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The Dynamics of Corporate Governance and Risk Management in the Banking Sector of Pakistan

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Abstract: In this article, the perspectives of India and China's interaction are examined. Throughout the last fifteen years, the intricate character of India and China's ties has been clear: from promises of unending kinship to a border This study aims to assess the impact of corporate governance (CG) on risk management (RM) in the banking industry. The research focuses on the implementation of strong corporate governance practices to enhance efficiency, ensure compliance with laws and moral principles, and safeguard stakeholder interests. The study utilizes a quantitative research design and empirical data to analyze the relationship between CG factors and risk management indicators. The variables considered include board independence, board size, audit committee, ownership concentration, firm size, and leverage. The findings reveal significant correlations between these variables and risk management, as measured by the Z-Score. The study contributes to the understanding of the role of CG in managing complex risks in the banking sector and emphasizes the importance of effective governance practices in ensuring financial stability and protecting stakeholders' interests.

Keywords: Corporate governance, risk management, board size, ownership structure.

1. Introduction

CG plays a crucial role in overseeing a company's activities and overall operations, including its internal systems and management. The CG functions involve establishing effective relationships between the company's control system, shareholders, stakeholders, and the responsibilities of its board of directors (Rasheed et al., 2019). According to Williamson (1988), robust CG practices significantly enhance the firm's performance (FP), while weak CG practices lead to decreased investor interest and discourage investments. Additionally, Bhagat and Bolton (2008) reported a positive impact of CG on FP and vice versa. According to Naciti et al., (2020), the concept of CG involves a diverse range of policies and procedures that provide direction to decision-making processes. This framework functions as a guide towards accomplishing the objectives of the organization, delineating essential actions and evaluating the outcomes attained (Alemu, 2021).

The term "CG" refers to an organization's collection of rules and procedures for making decisions. It lays out what has to be done and how success will be determined, making it a vital tool for every business. Simply said, CG is an all-encompassing management and oversight structure that promotes openness, honesty, and integrity across an organization. Since the global financial crisis (GFC) of 2007-08, CG has taken on a greater role in the banking sector. Liquidity dried up as a consequence of the crisis, which had far-reaching impacts on financial markets throughout the globe. (Cheffins, 2009) was precipitated by the collapse of the US sub-prime mortgage market. Greuning (2004) Simpson (1999), Prowse (1997), and others note that the Global Financial Crisis (GFC) revealed the weaknesses of financial institutions and emphasized the necessity for strong RM processes and efficient CG procedures. Financial institutions in Pakistan have boosted their spending on information technology (IT) infrastructure, product development, and innovation in order to stay competitive in the face of rising market demands (Elamer et al., 2020). Short-term, high-risk investments are being replaced with long-term low-risk ones, as banks diversify their investment portfolios. However, questions have been raised about banks' capacity for prudent investment portfolio management and sustained financial health, especially in times of economic turmoil (Reyad et al., 2013).

Issues of CG, RM, bank characteristics, and financial performance are of paramount importance due to the role commercial banks play in the financial intermediation process. Legislative and regulatory actions have been adopted to remedy the shortcomings in RM and CG processes. The Basel Committee on Banking Supervision is responsible for a number of agreements that seek to strengthen the financial sector as a whole. Capital adequacy, risk management, and disclosure requirements were addressed in Basel II in 2004, while capital, leverage, financing, and liquidity were stressed in Basel III in 2010. Basel I was published in 1988 and concerned itself with credit/default risk. The State Bank of Pakistan has taken action to improve commercial banks' CG and RM practices. Throughout its history, it has produced prudential recommendations and revised CG regulations in an effort to improve the CG process in domestically active businesses. To delve deeper into the current landscape of CG and RM in the banking sector, it is essential to explore recent studies and scholarly works that shed light on the topic.

1.1 Research Objective

1. To examine how board size influence RM.
2. To examine how ownership concentration influence RM.
3. To examine how board independence influence RM.
4. To examine how audit committee influence RM.

2 LITERATURE REVIEW

Theoretical Background

2.1 Agency Theory and CG

In accordance with agency theory, there exists the possibility that managers of companies may prioritize their personal interests above the interests of the shareholders they represent. Consequently, it becomes imperative to establish mechanisms that oversee and control management actions, ensuring their alignment with shareholder interests and compliance with established regulations, policies, and directives. These mechanisms, often referred to as agency costs, encompass various measures such as generating clear financial reports, covering audit fees, and implementing internal controls. The concept of agency theory is extensively acknowledged as an accurate portrayal of real-world dynamics. Nevertheless, it is essential to acknowledge the possible agency problems that may arise due to the separation of management and corporate ownership, especially in publicly operated companies. To address these concerns effectively, the implementation of good governance practices rooted in agency theory (Jensen and Meckling, 1976) assumes a vital role in mitigating such issues. The primary objective of these governance practices is to manage managerial decisions in the best interest of the shareholders, ultimately fostering an environment where the agency conflicts are minimized.

The agency theory serves as a theoretical foundation for this investigation of banking industry, CG and risk management. Organizational principals (shareholders or owners) and organizational agents (management or board of directors) are the focus of agency theory. The agency theory state that shareholders provide managerial personnel discretionary autonomy in order to increase the firm's value. However, as principals and agents may have different motivations and information needs, a conflict of interest may arise. Managers' self-interest or reckless actions might have a detrimental effect on shareholder value.

2.2 CG and RM in the Banking Industry

In Pakistan, CG plays a pivotal role in facilitating effective RM within the banking sector. By embracing principles such as transparency, accountability, and robust board oversight, banks can adeptly recognize and handle hazards, thus mitigating the likelihood of financial crises and ensuring stability in the industry. As risks in the banking sector continue to evolve in complexity, adopting sound CG practices becomes imperative for banks. It not only boosts their operational efficiency and regulatory compliance, but also safeguards the interests of stakeholders while upholding ethical standards. The implementation of CG practices involves concerted efforts from the government, public sector, and private sector, as proposed by Fernandes and Fresly (2017) in the GCG theory. Improving the execution and implications of CG is crucial for advancing the overall state of the banking system, given the ever-changing landscape of risks.

To uphold CG standards, it is essential to take various factors into account, such as:

- 1) Carrying out the obligations and tasks of executives and board members.
- 2) Ensuring full and accurate execution of responsibilities by the working groups and committees overseeing internal control functions.
- 3) Executing external and internal audits while establishing a compliance function.
- 4) Implementing risk mitigation tactics.
- 5) Effectively organizing loans to affiliated entities and allocating substantial provisions.
- 6) Creating and executing a well-thought-out strategy.
- 7) Ensuring openness regarding both financial and non-financial aspects allows companies to mitigate ethical breaches and enhance their overall performance.

CG shows a vital part in ensuring the strength and success of the banking system, as emphasized by the 2021 report by the World Bank. A comprehensive CG framework requires strong leadership, resilient RM systems, and well-defined strategies to attain organizational goals. The board of directors plays a central role in overseeing CG by establishing the bank's strategic direction, supervising and overseeing its activities while ensuring adherence to regulatory obligations. In Pakistan's banking industry, the effectiveness of RM is significantly influenced by CG. Altunbas et al. (2020) found a notable positive correlation between CG and RM practices in the country's banking sector. This research underscores the importance of sound governance in banks, as it improves their capacity to identify, assess, and mitigate risks, ultimately contributing to better financial outcomes and overall stability. Furthermore, Alkurdi et al. (2019) have also conducted research that sheds light on the impact of CG on RM in Pakistan's banking industry.

2.3 Elements of CG and Risk Management

Various empirical investigations shed light on numerous CG components and their impact on risk management, which has been duly observed. In the subsequent discussion, some of these elements are explored.

2.3.1 Board Size

According to various studies (Ajinkya, 2005; Karamanou and Vafeas, 2005), the effectiveness of a company's board of directors plays a vital role in enhancing the value and frequency of information provided to investors by the management. Verrecchia (2006) suggests that increased disclosure lower information asymmetry within companies that have more efficient boards. Among the essential determinants of CG, the size of the board is a significant factor (Di Pietra et al., 2008). Interestingly, Yermack (1996) proposed a different viewpoint, suggesting that larger boards might be less competent than smaller ones in decreasing agency costs. However, this efficiency aspect might differ in firms with higher ownership attention, where larger boards could be more successful in resolving conflicts of interest between insiders and outsiders (Di Pietra et al., 2008). Recently, Allegrini and Greco (2013) have raised a

pertinent question about the influence of larger boards on the levels of disclosure. Understanding this relationship is crucial in the context of reducing information asymmetry and improving CG practices. As such, the role and functioning of a company's board of directors remain a critical area of research and interest in the field of CG.

2.3.2 Board Independence

Adhering to CG principles, the inclusion of independent directors on a company's board can play a crucial role in mitigating conflicts of interest between managers and investors. These independent directors, being impartial and unaffiliated with either party, offer unbiased advice that benefits the overall health of the company (Patelli & Prencipe, 2007). Furthermore, the presence of independent directors could serve as a driving force towards promoting greater transparency through voluntary disclosure. This serves to determine their lack of involvement with company insiders and their dedication to enhancing the business's market reputation. Scholars have extensively explored the link between board composition and the level of volunteer disclosure. Notable research by Ajinkya et al. (2005) and Karamanou & Vafeas (2005) has delved into how the number of independent directors on a board and the over-all board excellence can impact the extent of corporate information disclosure. Findings from various studies, including those conducted by Ajinkya et al., (2005) and Forker (1992), consistently indicate a direct relationship between board independence and the extent of corporate discovery. Additionally, Donnelly and Mulcahy (2008) discovered that the presence of non-executive directors on a board leads to a notable increase in voluntary disclosures. Companies with independent directors, in comparison to other types of firms, demonstrate a higher willingness to disclose information. This positive association between independent directors and mandated disclosure is further supported by research such as Gul and Leung's study in 2004 and Romano and Guerrini's (2014) investigation of Italian listed businesses between 2002 and 2010.

2.3.3 CEO Duality

According to various researchers, the presence of CEO duality in companies may lead to reduced levels of disclosure, as proposed by Fama and Jensen (1983) and Finkelstein and D'Aveni (1994). Worrell et al. (1997) conducted a study showing that the stock market reacts negatively to CEO duality statements, suggesting a potential weakening of the board's monitoring function. On the other hand, different studies, such as those by Finkelstein and D'Aveni (1994) and Gul & Leung (2004), have found a connection between CEO duality and adverse effects on disclosure. Cerbioni and Parbonetti (2007) have also identified indicators pointing to a negative association between power concentration, voluntary disclosure, and intellectual capital. Recent studies in both Italian and UK contexts, like the one conducted by Allegrini and Greco (2013), support the idea that CEO duality may have an adverse impact on the volunteer disclosure of general or forward-looking information. CEO duality remain inconclusive there are signs of detrimental effect the contribution of Wang & Husainey (2013).

2.3.4 Dividend Policy

Agency theory reports that dividends can be used to mitigate agency conflict between share- holders and managers (Jensen 1986). Fluck (1998, 1999) examine that dividend distribution could help resolve disagreements between the insiders and outsiders of a firm. Moreover, investors receiving dividends may show less concern about a firm's risk disclosure, making dividends a viable substitute for risk disclosure (Fluck, 1998). Empirical studies, like the one conducted by Mancinelli and Ozkan (2006) on Italian companies, indicate that firms with a higher percentage of voting rights held by the largest shareholder tend to make lower dividend payouts. This finding suggests a potential connection between dividend policy, riskiness, and information asymmetry in companies. Fluck (1998) also highlights that dividends can serve as a risk premium distributed to shareholders, helping to alleviate agency costs. Consequently, a higher dividend payout may signify superior management practices within a corporate setting and reflect the influence of minority shareholders.

2.3.5 Concentrated Ownership Structure

When ownership and control become disconnected in public and private organizations, it gives rise to a principal-agent conflict, leading to inefficient capital utilization (Shleifer & Vishny, 1997). In cases where ownership is widely distributed among individual shareholders, there is often little motivation for them to actively oversee management, since the costs of monitoring may outweigh the potential benefits of improved performance. On the contrary, concentrated ownership can enhance management control and may foster a stronger inclination towards monitoring (Faccio & Lang, 2002). However, the separation of ownership and control in corporations not only

generates principal-agent problems but also exposes minority shareholders to the risk of value appropriation by controlling owners. A study by Brammer and Pavelin (2006) examining 450 UK firms revealed that corporations with extensively distributed ownership tend to provide more voluntary disclosures compared to those with more concentrated ownership structures.

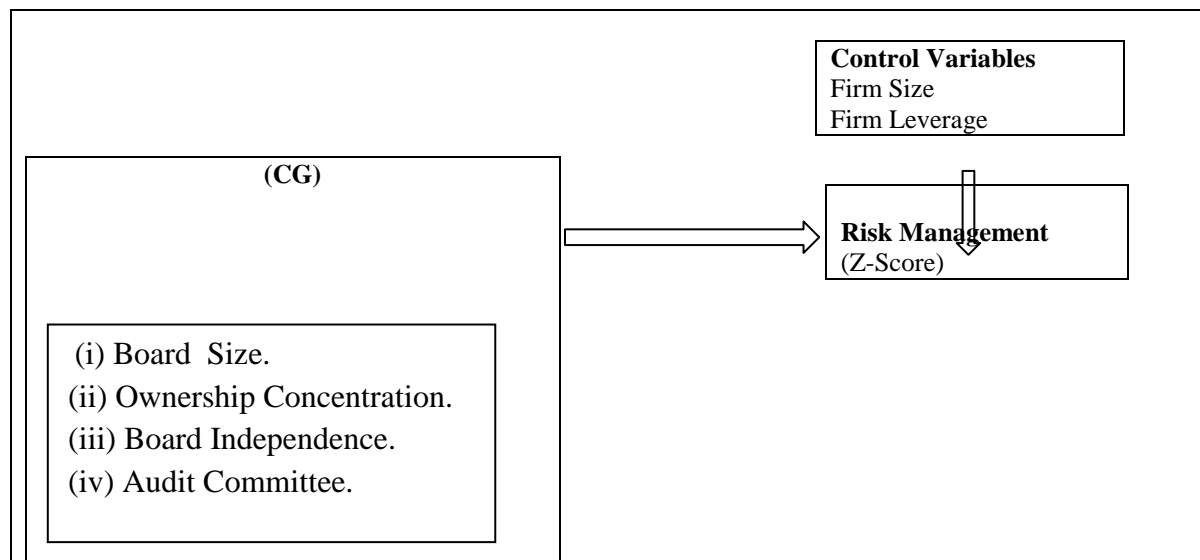
2.3.6 Audit Quality

To tackle agency costs, companies can adopt CG measures and choose to disclose information voluntarily. External audits play a crucial role in improving the accuracy of financial statements and reinforcing investor trust in the organization (Barako et al., 2006). As per the findings of (Frankel et al., 2002), independent auditors can successfully monitor and curtail management's ability to engage in earnings management activities, representing that higher audit quality is linked to improved CG practices and serves as a means to diminish agency costs.

In summary, to address agency costs, companies employ regulatory structures and voluntary disclosure based on agency theory. External audit firms play an important role in enhancing financial statement excellence and boosting investor self-confidence (Barako, Hancock, & Izan, 2006). The research conducted by Frankel, Johnson, and Nelson (2002) supports the notion that reliable and independent auditors can efficiently monitor and deter earnings management, highlighting the connection between high audit quality, better CG practices, and reduced agency costs.

2.4 Theoretical Framework

The subsequent conceptual framework is built upon the preceding literature review. The left section of this framework represents the independent variables of the study, while the right side displays the dependent and control variables considered for the investigation.



The following anticipated hypotheses could be derived from a thorough review of the existing literature:

H1: There exists a significant correlation between Z-Score and Board Size.

H2: A significant correlation is expected between Z-Score and Board Independence.

H3: Z-Score is anticipated to exhibit a significant correlation with Audit Committee.

H4: A significant correlation is expected to be observed between Z-Score and Ownership Concentration.

3. METHODOLOGY

3.1 Research Design

This research utilizes a descriptive research approach to explore the influence of the independent variable on the dependent variable. To achieve its objectives, this research employs a quantitative research design, focusing on the quantitative examination of these objectives. A reputable scholarly source, Creswell (2014), is referenced in this study. The methodology segment provides a detailed description of the impact of CG on RM.

3.2 Population

The study's population encompasses the entirety of commercial banks operating in Pakistan, representing the field from which data is gathered.

3.2 Sample

A representative sample, capturing a subset of the overall population under investigation, is meticulously chosen utilizing a sampling method. Employing sampling techniques tends to yield more accurate outcomes compared to conducting censuses. The study focused on nine prominent commercial banks in Pakistan, namely Habib Bank Ltd (HBL), National Bank of Pakistan (NBP), United Bank Ltd (UBL), Muslim Commercial Bank Ltd (MCB), Allied Bank Ltd (ABL), Bank Alfalah Ltd, Bank Alhabib Ltd, Askary Bank Ltd, and Meezan Bank Ltd. The sample is selected using a purposive sampling technique, with the specific banks being chosen due to their significant role and representation within the nation's banking industry.

3.3 Variables

3.3.1 Dependent Variable

RM

In this investigation, our focus centers around the Z-Score as the dependent variable, derived from the seminal work of Boyd and Graham in 1986. Their research delved into Z-Score and its association with failure risk, concluding that lower Z-Scores correspond to elevated probabilities of higher risk, while higher Z-Scores indicate lower risk probabilities. Mathematically Z-Score is as under:-

$$Z\text{-score} = \left[\frac{ROA + E/A}{SDROA} \right]$$

In this research, we examine four independent variables, which are follows:

3.3.2 Independent Variables

3.3.3 Board Independence

Beasley's (1996) research and Rosenstein and Rosenstein (1997) findings highlight the direct involvement of external directors and their impact on board independence. Likewise, Core et al. (1999) have reported adverse consequences associated with the presence of outside directors on the board. To assess board independence, we conduct an analysis of the percentage of external board members.

3.3.4. Board Size

Yermack's study in 1996 examined board size and found a notable negative correlation. Likewise, Spencer Stuart's investigation in 2008 also indicated adverse effects associated with larger boards. Both studies yielded consistent results. In our own research, we will employ the number of Boards as our chosen metric to gauge board size, building upon their findings.

3.3.5 Audit Committee

The significance of calculating organizational risks cannot be overstated. The Audit committee's pivotal role within firms is to maintain independence, free from any interference from management and boards. This committee is composed of external representatives who dutifully fulfill their responsibilities. As part of our study, we will investigate the composition of this committee.

3.3.6 Ownership Concentration

Ownership concentration exhibits a positive correlation with firm risk. When individual ownership stakes increase, firm performance tends to diminish. Research conducted by Claessens and Djankov (1999) demonstrates that enhanced ownership concentration in Czech firms leads to positive impacts on profitability and labor productivity. Similar findings were observed by McConnell and Servaes (1990) and Nguyen (2011), who discovered a positive relationship between ownership concentration and risk management. Javid and Iqbal (2008) also identified a significant association between these variables. For our study, we measure ownership concentration based on the total percentage of shareholdings held by the top-5 and top-10 shareholders in each bank.

3.3.7 Control Variable

3.3.8 Firm Size

Based on the research conducted by Ltifi & Hichri (2022), it is evident that various factors play a role in determining a firm's value, but a significant indicator of its net worth is its net assets. These studies highlight that assets serve as a representation of a company's financial resources. To determine the firm's size, the logarithm of total assets is used in this calculations.

3.3.9 Firm Leverage

Leverage, as defined by previous research conducted (Pandey et al., 2004), refers to the extent to which a company utilizes debt in order to fund its assets. Within the scope of our investigation, we measure leverage by dividing the total debt of the company by its overall assets.

3.3.10 Data Collection

The process of data collection is a crucial element in conducting research, as it provides the groundwork for exploring the research objectives and aims (Couper, 2017). In this Paper, secondary data is utilized, and Z-Score measures, Financial metrics, including net profit, total assets, equity, and the logarithm of total assets, were derived from the income statement and balance sheets of commercial banks, accessible through The State Bank of Pakistan's authorized website. Additionally, relevant CG factors like board size, board independence, ownership concentration, and audit committee information are extracted from the annual reports of selected banks. The data was collected over a period spanning from 2012 to 2021.

4 RESULTS

Descriptive Statistics.

Presented below are the findings from the descriptive analysis.

Table1: Descriptive Statistics

Variables,	Mean	Std. Deviation	Min	Max
Z score.	136.7270	149.5508	-26.56502	633.5131
BS.	9.555550	1.960916	6	13
BI.	4.688880	2.734073	0	12
AC.	3.988880	.7569074	2	6
OC.	0.834777	.1461042	.364305	.984028
FS.	6.072118	.2631158	5.438443	6.635229
FL.	.1639411	.0580671	.0232	.3034

The above table presents the statistical analysis results for various variables, including board size, audit committee, board independence, black holder firm size, and firm leverage. Regarding RM (z-score), the data indicates a range from -26.56 to 633.51, with a mean value of 136.72. The average board size is 9.5, ranging from 6 to 13. Board independence, on the other hand, has a mean value of 4.6, ranging from 0 to 12. The average value for the audit committee is 3.9, and the black holder's mean is 0.834. Additionally, the mean firm size is calculated to be 6.07, and the firm leverage has an average value of 0.163.

Correlation analysis

The results of correlation analysis are given below.

Table 2: Correlation Analysis.

Variables.	Z score	BS	BI	AC	OC	FS	FL
Z score	1.0000						
BS	-0.2118	1.0000					
BI	0.0235	0.7829	1.0000				
AC	0.2909	0.1632	0.1395	1.0000			
OC	-0.4062	-0.1579	-0.4062	0.0724	1.0000		
FS	-0.1703	-0.3740	-0.2306	0.0499	0.2083	1.0000	
FL	0.1559	-0.5189	-0.3662	0.0472	0.2373	0.4627	1.0000

The result of correlation table shows a strong positive correlation between BI, and AC, the Z score is 1, and the board independent and audit committee. Same is the case a moderate positive Correlation between FS and BI, as well as FS and audit. On the other hand, board size and RM exhibit a negative but positive correlation, implying that a change in one may have a negative impact on the other variable (RM). Another variable with a negative correlation to Z-Score is firm size, with a value of -0.1703. Additionally, board independence and firm size share a weaker adverse correlation, while black holder and audit display a weak negative correlation as well.

Diagnostic Test**1 Normality Test**

Jarque-Bera normality test. 10.60 Chi (2) 0.005

Jarque-Bera test for Ho normality.

2 Multicollinearity Test

Table.3: Multicollinearity Test

Variables	VIF	1/VIF
BS.	3.270	0.306030
BI.	2.630	0.380781
FS.	1.350	0.740713
FL.	1.610	0.621338
OC.	1.090	0.920936
AC.	1.070	0.937188
Mean VIF.	1.830	

An examination is conducted to assess the normality of the data and the presence of multicollinearity. The purpose of this test was to ascertain whether variables within the dataset is correlated, potentially leading to issues in subsequent hypothesis testing. The Variance Inflation Factor (VIF) values for each variable, namely Board size, board independence, firm leverage, firm size, black holder, and Audit committee, is found to be 3.27, 2.63, 1.61, 1.35, 1.09, and 1.07, respectively, all of which are below the threshold of 10. Additionally, all p-values were less than 10, indicating a moderate level of multicollinearity, which is considered normal and not severe. As a result, there is no necessity to exclude any explanatory variable from the analysis.

Heteroskedasticity Test

White's test for Ho. Homoscedasticity, against Ha unrestricted heteroskedasticity.

$$\chi^2(27) = 44.040$$

$$P > \chi^2 = 0.02050$$

Table 4: Cameron & Trivedi's decomposition of IM-test

Source	Chi2	Df	p
Heteroskedasticity.	44.040	27.0	0.0205
Skewness.	12.190	6.00	0.0578
Kurtosis.	3.480	1.00	0.0621
Total.	59.710	34.0	0.0042

After analyzing the aforementioned results, it is evident that the P-value of the P.chi-square test conducted on the white test falls below .05. This significant result leads to the rejection of the null hypothesis (H0) in favor of the alternative hypothesis, indicating the presence of heteroscedasticity in this particular model.

Regression Analysis

Following are the outcomes from the model summary of regression analysis.

Table5: Model Summary

F(0.6, 83)	Prob > F	R-squared	Adj R-squared	Root MSE
14.960	0.000	0.5190	0.4840	107.340

Results of ANOVA Table

Table6: ANOVA

Source	SS.	Df.	MS.
Model.	1034211.3	6	172368.55
Residual.	956312.968	83	11521.843
Total.	1990524.27	89	22365.4412

Below is the table of coefficients.

Table7: Coefficients

Z Score	Coef.	Std. Err.	T	P> t .	[95% Conf. Interval]	
BS	-57.2530	10.48870	-5.460	0.0000	-78.1155	-36.392
BI	27.2090	6.744010	4.030	0.0000	13.7962	40.623
AC	63.93790	15.52770	4.120	0.0000	13.7962	40.623
OC	-411.480	81.14990	-5.070	0.0000	-572.891	-250.08
FS	-203.9670	50.24510	-4.060	0.0000	-303.903	-104.03
FL	501.3320	248.5830	2.020	0.0470	6.90954	995.754
Cons	1801.020	322.2060	5.590	0.0000	1160.16	2441.87

The results of the t-tests conducted on each independent variable are as follows: a) Board size yielded a t-count of -5.46, which is greater than the critical t-table value of 1.99, and the associated p-value is found to be 0.000, which is less than the significance level of 0.05. These findings indicate that Board size has a significantly negative impact on RMin banking institutions, leading to the acceptance of hypothesis H1. b) Board Independence produced a t-count of 4.03, surpassing the critical t-table value of 1.99, and the p-value is determined to be 0.000, which is lower than 0.05, signifying statistical significance. This indicates that Board Independence has a significant positive effect on Risk Management, leading to the acceptance of hypothesis H2. c) The Audit committee yielded a t-count of 4.12, exceeding the critical t-table value of 1.99, and the p-value is calculated to be 0.000, less than the significance level of 0.05. These findings suggest that the Audit committee has a significant positive effect on the Z-Score, leading to the acceptance of the hypothesis. d) Firm size resulted in a t-count of -5.06, which is higher than the critical t-table value of 1.99, and the p-value was determined to be 0.000, lower than 0.05, indicating statistical significance. This implies that Firm size has a negative and significant effect on the Z-core, leading to the acceptance of hypothesis H3. e) Firm leverage yielded a t-count of 2.02, which exceeds the critical t-table value of 1.99, and the associated p-value found to be 0.000, less than the significance level of 0.05. These findings suggest that Firm leverage has a positive and significant effect on the Z-score, leading to the acceptance of hypothesis H4.

Random Effect

Random-effects GLS. regression.	Number of obs. = 90.00
Group variables: ID	Number of groups = 9.00
R-sq: within = 0.12060	Obs per group: min. = 1.00
between = 0.93470	avg = 10.00
Overall = 0.51950	max = 10.00
Wald chi2(6) = 84.630	corr(u_i, X) = 0 (assumed)

Prob > chi2 = 0.000

Table 8: Random Effect.

Z-Score	Coef..	Std. Err.	Z	P> z	[95% Conf-Interval]	
BS	-56.97820	10.58145	-5.38	0.000	-77.71750	-36.23890
BI	26.81040	6.778592	3.96	0.000	13.52460	40.09620
AC	63.93790	15.52779	4.01	0.000	32.28460	94.16640
OC	-411.4870	81.14998	-4.93	0.000	-565.0140	-243.650
FS	-203.9670	50.24513	-3.97	0.000	-301.9130	-102.4630
FL	501.3320	248.5834	1.90	0.058	-15.5020	968.3310
Cons	1801.020	322.206	5.50	0.000	1152.850	2427.960

sigma_u.	7.9957100
sigma_e.	94.904240
Rho.	0.00704800

The significance of $p < 0.05$ indicates the presence of Heteroskedasticity issue.

Random and fixed effects models are employed to address the issue of heteroskedasticity.

Fixed Effect

Fixed-effects (within) regression. Number of obs = 90.00
 Group variable: ID Number of groups = 9.00
 R-sq: within = 0.1772 Obs per group: min = 10.00
 between = 0.5332 avg = 10.0
 overall = 0.3342 max = 10
 F(6,75) = 2.69
 corr(u_i, Xb) = 0.3457 Prob > F = 0.0202

Table 9: Fixed Effect

Z Score	Coef.	Std. Err.	T	P> t	[95% Conf. Interval]	
BS	-33.80263	17.32349	-1.95	0.055	-68.31278	.7075285
BI	-33.80263	7.618213	2.03	0.046	.2533603	30.60588
AC	13.78299	25.75292	0.54	0.594	-37.51945	65.08543
OC	-132.3298	108.1401	-1.22	0.225	-347.7561	83.09637
FS	-161.6531	66.42978	-2.43	0.017	-293.988	-29.31824
FL	-152.9408	315.2526	-0.49	0.629	-780.9563	475.0746
Cons	1449.52	387.9324	3.74	0.000	676.7195	2222.321

sigma_u	96.049490
sigma_e	94.904240
Rho	94.904240

Upon conducting the F test to assess the equality of all u_i (coefficients) being zero, the results indicate that F (8, 75) is equal to 3.90, with a corresponding probability (Prob > F) of 0.0007. Analyzing the Fixed Effect table, it

becomes evident that the R-square value is 0.330, indicating that 33% of the variance in the dependent variable can be attributed to the included variables. Additionally, the F value of 2.69, which falls below 10, suggests a lower level of significance. Furthermore, with a p-value less than 0.05, the null hypothesis is rejected.

Hausman Test for Random.

Table 10 Coefficients

Variables.	(b). Random	(B)	(b-B) Difference
BS	-56.978260	-33.80263	-23.17563
BI	26.810490	15.42962	11.38087
AC	26.810490	13.78299	49.44256
OC	-404.3340	-132.3298	-272.0044
FS	-202.1880	-161.6531	-40.53523
FL	476.4140	-152.9408	629.3552

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\chi^2(6) = (b-B)'[(V_b - V_B)^{-1}](b-B) = -38.70 \quad \chi^2 < 0 \implies$$

The applied model on this dataset does not meet the asymptotic assumptions required for the Hausman test. To ensure a more comprehensive evaluation, it is advisable to utilize the suest method. Additionally, the aforementioned observation indicates a p-value < 0.05, further highlighting the invalidity of the Hausman test and leading to the rejection of the Random Value.

Summary of Hypotheses

Below tables shows summary of the hypotheses.

H	Hypotheses	Result
H1., Z	The correlation between Score and Board Size is statistically significant.	Accepted
H2., Z	The correlation between Score and Board independence are significant.	Accepted
H3., Z	The correlation between Score and Audit Committee are statistically significant.	Accepted
H4., Z	The correlation between Score and Ownership concentration are statistically significant.	Accepted

Discussion

Chapter 4's analysis concentrates on validating the study's theories using balanced panel data, as it offers an advantageous approach for accurately estimating challenging-to-measure factors. To tackle potential endogeneity concerns, lagged values of independent and moderator variables are integrated. The examination of the relationship between selected components and the Z score employs the Fixed Effect technique. Descriptive statistics inaugurate the chapter, presenting means, standard deviations, minimum and maximum values of the variables under scrutiny, including RM (Z score), board size, board independence, audit committee, black holder ownership, firm size, and firm leverage.

Furthermore, the chapter conducts correlation analysis to evaluate interrelationships between the variables. Positive and robust correlations emerge between board size and board independence, as well as between board independence and the audit committee. Moderately positive correlations are found between firm size and board independence, and

firm size and the audit committee. Conversely, negative correlations are observed between board size and RM (Z score), and firm size and risk management.

Diagnostic tests are also incorporated. The Jarque-Bera test reveals that the data does not follow a normal distribution, while the multicollinearity test suggests a moderate level of multicollinearity among the explanatory variables, which is considered normal. Heteroscedasticity is detected through the heteroscedasticity test. Subsequently, regression analysis is conducted, commencing with a model summary and ANOVA table, followed by the coefficients table. The t-tests' outcomes indicate the significant influence of board size, board independence, audit committee, firm size, and firm leverage on the Z score.

To address heteroscedasticity, both the random effects model and fixed effects model are employed. Ultimately, the fixed effects model proves to be the better fit for the data, yielding an R-squared value of 0.3342. Lastly, the chapter concludes with the Hausman test, comparing the random effects and fixed effects models, which indicates the preference for the fixed effects model, signifying the substantial impact of individual-specific effects on the dependent variable.

Recommendations

Future investigations ought to consider a more comprehensive range of variables and industries to gain a more nuanced comprehension of the correlation between CG and risk management. This might involve the inclusion of supplementary variables and the examination of various industries to encompass a broader spectrum of governance practices and RM approaches. To validate the findings and extend their applicability to different contexts, it would be beneficial to replicate the study in other countries. Additionally, conducting comparative studies across countries can offer valuable insights into how cultural, legal, and institutional factors influence the relationship between CG and risk management. Longitudinal studies may also provide valuable awareness into the evolving association between CG and RM over time. Analyzing changes in governance practices and RM outcomes over an extended period can help researchers to identify trends and patterns that can guide future governance practices.

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