




ORIGINAL

## Board structure and corporate risk-taking: empirical evidence from vietnamese enterprises

### Estructura del consejo y asumición de riesgos corporativos: evidencia empírica de empresas vietnamitas

Le Thi Nhung<sup>1</sup>  , Tran Trong Nguyen<sup>1</sup>, Do Thi Hong Tham<sup>1</sup>, Do Thi Ha Anh<sup>1</sup>

<sup>1</sup>Academy of Policy and Development. Hanoi, Vietnam.

Cite as: Nhung LT, Nguyen TT, Hong Tham DT, Ha Anh DT. Board structure and corporate risk-taking: Empirical evidence from Vietnamese enterprises. Salud, Ciencia y Tecnología - Serie de Conferencias. 2024; 3:1444. <https://doi.org/10.56294/sctconf2024.1444>

Submitted: 31-05-2024

Revised: 24-09-2024

Accepted: 27-12-2024

Published: 28-12-2024

Editor: Prof. Dr. William Castillo-González 

Corresponding Author: Le Thi Nhung 

#### ABSTRACT

The research investigates the relationship between board structure and corporate risk-taking among publicly listed companies in Vietnam.

**Introduction:** we examine the impact of factors such as board size, independence, and duality on corporate risk-taking behavior.

**Method:** using the generalized method of moments estimator and our sample is based on an unbalanced panel dataset of listed firms on the Vietnamese stock exchange, excluding commercial banks, covering the period from 2012 to 2023.

**Results:** the results suggest that larger board size, a higher proportion of independent directors, and a reduction in the number of executive directors are associated with lower levels of corporate risk-taking.

**Conclusions:** in contrast, an increased presence of executive directors is positively correlated with higher corporate risk-taking. These findings contribute to the understanding of corporate governance and may inform regulatory and policy decisions.

**Keywords:** Board Structure; Corporate Risk-Taking; Vietnam.

#### RESUMEN

La investigación investiga la relación entre la estructura de la junta directiva y la asunción de riesgos corporativos entre las empresas que cotizan en bolsa en Vietnam.

**Introducción:** examinamos el impacto de factores como el tamaño de la junta directiva, la independencia y la dualidad en el comportamiento de asunción de riesgos corporativos.

**Método:** utilizamos el método generalizado del estimador de momentos y nuestra muestra se basa en un conjunto de datos de panel desequilibrado de empresas que cotizan en la bolsa de valores vietnamita, excluidos los bancos comerciales, que cubren el período de 2012 a 2023.

**Resultados:** los resultados sugieren que un mayor tamaño del directorio, una mayor proporción de directores independientes y una reducción en el número de directores ejecutivos están asociados con menores niveles de asunción de riesgos corporativos.

**Conclusiones:** por el contrario, una mayor presencia de directores ejecutivos se correlaciona positivamente con una mayor asunción de riesgos corporativos. Estos hallazgos contribuyen a la comprensión del gobierno corporativo y pueden informar las decisiones regulatorias y políticas.

**Palabras clave:** Estructura del Directorio; Asunción de Riesgos Corporativos; Vietnam.

## INTRODUCTION

The risk-return trade-off theory states that higher expected profits are typically linked to higher levels of risk, while lower risk tends to accompany lower profit expectations. Profit is always one of the important goals that enterprises aim for. However, operational challenges confront enterprises with a diverse array of risks, varying in type and complexity. In financial risk management, risk-taking is one of the risk control measures used to realize profit goals, because risk-taking at a sufficient level will positively impact the firm's profit growth. However, the excessive pursuit of high profits through heightened risk-taking can potentially precipitate local corporate failures and contribute to broader financial crises at the national or even global level, as evidenced by the 2008 global financial crisis. Therefore, research into corporate risk-taking attracted the attention of researchers and the community, businesses, managers, and policymakers.

Internal corporate governance mechanisms often formulate and implement strategic decisions in most organizations. Following the 2008 global financial crisis, scholarly consensus pointed to inadequate board performance as a significant factor contributing to the crisis.<sup>(1)</sup> At the same time, the internal governance mechanism, including the board structure, is an important factor when considering corporate risk-taking behavior.<sup>(2)</sup> The agency theory has shown that there is always a conflict between the owners and the users of capital in joint stock companies.<sup>(3)</sup> Managers, who are not shareholders, may take risks that benefit themselves rather than shareholders' interests. For example, in some cases, managers take on excessive risks to gain more significant compensation and incentives tied to the company's performance objectives.<sup>(4)</sup> On the other hand, they may also take on insufficient risks to protect their safety and reputation.<sup>(5)</sup>

Board structure, including board size, duality, and independence, serves as a critical mechanism for owners to control and regulate managers' risk-taking behavior.<sup>(6)</sup> A well-designed board structure can mitigate excessive risk in decisions taken by managers or executives, which could otherwise result in adverse consequences for the company. On the contrary, when managers avoid risks, it will limit the company's growth. Exploring how board structure influences corporate risk-taking provides valuable insights for owners, governance bodies, and policymakers.

Global research on board structure and corporate risk-taking primarily focuses on developed countries such as the US, Canada, Japan, the UK, and various European nations. In contrast, emerging and developing economies, where oversight mechanisms and managerial control are less robust, are seeing growing attention to corporate governance issues. In these regions, managers might take advantage of the weaker governance systems, prioritizing their own interests over those of shareholders, leading to higher agency costs compared to firms in more developed economies. Additionally, inconsistencies in the measurement of corporate risk-taking, board structures, research methodologies, and sample characteristics create challenges in this area of study. Thus, these differences are crucial when examining the impact of board structure on corporate risk-taking in Vietnamese listed companies. This study highlights that factors such as board size, independence, and duality influence corporate risk-taking in Vietnamese firms. Moreover, Adams, R.B et al.<sup>(7)</sup> contend that the endogenous nature of board structure variables introduces challenges in accurately assessing the effectiveness of governance interventions. Board size and independence are recognized as endogenous variables.<sup>(8)</sup> To address this, we account for all three types of endogeneity in our analysis by employing a generalized method of moments estimator for dynamic panel data.

The structure of this study is as follows: Section 2 provides a review of the existing literature and formulates the research hypotheses; Section 3 outlines the methodology and materials used; Section 4 presents the empirical analysis and discusses the findings; and Section 5 concludes with the implications for policy, addresses the limitations of the study, and suggests avenues for future research.

## Literature review

Agency theory posits that managers are typically risk-averse due to concerns over their reputation and job security.<sup>(3,5)</sup> However, managerial incentives, particularly those linked to firm performance, can encourage them to take on greater risks.<sup>(4)</sup> To align the interests of managers with those of shareholders, various incentives are offered to boost firm value.<sup>(3)</sup> Given the complexity of the instruments used and the ability of regulators to influence and adjust risk structures, governments worldwide have implemented regulations aimed at safeguarding the interests of shareholders and other stakeholders.<sup>(9)</sup> While government intervention can serve as a governance mechanism to address agency issues, it may also result in adverse effects. For instance, in the presence of moral hazard, shareholders may be less inclined to monitor, while managers could be incentivized to pursue riskier investments.<sup>(10)</sup>

Moreover, while government intervention is designed to address agency problems, it can sometimes result in unintended consequences. For example, regulations may limit external governance mechanisms, such as takeovers or competition.<sup>(11)</sup> This highlights the importance of internal governance mechanisms, like board structure, in managing managerial behavior and mitigating agency issues within firms.<sup>(12)</sup> In line with this perspective,<sup>(13)</sup> argue that the effectiveness of a board of directors is largely determined by the structure of the board.

Adams, R.B et al.<sup>(7)</sup> suggest that board size, independence, and CEO power are essential in addressing

organizational agency issues. Similarly, Belghitar, Y et al.<sup>(14)</sup> demonstrate that monitoring mechanisms, such as board size, effectively reduce agency costs within firms. Furthermore,<sup>(15)</sup> propose that European banks can improve their risk management by incorporating external members on their boards. In light of these findings, the following section reviews the relevant literature on board structure, focusing on aspects such as board size, independence, and duality.

#### *First, board size and corporate risk-taking*

Agency theory suggests that the size of a corporate board influences the effectiveness of its decisions. Smaller boards are generally considered more efficient and productive, as they face fewer challenges related to communication and coordination.<sup>(16,17)</sup> In contrast, larger boards may lead to higher agency costs, which can outweigh the advantages of having specialized members, thus limiting the firm's risk-taking.<sup>(17)</sup> Additionally, larger boards are often prone to greater communication and coordination issues, which may result in less decisive actions and reduced variability in corporate performance.

This perspective is consistent with research indicating that decision-making becomes increasingly complex in larger groups, requiring more compromise.<sup>(18)</sup>

As a result, a negative correlation between board size and corporate risk-taking is anticipated, which forms the basis for our first hypothesis as follows:

Hypothesis 1: Increasing the number of board directors will reduce the risk-taking level of Vietnamese enterprises.

#### *Second, board independence and corporate risk-taking*

In the literature, board independence is typically characterized by the presence of independent directors on corporate boards.<sup>(19)</sup> Agency theory posits that managers are often inclined to prioritize their personal objectives over the company's goals, which can lead to excessive risk-taking and more volatile performance outcomes.<sup>(20)</sup> Additionally, Hermalin, B.E et al.<sup>(21)</sup> highlight the central principles of agency theory, emphasizing that managers are motivated to maximize personal gains, sometimes at the cost of fulfilling their contractual responsibilities.

To counteract these risks from self-interested behavior, oversight mechanisms such as the board of directors were introduced.<sup>(3)</sup> Eisenhardt, K et al.<sup>(22)</sup> proposed boards as information systems capable of monitoring and detecting detrimental management practices arising from moral hazards, adverse selection, or information asymmetry. Independent directors play a pivotal role in this oversight by virtue of their independence from management and their vested interest in safeguarding their reputation in the labour market.<sup>(5)</sup>

The reputation hypothesis posits that independent directors are more likely to endorse investments in lower-risk projects, thus protecting companies from potential losses and safeguarding their corporate reputation.<sup>(12)</sup> Furthermore, according to the monitoring hypothesis, independent directors are expected to mitigate corporate risk. This hypothesis suggests that due to limited information available to the firm, information asymmetry increases, leading to higher information costs for independent directors.<sup>(23,24)</sup>

Empirical studies also indicate that a higher proportion of independent directors is linked to reduced corporate risk-taking.<sup>(25,12)</sup>

Overall, the effectiveness of the board of directors in performing its oversight function is linked to the independence of the board structure.<sup>(26)</sup> As a result, we anticipate an inverse relationship between board independence and corporate risk-taking in Vietnamese firms, which leads to our second hypothesis as follows:

Hypothesis 2: A negative correlation exists between board independence and corporate risk-taking in Vietnamese enterprises.

#### *Third, board duality and corporate risk-taking*

Two opposing views exist on the relationship between board duality and corporate risk-taking. According to Akbar, S et al.<sup>(27)</sup> companies where the CEO also serves as chairman tend to engage in significant corporate risk-taking, as indicated by measures of profit volatility. This suggests that CEOs vested with singular decision-making authority are more likely to make highly impactful decisions, whether positive or negative, compared to firms where authority is more dispersed. Consequently, a positive correlation exists between board duality (or the lack thereof) and the extent of corporate risk-taking.

Within the framework of agency theory,<sup>(16)</sup> advocates for the separation of the CEO and chairman roles to improve the board's ability to monitor effectively, which ultimately benefits shareholders. Additionally,<sup>(28)</sup> suggests that managers tend to be more risk-averse, often aiming to safeguard their positions due to the human capital they have invested in the company. This caution arises from the potential threat of job loss associated with project failures and dismissal. Supporting this perspective,<sup>(12)</sup> finds that CEOs with greater power (through dual roles) are more likely to influence board decisions in a way that reduces risk, as managers possess non-diversifiable assets, such as human capital and relatively stable salaries. Furthermore, CEOs may

not receive compensation for failed high-risk projects, particularly if they hold minimal ownership in the company. Therefore, when a CEO holds a dominant position in decision-making, it can lead to more secure and profit-oriented outcomes through risk-averse choices.<sup>(29)</sup>

This study proposes that a high proportion of concurrent board directors diminishes the board's supervisory effectiveness, leading to increased corporate risk-taking. Consequently, we formulate the third hypothesis as follows:

Hypothesis 3: Increasing board duality leads to an increase in corporate risk-taking of Vietnamese enterprises.

## METHOD

### Data sample

This research covers all companies listed on the Ho Chi Minh City Stock Exchange (HOSE) and the Hanoi Stock Exchange (HNX) from 2012 to 2023. The sample consists of 274 companies, representing 58 % of the total 471 companies listed on HOSE and HNX during this period.

The analysis period begins with the implementation of legal regulations on corporate governance for public enterprises in Vietnam, which mandate that listed companies ensure independent directors make up at least one-third of the board. These regulations introduce a significant change regarding the independence of boards in Vietnamese listed companies, particularly for those that had not met the one-third independent director requirement prior to 2012. This underscores the importance and relevance of board independence in the governance structure of Vietnamese enterprises.

Commercial banks were excluded from the research sample due to their unique industry characteristics and distinct performance metrics, which could undermine the relevance of the study's findings for this sector. To be included in the study, companies had to meet two specific criteria. First, the financial data of the sample firms had to be available for a minimum of five consecutive years, which is a requirement for the generalized method of moments estimator used in this study for dynamic panel data.<sup>(30)</sup> Second, we collected data from the audited financial statements of firms listed on HOSE or HNX for the period 2012-2023, excluding commercial banks. Data were gathered from secondary sources, including information websites. As a result, our final sample consists of an unbalanced panel of 274 Vietnamese listed firms, with a total of 2,851 observations from 2012 to 2023. The firms were categorized into various industries based on the ICB (Industrial Classification Benchmark) Level 3 industry classification standard.

### Variable measurement

#### Dependent variable

We adopted the methodology proposed by<sup>(31)</sup> to assess corporate risk-taking behavior, using the ratio of profitability to the volatility of profitability. Profitability is represented by the company's operating return on assets (ROA), while the standard deviation of ROA captures the volatility of profitability. This measure provides a comprehensive indication of risk levels, reflecting how operational decisions influence risk outcomes. Additionally, return on equity (ROE) was used as a secondary measure, calculated as the ratio of net income to shareholders' equity. The standard deviation of ROE accounts for both the risk linked to the company's projects and the additional risk arising from leverage in its capital structure.<sup>(31)</sup>

Earnings after tax were utilized to calculate profitability, aligning with the approach advocated by.<sup>(31,32)</sup> Consequently, two corporate risk-taking measures were derived as follows:

$$CRT1 = \frac{ROA_{it}}{\sigma_{ROA_{it}}}$$

$$CRT2 = \frac{ROE_{it}}{\sigma_{ROE_{it}}}$$

In both instances, a higher value of these metrics signifies reduced corporate risk-taking.

#### Independent variable

The key governance variables in this study were obtained from secondary data sources. First, in line with<sup>(17,33)</sup> board size is measured as the natural logarithm of the total number of directors on the board. Second, board independence is assessed by calculating the ratio of independent directors to the total number of directors on the board.<sup>(34,33)</sup> Third, board duality is determined by dividing the number of executive directors by the total number of directors on the corporate board.<sup>(12,33)</sup>

### Control variables

Control variables in this study include firm size, as larger firms tend to have greater diversification and lower risk, according to.<sup>(35,32)</sup> Firm size is measured as the natural logarithm of the total assets of the firm in the sample.

Additionally, financial leverage, defined as the ratio of debt to total assets, is incorporated to account for the risk associated with higher leverage.<sup>(27,36,32)</sup>

In addition, firm performance was controlled using Tobin's q ratio.<sup>(37,32)</sup> Firm age was also included as a control variable, given that older firms tend to have more experience and potentially lower risk profiles.<sup>(38)</sup> Moreover, CEO ownership was controlled for to capture the impact of ownership incentives on managerial risk-taking behavior.<sup>(3)</sup> A comprehensive description and measurement of all variables are provided in table 1 below.

Variable	Measure
Dependent variables: Corporate Risk Taking	
Risk1 (CRT1)	Ratio of return on asset to the volatility of return on asset
Risk2 (CRT2)	Ratio of return on equity to the volatility of return on equity
Independent variable: Board structure	
Board Size (BSIZE)	The natural logarithm of the total number of directors on the corporate board.
Board Independence (INED)	The proportion of independent directors to the total number of directors on the corporate board.
Board Duality (DUAL)	The ratio of executive directors to the total number of directors on the corporate board.
Control variables	
Financial Leverage (LEV)	The proportion of total financial debt to the total value of assets.
Firm Size (SIZE)	Natural logarithm of the total assets
Years of operation (AGE)	Natural logarithm of (the researching year minus the year of business establishment)
Tobin's q (TOQ)	The ratio of stock market capitalization plus the book value of liabilities to total assets.
CEO Ownership (CEOWN)	The percentage of shares owned by the CEO

### Research methodology

In dynamic models, firm-specific fixed effects can introduce bias into the least squares estimators (OLS) when the lagged dependent variable is correlated with these fixed effects. While the fixed effects model (FEM) can address fixed effects, it does not resolve the issue of correlation between the transformed lagged dependent variable and the transformed error term. Additionally, if explanatory variables are endogenous, there may be a correlation between the error term and these variables, leading to inconsistencies in both the FEM and OLS estimators. To tackle these econometric challenges, the generalized method of moments estimator (S-GMM) for dynamic panel data is employed. This approach removes fixed effects through a first-differencing transformation and corrects for biases arising from such correlations.<sup>(39)</sup>

The S-GMM method is well-suited for endogenous models as it effectively addresses all three forms of endogeneity: simultaneity, unobservable heterogeneity, and dynamic endogeneity. Simultaneity arises when variables such as financial leverage are determined alongside corporate risk-taking decisions. For example, managers may alter financial leverage to manage potential insolvency risks, which can obscure the actual level of corporate risk. Unobservable heterogeneity refers to the endogeneity caused by omitted variables, like managerial expertise, which affect corporate risk-taking but are not directly measurable.<sup>(21)</sup> Lastly, dynamic endogeneity occurs when present financial variables are influenced by past corporate risk-taking, leading to bias in the model.<sup>(8)</sup>

By utilizing S-GMM, we can account for all three sources of endogeneity and assert that our estimates provide consistent results. This approach employs lags of both the dependent and explanatory variables as instruments. We incorporate lags of corporate risk-taking to examine the dynamic impact of past corporate risk-taking on the current risk-taking behavior of board structure and financial characteristics of the firm.

We employ the following model to analyze the influence of board structure on corporate risk-taking:

$$Y_{it} = \alpha_1 + k_1 Y_{it-1} + \sum_{j=1}^3 \beta_j BOD_{it} + \gamma \text{Control}_{it} + \mu_{it} + \varepsilon_{it}$$

In this model,  $Y_{it}$  denotes corporate risk-taking (CRT), while  $Y_{it-1}$  represents the first lag of the dependent variable. BOD<sub>it</sub> includes board structure variables such as board size, independence, and duality. Control<sub>it</sub> covers control variables including financial leverage (LEV), firm size (SIZE), firm age (AGE), Tobin’s q (TOQ), and CEO ownership (CEOWN).  $\mu_{it}$  accounts for unobserved firm effects, and  $\varepsilon_{it}$  represents the error term.

**RESULTS**

Table 2 provides descriptive statistics for the dependent, independent, and control variables utilized in the empirical analysis model. The average CRT1 and CRT2 values for Vietnamese listed companies are 2,054 and 2,248, respectively. The average board size consists of five members, with the smallest board comprising three members and the largest having eleven members, in accordance with current Vietnamese legal regulations. The average proportion of board independence is approximately 21,5 %, which falls short of the corporate governance regulations in Vietnam that mandate a higher ratio of independent directors. On average, 25,8 % of board positions are held concurrently by board members. Additionally, the control variables show a mean CEO ownership of 0,061, firm size of 28,073, financial leverage of 0,483, Tobin’s q at 0,658, and firm age averaging 2,973.

Variable	Mean	Std. Dev.	Min	Median	Max
Corporate risk-taking					
CRT1	2,054	1,884	-3,229	1,754	11,138
CRT2	2,248	2,237	-3,462	1,871	18,439
Board structure					
BSIZE	1,717	249	1,099	1,609	2,565
INED	233	75	0	200	667
DUAL	258	159	0	200	800
Firm characteristics					
LEV	483	216	1	499	1,619
SIZE	28,073	1,390	23,712	27,938	32,617
TOQ	658	416	0	571	2,421
CEOWN	61	109	0	4	875
AGE	2,973	2,811	2,308	3,091	3,970

Variable	CRT1	CRT2	BSIZE	INED	DUAL	SIZE	LEV	TOQ	AGE	CEOWN
CRT1	1									
CRT2	0,165*	1								
BSIZE	0,031*	0,103*	1							
INED	-0,123*	-0,032*	0,124*	1						
DUAL	0,036*	-0,164*	0,120*	0,004*	1					
SIZE	-0,017*	-0,138*	-0,033*	0,129*	0,221*	1				
LEV	-0,170*	0,111*	-0,111*	0,140*	0,102*	0,102*	1			
TOQ	0,1862*	-0,109*	-0,054*	-0,152*	-0,136*	0,181*	0,130*	1		
AGE	0,115*	-0,121*	0,002*	-0,119*	-0,004*	0,129*	-0,029*	0,142*	1	
CEOWN	-0,009*	0,114*	0,117*	0,105*	0,173*	-0,002*	-0,013*	0,138*	0,162*	1

Note: \*Represents significance at 0,01 level

Table 2 provides the descriptive statistics for the variables used in this study. CRT1 represents the ratio of ROA to its volatility, while CRT2 indicates the ratio of ROE to its volatility. BSIZE refers to the board size, INED denotes board independence, and DUAL reflects board duality. The control variables include firm size (SIZE), financial leverage (LEV), Tobin's q (TOQ), years of operation (AGE), and CEO ownership (CEOWN). The statistics are presented at the firm level, based on all firm-year observations. All continuous firm-level variables are winsorized at the 1st and 99th percentiles. A full definition of each variable is provided in table 1.

Table 3 displays the correlation matrix for the variables in this study. Gujarati, D.N.<sup>(40)</sup> a correlation coefficient of 0,08 or higher between variables may indicate multicollinearity within the model. The results presented in table 3 reveal that none of the correlation coefficients are sufficiently high to raise concerns about multicollinearity. Therefore, it can be concluded that multicollinearity is not an issue in our model.

Table 4 provides the growth in board structure of Vietnamese enterprises in the sample over 12 years (2012-2023). During this period, there was a marginal increase in board size, rising from an average of 5,4 members in 2012 to 5,6 members in 2023 based on the reported data. The data indicates that a significant portion of sample companies maintain a low average ratio of independent directors, with a slight decreasing trend over time, thereby falling short of current regulatory requirements concerning independent directorships in Vietnam. Moreover, the observed decline in the number of board directors concurrently holding multiple positions reflects a movement among Vietnamese enterprises towards aligning with recommendations aimed at enhancing board oversight.

Variable	Mean (Standard deviation)											
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
BSIZE	1,695 (0,234)	1,691 (0,243)	1,714 (0,242)	1,721 (0,243)	1,718 (0,252)	1,720 (0,245)	1,715 (0,249)	1,717 (0,255)	1,722 (0,252)	1,717 (0,254)	1,732 (0,259)	1,723 (0,257)
INED	0,250 (0,192)	0,254 (0,186)	0,251 (0,179)	0,248 (0,174)	0,246 (0,167)	0,247 (0,161)	0,246 (0,160)	0,245 (0,159)	0,242 (0,158)	0,244 (0,158)	0,240 (0,158)	0,231 (0,069)
DUAL	0,270 (0,160)	0,271 (0,156)	0,261 (0,159)	0,263 (0,155)	0,262 (0,157)	0,255 (0,156)	0,255 (0,155)	0,254 (0,155)	0,256 (0,158)	0,255 (0,157)	0,251 (0,155)	0,262 (0,157)

Table 4 presents the average and standard deviation for board size (BSIZE), the proportion of independent directors (INED), and the percentage of executive directors across the sample period.

The data presented in table 5 show that larger firms tend to have bigger boards of directors, with the mean difference being statistically significant at the 5 % level ( $p < 0,05$ ). This finding aligns with previous studies, which suggest that the complexity of larger firms necessitates a greater number of board members.<sup>(24)</sup> In contrast, smaller firms exhibit a lower average percentage of independent directors and a higher average proportion of board members holding multiple positions within the board compared to larger firms. These differences are statistically significant at the 1 % and 5 % levels, respectively.

Variable	Large firms	Small firms	t-statistics
BSIZE	1,775	1,686	(12,673) **
INED	271	228	(-8,328) ***
DUAL	246	270	(5,166) **

Table 5 presents the mean differences in board size (BSIZE), proportion of independent directors (INED), and proportion of executive directors (DUAL) between large and small firms. Firms are categorized based on market value: those above the median are classified as large firms, while those below the median are classified as small firms. The significance levels are indicated by \*\*\*, \*\*, \* for 1 %, 5 %, and 10 %, respectively.

Table 6 presents the findings from the model estimation. The results indicate that board size has a positive and statistically significant effect on both CRT1 and CRT2. This supports Hypothesis H1, which posits a negative relationship between board size and corporate risk-taking. The observed results align with agency theory and are consistent with prior research.<sup>(18,17)</sup> Specifically, the findings suggest that gaining consensus on risky decisions within larger boards is more challenging compared to smaller boards, as greater compromise is necessary,<sup>(16)</sup> leading to less extreme decisions and lower risk-taking behavior.

Dependent variable	(1) CRT1	(2) CRT2
BSIZE	0,674*** (0,002)	0,712*** (0,001)
INED	1,326*** (0,008)	1,381*** (0,000)
DUAL	-0,562** (0,032)	-0,438* (0,076)
SIZE	1,105 (0,183)	0,903 (0,177)
LEV	-0,283** (0,042)	-0,306* (0,090)
TOQ	-0,081* (0,062)	-0,073** (0,034)
AGE	0,009* (0,072)	0,017* (0,066)
CEOWN	0,064 (0,169)	0,011 (0,223)
CRT1t-1	1,376*** (0,003)	
CRT2t-1		1,258*** (0,001)
Intercept	2,008* (0,064)	2,175** (0,041)
AR(1) test (P-value)	0,000	0,001
AR(2) test (P-value)	0,428	0,415
Hansen test of over-identification (P-value)	0,255	0,237
Diff-in-Hansen test of exogeneity (P-value)	0,269	0,258

Table 6 shows the results obtained from the dynamic panel generalized method of moments estimator, utilizing CRT1 and CRT2 as proxies for corporate risk-taking. P-values are displayed in parentheses, and all t-statistics are derived from robust standard errors. Significance levels are indicated by \*\*\*, \*\*, \* for the 1 %, 5 %, and 10 % levels, respectively. The AR(1) and AR(2) tests assess the presence of first-order and second-order serial correlation in the first-differenced residuals, with the null hypothesis assuming no serial correlation. The Hansen test of over-identification is performed under the null hypothesis that all instruments are valid, while the diff-in-Hansen exogeneity test assumes the null hypothesis that the instruments used for the equations in levels are exogenous. The definitions of all variables are provided in table 1.

Table 6 reveals significant positive correlations between the proportion of independent directors on the board and all risk measures at the 1 % significance level, highlighting the notable influence of independent directors on corporate risk-taking, thereby supporting hypothesis H2. This outcome is consistent with both agency theory and the reputation hypothesis, suggesting that independent directors, mindful of their reputations<sup>(5,6)</sup> are inclined to guide companies toward safer investments to improve solvency. As independent directors are not involved in daily operations or compensated through managerial rewards, they contribute to risk reduction by advising on and influencing more conservative strategic decisions.<sup>(24)</sup>

On the other hand, board duality is found to negatively affect CRT1 and CRT2 at the 5 % and 10 % significance levels, respectively. This suggests that a higher presence of dual-hatting directors is associated with greater corporate risk-taking, thus supporting hypothesis H3. This outcome implies that when managerial authority intersects with board membership, it may create conflicts of interest that harm minority shareholders.<sup>(27)</sup>

Notably, our study observes conflicting effects of board duality and independence on corporate risk-taking,



echoing Vietnamese corporate governance regulations that discourage executive directors from serving on corporate boards. These opposing influences may offset each other when one is more dominant than the other.

Existing literature indicates a positive association between higher debt levels and increased risk.<sup>(1,41)</sup> In this context, our findings align with previous studies regarding the relationship between financial leverage and corporate risk-taking. Moreover, older firms tend to experience less volatility in performance, which enables them to manage risk more effectively.<sup>(27,38)</sup> In terms of operational efficiency, we observe a negative and statistically significant relationship between Tobin's Q (TOQ) and corporate risk-taking (CRT1 and CRT2), suggesting that greater efficiency may encourage managers to take on more risk. This outcome is consistent with prior research.<sup>(37)</sup> Additionally, the statistical significance<sup>(37)</sup> of lagged risk measures, as shown in table 6, supports their inclusion in the model specification.

The specification tests conducted validate the application of S-GMM in this study, affirming the robustness of the model's estimators. Wintoki, MB *et al.*<sup>(8)</sup> serial correlation may be present in the first differences (AR(1)), but no serial correlation should exist in the second differences (AR(2)). Our results confirm the absence of serial correlation in the second difference. Additionally, the Hansen test for over-identification indicates that the instruments used in this study are valid. The results of the difference-in-Hansen test further support the exogeneity of these instruments in the level equations. The p-values for this test are within acceptable limits, confirming the exogeneity of the instruments employed in the research.

## CONCLUSIONS

The board of directors acts as a central internal governance mechanism in modern enterprises. This study explores the link between board structure and corporate risk-taking in publicly listed firms in Vietnam. Our findings suggest that the structure of the board plays a crucial role in shaping corporate risk-taking. Specifically, the analysis reveals that a higher proportion of independent directors is associated with lower levels of risk-taking, aligning with agency theory, the reputation hypothesis, and the monitoring hypothesis.<sup>(5,6,23)</sup> Additionally, the study finds that board duality is positively correlated with higher corporate risk-taking, while a greater presence of independent directors on the board leads to a reduction in corporate risk-taking among Vietnamese listed companies.

The findings of this study offer valuable contributions to the theoretical understanding of how board size, independence, and duality influence corporate risk-taking in the context of Vietnam. Given the critical role of risk management within firms, this research makes several important contributions to the existing literature. First, the global financial crisis had a profound impact on various industries worldwide, highlighting the importance of examining the relationship between board structure and corporate risk-taking, which is both timely and relevant. Second, this study addresses endogeneity concerns in the empirical analysis by employing the S-GMM method, ensuring that the results remain robust to potential endogeneity issues.

This study offers significant insights into corporate governance regulations and corporate risk-taking, particularly in Vietnam and other developing nations. The results align with Vietnam's existing public corporate governance regulations. Additionally, the research provides valuable empirical evidence to assist managers and policymakers in refining and enhancing corporate governance frameworks in the future. In light of the recent global financial crisis and the subsequent push for improved corporate governance mechanisms, the study's findings on the relationship between board structure and corporate risk-taking contribute crucial information for regulators across various countries. Consequently, these findings can aid in fortifying future corporate governance policies in Vietnam and other developing economies, offering protection against similar crises.

Our findings regarding board composition, including the number of directors, the proportion of independent directors, and the share of executive directors, provide valuable insights for enhancing corporate governance. They highlight that concentrated managerial power is associated with higher corporate risk-taking behaviors. Therefore, increasing the proportion of non-executive directors can help align managerial objectives with those of shareholders, promoting decisions that maximize shareholder value. Additionally, our results advocate for expanding both the number of independent directors and the overall board size, as these factors tend to reduce corporate risk-taking. Lastly, in terms of research methodology, addressing the impact of endogeneity has become crucial in corporate governance studies. This study supports the continued use of the S-GMM technique in future corporate governance research.

While this study makes notable contributions, it has certain limitations. First, the research does not explore other board characteristics, such as the educational background of directors, their ownership stakes in various companies, or their roles in other firms. Future studies could enhance our analysis by incorporating these factors and other relevant board attributes, offering deeper insights into this area of research. Second, expanding the sample size of firms would strengthen the robustness of the findings and further inform corporate governance regulations. Lastly, while this study employs quantitative methods, examining the perspectives of managers and directors through qualitative approaches could provide valuable insights into the complex relationship between internal governance mechanisms and corporate risk-taking. These areas are suggested for future research.

## BIBLIOGRAPHIC REFERENCES

1. Erkens, Hung, M., Matos, P., David H. Corporate governance in the 2007-2008 Financial crisis: Evidence from Financial Institutions Worldwide. *Journal of Corporate Finance*. 2012;18(2):389-411.
2. Tricker, R.I. *Corporate governance: Principles, policie, and practices*. Third Edition ed. Oxford: Oxford University Press; 2015.
3. Jensen, M., Meckling, W. Theory of the firm: managerial behaviour, agency cost and ownership structure. *Journal of Financial Economics*. 1976;Vol. 3:305-60.
4. Jensen, M.C., Murphy, K.J. Performance pay and top-management incentives. *The Journal of Political Economy*. 1990;98(2):225-64.
5. Fama, E.F. Agency problems and the theory of the firm. *Journal of Political Economy*. 1980;88(2):288-307.
6. Fama, E.F., Jensen, M.C. Separation of Ownership and Control. *Journal of Law and Economics*. 1983;26(2):301-25.
7. Adams, R.B., Hermalin, B.E., Weisbach, M.S. The roles of Boards of Directors in Corporate governance: An conceptual framework and survey. *Journal of Economic Literature*. 2010;48(1):58-107.
8. Wintoki, M. B., Linck, J. S., Netter, J. M. Endogeneity and the dynamics of internal corporate governance. *Journal of Finance Economics*. 2012;581-606.
9. Grove, H., Pateli, L., Victoravich, L.M., Xu, P. Corporate governance and Performance in the wake of the Financial crisis: Evidence from US Commercial Banks. *Corporate Governance: An International Review*. 2011;19(5):418-36.
10. Staikouras, P., Staikouras, C., Agoraki, M.E. The effect of board size and composition on European bank performance. *European Journal of Law and Economics*. 2007;23(1):1-27.
11. Levine, R. *The corporate governance of banks: A concise discussion of concepts and evidence*. Working Paper, World Bank Policy Research. 2004;
12. Pathan, S. Strong Boards, CEO power and bank risk-taking. *Journal of Banking and Finance*. 2009;33(7):1340-50.
13. Pearce, J.A., Zahra, S.A. Board composition from a strategic contingency perspective. *Journal of Management Studies*. 1992;29(4):411-38.
14. Belghitar, Y., Clark, E. Managerial risk incentives and investment related agency costs. *International Review of Financial Analysis*. 2015;Volume 38:191-7.
15. Barakat, A., Hussainey, K. Bank governance, regulation, supervision, and risk reporting: Evidence from operation risk disclosures in European banks. *International Review of Financial Analysis*. 2013;Volume 30:254-73.
16. Jensen, M.C. The modern Industrial Revolution, Exit, and the Failure of Internal Control systems. *Journal of Finance*. 1993;48(3):831-80.
17. Cheng, S. Board size and the variability of Corporate performance. *Journal of Financial Economics*. 2008;157-76.
18. Sah, R.K., Stiglitz, J.E. The quality of managers in centralized vernus decentralized organizations. *The Quaterly Journal of Economics*. 1991;289-95.
19. Guest, P.M. Board structure and executive pay: Evidence from the UK. *Cambridge Journal of Economics*. 2010;34(6):1075-96.

20. Chatterjee, A., Hambrick, D.C. Executive personality, capability cues, and risk taking: How narcissistic CEOs react to their success and stumbles. *Administrative Science Quarterly*. 2007;202-37.
21. Hermalin, B.E., Weisbach, M.S. The determinants of board composition. *The RAND. Journal of Economics*. 1988;19(4):589-606.
22. Eisenhardt, K. Agency theory: An Assessment and Review. *Academy of Management Review*. 1989;57-74.
23. Raheja, C.G. Determinants of board size and composition: A theory of Corporate Boards. *Journal of Financial and Quantitative Analysis*. 2005;40(2):283-306.
24. Boone, A.L., Field, L.C., Karpoff, J.M., Raheja, C.G. The determinants of corporate board size and composition: An empirical analysis. *Journal of Financial Economics*. 2007;85(1):66-101.
25. Akbar, S., Kharabsheh, B., Poletti-Hughes, J., Shah, S.Z.A. Board structure and corporate governance risk taking in the UK financial sector. *International Review of Financial Analysis*. 2017;101-10.
26. Westphal, J.D. Board games: How CEOs adapt to increase in structural board independence from management. *Administrative Science Quarterly*. 1998;511-53.
27. Adams, R.B., Almeida, H., Ferreira, D. Powerful CEOs and their impact on corporate performance. *The Review of Financial Studies*. 2005;1403-32.
28. Belkhir, M. Board structure, ownership structure and firm performance: Evidence from banking. *Applied Financial Economics*. 2009;1581-93.
29. Bebchuk, L., Cremers, K.J.M., Peyer, U.C. The CEO pay slice. *Journal of Financial Economics*. 2011;199-221.
30. Florackis, C., Ozkan, A. The impact of Managerial entrenchment on agency cost: An empirical investigation using UK panel data. *European Financial Management*. 2009;497-528.
31. Faccio, M., Marchica, M.T., Mura, R. Large shareholder diversification and corporate risk-taking. *Review Financial Studies*. 2011;24(11):3601-41.
32. Le, T.N., Nguyen, V.T. Impact of corporate governance on corporate risk-taking of listed companies on Vietnam stock market. *Banking Science & Training Review*. 2024;Volume 260 & 261:109-21.
33. Le, T. N. The impact of corporate governance on the financial performance of listed non-financial joint stock companies in Vietnam. *Journal of Trade Science*. 2023;182/2023:35-49.
34. Chen, J.J., Zhang. The impact of the corporate governance code on earnings management. *European Financial Management*. 2014;20(3):596-632.
35. Konishi, M., Yasuda, Y. Factors affecting bank risk taking: Evidence from Japan. *Journal of Banking and Finance*. 2004;28(1):215-32.
36. Ozkan, A., Ozkan, N. Corporate cash holdings: An empirical investigation of UK companies. *Journal of Banking and Finance*. 2004;28(9):2103-34.
37. Hagendorff, J., Vallascas, F. CEO pay incentives and risk taking: Evidence from bank acquisitions. *Journal of Corporate Finance*. 2011;17(4):1078-95.
38. Lewellyn, K.B., Muller-Kahle, M.L. CEO power and risk taking: Evidence from the subprime lending industry. *Corporate Governance: An International Review*. 2012;20(3):289-307.
39. Arellano, M., Bond, S. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*. 1991;277-97.

40. Gujarati, D.N. Basic Econometrics. New York: McGraw-Hill; 2003.

41. Nakano, M., Nguyen, P. Board size and corporate risk-taking, further evidence from Japan. Corporate Governance: An International Review. 2012;369-87.

#### **FINANCING**

The authors did not receive financing for the development of this research.

#### **CONFLICT OF INTEREST**

The authors declare that there is no conflict of interest.

#### **AUTHORSHIP CONTRIBUTION**

*Conceptualization:* Le Thi Nhung.

*Data curation:* Le Thi Nhung, Tran Trong Nguyen.

*Formal analysis:* Le Thi Nhung.

*Research:* Le Thi Nhung.

*Methodology:* Le Thi Nhung.

*Project management:* Le Thi Nhung.

*Resources:* Le Thi Nhung.

*Software:* Le Thi Nhung, Tran Trong Nguyen.

*Supervision:* Le Thi Nhung.

*Validation:* Le Thi Nhung.

*Display:* Le Thi Nhung, Do Thi Ha Anh.

*Drafting - original draft:* Le Thi Nhung, Tran Trong Nguyen.

*Writing - proofreading and editing:* Le Thi Nhung, Tran Trong Nguyen, Do Thi Hong Tham.