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Floyd Khoza and Patricia Lindelwa Makoni

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Floyd Khoza (University of Mpumalanga - South Africa), Patricia Lindelwa Makoni (University of South Africa – UNISA)

Corresponding author: Patricia Lindelwa Makoni (makonpl@unisa.ac.za)

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Abstract

Since the 2007 global financial crisis, scholars have attempted to explain market failures using aspects other than corporate governance. Previous studies focused on the function of corporate governance in financial performance, with a dearth of literature on other financial dimensions like risk appetite, financial stability, and the effect of financial performance on the corporate governance of financial institutions. This study examines the cointegrating relationships between financial performance and corporate governance in selected South African listed financial institutions between 2007 and 2020. Employing the pooled mean group and fixed dynamic effect estimators in a panel autoregressive distributed lags framework, our results indicated notably positive long-term cointegrating relationships between the capital adequacy ratio (CAR) and financial stability, return on equity (ROE) and return on assets (ROA), respectively. We consider this paper valuable in that it contributes to the literature on the interrelatedness of corporate governance and financial performance, particularly of listed financial institutions, and is useful to central banks, market regulators, boards of directors and academics to inform policies and regulations.

Keywords: capital adequacy ratio, financial institutions, cointegration, corporate governance, financial stability, financial performance, risk appetite

JEL Classification: G30, G32, G39

1. Introduction

Several cases of institutional failures or collapses have been witnessed in the financial sector. United States (US) Financial institutions like Lehman Brothers, Washington Mutual, Wachovia, IndyMac Bank and J.P. Morgan (Nyaloti, 2024). International disasters in financial failures included non-financial firms such as the Maxwell saga in the United Kingdom (UK), Parmalat in Italy, Daewoo in Korea, and Macmed and Sentula in South Africa. Nigerian financial institutions included the Oceanic Bank, Savannah Bank Plc and Bank of the North (Gwaison and Maimako, 2021). In South Africa, financial sector scandals included Regal Treasury Bank, African Bank Saambou, Leisurenet, Fidentia, Venda Building Society (VBS) Mutual Bank, and JCI, demonstrating the growing need for transparency and robustness in governing the financial firms. Furthermore, South Africa reported on management misconduct in advisory firms such as Deloitte, African Bank and Klynveld Peat Marwick Goerdeler (KPMG) scandals (Lingwati and Mamabolo, 2023).

With the collapse of financial institutions and the activities of some other institutions, concerns have been raised about the need to improve corporate governance in financial institutions. According to Hunjra *et al*. (2024), sound corporate governance will ensure the effective and efficient functioning of financial institutions and the banking sector. Karpoff (2021) considers corporate governance to be an array of control procedures that organisations implement to restrict or discourage potentially self-interested managers (agents) from engaging in behaviours that are unfavourable to the financial welfare of shareholders and other stakeholders. Corporate governance describes how managers in charge of the company should run it. Therefore, the importance of the board of directors in institutionalising effective corporate governance principles in every organisation cannot be overstated.

The importance of the board of directors in corporate governance is apparent in model definitions of corporate governance, which define corporate governance as the structures and processes through which an institution's operations are directed and managed to improve long-term shareholders' value by improving corporate performance and accountability while taking stakeholders' interests into account (Tricker and Tricker, 2015).

The 2007 to 2009 global financial crisis emerged from corporate governance failures in the financial sector. Against this background, this study assesses the cointegrating relationships between financial performance and corporate governance in selected financial institutions.

2 Literature review

2.1 Theoretical literature review

The study was centred on both agency and stewardship theories' perceptions to enhance the impact of corporate governance on companies. According to Brealey *et al*. (2022) and Efunniyi *et al*. (2024), accounting information and corporate governance procedures can present stakeholders with information about an institution's financial position and performance. Accounting information summarises financial data in the form of ratios as the basis for forecasting future financial performance, which shareholders can use to make investment decisions (Brealey *et al*., 2022). Following the agency relationship, businesses experience agency problems due to asymmetric information between management, who act as agents, and shareholders, who act as principals involved in decision-making. As a result of random disturbances in the outcome of their actions, such as inefficient behaviour of all parties (i.e., shareholders and managers) in satisfying their interests, this information asymmetry may result in an incomplete contract (Schroeck, 2002). In agency theory, an agent is vital in formulating firm policies to provide investors with a sign and a desirable investment signal. However, good corporate development will inform stakeholders that the business has been able to maintain and grow its viability.

According to the stewardship theory, directors can accomplish organisational objectives for shareholders by improving their worth rather than self-serving. Donaldson and Davis (1991) support the argument of stewardship theory. According to stewardship theory, allowing managers (agents) to act with discretion can motivate them to perform better. According to Donaldson and Davis (1991), the stewardship approach emphasises that managers' concern for their career progression and reputation motivates them to operate in the best interests of the shareholders, reducing agency costs.

2.2 Empirical literature review

Oladipupo and Kelvin (2024) examined the impact of corporate governance on the financial performance of 39 listed Nigerian manufacturing firms from 2003 to 2022, in which the panel regression technique was employed. The results found that board size, audit committee and board composition negatively correlated with ROE. However, the audit committee and board composition positively correlated with ROA. The study found a negative relationship between board size and ROA. Furthermore, a positive relationship between board independence and financial performance (ROE and ROA). An earlier study by Elbahar (2016) assessed the key concepts of corporate governance, bank risk and performance of 90 banks selected from the GCC. Applying variables such as the return on assets (ROA) and the return on equity (ROE), he concluded that corporate governance variables of board size, gender diversity, duality and audit committee exerted little influence on bank performance (ROE). The study employed the Ordinary Least Squares (OLS) to analyse the results. Owusu and Garr (2024) investigated the impact of corporate governance on the financial performance of 14 Ghanaian-listed banks from 2008 to 2020. The study employed the Ordinary Least Squares (OLS) regression and found that board diversity, audit committee, board independence and board size had a positive relationship with ROA. However, a significant negative association was found between gender diversity and ROE.

Simanjuntak and Alfredo (2024) investigated the impact of corporate governance on the financial performance of Indonesian companies. The study employed regression analysis and sampled 100 publicly listed financial and non-financial companies. Shareholder rights, audit committee effectiveness and board independence proxied corporate governance, while ROA, net profit margin and ROE measured performance. The study found a positive relationship between corporate governance and financial performance. Talatu (2024) examined the effects of corporate governance on the financial performance of quoted healthcare firms in Nigeria from 2014 to 2023. The study employed the OLS regression model and found that board independence, skilled and diverse board composition positively correlate with ROE. Consistent with Mahmudi (2024), who found a positive correlation between financial performance and corporate governance using a systematic literature review.

Musa (2020) examined the association between corporate governance and the financial performance of Nigerian banks from the period 2013 to 2015. The study's independent variables are board meetings, board independence, and board gender, whereas the dependent variable is the ROA. The study sampled 15 listed banks and employed panel regression analysis. The results found the link between board independence and ROA is statistically insignificant. ROA and board meetings were found to be negatively significant. The association between board genders, the board size, and ROA, on the other hand, was statistically insignificant. Meanwhile, a positive and statistically significant association exists between firm size and ROA. The association between bank age and ROA was statistically significant and negative.

Kiptoo *et al*. (2021) examined the relationship between corporate governance and the financial performance of insurance firms in Kenya using data drawn from 51 Kenyan insurance companies from 2013–2018. Their corporate governance was measured exclusively using the board of directors' structure within the respective firms. They concluded that smaller boards, as well as boards with greater independent directors, were more efficient in enhancing financial performance within the surveyed insurance companies. Their findings were corroborated by Temba *et al*. (2023) in their assessment of the moderating role of corporate governance on the financial performance of commercial banks in Tanzania. Similarly, they recommended that enhanced corporate governance standards could improve the commercial banks' financial performance, particularly those pertaining to liquidity, capital adequacy, earning ability, efficient use of equity and asset quality.

Jouirou and Jouini (2022) examined the effect of gender diversity and directors' independence on French banks' performance. The study employed panel data regression model for 66 sampled French banks from 2015 to 2019. The results found a significant and positive relationship between gender diversity and profitability. In addition, a significant and positive effect of the independence of directors on the profitability of banks was found. However, Nizam and Liaqat (2022) examined the effect of corporate governance factors on bank performance in Pakistan, employing a sample of 15 banks from 2010 to 2020, using data from the financial reports. Their study applied the cointegration test, the Hausman test to determine the fixed or random effects and the Panel least squares regression to check the association between the variables. Nizam and Liaqat (2022) found a positive and significant association between board size and ROA, stipulating that optimal board size improves the ROA. In addition, their findings showed that board independence significantly affects ROA, implying that it plays a role in increasing shareholders' value.

Usendok (2022) investigated the relationship between corporate governance and firm performance in the Nigerian banking sector. ROA measures the firm performance of banks. Ex-post facto research and descriptive design were adopted, and the indirect least squares were employed in the study. The study sampled banks from 2014 to 2020, and the results found a significant positive association between board composition and performance, while board size and board meetings had a significant and negative relationship with the firm performance of the banks. Msomi and Nzama (2023) sought to identify firm-specific variables that affect the financial performance of 36 publicly listed South African insurance companies. Applying ROA as the dependent variable, they found that only leverage and liquidity ratios positively influenced financial performance, implying that insurance companies should focus on improving and maintaining these aspects. Muzata and Marozva (2023) assessed the effect of corporate governance on the financial performance of the Top 40 listed companies on the South African Johannesburg Stock Exchange (JSE). Based on their findings, they recommended that companies prioritise sound corporate governance practices because they positively influence firm performance.

Table 1: Summary of literature review

Author's name and year	Title	Methodology	Findings
Oladipupo and Kelvin (2024)	Corporate governance and manufacturing firms' financial performance in Nigeria	Panel regression technique	The study found that board size, audit committee and board composition have a negative relationship with ROE. Audit committee and board composition had a positive relationship with ROA. A positive relationship between board independence and financial performance.
Elbahar (2016)	Corporate governance, risk management and bank performance in the GCC banking sector	OLS regression analysis	The study found board size, gender diversity, duality and audit committee exerted little influence on ROE.
Owusu and Garr (2024)	Corporate governance dynamics and financial performance: Analysis of listed commercial banks in the Ghanaian context	OLS regression analysis	The study found that board diversity, audit committee, board independence and board size had a positive relationship with ROA.
Simanjuntak and Alfredo (2024)	impact of corporate governance on financial performance Evidence from Indonesia.	Regression analysis	The study found a positive relationship between corporate governance and financial performance.
Talatu (2024)	Effect of corporate governance on financial performance of quoted healthcare firms in Nigeria.	OLS regression model	The study found that board independence, skilled and diverse board composition, positively correlated with ROE.
Mahmudi (2024)	Corporate governance mechanisms and financial performance: A systematic literature review in emerging markets	Systematic literature review	The study found a positive correlation between financial performance and corporate governance
Musa (2020)	Corporate governance and financial performance of Nigeria listed banks.	Panel regression analysis	The study found the link between board independence and ROA is statistically insignificant. ROA and board meetings were found to be negatively significant. The association between board genders, the board size, and ROA, on the other hand, was statistically insignificant. Meanwhile, a positive and statistically significant association exists between firm size and ROA

Kiptoo et al. (2021)	Corporate governance and financial performance of insurance firms in Kenya.	Regression analysis	The study found that smaller boards, as well as boards with greater independent directors, were more efficient in enhancing financial performance.
Jouirou and Jouini (2022)	Corporate governance mechanisms and banking performance.	Panel data regression model	The study found a significant and positive relationship between gender diversity and profitability. In addition, a significant and positive effect of the independence of directors on the profitability
Nizam and Liaqat (2022)	Corporate governance and firm performance: Empirical evidence from Pakistan banking sector	Panel least squares regression analysis	The study found a positive and significant association between board size and ROA, and showed that board independence significantly affects ROA.
Usendok (2022)	Corporate Governance and Organizational Performance: A Study of Selected Banks in Nigeria.	Indirect least squares	The study found a significant positive association between board composition and performance, while board size and board meetings had a significant and negative relationship with the firm performance
Muzata and Marozva (2023)	The Nexus between Executive Compensation and Firm Performance: Does Governance and Inequality Matter?	Generalised method of moments model analysis	They recommended that companies prioritise sound corporate governance practices because they positively influence firm performance.

Source: Authors' own composition

Although many studies on corporate governance have been carried out across parts of the world, most of these studies have been conducted in different countries, employing different methodologies. South Africa has a robust regulatory framework for financial institutions. Furthermore, based on the scope of the research, limited studies have evaluated the impact of corporate governance in South Africa, utilising current data and different combinations of corporate governance measures employed in this study. This investigation was necessitated by the critical gap in the literature.

3 Data and methodology

Similar to the work of Khoza *et al*. (2024), the Bureau Van Dijk Orbis Bank and the Financial Sector Conduct Authority (FSCA) databases were used to source data on the financial institutions for this study. Although the South African financial services sector is fairly developed, our sample was restricted to 11 commercial banks and 10 insurance companies with complete data for the period under review (2007-2020).

Diagnostic tests were performed before data analysis to prevent spurious regression results. Principal component analysis (PCA) was used in this study to create a composite indicator of corporate governance. This method was adopted because there is no agreement in the literature on the most relevant variable to measure corporate governance (Swedan and Ahmed, 2019). To perform PCA, the Eigenvalues of the variance matrix must be computed. Several mutually independent principal components are applied to summarise the variables of interest, with each principal component being the weighted average of the underlying variables (Greenacre *et al*., 2022). Meanwhile, the composite index constructed provides a methodologically efficient approach to lower dimensionality while capturing the overall governance quality. However, it may introduce limitations that can influence certain results. The PCA assumptions of linearity and orthogonality could not adequately capture the complexity and interactive nature of corporate governance measures. Therefore, it can conceal the opposing effects, which may result in an overall insignificant association with financial performance.

Board size was measured by the total number on the board of directors, independent non-executive directors measured by the total number of independent non-executive directors to total non-executive directors, non-executive directors measured by the number of non-executive directors to the total number of directors, board remuneration measured by the total amount of remunerations for

board members, board diversity measured by the percentage of female board members on total board members. Transparency and disclosure are measured by disclosures of financial information, general corporate governance disclosure, board of directors' reports, age and qualification of directors, compliance reports, committees, accounting policies, remuneration of directors, and auditors' reports. Therefore, the study employed PCA to combine the six corporate governance metrics into a single index, GOVINDEX. This study employed the corporate governance index as the dependent variable. The independent variables were risk appetite, financial stability, and financial performance. Financial performance is measured by return on assets (net income to average total assets) and return on equity (net income to average total equity). The Z-score measures financial stability (Kajumbula and Makoni, 2024), while risk appetite is proxied by CAR and measured by the capitalisation ratio, consisting of total equity to total assets. Biresaw and Sibindi (2025) confirmed that risk appetite was a necessary variable to measure and account for in financial institutions, as it contributes to their overall enterprise risk management (ERM) framework.

3.1 Panel autoregressive distributed lags

Pesaran *et al*. (1999) introduced the pooled mean group (PMG), dynamic fixed effects (DFE), and the mean group (MG) approaches in the Autoregressive Distributive Lags (ARDL) framework, which the current study followed. The PMG has the advantage of allowing financial institutions' heterogeneity in error variances, short-run coefficients, and intercepts, as well as the speeds of adjustments to long-run equilibrium values with a proposal of homogenous long-run slope coefficients across financial institutions (Pesaran *et al*., 1999). The MG estimator requires a separate equation for each cross-sectional dimension, and the model's parameters are averaged to create reliable estimators. The DFE presupposes that long-run coefficients are constant throughout the sample. The Hausman test determined the most suitable estimation technique among the MG, PMG and DFE. A dynamic model is preferred because corporate governance is persistent. This study jointly estimates the long-run and short-run impacts by employing the ARDL and the error correction model (ECM) in panel data.

Baltagi (2008) and Croissant and Millo (2019) argued that panel data presume heterogeneity, in contrast with either cross-sectional (N) or time series (T) studies. When heterogeneity is ignored, when individual institution-specific variables are not controlled, a model is mis-specified (Baltagi, 2008). Panel data improves the effectiveness of econometric estimates by providing the researcher with an increasing degree of freedom, a larger number of data points and decreasing multicollinearity across study variables (Hsiao *et al*., 1995; Fujiki *et al*., 2002; Baltagi, 2008; Hsiao, 2022). Furthermore, panel data allow a researcher to use aggregate data to examine critical economic problems not addressed with time series or cross-sectional data sets (Baltagi, 2008; Hsiao, 2022).

The financial dimension is the determinant of corporate governance in this study. Corporate governance is hypothesised to be the function of the financial dimension, namely, financial performance, risk appetite and financial stability.

The unrestricted panel ARDL is specified below:

$$GOV_{it} = \varphi_0 + \sum_{j=1}^{p} \delta_{it} GOV_{i,\,t-j} + \sum_{j=0}^{q} \delta_{2t} X_{i,t-j} + \mu_i + \varepsilon_{it} \quad \text{Eq. 1}$$

Where:

GOV is the dependent variable captured in this study, which includes board size (BS), board remuneration (BR), board diversity (BD), and board composition (BC). The corporate governance (GOV) proxies are regressed individually. k is the selected financial institution, with lag lengths p and q, respectively. $X_{i,\,t-j}$ is the vector of the explanatory variables for group i. μ_i is the fixed effect. ε_{it} is the error term.

The equations below are re-parameterised to the specifics of the current study.

$$GOV_{it} = \beta_0 + \beta_{1i} GOV_{i,t-1} + \beta_{2i} FINPERF_{i,t-1} + \beta_{4i} FINSTAB_{i,t-1} + \sum_{j=1}^{p} \delta \Delta GOV_{i,t-j} + \sum_{j=0}^{q} \delta_{2t} \Delta FINPERF_{i,t-j} + \sum_{j=0}^{q} \delta_{4t} \Delta FINSTAB_{i,t-j} + \varepsilon_{it} \quad \text{Eq. 2}$$

$$FINPERF_{it} = \beta_0 + \beta_{1i} FINPERF_{i,t-1} + \beta_{2i} GOV_{i,t-1} + \beta_{4i} FINSTAB_{i,t-1} + \sum_{j=1}^{p} \lambda_{1t} \Delta FINPERF_{i,t-j} + \sum_{j=0}^{q} \delta_{2t} \Delta GOV_{i,t-j} + \sum_{j=0}^{q} \delta_{4t} \Delta FINSTAB_{i,t-j} + \varepsilon_{it} \quad \text{Eq. 3}$$

$$FINSTAB_{it} = \beta_0 + \beta_{1i} FINSTAB_{i,t-1} + \beta_{2i} GOV_{i,t-1} + \beta_{4i} FINPERF_{i,t-1} + \sum_{j=1}^{p} \lambda_{1t} \Delta FINSTAB_{i,t-j} + \sum_{j=0}^{q} \lambda_{2t} \Delta GOV_{i,t-j} + \sum_{j=0}^{q} \lambda_{4t} \Delta FINPERF_{i,t-j} + \varepsilon_{it} \quad \text{Eq. 4}$$

Where:

GOV is the corporate governance proxy, namely, board size (BS), board remuneration (BR), board diversity (BD) and board composition (BC) regressed individually. The proxies are regressed individually for corporate governance (GOV). FINPERF is the financial performance proxied by ROA and ROE. β denotes the long-run coefficient of the independent variable. Financial stability is FINSTAB. The short-run coefficients are φ, δ, γ, λ, Θ. The Akaike information criterion is applied to select the lag order (p, q). *t-j* represents the short-run and long-run relationships tested with differenced and lagged variables of the ARDL. The error term with the *i* of the institution and time period *t* is ε_{it}.

3.2 Error correction model

Once the long-run relationship between corporate governance and financial performance has been established, this study employs the vector error correction model (VECM) to determine the short-run effects (Apergis and Payne, 2010; Animasaun *et al*., 2025). Engle and Yoo (1987), Phillips (1991), and Hoffman and Rasche (1996) argue that the error correction model provides the advantages of incorporating cointegrations and capturing the short-run effect of the variables being analysed. However, VECM uses the error correction model (ECM). ECM is employed instead of VECM if there is no cointegration.

The generic error correction model is therefore specified below:

$$\Delta GOV_{i,t} = \alpha_{0,t} + \sum_{j=1}^{p} \beta_j \Delta GOV_{i,t-j} + \sum_{j=0}^{q} \phi_{i,j} \Delta X_{i,t-j} + \varphi_{1i} ECT_{i,\,t-1} + \omega_{it} \quad \text{Eq. 5}$$

Where:

Δ denotes the first difference operator. GOV represents each of the corporate governance proxies, board size (BS), board remuneration (BR), board diversity (BD), and board composition (BC), which are regressed individually. B and ϕ denote the short-run coefficients. ECT represents the error correction term. X denotes the vector of the independent variable. φ denotes the speeds of adjustments to the long-run equilibrium. α represents the constant. (p, q) represents the lagged lengths selected using the AIC. ω denotes the error term, which assumes a normal distribution with constant variance and zero mean.

The ECT coefficient (φ) in the ECM equation specifies the speed of system adjustments to long-run equilibrium after shocks in the short run. The ECT coefficients are expected to be statistically significant and negative to show convergence of the variables to equilibrium (Croissant and Millo, 2019).

We used the GOVINDEX as a measure of the corporate governance index. Equations 6 to 8 are equations for vector error correlation among corporate governance proxied by GOVINDEX (BS, BC, BC, BR, BD) and the financial variables (financial performance and financial stability). The equations are specified as follows:

$$\Delta GOVINDEX_{it} = \alpha_0 + \sum_{j=1}^{p} \delta \Delta GOVINDEX_{i,t-j} + \sum_{j=0}^{q} \delta_{2t} \Delta FINPERF_{i,t-j} + \sum_{j=0}^{q} \delta_{4t} \Delta FINSTAB_{i,t-j} + \phi_{1i} ECT_{i,\,t-1} + \varepsilon_{it} \quad \text{Eq. 6}$$

$$\Delta FINPERF_{it} = \alpha_0 + \sum_{j=1}^{p} \delta \Delta FINPERF_{i,t-j} + \sum_{j=0}^{q} \delta_{2t} \Delta GOVINDEX_{i,t-j} + \sum_{j=0}^{q} \delta_{4t} \Delta FINSTAB_{i,t-j} + \phi_{1i} ECT_{i,\,t-1} + \varepsilon_{it} \quad \text{Eq. 7}$$

$$\Delta FINSTAB_{it} = \alpha_0 + \sum_{j=1}^{p} \delta \Delta FINSTAB_{i,t-j} + \sum_{j=0}^{q} \delta_{2t} \Delta FINPERF_{i,t-j} + \sum_{j=0}^{q} \delta_{4t} \Delta GOVINDEX_{i,t-j} + \phi_{1i} ECT_{i,\,t-1} + \varepsilon_{it} \quad \text{Eq. 8}$$

Where:

GOVINDEX represents the corporate governance proxies: board size (BS), board remuneration (BR), board diversity (BD) and board composition (BC). GOVINDEX is a PCA composite index from the four individual proxies. FINPERF denotes the financial performance proxies, which are ROA and ROE. FINSTAB represents financial stability. φ, ϕ, λ denote speeds of adjustment to the long-run equilibrium. α denotes the constant. β denotes the coefficients in the short run.

4 Results and discussion of the findings

This section presents the results and discussions of the cointegrations and the ECT between the corporate governance index and financial variables: financial performance, risk appetite and financial stability. Each financial variable is jointly assessed to investigate the cointegration relationship with the corporate governance index. Using the Hausman tests, the PMG and DFE are preferred estimators for the study as the coefficients are verified for long-run homogeneity. Section 4.1 discusses the panel cointegrating and the error correction model results based on the financial performance measure (ROA). Section 4.2 discusses the panel cointegrating and the error correction model results based on the financial performance measure (ROE). Tables 1 to 8 provide the results of the preferred estimators.

4.1 Panel Cointegration and the ECM: Financial performance (ROA)

Table 2 presents the cointegrating and the ECT results. PMG is the most efficient and preferred estimator. Financial stability and the corporate governance index have a cointegrating and negative relationship. In the long run, an increase in financial stability reduces the corporate governance index of the selected financial institutions. Furthermore, the results imply that when financial stability increases, corporate governance practice could be ineffective. The result is consistent with Kiemo et al. (2019) and Gaganis et al (2020) who found a significantly negative nexus between financial stability and corporate governance index. However, inconsistent with Mallin (2010) and Wahba (2015), who found a positive correlation between financial stability and corporate governance index. Mutuma (2024) argues that corporate governance should provide oversight to management to maximise the institution's financial stability. The same results were observed between the CAR and the corporate governance index. When the CAR is increased, the corporate governance index experiences a reduction in the long run and is significant at a 0.05 significance level. The result shows that an increase in the CAR, in the long run, widens the corporate governance index gap. According to Jensen and Meckling (1976), while agency theory aims to reduce agency costs, which may lead to a reduced freedom of agents, it may restrict managerial adaptability and initiatives. Furthermore, meanwhile corporate governance is important for financial institutions, the agency relationship between agents and principals may encourage excessive risk taking if agents prefer higher returns, which may significantly reduce CAR and financial stability. The association between ROA and corporate governance is insignificant.

Table 2: Summary of the cointegrating results and the ECT: GOVINDEX

Variables	PMG D.GOVINDEX	MG D.GOVINDEX	DFE D.GOVINDEX
Long-run			
FINSTAB	-0.0219***	0.226	0.00377
	(-5.21)	(0.48)	(0.21)
ROA	0.00178	0.628	0.00964
	(0.39)	(1.17)	(0.64)
CAR	-0.00536*	0.793	-0.00598
	(-2.32)	(1.72)	(-0.89)
ECT	-0.665***	-0.839***	-0.464***
	(-8.07)	(-9.19)	(-8.65)
Short run			
D.FINSTAB	-0.0248	-0.0572	-0.00718
	(-0.48)	(-0.35)	(-0.99)
D.ROA	-0.00675	-0.0485	-0.00229
	(-0.07)	(-0.34)	(-0.43)
D.CAR	-0.0169	-0.322	-0.00519*
	(-0.34)	(-1.42)	(-1.99)
_cons	0.350**	-0.577	0.0245
	(2.90)	(-0.74)	(0.23)
N	273	273	273
Hausman Test (MG & MPG)	3.72	3.72	-
Hausman Test (DFE & MPG)	0.23	-	0.23

*** $p < 0.001$,** $p < 0.01$,* $p < 0.05$. Standard errors in parentheses. GOVINDEX (corporate governance proxies: BS, NED, INED, BR, BD, and TD), FINSTAB (financial stability), ROA (financial performance) and CAR (risk appetite). D. represents the difference operator.

Table 3: Summary of the cointegrating results and the ECT: FINSTAB

Variables	PMG D.FINSTAB	MG D.FINSTAB	DFE D.FINSTAB
Long-run			
GOVINDEX	0.0668	0.490	1.659
	(1.08)	(0.20)	(1.86)
ROA	0.256***	4.240*	-0.0214
	(13.35)	(2.00)	(-0.21)
CAR	0.244***	1.285	0.268***
	(131.69)	(1.93)	(7.33)
ECT	-0.450***	-1.177***	-0.688***
	(-4.71)	(-6.76)	(-9.64)
Short-run			
D.GOVINDEX	-3.405	-2.262*	-1.707**
	(-1.36)	(-2.04)	(-2.67)
D.ROA	3.307*	-0.615	0.0959
	(2.55)	(-0.68)	(1.77)
D.CAR	-0.0773	-2.159	-0.0141
	(-0.24)	(-1.24)	(-0.53)
_cons	4.639**	4.885	5.275***
	(2.77)	(1.70)	(5.02)
N	273	273	273
Hausman Test (MG & MPG)	0.99	0.99	-
Hausman Test (DFE & MPG)	49.60***	-	49.60***
Hausman Test (MG & DFE)	-	0.26	0.26

*** $p < 0.001$,** $p < 0.01$,* $p < 0.05$. GOVINDEX (corporate governance proxies: BS, NED, INED, BR, BD, and TD), FINSTAB (financial stability), ROA (financial performance) and CAR (risk appetite). D. represents the difference operator.

Several studies, such as Joe-Duke (2011), Aziz (2021) and Aluoch (2023) found an insignificant link between ROA and corporate governance. Corporate governance measures are process-oriented, while financial performance exhibits asset utilisation and operational efficiency. Bhagat and Bolton (2008) assert that corporate governance may not directly impact financial performance in the short run. ECT is significant and negative under the more efficient estimator (PMG). The findings infer a cointegrating relationship among the variables under analysis, namely, corporate governance index, financial stability, ROA, and CAR, but more

so, -0.665 represents the speed of adjustment. Therefore, the speed of adjustments to equilibrium will be 66.5 percent per year, which suggests a moderately fast adjustment speed. While financial stability and CAR are statistically insignificant in the short run, their ECT indicates a significant existence of an essential long run relationship with corporate governance index. Table 2 presents the cointegrating and the ECT results. DFE is the more efficient and preferred estimator.

DFE is more efficient for financial stability; therefore, the results discussed are based on the DFE estimator. There is a cointegrating relationship between the CAR and financial stability. The relationship is positive and statistically significant. However, in the long run, an increase in the CAR will increase the financial stability of the financial institutions. Therefore, it contributes to a well-functioning and efficient financial system sector. Nguyen (2021) and Affes and Jarboui (2023) assert that an improvement in corporate governance will also increase the financial stability of financial institutions. However, the current study found that the associations between the corporate governance index and financial stability, as well as ROA and financial stability, are insignificant. These results are inconsistent with those of Antwi and Kwakye (2022), who found a positive and significant association between financial stability and ROA.

There is a cointegrating relationship among the variables under analysis: financial stability, corporate governance index, ROA and CAR. The cointegrating relationship in ECT is negative and significant. Therefore, the model is in disequilibrium. While CAR is statistically insignificant in the short run, the ECT indicates a significant existence of an essential long run relationship with financial stability. -0.688 represents the speed of adjustment, which implies the speed of adjustments to equilibrium will be 68.8 percent per year, which suggests a moderately fast adjustment speed. Meanwhile, the corporate governance index is significant in the short run, its impact fades in the long run due to loss of strategic agility.

Table 4 provides the results of the cointegrating relationship and the ECT. PMG is more efficient. Therefore, it is the preferred estimator, and the results are based on PMG.

Table 4: Summary of the cointegrating results and the ECT: CAR.

Variables	PMG D.CAR	MG D.CAR	DFE D.CAR
Long-run			
GOVINDEX	-0.0557	-3.228	-1.161
	(-0.56)	(-1.66)	(-0.57)
FINSTAB	0.230***	3.581**	1.266***
	(14.95)	(3.05)	(5.85)
ROA	0.670***	-0.255	0.894***
	(7.49)	(-0.47)	(4.10)
ECT	-0.157*	-0.793*	-0.683***
	(-2.61)	(-2.56)	(-12.25)
Short-run			
D.ROA	-0.851*	0.254	-0.321**
	(-2.25)	(0.58)	(-2.70)
D.GOVINDEX	-2.806	-2.085	-3.273*
	(-1.62)	(-1.23)	(-2.30)
D.FINSTAB	2.205	-1.033	-0.0280
	(1.67)	(-1.08)	(-0.17)
_cons	14.45*	5.676	5.684*
	(2.52)	(0.97)	(2.35)
N	273	273	
Hausman Test (MG & MPG)	3.13	3.13	-
Hausman Test (DFE & MPG)	6.08	-	6.08

*** $p < 0.001$,** $p < 0.01$,* $p < 0.05$. GOVINDEX (corporate governance proxies: BS, NED, INED, BR, BD, and TD), FINSTAB (financial stability), ROA (financial performance) and CAR (risk appetite). D. represents the difference operator.

There is a cointegrating relationship between financial stability and the CAR. The long-run relationship is positive and significant at a 0.001 significance level. The higher the financial stability is, the higher the CAR. The results are consistent with the findings of Nguyen (2021) in Vietnamese financial institutions, where the relationship between the CAR and financial stability was positive and significant. When the study measured the relationship between the ROA and the CAR, the results showed a cointegrating relationship. The long-run relationship between the ROA and the CAR is positive and significant. The results imply that the higher the ROA, the higher the CAR for financial institutions. The CAR measures the financial institution's ability to meet its financial obligations by comparing its capital with its assets. The results of the current study are consistent with those of Shabani *et al*. (2019) and Benvenuto *et al*. (2021), who found a statistically significant and positive association between ROA and CAR. However, this is inconsistent with Setiawan and Irfani (2024), who found a negative link between ROA and CAR. The current study found an insignificant association between corporate governance and CAR.

The ECT is negative and significant. Therefore, the results confirm a cointegrating relationship between the variables (CAR, ROA, corporate governance index, and financial stability) under analysis, at a speed of adjustments to the equilibrium of 15.7 percent per year, which suggests a slow speed of adjustment. However, financial stability is insignificant in the short run, its impact increases

in the long run, indicating a significant level. While ROA is statistically significant in the short run, its ECT indicates a significant existence of an essential long run relationship with CAR. Table 5 provides the results of the cointegrating relationship and the ECT. PMG is more efficient. Therefore, it is the preferred estimator, and the results are based on PMG.

Table 5: Summary of the cointegrating results and ECT: ROA

Variables	PMG D.ROA	MG D.ROA	DFE D.ROA
Long-run			
GOVINDEX	-0.00871	-5.099	-1.599
	(-0.28)	(-1.63)	(-1.80)
FINSTAB	0.0190***	2.895**	0.0569
	(3.42)	(2.99)	(0.47)
CAR	0.0823***	-0.597***	0.102*
	(15.02)	(-4.22)	(2.31)
ECT	-0.483***	-0.959***	-0.831***
	(-4.75)	(-13.15)	(-12.99)
Short-run			
D.GOVINDEX	0.617	1.309	1.649*
	(1.32)	(1.41)	(2.15)
D.FINSTAB	2.495**	0.344	0.0679
	(2.60)	(1.11)	(0.77)
D.CAR	-0.108	0.259***	-0.000803
	(-1.32)	(3.84)	(-0.03)
_cons	0.554*	-2.176	-0.0142
	(2.03)	(-1.35)	(-0.01)
N	273	273	273
Hausman Test (MG & MPG)	0.81	0.81	-
Hausman Test (DFE & MPG)	6.35	-	6.35
Hausman Test (DFE & MPG)	-	0.56	0.56

*** $p < 0.001$,** $p < 0.01$,* $p < 0.05$. GOVINDEX (corporate governance proxies: BS, NED, INED, BR, BD, and TD), FINSTAB (financial stability), ROA (financial performance) and CAR (risk appetite). D. represents the difference operator.

The cointegrating relationship between ROA and the corporate governance index is insignificant. Ehikioya (2009) and Mollah et al. (2012) also found a negative and insignificant relationship between ROA and corporate governance index. The insignificant results suggest that strict corporate governance measures do not always affect the financial performance of financial institutions. There is a cointegrating relationship between financial stability and ROA. However, the cointegrating relationship is positive and significant. A percentage increase in the financial stability of the financial institutions increases the financial performance (ROA). This finding is consistent with Tan and Anchor (2016) and Antwi and Kwakye (2022), who found a significant and positive relationship between financial stability and ROA. However, the study found an insignificant association between corporate governance and ROA.
There is also a cointegrating relationship between the CAR and ROA. The relationship is both positive and significant. An increase in the financial institutions' CAR increases the ROA of the selected institutions. The result is consistent with those of Shabani *et al*. (2019), Mbaeri *et al*. (2021), and Benvenuto *et al*. (2021), who found positive and significant results. The ECT of the variables under analysis is negative and significant. Therefore, a cointegrating relationship exists between the variables under analysis: ROA, corporate governance index, financial stability, and CAR. The speed of adjustment to equilibrium will be 48.3 percent per year, which suggests a moderate speed of adjustment. However, CAR is insignificant in the short run, its impact increases in the long run, indicating a significant level. While financial stability is statistically significant in the short run, its ECT indicates a significant existence of an essential long run relationship with ROA.

4.2 Panel Cointegration and the ECM: Financial performance (ROE)

Table 6 provides the results of the cointegrating relationship and the ECT. DFE is more efficient. Therefore, it is the preferred estimator, and the results are based on DFE. This study found no cointegrating relationships between financial stability and the corporate governance index, ROE and the corporate governance index, CAR and the corporate governance index. Ajanthan et al. (2013), Elbahar (2016), and Bawaneh (2020) found an insignificant link between corporate governance and financial performance. However, the results are contrary to the agency theory prediction that corporate governance improves financial stability and performance (Jensen and Meckling, 1976). The cointegrating relationship between financial stability and the corporate governance index is positive but statistically insignificant in the long run. A cointegrating relationship exists among the variables under analysis, namely, corporate governance index, financial stability, ROE, and CAR. The model is in disequilibrium, and the speed of adjustments to equilibrium is 47.4 percent per year, which suggests a moderate speed of adjustment. However, CAR, ROE and financial stability are all insignificant in the short run, their impact also does not significantly increase in the long run. Table 7 provides the results of the cointegrating relationship and the ECT. DFE is more efficient. Therefore, it is the preferred estimator, and the results are based on DFE.

Table 6: Summary of the cointegrating results and the ECT: GOVINDEX

Variables	PMG D.GOVINDEX	MG D.GOVINDEX	DFE D.GOVINDEX
Long-run			
FINSTAB	-0.0191***	0.288	0.00315
	(-5.16)	(0.68)	(0.18)
ROE	-0.000184	-0.0237	-0.00290
	(-0.08)	(-0.96)	(-0.38)
CAR	-0.00521*	0.511	-0.00427
	(-2.56)	(1.43)	(-0.67)
ECT	-0.669***	-0.842***	-0.474***
	(-8.25)	(-9.35)	(-8.85)
Short-run			
D.FINSTAB	0.0229	-0.0668	-0.00724
	(0.70)	(-0.42)	(-1.00)
D.ROE	-0.00812	-0.00645	0.00107
	(-1.08)	(-0.67)	(0.36)
D.CAR	-0.0246	-0.190	-0.00529*
	(-0.69)	(-1.18)	(-2.04)
_cons	0.323**	-0.139	0.0468
	(2.72)	(-0.21)	(0.38)
N	273	273	273
Hausman Test (MG & MPG)	4.54	4.54	-
Hausman Test (DFE & MPG)	38.85***	-	38.85***
Hausman Test (MG & DFE)	-	0.25	0.25

*** $p < 0.001$,** $p < 0.01$,* $p < 0.05$. GOVINDEX (corporate governance proxies: BS, NED, INED, BR, BD, and TD), FINSTAB (financial stability), ROE (financial performance) and CAR (risk appetite). D. represents the difference operator.

Table 7: Summary of the cointegrating results and ECT: FINSTAB

	PMG D.FINSTAB	MG D.FINSTAB	DFE D.FINSTAB
Long-run			
GOVINDEX	0.494**	-2.051	1.400
	(2.82)	(-0.60)	(1.59)
ROE	0.197***	0.0609	-0.0714
	(11.73)	(0.29)	(-1.33)
CAR	0.269***	1.474	0.265***
	(312.01)	(1.94)	(7.99)
ECT	-0.462***	-1.142***	-0.704***
	(-5.50)	(-14.63)	(-9.82)
Short-run			
D.GOVINDEX	-3.852	-3.204	-1.589*
	(-1.16)	(-1.71)	(-2.48)
D.ROE	0.0383	0.00127	0.0450
	(0.86)	(0.02)	(1.49)
D.CAR	-0.0322	-2.095	-0.00946
	(-0.12)	(-1.62)	(-0.35)
_cons	3.262*	6.151	6.213***
	(2.09)	(1.34)	(5.14)
N	273	273	273
Hausman Test (MG & MPG)	1.63	1.63	-
Hausman Test (DFE & MPG)	40.00***	-	40.00***
Hausman Test (MG & DFE)	-	1.23	1.23

*** $p < 0.001$,** $p < 0.01$,* $p < 0.05$. GOVINDEX (corporate governance proxies: BS, NED, INED, BR, BD, and TD), FINSTAB (financial stability), ROE (financial performance) and CAR (risk appetite). D. represents the difference operator.

The cointegrating relationship between financial stability and corporate governance is positive and insignificant. Similar results were found by Haribowo et al. (2021), who found no significant impact of corporate governance on financial stability. A cointegrating relationship exists between the CAR and the financial stability of financial institutions. The long-run relationship is positive and significant at a 0.001 significance level. The results are consistent with those of Nguyen (2021), who found a positive and significant relationship between the CAR and financial stability. The result implies that an increase in the CAR will increase the financial stability of the financial institutions. However, the current study found an insignificant association between the corporate governance index and financial stability and between ROE and financial stability. The ECT is negative but highly significant at 0.001. Therefore, a cointegrating relationship between the variables exists, namely, financial stability, corporate governance index, ROE, and CAR under analysis, with -0.704 representing the speed of adjustment. Therefore, the speed of adjustments to equilibrium will be 70.4 percent per year, which suggests a moderately fast speed of adjustment. However, CAR is insignificant in the short run, its impact increases in the long run, reaching a significant level.

Table 8 provides the results of the cointegrating relationship and the ECT. DFE is more efficient. Therefore, it is the preferred estimator, and the results are based on DFE.

Table 8: Summary of the cointegrating results and ECT: CAR.

	PMG	MG	DFE
Variables	D.CAR	D.CAR	D.CAR
Long-run			
GOVINDEX	0.663	-2.785	-1.574
	(0.92)	(-1.43)	(-0.72)
FINSTAB	0.736***	3.337**	1.482***
	(6.01)	(2.93)	(6.63)
ROE	0.508***	0.0278	0.331*
	(7.04)	(0.17)	(2.51)
ECT	-0.310*	-1.739**	-0.648***
	(-2.20)	(-2.72)	(-11.59)
Short-run			
D.ROE	-0.184*	-0.0378	-0.156*
	(-2.17)	(-0.48)	(-2.31)
D.GOVINDEX	-2.733	-1.879*	-2.849*
	(-1.62)	(-2.01)	(-1.97)
D.FINSTAB	1.974	-0.746	-0.0655
	(1.69)	(-1.00)	(-0.39)
_cons	9.189	7.443	2.134
	(1.67)	(1.18)	(0.75)
N	273	273	273
Hausman Test (MG & MPG)	3.27	3.27	-
Hausman Test (DFE & MPG)			
Hausman Test (MG & DFE)	3.13	-	3.13
	-	55.75***	55.75***

*** $p < 0.001$,** $p < 0.01$,* $p < 0.05$. GOVINDEX (corporate governance proxies: BS, NED, INED, BR, BD, and TD), FINSTAB (financial stability), ROE (financial performance) and CAR (risk appetite). D. represents the difference operator.

There is no cointegrating relationship between CAR and corporate governance. Benvenuto et al. (2021) found similar results where there was no significant cointegrating relationship between CAR and corporate governance. There is a cointegrating relationship between financial stability and the CAR. The long-run relationship is positively significant at 0.001. In the long run, financial stability will increase financial institutions' CAR. This finding is consistent with the results of Nguyen (2021) and Benvenuto *et al*. (2021), who found a significant and positive relationship between financial stability and the CAR. However, the current study found an insignificant association between corporate governance and CAR.

The relationship between ROE and the CAR is also significant and positive. Therefore, there is a cointegrating relationship between these variables. The higher the ROE, the higher the CAR of the selected financial institutions. The results are consistent with those of Angahar *et al*. (2019) and Shabani *et al*. (2019), who found a positive and significant relationship between ROE and the CAR. Financial institutions use the CAR to assess the sufficiency of their capital holdings in light of their exposures. The ECT is negative and significant. Therefore, a cointegrating relationship exists between the variables: CAR, corporate governance index, financial stability, and ROE. Under this analysis, the speed of adjustments to equilibrium will be 31 percent per year, which suggests a moderate adjustment speed. While financial stability is statistically insignificant in the short run, the ECT indicates a significant existence of an essential long run relationship with CAR. ROE is significant in the short run, its impact also increases in the long run due to increase in strategic agility. However, corporate governance is only significant in the short run, and its impact fades in the long run.

Table 9 provides the results of the cointegrating relationship and the ECT. PMG is more efficient. Therefore, it is the preferred estimator, and the results are based on PMG. The long-run relationship between the corporate governance index and ROE is insignificant. The results imply that corporate governance measures have no significant long-run relationship with ROE. Furthermore, corporate governance loses relevance over time. Furthermore, the relationship between financial stability and ROE is

also insignificant. Moreover, the relationship between the CAR and ROE is insignificant. Under the preferred PMG estimator, the ECT is negative and statistically significant at 0.001. Therefore, a cointegrating relationship between the variables exists: ROE, corporate governance index, financial stability, and CAR under analysis. The speed of adjustment to equilibrium will be 57.7 percent per year, which suggests a moderate adjustment speed. While financial stability is statistically significant in the short run, its relevance losses in the long run.

Table 9: Summary of the cointegrating results and ECT: ROE.

Variable	PMG D.ROE	MG D.ROE	DFE D.ROE
Long-run			
GOVINDEX	-0.138	62.65	-2.759
	(-0.21)	(0.93)	(-1.61)
FINSTAB	0.128	6.283	0.000331
	(1.14)	(1.40)	(0.00)
CAR	-0.0433	-4.543	0.00410
	(-1.40)	(-1.15)	(0.05)
ECT	-0.577***	-0.969***	-0.783***
	(-6.37)	(-11.76)	(-12.19)
Short-run			
D.GOVINDEX	2.579	6.133*	2.013
	(1.44)	(2.03)	(1.45)
D.FINSTAB	6.196*	-2.267	-0.0248
	(2.18)	(-0.98)	(-0.15)
D.CAR	1.283	6.872	0.0505
	(0.57)	(1.55)	(0.87)
_cons	7.903***	7.122	12.18***
	(5.84)	(1.24)	(4.62)
N	273	273	273
Hausman Test (MG & MPG)	0.73	0.73	-
Hausman Test (DFE & MPG)	0.60	-	0.60
Hausman Test (MG & DFE)	-	4.17	4.17

*** $p < 0.001$,** $p < 0.01$,* $p < 0.05$. GOVINDEX (corporate governance proxies: BS, NED, INED, BR, BD, and TD), FINSTAB (financial stability), ROE (financial performance) and CAR (risk appetite). D. represents the difference operator.

As a result of the entire test, in which the corporate governance index was the dependent variable, the ECT, measuring the speed of adjustments for long-run equilibrium, is significant and negative. ECT must be significant and negative to correct the short-run divergence to its long-run equilibrium (Gujarati, 2021). None of the ECTs in this study were positive, which implies that the time series converges towards the long-term equilibrium. The results satisfied the PMG and DFE conditions of the long-run relationships. The negative and significant coefficients of ECT were between 0 and -1.

Using corporate governance proxies as dependent variables, the study discussed the cointegration relationships. Therefore, the current study reported cointegrating relationships between the chosen independent variables.

5. Conclusions

The study was limited to South African financial institutions registered under the FSCA and the Bureau Van Dijk Orbis Bank, incorporating data from 2007 to 2020. The study included other financial variables (dimensions), namely, financial stability, risk appetite, and financial performance, in investigating the cointegrating association between financial performance and corporate governance. We employed the principal component analysis method to develop a composite index to proxy corporate governance instead of only using the individual corporate governance proxies: board diversity, remuneration, composition, and size. Therefore, the corporate governance index of the current study was necessary to capture and reflect the corporate governance differences in the sample of selected financial institutions. Moreover, incorporating the corporate governance index into the study further emphasised its importance in financial institutions.

When financial stability was regressed as the dependent variable, we concluded that financial stability in the selected financial institutions had cointegrating relationships with the corporate governance index, CAR, and ROA when the financial performance measure was used as ROA. Furthermore, financial stability cointegrated with the CAR when the financial performance measure was used as ROE. When the CAR was regressed as the dependent variable employing ROA to measure financial performance, we found cointegrating relationships between the CAR and financial stability, and between the CAR and ROA.

However, capital adequacy (CAR) had a cointegrating relationship with financial stability when the financial performance measure was ROE. When the ROA was regressed as the dependent variable, we found a cointegrating relationship between the ROA and the CAR. When the ROE was regressed as the dependent variable, we found a cointegrating relationship between the ROE and CAR. The presence of a cointegration relationship means that there is a long-term equilibrium between the variables.

Similar to Min *et al*. (2015), we concur that governance systems for financial institutions should have been created before the global financial crisis of 2007. However, regulators learned great lessons, and notable progress and improvements have been made since

then, although there are still some loopholes. We thus recommend that greater attention be paid to the enterprise risk management of financial institutions to enable them to identify and set their risk appetite thresholds, which impact the profitability of their operations. Regulators must also ensure that they continuously adjust the capital adequacy ratios of financial institutions, in line with their respective risk profiles, to avoid bank runs and failures.

Future research could consider applying Tobin's Q as a finance measure when gauged against individual corporate governance variables, as was the case in the study by Park and Byun (2022). Such results could then be compared to determine whether it matters that one study used a composite index, while others used individual variables.

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References

Affes, W. and Jarboui, A. (2023). The impact of corporate governance on financial performance: a cross-sector study. *International Journal of Disclosure and Governance*, *20*(4): 374-394.

Ajanthan, A., Balaputhiran, S. and Nimalathashan, B. (2013). Corporate governance and banking performance: A comparative study between private ad state banking sector in Sri Lanka. *European Journal of Business and Management*, 5(20): 92-100.

Angahar, P.A., Tsokar, E.E. and Agbo, A. (2019). Effect of capital structure on corporate performance of listed consumer goods firms in Nigeria, *Journal of Accounting, Finance and Management Discovery,* 2(2): 1-119.

Animasaun, R.O., Omotunwase, O.M., Babayanju, A.G.A. and Bamgboye, A.A. (2025). Effect of credit risk management on financial performance of listed deposit money banks in Nigeria. *International Journal of Research in Social Science and Humanities,* 6(1): 1-12.

Antwi, F. and Kwakye, M. (2022). Modelling the effect of bank performance on financial stability: Fresh evidence from Africa, *Research in Business & Social Science,* 11(7): 2147-4478.

Aluoch, M. O. (2023). Corporate governance and performance of commercial banks listed at the Nairobi Securities Exchange, Kenya. *European Scientific Journal, ESJ*, *19*(10), 194.

Apergis, N. and Payne, J.E. (2010). Renewable energy consumption and economic growth: Evidence from a panel of OECD countries, Energy policy 38(1): 656–660.

Aziz, S. and Abbas, U. (2021). Corporate governance, innovation and corporate performance: A study of pharmaceutical industry of Pakistan. *Asian Journal of Economics and Finance*, *3*(4), 459-471.

Baltagi, B. (2008). *Econometric analysis of panel data*. Hoboken, NJ: Wiley.

Benvenuto, M., Avram, R.L., Avram, A. and Viola, C. (2021). Assessing the impact of corporate governance index on financial performance in the Romanian and Italian banking systems. *Sustainability*, *13*(10): 1-16.

Biresaw, T.M. and Sibindi, A.B. (2025). A Structured Approach to Enterprise Risk Management in Ethiopian Commercial Banks. *Risk Management Magazine*, 20(1): 57-77. https://www.aifirm.it/wp-content/uploads/2025/04/RMM-2025-01-Excerpt-4.pdf

Bhagat, S. and Bolton, B. (2008). Corporate governance and firm performance. *Journal of corporate finance*, *14*(3), 257-273.

Brealey, R. A., Myers, S. C., Allen, F. and Edmans, A. (2022). *Principles of corporate finance.* 14th edition. New York: McGraw-Hill Irwin.

Croissant, Y. and Millo, G., 2019. *Panel data econometrics with R*. Wiley.

Donaldson, L. and Davis, J. H. (1991). Stewardship theory or agency theory: CEO governance and shareholder returns. *Australian Journal of Management*, 16(1): 49–64.

Efunniyi, C.P., Abhulimen, A.O., Obiki-Osafiele, A.N., Osundare, O.S., Agu, E.E. and Adeniran, I.A. (2024). Strengthening corporate governance and financial compliance: Enhancing accountability and transparency. *Finance & Accounting Research Journal*, *6*(8): 1597-1616.

Ehikioya, B. I. (2009). Corporate governance structure and firm performance in developing economies: evidence from Nigeria. *Corporate Governance: The international journal of business in society*, 9(3), 231-243.

Elbahar, E. (2016). *Corporate governance, risk management, and bank performance in the GCC banking sector.* Thesis. University of Plymouth. Available at: https://doi.org/10.24382/1002

Engle, R.F. and Yoo, B.S. (1987). Forecasting and testing in co-integrated systems. *Journal of Econometrics,* 35(1): 143-159.

Fujiki, H., Hsiao, C. and Shen, Y. (2002). Is there a stable money demand function under the low interest rate policy? A panel data analysis, *Monetary & Economic Studies*, 20(2), 1–23.

Gaganis, C., Lozano-Vivas, A., Papadimitri, P. and Pasiouras, F. (2020). Macroprudential policies, corporate governance and bank risk: Cross-country evidence. *Journal of Economic Behavior & Organization*, 169(1): 126-142. https://doi.org/10.1016/j.jebo.2019.11.004

Greenacre, M., Groenen, P.J., Hastie, T., D'Enza, A.I., Markos, A. and Tuzhilina, E. (2022). Principal component analysis. *Nature Reviews Methods Primers*, 2(1), 1-21.

Gujarati, D.N. (2021). *Essentials of econometrics*. 5th ed. SAGE Publications.

Gwaison, P.D. and Maimakp, L.N. (2021). Effects of corporate governance on financial performance of commercial banks in Nigeria, *International Journal of Financial Research,* 2(1): 13-23.

Haribowo, I., Putri, Z. E. and Yulianti, Y. (2021). Corporate Governance and Financial Stability of Islamic Banks in Asia. *The Journal of Asian Finance, Economics and Business*, *8*(12): 353-361.

Hoffman, D.L. and Rasche, R.H. (1996). Assessing forecast performance in a cointegrated system. *Journal of Applied Econometrics,* 11(5):495-517.

Hsiao, C. (2022). *Analysis of panel data*. Cambridge University Press.
Hsiao, C., Mountain, D.C. and Illman, K.H. (1995). A Bayesian integration of end-use metering and conditional-demand analysis, Journal of Business & Economic Statistics 13(3), 315–326.
Hunjra, A.I., Jebabli, I., Thrikawala, S.S., Alawi, S.M. and Mehmood, R., 2024. How do corporate governance and corporate social responsibility affect credit risk?. *Research in International Business and Finance*, *67*: 1-18. https://doi.org/10.1016/j.ribaf.2023.102139
Jensen, M. C. and Meckling, W. H. (1976). Theory of the Firm: Managerial Behaviour, Agency Costs, and Ownership Structure. *Journal of Financial Economics* 3(4): 305–50. https://doi.org/10.1016/0304-405X(76)90026-X
Joe-Duke, I. I. and Kankpang, K. A. (2011). Linking corporate governance with organizational performance: New insights and evidence from Nigeria. *Global Journal of Management and Business Research*, 11(12), 46-58.
Jouirou, M. and Jouini, F. (2022). Corporate governance mechanisms and banking performance. *Global Business and Economics Review*, *27*(4): 475-491.
Kajumbula, R. and Makoni, P.L. (2024). CEO power and bank risk nexus: Evidence from commercial banks in Uganda. *Risk Management Magazine*, 19(2): 42-53. http://dx.doi.org/10.47473/2020rmm0143.
Karpoff, J.M. (2021). On a stakeholder model of corporate governance. *Financial Management*, *50*(2): 321-343.
Khoza, F., Makina, D. and Makoni, P. L. (2024). Key determinants of corporate governance in financial institutions: evidence from South Africa; Risks 12 (6):90. https://doi.org/10.3390/risks12060090
Kiemo, S.M., Olweny, T.O., Muturi, W.M. and Mwangi, L.W. (2019). Bank-specific determinants of commercial banks financial stability in Kenya. *Journal of Applied finance and banking*, 9(1): 119-145.
Kiptoo, I. K., Kariuki, S. N., Ocharo, K. N. and Ntim, C. G. (2021). Corporate governance and financial performance of insurance firms in Kenya. Cogent Business & Management, 8(1): 1-17. https://doi.org/10.1080/23311975.2021.1938350
Lingwati, E. and Mamabolo, A. (2023). Emerging market entrepreneurs' narratives on managing business ethical misconduct. *Acta Commercii-Independent Research Journal in the Management Sciences*, *23*(1): 1-12.
Mahmudi, B. (2024). Corporate governance mechanisms and financial performance: A systematic literature review in emerging markets. *Management Studies and Business Journal,* 1(3): 270-285.
Mallin, C.A. (2010). Corporate governance and risk: A study of board structure and process. *Journal of Financial Regulation and Compliance*, 18(2): 174-191.
Mbaeri, M.N., Uwalake, U. and Gimba, J.T. (2021). Capital adequacy ratio and financial performance of listed commercial banks in Nigeria. *Journal of Economics and Allied Research*, *6*(3): 81-88.
Min, B. S., Cashel-Cordo, P. and Rhim, J. C. (2015). Corporate leverage strategy in an emerging market. *Global Business & Finance Review*, 20(2), 35-48.
Mollah, S., Al Farooque, O. and Karim, W. (2012). Ownership structure, corporate governance and firm performance: Evidence from an African emerging market. *Studies in Economics and finance*, 29(4), 301-319.
Msomi, T. S. and Nzama, S (2023). Analyzing firm-specific factors affecting the financial performance of insurance companies in South Africa. *Insurance Markets and Companies*, 14(1): 8-21. doi:10.21511/ins.14(1).2023.02
Musa, H. (2020). Corporate governance and financial performance of Nigeria listed banks. *Journal of Advanced Research in Dynamical & Control Systems*, 12(1): 5-10.
Mutuma, F. D. K. W. (2024). Emerging trends in board leadership and corporate governance. *ICS Governance Journal*, *1*(3): 23-37.
Muzata, T. and Marozva, G. (2023). The Nexus between Executive Compensation and Firm Performance: Does Governance and Inequality Matter? *Global Business & Finance Review*, 28(5): 31-50
Nguyen, M.S. (2021). Capital adequacy ratio and a bank's financial stability in Vietnam. *Banks and Bank Systems*, *16*(4): 61.
Nizam, K. and Liaqat, O. (2022). Corporate Governance and firm performance: empirical evidence from Pakistan banking sector. *International Journal of Business Diplomacy and Economy*, *1*(2): 18-28.
Nyaloti, L.A. (2024). Effect of stock market crashes in international markets on the global economy: A case study of US stock market crashes. *International Journal of Research publication and Reviews*, 5(8): 4145-4150.
Oladipupo, O.E. and Kelvin, A.O. (2024). Corporate governance and manufacturing firms' financial performance in Nigeria. *Asian Journal of Economics, Business and Accounting,* 24(11): 471-490.
Owusu, C.K. and Garr, D.K. (2024). Corporate governance dynamics and financial performance: Analysis of listed commercial banks in the Ghanaian context. *International Journal of Business, Management, and Economics,* 5(2): 114-133.
Park, K. H. and Byun, J. (2022). Board diversity, IPO underpricing, and firm value: evidence from Korea. *Global Business & Finance Review*, 27(1), 65-82
Pesaran, M. H., Shin, Y., and Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. Journal of the American Statistical Association, 94(446), 621-634.
Phillips, P. C. (1991). Optimal inference in cointegrated systems. *Econometrica: Journal of the Econometric Society*, 1(1): 283-306.
Schroeck, G. (2002). *Risk management and value creation in financial institutions*. G. Schroeck, (Ed.). U.S.: Wiley.
Setiawan, F. and Irfani, A. F. (2024). Predicting capital adequacy ratio of Islamic rural banks based on FDR, NPF, ROA, and BOPO. In *Proceeding International Conference on Law, Economy, Social and Sharia (ICLESS),* 2: 748-771.
Shabani, H., Morina, F. and Misiri, V. (2019). The effect of capital adequacy on returns of assets of commercial banks in Kosovo. *European Journal of Sustainable Development*, *8*(2): 201-201.
Simanjuntak, B. and Alfredo, J. (2024). The impact of corporate governance on financial performance Evidence from Indonesia. *International Journal of Strategic Accounting and Business Management,* 1(1): 1-5.
Swedan, Z. M. and Ahmed, S. (2019). The impact of corporate governance implementation on firm's performance in the Gulf countries (GCC) based on stewardship assumptions. *International Journal of Business Society*, *2*(11): 42-47.
Talatu, H. F. (2024). Effect of corporate governance on financial performance of quoted healthcare firms in Nigeria. *ANUK College of Private Sector Accounting Journal,* 1(2): 69-78.

Tan, A. Y. and Anchor, J. R. (2016). Stability and profitability in the Chinese banking industry: evidence from an auto-regressive-distributed linear specification. *Investment Management and Financial Innovations*, *13*(4): 120-128.
Temba, G. I., Kasoga, P. S. and Keregero, C. M. (2023). Corporate governance and financial performance: Evidence from commercial banks in Tanzania. *Cogent Economics & Finance*, 11(2). https://doi.org/10.1080/23322039.2023.2247162
Tricker, B. and Tricker, R. I. (2015). *Corporate governance: Principles, policies, and practices*. Oxford University Press, USA.
Usendok, I. G. (2022). Corporate governance and organizational performance: A study of selected banks in Nigeria. *International Journal of Business and Management Review*, *10*(4): 59-74.
Wahba, H. (2015). The joint effect of board characteristics on financial performance: Empirical evidence from Egypt. *Review of Accounting and Finance*, *14*(1): 20-40.