

RISK MANAGEMENT, COMPANY RISK, MODERATING ROLE OF BOARD GENDER DIVERSITY

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Abstract: *The study aims to determine the impact of corporate board risk management on the risks faced by the company, moderated by board gender diversity in non-financial corporations indexed on the Indonesian stock index during 2023. This study offers its novelty by focusing on Indonesian companies and examining the interaction of risk management variables and corporation risk as well as the role of diversity in board gender in Indonesia. This research sample consisted of 721 non-financial corporations indexed on the Indonesian stock exchange during 2023 and issued 2023 annual reports. This research found that management of risk conducted by the board negatively affects the risks faced by the company. Gender diversity moderates this relationship with mixed results. The presence of women has positive result and moderate the interaction between risk management and corporate risk while gender diversity in corporations board has negative result in moderating the risk management interaction with firm risk. The contribution of this study is to enrich the literature related to risk management and gender diversity in corporation board in the Indonesian context. It is also highlighted that regulator and companies need to maintain a certain level of female board members to avoid their negative impact on company risk management.*

Keywords: Board Gender Diversity, Corporate Risk, Risk Management

INTRODUCTION

After facing the Covid-19 pandemic, the world is now dealing with higher tension caused by the Ukraine-Russian War and Middle East crisis in Palestina that disrupts the course of the economy. This situation is certainly a test for companies to ensure the sustainability of their business ([Tashfeen et al. 2023](#)). Therefore, companies must build resilience to face the challenges that arise and ensure their business continuity ([Lisdiono et al. 2022b](#)). One way to realize this is by implementing risk management.

The world has seen what happens when companies do not implement risk management properly. [Karim et al. \(2024\)](#) mentioned that many companies in Malaysia were forced to close due to poor governance, one of which was the lack of a role in managing the risk in the corporations. [Gennaro & Nietlispach \(2021\)](#) stated that the absence of a system in managing risk in the corporation was one of the factors behind the financial crisis that happened globally from 2007 to 2008. After this crisis, corporate governance, especially risk management, has

received more attention to prevent a similar crisis from recurring.

All companies incorporated as limited liability companies in Indonesia are required to abide by the arrangements of Law No. 40/2007 on Limited Liability Companies. In article 92 paragraph (1), there is a sentence that stated running corporation's business is the board of directors task and in article 108 paragraph (1), there is the sentence that stated the task of board commissioner is to providing advice to the board of directors and oversee the running of the corporation ([Republik Indonesia 2007](#)). From Law Number 40 of 2007, it can be seen that Indonesia adheres to a dual board system of governance where there is a separation between supervisory duties by the board of commissioners and business implementation duties carried out by the board of directors ([Setiawan et al. 2021](#)).

Law No. 40/2007 does not clearly regulate the function of risk management in the corporations. The management of the risk function is regulated in the Governance Guidelines in Indonesia issued by OJK in 2014. In this guideline, corporate risk management becomes the responsibility of board of commissioner and board of director ([Otoritas Jasa Keuangan 2014](#)). This OJK guidance is needed to ensure that companies can carry out their operational activities to achieve maximum results with certain risks ([Rashid, Akmal, and Shah 2024](#)).

To help companies minimize risks, various measures have been taken. These include tightening risk management implementation and placing women on boards. Risk management has been acknowledged as critical factor for companies to avoid the risk of bankruptcy ([Gennaro and Nietlispach 2021](#); [Alzayed, Batiz-Lazo, and Eskandari 2024](#)) and maintain the sustainability of the company ([Shehadeh, Alkayed, and Aly 2022](#); [Tashfeen et al. 2023](#); [Lisdiono et al. 2022a](#)). Various research have found that the risk management process in the company can reduce the risks

faced by the company ([Agustina et al. 2021](#); [Gennaro and Nietlispach 2021](#); [Karim et al. 2024](#); [Beasley et al. 2023](#)). On the one hand, female directors can provide innovation as well as tighter control in the company's activities due to their different perspective from male directors and their risk-averse nature, which ultimately plays a role in reducing risk ([Rodriguez, Dandapani, and Lawrence 2024](#); [Chatjuthamard, Jiraporn, and Lee 2021](#); [Poletti-Hughes and Briano-Turrent 2019](#); [Zheng and Wang 2024](#); [Abou-El-Sood 2021](#); [Jouber 2024](#)).

This research has been proposed to look at the impact of corporate board risk management on the risks faced by companies moderated by board gender diversity in companies other than financial companies indexed on the Indonesian stock index during 2023. This research defines risk management activities as an action taken by the company to prevent the company from failing to achieve its goals ([Lisdiono et al. 2022a](#)). This study examines whether robust risk management by the company's board can minimize the risks confronted by the corporation. This research also looks at whether board gender diversity can moderate the effects of risk management practices in companies.

Several reasons make this study significant. First, many have examined the risk management board's role in corporate risk management disclosure ([Agustina et al. 2021](#); [Lisdiono et al. 2022b](#)) but not many have examined the effectiveness of corporate risk management and compared it with other variables in the Indonesian context. This research chooses Indonesia because Indonesia's position as a developing country with unique institutional, regulatory, and corporate governance characteristics that differ from developed countries ([Joni et al. 2021](#)). Indonesia is also the largest economy among ASEAN and G20 members ([Naama 2021](#)), and this presents dynamic environment where risk management practices in corporations are still

evolving in response to global pressures and local regulatory reforms.

Second, research on the effect of diversity in gender on corporate boards on corporate risk management is usually conducted in countries that have already developed ([Chatjuthamard, Jiraporn, and Lee 2021](#); [Shehadeh, Alkayed, and Aly 2022](#); [Tashfeen et al. 2023](#)). Developed countries usually have a mature governance system and more standardized risk oversight. This is not the case in developing countries which still face high uncertainty and weaker enforcement from regulator to conduct risk management in their companies ([Pariela and Suparno 2024](#)). Also, literature that discusses the effect of diversity in board gender on corporate risk management in the context of developing countries, especially Indonesia, is still insufficient, which becomes the gap for this type of research to be conducted in developing countries, especially Indonesia.

Some contributions are made by this research. This study's first contribution is the addition of literature on the efficacy of corporate risk management in the Indonesia environment. Second, contribution made by this research with adding the research literature regarding the effects of diversity in gender of corporate board on corporate risk management in the context of developing countries, especially Indonesia. Third, this research can provide insight to stakeholders to create legislation that incorporates the research results as a form of protection to companies and investors. This is because Indonesia does not yet have a specific law that regulates the formation of risk management boards outside the banking and financial industry.

Risk Management Practice and Corporate Risk

The risk management practice interaction with corporate risk can be understood by using agency theory and resource dependency theory. According to agency theory, the divergence in interests of principals

(shareholders) and agents (manager) can result in dispute between them ([Karim et al. 2024](#)). Establishment of mechanisms such as board oversight and risk management committees is often used to reduce agency conflicts and costs ([Agustin and Andryanto 2023](#)). Monitoring of managerial behaviour is enabled by employing these structures, and this action thereby limits opportunistic actions and encourages decisions that align with shareholder interests ([Karim et al. 2024](#); [Agustina et al. 2021](#)).

Alongside with agency theory, resource dependency theory highlighted the importance for corporate boards to secure the external resources critical to organizational success. According to this theory, self-sufficiency is impossible for corporations, so they need to interact with external environments to acquire funding, expertise, and innovative practices ([Pfeffer and Salancik 1978](#)). A crucial role is played by the board of directors, particularly those with strategic networks and experience, in reducing organizational uncertainty by accessing these vital resources ([Muhammad, Migliori, and Mohsni 2023](#)). As such, effective risk management by the board is also a way to maintain external confidence and enable continued resource inflows ([Fernando et al. 2023](#); [Shehadeh, Alkayed, and Aly 2022](#)).

Empirical studies support the argument that implementation of risk management by the board has a significant impact on corporate risk outcomes. [Beasley et al. \(2023\)](#) demonstrated that strong board supervision in risk-related matters reduces the likelihood of financial reporting errors, such as earnings manipulation or material misstatements. [Rehman et al. \(2021\)](#) showed that independent boards who are active in risk mitigation efforts contribute to improved financial performance by managing operational uncertainties. Similarly, [Gennaro & Nietlispach \(2021\)](#) emphasize the strategic importance of integrating risk management functions within governance structures to avoid financial distress or business failure. [Lisdiono et al. \(2022a\)](#) stated that risk management practices negatively

reduce corporate risk since corporations with robust risk management have higher resilience compared to corporate that do not.

Furthermore, dedicated risk committees have been established to increase transparency and build investor trust. [Agustina et al. \(2021\)](#) found that boards with formal risk oversight mechanisms tend to disclose risk-related information more effectively. [Escandon-Barbosa & Salas-Paramo \(2024\)](#) and [Mariscal-Caceres et al. \(2024\)](#) also noted that sound risk governance enhances corporate sustainability by reducing liquidity risk and ensuring ethical operations.

In light of these theoretical insights and empirical findings, risk management practice in this study refers to board-level actions aimed at identifying, assessing, and monitoring corporate risk. Risk management practice will reduce corporate risk, which may affect financial performance ([Beasley et al. 2023](#); [Escandon-Barbosa and Salas-Paramo 2024](#); [Rehman et al. 2021](#)). Therefore, we hypothesize the following.

H₁: Risk management practice negatively affected company risk

Board Gender Diversity and Risk Management Practice

Corporate boards benefit significantly from diversity in background, experience, and gender. One aspect of diversity that has received increasing attention is gender composition. [Mohsni et al. \(2021\)](#) argue that homogeneous boards may lead to idiosyncratic decisions due to limited debate and lack of contrasting perspectives. The presence of women on boards can break this pattern by introducing different viewpoints and enhancing board dynamics, ultimately leading to more balanced and effective corporate decisions ([Darmawan 2024](#)).

Psychological studies support the idea that compare to men, women are generally more risk-averse, which influences their behaviour in corporate settings. Women on boards are more likely to scrutinize managerial actions and

promote cautious strategic planning ([Chatjuthamard, Jiraporn, and Lee 2021](#)). This behavior encourages companies to establish safeguards and adopt more robust risk management frameworks, ultimately helping to mitigate risk exposure ([Poletti-Hughes and Briano-Turrent 2019](#)). The women's existence on the corporation board will also help increase venture risk to prevent the failure of corporate choices from affecting firm performance ([Poletti-Hughes and Briano-Turrent 2019](#); [Jouber 2024](#)). Therefore, the inclusion of women in boardroom decision-making may serve as a differentiating factor in driving sound risk governance ([Fernando et al. 2023](#)).

Other than that, several theories, such as resource dependency theory and upper-echelon theory, provide the ground for understanding the positive impact the women board offer to corporation. In resource dependency theory, according to [Pfeffer & Salancik \(1978\)](#), organizations must maintain external relationships to obtain necessary resources. In this context, the board of directors acts as a bridge between the company and its environment ([Jouber 2024](#)). A gender-diverse board not only enhances credibility with external stakeholders but also brings novel approaches to board deliberations and decision-making ([Aquir et al. 2023](#)). These benefits contribute to better risk assessment and resource management ([Muhammad, Migliori, and Mohsni 2023](#)).

Upper echelon theory further strengthens the rationale for gender-diverse boards in the context of risk oversight. This theory asserts that top management characteristics, including gender, shape organizational outcomes through their influence on decision-making ([Tashfeen et al. 2023](#)). Boards can do implementation of decisions which can minimize the probability of financial failure with diverse gender representation. Diversity of gender in corporate boards improves the boards capability to process complex information and this will assist them to make and

implement the decision to minimize probability of financial failure ([Tashfeen et al. 2023](#); [Aguir et al. 2023](#)).

Empirical evidence supports the theoretical claims regarding gender diversity and corporate risk. [Tashfeen et al. \(2023\)](#) found that women on boards help firms optimize the use of derivative instruments to manage financial risk. [Poletti-Hughes & Briano-Turrent \(2019\)](#) observed that women contribute to increased preparedness for risky ventures by encouraging firms to develop contingency plans. [Chatjuthamard, Jiraporn, and Lee \(2021\)](#) revealed that gender diversity can decrease risk-taking behavior, although it may also reduce firms' willingness to engage in optimal risk derels. [Rodriguez, Dandapani, and Lawrence \(2024\)](#) and [Teodósio et al. \(2021\)](#) found that board diversity helps mitigate specific risks, such as litigation and operational risks. [Alzayed, Batiz-Lazo, and Eskandari \(2024\)](#) reported mixed but generally supportive findings.

Based on these theoretical perspectives and empirical findings, board gender diversity can influence the quality of board discussions and decisions ([Muhammad, Migliori, and Mohsni 2023](#); [Tashfeen et al. 2023](#)). It's proposed that gender diversity can moderate the board-level risk management relationship with overall corporate risk, strengthening the effect of governance on risk mitigation.

H₂: Board gender diversity moderate relationship among risk management practice and corporate risk.

RESEARCH METHOD

This research was quantitative and used secondary data taken from annual reports and the Refinitiv Eikon database. Annual reports were used as a source of board responsibility and board gender diversity data, while the Refinitiv database was used to retrieve financial data. Moderated regression analysis was used in this study to test the interaction between variables and hypotheses.

This study utilizing year 2023 as observation year. We only choose 2023 as the sole year of observation because of this reason. First, the year of 2023 sees the improvement from post-pandemic stabilization which results in more companies strengthening their risk management to anticipate the future adverse effect from uncertainty event ([Fitria and Cahyani 2025](#)). Second, there is an updated in corporate governance and board diversity by OJK and IDX that making it relevant for examining the moderating role of board diversity in the interaction between firm risk management and firm risk ([Ahmad et al. 2024](#)).

All non-financial and banking companies indexed on the Indonesian stock exchange during 2023 become this research sample. We exclude financial and banking companies from our sample due to their stricter regulations and different financial characteristics from other industries ([Tashfeen et al. 2023](#)). In addition, we also exclude companies that do not publish their annual reports in 2023, resulting in a total sample size of 765 data. Table 1 explains the sample calculation method of this study.

Table 1. Research Sample

Criteria	Total
Company sample from IDX	938
Less financial and banking companies	(104)
Less companies that do not issue 2023 annual reports	(69)
Research sample	765
Removed because of an outlier problem	(44)
Final Sample	721

This research defines risk variable (RISK) as dependent variable. This research measured risk by using Z-score ([Rehman et al. 2021](#)). Risk calculation with Z-score has been widely used by previous studies to measure company risk and solvency ([Rehman et al. 2021](#); [Rashid, Akmal, and Shah 2024](#); [Alzayed, Batiz-Lazo, and Eskandari 2024](#)). The common use of Z-score by researchers indicates that they have built trust in using this calculation ([Rashid, Akmal, and Shah 2024](#)). In this research, Z-Score was measured by dividing the value of total assets by company equity plus the average return on assets ratio divided by the standard deviation of the return on assets ratio ([Alzayed, Batiz-Lazo, and Eskandari 2024](#)). The higher value in Z-Score, usually above 0, indicating low risk of corporation going bankrupt. Natural logarithm employed as the value of Z-Score in this research because the Z-Score calculation value has high variation and indicates the data is skewed ([Rehman et al. 2021](#)).

Board risk management (BRM) is defined as independent variable in this research. This variable is measured using the method used by [Beasley et al. \(2021\)](#). This method is used to measure the robustness of the risk management process conducted by the corporation board of directors. The board risk management variable shows the measurement of the company's level of disclosure relating to the involvement of corporate board of director in corporation risk management process from the 2023 annual report ([Beasley et al., 2023](#)).

Board risk management is assessed by these three categories, namely responsibility, consistency, and risk-aware mindset ([Beasley et al. 2023](#)). Each assessment is given a number 1 if there is evidence in the annual report and 0 if there is no evidence in the annual report ([Beasley et al. 2023](#)). The responsibility assessment indicates the board's responsibility for risk management and is assigned 1 if the annual report verbally and explicitly states that the company's board is responsible for overseeing and implementing risk management

and 0 if there is no such statement. The consistency assessment indicates how often the board reviews the company's risk management regulations. It is assigned 1 if there is disclosure that the board regularly (at least annually) reviews the company's risk management regulations and 0 if there is no such disclosure. The risk-aware mindset assessment refers to board behavior that reminds and directs companies to be aware of the risks they face, such as conveying the company's willingness to take risk, strategy to manage risk, and company practice related to risk. If there is such a statement, then a number 1 is given; if not, a number 0 is given ([Beasley et al. 2023](#)). All of these three assessments were then summarized as a value for board risk management variable ([Beasley et al. 2021](#)).

Diversity in gender on corporate board become the moderating variable in this research. Diversity in board gender is measured using two methods, that is by female board ratio and blau index. First, this research calculated the ratio of female board in corporate board compare to total director member in corporation (FEMALE RATIO) ([Tashfeen et al. 2023](#)). The measurement is done by splitting the number of female directors by the total number of board members of the corporations. It represents the existence of women on the board of directors in the corporations ([Abou-El-Sood 2021](#)). Second, the measurement is done using the Blau index (FBLAU). How varied a company's board is determined by Blau Index ([Shehadeh et al. 2022](#)). Following [Zheng & Wang \(2024\)](#), the Blau Index is measured by the method $FBLAU = 1 - Female Ratio^2 - (1 - Female Ratio)^2$. The FBLAU value will be in the range of 0 (not diverse) and 0.5 (highly diverse) ([Rodriguez, Dandapani, and Lawrence 2024](#)).

This research model used a number of control variables. Firm board size (BSIZE), firm size (SIZE), firm age (AGE), and company's financial leverage (LEV) are our control variables. Table 2 further explains the variables used in this research.

Table 2. Variable Explanation

Variable Type	Variable Name	Measurement	Source
Dependent	RISK	Dividing the value of total assets by company equity plus the average return on assets ratio divided by the standard deviation of the return on assets ratio	Alzayed, Batiz-Lazo, and Eskandari (2024)
Independent	BRM	Value from 0-3 to assess three categories of risk management conducted by corporation.	Beasley et al. (2023)
	FEMALERATIO	Splitting the number of female directors by the total number of board members of the corporations	Abou-El-Sood (2021)
	FBLAU	1 - Female Ratio ² - (1 - Female Ratio ²)	Zheng & Wang (2024)
Control	BSIZE	Natural logarithm for firm total board member.	Karim et al. (2024)
	SIZE	Natural logarithm for firm total assets.	Muhammad, Migliori, and Mohsni (2023)
	AGE	Natural logarithm for firm age.	Jouber (2024)
	LEV	Splitting the company's total interest-bearing debt by the total assets of corporations	Chatjuthamard, Jiraporn, and Lee (2021)
Additional Control (Robustness Test)	SG	Growth in revenue each year.	Mohsni, Otchere, and Shahriar (2021)

This study uses moderation analysis regression testing for each model. Equations (1) and (2) below are employed in this research model. This model examines the connection between the dependent variable (BRM) with the independent variable (RISK), the moderating variable (FEMALERATIO and FBLAU) and the control variable (BSIZE, SIZE, AGE, LEV). This model was then run in the SPSS version 26 application to obtain the observation of this research. This model also can be explained by the conceptual model.

$$RISK_{i,t} = \alpha + \beta_1 BRM_{i,t} + \beta_2 BGD_{i,t} + \beta_1 BRM_{i,t} * FEMALERATIO_{i,t} + \beta_3 BSIZE + \beta_4 SIZE + \beta_5 AGE + \beta_6 LEV + \varepsilon_{i,t} \quad (1)$$

$$RISK_{i,t} = \alpha + \beta_1 BRM_{i,t} + \beta_2 BGD_{i,t} + \beta_1 BRM_{i,t} * FBLAU_{i,t} + \beta_3 BSIZE + \beta_4 SIZE + \beta_5 AGE + \beta_6 LEV + \varepsilon_{i,t} \quad (2)$$

To strengthen the result, we also conducted robustness test. This test was conducted by adding one control variable, that is, sales growth (SG), to see whether the result remains the same after this variable added. This variable added since higher sales growth indicating that company is in their growth phase which requires the company to take risky actions that make the company more unstable so that the risk increases ([Mohsni, Otchere, and Shahriar 2021](#)).

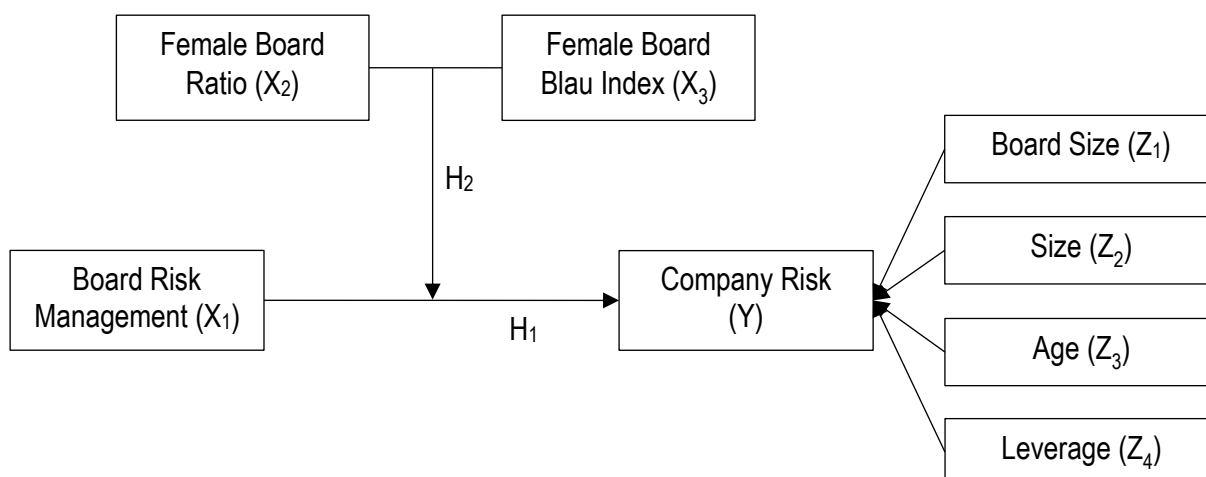


Figure 1. Research Model

RESULTS & DISCUSSION

Descriptive Statistical and Correlation

Results of descriptive statistics of the variable in this research are shown in Table 2. This research observes 765 data. Data have been winsorized at 1%. Despite that, a total of 44 data were not used in the study because they showed outlier characteristics which cannot be resolved after the process of data winsorizing. This could interfere with the normality of the data owned, thus disrupting the research results (Gibbert et al. 2021). Because of that, we need to deduct that data and in total, our final data observed are 721 data.

In the risk variable (RISK), the value - 1.18 observe as the minimum number for risk variable obtained and 6.04 is the maximum value. Research sample has mean of 3.08 for this variable and 1.27 as standard deviation of this variable. Higher Z-Score value indicates that the company has a low insolvency risk. Therefore, if the Z-Score value becomes higher, this indicates that the corporation has a minimal possibility of bankruptcy (Rashid, Akmal, and Shah 2024).

In the diversity variable (FEMALERATIO and FBLAU), it is known that the average female board member in Indonesia is 16% and the average diversity in the member of director in Indonesia corporation is 19%. The

maximum values contained in the observation data are 0.75 and 0.5. The distance between the average value and the maximum value observed illustrated the little involvement of women director in board of directors in Indonesia corporation.

In the risk management variable (BRM), the sample average is 1.61. This indicates that the sample data during 2023 has reported two of the three criteria assessed in the risk management assessment according to Beasley et al. (2021). The most common types of reporting disclosed by companies related to risk management by board members are related to board responsibility for risk and board evaluation of risk management. Reporting related to a risk-aware mindset is still rarely reported, indicating that a risk-aware culture has not been the focus of management when managing its risks.

Results of classical assumption testing for research data, that is normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test are shown in Table 4. Research data are normal since the normality test using Monte Carlo method shows value more than 0.05 despite Kolmogorov-Smirnov test show the opposite (Zygmunt 2023; Bishara, Li, and Conley 2021). This research data is free from multicollinearity and heteroscedasticity problem (Singh, Singh, and Paprzycki 2023;

Table 3. Descriptive Statistics of Research Data

Variable	Data	Minimum	Maximum	Mean	Standard Deviation
RISK	721	-1.18	6.04	3.08	1.27
BRM	721	0	3	1.61	0.72
FEMALERATIO	721	0	0.75	0.16	0.21
FBLAU	721	0	0.50	0.19	0.21
SIZE	721	24.43	32.49	28.02	1.93
AGE	721	1.61	4.77	3.23	0.65
BSIZE	721	0	2.71	1.27	0.44
LEV	721	0	7.73	0.74	1.25

[Ghozali 2018](#)). Autocorrelation test using Breusch Godfrey test also reveal that no autocorrelation problem was detected ([Ghozali 2018](#)).

The results of pearson correlation for each variable in this study can be seen in Table 5. According to the table, the BRM variable has a negative correlation with FEMALERATIO but a positive correlation with FBLAU variables. This indicates that there may be a negative interaction between risk management variables (BRM) and female director number (FEMALERATIO), but negative interaction with gender diversity variables (FBLAU). In addition, the RISK variable is positively correlated with the BRM, FEMALERATIO and FBLAU variables.

Positive interaction between dependent variable and the three variables tested can be concluded from correlation result.

There are two variable interactions that have a correlation coefficient value above 0.5. These interactions are the interaction between FEMALE RATIO and FBLAU and the interaction between FIRMSIZE and BSIZE. The correlation coefficient between the FEMALE RATIO and FBLAU variables is 0.893 and this can occur because the two variables measure the same result, namely gender diversity. The correlation coefficient between the variables FIRMSIZE and BSIZE is 0.597. Interactions with a correlation coefficient value above 0.5 indicate a multicollinearity problem ([He, Du, and Yu 2022](#)).

Table 4. Test Result for Classical Assumptions of Research Data

Test	Value In Test	Term for Pass The Test	Conclusion
Normality Test (Kolmogorov-Smirnov)	0.00	Value test>0.05	Contain normality problem
Normality Test (Monte Carlo)	0.2	Value Test>0.05	Normally distributed data
Multicollinearity (VIF)	1.15, 5.16, 5,12	<10	No multicollinearity problem detected
Heteroscedasticity	0.53, 0.50, 0.71	>0.05	No heteroscedasticity problem detected
Autocorrelation (Breusch Godfrey)	0.79, 0.46, 0.39, 0.26, 0.39, 0.23, 0.51	>0.05	No autocorrelation problem detected

Table 5. Pearson Correlation of Research Variables

	RISK	BRM	FEM.RATIO	FBLAU	SIZE	AGE	BSIZE	LEV
RISK	1.00							
BRM	0.04	1.00						
FEM. RATIO	0.03	-0.3	1.00					
FBLAU	0.06	-0.01	0.893***	1.00				
SIZE	0.097***	0.36***	-0.098***	-0.01	1.00			
AGE	0.065**	0.10***	-0.03	0.04	0.382***	1.00		
BSIZE	0.012	0.24***	-0.01	0.11***	0.597***	0.31***	1.00	
LEV	-0.33***	0.03	-0.103***	-0.095**	0.12***	0.11***	-0.002	1.00

Notes: ***, **, * indicate 1%, 5%, and 10% significance.

However, multicollinearity testing was conducted by examining at the VIF value. The VIF results show that are still below 10 in Table 4, indicating that the model is clear from multicollinearity issues.

Risk Management Practice and Corporate Risk

The results of our research from moderated regression analysis and model feasibility testing are shown in Table 6. The F test was performed on regression models without moderation and with moderation. Both models show an F value of 20.008 without

moderation and 17.370 with moderation with the significance value of both tests being 0.000. Because the significance value is below 5%, the research model is valid for predicting the interaction between variables ([Ghozali 2018](#)).

From Table 6, the BRM variable shows a significant positive coefficient result between risk variables. Risk variables are measured by the Z-Score value ([Alzayed, Batiz-Lazo, and Eskandari 2024](#); [Muhammad, Migliori, and Mohsni 2023](#); [Rehman et al. 2021](#)). In addition, the regression results exhibit that the percentage of women's presence, which describes the proportion of women's presence on the board of

Table 6. Research Hypothesis Testing Results

Variable	Without Moderation	With Moderation
BRM	0.138*** (0.023)	0.245*** (0.00)
FEMALERATIO	-	-0.438*** (0.016)
FBLAU	-	0.705*** (0.00)
SIZE	0.261	0.266
AGE	0.090	0.088
BSIZE	-0.191	-0.188
LEV	-0.534	-0.527
BRM*FBLAU	-	-0.631*** (0.002)
BRM*FEMALERATIO	-	0.354* (0.084)
Observation Data	721	721
R square	0.164	0.180
Adjusted R Square	0.156	0.170
F value	20.008, p = 0.00	17.370, p = 0.00

Note: The significant level is indicated by *** for p<1%, ** for p<5%, and * for p<10%.

directors, significantly negatively impacts the company's Z-Score value. Meanwhile, the diversity of genders in the board of directors calculated using blau index exhibits a significant positive impact on the company's Z-Score value. When moderation is performed, the moderation value between risk management and gender diversity proxies shows significant results at the 5% and 10% significance levels.

The regression results show that risk management by the board of directors exerts a substantial positive influence on the firm's Z-Score value ($\beta = 0.088$, $p = 0.023$). Since lower risks of bankruptcy are observed in companies with higher Z-Score ([Rashid, Akmal, and Shah 2024](#)), this suggests that risk management by the board reduces the corporation exposure to risk. This result matches the results of previous research conducted by [Rashid, Akmal, and Shah \(2024\)](#) and [Beasley et al. \(2023\)](#).

Our findings are also consistent with the agency theory employed as the ground for the hypothesis in this research. The disclosure of risk management by the board in the annual report provides a form of supervision to management regarding their risk management. The existence of supervision from investors as principals can reduce agency problems that can arise from agency relationships ([Karim et al. 2024](#)). The result also supports [Beasley et al. \(2023\)](#) who found that robust risk management can reduce financial reporting risk, thereby increasing investor confidence and protecting the interests of principals from management's deviant behavior.

This finding is also consistent with the resource dependence theory used as the ground for the hypothesis. ([Muhammad, Migliori, and Mohsni 2023](#)) mentioned that board of directors play an important role for the company to be able to secure the necessary resources, such as funding and human resources. [Agustina et al. \(2021\)](#) found that risk disclosure in annual reports increases investor confidence in the corporations. To further support this, [Rashid, Akmal, and Shah \(2024\)](#) found that the

company's risk management as measured by several governance proxies is positively correlated with the Z-Score value. The existence of a form of protection through risk management carried out by the company can guarantee that investors and creditors will provide funds to the company. The company can also attract better human resources if its solvency resilience is good through job security in the company ([Lisdiono et al. 2022a](#); [Agustina et al. 2021](#); [Rashid, Akmal, and Shah 2024](#)). Thus, these regression results justify the first hypothesis of the study that risk management by management positively impacts risk management in corporation through decreasing the risks faced by the company.

Board Gender Diversity and Risk Management Practice

Table 6 shows different results on the presence of women with firm risk calculated by Z-Score ($\beta = -0.504$, $p = 0.009$). The variable representing female presence on the board of director is indicated by the percentage of women on the board (FEMALERATIO), which shows a significant negative result at a significance level of 1% on firm risk. This indicates that the presence of women on the corporation board of directors increases the level of corporate risk because a low Z-Score value exhibits higher level of bankruptcy ([Rashid, Akmal, and Shah 2024](#)).

This result is consistent with [Alzayed, Batiz-Lazo, and Eskandari \(2024\)](#) result. [Alzayed, Batiz-Lazo, and Eskandari \(2024\)](#) also found that the presence of women directors on corporation board of director also reduced the Z-Score value of financial corporations in the United States. [Alzayed, Batiz-Lazo, and Eskandari \(2024\)](#) concluded that this could happen because women have less experience than men in managing companies. In addition, there is an assumption when board of director includes women in their board, this is more intended to meet the need for diversity and demands from external parties rather than

maximizing returns and financial stability of the company ([Aguir et al. 2023](#)). In addition, women who are included in boards of directors that are still dominated by men tend to have lower risk aversion than other women because they adapt to an environment filled with men ([Mohsni, Otchere, and Shahriar 2021](#)). From Table 3, the number of women directors on corporate the board of directors in non-financial companies in Indonesia averages only 16% of the total directors. With many men still sitting on the board of directors, this can change the risk perception of women directors who were previously risk-averse to be brave enough to take risks. This will reduce the effectiveness of female directors in managing risk ([Mohsni, Otchere, and Shahriar 2021](#)).

However, different results are shown on the board diversity variable calculated by the Blau index (FBLAU). The result of regression exhibits that board diversity has positively given significant impact at the 1% significance level on the firm's Z-Score value ($\beta = 0.709$, $p = 0.000$). This implied that a diverse gender board of directors has a significant influence on the firm's Z-Score value. A higher company Z-Score indicates corporation faced lower probability to be bankrupt ([Rashid, Akmal, and Shah 2024](#)). Therefore, the conclusion can be derived that board gender diversity can bring lower risk to corporations and thus have a positive correlation to corporate risk management.

This result is aligned with the findings of [Rodriguez, Dandapani, and Lawrence \(2024\)](#) and [Tashfeen et al. \(2023\)](#). [Rodriguez, Dandapani, and Lawrence \(2024\)](#) found that a female board of directors can lower the level of the firm's expected risk with the firm's cash management and the use of hedging derivatives. [Tashfeen et al. \(2023\)](#) found that better resilience during the Covid-19 pandemic crisis observed in companies with female boards of directors than companies that do not. The Upper Echelon Theory and Lehman Sister Hypothesis support our results that female boards have different knowledge and values from male

directors and can avoid decision-making bias ([Tashfeen et al. 2023](#)). When board of directors are more diverse, especially on the risk profile, it can make the board dynamics more fluid in managing risk so that it can help reduce firm risk and improve firm performance ([Rodriguez, Dandapani, and Lawrence 2024](#)).

The regression results also show that board gender diversity moderates risk management conducted by corporations. However, two variables used for measuring board of directors' gender diversity have different moderation directions according to regression results. The moderation result between the existence of women on the board of directors (FEMALERATIO) on corporate risk management is significantly positive ($\beta = 0.403$, $p = 0.069$) at the 10% significance level. This result implies that when women present themselves in corporation boards of director, there will be an increase in company's Z-Score value by 0.403% per 1% increase in corporation risk.

This result matches those of [Muhammad, Migliori, and Mohsni \(2023\)](#). [Muhammad, Migliori, and Mohsni \(2023\)](#) found that female board of directors' presence also moderates the connection between corporate board size and corporate risk positively. This can occur because the presence of women in the company can present a broader perspective in decision making and more effective problem solving ([Muhammad, Migliori, and Mohsni 2023](#)). Women are also more community-focused so that they develop traits such as being more supportive and empathetic to others, which makes them able to prioritize and answer the needs of stakeholders at large, one of which is more optimal risk management ([Shehadeh, Alkayed, and Aly 2022](#)).

The moderation connection between corporate risk management and board diversity in the company (FBLAU) shows a result that negatively and significantly moderates the independent variable ($\beta = 0.444$, $p = 0.046$) at the 5% significance level. This result implies that

corporation boards that have gender diversity will negatively moderate the corporate risk management interaction with the risks faced by the company.

[Chatjuthamard, Jiraporn, and Lee \(2021\)](#) support this research result. [Chatjuthamard, Jiraporn, and Lee \(2021\)](#) found that companies with a high level of gender diversity have an incentive to take greater risks. This is because the nature of women to be more risk-averse affects other directors, causing the level of risk taking to drop and affecting company performance. To compensate, the company increases incentives so that directors are willing to make risky decisions that make the company take greater risks than before ([Chatjuthamard, Jiraporn, and Lee 2021](#)). [Naghavi, Sharif, and Hussain \(2020\)](#) also support this research result. Corporate culture can also influence decision making regarding risk management. [Naghavi, Sharif, and Hussain \(2020\)](#) found that gender diversity in companies located in countries with high level of masculinity can reduce the effectiveness of gender diversity. Masculinity is a condition where people are more focused on results. In the context of companies, results

orientation means that companies are more concerned with getting profits and returns on investment ([Naghavi, Sharif, and Hussain 2020](#)). This is true in Indonesia since there is still a stigma that see women are only appropriate to do their responsibility at home and cannot contribute much to companies compared to men, which indicates a high masculinity culture ([Israini 2020](#)). Most companies in Indonesia are still affected by this and can decrease the effectiveness of risk management by gender diverse boards, due to stakeholder pressure to meet net profit targets or stock returns. Another reason may support this finding. A board that is too diverse can cause conflicts that make the process of reaching an agreement more difficult and the agreement taken is not optimal ([Mohsni, Otchere, and Shahriar 2021](#)). An overly diverse board can also weaken cooperation among board members, make communication difficult, and cause internal conflicts through differences in board backgrounds ([Alzayed, Batiz-Lazo, and Eskandari 2024](#)). These things can cause board gender diversity to negatively moderate board risk management in companies.

Table 7. Robustness Test Result

Variable	Regression Result	
	Without Moderation	With Moderation
BRM	0.139*** (0.00)	0.245*** (0.00)
FEMALERATIO	-	-0.452*** (0.013)
FBLAU	-	0.715*** (0.00)
FIRMSIZE	0.263	0.269
AGE	0.100	0.098
BSIZE	-0.194	-0.191
LEV	-0.531	-0.524
SG	0.054	0.057
BRM*FBLAU	-	-0.651*** (0.002)
BRM*FEMALERATIO	-	0.377* (0.066)
Observation Data	721	721
R square	0.164	0.180
Adjusted R Square	0.156	0.170
F value	15.431, p = 0.00	16.595, p = 0.00

Note: signification of variable is indicated by *** for p<1%, ** for p<5%, and * for p<10%.

Robustness Test

Additional tests have been conducted to test the robustness of the hypothesis results. The test is conducted by adding one control variable to the model, namely the revenue growth variable (SG). Companies tend to have high risk when they are in the expansion phase which is characterized by a significant increase in revenue. This is because the expansion phase requires the company to take risky actions that make the company more unstable to increase the risk ([Mohsni, Otchere, and Shahriar 2021](#)). Hence, the addition of this variable is essential to control for such effects to ensure the regression results remain robust. Table 7 shows that the results of the interaction of risk management and gender diversity with firm risk remain significant, just as when the revenue growth variable is not added. This shows that the hypothesized results remain robust.

CONCLUSION

This research has the intention to observe whether the corporation board risk management affects the risks confronted by the corporation. This research also looks at whether diversity in board gender in the company moderates board risk management, which also has an impact on the risks faced by the company. The population for this research is non-financial corporations indexed on the Indonesian stock index during 2023. The sample for this research includes all corporations indexed on the Indonesia Stock Exchange with the criteria (1) not financial and banking companies and (2) issued annual reports for 2023. A total of 765 companies became our sample, with a total final sample in the study of 721 samples, because of data smoothing for fixing issues in data normality.

This research result found that risk management carried out by the corporation board gives a significantly positive impact on the value of Z-Score, which exhibits that risk management can reduce the risks faced by the company. Diversity in gender of corporation

board of director produces an irregular result where the presence of women can reduce risk. Still, when women become present with too large a portion (the board of directors is too gender diverse) it can actually increase the corporation exposure to risk. Robustness tests have been conducted and the result remain robust despite the addition of a control variable.

This study has several shortcomings. First, the study only looked at company data for one year, namely 2023. Future research can use panel data to see whether the impacts of risk management and board gender diversity on corporate risk are also consistent in previous years. Second, this study only looks at total company risk through the Z-Score value which measures the company's bankruptcy risk ([Rashid, Akmal, and Shah 2024](#)). [Teodósio et al. \(2021\)](#) revealed that the effect of gender diversity on corporate risk varies with each risk. Future research can use other risk calculations to see the consistency of the impact of gender diversity on all risks faced by the company.

Several contributions made by this research. Contribution made by adding to the literature related to risk management and the effects of gender diversity in the Indonesian context is first contribution for this research. It is still rare for research related to risk management and board gender diversity on corporate risk to be conducted in Indonesia. Secondly, this study contributes to providing stakeholders with views regarding the impacts of diversity on board gender. Although diversity in gender in board of directors can improve risk management individually, when it becomes a moderating variable, board gender diversity can actually diminish the effectiveness of risk management. This can be a concern for stakeholders, so that the pressure for companies to bring gender diversity to corporate boards does not adversely affect the corporation.

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