

How risk governance affects bank risk-taking: evidence from GCC banks on the mediating role of risk disclosure and moderating role of ownership

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Abstract

Purpose – This study aims to enrich the understanding of how risk governance influences bank risk-taking, examining the mediating effects of risk disclosure and the moderating role of ownership structure.

Design/methodology/approach – This study analyzes a sample of 58 commercial banks from the Gulf Cooperation Council (GCC) countries over the period from 2013 to 2022. The primary empirical methodologies used are Structural Equation Modeling (SEM) and the Generalized Least Squares (GLS) technique. To ensure the robustness of the findings, alternative methodologies-including the Two-Stage Least Squares (2SLS) technique and the two-step system Generalized Method of Moments (GMM) approach-as well as various measures for bank risk, risk disclosure and ownership structure, are also used.

Findings – The empirical findings reveal a counterintuitive result. It suggest that risk governance mechanisms tend to significantly increase, rather than decrease, bank risk. For Islamic banks, risk disclosure entirely mediates the link between risk governance and risk-taking, while for conventional banks, the effect is partially mediated. Additionally, ownership moderates both the relationship between risk governance and bank risk-taking and the mediating role of risk disclosure on the association between risk governance and bank risk-taking.

Originality/value – Given the limited research on this topic, this paper initiates a discussion on the impact of risk governance on bank risk in GCC countries. Using a substantial sample of both conventional and Islamic banks, the study emphasizes the significance of risk disclosure and ownership structure, which should be considered when implementing a risk governance structure.

Keywords Risk governance, Risk-taking, Risk disclosure, Ownership structure, Islamic banks, GCC countries

Paper type Research paper

1. Introduction

Following the 2008 financial crisis, both researchers and regulators emphasized the critical necessity for robust risk management frameworks and risk disclosure within banks. The vulnerabilities exposed in risk governance mechanisms and the propensity for excessive risk-taking were identified as pivotal factors contributing to the crisis. The response to these challenges was marked by the establishment of new regulatory guidance by several international regulators (G20/OECD, 2015; Basel, 2015; FSB, 2013; FSB, 2017). This guidance aimed to restructure corporate governance, implement policies to dissuade management from taking excessive risks, and urge financial institutions to enhance their enterprise risk management practices (Erin *et al.*, 2020). An often-recommended strategy



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involves the establishment of specialized structures within banks. Consequently, an increasing number of banks are instituting risk committees to strengthen risk management efforts. This entails elevating the number of independent directors and financial experts on the board, and by hiring a chief risk officer (CRO) responsible for overseeing all pertinent risks encountered by the organization.

The banking sectors in Gulf Cooperation Council (GCC) countries exhibit notable weaknesses in their corporate governance structures, including dual Chief Executive Officer (CEO) roles, insufficient board independence and effectiveness, limited participation from institutional investors and inadequate transparency and disclosure practices. Moreover, these sectors are characterized by concentrated ownership structures, such as family and government ownership (Srairi *et al.*, 2022). Additionally, there has been a remarkable surge in Islamic banking within the GCC banking sector in recent years (Farooq *et al.*, 2025). While this growth is often viewed favorably, it introduces additional challenges related to management, governance and agency. Meanwhile, corporate governance mechanisms in GCC countries have significantly transformed in recent years. In efforts to attract foreign investment and to enhance the credibility of local markets, governance structures have been harmonized with pertinent international standards, such as the implementation of International Financial Reporting Standards (IFRS) and Basel accords. Governments and regulatory authorities have introduced amendments to existing principles aimed at fostering improved governance practices for both conventional and Islamic banks (Aljughaiman and Salama, 2019). These amendments comprise a variety of initiatives. For instance, the UAE's Securities and Commodities Authority introduced a new corporate governance framework for public joint-stock companies in 2020. Similarly, the Saudi Arabian Monetary Agency enhanced Principle 4, Article 78 in 2014, and the Central Bank of Bahrain revised Principle 1, Section 1 in 2018. The Kuwait Capital Market Authority updated Principle 5.1 in 2013, while the Qatar Central Bank amended Principle 4 in 2015. Oman's Capital Markets Authority also issued a new corporate governance code in 2015. These amendments introduce specific requirements and recommendations aimed at strengthening corporate governance within the banking sector. For example, the UAE's new framework mandates the establishment of a code of conduct for board members, employees and auditors. Likewise, Bahrain's governance code recommends the creation of a risk committee (RC) to identify and mitigate business risks.

Despite the growing recognition of risk governance as a critical factor in the stability and performance of financial institutions, particularly in the banking sector, research on the effectiveness of these structures in promoting robust risk management remains limited. Additionally, a significant gap persists in understanding the impact of corporate governance structures on the banking sector in emerging markets like the GCC. Empirical studies on GCC banking have largely focused on corporate governance structures (characteristics and composition of board of directors) and their effects on performance (e.g. Ben zeineb and mensi, 2018; srairi *et al.*, 2022) and risk (e.g. El-Masry *et al.*, 2016; Reyad *et al.*, 2022; srairi, 2024), yet the specific role of risk governance remains underexplored. While Raouf and Ahmed (2022) recently examined the link between risk governance and financial stability in GCC banks, their study primarily considers a direct and linear relationship, overlooking the complex mechanisms through which risk governance practices influence risk-taking behavior. Additionally, existing research in other regions has largely concentrated on individual aspects of risk governance, such as risk committees (Mashamba and Gani, 2022), CROs (Aljughaiman and Salama, 2019; Balasubramanyan *et al.*, 2024), Shariah supervisory boards (Nainggolan *et al.*, 2023) and audit committees (Nguyen and Dang, 2022), with limited exploration of the broader set of governance mechanisms involved.

Moreover, most of these studies have primarily investigated the straightforward, linear correlation between risk governance and bank risk, overlooking the nuanced pathways by which risk governance structures impact the risk-taking behaviors of banks. Only a minority of scholars have attempted to explore the nuanced ways in which risk governance influences the risk profile of financial institutions. For instance, [Abdul et al. \(2024\)](#) explored the influence of institutional quality (IQ) on moderating the effects of corporate governance structures on risk management in financial institutions in Pakistan. The findings demonstrated that IQ plays a significant and substantial role in mitigating risk levels. They also found that this moderating role differs between Islamic and conventional banks. Using a large sample of 185 banks operating in the Asian region, [Rashid et al. \(2024\)](#) observed that ownership status influences the relationship between risk governance mechanisms and bank risk-taking. Specifically, risk governance mechanisms prove more impactful in diminishing risk and enhancing financial performance in privately owned banks.

To address this gap, we extend existing research by examining the multifaceted impact of risk governance on bank risk, considering both its direct effects and the mechanisms that shape risk outcomes. Our analysis incorporates risk disclosure and ownership structure as key explanatory factors. According to agency theory, adequate disclosure is crucial for both external investors and internal shareholders to effectively monitor bank managers' risk-taking behavior. Empirical literature on risk disclosure suggests that increased transparency can promote improved risk management practices within banks, reduce risk-taking behavior and facilitate better-informed decision-making by stakeholders ([Altunbaş et al., 2023](#); [Zer, 2015](#)). On the other hand, theoretical frameworks (such as agency, resource-based and legitimacy theories) argue that risk disclosure is significantly influenced by internal factors such as the firm's characteristics and its risk governance structure. Several studies (e.g. [Nahar et al., 2020](#)) have reported that risk disclosure is affected by specific risk governance mechanisms, such as RCs, audit committees (ACs) and the presence of a CRO. Additionally, the literature suggests that ownership structure influences a bank's risk disclosure practices and overall risk management. Multiple studies ([Grassa et al., 2021a](#); [Khan et al., 2013](#); [Ntim et al., 2013](#)) have affirmed the correlation between risk reporting and ownership structure. The ownership framework also significantly influences the formation of risk governance practices within banks. The characteristics of ownership structure (concentration, types of shareholders) can influence a company's strategy to have a CRO and a RC ([Dupire and Slagmulder, 2019](#); [Malik et al., 2023](#)).

While prior studies have explored these dimensions independently, few have examined how they interact within a single analytical model. In particular, the existing literature lacks a comprehensive understanding of how risk disclosure serves as a transmission channel (mediator) through which risk governance affects bank risk, and how ownership structure may condition (moderate) this relationship. By adopting a moderated mediation framework, this study not only captures the direct impact of risk governance on bank risk-taking but also clarifies the indirect effect via risk disclosure and the conditional role played by ownership dynamics. This approach is justified both theoretically and empirically, as it reflects the complex institutional realities of banking systems, especially in emerging markets like the GCC, where governance mechanisms, transparency norms and ownership patterns differ markedly from those in developed economies. Our contribution lies in bridging these dimensions through an integrative framework that reveals both the mediating influence of disclosure and the contextual effects introduced by varying ownership configurations.

Given the dual banking system in the GCC, where Islamic and conventional banks operate under distinct regulatory and governance frameworks, the impact of risk governance may vary across institutions. Islamic banks, governed by Shariah principles, face unique risk

constraints and additional oversight through Shariah boards, while conventional banks follow interest-based models and different regulatory standards. These differences in business models, risk exposure and governance structures (Quttainah and Ben Said, 2024; Aljughaiman and Salama, 2019) suggest that the effect of risk governance is not uniform across banking types. Despite its growing importance for financial stability, empirical research on risk governance in dual banking systems remains limited. Our study fills this gap by examining how risk governance mechanisms influence risk-taking behavior in both Islamic and conventional banks, providing a more nuanced understanding of risk management dynamics in the GCC. We analyze a sample of 58 commercial banks operating between 2013 and 2022 across six GCC countries: Bahrain, Kuwait, Qatar, Oman, Saudi Arabia and the United Arab Emirates.

To deepen our understanding of the interplay between risk governance, bank risk, risk disclosure and ownership structure in the GCC, we address the following research questions:

- RQ1. What is the impact of risk governance mechanisms on banks' risk-taking behavior?
- RQ2. What roles do risk disclosure and ownership structure play in the relationship between risk governance and bank risk?
- RQ3. How does this relationship differ between conventional and Islamic banks?

The unique economic and institutional characteristics of the GCC banking sector provide a valuable context for examining the influence of risk governance structures, risk disclosure and ownership structure on bank risk-taking behavior, particularly in comparison to conventional and Islamic banking sectors. The region's rapid economic growth, diversification efforts and interconnected financial markets contribute to distinct risk profiles for banks. Additionally, socio-cultural and geopolitical factors influence regulatory frameworks and risk attitudes, which, in turn, affect the effectiveness of risk governance. Furthermore, the evolving regulatory landscape, aimed at aligning with international best practices, provides an opportunity to assess how these changes impact bank risk-taking and disclosure practices.

This study makes a substantial contribution to the banking literature by addressing several key gaps and limitations in prior research. First, it emphasizes the roles of risk disclosure and ownership structure in shaping the relationship between risk governance and bank risk-taking behavior. Moreover, by applying a moderated mediation approach, it offers a more nuanced understanding of how internal governance mechanisms translate into actual risk outcomes. Additionally, this research challenges the assumption that merely having structural risk governance mechanisms in place is sufficient; instead, it underscores the importance of the effectiveness of these structures and the methods of their implementation. To address this, we developed a hand-collected governance index as a proxy for risk governance effectiveness. Furthermore, our evaluation of risk disclosure covers a broad range of risk categories relevant to both conventional and Islamic banks. Finally, this study offers valuable insights for regulators and policymakers, particularly in emerging markets. It provides tailored recommendations for both conventional and Islamic banks, aimed at strengthening risk governance mechanisms to better navigate competitive market dynamics and effectively manage potential financial crises.

The structure of this study is outlined as follows: in Section 2, we present the research hypotheses, synthesizing theoretical frameworks and empirical analysis. Section 3 introduces the data, variables and the econometric models. The discussion of empirical results and robustness tests is provided in Section 4. Finally, in Section 5, we conclude the

paper by summarizing the main findings and discussing the implications derived from our analysis.

2. Literature review and research hypothesis

The literature review first examines the influence of risk governance on bank risk-taking, then considers the mediating role of risk disclosure, and finally explores how ownership structure moderates these relationships.

2.1 Risk governance mechanisms and bank risk-taking

The relationship between risk governance and bank risk-taking has been widely debated, with theories offering divergent predictions. Agency theory suggests governance mechanisms mitigate conflicts between shareholders and managers, thereby constraining risk-taking (Ellul and Yerramilli, 2013). Option theory, however, views risk-taking as rational under certain conditions (Nguyen and Dang, 2022), while institutional theory highlights the influence of external norms and regulatory pressures (Ames et al., 2018).

Empirical evidence is equally mixed. Some studies report that stronger risk governance reduces risk-taking (Zhang et al., 2021; Aljughaiman and Salama, 2019), though effects vary across bank types and regulatory environments. Others find that governance mechanisms may actually encourage risk-taking by aligning managerial and shareholder interests (Mollah et al., 2017; Berger et al., 2016). A third stream reports no significant effect, suggesting outcomes depend on risk culture, regulation and market conditions (Cavezzali and Gardenal, 2015; Stulz, 2015). These inconsistencies arise from differences in governance measures, risk indicators, institutional contexts and methodological choices. To address this, we propose a more comprehensive framework that accounts for mediating and moderating factors. Accordingly, we state our first hypothesis:

H1. risk governance mechanisms are negatively associated with bank risk-taking.

2.2 The mediating role of risk disclosure.

Effective risk governance is expected to mitigate excessive bank risk-taking, but prior evidence suggests this relationship is neither direct nor uniform. Risk disclosure serves as a key transmission channel, linking governance practices to risk outcomes by enhancing transparency, reducing information asymmetry and reinforcing market discipline. In this framework, strong governance encourages higher-quality disclosure, which, in turn, constrains bank risk-taking.

The link between risk governance and disclosure has been examined through multiple theoretical perspectives. Agency theory views disclosure as a means to reduce information asymmetry (Khelifi and Bouri, 2010), while legitimacy theory emphasizes its role in maintaining societal acceptance (Neu et al., 1998). Stakeholder theory broadens this view to include investors, regulators and customers (Barakat and Hussainey, 2013) and resource-based theory positions governance as a strategic asset signaled through disclosure (Rumelt, 1984). Empirical evidence is mixed: most studies focus on general governance attributes such as board composition or audit committees (Raimo et al., 2022), while few examine specialized mechanisms like risk committees or CRO roles (Erin et al., 2023). These studies often face limitations related to context, endogeneity and an overemphasis on disclosure quantity rather than quality, leaving open questions about how risk governance translates into meaningful disclosure practices.

Post-crisis regulatory reforms, such as Basel II Pillar 3 and the Dodd-Frank Act, emphasize transparency as a tool to curb excessive risk-taking. However, disclosure can also incentivize risk-taking if banks use it to signal strength or respond to market pressures. Empirical findings remain mixed: many studies show that higher disclosure reduces risk, influenced by context, capital adequacy and qualitative dimensions (Altunbaş *et al.*, 2023), while some report a positive association under weak regulation or moral hazard conditions (Rahmani *et al.*, 2020). These results underscore the context-dependent nature of disclosure effects and the need to examine its interaction with governance mechanisms.

Building on these insights, we propose that risk disclosure mediates the relationship between risk governance and bank risk-taking by serving as a conduit through which governance structures influence risk outcomes. Effective mechanisms—such as board oversight, risk committees and CROs—enhance the quality and extent of risk-related disclosures, which, in turn, reduce information asymmetry, strengthen accountability and foster market discipline, thereby constraining excessive risk-taking (Elshandidy and Zeng, 2022). Agency, stakeholder, signaling and institutional theories collectively support this mediating role, highlighting how governance aligns managerial actions with stakeholder interests, informs regulators and investors, signals prudent management and ensures compliance with regulatory and normative pressures (Heinle and Smith, 2017; Oliveira *et al.*, 2006). Together, these perspectives suggest that risk disclosure translates governance mechanisms into tangible risk outcomes by fostering transparency, trust and market discipline. Accordingly, we hypothesize:

H2. Risk governance affects bank risk-taking behavior by increasing the level of risk disclosure.

This overall hypothesis comprises two testable subhypotheses:

H2a. Risk governance mechanisms are positively related to the level of risk disclosure practices.

H2b. High levels of risk disclosure are expected to negatively influence bank risk-taking.

2.3 The moderator role of ownership structure

In addition to risk disclosure, ownership structure critically shapes bank risk, the effectiveness of governance and the quality of disclosure. Shareholder identity, concentration and type—government, foreign, institutional, or blockholder—affect managerial incentives, monitoring intensity and access to resources. Concentrated ownership may align managers with shareholders but can also enable dominant shareholders to pursue higher-risk strategies, whereas dispersed ownership often weakens oversight and increases agency problems (Zheng *et al.*, 2017; Srairi, 2013). Government ownership tends to increase risk due to inefficiencies but promotes greater disclosure through political and regulatory pressures (Mateev *et al.*, 2023), while foreign and institutional ownership show context-dependent effects (Hunjra *et al.*, 2020; Setiyono and Tarazi, 2014). Based on these insights, we propose:

H3. Ownership structure affects risk-taking in GCC banks.

Beyond its direct effects, ownership structure moderates how risk governance influences bank risk. Concentrated ownership, such as family- or state-owned banks, enables closer monitoring and may reduce reliance on formal governance mechanisms like CROs or risk committees (Dupire and Slagmulder, 2019), while dispersed ownership weakens oversight and increases risk-taking. Institutional and resource-based perspectives highlight that

ownership shapes access to resources, expertise and regulatory pressures, with foreign or institutional owners strengthening governance and state-owned banks balancing stabilizing mandates with potential political interference (Malik *et al.*, 2023). Consequently, we posit:

H4. Ownership structure moderates the association between risk governance mechanisms and bank risk.

Ownership structure also influences the mediating role of risk disclosure. Effective governance enhances disclosure, which, in turn, constrains risk-taking, but the strength of these paths varies by ownership characteristics. Concentrated (blockholder) ownership may reduce public disclosure due to closer internal monitoring (Grassa and Chakroun, 2016; Grassa *et al.*, 2021a), yet signaling and legitimacy pressures can encourage transparency (Elamer *et al.*, 2020). Foreign ownership exhibits mixed effects, sometimes promoting disclosure due to investor demands and other times showing negligible impact (Barako *et al.*, 2006; Grassa *et al.*, 2021b). Building on this evidence, we propose a moderated mediation framework: risk disclosure mediates the relationship between risk governance and bank risk, while ownership structure moderates both the direct governance–risk link and the two mediation paths–governance to disclosure and disclosure to risk. Thus, we formulate:

H5. The indirect effect of risk governance on bank risk through risk disclosure is moderated by ownership structure (i.e. moderated mediation exists).

H5a. Ownership structure moderates the relationship between risk governance mechanisms and risk disclosure.

H5b. Ownership structure moderates the relationship between risk disclosure and bank risk.

In line with the reviewed literature, this study examines the interaction between risk governance and bank risk, incorporating risk governance as a mediating variable and ownership structure as a moderating variable, as illustrated in Figure 1.

3. Data and methodology

3.1 Sample and data

Our study explores the link between risk governance and bank risk-taking in the GCC region from 2013 to 2022. The final sample consists of 58 banks of varying sizes (20 large banks and 38 medium and small banks), including 22 Islamic and 36 conventional banks, representing 85% of the GCC banking industry. The sample distribution by bank type and country is presented in Table 1. Initially drawn from 72 banks in the Bankscope database, 14 were excluded due to data unavailability. The final data set comprises 552 firm-year observations over a 10-year period. It is worth noting that the majority of GCC banks (84%) are listed (100% in Bahrain, Kuwait and Qatar; 91% in Saudi Arabia; 78% in the UAE; and 38% in Oman). Our sample consists of 91.4% listed banks and 8.6% nonlisted banks, with the latter group comprising five banks from Oman and the UAE. Additionally, 83.3% of Islamic banks and 84.1% of conventional banks in the GCC region are publicly listed.

3.2 Variables and model specification

Data on variables, including bank risk, risk governance, risk disclosure, ownership structure and control variables, have been compiled, with a comprehensive description of their measurement and data sources provided in Table 2.

To test the first hypothesis in this paper and explore the impact of risk governance mechanisms on bank risk-taking, we estimate the following econometric model:

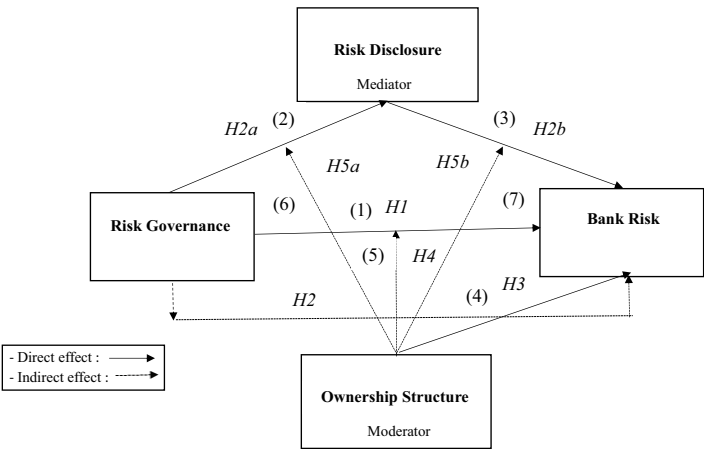


Figure 1. Research framework

Note(s): Path (1) illustrates the direct effect of risk governance on bank risk. Paths (2) and (3) delineate the mediating role of risk disclosure in the association between risk governance and bank risk. Path (4) represents the direct effect of ownership structure on bank risk, while Path (5) indicates the moderating role of ownership structure in the link between risk governance and bank risk. Finally, both Paths (6) and (7) denote the moderating role of ownership structure in the mediating effect of risk disclosure in explaining the association between risk governance and bank risk-taking

Source: Created by author

Table 1. Number of banks by type and country

Country	Sample		Population	
	Conventional banks	Islamic banks	Conventional banks	Islamic banks
Bahrain	4	5	5	8
Kuwait	5	4	5	4
Oman	3	1	6	2
Qatar	5	4	6	4
Saudi Arabia	7	4	7	4
United Arab Emirates	12	4	14	7
Total by type of banks	36	22	43	29
Total of banks	58 (80.6% of total banks)		72	

Note(s): *Investment banks have been excluded from this study; **This data concerns only commercial banks

Source(s): Table by author

$$\text{Risk}_{it} = \alpha + \beta 1 \text{RGI}_{it-1} + \beta 2 (X)_{it} + \beta 3 (Y)_{jt} + \beta 4 \text{Year}_t + \beta 5 \text{Country}_j + \varepsilon_{it} \quad (1)$$

In this equation (baseline model), the dependent variable, risk, is proxied by Z-score and credit risk. To address endogeneity or reverse causality, risk governance, RGI_{it-1} , is lagged by one period. X_{it} contains bank-specific variables. Y_{jt} is a matrix of external factors (country-level macroeconomic and financial industry variables) for country j at time t , Year_t and Country_j are dummy variables used to control for cross-country and time variations. To explore our second hypothesis, which posits that a robust risk governance function can

Table 2. Description of variables

Variables	Definition, measure and sources
<i>Dependent variables</i>	
Z-score	Indicator of insolvency risk, measured as the mean of return on assets plus the capital asset ratio (equity capital/total assets) divided by the standard deviation of asset returns (author's calculation)
Credit risk (NPL)	Ratio of non-performing loans to total loans (author's calculation)
<i>Independent variables</i>	
Risk governance index	Index, derived through the content method and drawing from various sources, consists of 25 items organized into five dimensions: board characteristics, risk committee, chief risk officer characteristics, internal committee, and audit committee (author's calculation, see Appendix n°1)
Risk disclosure index	Index calculated through content analysis based on seven types of risk (53 items) extracted from the annual reports of the bank (author's calculation, see Appendix n°2)
Ownership structure - Own Concentration	Equity percentage participation of the five largest shareholders in the bank (author's calculation)
State	Proportion of equity detained by the government
Foreign	Proportion of equity detained by foreign shareholders
Institutional	Proportion of equity detained by institutional shareholders
<i>Bank-specific variables</i>	
Bank size	Logarithm of total bank assets (bankscope)
Deposit ratio	Total deposit to total assets
Diversification	Net noninterest income to net interest income
Profitability (ROA)	Net income to total assets
<i>Industry and country specific variables</i>	
Financial market development	Stock market capitalization/GDP (annual reports of Central bank, world bank database)
Banking sector development	Credit to private sector/GDP (annual reports of Central bank)
Bank concentration	Assets of 3 largest banks to total assets of all banks in the country (annual reports of central bank)
Interest rate volatility	Annual average of the three months interbank rate (annual reports of Central bank)
Level of economic development	GDP per capita (world bank database)
Inflation	Growth of the consumer price index (world bank database)

Source(s): Table by author

mitigate excessive risk-taking and strengthen financial stability by increasing the level of risk disclosure, we elaborate on the framework outlined in [equation \(1\)](#). This leads us to derive [equations \(2\)](#) and [\(3\)](#) as follows:

$$RDI_{it} = \alpha + \beta 1 RGI_{it-1} + \beta 2 (X)_{it} + \beta 3 (Y)_{jt} + \beta 4 Year_t + \beta 5 Country_j + \varepsilon_{it} \quad (2)$$

$$Risk_{it} = \alpha + \beta 1 RGI_{it-1} + \beta 2 RDI_{it-1} + \beta 3 (X)_{it} + \beta 4 (Y)_{jt} + \beta 5 Year_t + \beta 6 Country_j + \varepsilon_{it} \quad (3)$$

In [equation \(2\)](#), Risk disclosure operates as the mediating variable. The coefficient $\beta 1$ of risk governance quantifies the effect of risk governance on the mediating variable (risk disclosure).

If both the coefficient β_1 of the risk governance variable in [equations \(2\) and \(3\)](#) and the coefficient β_2 of the risk disclosure variable in [equation \(3\)](#) are statistically significant, it suggests that risk disclosure serves as a partial mediating pathway through which risk governance influences bank risk. The relationship is full mediation when the coefficient β_1 of the risk governance variable in [equation \(3\)](#) is statistically insignificant ([Baron and Kenny, 1986](#)). Regarding the moderating effect, we initially propose that ownership structure in banks play a pivotal role as a mechanism through which risk governance influences bank risk (*H4*). Furthermore, we suggest that the ownership structure moderates the mediating role of risk disclosure in the relationship between risk governance and bank risk (*H5*). Hence, the ownership structure also serves as a critical moderator in shaping two connections: the association between risk governance and risk disclosure, and the relationship between risk disclosure and bank risk. Therefore, we test the *H4* using the [equation \(4\)](#) and we formulate the moderated-mediating analysis in two [equations \(5\) and \(6\)](#) in the following manner:

$$\begin{aligned} \text{Risk}_{it} = & \alpha + \beta_1 \text{RGI}_{it-1} + \beta_3 \text{OWN}_{it-1} + \beta_4 \text{RGI}_{it-1} * \text{OWN}_{it-1} + \beta_6 (\text{X})_{it} + \beta_7 (\text{Y})_{jt} + \beta_8 \text{Year}_t \\ & + \beta_9 \text{Country}_j + \varepsilon_{it} \end{aligned} \quad (4)$$

$$\begin{aligned} \text{RDI}_{it} = & \alpha + \beta_1 \text{RGI}_{it-1} + \beta_2 \text{OWN}_{it-1} + \beta_3 \text{RGI}_{it-1} * \text{OWN}_{it-1} + \beta_4 (\text{X})_{it} + \beta_5 (\text{Y})_{jt} \\ & + \beta_6 \text{Year}_t + \beta_7 \text{Country}_j + \varepsilon_{it} \end{aligned} \quad (5)$$

$$\begin{aligned} \text{Risk}_{it} = & \alpha + \beta_1 \text{RGI}_{it-1} + \beta_2 \text{RDI}_{it-1} + \beta_3 \text{OWN}_{it-1} + \beta_4 \text{RGI}_{it-1} * \text{OWN}_{it-1} \\ & + \beta_5 \text{RDI}_{it-1} * \text{OWN}_{it-1} + \beta_6 (\text{X})_{it} + \beta_7 (\text{Y})_{jt} + \beta_8 \text{Year}_t + \beta_9 \text{Country}_j + \varepsilon_{it} \end{aligned} \quad (6)$$

The [equation \(4\)](#) allows us to explore the moderator role of ownership in the relationship between risk governance and bank risk by introducing the term (RGI*OWN). [Equation \(5\)](#) examines the moderator role of ownership in the relationship between risk governance and risk disclosure by also introducing the same term (RGI*OWN). In [equation \(6\)](#), we introduce two interaction terms: one between the risk governance index and the ownership structure (RGI*OWN), and another between risk disclosure and ownership structure (RDI*OWN), aimed at evaluating the moderating-mediating influence of the ownership structure. This addition enables us to examine how the ownership structure, as indicated by its coefficients, impacts three relationships: between risk governance and bank risk, risk governance and risk disclosure and risk disclosure and bank risk. To assess the association between risk governance and bank risk [[equation \(1\)](#)] and address potential unobserved heterogeneity and endogeneity, we use a rigorous methodology to identify the most suitable model. In line with established practices in the literature ([Gutiérrez-Ponce and Wibowo, 2024](#); [Siueia et al., 2019](#)), we first consider three alternative models: the Common Effects Model (CEM) using Ordinary Least Squares (OLS), the Fixed Effects Model (FEM) using the Least Square Dummy Variable (LSDV) approach and the Random Effects Model (REM) using Generalized Least Squares (GLS). To determine the optimal model, we conduct several regression tests, including the Fisher test, Hausman test and Lagrange Multiplier test. Based on the test results, we select the Random Effects Generalized Least Squares (GLS) technique. Moreover, to assess the mediating effect of risk disclosure and the moderating role of ownership structure on bank risk, we estimated [equations \(2\)–\(6\)](#) using structural equation modeling (SEM) with panel data. SEM offers a robust framework for testing complex causal relationships, including mediation and moderation.

Unlike traditional regression, SEM allows variables to act as both dependent and independent across different equations, enabling a dynamic representation of real-world interactions (Gunzler *et al.*, 2013). It also accounts for interdependencies among endogenous variables and incorporates both measurement and structural components, addressing potential measurement errors. These features make SEM especially suitable for capturing the multifaceted relationships among risk governance, risk disclosure, ownership structure and bank risk.

4. Empirical result and analysis

4.1 Descriptive statistics.

Table 3 presents descriptive statistics for the key variables under examination in this paper, unveiling noteworthy characteristics of GCC banks. In terms of insolvency risk, Table highlights that, on average, GCC commercial banks exhibit a higher Z-Score, indicating greater financial stability. Nonetheless, the credit risk indicator demonstrates significant dispersion within the sample. Risk governance, with an average score of 30.21 and a standard deviation of 17.34, exhibits significant variability among banks. The notably high standard deviation accentuates substantial disparities in the adoption of risk governance among GCC banks, underscoring varying commitment levels to these principles. This heterogeneity in RGI across nations can be attributed to differences in regulatory frameworks, institutional practices and cultural factors influencing the implementation of risk governance measures. Table 3 further illustrates that the mean total risk disclosure index stands at 45.32. Additionally, it highlights substantial diversity in risk reporting among the sampled banks, ranging from a minimum of 32.17 to a maximum of 71.29. In relation to

Table 3. Summary statistics

Variables	Mean	SD	Min.	Max.
<i>Panel A: ownership structure</i>				
Ownership concentration (%)	78.45	34.81	52.19	88.17
Institutional shareholders (%)	3.21	9.12	7.82	21.11
Foreign shareholders (%)	12.73	31.57	0	43.44
State shareholders (%)	28.56	27.48	0	56.28
<i>Panel B: independent variables</i>				
Risk governance (%)	30.21	17.34	23.15	46.41
Risk disclosure (%)	45.32	23.52	32.17	71.29
<i>Panel C: bank risk</i>				
Z-score	19.22	5.41	13.73	27.12
Credit risk (%)	4.82	3.56	0.96	15.10
<i>Panel D: bank specific variables</i>				
Bank size	7.32	0.57	4.19	15.58
Deposit ratio (%)	70.15	16.21	31.12	92.29
Diversification (%)	25.82	11.56	15.32	29.23
ROA (%)	1.85	1.36	-3.21	11.53
<i>Panel E: industry and country specific variables (%)</i>				
Financial market development	96.1	2.5	88.9	103.1
Banking sector development	67.79	19.33	32.45	102.55
Bank concentration	72.11	15.36	54.15	90.26
GDP growth rate	3.75	2.13	-6.71	13.39
Three-month interbank rate	3.15	1.92	1.02	5.24
Inflation	2.95	2.62	-2.42	6.11

Source(s): Table by author

ownership structure, [Table 3](#) reveals that the sampled banks exhibit a high degree of concentrated ownership, as reflected in the mean value of the ownership concentration indicator at 78.45. This indicator varies between 52.19 and 88.17, highlighting notable ownership concentration differences among the banks. The involvement of institutional shareholders on GCC bank boards averages at 12.73%, with a range from 7.82% to 22%.

4.2 Baseline regression results: impact of risk governance on bank risk-taking

[Table 4](#) presents the baseline regression results from [equation \(1\)](#) using the GLS method, focusing on the relationship between risk governance and bank risk-taking-measured by z-score and credit risk (NPLs/TA)-without accounting for risk disclosure or ownership structure. Columns 1 and 2 report results for the full sample, while Columns 3–6 distinguish between conventional and Islamic banks. In the full sample, risk governance is significantly associated with lower z-score (-0.036) and higher credit risk (0.018), both statistically significant at the 1% and 5% levels, respectively. These results contradict *H1*, which posited that stronger risk governance reduces risk-taking.

Paradoxically, our findings suggest that enhanced risk governance in GCC banks may increase risk-taking. While agency theory argues that governance aligns managerial actions with shareholder interests to reduce risk ([Jensen and Meckling, 1976](#)), in practice, this alignment may incentivize excessive risk-taking. This phenomenon reflects global patterns where risk governance mechanisms failed to prevent risk build-up, as noted during the 2008 crisis ([Senior Supervisors Group, 2009](#)), and where short-term incentives led to riskier strategies ([Dobbin and Jung, 2010](#); [Fligstein and Roehrkasse, 2016](#)). In GCC banks, moral hazard theory offers a plausible explanation. Concentrated ownership may drive shareholders to encourage risky strategies, shifting potential losses to regulators or deposit insurers ([Felicio et al., 2018](#); [Calomiris and Jaremski, 2016](#)). Cultural and institutional factors in the region may weaken the effectiveness of formal governance mechanisms. Behavioral finance also suggests that stronger governance can breed overconfidence among executives, fostering riskier decisions under the illusion of control ([Shefrin, 2001](#); [Kahneman and Tversky, 1979](#)).

These insights align with regional evidence. [Raouf and Ahmed \(2022\)](#) found a negative impact of risk governance on stability in GCC banks, while [Aljughaiman and Salama \(2019\)](#) observed that stronger governance mechanisms were linked to increased risk-taking in MENA banks, especially before the financial crisis. When accountability is weak, governance may legitimize, rather than curb, risky behavior.

As shown in [Table 4](#), the subsample analysis reveals a notable *divergence* between conventional and Islamic banks regarding the effect of risk governance on risk-taking. While risk governance mechanisms significantly influence risk-taking in conventional banks, their impact is more limited in Islamic banks. This difference may be attributed to the distinct foundations and priorities of Islamic banking, which is governed by Sharia principles emphasizing ethical conduct, risk-sharing and the avoidance of interest (*riba*) and excessive uncertainty (*gharar*) ([Abedifar et al., 2013](#)).

Structural and institutional factors further explain this variation. Islamic banks rely less on traditional governance tools and more on Sharia supervisory boards, which oversee compliance with religious principles, thereby reshaping risk governance priorities. As noted by [Raouf and Ahmed \(2022\)](#), Islamic banks tend to score lower on the Risk Governance Index than conventional banks, suggesting differences in governance effectiveness. Moreover, Sharia-based contracts like *mudarabah* and *musharakah* distribute financial risk between parties, potentially reducing the relevance of conventional risk governance mechanisms. This perspective is supported by [Nguyen \(2021\)](#), who found that while audit

Table 4. Baseline regression results of risk governance and bank risk-taking

Explanatory variables	All banks		Conventional banks		Islamic banks	
	Z-score	Credit risk	Z-score	Credit risk	Z-score	Credit risk
Intercept	1.215*** (3.51)	1.262** (2.48)	1.096*** (2.32)	0.975*** (2.48)	0.862*** (2.22)	0.776** (2.31)
Risk governance _{t-1}	-0.027*** (-3.17)	0.014** (2.26)	-0.008** (-2.41)	0.012* (1.98)	-0.034 (-1.64)	0.049 (0.83)
<i>Bank characteristics</i>						
Bank size	0.019** (2.38)	-0.011* (-1.99)	0.016** (2.44)	-0.010* (-1.98)	0.009** (2.18)	-0.008 (-1.45)
Deposit ratio	0.011 (1.29)	-0.009 (-0.92)	0.007 (1.33)	-0.013 (-1.25)	0.004 (0.86)	-0.005 (-0.71)
Diversification	0.024** (2.22)	-0.014 (-1.15)	0.019** (2.46)	-0.009 (-0.72)	0.011** (2.34)	-0.011 (-1.18)
Return on assets (ROA)	0.009 (1.42)	-0.013** (-2.26)	0.007 (0.85)	-0.017** (-2.39)	0.021 (1.72)	-0.025* (-1.97)
<i>Indus. and country indicators</i>						
Financial market development	0.012** (2.29)	-0.08** (-2.42)	0.005** (2.16)	-0.015** (-2.48)	0.008** (2.26)	-0.006 (-1.62)
Banking sector development	0.021** (2.39)	-0.014** (-2.35)	0.012** (2.48)	-0.008* (-1.96)	0.021* (1.97)	-0.012 (-1.51)
Bank concentration	0.026** (2.55)	-0.013* (-1.98)	0.019* (1.97)	-0.012 (-1.43)	0.005 (0.71)	-0.008 (-1.07)
GDP growth	0.015 (0.73)	-0.027** (-2.49)	0.009 (0.77)	-0.019* (-1.97)	0.016 (1.33)	-0.003* (-1.99)
Interest rate volatility	-0.007* (-1.99)	0.010** (2.18)	-0.011** (2.34)	0.007** (2.28)	-0.009 (-1.84)	0.014 (1.61)
Inflation	0.012 (1.27)	-0.009 (-0.93)	0.009 (1.15)	-0.007 (-1.24)	0.002 (0.42)	-0.006 (-0.95)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Country dummy	Yes	Yes	Yes	Yes	Yes	Yes
Overall R ²	0.669	0.573	0.592	0.538	0.548	0.473
Wald chi2	53.24***	49.83***	48.17***	45.74**	42.40**	39.62**
Observations	552	552	344	344	208	208

Note(s): Table 4 reports the results of the GLS regressions. The dependent variable is bank risk-taking, measured by Z-score and credit risk. The independent variables include risk governance mechanisms, bank-specific characteristics, sectoral indicators and country-level factors. Separate regression results are also presented for conventional and Islamic banks. *, ** and *** denote statistical significance at the 10, 5 and 1% levels, respectively. Figures in parentheses are t-statistics

Source(s): Table by author

committees constrain risk-taking in conventional banks, their role is less significant in Islamic banks. Regulatory inconsistencies across jurisdictions may also contribute to these differences, as Islamic banking frameworks are not globally standardized. Overall, the weaker influence of risk governance in Islamic banks likely results from the interplay between religious oversight, risk-sharing contractual structures and divergent regulatory environments.

4.3 The mediating role of risk disclosure

To examine the mediating role of risk disclosure in the relationship between risk governance and bank risk, we apply both the Sobel test and bootstrapping analysis. The Sobel test evaluates the significance of the indirect effect, indicating whether the mediator transmits the effect of the independent variable on the dependent variable. Additionally, we conduct a bootstrap analysis with 5,000 iterations using the bias-corrected and accelerated method to estimate the total, direct and indirect effects. Mediation is confirmed when the confidence interval for the indirect effect excludes zero, suggesting a statistically significant indirect path (Hayes, 2013). This dual approach enhances the robustness of our mediation analysis and ensures the stability of coefficient estimates.

Table 5 presents the regression results assessing the mediating role of risk disclosure, based on equations (2) and (3). Consistent with the GLS results, risk governance shows a significant negative effect on the z-score and a positive effect on credit risk, indicating its association with increased risk-taking. The analysis also reveals that risk governance significantly enhances risk disclosure at the 1% level, supporting H2a. This finding suggests that mechanisms such as the RC, AC and CRO foster greater transparency, consistent with Erin et al. (2020) and Nahar et al. (2020). H2b, which posits a negative link between risk disclosure and bank risk, is partially supported. SEM results confirm a significant negative relationship only for the z-score, indicating that risk disclosure contributes to reducing insolvency risk (Altunbaş et al., 2023).

The Sobel test confirms this mediation effect only for z-score, with the z-statistic significant at the 5% level. Similarly, the bias-corrected bootstrap (95% CI = [0.072, 0.241]) excludes zero for the z-score, confirming a significant indirect effect. In contrast, the interval for credit risk includes zero ([-0.122, 0.201]), indicating an insignificant mediation effect. Following Baron and Kenny's (1986) mediation criteria, we identify a partial mediation when risk is measured by the z-score. Moreover, based on Zhao et al. (2010) and Ramli et al. (2019), the opposite signs of the direct and indirect effects suggest competitive mediation. While risk governance tends to elevate risk-taking, increased risk disclosure counteracts this effect by mitigating excessive risk, indicating a balancing role.

This competitive mediation points to a nuanced dynamic in GCC banks: risk disclosure acts not only as a transparency tool but also as a strategic mechanism that influences stakeholder perceptions and managerial behavior. Enhanced disclosure may reduce the disciplining role of risk premiums by narrowing the information asymmetry between banks and external observers. Simultaneously, it strengthens internal risk controls and serves as an early-warning signal to markets. These findings highlight that risk disclosure is not merely a reporting exercise but an integral component of risk governance. In GCC banks, effective risk management requires a strategic integration of both strong governance structures and robust disclosure practices to ensure that risk-taking aligns with long-term institutional stability and stakeholder expectations.

Additionally, we conducted a sub-sample analysis by bank type, and the results in Table 6 reveal distinct dynamics between conventional and Islamic banks. For conventional banks, risk governance is significantly and negatively associated with bank risk (z-score) at the 1%

Table 5. SEM mediation results of risk disclosure in the relationship between risk governance and bank risk

Hypothesis	Relationships	Coefficient	Std error	Z	$p > Z$	95% CI	Decision
<i>Z-score Direct effect</i>							
H1	RG → z-score	-0.584	0.273	-2.22	0.037**	-1.119 -0.073	Supported
H2a	RG → RD	0.293	0.037	4.13	0.000***	0.113 0.475	Supported
H2b	RD → z-score	0.327	0.121	2.32	0.029**	0.092 0.413	Supported
<i>Mediation effect (indirect effect)</i>							
H2	RG → RD z-score	0.096	0.013	2.09	0.026**	0.072 0.241	Supported
<i>Total effect</i>							
	RG → z-score	-0.488	0.154	2.51	0.042**	-0.524 -0.198	
<i>Credit risk: NPL Direct effect</i>							
H1	RG → NPL	0.175	0.142	2.06	0.026**	0.026 0.372	Supported
H2a	RG → RD	0.223	0.025	2.13	0.042**	0.086 0.382	Supported
H2b	RD → NPL	0.243	0.095	1.42	0.352	-0.085 0.441	Not supported
<i>Mediation effect (indirect effect)</i>							
H2	RG → RD → NPL	0.054	0.045	1.19	0.417	-0.122 0.201	Not supported
<i>Total effect</i>							
	RG → TQ	0.229	0.256	-0.41	0.625	-0.111 0.237	

Note(s): Significance levels: ** and *** denote statistical significance at the 5 and 1% levels, respectively

Source(s): Table by author

Table 6. SEM mediation results of risk disclosure on bank insolvency risk by bank type

Effects	Relationships	Coefficient	Std Error	Z	P>	95% CI	Decision
Conventional Banks : Z-score							
Direct effect							
H1	RG → z-score	-0.582	0.052	-5.84	0.000***	-0.814 -0.254	Supported
H2a	RG → RD	0.211	0.033	7.85	0.000***	0.135 0.495	Supported
H2b	RD → z-score	0.341	0.232	2.27	0.026**	0.168 0.572	Supported
Mediation Effect (Indirect effect)							
H2	RG → RD → z-score	0.072	0.031	2.52	0.036**	0.019 0.201	Supported
Total Effect							
	RG → z-score	-0.510	0.121	2.32	0.041**	-0.714 -0.306	
Islamic Banks : Z-score							
Direct effect							
H1	RG → z-score	-0.146	0.072	-1.30	0.321	-0.315 0.221	Not Supported
H2a	RG → RD	0.146	0.042	2.05	0.046**	0.091 0.321	Supported
H2b	RD → z-score	0.264	0.074	2.68	0.022*	0.121 0.492	Supported
Mediation Effect (Indirect effect)							
H2	RG → RD → z-score	0.038	0.011	2.39	0.35**	0.009 0.205	Supported
Total Effect							
	RG → z-score	-0.108	0.027	1.52	0.092	-0.184 0.237	

Note(s): Significance levels; *, ** and *** denote statistical significance at the 10, 5 and 1% levels, respectively
Source(s): Table by author

level. Furthermore, risk disclosure shows a significant positive indirect effect on this relationship at the 5% level, indicating a *competitive partial mediation*. This suggests that while risk governance reduces risk-taking, increased disclosure may encourage more sophisticated risk behavior by lowering information asymmetry and weakening market discipline, thereby reducing risk premiums. In contrast, for *Islamic banks*, the direct link between risk governance and bank risk is not statistically significant, consistent with findings by [Nguyen \(2021\)](#), who noted weaker governance effects in Islamic banks. However, risk disclosure demonstrates a significant indirect effect, suggesting *complete mediation*. In this context, governance mechanisms do not directly affect risk-taking but instead work through enhanced transparency. This reflects the unique governance environment of Islamic banks, where Sharia compliance and ethical conduct shape managerial behavior.

Economically, this indicates a shift in the role of governance: in Islamic banks, governance serves more as a signaling mechanism-reassuring stakeholders of Sharia adherence-than as a direct control tool. Risk disclosure thus becomes the primary channel through which governance influences risk, emphasizing transparency over command-and-control. Given the importance of reputational capital tied to religious compliance, this form of disclosure can affect market perceptions, funding costs and customer loyalty. Ultimately, the analysis underscores a fundamental difference: conventional banks rely on governance to directly constrain risk, while Islamic banks rely on disclosure to indirectly manage it. This divergence reflects the broader regulatory and ethical frameworks in which each banking model operates, conventional banks focus on prudential oversight, whereas Islamic banks emphasize values-based conduct and stakeholder trust.

4.4 The role of ownership structure

4.4.1 Ownership structure as a moderator between risk governance and bank risk-taking.

Before presenting the moderated mediation analysis, we first test *H4*, which posits that ownership structure moderates the relationship between risk governance and bank risk (Z-score). Using [equation \(4\)](#) (Model 1), we introduce interaction terms between risk governance and various ownership variables, ownership concentration, institutional, foreign and state ownership (Conc*RGI, Inst*RGI, Fore*RGI, Stat*RGI). The results are summarized in [Table 7](#).

First, *ownership concentration* shows a significant positive effect on Z-score (i.e. lower risk), suggesting that more concentrated ownership leads to less risky behavior, consistent with agency theory. Large shareholders tend to align managerial decisions with their own, promoting risk aversion. This finding is consistent with [Srairi \(2013\)](#). Second, *institutional ownership* also positively correlates with bank risk. Institutional investors, driven by return maximization, may support riskier strategies due to their superior capacity to assess and manage risk ([La Porta et al., 2002](#); [George et al., 2005](#)). Third, a positive association is observed between *foreign ownership* and bank risk. Foreign investors may introduce new governance practices or strategic goals that encourage greater risk-taking. They may also promote aggressive lending, expansion, or innovation strategies, especially in liberalized or privatized banking environments ([Boubakri et al., 2013](#); [Estrin et al., 2009](#)). Exposure to international markets could further increase vulnerability to external shocks, an outcome consistent with [Kabir et al. \(2020\)](#) and [Đặng et al. \(2022\)](#). Finally, the analysis shows no significant effect of *state ownership* on bank risk. This suggests that government-owned banks in the GCC adopt more conservative risk policies, likely due to regulatory oversight, a focus on long-term economic objectives, and a mandate for financial stability over profit maximization.

Table 7. SEM regression results of risk governance and bank risk-taking – Moderated Mediation analysis

Explanatory variables	Model 1 (Z-score)		Model 2 (risk disclosure)		Model 3 (Z-score)	
	Conventional banks	Islamic banks	Conventional banks	Islamic banks	Conventional banks	Islamic banks
Risk governance (RGI)	-0.029** (-2.37)	-0.043** (-2.57)	0.053*** (3.42)	0.038** (2.42)	-0.021** (-2.28)	-0.009 (-1.62)
Concentration (CONC)	0.044** (2.54)	0.018* (1.98)	0.024** (2.36)	0.013** (2.27)	0.018** (2.47)	0.038** (2.14)
Institutional shareholders	-0.018** (-2.24)	-0.007** (-2.17)	0.029** (2.10)	0.026** (2.16)	-0.007** (-2.38)	-0.017** (-2.24)
Foreign shareholders	-0.036** (-2.13)	-0.011* (-1.98)	0.018** (2.44)	0.011* (1.99)	-0.019** (-2.44)	-0.006* (-1.99)
State shareholders	0.008 (1.29)	0.033 (0.67)	0.004 (0.57)	0.028 (1.21)	0.016 (1.36)	0.011 0.92
CONC* RGI	0.052** (2.64)	0.028 (1.49)	0.031** (2.28)	0.013** (2.24)	0.012** (2.24)	0.003 (1.21)
Institutional* RGI	0.008** (2.17)	0.019 (1.38)	0.011** (2.23)	0.007 (2.23)	0.009** (2.12)	0.006 (0.055)
Foreign* RGI	0.021** (2.53)	0.006 (0.49)	0.005* (1.99)	0.032* (1.98)	0.024 (2.31)	0.016 (1.09)
State* RGI	0.016 (0.95)	0.014 (1.51)	0.024 (1.65)	0.003 (0.82)	0.012 (1.65)	0.002 (0.73)
Risk disclosure (RDI)	-	-	-	-	0.016** (2.57)	0.014** (2.17)
CONC* RDI	-	-	-	-	0.026** (2.33)	0.002 (1.27)
Institutional* RDI	-	-	-	-	0.004** (2.11)	0.011 (0.46)
Foreign* RDI	-	-	-	-	0.026* (1.98)	0.019 (1.57)
State* RDI	-	-	-	-	0.008 (0.61)	0.012 (0.92)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Observations	344	208	344	208	344	208

Note(s): Table 7 reports the results of the SEM regression. Model 1 shows the moderating effect of ownership structure variables (concentration, institutional, foreign and state ownership) on the relationship between risk governance and bank risk (Z-score). Model 2 presents the moderating effect of ownership structure on the relationship between risk governance and risk disclosure. Model 3 examines the moderating effect of ownership structure on the mediating role of risk disclosure in explaining bank risk-taking. *, ** and *** denote statistical significance at the 10, 5 and 1% levels, respectively. Figures in parentheses are t-statistics

Source(s): Table by author

In sum, the moderating role of ownership structure reveals important heterogeneity in how different ownership types influence the governance–risk nexus. Ownership concentration mitigates risk, while institutional and foreign ownership appear to amplify it. State ownership, by contrast, remains neutral, reflecting the unique institutional context of the GCC banking sector.

Moreover, a notable contrast arises when examining the interaction effects between risk governance and ownership structure across bank types. In *conventional banks*, the interaction terms-Conc*RGI, Inst*RGI and Fore*RGI-are significantly and positively associated with bank risk reduction, indicating that concentrated, institutional and foreign ownership reinforce the effectiveness of risk governance in curbing risk. The exception is Stat*RGI, which remains insignificant. This suggests that these ownership types strengthen governance impact, enhancing risk oversight and aligning managerial actions with investor expectations.

In contrast, *Islamic banks* show no significant interaction effects, implying that ownership structure does not moderate the governance–risk relationship. This divergence likely stems from the unique governance model of Islamic banks, shaped by Shariah principles, profit-and-loss sharing and religious compliance requirements. The role of Shariah supervisory boards, along with ethical and regulatory constraints, may overshadow the influence of external ownership types. Moreover, stricter regulatory oversight and a greater emphasis on long-term stability in Islamic finance can diminish the discretionary influence of institutional and foreign investors. As Islamic banks prioritize ethical conduct and financial soundness over short-term gains, ownership concentration and investor type appear to have a limited role in influencing risk governance outcomes. This finding is consistent with [Mateev et al. \(2023\)](#), who observed similar patterns in MENA region banks.

4.4.2 *Ownership structure as a moderator of the mediating role of risk disclosure in the relationship between risk governance and bank risk-taking.* Following the approach of [Edwards and Lambert \(2007\)](#) and [Baron and Kenny \(1986\)](#), a *moderated mediation process* requires three conditions: (1) the interaction between the independent variable and the moderator (RGI*OWN) must significantly predict the mediator (RDI); (2) the interaction between the mediator and the moderator (OWN*RDI) must significantly predict the dependent variable (Z-score); and (3) the mediator (RDI) must significantly affect the dependent variable. To test this, we estimate Models 2 and 3 in [Table 7](#) using the SEM technique.

- Model 2 [[equation \(5\)](#)] assesses whether ownership structure moderates the relationship between risk governance and risk disclosure by including the interaction terms Conc*RGI, Inst*RGI, Fore*RGI and Stat*RGI. The results indicate that ownership concentration positively and significantly influences risk disclosure in both conventional and Islamic banks, consistent with [Elamer et al. \(2020\)](#). This supports signaling, legitimacy and resource dependence theories, suggesting that concentrated ownership enhances transparency. Similarly, foreign and institutional ownership exhibit significant positive effects on risk disclosure, in line with findings from [Barako et al. \(2006\)](#), [Grassa et al. \(2021a\)](#), [Sayed Abd Elghaffar et al. \(2019\)](#) and [Setiyono and Tarazi \(2014\)](#). These ownership types typically demand greater transparency and accountability. Furthermore, the interaction terms Conc*RGI, Inst*RGI and Fore*RGI are positive and significant for both bank types, confirming the first condition of moderated mediation. Only Stat*RGI remains insignificant.

- Model 3 [[equation \(6\)](#)] tests the second and third conditions by regressing risk disclosure and the interaction terms Conc*RDI, Inst*RDI, Fore*RDI and Stat*RDI on bank risk. The results show that Conc*RDI, Inst*RDI and Fore*RDI have a positive and significant effect on the z-score, indicating that these ownership types enhance the risk-reducing effect of

disclosure. In contrast, Stat*RDI is insignificant, suggesting that state ownership does not moderate the disclosure–risk relationship. These findings align with [Setiyono and Tarazi \(2014\)](#) and reinforce the idea that blockholders (e.g. institutional, foreign and concentrated owners) play a key role in improving governance and disclosure quality. Their ability to monitor management increases transparency and aligns risk behavior with long-term interests.

In *conventional banks*, this moderating role is evident: concentrated, institutional and foreign ownership enhance the impact of disclosure on risk reduction. However, in *Islamic banks*, ownership structure does not significantly moderate this relationship. This may be attributed to the distinct governance mechanisms in Islamic banks—particularly Shariah compliance, ethical financing principles and profit-and-loss sharing—which inherently constrain risk-taking and reduce the influence of ownership structure. Additional oversight mechanisms further limit discretionary governance adjustments based on investor profiles.

Finally, the mediating effect of risk disclosure on the governance–risk relationship, as shown in [Table 6 \(H2b\)](#), is confirmed. Overall, all three conditions for moderated mediation are fulfilled, supporting *H5*: ownership structure—particularly concentration, foreign and institutional ownership—moderates both the governance–disclosure and the disclosure–risk relationships, strengthening the overall risk governance framework in conventional banks.

The moderating role of ownership structure can be explained by the economic incentives associated with different owner types. First, concentrated ownership introduces a principal-agent dynamic where dominant shareholders have both the capacity and motivation to monitor management closely. This can reinforce the positive relationship between risk governance and disclosure. However, such shareholders may also promote selective disclosure that aligns with their own risk preferences, potentially altering the effectiveness of disclosure in curbing risk-taking. Second, foreign investors often introduce global risk management standards and exert additional market discipline due to their heightened sensitivity to reputational risks, thereby enhancing governance mechanisms and fostering more comprehensive disclosures. Third, institutional investors—armed with professional expertise and fiduciary duties—are likely to reinforce the governance–disclosure link and ensure that transparency leads to prudent, rather than opportunistic, risk behavior.

These findings suggest that ownership structure influences not only the implementation of governance and disclosure practices but also their effectiveness in shaping bank risk profiles. In this context, risk disclosure emerges as an active mechanism shaped by ownership dynamics rather than a neutral tool. This underscores the need for governance and transparency reforms to account for ownership incentives. In the GCC, where banks often align with national development agendas (e.g. Saudi Vision 2030), governance reforms may prove insufficient unless aligned with ownership structures. For instance, encouraging foreign or institutional ownership could strengthen market discipline, although this may conflict with state-driven economic goals. Similarly, concentrated ownership—common in family-dominated GCC firms—may necessitate stricter disclosure requirements to offset incentives for risk information concealment.

4.4 Robustness test and heterogeneity analysis

We ensured the robustness of our regression results by using alternative measures for key variables and addressing endogeneity through 2SLS and the two-step system GMM, replacing the GLS regression. Additionally, we analyzed the moderating effects of bank size and the extent of risk governance practices on the relationship between risk governance and risk-taking.

4.4.1 Exploring alternative measures and addressing endogeneity: two-stage least squares and generalized method of moments approaches. This research undertakes a series of thorough robustness checks to ensure the reliability of our conclusions. The sensitivity analysis entails substituting certain variables and using an alternative methodology to explore the effect of risk governance on bank risk-taking. More specifically, we replace three variables. Bank risk is evaluated using two alternative indicators: loan loss reserves to total loans (LLR) and loan loss provision to total loans (Haq and Heaney, 2012). The risk disclosure index is segmented into key categories such as credit risk, liquidity risk, market risk, rate of return risk and specific risk for Islamic banks. Ownership structure is evaluated using the Herfindahl–Hirschman Index (HHI) and by considering the nature of ownership, including Institutional shareholders, Foreign shareholders and State shareholders.

Beyond robustness tests, we address potential endogeneity to reinforce the validity of our findings. While the baseline analysis relies on GLS under random effects, this may not fully resolve endogeneity concerns in the risk governance–bank risk nexus. Endogeneity may arise from omitted variables (e.g. managerial risk preferences), simultaneity, or measurement errors, potentially biasing estimates (Hermalin and Weisbach, 2001). To mitigate this, we adopt instrumental variable techniques–two-stage least squares (2SLS) and generalized method of moments (GMM)–as used in prior research (Barth *et al.*, 2009).

The 2SLS approach requires instruments correlated with the endogenous risk governance index (RGI) but uncorrelated with the structural error term (Angrist and Pischke, 2009). Rather than relying on lagged variables (e.g. Wintokia *et al.*, 2012), which may be ineffective due to RGI stability, we use two country-level governance indicators: *Regulatory Quality* and *Government Effectiveness* from the Worldwide Governance Indicators, in line with Zhang *et al.* (2021) and Kouzev *et al.* (2024). These proxies reflect institutional capacity to implement effective policy, potentially shaping bank-level governance but not directly influencing bank risk. In the 2SLS model, the first stage predicts RGI using the instruments and controls; the second stage regresses bank risk on the predicted RGI. Diagnostic tests support instrument validity: the Hausman test ($p < 0.05$) confirms endogeneity, while under- and weak identification tests ($p < 0.1$) and the over-identification test ($p > 0.1$) confirm relevance and exogeneity, respectively. The 2SLS results (Table 8) align closely with the GLS estimates, reinforcing confidence in the robustness of the main findings.

To further strengthen the analysis, we implement a dynamic panel estimator–two-step system GMM–following Blundell and Bond (1998), which addresses unobserved heterogeneity and dynamic endogeneity using internal instruments. GMM results (Table 9), disaggregated by bank type, confirm the primary finding: a negative and significant relationship between risk governance and bank risk, especially for conventional banks. Additionally, results reveal a moderating role of risk disclosure, particularly for credit, market and specific risks, in mitigating the risk-enhancing effect of governance, especially in Islamic banks. Ownership structure also moderates these effects. Ownership concentration (HHI) weakens the positive link between governance and risk. Consistent with emerging market literature (Hunjra *et al.*, 2020; Mateev *et al.*, 2023), foreign and institutional shareholding reduce risk-taking, mainly in conventional banks, likely due to political stability in the GCC. However, their weaker presence in Islamic banks may limit this effect. State ownership, in contrast, is associated with greater risk-taking, notably in conventional banks (Srairi, 2013).

Together, these results from 2SLS and GMM estimators reinforce the robustness and validity of our baseline findings.

4.2.2 Heterogeneity tests: the role of bank size and risk governance levels. Firm-specific characteristics, particularly bank size, significantly shape risk-taking behavior (Srairi *et al.*, 2022; Haq and Heaney, 2012). Following prior studies (Abid *et al.*, 2021; Aljughaiman and Salama, 2019), we classify banks into small and large groups based on total assets to explore the differential impact of risk governance.

Table 8. 2SLS results for the relationship between risk governance and bank risk

Explanatory variables	All banks		Conventional banks		Islamic banks	
	LLR	LLP	LLR	LLP	LLR	LLP
Intercept	1.017** (2.21)	0.975** (2.07)	0.944** (2.36)	0.832** (2.41)	0.749** (2.11)	0.651** (2.09)
Risk Governance _{t-1}	-0.032*** (-3.24)	-0.011** (-2.28)	-0.019** (-2.51)	-0.005* (-1.99)	-0.039 (-1.56)	-0.013 (-0.75)
Risk disclosure	0.012** (2.44)	0.033** (2.12)	0.046** (2.29)	0.013* (1.97)	0.007* (1.96)	0.016 (1.51)
<i>Ownership structure</i>						
HHI	0.019** (2.38)	0.008* (1.98)	0.032** (2.17)	0.014 (1.27)	0.034** (2.56)	0.006 (0.93)
Institutional shareholders	0.039** (2.25)	0.016* (1.98)	0.007** (2.46)	0.015 (1.34)	0.031 (1.05)	0.004 (0.96)
Foreign shareholders	0.054** (2.12)	0.027 (2.32)	0.017** (2.56)	0.003* (1.99)	0.006 (1.68)	0.011 (1.33)
State shareholders	-0.011* (-1.97)	-0.019 (-1.25)	-0.026** (-2.42)	-0.024* (1.98)	-0.012 (-1.47)	-0.021 (-1.07)
RGI* HHI	0.022** (2.56)	0.013 (1.05)	0.034** (2.50)	0.022 (1.14)	0.019** (2.38)	0.019** (2.38)
RGI* institutional	0.006* (1.99)	0.033 (0.97)	0.007* (1.97)	0.031 (1.73)	0.007 (0.82)	0.015 (1.29)
RGI* foreign	0.016** (2.22)	0.042** (2.18)	0.021** (2.46)	0.044* (1.99)	0.054** (2.12)	0.054** (2.12)
RGI* state	-0.027** (-2.19)	-0.006 (-0.46)	-0.017** (-2.38)	-0.004 (-1.42)	-0.025 (-1.43)	-0.002 (-0.66)
RDI* HHI	0.028** (2.34)	0.044* (1.98)	0.005** (2.11)	0.014 (1.57)	0.022 (0.72)	0.014 (1.61)
RDI* institutional	0.018** (2.22)	0.009** (2.42)	0.015** (2.13)	0.022** (2.46)	0.012* (1.98)	0.006 (0.88)
RDI* foreign	0.031* (1.99)	0.013** (2.26)	0.019** (2.42)	0.008** (2.25)	0.021 (1.47)	0.015 (1.37)
RDI* state	0.006 (0.77)	0.019 (1.33)	0.014 (1.63)	0.006 (0.77)	0.019* (1.24)	0.006 (0.90)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Country dummy	Yes	Yes	Yes	Yes	Yes	Yes
Overall R ²	0.506	0.428	0.461	0.372	0.439	0.319
F-value	8.22***	6.72**	6.55**	4.31**	5.46**	4.22**
Observations	552	552	344	344	208	208
Sargan test	0.477 (-0.951)	0.456 (-0.882)	0.458 (-0.833)	0.442 (-0.724)	0.438 (-0.838)	0.416 (-0.815)
Basmann test	0.467 (-1.346)	0.443 (-1.273)	0.458 (-1.247)	0.442 (-1.217)	0.411 (-1.184)	0.376 (-1.162)
Hausman test	22.41***	19.55***	20.63***	17.73***	18.61***	16.37***

Note(s): This table presents the results of the 2SLS regression analysis examining the relationship between bank risk and risk governance [equation (6)]. The dependent variable is bank risk, measured by loan loss reserves (LLR) and loan loss provisions (LLP). The independent variables include risk governance, risk disclosure, ownership structure, the interaction term RGI × Ownership Structure, and the interaction term RDI × Ownership Structure. Separate regression results are provided for conventional and Islamic banks. * ** and *** denote statistical significance at the 10, 5 and 1% levels, respectively. The t-statistics are presented in parentheses

Source(s): Table by author

Table 9. GMM results for the relationship between risk governance and bank risk

Explanatory variables	All banks		Conventional banks		Islamic banks	
	LLR	LLP	LLR	LLP	LLR	LLP
LLR _{t-1} /LLP _{t-1}	0.236*** (0.0752)	0.141** (0.0198)	0.257*** (0.043)	0.072** (0.0195)	0.133** (0.0212)	0.495* (0.0144)
RG _{t-1}	-0.137*** (0.018)	-0.151* (0.0027)	-0.176** (0.033)	-0.106* (0.0009)	-0.088 (0.0013)	-0.077 (0.0013)
<i>Ownership structure</i>						
HHI	0.046** (0.0075)	0.032* (0.0011)	0.027** (0.0033)	0.031 (0.0051)	0.019* (0.0022)	0.018* (0.0014)
Institutional shareholders	0.053** (0.0075)	0.016* (0.0024)	0.036** (0.0052)	0.021 (0.0011)	0.028 (0.0043)	0.028 (0.0019)
Foreign shareholders	0.008** (0.0082)	0.012* (0.0032)	0.009** (0.0067)	0.018 (0.0098)	0.003 (0.0021)	0.019 (0.015)
State shareholders	-0.107* (0.075)	-0.065* (0.042)	-0.082** (0.032)	-0.071 (0.027)	-0.082 (0.051)	-0.037 (0.007)
<i>Risk disclosure</i>						
Credit risk	0.032** (0.0056)	0.015* (0.0017)	0.024** (0.0042)	0.011 (0.0031)	0.025** (0.0044)	0.008* (0.0016)
Liquidity risk	0.011 (0.0025)	0.0013 (0.0026)	0.008 (0.0021)	0.0018 (0.0019)	0.034 (0.0048)	0.009 (0.0013)
Market risk	0.012* (0.0065)	0.013* (0.0021)	0.0042** (0.0012)	0.011 (0.0021)	0.0035** (0.0006)	0.0014* (0.0015)
Rate of return risk	0.0022 (0.0011)	0.013 (0.0058)	0.0035 (0.0043)	0.009 (0.0027)	0.0026 (0.0033)	0.004 (0.0014)
Specific risk	0.051 (0.0024)	0.004 (0.0011)	-	-	0.023** (0.0031)	0.009* (0.0037)
RG1* HHI	0.017** (0.0031)	0.013* (0.0027)	0.004* (0.0021)	0.003 (0.0013)	0.012** (0.0041)	0.007* (0.0032)
RG1* institutional RG1* foreign	0.036* (0.0052)	0.0049* (0.0025)	0.021* (0.0042)	0.0015 (0.0019)	0.028 (0.0012)	0.0011 (0.0003)
RG1* state	0.023** (0.0042)	0.017** (0.0042)	0.012** (0.0031)	0.011* (0.0021)	0.0029 (0.0031)	0.0009 (0.0014)
Constant	-0.022** (0.0053)	-0.019** (0.0046)	-0.021** (0.0053)	-0.006** (0.0028)	-0.017* (0.0052)	-0.003* (0.0019)
Country effects	0.011** (0.0042)	0.021** (0.0028)	0.033** (0.0073)	0.009** (0.0031)	0.018** (0.0006)	0.021** (0.0051)
Year effects	Yes	Yes	Yes	Yes	Yes	Yes
AR(1); <i>p</i> -value	0.0436	0.0621	0.0254	0.0741	0.0482	0.0751
AR(2); <i>p</i> -value	0.634	0.571	0.761	0.632	0.551	0.451
Sargan test; <i>p</i> -value	0.322	0.234	0.315	0.262	0.372	0.309
Hansen test	0.698	0.619	0.645	0.458	0.572	0.413
Observations	552	552	344	344	208	208

Note(s): Table 9 reports the results of the GMM regression. The dependent variable is bank risk, measured by loan loss reserves (LLR) and loan loss provisions (LLP). The independent variables include risk governance, risk disclosure (types of risk), ownership structure and the interaction term risk governance $\times$ ownership structure. Separate regression results are also presented for conventional and Islamic banks. *, ** and *** denote statistical significance at the 10, 5 and 1% levels, respectively. Figures in parentheses are robust standard errors

Source(s): Table by author

As reported in Table 10 (Models 1 and 2), the relationship between risk governance and bank risk varies by size. In large banks, which operate in more complex markets, strong governance frameworks are associated with increased risk-taking, likely due to better tools for strategic risk management. In small banks, the effect is weaker, as governance tends to emphasize compliance over proactive risk-taking. Ownership structure also shows size-dependent effects. Ownership concentration is negatively associated with risk, especially in small banks where dominant shareholders exert direct control. Conversely, institutional and foreign ownership increase risk, particularly in large banks where these stakeholders exert stronger influence. State ownership has no significant impact in either group. Risk disclosure reduces risk across the board but is more effective in small banks, where transparency compensates for limited governance capacity. Interaction effects further reveal that ownership structure and risk disclosure shape the governance–risk link differently across size groups. In small banks, ownership concentration enhances the risk-mitigating roles of both governance and disclosure, while institutional and foreign ownership in large banks amplify risk and diminish the stabilizing effect of disclosure.

We also examine heterogeneity by risk governance level, splitting the sample into high and low RGI banks (Table 10, Models 3 and 4). In high-RGI banks, governance surprisingly correlates with greater risk-taking, possibly reflecting more sophisticated, calculated risk strategies. Here, ownership concentration modestly reduces risk, while institutional and foreign ownership increase it. Risk disclosure still reduces risk but with a weaker effect, as these banks already have robust control systems in place. In contrast, low-RGI banks show a weaker positive relationship between governance and risk. In these banks, ownership concentration plays a stronger risk-reducing role, compensating for weak governance. Institutional and foreign ownership continue to raise risk, though less significantly and disclosure exerts a stronger mitigating effect due to its role in offsetting governance deficiencies.

Overall, our findings suggest that stronger governance does not inherently reduce risk. High-RGI banks may pursue more informed risk-taking, while low-RGI banks rely more on concentrated ownership and disclosure to control risk. Interaction effects underscore the importance of contextual factors: ownership concentration mitigates risk more effectively in weak governance settings, while institutional and foreign ownership tend to elevate risk, especially where governance is already strong.

5. Conclusion

Diverging from prior research, this study constructs an empirical framework to elucidate the relationship between risk governance and banks' risk-taking behavior. Through the analysis of data including both conventional and Islamic banks in GCC countries, our study seeks to illuminate not only the direct impact of risk governance on bank risk-taking, but also the moderating role of ownership structure on the mediating effect of risk disclosure in shaping bank risk behavior.

Our findings indicate that risk governance in GCC banks, particularly conventional banks, tends to increase bank risk, which may seem counterintuitive at first. However, this result aligns with observations from the 2008 financial crisis in US and European banks, where weak enforcement of risk governance mechanisms and moral hazard led to excessive risk-taking. This phenomenon can be explained by the alignment of interests between managers and shareholders, as managers are incentivized to adopt a less conservative approach and take on higher risk to maximize shareholder wealth (Laeven and Levine, 2009). Nevertheless, the findings from our subset analysis suggest that this phenomenon applies to conventional banks but does not extend to Islamic banks. Additionally, our examination of the mediating role of risk disclosure reveals that its implementation mitigates the positive relationship between risk governance and bank risk-taking. Furthermore, our investigation reveals that risk disclosure fulfills a complete mediating role in the relationship between risk governance and bank risk for Islamic banks, while it acts as a partially mediating factor for

Table 10. Effect of risk governance on bank risk: the role of size and risk governance levels using the GLS technique

Explanatory variables	Z-score		Z-score	
	Large banks Model 1	Small banks Model 2	High RG level Model 3	Low RG Level Model 4
Intercept	1.422*** (3.16)	0.951** (2.51)	1.115** (2.56)	1.328** (2.13)
Risk governance (RGI)	-0.025** (2.34)	-0.007 (1.73)	-0.015** (-2.52)	-0.024 (-1.72)
Concentration (CONC)	0.011* (1.98)	0.034** (2.19)	0.007 (1.38)	0.014** (2.32)
Institutional shareholders	-0.033** (2.26)	-0.005 (0.92)	-0.028** (-2.44)	-0.004 (-0.94)
Foreign shareholders	-0.009* (-1.99)	-0.015 (-1.42)	-0.017** (-2.19)	-0.012** (-1.61)
State shareholders	0.013 (0.72)	0.006 (1.03)	0.021 (1.37)	0.009 (0.82)
CONC* RGI	0.022* (1.98)	0.018** (2.44)	0.006 (1.69)	-0.024* (-1.99)
Institutional* RGI	-0.009** (-2.26)	-0.003 (-1.33)	-0.004** (-2.15)	-0.016 (-0.92)
Foreign* RGI	-0.028** (-2.42)	-0.014 (-0.74)	-0.017** (-2.39)	-0.004 (-1.03)
State* RGI	0.007 (1.52)	0.022 (1.24)	0.032 (1.56)	0.011 (0.54)
Risk disclosure (RDI)	0.019 (1.37)	0.017** (2.38)	0.007 (1.37)	0.018** (2.44)
CONC* RDI	0.005 (0.92)	0.029** (2.13)	0.025 (1.72)	-0.028* (1.99)
Institutional* RDI	0.014** (2.57)	0.002 (1.46)	0.012 (1.43)	0.002** (2.19)
Foreign* RDI	0.024* (1.97)	0.009 (0.29)	0.007** (1.48)	0.012** (2.46)
State* RDI	0.007 (0.67)	0.003 (1.26)	0.035 (0.96)	0.005 (1.82)
Control variables	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes
Country dummy	Yes	Yes	Yes	Yes
Overall R ²	0.513	0.424	0.483	0.375
Wald chi2	45.81***	39.32***	41.57***	37.74**
Observations	215	337	243	309

Note(s): Table 10 reports the results of the GLS regression. The dependent variable is bank risk, measured by Z-score. The independent variables include risk governance, risk disclosure, ownership structure and the interaction term RGI × ownership structure and the interaction term RDI × Ownership Structure. Separate regression results are also presented by bank size and risk governance level. *, ** and *** denote statistical significance at the 10, 5 and 1%

Source(s): Table by author

conventional banks. This heterogeneity across banks can be attributed to disparities in regulatory frameworks, cultural contexts and the inherent operational structures specific to each banking model. The results of the *moderated-mediation analysis* indicate that the mediating effect of risk disclosure on the relationship between risk governance and bank risk varies depending on the ownership profiles. Specifically, while enhanced disclosure is linked to reduced risk-taking, this impact is weaker in instances of government ownership and strongest when blockholders, foreign shareholders or institutional investors are present. Finally, the investigation into the moderating role of ownership structure reveals that higher ownership concentration, along with increased institutional and foreign ownership, moderates the impact of risk governance practices in conventional banks, leading to reduced risk-taking behavior. However, in Islamic banks, this interaction is not significant, indicating no moderating effect.

Our findings have important implications for managers, shareholders and regulators, especially in developing countries with dual banking systems. Bank managers should strengthen risk governance and disclosure, aligning executive incentives with long-term stability. Conventional banks need enhanced board oversight and real-time risk reporting, while Islamic banks should modernize governance and disclose Shari'ah-specific risks. Ownership structures should support accountability, leveraging institutional investors in conventional banks and ethically aligned blockholders in Islamic banks. Shareholders should promote governance reforms that enhance risk management, tailored to ownership structures, fostering long-term stability and value creation. Regulators must enforce rigorous governance standards and standardized risk disclosures, adapting frameworks to the business model. Executive compensation should link to stability metrics, and governance audits should ensure Shari'ah compliance in Islamic banks. Standardized disclosure ratings, periodic supervisory reviews and penalties for governance lapses can reinforce accountability and mitigate systemic risks.

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