverso dos riscos e navegar por políticas regulatórias e variáveis macroeconômicas. O RBV oferece contexto sobre os recursos exclusivos dos bancos para otimizar seus objetivos de longo prazo em um cenário econômico complexo.

Design/Methodologia/Abordagem: O estudo analisa dados de painéis de 12 bancos listados na Bolsa de Valores da Nigéria (NGX) de 2008 a 2021. Este estudo testa a autocorrelação, heterocedasticidade e dependência transversal para validar a análise do estudo. Com base em vários testes diagnósticos, os Mínimos Quadrados Generalizados Viáveis (FGLS) são adequados para o teste de hipóteses.

Conclusões: As conclusões revelaram que a interação da governança bancária com a qualidade dos ativos tem um impacto negativo e insignificante no risco bancário. Além disso, a liquidez, a taxa de juro, a inflação e o produto interno bruto são determinantes significativos do risco bancário.

Investigação, implicações práticas e sociais: A manutenção de uma gestão eficaz dos riscos bancários exige a adesão de todos os intervenientes às políticas macroprudenciais por parte dos decisores de política monetária e a adoção de fatores macroeconômicos por parte dos decisores de política orçamental.

Originalidade/Valor: Este estudo examina empiricamente a governança bancária, a qualidade dos ativos e o risco bancário em um país em desenvolvimento, incorpora políticas macroprudenciais e fatores macroeconômicos e usa a métrica de DTD para avaliação de riscos raramente usada em estudos relacionados em países em desenvolvimento.

Palavras-chave: Qualidade dos Ativos, Governança Corporativa, Risco Bancário, Política Prudencial, Fator Macroeconômico.

GOBERNANZA BANCARIA, CALIDAD DE LOS ACTIVOS Y RIESGO. ¿IMPORTAN LA POLÍTICA MACROPRUDENCIAL Y LOS FACTORES MACROECONÓMICOS? EVIDENCIA DEL SECTOR BANCARIO DE NIGERIA

RESUMEN

Objetivo: Este estudio examina el nexo entre la gobernanza bancaria, la calidad de los activos y el riesgo bancario medido por la distancia al impago (DTD) y sus interacciones con la política prudencial y los factores macroeconómicos.

Marco teórico: Este estudio utiliza la perspectiva basada en recursos (RBV, Resource Based View) para examinar cómo los bancos utilizan sus recursos, activos, competencias y marco de gobernanza únicos para mitigar el impacto adverso de los riesgos y navegar por las políticas reguladoras y las variables macroeconómicas. El RBV proporciona contexto sobre los recursos únicos de los bancos para optimizar sus objetivos a largo plazo en un panorama económico complejo.

Diseño/Methodología/Enfoque: El estudio analiza datos de panel de 12 bancos cotizados en la Bolsa de Valores de Nigeria (NGX) de 2008 a 2021. Este estudio evalúa la autocorrelación, la heteroesquisticidad y la dependencia transversal para validar el análisis del estudio. Sobre la base de varias pruebas diagnósticas, los Mínimos Cuadrados Generalizados Factibles (FGLS) son adecuados para las pruebas de hipótesis.

Hallazgos: Los hallazgos revelaron que la interacción de la gobernanza bancaria con la calidad de los activos tiene un impacto negativo e insignificante en el riesgo bancario. Y la liquidez, la tasa de interés, la inflación y el producto interno bruto son factores determinantes importantes del riesgo bancario.

Investigación, implicaciones prácticas y sociales: El mantenimiento de una gestión eficaz del riesgo bancario requiere la adhesión de todos los interesados a las políticas macroprudenciales por parte de los responsables de las políticas monetarias y los factores macroeconómicos por parte de los responsables de las políticas fiscales.

Originalidad/Valor: Este estudio examina empíricamente la gobernanza bancaria, la calidad de los activos y el riesgo bancario en un país en desarrollo, incorpora políticas macroprudenciales y factores macroeconómicos, y utiliza la métrica de DTD para la evaluación del riesgo que rara vez se utiliza en estudios conexos en los países en desarrollo.

Palabras clave: Calidad de Activos, Gobierno Corporativo, Riesgo Bancario, Política Prudencial, Factor Macroeconómico.

INTRODUCTION

The failures of Silicon Valley Bank and Signature Bank at the beginning of March 2023 were one of the largest in the United States of America (US) history. This event prompted swift action by the US Government to prevent potential financial contagion. Simultaneously, Credit Suisse Investment Banking Group experienced a run on its assets, resulting in its sudden demise. To ensure the financial system's stability, the Swiss government facilitated the acquisition of Credit Suisse by UBS, which included a form of bailout. This event triggered a global panic in the financial system, similar to the 2007-2008 US-global financial crisis. Nigeria had also experienced a similar banking crisis, as recently as in 2021, when the Central Bank of Nigeria (CBN) sacked the entire board of directors (excluding the MD/CEO) of Nigeria's oldest bank and one of the Domestic Systemically Important Banks (D-SIBs) or 'too-big-to-fail' banks-. The Apex Bank and regulator (CBN) defended their actions by citing deteriorating asset quality, inadequate corporate governance, and inadequate risk management.

According to Emefiele (2021), these measures aimed to protect minority shareholders' interests, stakeholders (depositors), and the banking industry. The recent intervention mirrored the banking crisis of 2009-2010 when the CBN intervened in eight banks, leading to three of the bank's transition to bridge banks and eventually offered for sale and acquired. In all these cases of bank failures, the government, through the asset management company of Nigeria (AMCOM) and the CBN, provided bailouts and liquidity to protect these banks' failures from contagion effect on the entire banking industry. But, again, the various joint stress test and examinations undertaken by the CBN and the Nigeria Deposit Insurance Commission (NDIC) highlighted three significant factors for the failures of these banks; poor corporate governance, deteriorating asset quality, and ineffective risk management (Alade, 2012).

Before the CBN/NDIC special examination of the entire banking industry in 2009, the regulator had adopted some monetary policies such as the reduction of monetary policy rate (MPR) from 10.25 per cent to 6.00 per cent as of July 2009 and the reduction of liquidity ratio from 40.00 per cent to 30 per cent as well as Cash Reserve Requirement (CRR) from 4.00 per cent to 1.00 per cent in response to the global financial crisis after effect. However, these monetary policies had little or no positive impact on banks' resilience. According to Oni (2012), these monetary policies were ineffective as the major threats to the financial system were

macroeconomic factors and governance issues, such as sudden capital inflows, corporate governance failures, inadequate disclosures, gaps in the regulatory framework, and lack of investors and consumers sophistication.

When banks fail, it often brings to light issues related to corporate governance, asset quality, and banking risks. These investigations commonly question the role of the regulator. The investigation primarily assesses how the regulator's macroprudential policies may have contributed to or facilitated the banking crisis. The costs of intervening in failing banks have significant implications for all parties involved. For instance, in Nigeria's 2009 banking crisis, the government injected \$4.13 billion (N620 billion) of taxpayers' monies in bailouts during the 2009–2010 Nigeria financial crisis to prevent contagion from impacting the entire banking ecosystem (Oni, 2012).

Empirical research examining these three significant factors identified as affecting the banking sector in Nigeria is scarce, as the existing literature is more fixated on the relationship between some of these factors on profitability or financial performance (Akpan & Riman, 2012; Babatunde & Akeju, 2016; Joshua, Efiong & Imong, 2019; Ibrahim & Danjuma, 2020; Herbert & Agwor 2021). Although financial performance is essential to the long-term stability of the banking industry, it was never a significant issue as most of the interventions by the regulator have always been on 'profitable banks'. Others have examined asset quality mostly proxy by non-performing loans (Adegboye, Ojeka & Adegboye, 2020) and corporate governance, risk management, and financial performance (Kafidipe et al., 2021). The banking sector in Nigeria is a critical component of the economy and plays a significant role in driving economic growth and development. However, the industry has its peculiar risks, as evidenced by past financial crises. Therefore, understanding the factors that influence the banking risk of quoted banks in Nigeria is crucial for ensuring the stability and resilience of the sector.

The CBN's intervention in sacking the Board of Nigeria's oldest bank in 2021 based on poor corporate governance practices, deteriorating asset quality, and inefficient risk management, when juxtaposed with the Nigerian banking crisis interventions in 2009-2010, has re-emphasised the importance of this study. Therefore, this study incorporates all the significant factors that may be determinants of banking risk mitigation undertaken in the banking system from 2008 to 2021, providing new insights on the possible impact of macro-prudential policy, macro-economic factors, corporate governance, and asset quality on banking risks.

This study investigates the potential impact of bank governance interactions with asset quality on bank risk. Additionally, we aim to examine whether macro-prudential policy and macroeconomic factors moderate the causal relationships and interactions between these variables. Existing studies have not addressed these interactions between bank governance, asset quality and bank risk. In context, the CBN have, over the years, reiterated that declining asset quality (NPA), poor corporate governance and inadequate banking risk management have been reoccurring challenges in the Nigeria financial system. And one of the tools available to the CBN to address this issue is the use of macroprudential policy. However, how effectively have these macroprudential policies addressed asset quality and banking risk? This study aims to provide these answers.

The present research offers three distinct contributions to the extant literature. Firstly, it adds to the current body of knowledge by providing empirical evidence on the influence of asset quality, corporate governance, and bank risk. Secondly, it examines the impact of macro-prudential policy and macroeconomic factors on these interactions. Lastly, it achieves these objectives within a single study. This study employs the distance to default (DTD) to assess bank risk. The study departs from prior research that relied on other banking risk proxies such as Zscore- (Lepetit et al., 2021; Anginer et al., 2014), Loan loss provision to net interest revenue (LPNR)- Kyei et al., 2022), Capital Adequacy ratio (CAR)- (Wu & Shen, 2019; Bitar et al., 2018), and others to measure bank risk.

The subsequent section of this paper is organised in the following manner: Section Two reflects on the theoretical framework by reviewing the literature and developing hypotheses. The paper's third section outlines the methodology employed, the dataset used, and the definition of variables. The fourth section of the paper presents the results and discussions, and Finally, the fifth section draws conclusions and outlines limitations and policy implications.

THEORETICAL FRAMEWORK

The Resource-Based View (RBV) framework acknowledges that banks possess distinctive human resources that can be leveraged to gain a competitive advantage in the industry. Non-executive directors can provide strategic and unique resources to banks as board members. Moreover, executive directors responsible for the bank's day-to-day activities also possess unique resources deployed to manage their relationship with the shareholders as agents of the principal, thus aligning their interest with that of the principal for the overall strategic goal of the firm. According to the RDT literature, firms utilise distinctive and non-replicable

resources to generate further resources. The resources referred to in this context comprise tangible and intangible assets, such as knowledge and experiences, as Wernerfelt (1984) and Barney (2018) noted. According to Johnson, Daily, and Ellstrand (1996:410), resource-based theorists emphasise using representatives from interdependent organisations to obtain access to resources crucial for firm success. This theory expands the scope of corporate governance to encompass the strategic management perspective of the firm, with a particular focus on the organisational theory viewpoint. The directors are responsible for maximising resources and optimising the company's objectives. The resources available to a business can be categorised as tangible or intangible. These resources may include knowledge of laws, technology, competition, patents, access to equity and capital, relationships with customers, creditors, and other stakeholders, market awareness, political and socio-economic connections, cultural identity, and business networks.

Through the resources dependency theory lens, board structure studies focus on how inside and outside directors manage agency and stakeholder relationships using available resources. Hillman et al. (2000) and Pearce and Zahra (1992) associated the resource dependency theory (RDT) role of directors with the environment, past performances, and strategies. Mizuchi and Stearns (1988) argue that capital availability is the primary resource challenge for corporations in times of uncertainty.

Research utilising the RDT lens in the context of corporate governance provides a unique theoretical viewpoint on the internal corporate governance structure. The board of directors can improve a company's financial performance (Pfeffer and Salancil, 1978; Muth and Donaldson (1998) elaborate on the role of network connections in determining the predictions of the resource dependency theory using a matrix. Firms utilising resources and network connections tend to exhibit high performance, as expected. Muth and Donaldson (1998) state that board independence or management does not affect better performance predictability. Asset quality and corporate governance impact banking risk theoretically, but to what extent? And which specific corporate governance metrics and asset quality interactions affect banking risk as proxied by the distance to default (DTD)? Therefore, this study fills this literature gap by answering these questions. However, this study relates to very few studies examining the interactions between corporate governance, asset quality, and banking risk, such as Gaganis et al. (2020), Meuleman and Vander Venet (2020), and Altunbas et al. (2018). Also, to establish this relatedness, this study had to expand the scope of some variables to mirror the variables within the context of the uniqueness of the banking industry in Nigeria.

Literature Review on Bank Governance and Asset Quality Interactions

The literature on the relevance of board structure, particular board size and banks' asset quality is vast. The proponents of large board size argue that a large board will have a larger pool of knowledgeable and experienced directors to deliver effective monitoring and oversight functions that can reposition the firm for optimal performance (Dalton et al., 1999). In addition, according to Coles et al. (2008), banks that require options for effective decision-making rely on large boardrooms to provide the needed advice to advance the bank's strategic goals. Pfeffer and Salancik (2003) postulate that a large board size fits into the resource dependence theory because a large pool of remarkable directors provides distinct resources for the firm. Therefore, when the bank has a large group of very knowledgeable directors, it is more certain there has the expertise to implement policies that may significantly reduce the bank's non-performing assets ratio to a sustainable level.

Also, Tarchouna, Jarraya and Bouri (2021) assert that the quality of banks' assets depends on their size. Using the dynamic GMM estimation technique to analyse data on 184 US banks from 2000 to 2013, the researchers report that small banks had a poor or low level of corporate governance system, contributing to their lousy asset quality (loan quality). And these findings on small banks can be explained by relying on personal connections to create loan portfolios. On the other hand, the medium-sized banks had sound corporate governance and moderate asset quality. However, the corporate governance system of larger banks is neutralised by excessive lending practices due to the pressure of enormous liquidity. Therefore, Tarchouna et al. (2021) concluded that a bank's asset quality depended on the bank's size.

Shukla, Narayanasamy and Krishnakumar (2020) researched the impact of board size on accounting returns and assets quality of Indian banks, using National Stock Exchange (NSE) data. With a sample of 29 listed banks from 2009 to 2016, the ratio of gross NPL to total assets proxied the asset quality. According to Shukla et al. (2020), board size is an insignificant determinant of asset quality in Indian banks. Gupta and Sharma (2022) report a similar negligible association. De Andres and Vallelado (2008) and Klein (2002) support a more extensive board size than a small board as a larger board size enhances the prospects of harnessing the specialisation diversity of more resourceful persons, which board members can utilise to optimise their monitoring functions. Furthermore, existing studies report mixed findings on the board size and asset quality relationship. Moreover, empirical evidence of this significant negative nexus between board size and asset quality has been reported in studies; Huang (2010) based on banks in Taiwan, O'Sullivan et al. (2016), and Hunjra et al. (2021)

In contrast, some other studies (Rehman et al., 2016; Dogan and Eksi, 2020; Tarchouna et al., 2021) found that large board size corresponds to substantial non-performing assets, thus establishing that there is a significant positive relationship between board size and asset quality. Furthermore, Tahir et al. (2020) and Nyor and Mejabi (2013) report a positive but insignificant relationship. The positive relationship reaffirms earlier studies such as Yermack (1996) and Lipton and Lorsch (1992), which argued that smaller-sized boards are more efficient in decision-making and execution, asserting that smaller boards can effectively manage the quality of their assets.

For instance, some studies (Zagorchev and Gao, 2015; O'Sullivan et al., 2016; Dogan and Eksi, 2020; and Hunjra et al., 2021) report that there is a significant, albeit negative, relationship between non-executive directors and asset quality of banks in USA, China, and Pakistan. These studies all used the regression analysis estimation method, and asset quality was proxied by Non-Performing Loans to total loans (NPL), except for Zagorchev and Gao (2015). They used non-Performing assets to total assets (NPA). These studies present empirical evidence affirming that the more non-executive directors banks have on their boards, the lower the bank's NPL or NPA ratio. A lower ratio implies the bank has better asset quality.

The ability of non-executive directors to curtail the threats posed by increasing NPL or deteriorating asset quality suggests that non-executive directors are very influential in their delegated oversight monitoring role. However, Lu and Boateng (2018) failed to accept the significant negative relationship between non-executive directors and asset quality and asserted a significant positive relationship. Thus, this implies that an increase in the number of non-executive directors corresponds to a proportional increase in banks' non-performing loans (NPL) or asset quality deterioration. Furthermore, Nyor and Mejabi (2013) found that although the relationship is positive, it was insignificant.

The literature also reports mixed findings regarding board meetings and firm performance; Khatib and Nour (2021) found that board meetings significantly negatively affect firm performance. The contradictory evidence from existing studies on board size and independence on the asset quality of banks, both in terms of the methodology used, theoretical lens and empiricism, coupled with the scarcity of studies on these relationships in the Nigerian banking system, provide this study with the motivation to fill this gap in the literature.

Bank Governance, Prudential Policy, Macroeconomic Factors and Bank Risk

The literature on board structure, banking risk, profitability and the influence of macro-prudential policies and macroeconomic factors has also produced inconclusive results. Malahim (2023) assert that the expertise of the board risk committee members in terms of the size of the committee itself, members' qualifications, independence, and meetings attendance are critical factors that determine banks' voluntary risk discourse, which helps mitigate adverse risk exposures. According to Malahim (2023), based on a study of a sample of 18 banks in Jordan, there is a negative and significant relationship between the expertise of risk management committee members, especially in Accounting or Finance, to the banks' market-to-book value (bank value). Aside from the expertise of risk management, several studies have also examined the impact of macroeconomic factors on the profitability of banks in developing countries which has an indirect effect on banking risk, with mixed findings; Al-Sharif (2023) and Amzal (2016) found that there is a positive and significant relationship between macroeconomic factors (except foreign direct investments) on banks profitability. In contrast, Agwu et al. (2020) and Kanwal and Nadeem (2013) report an insignificant impact of macroeconomic factors on bank performance.

Using a sample of 356 large banks across 50 countries from 2002-2017 and various regression analyses, Gaganis et al. (2019) examined the interaction of macroprudential policies such as CAR with corporate governance on banking risk. The authors found that using macroprudential policies, such as capital adequacy requirements and loan-to-value ratio limits, is associated with lower bank risk levels. Additionally, they found that the effectiveness of these policies depends on the quality of a bank's corporate governance. Specifically, Gaganis et al. (2019) found that banks with stronger corporate governance structures can better implement and benefit from macroprudential policies. In addition, the authors identified a statistically significant interaction between corporate governance structures and macroprudential regulations in the formation of banking risk.

Additionally, corporate governance has a positive (or negative) influence on banking risk without macroprudential policies. However, this effect becomes negative when several macroprudential policies are in place. Gaganis et al. (2019) also state that the influence of macroprudential measures on bank risk is more pronounced in countries with lower institutional quality. Also, they show that the efficacy of macroprudential interventions may be substantial in nations with poorer regulatory systems and governance. Overall, the study offers significant insights into how macroprudential policies and corporate governance can operate together to

lower bank risk and emphasises the significance of integrating both aspects in financial regulation and oversight. Their findings show that to minimise bank risk, regulators should evaluate the design and implementation of macroprudential rules and the quality of corporate governance within banks.

In a related study, Altunbas et al. (2018) examined the impact of macroprudential policy on bank risk. Their study used empirical models and statistical techniques to analyse the data from a sample of 3,177 banks from 61 advanced countries and developing economies; from 1990-2012). Altunbas et al. (2018) discovered that using macroprudential policies is associated with lower bank risk levels. Also, they found that the macroprudential index (MPI) and corporate bank governance interaction are statistically significant when Zscore measures banking risk. The interaction of MPI*BCG has a positive coefficient with Zcore (logarithm of the Z-score) and DTD but a negative coefficient with POD (Probability of default). They also claim that capital buffers and loan-to-value ratio limit or reduce bank risk. Furthermore, the authors discovered that the effectiveness of macroprudential policies in reducing bank risk depends on the policies' design, the country's institutional quality, and the characteristics of the banking sector. Finally, the study's findings suggest that policymakers should carefully consider the design and implementation of macroprudential policies to maximise their effectiveness in reducing bank risk.

Moreover, in terms of macroeconomic factors' impact on banking risk, previous studies (Benbouzid et al., 2017; Naifar, 2010; Bevan and Garzarelli, 2000) also reported that macroeconomic variables significantly affected banking risk. Di Tommaso and Thornton (2020) examined the relationship between environmental, social, and governance (ESG) scores and European banks' market value and risk-taking behaviour. The authors use the dynamic panel GMM estimator to examine a sample of 81 banks with headquarters in 19 European countries between Q3 2007 and Q4 2018. They discovered that ESG scores are associated with a moderate decrease in risk-taking for both high- and low-risk banks. However, they detract from bank value, indicating a decline. The results are robust to alternative measures of risk and value and estimation methodologies, and the key results hold for each of the ESG score's subcomponents. In another related study, Meuleman and Vander Vennet (2020) investigated the effectiveness of the macroprudential framework in addressing the possible systemic risk of banks in Europe between 2000 and 2017. Findings from this study postulate that, on average, banks benefit individually from macroprudential tools, and the risk-shifting effect was more significant with banks focused on retail banking.

Benbouzid et al. (2022) examined a daily data set of 4939 credit default swaps of 70 banks from 25 countries from 2010-2019 on asset quality, liquidity risk, and bank capital. And the analysis used econometric methodology with variables such as; Non-performing assets (asset quality), Liquidity ratios, capital ratios (counter-cyclical capital buffer-CCyB), efficiency ratios and leverage ratios. Benbouzid et al. (2022) found evidence that CcyB tightening decreases bank-level credit risk, and loosening CcyB does not significantly impact capital. Therefore, the study concludes that macro-prudential policies, especially on levels of capital held by banks, are effective in containing financial market risks. Similarly, Kyei et al. (2022) report a significant negative relationship between bank risk (LLPNR) and gender diversity, CEO duality, and board meetings. And a negative relationship between bank risk (LLRGL) and gender diversity, board meetings, and a negative relationship between bank risk (LLRGL) and board size and independence. Improving corporate governance practices in African banks can help mitigate bank risk and improve the financial system's stability.

Also, Felicio et al. (2018) investigated the relationship between banking risk and the CG mechanism of Europe's 97 largest listed banks with a dataset observation of 404 from 2006 to 2010. Their study used panel data analysis with the fixed effects model. This study examined nine corporate governance metrics: board size, CEO duality, director age, and meeting frequency. In addition, systemic and total risks were employed to measure banking risk (the standard deviation of stock returns). The size of banks, the eurozone, and per capita GDP serve as three control variables. According to Felicio et al. (2018), CEO duality and banking risk are negatively related, while board size and banking risk are positively correlated.

Puspitasari et al. (2021) examined the factors influencing the likelihood of rural Indonesian banks defaulting between 2009 and 2018 using a sample of 304 banks. They utilised the following variables: NPL, Operation Efficiency (OP), LDR, ROA, and NIM. The results indicated that net interest margin (NIM) as a proxy for market risk, non-performing loans (NPL), and operational efficiency significantly impacted default risk. In contrast, the loan-to-deposit ratio (LDR) did not. In conclusion, the study asserts that to generate high returns for rural banks; banks must implement risk management and meet regulatory requirements (macro-prudential policy) to resist risk and comply with bank governance. In a related study with a focus on interest rates, liquidity, and credit risk nexus on bank profitability, Nurfadillah et al. (2023), based on a study of 31 banks in Indonesia from 2017-2021, found that liquidity risk negatively and significantly impacts large banks' profitability. In contrast, credit risk negatively

impacts small and large banks' profitability. According to Nurfadillah et al. (2023), changes in interest rate are more sensitive to smaller than large banks.

Velliscig et al. (2022) paper investigates the relationship between capital and asset quality regarding provisioning and coverage policies, bank risk, and performance from 2005-Q1 to 2018-Q4. Also, the study used panel data from 63 banks across 22 European countries. The following variables were used; Risk (Idiosyncratic risk, systematic risk, Z-Score, distance to default), Performance (EVA, ROA, P/BR), Total capital ratio, leverage, and Texas ratio spread. The empirical findings by Velliscig et al. (2022) indicate a significant and negative relationship between the simple book leverage ratio and equity volatility. They also report a positive and statistically significant relationship between the Z-score and the distance to default. In the absence of literature extending the existing literature on this tripod of bank governance, asset quality and banking risk in Nigeria, we formulate the following main hypothesis.

H0: The interactions of board structure, asset quality, and macroeconomic factors do not significantly impact banking risk.

METHODOLOGY

This study's main objective is to explore the association between bank governance, asset quality, and banking risk using panel data estimation methods and apply the pooled ordinary least square (OLS) to investigate the relationships between these variables and its interactions with macro-prudential policy and macro-economic factors; this study estimation technique was influenced by the dynamic panel dataset used for this study. The combined panel data matrix set provides several different estimating methods. In addition, it comprises a time series for each cross-section member in the data set (Reed and Yu, 2011). The typical form of this expression is:

$$Y_{it} = \alpha + \beta X_{it} + u_{it} \quad (eq\ 1)$$

Y denotes the dependent variable, and X represents the vector of independent variables. The subscripts i and t depict cross-sections (N) and time/periods (T). Finally, α and β are parameters to be estimated. This study employed a linear panel data model that can be estimated using different methods: (a) with a common constant-pooled ordinal least squares (Pooled OLS), (b) the fixed effects model (FEM), and (c) the random effects model (REM), and Feasible generalise least squares (FGLS) model.

Sample Design and Data Collection

The initial sample for this study includes all commercial banks listed on the Nigeria Stock Exchange (NGX). Nigeria had twenty-four commercial banks, three non-interest banks, and six merchant banks as of December 2021 (CBN, 2021). A purposeful sampling technique was used to select the final sample size for this study. In terms of the validity of the dataset, listed banks must adhere to SEC regulations and regulatory mandates to prepare their financial statements according to best practices. In addition, the CBN scrutinises banks' governance and financial reports before making them public. As of 2021, the 14 publicly traded banks hold 14.11% of the NGX market capitalisation and 98.58% of total bank assets of N59.24 trillion (CBN, 2022). However, due to incomplete data, two banks were excluded, bringing the final sample size to 12. In addition, we hand-collected data on the independent variables-bank governance measures (board size, board independence, board meetings, board audit committee meeting)-from the corporate governance reports published in the annual reports of the sampled banks. In this study, we collected pertinent data from various reputable sources, including Bloomberg's financial database, official publications and reports from the Central Bank of Nigeria (CBN), and relevant statistical compilations provided by the World Bank. Adopting this comprehensive methodology facilitated the acquisition of robust and dependable data for the research.

Table 1: Selected Sampled Banks and their sizes as of December 2021.

S/N	Sampled listed Banks	Total Assets (N" Millions)-2021
1	Access Holdings PLC	11,731,964.93
2	Ecobank Transnational Inc	11,685,649.00
3	Zenith Bank PLC	9,447,843.00
4	FBN Holdings Plc	8,932,373.00
5	United Bank for Africa PLC	8,541,318.00
6	Guaranty Trust Holding Co PLC	5,436,035.00
7	Fidelity Bank PLC	3,289,536.00
8	Stanbic IBTC Holdings PLC	2,746,778.00
9	Union Bank of Nigeria PLC	2,595,769.00
10	FCMB Group Plc	2,493,197.63
11	Sterling Bank PLC	1,624,278.00
12	Wema Bank PLC	1,175,490.12

Source: Authors (2023) Based on sample banks' annual reports.

Variables Description

Due to the context of this study, it is important to clearly outline the dependent, independent, and control variables in this section of the paper. This study uses two dependent variables: the distance to default (DTD) proxy bank risk and the Non-performing loan to total loans proxy asset quality.

The Distance-to-Default (DTD)

The distance to default is a key metric in Robert Merton's default risk model that estimates the distance between a firm's current asset value and default point. As a result, the DTD can be used as a risk management and decision-making tool. Also known as the structural credit risk model or Merton model, it is based on the principles of option pricing theory (Merton (1974)). In the context of this study, DTD estimates the probability of default for a bank or an individual borrower. The basic formula for the Merton model is as follows:

$$PD = N(-d2) \quad (\text{eq 2})$$

$$d2 = [\ln(V / D) + (r - q - \sigma^2/2) * T] / (\sigma * \sqrt{T}) \quad (\text{eq 3})$$

Where:

PD = probability of default

N = Cumulative standard normal distribution function

V = Market value of the bank's assets

D = Face value of the banks' debt

r = Risk-free interest rate

q = Dividend yield (if applicable)

σ = Volatility of the bank's asset returns

T = time to maturity of the debt

The DTD measures the number of standard deviations a bank's asset value can decline before it reaches its default point. The default point is the value at which the bank's assets are equal to its liabilities (Coccoresse and Santucci, 2019). When the DTD is lower than a certain threshold, it indicates a high risk of default. The DTD model assumes that the banks' asset value follows a lognormal distribution and that the asset value volatility is constant over time. The model also assumes that the bank's debt is risk-free and that the interest rate is constant over time. Few studies have used the DTD to measure bank risk (Harada et al., 2010; Blundell-Wignall and Roulet, 2013; Eichler and Sobański, 2016) with varying degrees of results. And Harada et al. (2010) affirmed that the DTD was useful in predicting the crisis in the Japanese banking industry when they examined the DTD of failed Japanese banks between 1985 to 1992. Although Harada et al. (2010) noted that DTD failed to predict failures in some banks, they retracted that these results (failure to predict) were partly due to a lack of transparency in financial statements and disclosure information.

Non-Performing Assets (NPA)

The second dependent variable is the NPA. These are risk assets or loan advances that are created and advanced by banks to firms/borrowers for which there is a default or arrears. Debts tend to become non-performing if it's not recovered within 90 days. It is calculated as follows;

Asset quality = The ratio of non-performing assets (NPA) to total assets. As a proxy for asset quality, a lower NPA below the prudential policy maximum of 5.00 per cent is considered healthy/good/efficient asset quality. On the other hand, above 5.00 per cent is deteriorating or poor asset quality.

Independent Variables: bank governance (Board size, board independence, board meetings, board audit committee meetings)

Several measures have been used in the literature to proxy corporate governance internal mechanisms ranging from CEO-duality, gender diversity, board independence, frequency of committees meetings, board meetings, compensation, ownership structure, CEO connections, board educational and professional experiences, etc. In this study, we settled for the four most relevant board structure measures (Board size, board meetings, board independence, and board audit committee meetings). These four important board attributes are explicitly required based on the corporate governance code for banks and discount houses (2014) and the Nigeria Code of Corporate Governance (NCCG, 2018).

Control Variables: We used one bank-specific variable (Bank size), one monetary policy variable (Monetary policy rate), one macro-prudential policy (liquidity), and two macroeconomic factors (Gross Domestic Product (GDP, %) and Inflation rate (%)). Table 2 provides a summary of the variables measures.

Table 2 Description of Variables

Variable Name & Type	Variable measure	Acronym	Definition
Corporate Governance			
Independent	Board Size	BDS	The number of directors on the board
Independent	Board Meetings	BMT	The number of board meetings held during the reporting period.
Independent	Board Independence	BID	the proportion of non-executive directors to the total board size.
Independent	Board Audit Committee	ACM	The number of audit committee meetings held in a reporting period.
Banking Risk			
Dependent	Distance-to-Default	DTD	Measures the default point value at which the bank's assets are equal to its liabilities, the probability of default.
Asset Quality			
Dependent	Non-Performing Assets	NPA	The ratio of non-performing assets (NPA) to total assets
Control variables			
Bank-specific	Bank size	BKS	Log of bank's total assets
Monetary policy	Interest rate	MPR	Monetary policy rate: The interest rate set by the CBN is a tool to control the money supply and influence economic activity.
Macro-prudential	Liquidity	LDR	Loan-to-deposit ratio: The total loans to total bank deposits as of the financial year's end.
Macroeconomic factors	Inflation rate (%)	INF	measure indicates the rate at which the general level of prices for goods and services in an economy rises over a specific period.
Macroeconomic factors	Gross Domestic Product	GDP	The GDP % represents the economy's growth rate.

Source: Authors' concepts (2023)

Diagnostic Procedure and Pooled Regression Estimators

Diagnostic tests, such as the multicollinearity (VIF mean), check for possible high correlation among the independent variables. Numerous diagnostic tests were considered to facilitate accurate interpretation of results and hypothesis testing, including cross-sectional dependence, Testparm, Breusch-Pagan LM, Hausman test, serial correlation, and heteroscedasticity. The model's parameters were estimated using the Feasible Generalised Least Squares (FGLS) method, which applies when the error term's variance is not constant or when there is a serial correlation among the errors. By estimating the variance-covariance matrix of the errors, FGLS provides an efficient solution to these problems by generating OLS, REM, or FEM estimates based on the GLS. This study considered its data characteristics, the individual (bank-level data), and time effects (study period: 2008-2021) within its panel data when determining which of FEM, REM, and FGLS was most appropriate. The Hausman test informed the decision between FEM and REM, whereas the Breusch-Pagan test guided the choice between OLS and REM. After diagnostic tests, specifically the Pesaran CSD test (FStatistic) and the Woodridge Test for serial correlation, FGLS emerged as the most accurate estimator. Its capacity to address issues of cross-sectional dependence and serial correlation within the model suited it for this study's interpretation and hypothesis testing (Reed & Ye, 2011).

Model Specification and Regression

We employed a pooled panel data regression method to examine the influence of bank governance and asset quality on banking risk. This econometric model adheres to the methodologies utilised in similar research, specifically, the empirical models utilised in studies by Gupta and Mahakumar (2020) and Pham et al. (2022). Our model clearly examines the interactions between governance, asset quality, and risk in the banking sector.

$$DTD = f(BGA, NPA, BKS, LTD, MPR, INF, GDP) \text{ ---(eq 4) } DTD_{it} = \alpha_0 + \beta_1 BGA_{it} + \beta_2 NPA_{it} + \beta_3 BKS_{it} + \beta_4 LTD_{it} + \beta_5 MPR_{it} + \beta_6 INF_{it} + \beta_7 GDP_{it} + \varepsilon_{it} \text{ (eq 5)}$$

Where

DTD_{it} = denotes the bank risk for bank 'i' at a time 't'. Bank risk is quantified using the Distance to Default (DTD)
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BGA_{it} = The Bank Governance Attributes are the key independent variables for bank 'i' at a time 't'; these include Board Independence (BID), Board Size (BSI), number of Board Meetings (BMT), and number of Board Audit Committee Meetings (ACM), respectively.

NPA_{it} = Asset quality, the dependent variable for bank 'i' at a time 't'.

BKS_{it} = Bank size, log of total assets for bank 'i' at a time 't'.

LTD_{it} = Liquidity, loan-to-deposit ratio for bank 'i' at a time 't'. M

PR_{it} = Interest rate, monetary policy rate for bank 'i' at a time 't'.

INF_{it} = Inflation rate, for bank 'i' at a time 't'.

GDP_{it} = Gross domestic product, for bank 'i' at a time 't'.

ε_{it} = Is the disturbance term for bank 'i' at a time 't', capturing unexplained variability in bank risk 'i' ranges from 1 to 12, indexing the banks under consideration, and 't' ranges from 2008 to 2021, spanning the study period.

α_0 = is the intercept term, and the

β = parameters ($\beta_1, \dots \dots \beta_7$) are coefficients that capture the effects of the respective explanatory variables on the Bank risk indicator.

RESULTS AND DISCUSSIONS

Descriptive Statistics

Table 3 shows the details of the summary statistics and the characteristics of the data series used in the study. Mean and median are measures of central tendency. The data set's arithmetic average is the most frequently used mean. At the same time, the median is the value in the distribution that divides the upper 50% from the lower 50% of the distribution. The mean values of ACM, BDS, BKS, BMT, DTD, GDP, INF, LTD, MPR, and NPA are 4.4226, 13.6190, 8.5774, 2562975., 6.4583, 3.1225, 3.8158, 12.3108, 66.4268, 11.3949, and 3.2390 respectively, while the median values are 4.0000, 14.0000, 8.0000, 1644416., 6.0000, 2.8240, 3.9386, 12.1563, 65.8725, 12.0833, and 2.1093. Standard deviation is a measure of variability or dispersion of the data set from the mean. The higher the standard deviation, the further the data set is from the mean. For example, BKZ has the highest standard deviation of 2460294, while DTD has the lowest standard deviation of 1.6267, after ACM at 1.2357. The high deviation from the mean on bank size, In this context, the standard deviation measures the dispersion of 18 total assets among the sampled banks. The high standard deviation of 2,460,294 suggests that the sampled banks' total assets are significantly dispersed. This indicates that banks' total assets vary significantly from the average (mean) value of 2,562,975. In other words, some banks in the sample have significantly above-average total assets, while others have significantly belowaverage total assets. This is due to differences in sample bank size (See Table 1 on the sampled banks' assets size).

The skewness and Kurtosis are measures of the location or position of the data series in the probability distribution. Skewness measures the extent of asymmetry or symmetry of the data series, whether it has a long right or left long tail or is positively or negatively skewed. For example, GDP, LTD, and MPR are negatively skewed, reflecting a left-long tail, while ACM, BDS, BID, BKS, BMT, DTD, INF, and NPA are positively skewed, indicating a rightlong tail.

On the other hand, Kurtosis measures whether the data series is heavily or lightly peaked. It shows greater concentrations of the values, whether above or below the mean. BDS, GDP, INF, and MPR are platykurtic since their values are less than 3 for normal distribution, whereas others are leptokurtic since their values are greater than 3. Probability values of the Jacque-Bera statistic indicate whether the data set exhibits normal distribution. Table 3 revealed that only BDS, INF, and LTD showed normal distribution, while ACM, BID, BKZ, BMT, DTD, MPR, NPA, and GDP did not exhibit a normal distribution.

Descriptive Statistics

Table 3: Descriptive statistics

	ACM	BDS	BID	BKS	BMT	DTD	GDP	INF	LTD	MPR	NPA
Mean	4.4226	13.6190	8.5774	2562975.	6.4583	3.1225	3.8158	12.3108	66.4268	11.3949	3.2390
Median	4.0000	14.0000	8.0000	1644416.	6.0000	2.8240	3.9386	12.1563	65.8725	12.0833	2.1093
Maximum	11.0000	20.0000	14.0000	11731965	16.0000	14.3254	8.0369	16.9528	114.2259	14.0000	25.9000
Minimum	1.0000	7.0000	3.0000	129608.9	1.0000	0.0000	-1.7942	8.0625	0.0000	6.0833	0.0000
Std. Dev.	1.2357	2.8512	1.8780	2460294.	2.3416	1.6267	3.1304	2.6910	17.0843	2.3543	3.1078
Skewness	0.9709	0.1235	0.3740	1.6677	1.1234	2.2801	-0.3468	0.1594	-0.0379	-0.9823	3.2411
Kurtosis	7.9547	2.8011	3.6880	5.4032	4.7977	15.3689	2.0367	2.1761	3.6084	2.8477	19.8311
Jarque-Bera	198.2384	0.7044	7.2299	118.3062	57.9599	1216.485	9.8629	5.4630	2.6319	27.1813	2277.137
Probability	0.0000	0.7031	0.0269	0.0000	0.0000	0.0000	0.0072	0.0651	0.2682	0.0000	0.0000
Observations	168	168	168	168	168	168	168	168	168	168	168

Source: Authors' computations (2023)

Hypothesis Testing and Analysis

The estimated coefficients of Pooled Ordinary Least Squares (OLS), Fixed Effect Model (FEM) and Random Effects Model (REM), as well as Feasible Generalised Least Squares (FGLS) for the hypothesis testing are presented as follows in Table 4;

Table 4: Impact of BGA Interaction with Asset Quality on Banking Risk in Nigeria: Dependent Variable: DTD

VARIABLES	OLS	FEM	REM	FGLS
LNBGA*NPA	-0.2851* (0.1691)	-0.4014** (0.1781)	-0.3252* (0.1721)	-0.2176 (0.1334)
LNBKS	0.0797 (0.1476)	-0.7410** (0.3081)	-0.1614 (0.2053)	0.0279 (0.1282)
LTD	-0.0109 (0.0073)	-0.0288*** (0.0082)	0-0.0203*** (0.0077)	-0.0123** (0.0057)
MPR	0.1572* (0.0910)	0.2394*** (0.0896)	0.1775** (0.0870)	0.2130*** (0.0703)
INFLATION	0.1538*** (0.0571)	0.2003*** (0.0540)	0.1690*** (0.0537)	0.1979*** (0.0419)
GDP	0.2118*** (0.0714)	0.1545** (0.0670)	0.1911*** (0.0671)	0.2391*** (0.0511)
Constant	-0.9215 (2.6314)	11.0909** (4.4267)	2.9377 (3.2033)	-1.6924 (2.0981)
Observations	167	167	167	167
Number of c_id	12	12	12	12
R-squared	0.092	0.237		
Adj. R-squared	0.057			
F-statistic	F(6, 160) = 2.68 Prob > F = 0.017	F(6, 149) = 5.12 Prob > F = 0.00	Wald Chi ² (6) = 12.12 Prob > chi ² = 0.00	Wald Chi ² (6) = 38.27 Prob > chi ² = 0.00
Multicollinearity Test VIF Mean	1.95	-	-	-
Pesaran CSD Test	-	F(6, 149) = 0.60 Prob > F = 0.55	-	-
FE-Testparm	-	F(6, 149) = 5.12 Prob > F = 0.00	-	-
Breusch-Pagan LM Test	-	-	Chibar ² (6) = 13.16 Prob > chi ² = 0.00	-
Hausman Test	-	-	Chi ² (6) = 11.33 Prob > chi ² = 0.08	-
Modified Wald Test for Heteroskedasticity	-	Chi ² (12) = 165.97 Prob > chi ² = 0.00	-	-
Woodridge Test for Autocorrelation	-	F(1, 11) = 0.30 Prob > F = 0.59	-	AR(0.15)

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Source: Authors (2023)

The equation for result analysis is:

$$\begin{aligned}
 DTD_{it} &= \varphi + \varphi_1 LN(BGA * NPA)_{it} + \varphi_2 LNBKS_{it} + \varphi_3 LTD_{it} + \varphi_4 MPR_{it} + \varphi_5 INFLATION_{it} \\
 &+ \varphi_6 GDP_{it} + \varepsilon_t \quad (eq 6)
 \end{aligned}$$

$$\begin{aligned}
 DTD_{it} = & -1.692 - 0.218LN(CGA * NPA)_{it} + 0.028LNBKS_{it} - 0.012LTD_{it} \\
 & + 0.213MPR_{it} + 0.198INF_{it} \\
 & + 0.239GDP_{it}
 \end{aligned}
 \tag{eq 7}$$

The parameter estimates suggest that both the variable BGA*NPA- Bank governance attributes (BGA) interaction with Asset quality (NPA) and Liquidity (LTD) have a negative relationship with banking risk (DTD), implying that an increase in BGA*NPA and LTD would lead to a decrease in DTD. The magnitude of the effect is quantified as follows: a one per cent increase in CGA*NPA would result in a decrease of 0.002 units in DTD, and a one unit increase in LTD would lead to a decrease of 0.012 units in DTD. However, it is important to note that while the relationship for LTD is statistically significant at the 5% level, the interaction relationship between BGA*NPA is statistically insignificant.

On the contrary, the variables; bank size (LNBKS), Interest rate (MPR), Inflation rate (INF), and gross domestic product (GDP) show a positive relationship with banking risk (DTD), indicating that an increase in these variables would lead to an increase in DTD. The magnitude of the effect is quantified as follows: a one per cent increase in LNBKS would result in a 0.0003 unit increase in DTD, and a one unit increase in MPR, INF, and GDP would lead to increases of 0.213, 0.198, and 0.239 units, respectively, in DTD. Among these variables, MPR, INF, and GDP are statistically significant at the 1% level, indicating that they significantly impact DTD. However, LNBKS is not statistically significant.

Furthermore, a Wald chi-square test was conducted to test the significance of individual coefficients in the model to test the hypothesis that bank governance interaction with asset quality significantly affects banking risk. The test resulted in a chi-square value of 38.27 with a probability of 0.00, less than the 0.05 significance level. Based on these results, the null hypothesis is rejected, as there is evidence that bank governance attributes interactions with asset quality, prudential policy, and macroeconomic factors significantly affect banking risk.

DISCUSSION

The DTD reveals how far the bank is from default, implying that an increase in this variable means the bank is farther from bankruptcy or has better risk mitigation prospects. The findings from this study suggest a negative, albeit insignificant, relationship between bank governance interactions with asset quality on banking risk. Therefore, board independence, the board size, board audit committee meetings, board meetings, and asset quality do not necessarily impact banking risk. In context, the solution to banking risk depends not on

corporate governance perspectives but on stakeholders, particularly the executive management, responsible for the bank's day-to-day activities. There are more efficient in managing banking risk than the outside directors, which also involves managing the bank's asset quality. This negative relationship between bank governance and asset quality collaborates with the findings by Gupta and Sharma (2022) and Liang et al. (2013). On-board independence; the findings from this study are similar to the negative and insignificant relationship between board independence and asset quality reported by Huang (2010); Dong et al., 2017: and Tahir et al. (2020). These findings have important implications in theory and practice; firstly, based on the stakeholders' theory and resources base view, executive management brings unique resources to the board, and the fact that they have responsibilities for the day-to-day management of the bank, there are in a much better position to make faster decisions, and manage banking risk.

On bank size, this study found a positive and insignificant relationship between bank size and banking risk. This positive relationship implies that bank size enhances risk management or leads to better risk management as the bank's distance to default increases. This result aligns with the economies of scale theory that suggests that larger banks usually have diversified portfolios which enables them to manage their risk more effectively and efficiently and that larger banks can also attract unique human resources based on the resource dependency theory perspective, with expertise in risk management which helps in mitigating the adverse effect of banking risk. Therefore, as banks' scale increases, their asset quality and deposits base become increasingly diversified, and they can use a much lower capital-to-asset ratio to mitigate financial distress (Hughes et al., 1997; Laeven et al., 2014). However, the insignificance of this positive relationship underlines the need for further investigations, as there are other issues, such as the prudential policy and macroeconomic factors that may impact banking risk aside from bank size, as banks' complexity lies on the premise that banks are in the business of risk.

This study also found that liquidity (loan-to-deposit ratio) has a negative and significant relationship with banking risk. And liquidity is significant at the 5% level, implying that a higher loan-to-deposit ratio constrains the banks' liquidity as a greater portion of the bank's assets is tied to loans with the possible mismatch between its mid to long-term loan assets and short-term deposit liabilities. This situation, therefore, exposes the bank to risks since the bank's liquidity is reduced, thus making the bank more susceptible to default. The CBN's prudential policy requires banks to maintain a minimum of 65% and a maximum of 80% of the loan-to-deposit ratio. Based on the descriptive statistics (see Table 3), the average of the sampled banks' LDR is 66%; in addition to a cash reserves ratio (CRR) of 32.50% and liquidity ratio of 30%,

it seems that Nigeria's banks' liquidity is constrained and should they experience distress, their reserves is robust to provide liquidity shortfall in short to mid-term.

Also, this found that interest rates (MPR), inflation (INF), and gross domestic product (GDP) all have a positive and highly significant relationship with banking risk, as all three variables as statistically significant at the 1% level. This study's interest rate proxy by the MPR suggests an increase in CBN's MPR, which is the benchmark interest rates used by the banks for lending, the further the banks are from default. This could be explained by the fact that commercial banks are the major sources of funding in Nigeria for businesses, individuals and governments, as increased higher interest rates most always translate to increased revenue for banks, which further enhances their reserves and overall financial stability, thus the increasing distance to default. Based on the average rate of MPR at 11.40%, this rate seems optimal for bank risk. However, it should be stated in the context that the period between 2008-2021 was mainly a period of some stability in the global economy, unlike recently, when the Russia and Ukraine conflicts, COVID-19 impacts, and global inflationary pressures, with global central banks including the CBN hiking MPR to rain-in inflation. However, in contrast to this study's finding, Ayomi et al. (2021) report that MPR negatively affects bank risk measured with Zscore as the probability of default.

Inflation is closely related to interest rates; a positive and significant relationship between inflation rate and banking risk implies that as inflation increases, the banks' distance to default increases, meaning better risk management for the bank. In the context of this study, the average inflation rate is 12.31%, and an increase in this level of inflation is positively related to the banks' distance to default. These findings support the reports by Jain and Kamp (2010) that higher inflation rates provide companies with better pricing power, which translate to increased earnings and, therefore, better repayments abilities of their loans, which reduces the incidence of defaults.

Finally, this study found a positive and significant relationship between GDP and banking risk; banks are less prone to default as the economy grows, reflecting better risk management. The GDP growth signifies a striving economy with more productive activities, which translates to lower unemployment rates and increased customer spending, as well as robust business activities of borrowers, which means borrowers can avoid paying down their loans and taking up more loans without fear of default. Garcia et al. (2021) and Felicio et al. (2018) also reported this positive and significant relationship between GDP and banking risk. Therefore, this level of increased economic activities bolsters the bank's sustainable growth

and increases its distance to default. However, as seen with the GDP, banks have no control over these macroeconomic factors so GDP rates can change. Therefore, banks need to maintain their risk management strategies irrespective of the variabilities of the GDP.

CONCLUSION

The period between 2008 to 2021 has witnessed increased incidences of interventions by the apex bank (CBN) on regulatory oversight of banks in Nigeria. And the outcome of the interventions involving the sack of the boards of banks, transition of the distressed banks as bridge banks and eventual sale to new owners, mergers and acquisitions of struggling banks and stronger banks have raised the debate on bank governance to an all-time high since the CBN first introduced the code of corporate governance for banks in 2003. This debate comes on the heels of the reoccurring issues of poor governance, deteriorating asset quality and inadequate risk management as the main issues from the various interventions following the stress testing of banks in Nigeria.

The findings suggest that bank governance, as measured by four corporate governance mechanisms, and its interactions with asset quality have a negative and insignificant relationship with banking risk. Within the frameworks of agency theory, resource independence theory, and stakeholders theory, this result suggests that insider directors (executive directors) of banks bring unique resources that are more effective in managing the day-to-day operations of banks, including the management of liquidity and asset quality. The results also support the existence of a significant and negative relationship between liquidity risk and banking risk, as well as a highly significant and positive relationship between interest rate, inflation rate, and GDP, providing empirical evidence that liquidity, inflation, GDP, and interest rates are prudential and macroeconomic factors that impacts banking risk.

The results of our study have various implications. As evidenced in the existing body of scholarly work, policymakers must persist in fostering a practical corporate governance framework. Implementing macro-prudential policies should be considered as a complementary measure to ensure the long-term sustainability of banks. Given the findings of this study, the agency theory and resource base view perspective, agents of the shareholders (principal), that is, the executive management, are crucial stakeholders in the management of banks. While the board's independence provides responsible monitoring and oversight for the bank, there must be synergy between the agents and the principal to pursue common interests, recognising the immense contribution of the agents to the management of liquidity and banking risk with their

unique internal resources, which include financial and risk expertise based on the resource dependence theory, to bear on the day-to-day activities of the banks.

However, this study has some limitations which future research can extend. This study used DTD to measure banking risk, and the average DTD of the sampled banks is 3.12. Unfortunately, studies using the DTD as a measure of bank risk in Nigeria are scarce, so one of the limitations of this study is our inability to compare the DTD of the banking sector in Nigeria with other industries to ascertain if DTD correctly predicts default risk. Nevertheless, the 3.12 DTD of banks in Nigeria is lower than the mean of 4.96 based on a study of European banks by José García (2022). Although, banks in Nigeria maintain a higher CAR than their European peers. Further studies could also include more variables than our study, notably variables that extend to other micro and macroeconomic and prudential factors and policies in other sub-Saharan African countries using the DTD to proxy bank risks.

In addition, it may be necessary to determine at what level the inflation rate and GDP growth rate are optimally positive and significantly impact bank risk using the measures of distance to default. Analysing the effect of these results if non-performing assets are used as a proxy for credit risk and return on assets is used as a proxy for asset quality is another exciting area of research to consider. Similarly, due to the limitation of this study to listed banks in Nigeria, it would be interesting to expand this research to banks across the sub-Saharan African countries to provide contexts for comparative studies with other studies, particularly on the distance to default (DTD) of banks in Europe, North America, and Asia.

On policy implications, it's important to note that banks rely on various resources, including capital, human resources, and information, to operate effectively and manage risks. Resource dependency theory helps us understand this dependence. It highlights the significance of maintaining diverse resources and managing dependencies to reduce vulnerabilities. Stakeholder theory, on the other hand, acknowledges that banks have multiple stakeholders, including shareholders, customers, employees, regulators, and society at large.

The CBN actively utilises macroprudential policy to safeguard the corporate governance framework concerning asset quality and banking risk to achieve its desired outcomes. This research reaffirms the significance of macroprudential policy, macroeconomic factors, and effective corporate governance in determining banking risk. Policymakers and stakeholders need to devise measures to ensure that banks adhere to the principles-based corporate governance code and non-monetary policy measures that can improve the credit environment, such as implementing Global standing instructions (GSI) for borrowers in mitigating non-

performing loans. In addition, there must be coordination between the fiscal and monetary authorities. Monetary policymakers should continue to fine-tune their micro and macro-prudential policies. At the same time, the fiscal authority ensures that macroeconomic factor-related policies are consistent with the monetary authority's long-term objectives.

Regulators, policymakers, shareholders and bank management should recognise the significance of adhering to a principles-based corporate governance framework for banks to effectively reduce non-performing loans and maintain sound asset quality within the required prudential limits in the interest of all stakeholders. However, macro-prudential policies such as the capital adequacy ratio and loan-to-deposit ratio, monetary policies such as the MPR, and macroeconomic factors, including inflation, and GDP, play more crucial roles in managing and mitigating bank risk. Hence, it is essential to foster holistic interactions among all stakeholders while considering monetary, fiscal, macroeconomic and prudential policies to address the interconnected aspects of corporate governance, asset quality, and banking risk.

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