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Original

Interconnectedness between Corporate Governance, Global Burden of Disease, SARS-CoV and Banking Sector Development in Nigeria: The Role of Institutional Quality

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ABSTRACT

Background: Nigeria's banking sector has experienced profound reforms and restructuring, shaped by governance transitions and recurrent global health crises such as SARS-CoV. However, the nexus between corporate governance, institutional quality, and health shocks, and their joint implications for financial sector development, has not been adequately examined. This study investigates the interplay of corporate governance, institutional quality, and health shocks in influencing banking sector development in Nigeria from 2000 to 2024. It specifically assesses the direct role of governance, the disruptive effects of health crises, and the moderating contribution of institutional quality. By employing QARDL and FMOLS approaches, the study captures both short- and long-run dynamics while identifying structural breakpoints linked to reforms and health disruptions.

Methods: The Quantile Autoregressive Distributed Lag (QARDL) model is applied to estimate asymmetric and quantile-specific effects, while Fully Modified Ordinary Least Squares (FMOLS) validates long-run robustness. Structural break tests are conducted to identify critical periods of disruption.

Results: The results reveal that governance, health shocks, and credit flows interact in quantile-dependent ways. Short-run dynamics highlight the importance of credit persistence, governance quality, and health sector responsiveness, whereas in the long run, the rule of law consistently fosters banking sector growth. Breakpoints in 2004, 2005, 2015, and 2016 coincide with major reforms and health crises.

Conclusion: Strengthening institutional quality, particularly legal and regulatory frameworks, is central to financial resilience. Policy priorities include reinforcing governance through oversight and audits, integrating health risks into financial planning, and leveraging digital innovations to enhance institutional responsiveness.

Keywords: Corporate Governance, Global Burden of Disease, SARS-CoV, Bank Development, Institutional Quality

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INTRODUCTION

The Nigerian banking sector has long stood as a cornerstone of financial stability and a key driver of economic transformation, serving as the primary channel through which surplus savings are mobilized into productive investments that promote capital accumulation and long-term growth.[1] Beyond its traditional role in financial intermediation, the sector advances broader developmental objectives, including economic diversification, financial inclusion, and poverty alleviation.[2, 3, 4] Banks further act as vital conduits for monetary policy transmission, shaping credit allocation, investment decisions, and consumption patterns across the economy.[1, 5] Over the last three decades, the sector has experienced substantial reforms motivated by both domestic imperatives and global financial trends. These include stricter regulatory frameworks, increased capitalization requirements, and the integration of innovative technologies such as digital banking. Collectively, these measures have enhanced resilience, expanded access to financial services, improved risk management, and strengthened investor confidence.[6,7,8] Despite these advances, significant challenges remain. Financial exclusion persists in rural and low-income communities, non-performing loans continue to strain bank balance sheets, and weaknesses in corporate governance have eroded sectoral integrity.[6, 8] External shocks, notably the COVID-19 pandemic and earlier outbreaks like SARS, have intensified sectoral vulnerabilities by reducing household incomes, undermining creditworthiness, and disrupting banking operations.[9] These pressures are further compounded by Nigeria's fragile institutional environment, characterized by regulatory lapses, corruption, and political interference.[10, 11, 12] Such conditions underscore the urgent need to examine the combined influence of corporate governance, institutional quality, and health shocks on the development and resilience of the Nigerian banking sector.[6, 9, 13]

Corporate governance has consistently been recognized as a key determinant of the performance, stability, and long-term sustainability of financial institutions. Strong governance frameworks promote accountability, enhance transparency, and reduce the risks associated with managerial opportunism and insider abuses that have historically destabilized banks.[6, 15] Nigeria provides a clear illustration of both the advantages of effective governance and the costs of its absence. The 2009 banking crisis demonstrated how weak boards, opaque practices, and insider lending rapidly eroded depositor confidence and threatened systemic stability.[5] In response, the Central Bank of Nigeria implemented swift and transformative measures, including stricter codes of conduct, reinforced supervisory oversight, and strengthened accountability structures which collectively restored public trust and stabilized the sector.[6, 14] In contrast, the collapse of Oceanic Bank and Intercontinental Bank highlights the consequences of neglected governance. Insider dealings, inadequate oversight, and poor transparency not only led to institutional failure but also disrupted the wider financial system, generating widespread losses and undermining investor confidence.[15] These contrasting experiences underscore that governance is more than regulatory compliance; it is a foundational requirement for sustainable banking development. Without strong governance norms, reforms can be weakened, investor confidence diminished, and institutions left vulnerable to recurring crises.[6, 15] These reinforces that the resilience of Nigeria's banking system depends not only on regulatory frameworks but also on embedding good transparency, accountability,[14] and effective oversight into everyday operations, ensuring institutions can withstand both internal and external shocks while supporting sustainable growth and stability.

Health-related shocks have profoundly influenced the Nigerian banking sector, affecting both economic performance and financial stability. The global burden of disease, encompassing communicable and non-communicable illnesses as well as injuries, reduces household income, diminishes labor productivity, and diverts resources from savings and investment toward healthcare.[16, 17] Pandemics such as COVID 19 have further disrupted market confidence, bank liquidity, and overall financial stability, underscoring the importance of incorporating health considerations into financial planning and risk management.[3, 18, 19] For banks, these shocks translate into reduced credit demand, higher credit risk, and increased systemic fragility.[20] Epidemics such as Severe Acute Respiratory Syndrome Coronavirus and COVID 19 intensified these challenges, as declining household incomes and financial difficulties among small and medium enterprises led to rising non-performing loans and weakened bank balance sheets.[21] The COVID 19 pandemic also disrupted traditional in-person banking, accelerating the adoption of digital platforms.[21, 22] Although digital banking has

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long been promoted as a modern tool for financial inclusion, the sudden transition exposed gaps in technological infrastructure and widened exclusion, particularly in rural and underserved communities.[17, 23] Simultaneously, investor confidence weakened, capital inflows slowed, and banks revised risk assessment frameworks, increasing provisions for potential loan losses and constraining profitability.[3, 23] Access Bank's 2020 Annual Report illustrates this, highlighting a significant rise in loan impairments and operational costs due to pandemic disruptions.[24] These experiences demonstrate that health shocks are not secondary disturbances but central risks that directly affect financial institutions. They emphasize the need for banking development strategies that integrate health crisis preparedness as a fundamental component.[3,17, 25]

Institutional quality plays a pivotal role in shaping the performance and stability of the Nigerian banking sector. Strong institutions characterized by adherence to the rule of law, regulatory effectiveness, political stability, and control of corruption, provide the foundation for transparent, efficient, and innovative financial practices.[2, 24, 26] Conversely, weak institutions foster inefficiencies, regulatory gaps, and corruption, discouraging investment and undermining sustainable sectoral growth.[2, 25, 26] The 2009 financial crisis exemplifies how institutional weaknesses, including lax enforcement, regulatory capture, and political interference, can trigger systemic instability and reckless risk-taking.[2,6,27] Reforms such as the establishment of the Asset Management Corporation of Nigeria (AMCON) and the strengthening of the Nigeria Deposit Insurance Corporation (NDIC) have introduced important safeguards. However, enforcement gaps and judicial inefficiencies such as difficulties in loan recovery, continue to constrain credit provision to small and medium-sized enterprises, limiting inclusive growth.[2,12,28] Enhancing institutional quality through transparent judicial processes, independent regulatory oversight, and credible anti-corruption initiatives is therefore crucial for sustainable banking development.[6, 24, 29] Empirical evidence underscores that corporate governance and institutional quality act as enablers of resilience and growth, whereas external shocks, particularly health crises such as pandemics and the global burden of disease serve as inhibitors.[17, 23, 30] To explore these dynamics, this study employs advanced econometric techniques, including the Quantile Autoregressive Distributed Lag (QARDL) model, Fully Modified Ordinary Least Squares (FMOLS), and structural break analysis, offering nuanced insights into the interplay between institutional quality and systemic shocks in the Nigerian banking sector. The paper is organized as follows: Section 2 reviews the literature; Section 3 outlines methodology; Section 4 presents results and discussion; and Section 5 concludes with policy recommendations.
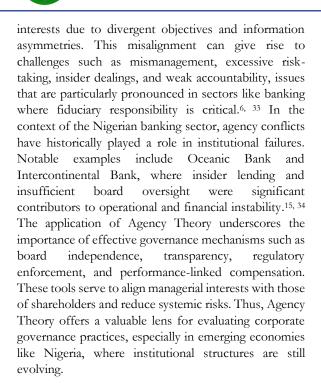
Review of Literature – Theory and Empirical Evaluation

Financial Intermediation Theory

The Financial Intermediation Theory provides a foundational explanation of how financial institutions, particularly banks, facilitate economic growth by acting as intermediaries between savers and borrowers. The theory posits that banks play a crucial role in mobilizing savings, reducing transaction costs, and efficiently allocating capital to productive investments[1,5]. By pooling resources and providing credit to firms and individuals, banks enable economic agents to overcome information asymmetries and liquidity constraints, thereby fostering growth and financial inclusion. In the context of Nigeria, financial intermediation is particularly vital given the high levels of financial exclusion and the need for robust economic development. However, the effectiveness of intermediation is heavily influenced by institutional quality and corporate governance. Weak institutions, regulatory inefficiencies, and poor governance can hinder the ability of banks to allocate resources efficiently, increase credit risks, and reduce trust in the financial system.[5, 31] Thus, the Financial Intermediation Theory provides a valuable lens to examine how banking sector development responds to both institutional dynamics and systemic health shocks.

Agency Theory

Agency theory is widely regarded as a foundational framework for understanding corporate governance. Originally, the theory examines the relationship between principals (shareholders) and agents (managers or executives) within a firm.[32] It emphasizes that agents, who are entrusted to manage resources on behalf of principals, may not always act in the owners' best

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interests due to divergent objectives and information asymmetries. This misalignment can give rise to challenges such as mismanagement, excessive risk-taking, insider dealings, and weak accountability, issues that are particularly pronounced in sectors like banking where fiduciary responsibility is critical.[6, 33] In the context of the Nigerian banking sector, agency conflicts have historically played a role in institutional failures. Notable examples include Oceanic Bank and Intercontinental Bank, where insider lending and insufficient board oversight were significant contributors to operational and financial instability.[15, 34] The application of Agency Theory underscores the importance of effective governance mechanisms such as board independence, transparency, regulatory enforcement, and performance-linked compensation. These tools serve to align managerial interests with those of shareholders and reduce systemic risks. Thus, Agency Theory offers a valuable lens for evaluating corporate governance practices, especially in emerging economies like Nigeria, where institutional structures are still evolving.

Health-Led Growth Hypothesis (HLGH)

The health-Led Growth Hypothesis (HLGH) posits that improvements in population health are fundamental drivers of economic growth, labour productivity, and financial sector performance. Proponents argue that healthier populations participate more actively in economic activities, thereby fostering stronger financial intermediation, institutional development, and long-run growth.[11, 13, 35] Empirical evidence across emerging and African economies demonstrates that institutional quality, through mechanisms such as rule of law, governance efficiency, and regulatory frameworks amplifies the positive spillovers of health improvements on financial development and broader economic resilience.[12, 36] In contrast, a high Global Burden of Disease (GBD), comprising communicable and non-communicable diseases can strain household incomes, reduce workforce productivity, and divert public and private resources from economic activities to healthcare (World Bank, 1993).. For Nigeria, these adverse health conditions weaken the banking sector by eroding savings, increasing loan defaults, and amplifying systemic vulnerabilities. The outbreak of SARS-CoV and related pandemics like COVID-19 has further underscored the relevance of HLGH. Health emergencies disrupted economic transactions, increased

non-performing loans, and compelled banks to reallocate operational resources to risk management and digital infrastructure.[10, 37] The associated uncertainty also reduced investor confidence and limited capital inflows. Thus, HLGH provides a vital framework for understanding how public health challenges directly and indirectly influence banking sector development. In Nigeria's context, the theory highlights the necessity of integrating health policy with financial sector reforms to foster a resilient and inclusive banking environment.

Empirical Evaluation

Empirical studies examining the relationship between board characteristics and firm performance reveal mixed and context-specific results across various countries. a study[32], analyzing 348 firms listed on India's NSE between 2012 and 2018 using OLS fixed effect and GMM regressions, found a significant positive effect of board size on firm performance, identifying optimal board sizes for mid-cap (8) and large-cap (7–18) firms, with market capitalization acting as a moderator. Similarly, a study[38] conducted a meta-analysis on 2,098 firm-year observations from 336 Saudi firms and observed a small but positive relationship between board size and performance metrics such as ROA, ROE, and Tobin's Q. In contrast, this study[34] focusing on 12 listed Saudi banks from 2009 to 2018, found board size only significantly influenced operational ROA. In Kenya, some studies[39, 40] reported that board size had no significant effect on ROE among 26 non-financial firms. In Uganda, studies[41] discovered that nonexecutive directors positively influenced firm performance. However, findings from these countries may not generalize to Nigeria. In Nigeria, an empirical investigation[6] found that board size negatively and significantly impacts the financial performance of listed commercial banks. Similarly, using a system-GMM approach, a study[36], noted that board independence does not significantly predict bank performance. Also, a critical analysis[37] reported that board gender diversity had a negative and significant impact on return on assets (ROA), while board size had an insignificant effect among Nigerian deposit money banks from 2014 to 2020. In Vietnam, similar study[38] found that board size, major shareholders, and CEO duality significantly influence operating efficiency ratio (OER) and ROA, while foreign and institutional investors had minimal effect. From a broader comparative perspective, prior research has applied two-stage dynamic panel and GMM estimation to both developed and emerging markets,

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demonstrating that financial leverage mediates the relationship between corporate governance and firm performance in diverse contexts.[34,36] Lastly, [9], studying 34 Indian commercial banks (2009–2018), concluded that board size and independence positively affect ROA, while a higher proportion of executive directors correlates negatively. Collectively, these studies emphasize that the effects of board characteristics on firm performance are highly dependent on institutional and regional contexts.

Recent research highlights the growing breadth and depth of the Global Burden of Disease (GBD) studies in informing global health policy. One study[12], outlines the evolution of the GBD Study into a robust global collaboration involving over 8,000 scientists in more than 150 countries, providing granular health metrics across thousands of outcomes. Using GBD 2021 data, one study[17] assessed the burden of rare infectious diseases of poverty (rIDPs), revealing sustained and disproportionate impacts in low-income regions, particularly sub-Saharan Africa and South Asia, with children and women of reproductive age most affected, calling for targeted health interventions. Another study[39] reported that air pollution caused 2.46 million cardiovascular disease (CVD) deaths and 58.3 million DALYs globally in 2021, especially among older males, stressing the need for air quality and heart health initiatives. Global dengue burden was nearly doubled since 1990, particularly in South Asia and Latin America, linking it to climate change and sea level rise.[43] Regional inequalities in stroke burden across India, tied to socioeconomic indicators and lifestyle-related risk factors, were highlighted.[44] Additionally, the rising global impact of neurodegenerative diseases, driven by aging populations and worsened by the COVID-19 pandemic, was noted[19, 41, 45], advocating for integrated care systems. Meanwhile, significant data gaps in understanding scabies' health and economic burden, especially in low-income settings, were emphasized[9], urging its inclusion in broader NTD surveillance.

A substantial body of literature has examined the diverse impact of the COVID-19 pandemic on corporate performance, banking stability, and economic systems, particularly in developing countries.[21]. In Nigeria[23], found that liquidity ratios and return on equity (ROE) improved during the pandemic, suggesting a shift in firms' financial performance. Similarly, improved business performance metrics were identified during the crisis[16]. In a regional study, 1331 banks across 18 CESE countries were shown to maintain capital adequacy despite rising nonperforming loans[53] Conversely, a study[15] observed worsening liquidity and financial health in South Asian banks, especially from mid-2020, signaling growing bankruptcy risks. Further investigation[23, 42] revealed a negative impact of the pandemic on Nigerian private firms' financial and operational performance. One study[2] recorded heightened volatility and reduced returns in the Nigerian Stock Exchange, whereas other evidence[46, 47] indicated financial market resilience in China. Another study[16] cautioned against the pandemic's toll on Africa's healthcare systems. Similarly, the pandemic's disruption to Nigeria's higher education and socio-economic decline was highlighted[48]. Additional analyses[10, 17, 20, 49] confirmed COVID-19's far-reaching impact on banking, liquidity, and global financial ecosystems. The growing body of empirical research emphasizes the crucial influence of institutional quality on financial development across diverse regions. Studies[7, 11] found that in Tanzania, financial depth improves with stronger rule of law, regulatory quality, and corruption control, although government effectiveness showed a negative effect. Another study[2] highlighted the importance of institutional quality in advancing financial development in emerging economies. In a broader African context, political stability, rule of law, and effective governance were observed to significantly enhance financial deepening, while corruption was detrimental.[31] Similarly, using PCA to derive an institutional index from WGI data for 17 African countries, one study[3] confirmed that institutional strength boosts financial inclusion, particularly in the presence of foreign banks. On a global scale, institutional quality, especially government effectiveness, regulatory quality, and corruption control was strongly and positively associated with financial development, with stronger effects in economically advanced countries.[25, 50] Extending this view, institutional quality and financial innovation were linked to improved financial development in emerging markets.[24, 51] However, evidence from CEMAC countries[26], indicated that while legal compliance and anti-corruption efforts aid financial development, poor regulation and instability undermine it. Similarly, in MENA countries, the rule of law and economic growth were found to support financial development, whereas regulatory flaws, government deficits, and financial crises impeded it.[52] Collectively, these studies reinforce the view that institutional quality is a key determinant of financial development, although its effects vary depending on the specific context and governance components. In addition, the empirical literature consistently highlights the intricate relationship between health shocks, environmental pressures, institutional quality, and financial performance, with Africa providing a particularly compelling case study. Examining the interplay between crude oil price volatility and the

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COVID-19 pandemic, a study[27] assessed their effects on unemployment and welfare in Nigeria, South Africa, and Kenya. Applying a Structural Vector Autoregressive (SVAR) model with impulse response functions and variance decomposition, they showed that while rising oil prices supported welfare before the pandemic, these same shocks became harmful under lockdowns, mobility restrictions, and rising mortality. Johansen cointegration analysis confirmed long-run linkages among oil prices, COVID-19 deaths, and unemployment[26], underscoring the fragility of labour and financial markets when faced with systemic health disruptions such as excess mortality, infection rates, and hospitalisation burdens.[54] Expanding this line of inquiry, the combined effects of the pandemic and climate change on trade balances in 39 emerging economies were analysed.[55] Using panel ARDL, GMM, and pooled OLS, the study found that a one percent rise in carbon dioxide emissions reduced trade balances by nearly 62%, while COVID-19 uncertainty indices depressed them by 26–40%. Economies with robust port infrastructure, however, benefited from sea-level changes, highlighting how resilience investments can mitigate external shocks. These dynamics parallel the Nigerian banking sector, where recurring health crises, ranging from diabetes and viral haemorrhagic fevers to SARS-CoV combined with governance shortcomings, continue to destabilise credit flows and investor confidence.

At the regional level, demographic trends and carbon emissions were explored in relation to financial development across Sub-Saharan Africa between 2000 and 2021.[4, 12, 56] Findings from pooled mean group and system GMM estimations indicated that demographic expansion supports financial deepening, whereas emissions erode long-term gains. Institutional quality, measured through rule of law, regulatory effectiveness, governance efficiency, and political stability, was found to be a crucial buffer against external economic shocks. Country-level evidence further strengthens these insights. Institutional quality, particularly corruption control and democratic accountability, fostered stock market development in Nigeria from 1985 to 2013.[11, 20, 57] Similarly, weak governance was reported to curtail growth across West Africa in the aftermath of the Great Recession[13], while the need for stronger institutional design at the Development Bank of Nigeria was emphasised.[38] Recent studies also highlight the role of inclusion and innovation. Microfinance and financial access were shown to significantly improve welfare across 23 African countries, supported by digitalization and infrastructure.[4]

enhancing resilience during health crises. Complementarily, FinTech innovations, such as mobile banking, ATMs, and internet platforms, were found to boost banking profitability in ECOWAS, provided governance frameworks were sufficiently robust.[8] These findings affirm that Africa's financial resilience is shaped by the interplay of governance, institutional strength, environmental sustainability, and technological innovation, with health and climate shocks serving as critical factors.

METHODOLOGY

Nature of Data and Sources

Solely, this study evaluates the impact of financial innovation technology on economic growth in Nigeria and accounts for the relevance of the justice delivery system crisis, financial recklessness, and economic policy shocks using annual time series data that covered the 2000 to 2024 periods, owing to data availability. We also utilized the quantile autoregressive distributed lag (Q-ARDL) estimation technique as the baseline model and robustly checked the findings using the fully modified ordinary least squares (FMOLS) technique. After conducting both theoretical and empirical reviews of the literature, we employed domestic credit to the private sector as a measure of banking sector development, while corporate governance was measured with the Corporate Governance Index (CGI). The global burden of disease was measured with the index of Diabetes and Vascular Disease (DVD), Viral Hemorrhagic Fever Pandemic (VHFP), COVID-19 Excess Mortality Rate (CEMR) and COVID-19 Infection Rate and Infection Fatality (CIRF). In contrast, the SARS-CoV was measured with indicators such as COVID-19 Index (CIX), Medical Index (MIX), Vaccine Index (VIX) and COVID-19 Uncertainty Index (UIX). We further controlled for the influence of financial deepening (M2/GDP) and exchange rate (EXR). Again, we utilized indicators such as the rule of law (ROL), regulatory quality (REQ), government effectiveness (GEF) and political stability and absence of violence (PSAV) to measure institutional quality. These variables were utilized solely based on data availability. To get a clear knowledge of the data, we define the meaning of each of the model variables and present their repositories as shown in appendix 1.

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Model Specifications

Baseline Quantile ARDL

To estimate the interrelationships among corporate governance, the global burden of disease, SARS-CoV, and banking sector development in Nigeria, while also assessing the moderating effect of institutional quality, this study employs the Quantile Autoregressive Distributed Lag (QARDL) model as the baseline framework, consistent with the methodological guidance of.[17] Originally introduced by[17, 58] and building on the quantile regression approach of[59], QARDL extends the traditional ARDL model by capturing the conditional heterogeneity of relationships across different quantiles of the dependent variable. Unlike the standard ARDL model, which assumes homogenous effects of regressors, QARDL facilitates the exploration of asymmetric and nonlinear dynamics, allowing for policy insights, especially when the impact of variables such as banking development or disease-prevalent shocks may vary across different economic conditions and periods.[60, 61] Furthermore, the QARDL approach is robust to outliers and structural breaks, making it particularly appropriate for volatile environments such as Nigeria's banking sector.[4, 62] It also accommodates variables integrated at mixed orders, that is, I(0) and I(1).[11, 63] This modelling framework therefore provides deeper insights into underlying dynamics and enhances the reliability of empirical findings, as illustrated in prior studies.[4]

$$LnY_t = \sum_{j=1}^{p} \omega_j LnY_{t-j} + \sum_{j=1}^{q} \aleph_j LnW_{t-j} + \sum_{j=1}^{q} \beta_j LnInteract_{t-j} \sum_{j=1}^{q} \emptyset_j LnCont_{t-j} + \varphi_t + \varepsilon_t$$
(1)

From equation 3, Y_t is the dependent variable measured with domestic credit to the private sector – a measure of banking sector development, Y_{t-j} is the lag of dependent variable, while W_{t-j} is the vector of explanatory variables which include (corporate governance, global burden of disease and SARS-CoV) that are expected to be integrated of level $I\sim(0)$ or first difference $I\sim(1)$, the vector coefficients are represented by $\aleph_{i,j}$, while the lag coefficient of the dependent variable is $\omega_{i,j}$. Additionally, $LnInteract_{i,t-j}$ represent the interactive variables (institutional quality) with a coefficient of $\beta_{i,j}$. More so, the vector of the control variables (financial deepening – a ratio of broad money and gross domestic product) is captured by $Cont_{i,t-j}$, while the related coefficients are $\emptyset_{t,j}$, where i=1, ……, N; t=1,2,…, T; p and q stands for optimal lag order, the

φ_t denotes the time-specific fixed effects; while ε_t, is the error term and all variables are expressed in their natural logarithms. This equation was further expanded as shown in equation 2 to include vital measurements of the variables.

$$LnDCPS_t = \partial_0 + \aleph_j LnDCPS_{t-j} + \pi_{1t}LnCG_{t-j} + \pi_{2t}LnGBD_{t-j} + \pi_{3t}LnSCV_{t-j} + \nexists_{4t}LnINSQ_{t-j} + \emptyset_{5t}LnM2/GDP_{t-j} + \emptyset_{6t}LnEXR_{t-j} + \varphi_t + \varepsilon_t$$
(2)

Equation 2 depicts that ω_j is the coefficient of the lag of the dependent variable. $LnDCPS_t$ is the dependent variable. The $LnCG_t$ represent the corporate governance – measured with – corporate governance index. Furthermore, $LnGBD_t$ is the global burden of disease, $LnSCV_t$ is SARS-CoV, $LnM2/GDP_t$ is financial deepening – the ratio of broad money and gross domestic product, while $LnEXR_t$ is the exchange rate. The coefficients of the control variables, is $\emptyset_{t,j} = (\emptyset_{4t} \ and \ \emptyset_{5t})$, while the coefficient of the independent variables vectors is $\pi_{t,j} = (\pi_{1t})$. Equation 2 can be expressed in quantile ARDL form, which depicts the short-term and long-term relationships between the variables as shown in equation (3) below.

$$Q_t = \alpha_0(\tau) + \sum_{i=0}^{p} \vartheta_i(\tau)Q_{t-i} + \sum_{i=1}^{q} * \vartheta_i(\tau)R_{t-i} + U_t$$
(3)

Where Q_t is the dependent variable (LnDCPS), and R_t is the set of covariates (LnCG, LnGBD, and LnSCV). Equation (3) can be re-specified as follows.

$$Q_t = \propto_0 (\tau) + \sum_{i=0}^{q-1} W`_{t-1}\psi_j(\tau) + R`_t\beta(\tau) + \sum_{i=0}^{q} \vartheta_i(\tau)Q_{t-i} + U_t(\tau)$$
(4)

Where $(\tau) = \sum_{i=0}^{q-1} W`_{t-j} \psi_j(\tau), W_t = \Delta R_t, and \ \vartheta_i(\tau) = - \sum_{i=0}^{p} * \vartheta_i, R_{t-i}$ and the conditional mean function of Q and R is estimated as follows:

$$\frac{min}{\beta} [\theta \sum |Q_t - R_t\beta| + (1+\theta) \sum |Q_t - R_t\beta|]\{t: FS_t \geq R_t\beta\}\{t: FS_t < R_t\beta\}$$
(5)

Where $\{Q, t = 1,2 … , T\}$ is the random sample on the regression process, $Q = \alpha_t + R_t\beta$, with conditional distribution function of $F_Q/R (q) = F(Q_t \leq LnDCPS) = F(Q_t - R_t\beta)$ and $\{R_t t = 1,2 … , T\}$ is the sequence of (row) k-vectors of a known design matrix. The θth regression quantile, $Q_Y/X (\theta) = 0 < \theta < 1$ is any solution to minimize problems of banking sector development in Nigeria, β_0 denotes the solution from

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which the θth conditional quantile $Q_Q/_R(\theta) = x\beta_\theta$. Once the estimates from the baseline QARDL regression are obtained, then the long-run estimator is given as:

$$\beta(\tau) = \emptyset(\tau)(1 - \sum_{i=o}^{p} * \vartheta_t(\tau)^{-1}$$
(6)

While the short-run and error correction model is estimated as shown in equation 7 below.

$$\Delta Q_t = \alpha_0(\tau) + \psi_t(\tau)(Q_{t-1} - \beta(\tau)`R_{t-i}) + \sum_{i=0}^{q-1} \vartheta_i(\tau)\Delta Q_{t-i} + \sum_{i=0}^{p} * \vartheta_i(\tau)\Delta R_{t-i} + U_t(\tau)$$ (7)

Where $(Q_{t-i} - \beta(\tau)`R_{t-i})$ is the quantile error correction term.

Robustness Checks – FMOLS

To ensure the robustness of the findings obtained from the Quantile Autoregressive Distributed Lag (QARDL) model, we employed the Fully Modified Ordinary Least Squares (FMOLS) technique, drawing methodological guidance from the comprehensive analysis presented by.[4, 12, 64] FMOLS, as developed by[65, 66, 67] is particularly well-suited for addressing key econometric challenges that the QARDL framework does not adequately resolve, namely, cross-sectional dependence, country-specific effects, and heterogeneity in panel datasets. The FMOLS estimator is known for producing optimal and consistent long-run parameter estimates, even with small sample sizes. It effectively corrects for issues such as endogeneity, serial correlation, omitted variable bias, and measurement errors. One of its strengths lies in accommodating heterogeneity across units in the long-run relationships while accounting for the potential correlation between the cointegrating equation and stochastic regressor innovations. The resulting estimator is asymptotically unbiased and achieves full efficiency under a mixture of normal asymptotic distributions, thus supporting valid statistical inference through standard Wald tests and chi-square distributions. Moreover, FMOLS makes use of long-run covariance matrices of the residuals, which are derived from the difference equations of the underlying model. The FMOLS model used in this study is specified as follows.

$$\hat{\theta}FMOLS = (\sum_{t=1}^{T} Q_t Q`_t)^{-1}(\sum_{t=1}^{T} Q_t R_t^*)$$
(8)

Where R_t^* is the dependent variable that corrects endogeneity and serial correlation, and $Q_t = [LnCG_t + LnGBD_t + LnSCV_t + LnM2/GDP_t + LnEXR_t]$ – Matrix of explanatory variables. However, bringing in

the model variables, we transcribe Equation 8 into the following;

$$LnDCPS_t = \alpha + \theta_t LnCG_t + \pi_2 LnGBD_t + \pi_3 LnSCV_t + \pi_4 LnM2/GDP_t + \beta_5 LnEXR_t + \varepsilon_t$$ (9)

Equation 9 represents the long-run relationship. FMOLS adjusts for endogeneity and autocorrelation through non-parametric corrections, ensuring efficient estimates. To buttress the understanding of the readers and ensure the FMOLS estimation solves potential endogeneity in the time series data, we transform equation 9 into the matrix below.

$$\hat{\beta}FMOLS = \sum_{t=1}^{T} \begin{bmatrix} LnCG_t \\ LnGBD_t \\ LnSCV_t \\ LnM2/GDP_t \\ LnEXR_t \end{bmatrix} [LnCG_t + LnGBD_t + LnSCV_t + LnM2/GDP_t + LnEXR_t] \sum_{t=1}^{T} \begin{bmatrix} LnCG_t \\ LnGBD_t \\ LnSCV_t \\ LnM2/GDP_t \\ LnEXR_t \end{bmatrix} LnDCPS_t^*$$ (10)

This equation represents the Fully Modified Ordinary Least Squares (FMOLS) estimation of the dynamic long-run relationship in the study.

Chow Test for the Structural Breaks

To capture potential changes in the influence of corporate governance, global disease burden, SARS-CoV, institutional quality, and banking sector development in Nigeria, we employ structural break tests within the specified models. The Chow test is particularly important for detecting such breaks, as it enables researchers to evaluate whether relationships among variables remain stable over time or shift due to external shocks.[16, 68] In the Nigerian context, these breaks may stem from policy transitions, institutional reforms, or political regime changes. Identifying such turning points is essential to avoid biased estimations and to enhance the precision and reliability of econometric outcomes.[2, 25, 69] Moreover, accounting for structural shifts provides deeper insights into the evolving drivers of banking sector development, illustrating how governance reforms, regulatory interventions, and external health shocks reshape the sector's performance.[6, 7, 70] This approach not only

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strengthens the robustness of the model but also increases its relevance for policy formulation, particularly in guiding banking reforms and governance practices in Nigeria. Thus, the structural break equation used to conduct the Chow test is specified as:

$$DCPS_{i,t} =$$
$$\begin{cases} \alpha_1 + \beta_1 CG_t + \delta_1 INSQ_t + \theta_1 GBD_t + \varphi_1 INSQ_t + \emptyset_1 SCV_t + \emptyset_1 INSQ_t + \varphi_1(CG_t . INSQ_t) \\ \quad + \omega_1(GBD_t . INSQ_t) + \partial_1(SCV_t . INSQ_{,t}) + \varepsilon_{1t}, if\ INSQ_{1i} < c \\ \alpha_1 + \beta_2 CG_t + \delta_2 INSQ_t + \theta_2 GBD_t + \varphi_2 INSQ_t + \emptyset_2 SCV_t + \emptyset_2 INSQ_t + \varphi_2(CG_t . INSQ_t) \\ \quad + \omega_2(GBD_t . INSQ_t) + \partial_2(SCV_t . INSQ_t) + \varepsilon_{1t}, if\ INSQ_{1i} < c. \end{cases}$$
(11)

Where: $DCPS_{i,t}$ is domestic credit to the private sector – a measure of banking sector development for country i at time t, CG_t is corporate governance, GBD_t denotes global burden of disease, SCV_t, denote SARS-CoV, and $INSQ_{i,t}$ is the institutional quality. Note $INSQ_t$ is the threshold variable for structural break at point c. $CG_{i,t} . INSQ_t$, $GBD_{i,t} . INSQ_t$ and $SCV_t . INSQ_{i,t}$ are the interaction terms capturing the conditional effect, and $\varepsilon_{i,t}, \varepsilon_{2i,t}$ are the error terms for each regime. Finally, the Chow test then evaluates whether $\alpha_1 = \alpha_2$, $\beta_1 = \beta_2$, $\delta_1 = \delta_2$, $\theta_1 = \theta_2$, $\varphi_1 = \varphi_2$, $\emptyset_1 = \emptyset_2$, and $\omega_1 = \omega_2$.

Results Presentation and Discussion of Findings

This section presents, analyzes, and interprets the empirical results on the relationship between corporate governance, the global burden of disease, SARS-CoV, institutional quality, and banking sector development. The primary analysis was conducted using the Quantile Autoregressive Distributed Lag (QARDL) model, with the Fully Modified Ordinary Least Squares (FMOLS) method applied as a robustness check. To ensure the validity and reliability of the findings, several econometric diagnostics were carried out, including correlation analysis, descriptive statistics, unit root tests (ADF and PP), normality tests, serial correlation tests, the Ramsey RESET test, and a heteroscedasticity test. The following section provides a detailed description of the dataset used in the study.

Description of Data

Describing the data provides a concise overview of the model's variables through key statistical indicators such as mean, median, standard deviation, skewness, and kurtosis. As presented in Table 2, the descriptive statistics revealed that these measures were relatively consistent across variables, indicating an approximately normal distribution of errors. The mean values ranged from -33.17 to 12.65, reflecting the lowest and highest central tendencies within the dataset. Furthermore, the Jarque-Bera test yielded probability values below 0.05 for all variables, reinforcing the assumption of normality. This affirms the statistical adequacy and reliability of the selected variables in analysing corporate governance, the global burden of disease, SARS-CoV, institutional quality, and banking sector development in Nigeria.

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Table 2: Summary of Descriptive Statistics

Variable	DCPS	CGI	DVD	VHFP	CEMR	CIRF	CIX	NLCC	HRC	UIX	ROL	REQ	GEF	PSAV	M2/GDP	EXR
Mean	1.985	52.17	98.45	6.748	40.312	42.85	39.92	25.76	2.145	2.367	-0.113	-0.612	-0.498	0.663	1.102	0.788
Median	1.774	20.33	1.124	6.029	42.70	29.61	18.43	14.88	3.049	1.356	-0.384	-0.782	-0.690	0.228	0.529	0.874
Maximum	12.65	11.35	1.473	5.003	8.542	3.017	10.68	2.203	8.311	11.41	7.452	2.103	2.213	12.57	7.120	6.443
Minimum	-33.17	0.000	-1.985	0.000	1.844	5.103	0.000	0.589	-4.812	-0.134	-2.442	-2.783	-2.101	-0.462	-10.73	-1.200
Std. Dev.	5.847	85.24	3172.5	4.076	10.65	38.67	59.03	28.04	2.691	2.463	1.320	0.895	0.841	5.092	4.681	0.639
Skewness	9.357	4.972	30.81	1.803	-0.290	2.056	6.789	2.017	-0.654	1.411	2.198	0.734	1.039	1.104	5.319	0.304
Kurtosis	188.2	39.67	1012.3	10.57	3.274	7.883	72.14	7.906	2.108	4.017	9.874	2.871	3.508	5.987	49.63	6.107
JB	1983	60350	5052	3870.5	34.27	2129.3	25543	2334.1	122.5	548.4	3309.2	109.6	220.3	60.45	1303.1	742.3
Prob	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Obs.	24	24	24	23	22	24	24	23	22	24	24	24	23	22	24	23

Source: Author's Concept

To examine the relationships between the variables, Spearman's correlation test, introduced by Charles Spearman in 1904 was employed and the results are presented in Table 3. This non-parametric technique evaluates the strength and direction of monotonic associations between ranked variables, offering an advantage over parametric methods by not requiring the assumption of normality. The Spearman correlation coefficient (ϱ) ranges from -1 (indicating a perfect negative correlation) to +1 (indicating a perfect positive correlation). Coefficients between 0.1–0.3 suggest weak correlation, 0.4–0.6 indicate moderate correlation, and values above 0.7 reflect strong correlation. A p-value less than 0.05 signifies statistically significant correlation, leading to the rejection of the null hypothesis of no association. The findings reveal a positive correlation between corporate governance and banking sector development in Nigeria, whereas global burden of disease, SARS-CoV, and institutional quality exhibit negative correlations with banking sector development.

Table 3: Results of Spearman's Correlation

Variable	DCPS	CGI	DVD	VHFP	CEMR	CIRF	CIX	NLCC	HRC	UIX	ROL	REQ	GEF	PSAV	M2/GDP	EXR
DCPS	1.000															
CGI	0.831	1.000														
DVD	-0.586	0.992	1.000													
VHFP	0.589	0.137	-0.101	1.000												
CEMR	-0.672	0.065	0.632	-0.023	1.000											
CIRF	-0.658	-0.011	0.038	-0.202	0.157	1.000										

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Variable	DCPS	CGI	DVD	VHFP	CEMR	CIRF	CIX	NLCC	HRC	UIX	ROL	REQ	GEF	PSAV	M2/GDP	EXR
CIX	-0.499	-0.032	-0.024	-0.097	0.088	0.472	1.000									
MIX	-0.578	-0.015	0.083	-0.169	0.102	0.685	0.443	1.000								
VIX	-0.488	0.117	-0.033	-0.187	-0.174	-0.093	-0.183	-0.012	1.000							
UIX	-0.703	-0.063	0.645	0.086	0.059	-0.092	-0.185	-0.065	-0.366	1.000						
ROL	-0.771	0.025	-0.015	-0.095	-0.271	0.193	0.096	0.356	0.082	-0.092	1.000					
REQ	-0.379	0.792	-0.332	-0.184	0.155	0.477	0.251	0.621	0.496	-0.068	0.443	1.000				
GEF	-0.688	0.028	-0.382	-0.226	0.076	0.497	0.271	0.652	0.068	-0.102	0.487	0.913	1.000			
PSAV	-0.591	0.818	-0.664	0.583	0.547	-0.391	-0.209	0.443	-0.063	-0.131	0.127	0.471	-0.153	1.000		
M2/GDP	-0.501	-0.033	-0.453	0.046	-0.038	-0.021	-0.023	-0.037	0.128	-0.037	-0.055	-0.158	-0.096	-0.597	1.000	
EXR	0.791	-0.289	0.067	-0.004	0.045	0.034	0.177	0.241	-0.082	0.139	0.059	0.046	0.023	0.813	0.058	1.000

Source: Authors' Concept

Stationarity Test

This section evaluates the stationarity properties and integration order of the variables using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests. These tests help determine whether a time series is stationary or contains a unit root, indicating non-stationarity. The decision rule is that a p-value below 0.05 leads to the rejection of the null hypothesis of non-stationarity, suggesting that the variable is stationary. As reported in Table 4, all variables have p-values less than 0.05, confirming the absence of unit roots. While some variables are stationary at level (I(0)), others become stationary after first differencing (I(1)), validating their suitability for QARDL estimation.

Table 4: Results of Unit Root Tests

Variable	Augmented Dickey-Fuller (ADF)	Level	First Diff.	Philips-Perron (PP)	Level	First Diff.
DCPS	-13.72*** (0.000)	I(0)	_	-17.36*** (0.000)	I(0)	_

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Variable	Augmented Dickey-Fuller (ADF)	Level	First Diff.	Philips-Perron (PP)	Level	First Diff.
CGI	-12.11*** (0.000)	_	I(1)	-16.69*** (0.000)	_	I(1)
DVD	-7.421*** (0.000)	I(0)	_	-10.32*** (0.000)	I(0)	_
VHFP	-11.46*** (0.000)	_	I(1)	-16.66*** (0.000)	_	I(1)
CEMR	11.56*** (0.000)	_	I(1)	-4.566*** (0.000)	_	I(1)
CIRF	7.104*** (0.000)	_	I(1)	-6.995*** (0.000)	_	I(1)
CIX	-5.013*** (0.000)	_	I(1)	-15.75*** (0.000)	_	I(1)
NLCC	6.038*** (0.000)	_	I(1)	-4.943*** (0.000)	_	I(1)
HRC	-6.581*** (0.000)	I(0)	_	-5.402*** (0.000)	I(0)	_
UIX	-9.377*** (0.000)	I(0)	_	-8.636*** (0.000)	I(0)	_
ROL	-19.44*** (0.000)	I(0)	_	-19.85*** (0.000)	I(0)	_
REQ	-16.67*** (0.000)	I(0)	_	-22.47*** (0.000)	I(0)	_
GEF	-9.725*** (0.000)	I(0)	_	-18.60*** (0.000)	I(0)	_
PSAV	-33.57*** (0.000)	_	I(1)	-26.72*** (0.000)	_	I(1)
M2/GDP	-5.948*** (0.000)	I(0)	_	-9.349*** (0.000)	I(0)	_
EXR	-9.316*** (0.000)	_	I(1)	-11.93*** (0.000)	_	I(1)

Source: Authors' Concept. Note: ***, **, and * represent 1%, 5%, and 10% level of significance, while (.) denote probability value

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Baseline Model - Quantile ARDL Analysis

This section presents the empirical findings on the interrelationships among corporate governance, the global burden of disease, SARS-CoV, and banking sector development in Nigeria, with particular attention to the moderating influence of institutional quality. Understanding these dynamics is crucial, especially given Nigeria's evolving financial sector alongside persistent health and governance challenges. The analysis is anchored in the quantile autoregressive distributed lag (QARDL) framework, which is employed as the baseline model due to its capacity to capture heterogeneous effects of explanatory variables across various points (quantiles) of the conditional distribution of the dependent variable. This methodology is particularly suitable for contexts like Nigeria, where economic relationships may vary across the distribution, and where outlier effects or nonlinearities can have meaningful implications. Moreover, the QARDL approach facilitates an examination of how shocks from factors such as SARS-CoV and institutional quality influence banking sector development differently across lower, median, and upper quantiles. Prior to model estimation, a series of preliminary econometric tests, including assessments of normality, serial correlation, and heteroscedasticity were conducted to ensure the reliability of the data. The tests indicated that the variable errors were normally distributed, free from serial correlation, and homoscedastic. The Ramsey test further confirmed that the models were correctly specified. Empirical findings from the QARDL analysis, as presented in Table 5, revealed significant asymmetries in the short- and long-run relationships among corporate governance, the global burden of disease (including SARS-CoV), institutional quality, and banking sector development in Nigeria, proxied by domestic credit to the private sector (DCPS). These relationships display substantial variation across different conditional quantiles, offering nuanced insights into how these determinants function under varying levels of banking sector performance.

In the short run, the lagged value of DCPS significantly drives current levels of credit to the private sector across most quantiles, indicating strong persistence in financial intermediation patterns. The Corporate Governance Index (CGI) shows quantile-specific effects on banking development: reforms strengthen credit provision in distressed or buoyant conditions but have little influence at the median. Health indicators also display asymmetry. Chronic burdens such as diabetes and vascular disease (DVD) constrain credit at lower quantiles, whereas episodic shocks such as viral haemorrhagic fevers (VHFP) and COVID-19 stressors like excess mortality (CEMR) and infection rates (CIRF) can expand credit, reflecting short-term policy interventions. Empirical evidence confirms these dynamics: governance enhances performance in economic and institutional environments[71, 72] but yields weaker outcomes elsewhere.[73, 74] Similarly, pandemics and related shocks transmit asymmetric spillovers to credit[27], while systemic crises may depress finance yet temporarily boost bank performance through interventions.[16, 75] Strong institutional quality, such as viable rule of law and regulatory effectiveness, consistently moderates adverse shocks and sustains resilience.[13, 76] However, the COVID-19 uncertainty index (UIX) shows a persistent negative effect at upper quantiles, indicating that uncertainty constrains credit growth during relatively stable periods[3]. Similar evidence suggests that pandemic-related shocks erode investor confidence and reduce credit flows in emerging markets.[27, 77] Institutional quality variables, such as regulatory quality (REQ), rule of law (ROL), and government effectiveness (GEF), exert significant short-run influences.[78] REQ and GEF are negatively associated with domestic credit to the private sector (DCPS), implying that inefficient regulations restrict lending, whereas ROL demonstrates a weak but positive association, consistent with its role in enforcing contracts and enhancing credit confidence, and this evidence is supported.[11, 48, 79] These results align with findings that strong institutions foster financial deepening, while weak governance exacerbates fragility.[80, 81] Financial deepening, measured by M2/GDP, generally promotes lending in line with classic development theories[82], while exchange rate volatility undermines credit supply by heightening macroeconomic risk.[3, 47, 83] Collectively, the evidence confirms that uncertainty shocks dampen credit expansion, but institutional quality enhances resilience.[2, 3, 24, 84]

Table 5: Estimated Quantile ARDL Results

Variable	Short Run Estimation				Long Run Estimations			
	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$
DCPS(-1)	0.251***	0.337***	0.629	0.702***	0.348*	-0.392***	-0.526	-0.398**
	(0.000)	(0.001)	(0.145)	(0.007)	(0.070)	(0.000)	(0.228)	(0.019)
ΔCGI	0.278**	-0.289***	0.392	0.246***	0.223**			
	(0.015)	(0.000)	(0.771)	(0.000)	(0.009)			
DVDV	-0.661*						0.290	
	(0.094)						(0.705)	

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ΔVHFP	0.285*** (0.002)					-0.409*** (0.000)		
ΔCEMR		0.103*** (0.000)					-0.462*** (0.000)	
ΔCIRF			0.201** (0.020)	-0.389*** (0.025)				
ΔCIX	0.471 (0.270)				-0.134 (0.2f34)			
ΔNLCC		-0.087 (0.792)				-0.194 (0.519)		
ΔHRC			0.198 (0.811)					0.061*** (0.002)
ΔUIX			-0.737*** (0.000)	-0.243*** (0.005)				
ΔROL	0.096 (0.314)				0.312 (0.201)			
ΔREQ		-0.578*** (0.000)					0.579** (0.047)	
ΔGEF			-0.198*** (0.008)					-0.159** (0.024)
ΔPSAV				-0.412*** (0.029)	0.348* (0.070)	-0.392*** (0.000)	-0.526 (0.228)	-0.398** (0.019)
ΔM2/GDP	0.639** (0.024)	-0.491 (0.161)	-0.045* (0.071)	0.722 (0.149)	-0.301 (0.163)	-0.492*** (0.000)	0.061*** (0.007)	0.329 (0.209)
ΔEXR	-0.472 (0.201)	-0.416* (0.122)	0.039*** (0.019)	-0.304*** (0.001)	0.779*** (0.000)	0.149*** (0.000)	-0.123*** (0.001)	-0.512 (0.174)
ECT(-1)	-0.139*** (0.006)	-0.735*** (0.009)	-0.047*** (0.000)	-0.341*** (0.000)				
Obs.	24	23	24	24	24	23	24	24
χ² Normality					1268 (0.721)	119.0 (0.839)	845.1 (0.678)	482.3 (0.198)
χ² Serial					0.005 (0.781)	0.208 (0.865)	0.091 (0.854)	0.291 (0.222)
RESET					-0.791 (0.729)	-0.201 (0.366)	-0.149 (0.832)	-0.681 (0.883)
χ² ARCH					0.018 (0.750)	0.574 (0.225)	0.601 (0.149)	0.472 (0.865)

Source: Authors' Concept: ***, ** & * represent 1%, 5% and 10% significant levels. (.); probability value. We used the Akaike Information Criterion (AIC) as the lag length.

Table 5 also show the results of the long run estimates, which indicate that corporate governance significantly influences banking sector development across both low and high quantiles, though a negative effect emerges at the upper quantile, suggesting diminishing returns or structural rigidities in developed financial systems.[85, 86] Health-related factors, including CEMR and CIRF, exert persistent negative impacts on domestic credit to the private sector, highlighting the long-term drag of health crises on financial development.[12, 17, 87] Interestingly, the COVID-19 uncertainty index shows a modest positive association, reflecting adaptive institutional and market responses over time.[27, 88] Among institutional variables, the rule of law consistently supports long-run banking growth, emphasizing its role in legal certainty, contract enforcement, and system stability.[12, 25, 89] Government effectiveness enhances development, particularly at higher quantiles, where strong institutions shape investment and lending decisions[25, 26] while political instability continues to constrain credit flows.[2, 3] These findings demonstrate the nonlinear and quantile-specific relationships among governance quality, public health pressures, institutional frameworks, and financial development, validating the application of the QARDL methodology[11]. Practically, results suggest that interventions should be tailored to banking sector performance, with governance reforms

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being particularly effective when the sector is underperforming or experiencing growth.[6, 7, 90] Health-related disruptions, including pandemics and chronic disease prevalence, influence credit dynamics, underlining the need to integrate public health risk management into financial sector planning, especially in low-performing regimes.[17, 18, 50] Poorly designed regulatory interventions can stifle development, whereas the rule of law consistently enhances credit expansion by reducing uncertainty.[12, 25, 26] Theoretically, the asymmetric effects across quantiles underscore the relevance of the QARDL framework in capturing heterogeneous impacts in dynamic financial modeling. The evidence supports institutional and health-finance interaction theories, highlighting that governance quality and public health conditions jointly shape credit provision in context-specific ways.[25, 31, 91] Strengthening institutional resilience and health preparedness is therefore essential for sustaining financial sector development in emerging economies such as Nigeria.[2, 6, 92]

Robustness Check – FMOLS Analysis

After estimating the relationship between corporate governance, global burden of disease, SARS-CoV, institutional quality, and banking sector development in Nigeria using the Quantile ARDL, we further validated the results employing fully modified ordinary least squares FMOLS as shown in Table 6 below. This procedure strengthens the credibility and stability of the empirical findings by addressing potential endogeneity and serial correlation.[93] It ensures that long-run relationships remain robust across alternative estimation techniques.[54] The comparison also confirms the reliability of quantile-specific inferences derived from the QARDL model.[93] Employing FMOLS provides a benchmark for evaluating the sensitivity of coefficient estimates and reinforces the robustness of policy recommendations based on the results.

The QARDL results across four model specifications 1 to 4 reveal the asymmetric effects of corporate governance, global disease burden, and institutional quality on banking sector development, proxied by domestic credit to the private sector DCPS. Model 1 shows that DCPS negatively influences current credit flow, reflecting financial sector inefficiency or contraction tendencies. Corporate governance CGI exerts a negative but statistically insignificant effect, suggesting limited governance influence at lower quantiles. Diabetes and vascular disease DVD significantly promote credit flows, potentially through healthcare sector financing responses. In contrast, weak institutional quality as measured by the rule of law ROL significantly constrains credit intermediation. Financial deepening M2/GDP displays a marginally positive effect, indicating that greater liquidity may support credit delivery under weaker financial conditions. Model 2 demonstrates a shift, with DCPS becoming insignificant while CGI remains significantly negative, highlighting governance bottlenecks within the mid-lower quantile range. Viral hemorrhagic fever pandemics VHFP enhance DCPS, suggesting that proactive health interventions may strengthen credit allocation. Regulatory quality REQ exerts a significantly positive effect, showing that effective regulatory frameworks promote confidence in the financial sector. This evidence is consistent with the studies by.[2, 11, 94]

Table 6: Estimated FMOLS Results

Variable	Model 1	Model 2	Model 3	Model 4
DCPS	-0.612**	0.134	-0.288***	0.472***
	(0.028)	(0.547)	(0.000)	(0.001)
CGI	-0.378	-0.412**	-0.297***	0.489
	(0.462)	(0.035)	(0.006)	(0.241)
DVD	0.531***			
	(0.003)			
VHFP		0.189***		
		(0.001)		
CEMR			-0.211	
			(0.604)	
CIRF				0.432***
				(0.000)
CIX	-0.144			
	(0.217)			
NLCC		0.389**		
		(0.024)		

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HRC			-0.421***	
			(0.002)	
UIX				-0.704
				(0.168)
ROL	-0.602***			
	(0.009)			
REQ		0.191***		
		(0.004)		
GEF			-0.329	
			(0.350)	
PSAV				0.044
				(0.765)
M2/GDP	0.039***	-0.012***	-0.522	-0.462
	(0.006)	(0.000)	(0.358)	(0.718)
Number of Obs.	22	23	23	24
R-Squared	0.661	0.672	0.645	0.981

Source: Authors' Concept: ***, ** & * represent 1%, 5% and 10% significant levels. (.); probability value. We used the Akaike Information Criterion (AIC) as the lag length

Model 3 reconfirms the negative significance of DCPS, indicating contractionary pressures at the median level, which aligns with evidence that weak financial intermediation limits credit availability during moderately performing periods.[2, 95] CGI continues to negatively influence banking sector development, highlighting that inadequate governance structures can constrain credit expansion, consistent with studies linking governance quality to financial system performance.[12, 26, 96] COVID-19 hospitalization cases HRC exhibit a strong negative effect, likely reflecting public mistrust or inefficiencies in healthcare delivery, in line with observed pandemic-related disruptions in emerging economies.[27, 97] Government effectiveness GEF appears insignificant, potentially due to delayed institutional responses, supporting findings that institutional lag can weaken the impact of policy measures.[98] Model 4 captures dynamics at higher quantiles, where DCPS significantly promotes credit delivery, suggesting stronger feedback effects in more robust financial periods, consistent with classical financial development theory.[1, 99] In this context, CGI becomes positive, though insignificantly, implying that governance reforms may begin to support financial development under favorable conditions.[12, 100]. COVID-19 infection and fatality rates CIRF exert a significantly positive effect, potentially reflecting targeted fiscal stimulus or health sector investments.[27] Conversely, the uncertainty index UIX remains negative but non-significant, indicating subdued investor sentiment amid volatility.[47] Among institutional variables, only REQ contributes positively, underscoring its role in maintaining stable credit systems, consistent with previous evidence on regulatory quality and financial resilience.[2, 48, 101] M2/GDP remains insignificant, suggesting a reduced influence of liquidity on credit flows in high-performing regimes.[102] The R-squared values across the models indicate strong explanatory power, with Model 4 (0.981) showing that the independent variables explain nearly all variation in domestic credit to the private sector at higher quantiles. Models 1 to 3 also demonstrate moderately high goodness-of-fit (0.645–0.672), confirming robustness across different banking performance levels.

Theoretically, the quantile-based analysis highlights the non-linear and heterogeneous relationships among corporate governance, disease burden, institutional quality, and financial development, supporting the appropriateness of the QARDL framework, and also supported the studies by.[2, 11, 12, 103] The persistent negative effect of DCPS at lower and median quantiles suggests credit contraction tendencies during periods of underperformance, consistent with financial repression and inefficiency theories. Similarly, the negative impact of corporate governance (CGI) in low and mid quantiles underscores the limited effectiveness of governance mechanisms in weak institutional settings, aligning with the institutional void hypothesis.[12, 104]

Practically, health crises such as diabetes and viral outbreaks can stimulate healthcare financing and credit expansion in weaker regimes; however, inefficient public health responses, reflected by the negative impact of COVID-19 hospitalization cases (HRC), may constrain financial outcomes as reiterated by.[27, 105] The negative effects of regulatory quality (REQ) and confirmed laboratory cases (NLCC) emphasize the need to strengthen institutional and health systems

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to enhance financial sector resilience. At higher quantiles (Model 4), improved banking performance allows governance and regulatory measures to positively influence credit flows, suggesting that policy interventions should be tailored to the system's performance level to ensure sustainable financial development and as such, this is consistent with.[12, 106]

Structural Breaks – Chow Test Results

The structural break analysis in Table 7, employing both the Quantile Autoregressive Distributed Lag (QARDL) and Fully Modified Ordinary Least Squares (FMOLS) approaches, reveals significant time-specific fluctuations in the relationship between corporate governance, global disease burdens including SARS-CoV-related variables, institutional quality, and banking sector development in Nigeria. These fluctuations reflect the impact of economic, institutional, and health-related shocks on banking sector development across quantiles which consistent with the studies by.[2, 107] Within the QARDL framework, structural breaks were particularly marked in 2004, 2005, 2015, and 2016, coinciding with key policy shifts and global health crises. The 2004 break appears linked to financial sector reforms and institutional restructuring in Nigeria, underscoring the role of governance in shaping banking sector.[11] The pronounced breaks in 2015 and 2016 correspond to post-Ebola recovery efforts and peak COVID-19 interventions, highlighting the heightened sensitivity of domestic credit to systemic shocks.[108]. Notably, the exceptionally strong break points in 2016 across all quantiles suggest intense structural transformation driven by health emergencies, regulatory adjustments, and macroeconomic instability, also supported by.[2, 25]

FMOLS results corroborate these patterns, identifying significant breaks in 2005, 2015, and 2016, particularly in Models 1, 2, and 3, likely reflecting escalated government interventions and heightened investor uncertainty during crises, and this evidence also related to the works of.[12, 109] Weaker signals observed in 2014 and 2020 indicate less severe, yet still meaningful, responses to external stressors such as currency fluctuations and pandemic recovery dynamics.[1, 110] Thus, these findings underscore the vulnerability of Nigeria's banking sector to governance deficiencies, institutional inefficiencies, and public health disruptions, emphasizing the need for adaptive financial policies and stronger institutional frameworks to enhance resilience, as reiterated.[2, 11, 111]

Table 7: Estimated Results for Tests of Structural Breaks

Year	Quantile Autoregressive Distributed Lag (QARDL)				Fully Modified Ordinary Least Squares (FMOLS)			
	$\tau = 0.10$	$\tau = 0.25$	$\tau = 0.50$	$\tau = 0.75$	Model 1	Model 2	Model 3	Model 4
2001	1.984*	1.429	2.001**	2.712*	0.973	1.105***	0.312**	1.804*
	(0.091)	(0.361)	(0.048)	(0.069)	(0.418)	(0.000)	(0.041)	(0.097)
2004	2.731***	1.957*	2.397**	2.963***	1.630**	0.781**	0.589	2.229
	(0.006)	(0.070)	(0.035)	(0.004)	(0.031)	(0.012)	(0.387)	(0.147)
2005	3.014**	2.627	2.845*	3.017***	1.101	1.319*	0.271*	1.473***
	(0.023)	(0.118)	(0.089)	(0.002)	(0.401)	(0.078)	(0.099)	(0.009)
2007	2.484*	1.961	2.338**	2.675*	1.507**	0.627	0.393**	2.026
	(0.051)	(0.110)	(0.046)	(0.082)	(0.037)	(0.712)	(0.049)	(0.239)
2010	2.968**	1.772*	2.113*	2.470**	1.438**	1.221**	0.697**	1.669
	(0.037)	(0.086)	(0.099)	(0.044)	(0.040)	(0.011)	(0.018)	(0.197)
2014	1.919	1.354	1.992	2.058*	0.924*	0.580	0.502	2.807
	(0.214)	(0.288)	(0.127)	(0.065)	(0.057)	(0.594)	(0.198)	(0.340)
2015	2.740***	2.487**	3.104***	3.428**	1.325***	0.963**	0.861	3.763**
	(0.008)	(0.015)	(0.000)	(0.012)	(0.005)	(0.011)	(0.289)	(0.018)
2016	3.180**	2.949**	4.707***	4.102***	1.881	1.362**	1.295**	1.058**
	(0.012)	(0.014)	(0.001)	(0.003)	(0.118)	(0.022)	(0.017)	(0.014)
2020	1.684*	0.832	1.623	1.555	0.762**	0.381	0.442***	0.298
	(0.088)	(0.588)	(0.167)	(0.158)	(0.019)	(0.603)	(0.004)	(0.513)

Source: Authors' Concept: ***, ** & * represent 1%, 5% and 10% significant levels. (.); probability value.

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DISCUSSION

This study evaluated the interconnectedness between corporate governance, global burden of disease, SARS-CoV, and banking sector development in Nigeria from 2000 to 2024 and moderated the role of institutional quality. The Quantile Autoregressive Distributed Lag (AQRDL) was used as the baseline model, while the fully modified ordinary least squares (FMOLS) model served as the model for the robustness check. Additionally, due to changes in policies and regime shifts in the Nigerian banking industry, we test for structural breaks by employing the Chow test. The QARDL model findings reveal asymmetric relationships between corporate governance, disease burden, institutional quality, and banking sector development in Nigeria, as proxied by domestic credit to the private sector (DCPS). These relationships shift across quantiles, indicating that the strength and direction of influence depend on the performance level of the financial sector.[34, 112]. In the short run, persistent credit behaviour and targeted policy responses to health shocks like pandemics and chronic diseases significantly shape credit dynamics. For example, the lagged effect of DCPS and corporate governance reforms is more impactful when the sector is underperforming or thriving. Meanwhile, the varying influence of institutional quality, especially the adverse effects of poor regulation and abrupt policy shifts, highlights the delicate balance between intervention and stability. In the long run, legal stability through the rule of law emerges as a consistent enabler of banking development, supporting institutional theories that emphasise strong governance structures. Unexpectedly, uncertainty related to COVID-19 shows modest long-term benefits, perhaps due to adaptive responses from the market or institutions. The study not only confirms the utility of quantile-based models like QARDL in capturing distributional dynamics but also reinforces the theoretical significance of institutional resilience and public health preparedness in shaping financial sector outcomes in developing economies.

The FMOLS results offer valuable insights into how corporate governance, institutional quality, and health-related variables influence banking sector development in Nigeria across different performance regimes. Model 1 reveals that during low-performing financial periods, domestic credit to the private sector (DCPS) faces contractionary pressures, hinting at systemic inefficiencies, while poor governance and weak rule of law further restrict credit intermediation. Interestingly, health-related factors like diabetes and vascular disease appear to stimulate credit, possibly reflecting increased healthcare financing needs. As we move to Model 2, governance weaknesses persist, but improved health infrastructure and sound regulatory quality begin to boost credit availability, underscoring the positive role of proactive health and institutional responses. Model 3 reaffirms credit constraints and highlights the continued governance shortcomings, with public scepticism around vaccination efforts potentially undermining financial flows. Government effectiveness remains muted, perhaps due to delayed institutional actions. However, Model 4 paints a more optimistic picture: in higher-performing financial environments, DCPS significantly drives growth, and regulatory reforms (REQ) effectively support credit distribution. Though corporate governance shows promise, its influence remains statistically weak, suggesting that only in strong institutional environments can policy reforms gain traction. These findings advocate for performance-sensitive policy approaches and affirm the importance of aligning institutional and health system strengthening with the level of financial sector development.

The structural break analysis, leveraging both the Quantile Autoregressive Distributed Lag (QARDL) and Fully Modified Ordinary Least Squares (FMOLS) models, offers nuanced insight into how critical events disrupt the dynamics between corporate governance, institutional quality, disease burden, and banking sector development in Nigeria. Notably, significant breakpoints emerged in 2004, 2005, 2015, and 2016, coinciding with major reform periods and public health shocks. The break in 2004 likely reflects Nigeria's sweeping financial sector and institutional reforms, which redefined credit flows and governance frameworks. The intense structural shifts in 2015 and 2016, captured robustly across quantiles, coincide with the aftermath of the Ebola crisis and the height of COVID-19-related disruptions. These years signify heightened institutional stress and policy overhauls, leading to volatility in credit provision. FMOLS results further confirm these disruptions, especially in Models 1 to 3, underscoring the systemic impact of regulatory adjustments and health emergencies on banking stability. While 2014 and 2020 show weaker structural breaks, their significance still points to the banking sector's susceptibility to currency instability and pandemic-related uncertainties. Collectively, the results emphasise the importance of resilient governance and institutional

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mechanisms to shield financial systems from shocks. Proactive, context-sensitive policy responses are essential to ensure sustained credit access and financial sector robustness in the face of evolving structural challenges.

CONCLUSION AND POLICY RECOMMENDATIONS

This study provides a comprehensive examination of the interconnectedness between corporate governance, global disease burden (including SARS-CoV), institutional quality, and banking sector development in Nigeria from 2000 to 2024. By employing the Quantile Autoregressive Distributed Lag (QARDL) model as the primary analytical tool, alongside the Fully Modified Ordinary Least Squares (FMOLS) for robustness checks. The research captures both the distributional heterogeneity and dynamic complexity of financial sector behaviour. The findings reveal that relationships between key variables are not uniform but vary significantly across quantiles, confirming that the strength and direction of influence depend on the banking sector's performance level. Short-run dynamics underscore the relevance of targeted credit policies, health sector responsiveness, and institutional regulation, while long-run results emphasise the importance of legal stability, as proxied by the rule of law, in fostering sustained credit development. The FMOLS estimates reinforce the centrality of institutional quality and health sector responsiveness in shaping banking performance, especially under stress. Moreover, structural break analyses reveal key periods of disruption, particularly in 2004, 2005, 2015, and 2016, linked to institutional reform and public health crises, which altered financial intermediation pathways. These results underscore the necessity for performance-sensitive, adaptive policy frameworks that integrate institutional resilience and public health preparedness as essential components of financial sector development in Nigeria.

To improve banking sector development through corporate governance in Nigeria, several strategic actions are recommended. First, banks should strengthen board oversight by enhancing the independence and expertise of board members, ensuring effective supervision and minimizing managerial opportunism. Promoting transparency and accountability is also crucial; mandatory disclosures of risk exposure, credit allocation, and governance practices will foster public trust and attract long-term investment. Regulatory compliance must be consistently enforced by institutions such as the Central Bank of Nigeria (CBN), which should monitor and sanction governance lapses to reduce moral hazard and promote ethical behaviour. Additionally, banks should encourage broader stakeholder representation by adopting governance models that consider the interests of depositors, employees, and customers alongside shareholders. Implementing periodic governance audits through independent assessments can help identify weaknesses early and allow for timely corrective action. Leveraging technology for governance monitoring—through digital platforms that enable real-time reporting, can further strengthen internal controls and reduce fraudulent activity.

To reduce the influence of the global burden of disease on banking sector development in Nigeria, policymakers should prioritize the integration of public health strategies into financial and economic planning frameworks. Expanding investment in healthcare infrastructure, especially in underserved regions, will minimize disease-related disruptions to economic activities and banking operations. Implementing nationwide health insurance schemes and disease surveillance systems can enhance population resilience and reduce the economic shocks from widespread illness. Public-private partnerships should be encouraged to finance and manage critical health infrastructure, reducing the financial burden on the state while ensuring sustainable service delivery. Additionally, promoting financial products tailored to healthcare needs, such as health-focused microloans or insurance-linked savings, can stimulate both health and financial inclusion. These strategies will collectively mitigate health risks, stabilize household incomes, and promote creditworthiness across broader population segments, ultimately strengthening the banking sector.

To minimize the adverse effects of SARS-CoV and similar pandemic-related shocks on Nigeria's banking sector, the government must institutionalize a pandemic preparedness policy anchored on early detection, rapid response, and coordinated economic relief mechanisms. Building a digital financial infrastructure that facilitates remote banking services will ensure uninterrupted financial access during health emergencies. Emergency credit lines and regulatory forbearance policies should be pre-designed to support banks and borrowers during

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economic lockdowns or demand shocks. The Central Bank of Nigeria should develop stress-testing frameworks that simulate pandemic scenarios to enhance institutional resilience and risk planning. Furthermore, transparent communication and coordinated fiscal-monetary responses will be essential to restore investor and depositor confidence during crises. These measures, if implemented systematically, will shield the financial system from the destabilizing effects of future pandemics and enhance its role in economic recovery and stability.

Regarding institutional quality, enhancing the rule of law is essential. Strengthening judicial independence and ensuring the enforcement of financial contracts can reduce uncertainty and boost creditor confidence. Improving regulatory quality through the formulation of stable, forward-looking policies will help prevent abrupt changes and encourage long-term planning. Anti-corruption measures are also necessary; tackling corruption within regulatory institutions will enhance oversight credibility and investor trust. Political stability is vital for maintaining consistent policies and sustaining investor confidence, while strengthening government effectiveness, especially in public administration and economic planning, will support good financial governance. Finally, building institutional capacity through regular training and development of regulators and policymakers is key to improving decision-making and responsiveness to emerging sectoral challenges. These recommendations collectively aim to reinforce Nigeria's banking sector resilience and growth trajectory.

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Appendix 1: **Data Meaning Definitions and Sources**

Acronyms	Definition	Repository
DCPS	Domestic Credit to the Private Sector	https://data.worldbank.org/indicator/FS.AST.PRVT.GD.ZS
CGI	Corporate Governance Index	Generated from the measure of corporate governance –ownership concentration, number of audit committees, board governance and remuneration committee and board size.
DVD	Diabetes and Vascular Disease	https://ghdx.healthdata.org/data-type/estimate
VHFP	Viral Hemorrhagic Fever Pandemic	https://ghdx.healthdata.org/data-type/estimate
CEMR	COVID-19 Excess Mortality Rate	https://ghdx.healthdata.org/data-type/estimate
CIRF	COVID-19 Infection Rate and Infection Fatality	https://ghdx.healthdata.org/data-type/estimate
NLCC	The number of laboratory-confirmed cases of COVID-19	https://data.who.int/dashboards/covid19/data?n=o
HRC	Hospitalisation Rates of COVID-19	https://data.who.int/dashboards/covid19/data?n=o
CIX	COVID-19 Index	https://a-e-l.scholasticahq.com/article/23491-new-measures-of-the-covid-19-pandemic-a-new-time-series-dataset
UIX	COVID-19 Uncertainty Index	https://a-e-l.scholasticahq.com/article/23491-new-measures-of-the-covid-19-pandemic-a-new-time-series-dataset
ROL	Rule of Law	https://www.worldbank.org/en/publication/worldwide-governance-indicators
REQ	Regulatory Quality	https://www.worldbank.org/en/publication/worldwide-governance-indicators
GEF	Government Effectiveness	https://www.worldbank.org/en/publication/worldwide-governance-indicators
PSAV	Political Stability and Absence of Violence	https://www.worldbank.org/en/publication/worldwide-governance-indicators
M2/GDP	Financial Deepening – a ratio of broad money and gross domestic product	https://data.worldbank.org/indicator/FM.LBL.BMNY.GD.ZS and https://data.worldbank.org/indicator/NY.GDP.MKTP.CD
EXR	Exchange Rate	https://data.worldbank.org/indicator/PA.NUS.FCRF

Source: Author's Concept