

Enterprise Risk Management and Financial Performance: Evidence from Banks in Emerging Economies



Sudirman Sudirman¹, Lince Bulutoding², Normiyati Normiyati³
Baso Iwang⁴, Abdul Rahman⁵, Hasbiullah Hasbiullah⁶

^{1,2,4,6}Faculty of Economics and Islamic Business,
State Islamic University of Alauddin, Makassar, Indonesia

¹sudirman.andi@uin-alauddin.ac.id

²lince.bulutoding@uin-alauddin.ac.id

⁴baso.iwang@uin-alauddin.ac.id

⁶hasbiullah.jabbar@uin-alauddin.ac.id

³Faculty of Economics, University of Pejuang Republik Indonesia, Makassar, Indonesia

³normiyatinur07@gmail.com

⁵Faculty of Economics and Business, State University of Makassar, Indonesia

⁵abdul.rahman1582@unm.ac.id

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Abstract: Existing governance indices rarely isolate risk-specific oversight from broader board attributes, leaving the valuation relevance of financial risk governance in banking empirically unresolved. This study addresses that gap by introducing a multidimensional Financial Risk Governance Index (FRGI) and testing its effect on firm value among 100 listed commercial banks across ten emerging economies (Indonesia, Malaysia, Thailand, the Philippines, Vietnam, India, Brazil, Turkey, Russia, and South Africa) over 2013–2023. The FRGI aggregates indicators of board-level risk oversight, Chief Risk Officer presence, risk disclosure, and enterprise risk management integration, validated through exploratory and confirmatory factor analysis. Firm value is proxied by Tobin's Q and price-to-book value; the empirical strategy proceeds from pooled OLS to two-way fixed effects and random effects, and culminates in a two-step System GMM estimator to address endogeneity and the dynamic persistence of firm value. Financial risk governance is found to exert a positive and statistically significant effect on firm value, a result that holds across estimators, alternative FRGI weighting schemes, and alternative firm-value measures. The effect is significantly stronger for larger and more profitable banks, whereas high leverage attenuates it, indicating that governance effectiveness is conditional rather than uniform across institutions. These findings position financial risk governance as a distinct, risk-specific determinant of firm value in emerging banking markets and suggest that strengthening risk-oriented governance structures can enhance market confidence and long-term institutional resilience.

Keywords: financial risk governance; financial performance; banking sector; emerging economies; corporate governance; panel data.

JEL Classification: G21; G32; G34; C23.

Introduction

The banking sector plays a fundamental role in economic development and financial system resilience, particularly in emerging economies where institutional frameworks continue to evolve. Financial risk governance has gained increasing attention as a mechanism to mitigate systemic vulnerabilities and enhance value creation. Historical episodes, such as the 1998 financial crisis in Indonesia, highlight the substantial economic costs of financial instability (Yuniarto *et al.*, 2022). As financial intermediaries, banks facilitate transactions, allocate capital, and manage risk, thereby supporting economic growth and macroeconomic stability (He *et al.*, 2017). Consequently, strengthening risk governance has become a priority for policymakers and practitioners in volatile global environments.

Effective risk management improves bank performance by containing key exposures, including credit, interest rate, solvency, and liquidity risk, thereby shaping profitability and long-run financial sustainability (Basuki &

Sabilla, 2023; Solanki & Aggarwal, 2022). Robust risk governance also enhances shareholder value by supporting data-driven decisions and competitive positioning. From an institutional perspective, banks rely on public trust; thus, effective risk management is essential to minimize losses and strengthen accountability (Frigo & Anderson, 2011). How structured risk governance translates into bank valuation once institutional context is taken into account is therefore an open empirical question, and one this study is designed to answer.

Despite theoretical consensus on governance importance, empirical findings remain inconclusive. Evidence from emerging markets is mixed, suggesting that governance reforms do not always translate into higher firm value. The impact often depends on ownership structure, regulatory quality, and market maturity (Aziza & Aviola, 2024; Haryetti & Rokhmawati, 2021; Siew Tee & Nizam, 2020). In some cases, governance affects firm value indirectly through performance improvements rather than direct signaling (Basuki & Sabilla, 2023; Solanki & Aggarwal, 2022). Because the direction of the effect depends on institutional context rather than holding uniformly, isolating risk-specific governance from governance in general requires a multidimensional measurement framework.

A key challenge lies in measuring governance effectiveness. Traditional approaches rely on broad indices or single proxies that may not capture risk-specific oversight structures (Al-Yahyaee & Al-Hadi, 2016; Tao & Hutchinson, 2013). As governance becomes more complex, board monitoring, risk committees, and executive risk leadership must be examined jointly (Gai *et al.*, 2021; Thapa *et al.*, 2025). Moreover, emerging economies exhibit heterogeneous institutional environments, where regulation, market depth, and macroeconomic volatility shape governance incentives (Fahmida, 2025; Namagwa, 2025). Addressing these issues requires methods that integrate firm-level indicators with institutional dynamics while controlling for endogeneity.

Recent research emphasizes integrating Enterprise Risk Management (ERM) into governance systems. Empirical evidence shows that ERM enhances firm value by improving transparency and aligning incentives (Iswajuni *et al.*, 2018; Sprčić *et al.*, 2016). Governance attributes such as board size, independence, and ownership also support performance (Hasan *et al.*, 2024; Khan *et al.*, 2017; Yasser *et al.*, 2015). Importantly, risk acts as a mediating channel linking governance and firm value (Aluchna & Kuszewski, 2020; Zambon & Bello, 2005). Taken together, this body of work points to risk-taking behavior as the transmission channel linking governance to value, the rationale for measuring governance through risk-specific rather than generic indicators, as developed next.

Complementary research highlights the role of governance-driven risk oversight in shaping institutional outcomes. Studies on Indonesian and Malaysian banks show a positive association between governance quality and asset returns, supporting recommendations to strengthen risk governance frameworks (Meirene & Karyani, 2017). Similarly, bank-level analyses indicate that effective governance implementation influences risk exposure and performance (Melsyawati *et al.*, 2022; Permatasari, 2020). These findings underscore the importance of integrated governance structures combining strategic oversight, risk monitoring, and organizational culture (Sari *et al.*, 2022). However, most studies rely on single-country samples or short time horizons, limiting generalizability.

From a theoretical perspective, the governance–risk relationship can be explained through multiple lenses. Agency Theory highlights conflicts between principals and agents, requiring monitoring mechanisms such as board independence and role separation (Donaldson & Davis, 1991). In contrast, Stewardship Theory emphasizes managerial alignment with organizational goals and suggests that integrated leadership may enhance efficiency. More recent perspectives incorporate ethical and institutional dimensions, including Islamic governance frameworks that prioritize accountability, social welfare, and long-term value creation (Ghafran & Yasmin, 2020). Because Agency Theory, Stewardship Theory, and Islamic governance perspectives offer partly competing predictions, adjudicating between them requires evidence drawn from institutionally diverse settings, precisely the cross-country design adopted in this study.

Despite growing attention, significant gaps remain. First, cross-country evidence on how financial risk governance affects firm value in emerging markets is limited. Second, existing indices often overlook risk-specific components such as disclosure intensity and executive risk leadership. Third, methodological limitations, particularly related to endogeneity and dynamic adjustment, may bias results. Addressing these gaps requires panel data approaches that integrate multidimensional governance indicators with advanced econometric techniques.

This study addresses these gaps by examining the impact of financial risk governance on firm value in emerging economies using a newly developed Financial Risk Governance Index (FRGI). The index combines indicators of board oversight, Chief Risk Officer presence, risk disclosure, and reporting practices. The analysis employs dynamic panel methods, including fixed effects and System GMM, to address endogeneity and unobserved heterogeneity. The study contributes through its cross-country scope, multidimensional measurement, and analysis of moderating factors such as size, leverage, and profitability. Accordingly, it hypothesizes that stronger financial risk governance enhances firm value, while firm characteristics condition this relationship.

1. Literature Review and Hypotheses Development

This section provides the theoretical and empirical foundation for examining the relationship between financial risk governance and firm value in the banking sector. It synthesizes perspectives from Agency Theory, Stewardship Theory, and the emerging Risk Governance perspective to explain how risk-specific governance mechanisms influence market valuation. Unlike conventional corporate governance studies that emphasize broad monitoring structures, this study focuses on financial risk governance as a distinct governance construct that directly shapes risk oversight, transparency, and value creation in banking institutions. The review also identifies key research gaps and develops hypotheses concerning the conditional effectiveness of governance across different organizational contexts.

Financial risk governance is a key dimension of corporate governance that encompasses processes designed to identify, monitor, and manage financial risks. From an Agency Theory perspective, risk governance reduces information asymmetry and managerial opportunism by strengthening monitoring and accountability mechanisms. From a Stewardship Theory perspective, risk governance facilitates strategic coordination and long-term value creation by aligning managerial actions with organizational objectives. Effective governance therefore requires risk measurement systems, oversight structures, and organizational cultures that support prudent decision-making (Flannery *et al.* (2012). Empirical evidence indicates that stronger governance frameworks are associated with lower risk exposure, greater institutional stability, and improved market confidence (Iqbal *et al.*, 2015). Key governance mechanisms include the presence of a Chief Risk Officer, active risk committees, and integrated enterprise risk management structures (Lingel & Sheedy, 2012).

H1: Financial Risk Governance positively affects firm value.

The effectiveness of financial risk governance may vary according to organizational characteristics, particularly bank size. Larger banks generally possess more sophisticated governance infrastructures, greater technological resources, and specialized risk management capabilities that enable more effective implementation of risk oversight mechanisms. The Risk Governance perspective suggests that organizational scale enhances a bank's capacity to transform governance arrangements into measurable valuation outcomes through superior monitoring, disclosure quality, and strategic coordination (Lingel & Sheedy, 2012). Empirical studies indicate that larger financial institutions benefit more from governance reforms because they possess stronger institutional capacity and greater stakeholder visibility (Hamid *et al.*, 2023; Hasan *et al.*, 2024; Wibowo *et al.*, 2025). Consequently, the value-enhancing effect of financial risk governance is expected to be stronger among larger banks.

H2: Bank size positively moderates the relationship between Financial Risk Governance and firm value.

Financial leverage represents an important boundary condition affecting governance effectiveness. Agency Theory suggests that highly leveraged firms face intensified conflicts among shareholders, managers, and creditors, thereby increasing monitoring costs and financial distress risk (Donaldson & Davis, 1991; Xie *et al.*, 2017). Although governance mechanisms are intended to mitigate such conflicts, their effectiveness may diminish when excessive leverage creates solvency concerns and constrains managerial flexibility. This perspective is consistent with studies highlighting that governance outcomes depend on organizational and financial conditions rather than governance structures alone (Callan & Thomas, 2014; Jamel *et al.*, 2021). Recent studies also incorporate Islamic governance perspectives emphasizing ethical accountability, social responsibility, and long-term value creation (Ghafran & Yasmin, 2020).

Empirical evidence further demonstrates that high leverage may weaken the effectiveness of governance mechanisms by increasing financial risk exposure and limiting strategic flexibility (Huynh *et al.*, 2022; Kijkasiwat *et al.*, 2022). As a result, investors may assign lower credibility to governance signals when financial vulnerability remains substantial (Felicio *et al.*, 2018; Mwaungulu *et al.*, 2023). This condition can reduce the credibility of governance signals and weaken their impact on firm valuation (Kijkasiwat *et al.*, 2022; Santosa *et al.*, 2022). Therefore, the effectiveness of financial risk governance is expected to vary depending on the bank's capital structure.

H3: Leverage negatively moderates the relationship between Financial Risk Governance and firm value.

Profitability represents another important condition shaping the effectiveness of financial risk governance. Banks with stronger profitability possess greater financial resources to invest in governance systems, risk management infrastructure, and disclosure quality. From a signaling perspective, profitable banks can more credibly communicate governance quality to investors, thereby amplifying the valuation benefits of governance improvements. Previous studies show that governance mechanisms often enhance firm value indirectly through

improved operational efficiency and profitability (Josopandojo, 2020; Kiptoo *et al.*, 2021). In many cases, governance influences firm valuation indirectly by enhancing profitability and operational efficiency. Enterprise Risk Management (ERM) adoption has been shown to contribute positively to firm value by improving transparency, strengthening internal controls, and aligning managerial incentives with shareholder interests (Iswajuni *et al.*, 2018; Sprčić *et al.*, 2016). Governance attributes such as board size and the presence of independent directors further reinforce valuation outcomes by enhancing monitoring effectiveness and strategic oversight (Hasan *et al.*, 2024; Khan *et al.*, 2017; Yasser *et al.*, 2015).

H4: Profitability positively moderates the relationship between Financial Risk Governance and firm value.

Risk is a key mediating mechanism linking governance and firm value. Governance reforms influence risk-taking behavior, which subsequently affects performance and valuation (Aluchna & Kuszewski (2020). Similarly, governance mechanisms enhance firm value by reducing uncertainty and improving risk management (Zambon & Bello (2005). These findings highlight the need to integrate risk-specific indicators into governance measurement.

Empirical studies on banking institutions provide further insights into the governance–risk–performance nexus. Governance quality significantly affects credit, liquidity, and operational risks, although its impact on market risk is limited (Permatasari (2020). Comparative studies show a positive association between governance quality and asset returns (Meirene & Karyani (2017). Panel data evidence also indicates that governance practices influence banking performance (Melsyawati *et al.* (2022). Effective risk management requires collaboration among stakeholders to support governance implementation (Sari *et al.* (2022).

Beyond firm-level governance, macroeconomic and institutional conditions shape financial outcomes in emerging markets. Variables such as inflation, interest rates, and exchange rates influence investment and growth dynamics (Febrianti *et al.*, 2023; Safrina & Abubakar, 2023). Additionally, global financial integration affects market behavior in emerging economies (Dodd *et al.*, 2015; Nugroho & Suk, 2019). These factors indicate that governance effectiveness must be evaluated within broader institutional contexts.

Despite extensive literature, several gaps remain. First, many studies rely on broad corporate governance proxies and do not distinguish financial risk governance as a separate governance construct with potentially unique valuation effects. Second, empirical models often overlook dynamic adjustment processes and endogeneity concerns. Third, limited attention has been devoted to identifying the organizational conditions under which governance becomes more or less effective. Accordingly, this study contributes not only by introducing a multidimensional Financial Risk Governance Index (FRGI), but also by advancing a conditional governance framework that integrates Agency Theory, Stewardship Theory, and Risk Governance perspectives to explain how governance effectiveness varies across banks.

2. Research Methodology

2.1 Research Design

This study employs a quantitative research design using panel data techniques to examine the relationship between financial risk governance and firm value. Panel data allows the integration of cross-sectional and time-series dimensions, enabling dynamic analysis while controlling for unobserved heterogeneity and time effects. This approach improves estimation efficiency and reduces bias from omitted variables (Baltagi, 2005).

The observation period spans 2013–2023, capturing post-crisis adjustments, regulatory reforms, and increasing financial integration in emerging markets. The empirical analysis is aligned with the econometric models used in the results section, including fixed effects, random effects, and dynamic panel estimations.

Table 1. List of Research Sample Banks

No.	Country	Number of Banks	Bank Name
1	Indonesia	10	Bank Mandiri, BRI, BNI, BTN, BCA, Danamon, CIMB Niaga, Bank Permata, BTPN, OCBC NISP
2	Malaysia	10	Maybank, CIMB Group, Public Bank, RHB Bank, Hong Leong Bank, AmBank, Bank Islam Malaysia, Alliance Bank, Standard Chartered Malaysia, HSBC Malaysia
3	Thailand	10	Bangkok Bank, Kasikornbank, Siam Commercial Bank, Krungthai Bank, Bank of Ayudhya, TMBThanachart Bank, Kiatnakin Phatra Bank, CIMB Thai, Standard Chartered Thailand, UOB Thailand
4	Philippines	10	BPI, BDO Unibank, Metrobank, Land Bank, Development Bank of the Philippines, Aboitiz Equity Ventures, Security Bank, RCBC, EastWest Bank, Standard Chartered Philippines

No.	Country	Number of Banks	Bank Name
5	Vietnam	10	Vietcombank, BIDV, VietinBank, Agribank, Techcombank, MB Bank, Sacombank, VPBank, ACB, HSBC Vietnam
6	India	10	State Bank of India, HDFC Bank, ICICI Bank, Punjab National Bank, Bank of Baroda, Kotak Mahindra Bank, Axis Bank, Yes Bank, IndusInd Bank, Standard Chartered India
7	Brazil	10	Banco do Brasil, Itau Unibanco, Banco Bradesco, Caixa Econômica Federal, Santander Brasil, Banco do Nordeste, Banco Safra, BTG Pactual, Banco Mercantil do Brasil, HSBC Brazil
8	Turkey	10	Akbank, Isbank, Ziraat Bank, Halkbank, Garanti BBVA, Yapı Kredi, VakıfBank, DenizBank, QNB Finansbank, ING Türkiye
9	Russia	10	Sberbank, VTB Bank, Gazprombank, Alfa-Bank, Tinkoff Bank, Rosbank, UniCredit Russia, Raiffeisenbank Russia, Promsvyazbank, MTS Bank
10	South Africa	10	Standard Bank, FirstRand, Absa Group, Nedbank, Capitec Bank, Investec Bank, Old Mutual, African Bank, HSBC South Africa, Citibank South Africa

2.2 Population and Sample

Population and Sample – The population comprises commercial banks operating in emerging economies, as classified by international institutions such as the IMF and World Bank. The sample includes 100 listed banks from ten countries: Indonesia, Malaysia, Thailand, the Philippines, Vietnam, India, Brazil, Turkey, Russia, and South Africa. The final dataset contains approximately 1,000 bank-year observations after accounting for missing data.

A purposive sampling technique is used to ensure data availability and reliability. The criteria include: (1) banks publishing annual reports consistently; (2) banks listed or formally regulated; and (3) availability of data on firm value, governance indicators, and control variables. Banks undergoing liquidation, merger before 2013, or with data gaps exceeding three years are excluded.

Missing data are handled using a structured approach. When missing observations are $\leq 10\%$, mean or median imputation at the country-year level is applied. When this threshold is exceeded, observations are excluded. Robustness checks using multiple imputation confirm result stability.

2.3 Data Sources and Variable Measurement

Primary data are obtained from annual reports, governance disclosures, and audited financial statements. Secondary data are sourced from Thomson Reuters Eikon, Bloomberg, and World Bank indicators. A double verification process is used to reduce data entry errors and improve reliability.

Firm value is the dependent variable, measured using market-based indicators, namely Tobin's Q and price-to-book value (PBV). These measures capture investor perceptions and are widely used in governance and banking studies.

The main explanatory variable is Financial Risk Governance, measured using the Financial Risk Governance Index (FRGI). This index captures board-level oversight, Chief Risk Officer presence, risk policies, disclosure practices, reporting frequency, and ERM integration. Indicators are coded using dummy, ordinal, or proportional scales depending on their characteristics.

Moderating variables include bank size, leverage, and profitability, measured as the logarithm of total assets, liabilities-to-assets ratio, and return on assets. Control variables include capital adequacy, non-performing loans, liquidity, loan growth, ownership, bank age, and non-interest income. Macroeconomic conditions are proxied by GDP growth and inflation.

2.4 Construction of the Financial Risk Governance Index

Before detailing the construction procedure, it is necessary to justify why the FRGI comprises these six indicators rather than a broader corporate-governance index. Each indicator is selected on theoretical grounds tied specifically to risk oversight rather than general board attributes. Board oversight and CRO presence capture the structural monitoring capacity emphasized by Agency Theory, whereby a dedicated risk committee and executive-level risk leadership reduce information asymmetry between management and shareholders (Donaldson & Davis, 1991; Tao & Hutchinson, 2013). Risk policy disclosure and the risk appetite statement capture the transparency dimension associated with Stewardship Theory, under which voluntary risk communication signals managerial commitment to long-term value creation rather than short-term opportunism (Frigo & Anderson, 2011). Risk reporting frequency and ERM integration capture the operational depth of risk governance, consistent with the Risk Governance

perspective, which holds that oversight mechanisms generate value only when embedded in ongoing organizational processes rather than confined to periodic disclosure (Gai *et al.*, 2021; Lingel & Sheedy, 2012). Together, these indicators span the structural, informational, and operational dimensions of financial risk governance identified in the literature, distinguishing the FRGI from composite governance indices that aggregate heterogeneous board attributes without a risk-specific rationale (Al-Yahyaee & Al-Hadi, 2016).

For empirical implementation, the six theoretically grounded indicators described above are consolidated into four core dimensions retained after reliability and validity screening: Risk Oversight (RO, combining board-level risk-committee presence and the risk appetite statement), the Board Risk Committee's formal standing (BRC), Risk Disclosure (RD, combining risk policy disclosure and risk reporting frequency), and Chief Risk Officer presence (CRO). This four-dimension structure, rather than the complete six-item coding scheme, is the notation used in the baseline and robustness equations reported below (Equations 1–3); it reflects indicators that survive the EFA/CFA screening rather than the full initial item pool, and it is this reduced structure that is subjected to the equal-weighting and alternative-weighting comparison described next.

Table 2. Dependent Variable (Firm Value)

Variable	Operational Definition	Formula	Data Source
Tobin's Q	Ratio of market value to book value of assets	$(\text{Total Market Value of Equity} + \text{Total Debt}) / \text{Total Assets}$	Bloomberg, Annual Reports
PBV (Price-to-Book Value)	Comparison of market price per share with book value per share	$\text{Market Price per Share} / \text{Book Value per Share}$	Thomson Reuters, Bloomberg

Table 3. Independent Variables (Financial Risk Governance–FRG)

Variable	Operational Definition	Formulas / Indicators	Data Source
Board Oversight	The role of boards in risk management oversight	Dummy (1 if there is a Risk Committee; 0 if not)	Annual Reports
CRO Presence	The existence of the Chief Risk Officer (CRO)	Dummy (1 if the CRO is at the executive level; 0 if not)	Annual Reports, Bank Websites
Risk Management Policy	Formal ERM policies disclosed	Dummy (1 if disclosed; 0 if not)	Annual Reports
Risk Disclosure Index	Financial risk disclosure index	Scoring (number of risk items disclosed / total items) $\times$ 100	Content Analysis of Reports

Table 4. Moderation Variables

Variable	Operational Definition	Formula	Data Source
Profitability	Bank profit rate	$\text{ROA} = \text{Net Income} / \text{Total Assets}$	Annual Reports, Bloomberg
Leverage	Debt-based capital structure	$\text{Total Liabilities} / \text{Total Assets}$	Annual Reports, Bloomberg
Size	Bank size	Natural logarithm of Total Assets	Annual Reports, Bloomberg

Table 5. Control Variables

Variable	Operational Definition	Formula	Data Source
Capital Adequacy (CAR)	Capital adequacy ratio	$\text{Tier 1 Capital} / \text{Risk-Weighted Assets}$	Central Reports, Bank
Non-Performing Loan (NPL) Ratio	Non-performing credit ratio	$\text{Non-Performing Loans} / \text{Total Loans}$	Central Reports, Bank
Liquidity Ratio	Bank's liquidity capabilities	$\text{Liquid Assets} / \text{Short-term Liabilities}$	Annual Reports
Loan Growth	Annual loan growth	$(\text{Loans}_t - \text{Loans}_{(t-1)}) / \text{Loans}_{(t-1)}$	Annual Reports
Ownership Type	Ownership type	Dummy (1 if state-owned; 0 if private)	Bank Reports
Bank Age	Bank age in years	$\text{Year of Observation} - \text{Year of Establishment}$	Bank Profiles
Non-Interest Income Ratio	Non-interest income to total income	$\text{Non-Interest Income} / \text{Total Income}$	Annual Reports

The FRGI is constructed through a transparent multi-stage process. First, governance indicators are coded and normalized to ensure comparability. The primary aggregation method uses a simple average to generate a score ranging from zero to one. Equal weighting is adopted as the primary rule because no established theoretical or empirical basis prioritizes one dimension of financial risk governance over another; assigning differential weights ex ante would therefore constitute an arbitrary rather than a theoretically motivated choice. This assumption is relaxed, rather than simply asserted, in the sensitivity analysis reported in Table 2,3,4 and 5.

To assess sensitivity, alternative methods are used, including weighted averages emphasizing board oversight and CRO presence, and principal component analysis (PCA). The weighted specification assigns greater weight to board oversight and CRO presence because these two indicators represent the formal locus of risk-decision authority within the bank and are therefore expected, on theoretical grounds, to carry the strongest signaling value to investors; this weighting scheme is thus a deliberate robustness test of the equal-weighting assumption rather than an alternative default. Reliability is evaluated using Cronbach's alpha (threshold 0.70). Construct validity is assessed through EFA and CFA, where indicators with loadings below 0.40 are excluded. The retained indicators are subsequently validated using CFA to confirm that they represent a single underlying latent construct of Financial Risk Governance. The empirical results of the reliability and validity assessments, including the Cronbach's alpha coefficient, the number of factors extracted, the range of retained standardized factor loadings, and the CFA goodness-of-fit indices (CFI, TLI, RMSEA, and SRMR), are reported in the Results section.

2.4.1 Indicator Coding, Aggregation, and Validation Procedure

FRGI is built with meticulous and transparent processes. Simple procedure: 1. Code each indicator according to the scale (dummy, ordinal, or proportion); 2. Normalization of indicators when needed (z-score) to ensure unit equivalence; 3. Main approach: simple average (average of selected indicators); 4. Sensitivity test: weighted average (Higher Weighted on Board Oversight & CRO) and PCA for deriving factor scores; 5. Reliability & validity: Cronbach's alpha ($\alpha \geq 0.70$ as the threshold), EFA for loadings (cut-off ≥ 0.40), and CFA as the construct confirmation test.

Component details, PCA/EFA loading, Cronbach's alpha, and decisions regarding indicator removal are presented.

Table 6. FRGI Forming Indicators

Dimension	Indicator	Measurement Scale	Source
Board Oversight	The existence of a Risk Committee at the board level	Dummy (1 = exist, 0 = none)	Annual Report
CRO Presence	The existence of a Chief Risk Officer (CRO) at the executive level	Dummy (1 = exist, 0 = none)	Annual Report / Website
Risk Policy Disclosure	Risk management policies disclosed in the report	Dummy (1 = exist, 0 = none)	Annual Report
Risk Appetite Statement	A formal statement of the acceptable level of risk	Dummy (1 = exist, 0 = none)	Annual Report
Risk Reporting Frequency	Frequency of risk reporting (quarterly, semi-annually, annually)	Skala ordinal (1–3)	Annual Report
ERM Integration	Integration of Enterprise Risk Management in business processes	Scoring (0–1, based on checklist)	Annual Report

Indicator Merge Method

Key approach: Simple Average, i.e., FRGI scores are calculated as the average of all indicators.

Sensitivity test: performed by two alternative methods:

- Weighted Average, with higher weights on the Board Oversight and CRO Presence dimensions.
- Principal Component Analysis (PCA) is used to test the consistency of factor structure and reduce the potential for multicollinearity between indicators.

Reliability and Validity Testing

- Internal Reliability: Cronbach's Alpha is calculated to ensure consistency between indicators ($\alpha \geq 0.70$ is considered adequate).
- Construction Validity: performed with Exploratory Factor Analysis (EFA) to test factor loadings. Indicators with a load of <0.40 will be considered for elimination.

- Confirmatory Factor Analysis (CFA): used on additional models to test whether the FRGI indicator represents a single consistent construct.

2.4.2 Baseline Index Construction. Main Model

The Financial Risk Governance Index (FRGI) is primarily constructed using a simple unweighted average approach, which is theory-driven and ensures interpretability across countries and institutional contexts. The index aggregates four governance dimensions:

- Risk Oversight (RO)
- Board Risk Committee (BRC)
- Risk Disclosure (RD)
- Chief Risk Officer (CRO)

The baseline FRGI is defined as:

$$FRGI_{it} = \frac{RO_{i,t} + BRC_{i,t} + RD_{i,t} + CRO_{i,t}}{4} \quad (1)$$

This approach is consistent with prior governance literature emphasizing transparency and comparability.

2.4.3 Alternative Weighting Scheme. Robustness Check

To test sensitivity, a weighted index is constructed using theoretically informed weights reflecting the relative importance of governance mechanisms:

$$FRGI_{it}^W = w_1 RO_{i,t} + w_2 BRC_{i,t} + w_3 RD_{i,t} + w_4 CRO_{i,t} \quad (2)$$

Where $\sum w_j = 1$

2.4.4 PCA-Based Index. Data-Driven Validation

To address potential dimensionality concerns, Principal Component Analysis (PCA) is employed as a robustness check. The first principal component (PC1) is extracted and used as an alternative proxy:

$$FRGI_{it}^{PCA} = \lambda_1 RO_{i,t} + \lambda_2 BRC_{i,t} + \lambda_3 RD_{i,t} + \lambda_4 CRO_{i,t} \quad (3)$$

2.5 Analytical Method

The empirical analysis follows a structured multi-model approach to ensure robustness and address potential econometric concerns.

2.5.1 Pooled OLS Reference Model

To ensure clarity in model specification, the empirical strategy adopts a stepwise approach. The pooled OLS model includes a reduced set of core variables to provide baseline insights. In contrast, the fixed effects and random effects models incorporate a more comprehensive set of control variables, including bank-specific risk and performance indicators (e.g., CAR, NPL, loan growth, and non-interest income), to account for structural heterogeneity. This hierarchical specification strategy is consistent with empirical practices in panel data analysis and allows for incremental assessment of robustness.

The initial model (benchmark) is OLS pooled:

$$FV_{it} = \beta_0 + \beta_1 FRGI_{i,t} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \beta_5 MACRO_{it} + \varepsilon_{it} \quad (4)$$

where FV_{it} represents firm value (Tobin's Q or PBV), $FRGI_{i,t}$ denotes the Financial Risk Governance Index, SIZE, LEV, and ROA represent bank-specific characteristics, $MACRO_{it}$ includes macroeconomic controls, ε_{it} the error term.

2.5.2 Fixed Effects (Two-way FE) and Country FE

The main specification uses a two-way fixed effects model with bank and year effects. This controls for time-invariant characteristics and common shocks. In some specifications, country or country-year effects are included to capture policy heterogeneity. Standard errors are clustered at the bank level, with alternative corrections (Driscoll-Kraay and two-way clustering) to address cross-sectional dependence.

$$FV_{it} = \beta_0 + \beta_1 FRGI_{it} + \beta_2 Controls_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (5)$$

where μ_i denotes bank-specific fixed effects; λ_t denotes year fixed effects; $Controls_{it}$ include CAR, NPL, Loan Growth, and Non-Interest Income.

This model is the primary specification due to its ability to mitigate omitted variable bias arising from unobserved heterogeneity.

2.5.3 Model Random Effects (RE)

Random effects estimation complements the fixed effects model under the assumption that unobserved heterogeneity is uncorrelated with regressors. Model selection is based on the Hausman test; failure to reject the null supports the RE estimator. The RE model is selected when the exogeneity assumption is satisfied (Hausman test).

$$FV_{it} = \beta_i + \beta_1 FRGI_{it} + \beta_2 Controls_{it} + \mathcal{U}_i + \varepsilon_{it} \quad (6)$$

where $\mathcal{U}_i$ is represents random individual effects.

The Hausman test is employed to determine the preferred model between fixed effects and random effects estimators.

2.5.4 Model with Interaction/Moderation

Interaction terms between FRGI and bank characteristics (size, leverage, profitability) are included to examine heterogeneous effects. Moderator variables are mean-centered to improve interpretation and reduce multicollinearity. Marginal effects are analyzed to illustrate conditional impacts.

$$FV_{it} = \beta_0 + \beta_1 FRGI_{it} + \beta_2 MOD_{it} + \beta_3 (FRGI_{it} \times SIZE_{it}) + \beta_4 Controls_{cit} + \mu_i + \lambda_t + \varepsilon_{it} \quad (7)$$

where $MOD_{it} = \{SIZE_{it}, LEV_{it}, ROA_{it}\}$

2.5.5 Dynamic Panel Model (System GMM)

To address potential endogeneity, reverse causality, and persistence in firm value, this study employs the two-step System Generalized Method of Moments (System GMM) estimator developed by Blundell & Bond (1998). The dynamic specification incorporates the lagged dependent variable to capture the persistence of firm value over time and to account for adjustment dynamics in banking institutions operating within emerging economies.

The baseline dynamic model is specified as follows:

$$FV_{it} = \alpha FV_{i,t-1} + \beta_1 FRGI_{it} + \beta_2 Controls_{it} + \mu_{it} + \lambda_t + \varepsilon_{it} \quad (5)$$

where $FV_{i,t-1}$ is represents firm value measured by Tobin's Q or PBV, $FV_{i,t-1}$ denotes the one-period lagged dependent variable, $FRGI_{it}$ refers to the Financial Risk Governance Index, and represents the vector of bank-specific control variables including profitability, X_{it} leverage, capital adequacy, loan growth, non-performing loans, and non-interest income. The terms μ_{it} and λ_t capture unobserved bank-specific and time-specific effects, respectively.

The estimation follows the two-step System GMM procedure with Windmeijer finite-sample corrected robust standard errors to improve estimator efficiency and reduce downward bias in standard error estimates. Internal instruments are generated using appropriate lag structures in both level and differenced equations, consistent with the System GMM framework.

To avoid instrument proliferation, the instrument matrix is collapsed and lag depth is restricted following the recommendations of Roodman. The validity of the instruments is assessed using the Hansen J-test of overidentifying restrictions, while serial correlation is evaluated using the Arellano - Bond AR(1) and AR(2) tests. A statistically insignificant AR(2) test and Hansen test support the validity and consistency of the dynamic specification.

2.6 Diagnostic Tests and Model Selection

Diagnostic tests include VIF for multicollinearity, Breusch - Pagan and White tests for heteroscedasticity, and the Wooldridge test for autocorrelation. Cross-sectional dependence is assessed using Pesaran's CD test. For the dynamic System GMM specification, instrument validity is additionally evaluated through the instrument-to-group ratio, following Roodman's guidance that the number of instruments should not exceed the number of cross-sectional units; the collapsed instrument set used here (34 instruments relative to 100 bank groups) satisfies this criterion, indicating that instrument proliferation is unlikely to bias the estimated coefficients. The full numerical

results of these tests, together with their implications for model specification, are reported in Table 15 in Section 3.7.

Robustness checks include alternative dependent variables, alternative FRGI constructions, complete-case estimations, and sub-sample analyses based on size, ownership, and region. Placebo tests are also conducted to strengthen causal interpretation.

2.7 Reproducibility and Data Availability

The dataset, coding procedures, and econometric scripts are archived and available upon request in line with journal policies. Despite the rigorous design, limitations remain, including omitted institutional variables, challenges in capturing qualitative risk culture, and potential sample selection bias. These limitations are acknowledged and provide directions for future research.

3. Research Results

3.1 Descriptive Overview of the Dataset

This section presents empirical findings on the relationship between Financial Risk Governance (FRG), proxied by the FRGI, and firm value in banks across emerging economies. The final balanced panel includes 100 banks over 2013–2023, yielding approximately 1,000 bank-year observations after data cleaning.

Table 7. Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max	Unit
Firm Value (Tobin's Q)	1.32	0.58	0.45	3.75	Ratio
Firm Value (PBV)	1.78	0.92	0.30	5.40	Ratio
Financial Risk Governance Index (FRGI)	0.62	0.15	0.25	0.95	Index (0–1)
Size (Ln Total Assets)	15.85	1.35	13.10	19.20	Ln (USD million)
Leverage (Debt/Equity)	7.25	3.10	1.80	15.50	Ratio
Profitability (ROA)	1.45	0.95	-0.80	4.20	%
Macro Indicators (GDP Growth)	4.15	1.20	-2.10	7.50	%

Table 7 shows that the mean Tobin's Q is 1.32, indicating that market valuation exceeds book value and reflects positive investor expectations. The average PBV of 1.78 suggests heterogeneity across countries. These results align with prior studies indicating that market-based measures capture forward-looking perceptions of governance and stability (Basuki & Sabilla, 2023; Solanki & Aggarwal, 2022).

The FRGI has a mean of 0.62 (range 0.25–0.95), indicating substantial variation in governance adoption. This supports the view that governance effectiveness depends on institutional and regulatory conditions (Flannery *et al.*, 2012; Hasan *et al.*, 2024). Bank size also varies considerably, reflecting structural differences across banking systems.

Temporal trends indicate cyclical movements in firm value. Periods of growth coincide with improvements in governance transparency and financial integration, supporting the argument that risk management enhances competitiveness (Solanki & Aggarwal, 2022). These patterns justify the use of panel methods to capture heterogeneity and dynamics (Baltagi, 2005).

As reported in Table 8, the reliability and construct validity of the Financial Risk Governance Index (FRGI) were evaluated prior to constructing the composite index to ensure that the selected governance indicators consistently represent the underlying financial risk governance construct. Internal consistency was assessed using Cronbach's alpha, which yielded a coefficient of 0.842, exceeding the recommended threshold of 0.70 and indicating satisfactory reliability. Furthermore, the Exploratory Factor Analysis (EFA) extracted a single underlying factor, with standardized factor loadings ranging from 0.63 to 0.88. All retained indicators exceeded the minimum acceptable loading of 0.40, providing strong evidence of convergent validity and supporting the retention of all six indicators in the final index.

Table 8. Reliability and Construct Validity Assessment of the Financial Risk Governance Index (FRGI)

Assessment	Indicator	Obtained Value	Recommended Threshold	Interpretation
Internal Consistency	Cronbach's Alpha	0.842	≥ 0.70	Satisfactory reliability
Exploratory Factor Analysis (EFA)	Number of Factors Extracted	1	One dominant factor	Unidimensional structure confirmed
	Standardized Factor Loading	0.63–0.88	≥ 0.40	All indicators retained
Confirmatory Factor Analysis (CFA)	Comparative Fit Index (CFI)	0.961	> 0.90	Excellent model fit
	Tucker–Lewis Index (TLI)	0.952	> 0.90	Excellent model fit
	Root Mean Square Error of Approximation (RMSEA)	0.047	< 0.08	Good model fit
	Standardized Root Mean Square Residual (SRMR)	0.036	< 0.08	Good model fit
Overall Assessment	Reliability and Construct Validity	Accepted	Meets all criteria	FRGI suitable for empirical analysis

To further validate the dimensionality of the FRGI, a Confirmatory Factor Analysis (CFA) was performed. As presented in Table 7, the CFA results indicate an excellent overall model fit, with a Comparative Fit Index (CFI) of 0.961, Tucker–Lewis Index (TLI) of 0.952, Root Mean Square Error of Approximation (RMSEA) of 0.047, and Standardized Root Mean Square Residual (SRMR) of 0.036. All fit indices satisfy the widely accepted goodness-of-fit criteria (CFI and TLI > 0.90 ; RMSEA < 0.08 ; SRMR < 0.08), thereby confirming the unidimensional structure of the Financial Risk Governance Index. Overall, the reliability and validity assessments demonstrate that the FRGI possesses satisfactory internal consistency, convergent validity, and construct validity, providing a sound methodological basis for its application in the subsequent panel-data estimations.

3.2 Correlation Structure and Preliminary Insights

Pearson correlations are estimated to examine preliminary relationships among variables.

Table 9. Correlation Matrix

Variable	Tobin's Q	PBV	FRGI	Size	Leverage	ROA
Tobin's Q	1.00					
PBV	0.78	1.00				
FRGI	0.42	0.45	1.00			
Size	−0.25	−0.28	0.30	1.00		
Leverage	−0.30	−0.32	−0.18	0.40	1.00	
ROA	0.38	0.40	0.35	−0.15	−0.22	1.00

Table 9 shows that FRGI is positively correlated with Tobin's Q and PBV, indicating that stronger governance is associated with higher valuation. Profitability is also positively related to firm value, supporting the role of risk management in enhancing performance (Basuki & Sabilla, 2023).

Leverage is negatively correlated with firm value, reflecting financial risk. Bank size shows mixed relationships, being positively related to governance but negatively to valuation in simple correlations. These patterns highlight the need for multivariate panel analysis to control for heterogeneity.

3.3 Pooled OLS Benchmark Results

As an initial reference, pooled Ordinary Least Squares (OLS) regression is estimated to provide baseline insights into the governance–value relationship.

Table 10 presents the pooled OLS estimation results indicates that FRGI has a positive and significant effect on firm value. Size and profitability also show positive effects, while leverage has a negative effect.

The model fit ($R^2 = 0.37$) indicates moderate explanatory power. However, pooled OLS does not control for unobserved heterogeneity, so results are interpreted cautiously and used as a benchmark for panel estimations (Baltagi, 2005).

Table 10. Pooled OLS Results

Variable	Coefficient	Std. Error	Significance
FRGI	0.219	0.076	***
Size	0.095	0.031	***
ROA	0.048	0.016	***
Leverage	-0.042	0.020	*
Macro	0.021	0.009	**
Model fit: $R^2 = 0.37$; F-statistic significant at 1%.			

3.4 Fixed Effects Model (Two-Way FE)

The main specification uses a two-way fixed effects model with bank and year effects to control for unobserved heterogeneity and common shocks.

Table 11. Fixed Effects Results

Variable	Coefficient	Std. Error	Significance
FRGI	0.274	0.082	***
CAR	0.119	0.051	**
NPL	-0.083	0.029	***
Loan Growth	0.067	0.028	**
Non-interest Income	0.094	0.037	**
Within $R^2 = 0.41$.			

Table 11 reports the two-way fixed effects estimation provides strong evidence that financial risk governance significantly enhances firm value in emerging banking markets. The coefficient of FRGI is positive and statistically significant at the 1% level, indicating that improvements in governance structures are consistently rewarded by the market.

From an economic standpoint, the magnitude of the coefficient suggests that a one-unit increase in the governance index leads to a substantial increase in firm valuation. This reflects the role of governance as a mechanism for reducing uncertainty, improving transparency, and strengthening investor confidence.

Control variables further reinforce the structural validity of the model. Capital adequacy (CAR) exhibits a positive and significant effect, highlighting the importance of financial resilience in shaping market valuation. In contrast, non-performing loans (NPL) negatively affect firm value, confirming that asset quality remains a critical risk factor in banking performance.

Additionally, loan growth and non-interest income contribute positively to firm value, suggesting that diversification and expansion strategies enhance market perception when supported by sound governance frameworks.

The within R^2 of 0.41 indicates that the model explains a substantial portion of within-bank variation over time, underscoring the importance of controlling for unobserved heterogeneity in governance studies.

3.5 Random Effects Model (RE)

A random effects model is estimated assuming no correlation between unobserved effects and regressors. Results are broadly consistent with OLS and FE, with FRGI remaining positive and significant.

Table 12. Random Effects Results

Variables	Coefficient	Std. Error	z-Statistic	Significance
FRGI	0.241	0.078	3.09	***
CAR	0.102	0.048	2.12	**
NPL	-0.071	0.027	-2.63	***
Loan Growth	0.061	0.026	2.34	**
Non-Interest Income	0.087	0.034	2.56	**

The random effects model results are presented in Table 12 shows that although the Hausman test yields a p-value of 0.27, suggesting that, the random effects estimator is statistically consistent and efficient, the fixed effects model is retained as the primary specification for several theoretical and methodological reasons. First, financial risk governance is inherently linked to unobserved institutional and managerial characteristics that are likely correlated with explanatory variables, potentially violating the strict exogeneity assumption required by the random effects model.

Second, prior literature in corporate governance and banking consistently emphasizes the importance of controlling for unobserved heterogeneity using fixed effects to mitigate omitted variable bias. Third, the consistency of results across FE, RE, and dynamic GMM estimations further supports the robustness of the findings, reducing concerns regarding estimator sensitivity.

Therefore, the fixed effects model is considered the most reliable specification for inference, while the random effects results are used as a complementary robustness check.

3.6 Moderation Analysis: Conditional Governance Effect

Interaction terms between FRGI and bank characteristics are included to examine heterogeneous effects. Results indicate that governance effectiveness depends on firm characteristics.

Based on Table 13, the moderation analysis reveals that the effectiveness of financial risk governance is conditional upon firm-specific characteristics. The positive interaction between the Financial Risk Governance Index (FRGI) and bank size suggests that larger institutions possess superior organizational capacity, enabling more effective implementation of governance frameworks and enhancing their impact on firm value.

Similarly, the positive interaction between FRGI and profitability indicates that financially stronger banks are better positioned to signal governance quality to the market, thereby strengthening investor confidence and amplifying valuation effects.

Table 13. Moderation Model Results

Variable	Coefficient	Std. Error	Significance
FRGI	0.198	0.085	**
FRGI × Size	0.041	0.018	**
FRGI × ROA	0.052	0.020	***
FRGI × Leverage	-0.027	0.014	*
Within R ² = 0.44.			

In contrast, the negative interaction between FRGI and leverage supports the hypothesis that excessive financial risk weakens the benefits of governance improvements. Higher leverage levels may amplify uncertainty, increase solvency concerns, and constrain managerial flexibility, ultimately reducing the effectiveness of governance mechanisms in enhancing firm value.

3.7 Dynamic Panel Estimation (System GMM)

To further address endogeneity concerns and capture the dynamic persistence of firm value, this study employs the two-step System GMM estimator. The inclusion of the lagged dependent variable confirms the dynamic nature of the empirical specification and allows the analysis to account for adjustment behavior in firm valuation over time.

Table 14. System GMM Results Table 14. System GMM Results

Variable	Coefficient	Std. Error	Significance
Lagged Firm Value	0.412	0.072	***
FRGI	0.268	0.089	***
ROA	0.037	0.014	**
CAR	0.052	0.021	**
NPL	-0.063	0.022	***
Diagnostics: AR(2) p = 0.31; Hansen p = 0.28.			
Diagnostic Indicator		Result	
AR(1) p-value		0.000	
AR(2) p-value		0.310	
Hansen J-test p-value		0.284	
Number of Instruments		34	
Number of Groups		100	
Estimator		Two-Step System GMM	
Windmeijer Correction		Applied	

Note: ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Table 14 presents the results of the two-step System GMM estimation. The coefficient of the lagged dependent variable is positive and highly significant, indicating strong persistence in firm value over time. This

finding confirms the dynamic nature of firm valuation and supports the inclusion of a lagged dependent variable within the empirical framework.

Importantly, the Financial Risk Governance Index (FRGI) remains positive and statistically significant after controlling for endogeneity and dynamic adjustment effects. This result provides robust evidence that stronger financial risk governance contributes positively to firm value in emerging banking markets.

The diagnostic tests further support the validity of the estimation procedure. The Arellano–Bond AR(1) test is significant, as expected in first-differenced estimations, while the AR(2) test is statistically insignificant, indicating the absence of second-order serial correlation. Furthermore, the Hansen J-test fails to reject the null hypothesis, confirming the validity of the internal instruments used in the model.

The estimation specifically employs the two-step System GMM procedure with Windmeijer-corrected robust standard errors and a collapsed instrument matrix to mitigate instrument proliferation and improve estimator reliability. Overall, the consistency of the System GMM results with the fixed effects and random effects estimations strengthens the robustness of the empirical findings.

Beyond the model-selection and instrument-validity statistics reported above, the diagnostic procedures described in Section 3.7 are formally implemented and reported here to substantiate the specification of the fixed effects and random effects models. Table 15 summarizes the results of the multicollinearity, heteroscedasticity, autocorrelation, and cross-sectional dependence tests.

Table 15. Additional Diagnostic Tests for Model Specification

Diagnostic Test	Statistic / p-value	Interpretation Criterion
Mean VIF (all regressors)	2.38	No indication of severe multicollinearity (Mean VIF < 5)
Maximum VIF (single regressor)	4.71	No indication of severe multicollinearity (Maximum VIF < 10)
Breusch–Pagan / Cook–Weisberg Test	$\chi^2 = 42.63$; $p < 0.001$	Rejects the null hypothesis of homoscedasticity, indicating heteroscedasticity
White Test	$\chi^2 = 87.94$; $p < 0.001$	Confirms the presence of heteroscedasticity of unknown form
Wooldridge Test for Autocorrelation in Panel Data	$F = 31.56$; $p < 0.001$	Rejects the null hypothesis of no first-order autocorrelation

Table 15 presents the diagnostic tests conducted to evaluate the adequacy of the panel-data specification. The Mean Variance Inflation Factor (VIF) of 2.38 and the Maximum VIF of 4.71 are both well below the conventional thresholds of 5 and 10, respectively, indicating that multicollinearity is not a serious concern among the Financial Risk Governance Index (FRGI), moderator variables, and control variables.

The Breusch–Pagan/Cook–Weisberg test ($\chi^2 = 42.63$, $p < 0.001$) and the White test ($\chi^2 = 87.94$, $p < 0.001$) both reject the null hypothesis of homoscedasticity, indicating the presence of heteroscedasticity in the panel data. Accordingly, all static panel estimations reported in Tables 10–13 employ heteroscedasticity-robust and bank-level clustered standard errors to ensure valid statistical inference.

The Wooldridge test ($F = 31.56$, $p < 0.001$) further indicates the existence of first-order serial correlation within panel units. This issue is appropriately addressed through clustered standard errors in the fixed-effects estimations and by employing the two-step System GMM estimator, which explicitly accommodates dynamic persistence and serial dependence.

Finally, the Pesaran Cross-sectional Dependence (CD) test ($CD = 4.27$, $p < 0.001$) reveals significant cross-sectional dependence, suggesting that banks operating across emerging economies are jointly influenced by common macroeconomic and financial shocks. Consequently, the robustness analyses incorporate Driscoll–Kraay and two-way clustered standard errors to obtain consistent inference under heteroscedasticity, serial correlation, and cross-sectional dependence. Overall, the diagnostic results support the reliability of the empirical estimation strategy and reinforce the robustness of the reported findings.

3.8 Robustness Checks

Robustness tests were conducted using alternative dependent variables and index constructions.

Table 16 reports a series of robustness tests conducted to evaluate the stability of empirical findings. First, alternative dependent variables, including PBV and profitability indicators, are employed. Second, alternative constructions of the Financial Risk Governance Index are examined, including weighted aggregation and principal component analysis (PCA)-based factor scores.

Table 16. Robustness Results

Specification	FRGI Coefficient	Significance
Tobin's Q	0.272	***
PBV	0.318	***
ROA	0.041	**
Weighted FRGI	0.265	***
PCA-based FRGI	0.249	***

Across all specifications, the coefficient of FRGI remains positive and statistically significant. The consistency of results suggests that the governance–value relationship is not sensitive to measurement choices or model assumptions. These findings corroborate arguments in the governance literature that multidimensional risk oversight mechanisms represent economically meaningful determinants of firm performance and valuation outcomes (Sprčić *et al.*, 2016; Hasan *et al.*, 2024).

Overall, the empirical evidence demonstrates that Financial Risk Governance constitutes a stable and significant driver of firm value in emerging banking markets. By integrating governance structures, risk management practices, and dynamic institutional contexts, the results contribute to a deeper understanding of how strategic risk oversight enhances financial resilience and market confidence.

4. Discussions

The central finding of this study is that structured financial risk governance carries independent valuation relevance once separated from broader corporate-governance indices. This distinction matters because most prior work treats risk oversight as a single item embedded within composite governance scores, which makes it difficult to isolate its specific contribution. By constructing the FRGI as a risk-specific measure, this study is able to attribute the observed valuation premium to governance channels specifically, transparency, accountability, and risk mitigation, rather than to governance broadly defined (Aluchna & Kuszewski, 2020; Frigo & Anderson, 2011). This reframes a recurring question in the governance-performance literature: rather than asking whether governance affects value in general, the more useful question is which governance mechanisms carry price-relevant information, and the evidence here identifies risk-specific oversight as one such mechanism.

The ten-country scope of this study contrasts with the largely single-country evidence base in this literature: Meirene and Karyani (2017) examine only Indonesian and Malaysian banks, and Permatasari (2020) restricts attention to Indonesia alone. The wide dispersion in FRGI scores observed here (Table 7) indicates that governance adoption is not a homogeneous process even among banks operating under broadly similar emerging-market conditions, reflecting differences in regulatory enforcement, disclosure regimes, and financial market maturity across, rather than only within, countries. This heterogeneity is consistent with arguments that governance outcomes are shaped by broader institutional environments rather than firm-level attributes alone (Flannery *et al.*, 2012; Hasan *et al.*, 2024). What the cross-country evidence adds beyond the earlier single-country studies is a test of whether the governance–value relationship survives this heterogeneity rather than being an artifact of any one regulatory regime; the results indicate that it does, which is a stronger claim than either Meirene and Karyani (2017) or Permatasari (2020) were able to make from their respective samples.

The estimator comparison in Section 4 is less interesting on its own than what the dynamic specification reveals once endogeneity and persistence are addressed together (Baltagi, 2005). Firm value is persistent, which implies that governance reforms are priced in gradually rather than triggering an immediate re-rating, consistent with a market-learning process in which credibility is built rather than assumed (Iqbal *et al.*, 2015). A practical implication that is easy to overlook follows from this: studies relying on single-period cross-sections are likely to misestimate the magnitude of the governance–value relationship, since they cannot separate the immediate effect from its gradual accumulation over time.

The moderation results carry a distributive implication that is worth stating directly: because the valuation effect of financial risk governance is amplified in larger banks, uniform governance mandates may unintentionally widen the valuation gap between large and small institutions rather than closing it. This follows from organizational-scale arguments in Agency Theory and Stewardship Theory, which hold that scale enhances monitoring capacity, resource availability, and strategic coordination (Donaldson & Davis, 1991). Prior studies reporting the same amplification pattern (Hamid *et al.*, 2023; Hasan *et al.*, 2024; Wibowo *et al.*, 2025) document the effect but do not discuss its equity implications; smaller banks may face structural constraints in building comprehensive enterprise risk management systems regardless of how strong their governance intentions are, which is a limitation of governance policy that scale-blind mandates do not resolve.

The profitability interaction points to a related but distinct mechanism: signaling credibility rather than resource capacity. Profitable banks can make governance disclosures credible in a way that less profitable banks cannot, because investors can verify the disclosed commitments against observed financial soundness, a mutually reinforcing relationship between governance and performance (Iswajuni *et al.*, 2018; Sprčić *et al.*, 2016). A corollary is that governance reforms likely yield diminishing returns in financially distressed institutions, where investor skepticism and liquidity constraints limit how much credit the market extends to structural improvements regardless of their substance.

The negative FRGI $\times$ Leverage interaction is not simply a mirror image of the positive size and profitability interactions reported above; it marks a specific boundary condition under which governance signals lose credibility with the market. Notably, its magnitude (-0.027) is smaller than the profitability interaction (0.052), yet remains statistically significant, indicating that leverage constrains the governance-value link even independently of a bank's profitability. This aligns with agency-based interpretations that leverage intensifies conflicts between stakeholders and increases exposure to financial distress (Xie *et al.*, 2017). Read together with the size result, this suggests governance operates as an amplifier rather than a substitute for underlying financial condition: it strengthens valuation where a bank is already large or well-capitalized, and does comparatively little to rescue valuation where leverage is high, which argues against treating governance reform as a stand-alone remedy for structurally weak banks.

Beyond firm-specific dynamics, the two-way fixed-effects specification's inclusion of year effects (Equation 5) is itself an acknowledgment that macroeconomic and institutional conditions move firm value independently of governance quality. This matters for interpretation: the FRGI coefficient reported in Tables 10–13 is identified net of common shocks such as inflation, exchange-rate volatility, and global financial integration (Dodd *et al.*, 2015; Nugroho & Suk, 2019), which is why the estimated governance premium should be read as bank-specific rather than as capturing a general rising tide across the sample period. A systemic view of risk governance therefore needs to distinguish what governance buys a bank on top of the macroeconomic environment it operates in, rather than treating the two as substitutable explanations for the same valuation pattern.

The robustness results in Table 16 rule out one specific concern, that the FRGI–value relationship is an artifact of how the index is constructed or which valuation proxy is used, but they do not rule out omitted-variable concerns that no index-construction choice can address, such as unobserved risk culture or informal managerial commitment to risk oversight that annual reports do not capture. The consistency of the coefficient across specifications is therefore best read as evidence of measurement stability, not as independent confirmation of causality beyond what the System GMM specification already provides.

From a theoretical standpoint, the results contribute to ongoing debates concerning the relative importance of governance structures versus managerial incentives in determining firm outcomes. While Agency Theory emphasizes monitoring mechanisms such as board independence and executive oversight, the present findings suggest that risk-specific governance arrangements provide a more direct channel through which governance influences valuation. This perspective complements emerging institutional and ethical frameworks, including Islamic governance principles that prioritize accountability, social welfare, and long-term sustainability (Ghafran & Yasmin, 2020). This is a claim that future work can test directly: if risk-specific governance is indeed the more direct channel, its coefficient should dominate broader board-composition variables when both are entered jointly, a specification this study does not run but that would sharpen the comparison.

Nevertheless, the findings should be interpreted with due consideration of methodological limitations. Although dynamic panel techniques mitigate endogeneity concerns, unobserved qualitative dimensions of risk culture and strategic leadership may remain difficult to capture quantitatively. In addition, the focus on listed commercial banks may introduce sample selection bias, as publicly traded institutions are typically subject to higher disclosure requirements and governance scrutiny. Future research could extend this analysis by incorporating non-listed banks, fintech institutions, or longitudinal case studies that explore the micro-foundations of risk governance implementation.

Taken together, these conditional patterns point away from a one-size-fits-all governance mandate and toward regulatory approaches that account for a bank's size, profitability, and capital structure when setting risk-governance expectations.

Conclusions and Further Research

This study provides robust empirical evidence that structured financial risk governance constitutes a significant driver of firm value in banking institutions operating across emerging economies. Using a newly developed multidimensional Financial Risk Governance Index and applying a comprehensive panel econometric framework,

the findings consistently demonstrate that stronger governance arrangements related to risk oversight enhance market valuation, improve resilience, and support sustainable performance outcomes. The results further reveal that governance effectiveness is conditional upon organizational characteristics, as larger and more profitable banks are better positioned to translate governance reforms into tangible valuation gains, while excessive leverage may weaken these benefits.

The study contributes to the literature by extending the governance–performance nexus through a risk-specific perspective, integrating enterprise risk management structures into corporate governance analysis within a cross-country emerging market context. Methodologically, the use of dynamic panel techniques and multiple robustness strategies strengthens causal interpretation and highlights the importance of persistence and institutional heterogeneity in shaping firm value. From a practical standpoint, the findings underscore the strategic relevance of embedding risk governance into core banking operations, thereby offering insights for regulators, bank managers, and investors seeking to enhance financial stability and market confidence.

By demonstrating that multidimensional risk governance mechanisms represent economically meaningful determinants of valuation, this research advances the understanding of how financial institutions create value under uncertainty. Future research may extend this framework by incorporating qualitative dimensions of risk culture, examining non-listed banks and fintech institutions, or exploring nonlinear and threshold effects of governance reforms across different stages of financial development.

Declarations

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CRedit Authorship Contribution Statement

Sudirman Sudirman: Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Supervision, Project administration.

Lince Bulutoding: Conceptualization; Methodology; Investigation; Formal Analysis; Writing – original draft; Writing – review & editing.

Normiyati Normiyati: Data curation, Validation, Formal analysis, Writing – review & editing, Visualization.

Baso Iwang: Investigation, Resources, Visualization, Writing – review & editing.

Abdul Rahman: Software, Validation, Data curation, Investigation, Formal analysis.

Hasbiullah Hasbiullah: Conceptualization, Methodology, Validation, Writing – review & editing, Supervision.

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Declaration of Use of Generative AI and AI-assisted Technologies: The authors declare that they have used generative AI and AI-assisted technologies during the preparation of this work. AI-assisted applications were employed to improve grammar clarity, enhance language style, and facilitate the identification of relevant scholarly references. These tools supported the refinement of the paper without compromising the authors' intellectual contributions, critical interpretations, and originality of the research. The final responsibility for the content, analysis, and conclusions remains solely with the authors.

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