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Who Governs Bank Stability Amid Crises? Evidence From Broad Characteristics, Risk, and Performance

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ABSTRACT

Introduction*: This study explores a relatively under-researched area in Indonesia, namely the influence of women board members on bank performance and risk. This study fills a crucial gap in the literature on the influence of board characteristics on bank risk-taking and performance in Indonesia, a country in Asia with characteristics distinct from those of European countries. We investigate the impact of board characteristics on bank risk and performance.*

Methods*: We used unbalanced panel data comprising 594 bank-year observations from Bank Indonesia for 2003-2022 and tested the model using a fixed-effects model, controlling for bank and year effects*

Results*: This study found that women board members have a positive effect on bank performance and a negative impact on bank risk. On the other hand, we find robust results related to women directors have a positive impact on bank performance and a negative impact on bank risk, even though examined with different models and proxies. On the other hand, Board size positively affects bank stability but shows no consistent impact on credit risk or performance during crises. In contrast, board independence is negatively associated with stability and weakens bank performance during crisis periods.*

Conclusion and suggestion*: This research can contribute to the government's attention to the importance of gender diversity on boards of directors. These study results can also guide other developing countries with similar legal systems.*

Keywords: *Board Size, Board Independent, Bank Risk, Bank Performance, Women on Board*

INTRODUCTION

Bank decision-making by board members to mitigate risk is important for improving performance. Previous literature has mostly discussed regulations and liquidity hazards, but only a few have explored the gap in the literature regarding the impact of board composition on bank risk-taking (Aslam & Haron, 2021; Corona et al., 2019). Berger et al. (2014) Found evidence that poor bank performance is related to weak governance practices and the failed performance of the board of directors. However, Adams & Ferreira (2009) and Adams & Funk (2012) found that the board of directors' structure influences company performance, especially board gender diversity. Therefore, this research investigates board structure and examines how board characteristic influences bank risk and bank performance in Indonesia. Good bank performance is closely related to regulatory supervision and financial development. Banks usually have more complex agency conflicts than other industries (Shabir et al., 2024). Therefore, the board structure is important concerning bank performance, especially in developing countries with weaker control mechanisms, such as Indonesia (Nadia & Hanafi, 2022; Saeed & Sameer, 2017; Setiyono & Tarazi, 2018). Female leadership in bank board composition is important to consider because their characteristics can bring distinctive characteristics that positively impact bank performance and reduce risk (Huang et al., 2024; Liu et al., 2014; Setiyono & Tarazi, 2018; Thanh Tu et al., 2015).

The financial crisis, which can seriously threaten global and domestic economic stability, is the main research focus in the current academic sphere (Atif et al., 2019; Zhou et al., 2022). The role of banks as shock amplifiers or dampeners in the financial sector is becoming increasingly important to pay full attention to. However, the role of board characteristics in bank risk and performance remains inconclusive. As a significant management mechanism, board composition has attracted the attention of researchers across law, economics, and finance. The operation of this control body has also been the focus of debates and reform proposals regarding its characteristics, such as its size, the presence of independent members, and the participation of women. As a result, the literature addressing studies on the effect of board composition on firm performance is voluminous (Ahmadi et al., 2018); Farag & Mallin, (2017); Huang et al. (2024); Setiyono & Tarazi (2018) find that women directors negatively affect bank risk due to their risk-averse characteristics, suggesting that women directors can reduce bank risk. In contrast, Adams & Funk (2012) and Sila et al. (2016) find insignificant and positive relationships that support the idea that women should adapt to a male-dominated culture to get promoted by their male colleagues. Regarding bank performance, understanding board diversity is essential to improving overall understanding. However, the literature about the effect of women directors on bank performance has mixed findings. Thanh Tu et al. (2015) find that female leadership on bank boards of directors positively affects bank performance in ASEAN banks, while the results in the Indonesian bank sample are mainly robust. This result differs from Setiyono & Tarazi (2018), who have not found an effect on bank performance on women directors. Therefore, following the spirit of the previous research, we examined the effect of board characteristics on bank risk and performance.

We aim to fill the literature gap by testing the impact of board size, independent board, and women directors on bank risk and performance using Indonesian bank data. The bank sector was selected because the legal institutions in Indonesia are related to investor protection, and the quality of corporate governance is relatively poorer than that in developed countries (Setiyono & Tarazi, 2018). Therefore, considering women as bank board members is the way to enhance the board's function and could play an important role in improving the effectiveness of bank governance. We find that women board members affect bank risk

negatively and positively affect bank performance. This result implies that female leadership could reduce bank risk and improve performance. On the other hand, board size has a positive effect on bank stability, but does not consistently affect credit risk and financial performance. Conversely, board independence is negatively correlated with bank stability and negatively affects performance during crisis periods, suggesting that it is not always effective in maintaining stability under pressure. Periods of financial crisis consistently expose vulnerabilities in banking systems and reignite the debate on who truly governs bank stability. While prior studies have predominantly examined bank stability through isolated lenses such as governance structure, risk exposure, or financial performance empirical evidence that integrates these dimensions within a unified analytical framework remains limited. This study addresses this gap by offering a novel perspective that simultaneously examines broad bank characteristics, risk profiles, and performance indicators to identify their relative and combined roles in sustaining bank stability during crisis periods. By moving beyond single-factor explanations, this research contributes original empirical insights into the mechanisms that govern bank resilience under stress, thereby advancing the literature on financial stability and providing a more comprehensive basis for regulatory and managerial decision-making in turbulent economic environments.

This study contributes to the literature in three ways. First, it explores a relatively under-researched area in Indonesia, namely studies on the influence of board characteristics on bank performance and risk. Most previous literature focuses on non-financial data (Liu et al., 2014; Ullah et al., 2020). Second, it fills a crucial gap in the literature on the influence of board characteristics on bank risk-taking and performance in Indonesia, a country in the Asian continent with characteristics different from European countries. Finally, this study contributes to economic and policy implications. Gender diversity on boards in developed countries has been widely discussed and implemented. On the other hand, gender diversity on boards in developing countries is hardly discussed and implemented. Therefore, this research can contribute to the government's attention to the importance of gender diversity composition on the board of directors. This study result can also guide other developing countries with similar legal systems. This article proceeds as follows. Section 2 presents a literature review on women on board, their effect on bank performance and risk, and hypothesis development. Section 3 presents the methods and discusses the data, empirical methods, and variables. Section 4 presents the result and discussion. Finally, we conclude and give implications in Section 5.

LITERATURE REVIEW

The resource-based theory explains that the board of directors is a strategic resource that a firm can obtain from external sources, such as new skills and opportunities. A large body of literature examines board gender diversity through the lens of agency theory. Members of the board of directors can act for their own benefit, not for the interest of shareholders (Adams & Ferreira, 2009; Jensen & Meckling, 2012). Since they are not direct owners and have less personal wealth at stake, their natural pursuit of self-interest could lead to riskier behavior or even dishonesty, potentially harming the company. A more diverse board can positively affect a firm, such as better financial performance (Ullah et al., 2020). Previous literature has found that female directors can provide better monitoring, reduce agency conflict, and improve governance (Nielsen & Huse, 2010). Therefore, a diverse board, such as gender diversity, allows more information and skills that can benefit a company.

Most previous literature explored the bank risk implications of gender diversity on boards in non-financial firms. Previous evidence that examines banking risks and performance

finds inconsistent findings. Charness & Gneezy (2012) found evidence of a negative relationship between women's leadership and bank risk. The logical argument for the finding is related to the psychological theory that women tend to be more risk-averse than men (Nadia & Hanafi, 2022). Some findings in the context of developed countries are that more female representation on boards can reduce the frequency of misconduct fines in US banks (Arnaboldi et al., 2021). A higher proportion of female directors on boards of EU banks carries lower risks and reduces vulnerability to crises (de Cabo et al., 2012). However, there is evidence that gender diversity in the boardroom does not significantly impact bank risk (Cardillo et al., 2021; Setiyono & Tarazi, 2018). However, most of the evidence is from developed countries, and there is a lack of studies in developing countries. Indonesia is a developing country that adheres to the concept of family. In particular, social norms and values usually expect women to take on major responsibilities in caring for family members. As a result, women in Indonesia tend to be more cautious and value safety and stability more than men. This condition proves women are more risk-averse (Nadia & Hanafi, 2022). In the case of emerging countries, external issues bring problems for banks or companies, such as the lack of institutional environment and protection for shareholders (Setiyono & Tarazi, 2018). In emerging countries such as Indonesia, the ownership structure is often largely concentrated, and the conflict between majority and minority shareholders is generally more pronounced (Gyapong et al., 2019; Nadia & Hanafi, 2022; Setiyono & Tarazi, 2018). Therefore, the structure and composition of boards in developing countries is very important, and there needs to be the right mix, such as gender diversity boards. Therefore, we expect that women on bank boards in Indonesia are more risk-averse than their counterparts. So, they can reduce bank risk-taking.

H1: The presence of female directors reduces bank risk.

A growing body of evidence suggests that women's presence on boards can improve bank performance. This is due to various factors, including the fact that women bring different perspectives and experiences to the table, which can lead to more diverse and inclusive decision-making. This can be particularly important in the banking industry, where a wide range of customers and stakeholders have different needs and expectations (Dey et al., 2023; Sawitri et al., 2016). Additionally, research has shown that companies with greater gender diversity tend to perform better financially, as they are better able to attract and retain top talent and respond more effectively to customer needs. This is because women and other underrepresented groups often feel more valued and included in organizations with diverse leadership (Farhana, 2020; Iren, 2016; Simionescu et al., 2021).

In agency theory and resource-based theories, board diversity helps companies avoid agency problems. The role of bank directors is certainly different from that in other industries. This is because bank directors, in addition to being responsible to their shareholders, are also responsible to securities regulators, stock exchange regulators, and banking regulators. A bank's failure can impact other banks or have spillover effects (García-Meca et al., 2015). Berger et al. (2014) Found that gender diversity can increase risk in a firm's portfolio. This is in line with the findings of Liu et al., (2014) that a more diverse board is considered positive for the company and its financial performance. However, Setiyono & Tarazi (2018) Found that women directors did not affect bank performance.

H2: The presence of female directors brings better bank performance.

Agency theory posits that corporate managers are not owners but agents of the firm, contracted to manage the firm on behalf of the owners. Since they are not direct owners and have less personal wealth at stake, their natural pursuit of self-interest could lead to riskier behavior or even dishonesty, potentially harming the company or its owners. Boards of

directors play a key role in overseeing managers' actions and decisions, and in guiding the planning and execution of corporate strategy. Many experts, economists, and policy documents have provided recommendations on corporate governance, particularly regarding the independence of the Board of Directors (BoD). A key point of these recommendations is that various characteristics of directors can affect their incentives and ability to perform their roles, and as a result, influence decisions regarding risk-taking. Further, the impact of board characteristics on firm value may depend on the balance of advantages and disadvantages arising from monitoring and counseling functions (Ramly & Basharahil, 2021). A larger board size is associated with a lower rate of return, while on smaller boards, board size has no significant impact (Ghosh & Ansari, 2018). Research has shown that diversity and adequate board size can improve decision-making efficiency, create a more innovative environment, and increase profitability (Abdul Gafoor et al., 2018; Tabasam et al., 2022). By having a large enough board, banks can gain a variety of perspectives and knowledge from diverse board members, which in turn can help in identifying potential risks and strategic opportunities.

An independent director may improve the management hierarchy by serving as a third party. For potential investors, the company's value would increase if it hired independent directors. With independent directors, investors will perceive that both the financial and non-financial aspects of the company are better than those without external board members (Ahmadi et al., 2018). The appointment of independent directors does not have a significant impact on bank performance. This indicates that selecting unaffiliated bank directors who lack operational independence may increase complexity and information asymmetry within the bank. The lack of familiarity of independent directors with the internal information and activities of the bank may lead to such conditions (Bhatia & Gulati, 2021).

H3: Board size has a positive impact on bank performance.

H4: Board size can reduce bank risk.

H5: Independent boards have a positive impact on bank performance.

H6: Independent boards can reduce bank risk.

METHOD

Sample and Data

We used samples from the Indonesian Bank, including a data stream for the period 2003-2022. Then, we employed unbalanced panel data because we could not collect the data for each bank from 2003-2022. The observation period for this study was limited to 2022 because that year marked the final phase of the global crisis, particularly the COVID-19 pandemic, in the banking sector. Banks are still in the post-crisis adjustment and recovery phase, making this period relevant for comprehensively capturing the effects of the crisis and the dynamics of board governance. We dropped banks with missing financial and corporate governance data. We hand-collected corporate governance data from annual reports of each bank, which had already been published on their company websites.

Bank Risk and Performance Measurements

Based on previous work, our dependent variables are Bank Risk and Bank Performance. This research uses aspects of financial difficulty as measured by the z-score. We follow Huang et al. (2024) using a z-score to measure each bank’s bankruptcy risk. Z-score measures the distance from bankruptcy. A higher z-score indicates that the bank is more

stable and less risky. Therefore, this proxy can indicate financial difficulties and the potential for banks to face solvency problems. Bank risk was calculated using the natural Logarithm of z-scores, which served as a proxy for insolvency or default risk (Mollah et al., 2017). Other than that, we also used credit risk and earning stability, which was measured by non-performing loans to gross loan (NPL/GL) and standard deviation of Return on Asset, respectively (*σ(ROA))*. The higher credit and profitability risks indicate that the bank is at high risk.

The second dependent variable is bank performance. We follow previous literature, such as Mollah et al., (2017), which measures performance: First, we use the bank's return on assets (ROA), defined as profit before tax divided by average assets. Second, we also use return on equity (ROE), we also use return on equity (ROE) which is defined as the ratio of profit before tax to average equity.

Women on Board Measurement

Women on the board of directors are the main variable of interest as the independent variable in this study. Women's board members represent women's inclusion in the financial industry. Following previous literature (Adams & Ferreira, 2009; Adams & Funk, 2012; Liu et al., 2014; Nadia & Hanafi, 2022)We employ %Women as measured by the percentage of women directors on the board or the total number of women on the board divided by the total number of board members.

Control Variables Measurement

Following previous corporate board literature, such as Huang et al. (2024) and Setiyono & Tarazi (2018), we include three set control variables in models linked to board characteristics, bank characteristics, and macroeconomic variables. For board characteristics, we control board size and independent boars, measured by the natural Logarithm of the total board and the ratio of the independent board divided by the total board, respectively. We employ control variables of bank characteristics such as bank size, loan ratio, and capital ratio, which are measured by the natural Logarithm of total assets, net loans to total assets, and equity to total assets, respectively. For macroeconomic variables, we employ GDP growth and inflation as control variables.

Table 1. The Definitions of Variables

Variables		Sources of the data
Bank Stability Measures		
Z-score	It is computed as the sum of ROA and equity-to-asset ratio divided by the standard deviation of ROA over the past three years.	Osiris Database
σ(ROA)	Natural Logarithm of ROA divided by the standard deviation of ROA	Osiris Database
Credit Risk (NPL/GL)	The ratio of non-performing loans to total loans	Osiris Database
Bank Performance Measures		
ROA	Total return divided by total asset	Osiris Database
ROE	Total return divided by equity	Osiris Database
Board Compotition Variables		
%Women	Total women on board divided by total board in each bank	Annual Report
Board Size	Natural Logarithm of bank total board	Annual Report
IndBoard	Total Independent Board divided by total bank board	Annual Report

Variables		Sources of the data
Size	Natural Logarithm of Total Assets	Osiris Database
Equity Ratio	The ratio of total equity over total assets	Osiris Database
Loan Ratio	The ratio of net loans to total assets	Osiris Database
Macroeconomic Variables GDP		
GDP Growth	GDP per capita growth rate	World Bank Database
Inflation	The annual growth rate of the consumer price index	World Bank Database

Source: Processed Data, 2025

Table 1 presents the definitions and data sources of the variables employed in this study, which are systematically categorized into bank stability measures, bank performance measures, board composition variables, bank characteristic variables, and macroeconomic variables. Bank stability is captured using the Z-score, which reflects the distance to default by combining profitability, capitalization, and earnings volatility, along with σ(ROA) to measure income volatility, and credit risk (NPL/GL) to assess asset quality and loan default exposure. Bank performance is evaluated through ROA and ROE, representing operational efficiency and shareholders' returns, respectively. Governance aspects are proxied by board composition variables, including the proportion of women on the board, board size, and the proportion of independent directors, which capture diversity, monitoring capacity, and board independence.

Bank-specific characteristics, such as size, equity ratio, and loan ratio, are incorporated to control for differences in scale, capitalization, and lending intensity. Finally, macroeconomic conditions are accounted for using GDP growth and inflation, reflecting the broader economic environment in which banks operate. In addition, the selection of these variables allows for a holistic assessment of bank stability by capturing both internal and external determinants during crisis periods. The integration of stability, performance, governance, and risk indicators enables the study to disentangle how managerial decisions, board structures, and financial conditions jointly influence banks' resilience under economic stress. By controlling for bank-specific characteristics and macroeconomic factors, the model minimizes omitted variable bias and enhances the validity of the estimated relationships. This comprehensive variable framework not only strengthens the empirical robustness of the analysis but also represents a methodological contribution by linking governance attributes with risk-taking behavior and performance outcomes in explaining bank stability amid crises.

Econometric Model

We construct a panel-data regression model to investigate the effect of board composition on bank risk and performance in Indonesia. We constructed our baseline linear regression models by following existing literature (Levi et al., 2014; Shabir et al., 2024) and is estimated as follows:

$$\text{Bank risk}_{i,t} = \alpha + \beta_1 \text{ Board Characteristics} + \Sigma\beta_i \text{ Controls}_{i,t} + \text{Bank FE} + \text{Year FE} + \varepsilon_{i,t} \quad (1)$$

$$\text{Performance}_{i,t} = \alpha + \beta_1 \text{ Board Characteristics} + \Sigma\beta_i \text{ Controls}_{i,t} + \text{Bank FE} + \text{Year FE} + \varepsilon_{i,t} \quad (2)$$

Where *i* and *t* denote banks and time, respectively, the dependent variables in model 1 include z-score, credit risk (NPL/GL), and volatility of earnings (*σ(ROA))*. The dependent variable model 2 includes ROA and ROE. We estimate models 1 and 2 using a fixed-effects model and include lagged value variables to confirm robustness. To test how board

characteristics affect bank risk and bank performance during crisis periods, we examine the moderating role of a crisis variable that equals 1 during crisis periods and 0 otherwise. For this purpose, we follow Cambrea et al. (2021) and extend our baseline models 1 and 2 by including the interaction variable as a moderator (Crisis) with board characteristics variables. Then, the models are constructed as follows:

$$\text{Bank risk}_{i,t} = \alpha + \beta_1 \text{ Board Characteristics }_{i,t} + \beta 2 \text{ Crisis }_{i,t} + \beta_1 \text{ Board Characteristics}_{i,t} * \text{Crisis }_{i,t} + \Sigma\beta_i \text{ Controls}_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$\text{Performance}_{i,t} = \alpha + \beta_1 \text{ Board Characteristics }_{i,t} + \beta 2 \text{ Crisis }_{i,t} + \beta_1 \text{ Board Characteristics}_{i,t} * \text{Crisis }_{i,t} + \Sigma\beta_i \text{ Controls}_{i,t} + \varepsilon_{i,t} \quad (4)$$

Where Crisis $_{i,t}$ represents our moderator variable, and Board Characteristics$_{i,t}$ * Crisis $_{i,t}$ represent the interaction between our explanatory variables and moderator variable. We estimate models 1 and 2 using a fixed-effects model with bank and year effects in STATA 17.

RESULT AND ANALYSIS

Energy poverty has significant impact in explaining environmental degradation. This implies that, an increase.

Descriptive Statistics

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Z_Score	431	3.451	1.149	-1.073	5.472
Credit Risk	500	0.044	0.077	0	0.969
σ(ROA)	476	0.01	0.0196	0.0000707	0.1461
ROA	497	0.0087	0.0286	-0.224	0.108
ROE	501	0.066	0.241	-3.555	0.421
%Women	594	0.153	0.1382	0	0.75
Boardsize	594	2.343	0.396	1.098	3.434
IndBoard	594	0.234	0.0901	0	1
Bank Size	501	20.205	2.551	13.64	23.025
Loan Ratio	500	0.6006	0.121	0.0001	0.812
Equity ratio	501	0.163	0.1066	0.0318	0.889
gdp_growth	548	4.564	2.109	-2.065	6.345
Inflation2	594	4.598	2.254	1.560	13.108

Source: Researcher's Computation, 2025

Table 2 explain before presenting the analysis results, we exclude the 1% lowest and highest values to address potential outlier issues. Table 2 above describes the statistics of all variables used in this study. We use the logarithmic value of the z-score to assess the bank's risk-taking. The risk variables used in this study are Z-score, NPL/GL, and *σ(ROA),* with average values of 3.451, 0.044, and 0.01, respectively. For performance measures, ROA and ROE have average values of 0.008 and 0.066, respectively. As aforementioned, we calculate %women as the ratio of women on the board each year from 2003-2022. The average value of %women is 0.153 with minimum and maximum values of 0 and 0.75%, respectively.

Univariate Analysis

Table 3 presents the Pearson correlation matrix for all the variables already considered. We can see from Table 3 that %Women on the board reduces bank risk or reduces risk-taking. Multicollinearity among the variables should not be a concern. From Table 3 below, we conclude that there is no collinearity problem.

Table 3. Pearson Correlation Matrix

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1	**z_score**	1.0000												
2	**Credit Risk**	-0.2565	1.0000											
3	**σ(ROA)**	-0.6777	0.2770	1.0000										
4	**ROA**	0.5498	-0.2711	-0.5562	1.0000									
5	**ROE**	0.6166	-0.1491	-0.4619	0.7441	1.0000								
6	**%Women**	0.0655	-0.0610	0.0498	-0.0118	-0.0137	1.0000							
7	**Boardsize**	0.1879	-0.0429	-0.2772	0.2928	0.2887	-0.1611	1.0000						
8	**IndBoard**	-0.1128	0.0236	0.1790	-0.1121	-0.1082	0.0403	-0.2008	1.0000					
9	**Bank Size**	-0.1406	0.0015	0.1432	-0.1758	-0.1926	0.0510	-0.5331	0.1649	1.0000				
10	**Loan Ratio**	0.0587	-0.0078	-0.2624	0.0779	0.0134	-0.0233	0.1725	-0.0196	-0.0695	1.0000			
11	**Capital Ratio**	-0.0873	-0.0130	0.4757	-0.1426	-0.1055	0.1742	-0.2788	0.0976	0.0743	-0.3430	1.0000		
12	**gdp_growth**	0.0611	0.0319	-0.0526	0.1298	0.1329	-0.0390	0.0093	-0.0727	-0.0304	0.1949	-0.1459	1.0000	
13	**inflation**	0.0805	-0.0090	-0.1437	0.1664	0.2094	-0.1445	0.0510	-0.2516	0.0061	0.0477	-0.2274	-0.8079	1.0000

Source: Researcher's Computation, 2025

Multivariate Analysis

We run regressions for all dependent variables to examine the effect of board characteristics, controlling for board and bank characteristics and macroeconomic variables. Other than that, we include bank and year effects on all models. Models 1-6 were tested using a fixed-effect model with a lag value of %women variable.

Who governs bank risk at the board level?

Table 4 shows the regression results. Following previous literature, such as Huang et al. (2024), to mitigate the possible concern of endogenous control problems, we construct models 1-3 excluding control variables. The model 4-6 include all control variables. We include bank and year fixed effects for all models (1-6).

Table 4. Board Characteristics on Bank Risk

	(1) z_score	(2) nplgl	(3) stdev_roa	(4) z_score	(5) nplgl	(6) stdev_roa
L.%Womrat	1.514 **	-0.0436	-0.0259 ***	1.801 ***	-0.0791 *	-0.0264 ***
	(2.51)	(-1.04)	(-2.95)	(2.86)	(-1.76)	(-3.26)
Boardsize				0.524 *	-0.0303	-0.00283
				(1.79)	(-1.41)	(-0.75)
IndBoard				-2.426 ***	0.00403	0.0121
				(-2.98)	(0.07)	(1.20)
Bank Size				0.00651	-0.000859	0.000220
				(0.22)	(-0.41)	(0.59)
Loan Ratio				0.0358	0.175 ***	-0.00698
				(0.05)	(3.31)	(-0.75)
Capital Ratio				2.837 ***	-0.201 ***	-0.0121
				(2.83)	(-3.17)	(-0.99)

	(1) z_score	(2) nplgl	(3) stdev_roa	(4) z_score	(5) nplgl	(6) stdev_roa
gdp_growth				0.0278	0.00196	0.000648 ***
				(0.98)	(0.91)	(1.77)
Inflation				0.0588	-0.00806	-0.002431
				(0.38)	(-0.71)	(-1.24)
_cons	3.392 ***	0.0381 ***	0.0131 ***	1.634 *	0.0989	0.0240 *
	(19.55)	(3.12)	(5.09)	(1.67)	(1.43)	(1.95)
Bank Effect	YES	YES	YES	YES	YES	YES
Year Effect	YES	YES	YES	YES	YES	YES
Obs.	414	476	498	371	430	408
R2	0.0506	0.0422	0.0421	0.106	0.112	0.0755

Note: The definitions of the variables can be seen in Table 1. * denotes p<0.1, with a significance level of 10% level. ** p<0.05 at 5% level. *** p<0.01 at 1% level

Results in Table 4 prove that % Women are significant in all models (except model 2, although it gives a robust sign) in levels 1%, 5%, and 10%. %Women is positively related to z-score and negatively related to credit risk and profitability risk (NPL/GL and *σ(ROA)*), indicating that %women can reduce bank risk. This result supports our hypothesis that women on bank boards can reduce bank risk and, as a result, improve bank stability. This result supports the social perception that women tend to be risk-averse and avoid risks (Nadia & Hanafi, 2022). Charness & Gneezy (2012), one author of sociology literature, states that risk-averse individuals are likelier to behave properly and follow the rules. Regarding the other variables, the model finds that a larger board size is associated with reduced bank risk, as the coefficient on board size is positive and statistically significant at the 10 percent level. This also suggests that increasing board size may introduce a new role and monitoring behavior that shows a board's effective functioning (Ratnawati, 2019). The independent director variable shows a negative coefficient and is statistically significant at a 1 percent level. They indicate that the presence of an independent board of directors increases bank risk.

Who on the Board of Directors Can Make an Effort to Increase Bank Performance?

Table 5 below shows the regression results on bank performance. We construct models 1-2, excluding control variables. The model 3-4 includes all control variables. All models include the firm and year-fixed effect.

Table 5. Board Characteristics and Bank Performance

Variables	(1) ROA	(2) ROE	(3) ROA	(4) ROE
L. %Women	0.0298 **	0.475 ***	0.0374 **	0.552 ***
	(2.17)	(3.63)	(2.53)	(3.80)
Boardsize			0.000814	0.0517
			(0.12)	(0.74)
IndBoard			-0.0186	-0.234
			(-0.99)	(-1.25)
Bank Size			0.000229	-0.00269
			(0.33)	(-0.40)
Loan Ratio			0.0290 *	0.176
			(1.68)	(1.03)
Capital Ratio			0.0436 **	0.490 **
			(2.08)	(2.38)
gdp_growth			-0.000478	-0.00285
			(-0.68)	(-0.41)
Inflation			0.00678 *	0.0324
			(1.80)	(0.87)

Variables	(1) ROA	(2) ROE	(3) ROA	(4) ROE
_cons	0.00382 (0.94)	-0.00813 (-0.21)	-0.0404 * (-1.79)	-0.321 (-1.43)
Bank Effect	YES	YES	YES	YES
Year Effect	YES	YES	YES	YES
Obs.	473	477	427	430
R2	0.0742	0.0845	0.0949	0.104

Note: The definitions of the variables can be seen in Table 1. * denotes p<0.1, with a significance level at 10% level. ** p<0.05 at 5% level. *** p<0.01 at 1% level

We report the findings in Table 5. We tested the model without a lag value of %Women, and the result was positive but insignificant (untabulated). Then, we lag one year %Women and tested the model using fixed effects as shown in Table 5. As expected, the result indicates that increasing the number of women on the bank's board will improve performance. A one-year lag value of %Women may indicate that the bank's female board members require more time to influence the bank's performance. The results in models 1-4 are statistically significant and show robust effects at the 5% level for ROA and at the 1% level for ROE. It shows that the presence of women directors on the board positively impacts bank performance, as measured by Return on Assets (ROA) and Return on Equity (ROE). Board gender diversity can lead to better corporate governance and, in turn, better performance.

The board size does not significantly impact the bank's performance. The board size does not significantly impact managerial decisions when formulating firm policy during the execution of its supervisory role. The firm needs a board of commissioners with competence in finance or accounting and more business experience than many commissioners. In other words, board size does not determine the company's profits (Wijaya et al., 2021). The results indicate that the independent directors have a negative coefficient of bank performance. However, it is not statistically significant, indicating that the independent board does not significantly impact the bank's performance. Some independent directors may have only formal and less active roles in oversight and strategic decision-making (Bhagat & Black, 2005).

Table 6. Result on Crisis Effect

Varibles	(1) lnzscore	(2) lnzscore	(3) lnzscore	(4) roa	(5) roa	(6) roa
Bzc	-0,504** (-2.36)			0,112 (1,39)		
Rwc		0,452 (0,61)			0,486** (2,05)	
Idc			-1,027 (-0,71)			-0,997** (-2,01)
Crisis	1,286** (2,30)	-0,243 (-0,99)	0,0860 (0,21)	-0,309 (-1,47)	-0,125 (-1,54)	0,303** (2,18)
BoardSize	0,475* (1,85)			0,095 (0,95)		
%Women		-1,074 (-1,37)			0,0224 (0,10)	
IndBoard			-2,666*** (-2,93)			-0,172 (-0,59)
roa	29,29*** (9,40)	-1,049 (-0,29)	-2,570 (-0,74)			
credit growth	0,808* (1,91)	2,095*** (4,01)	2,313*** (4,48)	0,515*** (3,35)	0,522*** (3,40)	0,445*** (2,72)
Capital Ratio	3,582*** (3,84)	1,700 (1,54)	1,136 (1,02)	-0,512 (-1,44)	-0,348 (-0,97)	-0,682* (-1,90)
_cons	1,638** (2,39)	3,357*** (10,90)	3,924*** (11,15)	0,461* (1,77)	0,671*** (7,31)	0,772*** (6,89)
Bank Effect	YES	YES	YES	YES	YES	YES

Varibles	(1) lnzscore	(2) lnzscore	(3) lnzscore	(4) roa	(5) roa	(6) roa
Year Effect	YES	YES	YES	YES	YES	YES
Obs.	385	354	354	390	390	370
R2	0,304	0,096	0,131	0,257	0,259	0,225

Source: Researcher's Computation, 2025

Concerning the effects of board characteristics on bank risk and performance during the crisis period, we run models 3 and 4 using lagged fixed effects, including bank and year effects. Table 6, columns 1-3, presents the effect of board characteristics on bank risk during a crisis period, while columns 4-5 present the effect of board characteristics on bank performance. In crisis times, the coefficient for the interaction between board size and the crisis dummy is negative and statistically significant ($\beta = -0.504$, $p < 0.05$). This result implies that larger boards tend to be risk-averse during the crisis, whereas smaller boards are associated with greater risk-taking by banks. Column 4 examines the interaction between board size and the crisis dummy on bank performance and finds that it is not statistically significant. This result is consistent with (Ferrero-Ferrero et al., 2012). Columns 2 and 5 represent the role of women directors who interacted with crisis variables to affect risk-taking and performance, respectively. Column 2 indicates that women directors did not affect bank risk-taking during crisis periods. On the other hand, column 5 indicates that women directors can bring better performance during a crisis. Adams and Ferreira (2009) find that the representation of female directors increases board meeting attendance and improves performance. Columns 3 and 6 show the role of the interaction between the independent director and the crisis dummy. The results indicate that during the crisis, the proportion of independent directors did not affect bank risk-taking, but the higher proportion of independent directors reduced bank performance.

DISCUSSION

The results of this study indicate that board characteristics influence bank stability, risk, and performance in different ways. Board size has been shown to increase bank stability, although the effect is significant at the 10% level, and has no consistent impact on credit risk or financial performance. According to agency theory, boards play a crucial role in effectively creating corporate monitoring and ratification systems, which control every action management takes (Chumba, 2015). Three major decision-making powers available to boards of directors to reduce agency costs are monitoring, ratification, and reward and punishment. These choices can involve taking high or low risks by implementing careful strategies. But the board's large size is also a sign of the complex problems a company faces. However, if the board size does not have a good effect on the company's performance, this indicates that communication and coordination within the company are running inefficiently (Pathan and Faff, 2013). This finding is supported by the fact that companies in Indonesia implement a system that separates the board of directors and commissioners (Wijaya et al., 2021), so that when the board size is too large, it will make it less flexible in making decisions due to the many differences of opinion (Ramly & Basharahil, 2021) and differences of interest. (Ratnawati, 2019).

Conversely, board independence is negatively associated with bank stability and does not clearly contribute to performance. The results indicated that the presence of an independent board of directors is associated with higher levels of bank risk-taking. In agency theory, independent directors help alleviate agency problems between shareholders and management (Mulia et al., 2020). However, our results indicate that the presence of an independent director may increase bank risk. The argument can be addressed because independent directors usually face certain limitations or obstacles in their roles. Previous research suggests that boards serve only a legal fiction dominated by upper management (Kosnik, 1987). This can result in independent directors not being privy to confidential information about the companies they serve, thereby causing information asymmetry, which is then exploited by opportunistic behavior by other parties (Arora, 2018). The results also

show that the ratio of women on the board has a positive effect on bank stability and performance. Previous evidence finds that women directors have better attendance records and are more actively taking the initiative (Adams & Ferreira, 2009).

In agency theory, agency problems arise from separating ownership (by shareholders) from control (by management), leading to potential conflicts of interest. Including women on boards is considered a governance mechanism to address these issues. By involving female directors, companies can create a more balanced supervisory structure. Therefore, within the agency theory framework, female directors' presence can be considered a control mechanism that can improve performance and better manage company risks (Korenkiewicz & Maennig, 2023). However, this result is consistent with Setiyono & Tarazi (2018), who found that female leadership in bank structures can reduce bank risk. Therefore, this result implies that the risk-averse nature of women directors can drive their motivation to make more efforts to reduce bank risk. On the other hand, the result shows that women directors bring better performance and is related to agency theory, which implies that female directors can more effectively resolve agency problems between shareholders and company managers. The participation of women directors can result in boards becoming more involved in advising and shaping strategy, as boards are increasingly able to deal with the complexities and uncertainties surrounding business strategic decisions (Post & Byron, 2015). The presence of women on boards can affect agency problems by influencing board dynamics and decision-making processes and mitigating potential conflicts of interest between shareholders and managers (Korenkiewicz & Maennig, 2023). Therefore, our result is consistent with the previous research, such as Farag & Mallin (2016). Female directors possess risk-averse habits, distinct core values from their counterparts, and unique skills; therefore, they can achieve better performance by serving as active monitors and careful decision-makers.

Analysis of crisis periods shows that the effectiveness of board characteristics varies with increasing economic pressures. Larger board sizes actually decrease stability during crises, indicating coordination problems and slow decision-making. Conversely, women on boards continued to contribute positively to bank performance during the crisis, while board independence negatively impacted performance. This result confirms the theory that a bank with more independent directors means higher asymmetry information may benefit inside directors (Fama and Jensen, 1983). Therefore, more independent directors in crisis times may have higher asymmetric information, which might not be reflected in improved performance. This result suggests that an independent board is chosen more to confirm regulatory requirements, or that the market for high-performance independent directors is limited. This result supported the previous studies (e.g. Erkens et al. 2012; Pathan and Faff., 2013). These findings confirm that the crisis served as a real-world test of board governance effectiveness. The impact of board characteristics on firm value may depend on the balance of advantages and disadvantages arising from monitoring and counseling functions (Ramly & Basharahil, 2021). Therefore, the overall study shows that board characteristics do not operate uniformly across all circumstances. Board governance effectiveness is highly dependent on economic circumstances, making adaptive board design more important than a blanket governance approach.

CONCLUSION

Bank board competition has received increasing attention from researchers, regulators, and practitioners. Board gender diversity is expected to enrich decision-making and improve bank performance. Therefore, we examine women on bank boards and how they influence bank risks and performance in Indonesia. We expect that women bring better results and reduce bank risk. We employed an unbalanced panel data set containing 43 Indonesian banks for 2003-2022. We tested the model using fixed-effect models, including bank and year effects, and lagged the value %Women. Using fixed effect models and including bank and year effects and lag value models, we find that in normal times, board structure, including

board size, women directors, and independent directors, positively and statistically significantly affect bank risk-taking. Other than women directors, no other board characteristics positively affect bank performance. In crisis times, changes in board size negatively affect bank risk-taking. Women directors positively affect bank performance, though the effect is robust during crises. Then, independent directors negatively affect bank performance during crises. Thus, the result implies greater asymmetric information at the bank, which might harm its performance. However, we support the idea that board characteristics may affect bank risk-taking and performance in two conditions. Our study fills a gap in the limited literature on this topic in Indonesian banks, which has been under-examined. Therefore, we contribute to the theory and the literature on women board directors in bank board composition and how they affect bank risk-taking and performance. Future studies can extend our analyses by including directors' personal characteristics, such as education and ethnicity, to provide additional useful insights.

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