THE IMPACT OF FEMALE LEADERSHIP ON THE STOCK PRICE CRASH RISK OF NON-FINANCIAL FIRMS

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Abstract

Although the contribution of female leaders has changed significantly in recent years, pathways to achieving gender parity in leadership positions are still challenging. The paper examines the impact of executive gender and board gender diversity on stock price crash risk, using a regression method based on a sample of 148 Vietnamese non-financial firms over the period of 2013 to 2022. The results indicate that the presence of female chief executive officers (CEOs) or diverse genders on the board of directors (BOD) can reduce the risk of stock price crashes for non-financial enterprises. The study contributes to agency theory in the notion that female CEOs and female BOD members are often more risk-averse, and more adherent to regulations, business ethics, and financial reporting standards, thus reducing the possibility of hoarding bad news. Furthermore, the relationship between female CEOs, female members of BOD, and stock price crash risk is negative and more pronounced in firms with older female CEOs. However, large enterprises positively impact the risk of the stock price crash, regardless of the executive gender or board gender diversity. The findings contribute to the objective of gender parity and sustainable development of the stock exchange market in Vietnam and may also offer implications for other emerging markets.

Keywords: Female Leadership, Female CEO, Gender Diversity, Stock Price Crash Risk

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1. INTRODUCTION

Female senior leaders are playing an increasingly important role in business. According to a global survey conducted in 28 countries, published by Grant Thornton Belgium in 2024, 33.5% of top positions in companies worldwide are held by women, up from 30% in 2020 and 19.4% in 2004.

Among medium-sized companies worldwide, 93% have at least one woman in senior management, compared to 66% in 2012. Although the past 20 years have witnessed significant progress in gender management and diversity, it is projected that gender parity, with 50% of top management positions filled by women, will not be achieved until 2053 (Grant Thornton, 2024).

Female leaders, including female chief executive officers (CEOs) and board members, play crucial roles in managing and controlling organizations. In business management, women may possess distinctive advantages, such as a stronger adherence to regulations concerning tax compliance, business ethics, financial reporting standards, and financial market regulations (Barnett et al., 1994; Bernardi & Arnold, 1997; Fallan, 1999; Ittonen et al., 2013; Brooks et al., 2019). They also tend to exhibit feminine traits, including nurturing, kindness, and a strong concern for the rights and grievances of others (Eagly et al., 2000). As a result, companies led by women may experience superior outcomes.

Similarly, the presence of female members on the board of directors (BOD) can enhance decision-making by providing diverse viewpoints and perspectives. This diversity may help mitigate the risk of crises (Fang et al., 2020) and reduce the likelihood of corporate bankruptcy (Adusei & Obeng, 2019).

Prior studies have explored the impact of executive gender on stock price crash risk. Stock price crash risk, defined as the likelihood of a significant decline in stock prices within a specific timeframe, can severely affect the market value of publicly traded companies, harm the interests of shareholders and investors, erode market confidence, and, if it happens on a large scale, may negatively impact the real economy of a country (Chen et al., 2021). In a typical organizational structure of a firm, executives and BOD are responsible for making all important and strategic decisions related to the firm's business (Lee et al., 2019). As a result, research on the relationship between executive gender, gender-diverse boards, and stock price crash risk attracts a lot of attention. However, the findings are inconsistent findings. While most research found a negative relationship between female leadership and crash risk, both in developed and emerging markets (Le et al., 2022; Lee et al., 2019; Gull et al., 2024; Kong et al., 2023; Qayyum et al., 2021), some found the relationship is insignificant (Li & Zeng, 2019) or positive (Wang & Fung, 2022). Moreover, in most previous studies, gender variables have been examined from a narrow perspective, with leadership gender often treated as a binary variable. The interactive relationship between gender executives and gender-diversified boards with other important factors, such as age, company size, company history, and company industry is often overlooked.

This paper examines the impact of executive gender and board gender diversity on stock price crash risk in Vietnam, considering the interaction between gender and other personal and company characteristics, such as executives' age, company size, company history, and industry. The study utilizes data from the audited financial reports of 148 non-financial firms listed on Vietnam's stock exchanges during the period from 2013 to 2022. RStudio, in combination with Excel, was used to calculate data for stock price crash variables (*Crash, Ncskew, Duvol*) and control variables (*Sigma* and *Return*). Regression models, including logistic regression, ordinary least squares (OLS), random effect model (REM), fixed effect model (FEM), and generalized least squares (GLS), were employed to quantify the relationship between executive gender, gender-diverse boards, and stock price crash risk using two types of models. In the baseline models, we examine the separate effects of female executives and gender-diverse boards on stock price crash risk to assess how each predictor influences the outcome variables. In the extended models, we investigate the interactive effects of executive gender and gender-diverse boards with personal characteristics (age) and company characteristics (company size, company history, and industry) on stock price crash risk. This allows us to examine whether the impact of female executives and the proportion of female board members varies across different personal and company characteristics.

The paper contributes to the literature in several significant ways. First, it enhances agency theory by showing that female executives and a higher proportion of female members on the board can reduce the risk of stock price crashes. This could be the result of female manager's characteristics often more prudent and less prone to information hoarding (Le et al., 2022; Li & Zeng, 2019; Gull et al., 2024; Kong et al., 2023; Lee et al., 2019). Second, we contribute to the vast studies exploring the factors impact stock price crash risk (Li & Zeng, 2019; Andreou et al., 2016; Qiao et al., 2022; Chen et al., 2021; Kim et al., 2011a, 2011b; Kim et al., 2016; Dang et al., 2019; Robin & Zhang, 2015; DeFond et al., 2015; Thuy et al., 2022; Dai et al., 2019). Distinct from these studies, we examine the relationship between female CEOs, female board members, and stock price crash risk across different CEO and firm characteristics, including CEO age, company size, history of establishment, and industry. Third, to the best of the authors' knowledge, this research is one of the very first studies on this topic conducted in Vietnam, making it an intriguing case. The participation rate of Vietnamese women in the labor market is notably higher than in many countries, both regionally and globally (International Labour Organisation [ILO], 2021). However, within Vietnam's traditional social structure, women are often constrained by deeply rooted stereotypes and immense societal pressures, which may require them to exert significantly more effort than their male counterparts to gain recognition in the workplace. Consequently, information about a company being led by a female CEO may attract considerable attention from investors, potentially triggering negative reactions in the market. Moreover, the Vietnamese stock market is undergoing rapid growth, with a high proportion of individual investors (Le Hai, 2024), which could increase the risk of volatility and stock price collapse.

The findings can contribute to the key objective of increasing gender parity and promoting the sustainable development of the Vietnamese stock exchange. They are also helpful for businesses and investors to avoid stock price crash risk.

The structure of this paper is as follows. Section 2 reviews the relevant literature. Section 3 analyses the methodology that has been used to conduct the empirical research. Section 4 presents the result and discussion. Section 5 provides the conclusion.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Executive gender and business performance

In terms of the impact of executive gender on business performance, numerous studies have highlighted the significant positive contributions of female executives across various aspects. Firms led by women tend to have higher credit ratings (Datta et al., 2021), demonstrate higher accrual accounting quality and greater accounting conservatism (Barua et al., 2010; Francis et al., 2015), and engage in fewer acquisitions and debt issuances (Huang & Kisgen, 2013). Additionally, firms with female executives tend to reduce the risk of crises (Fang et al., 2020), maintain lower leverage, exhibit less volatile earnings, and have a higher likelihood of surviving financial shocks (Faccio et al., 2016). Agha and Pramathevan (2023) explore the role of female CEOs more deeply by examining the interactive effects of executive gender and age on corporate financial decisions and performance. Their findings suggest that firms led by older female executives achieve the best operating performance, despite making the lowest levels of investment. This outcome may be due to older female executives exhibiting lower levels of overconfidence, which results in more conservative risk-taking behavior.

Recent studies also suggest that female executives and gender-diverse boards contribute positively to a company's long-term sustainability. Female executives have played a significant role in promoting digitization (Meng & Zhu, 2024), improving corporate environmental, social, and governance (ESG) performance (Meng & Zhu, 2024; Yan et al., 2024; Provasi & Harasheh, 2021), and increasing the incorporation of corporate social responsibility (CSR) into executive compensation contracts (Liu et al., 2023). The superior performance of female executives can be attributed to their innate empathy and strong communication skills, which enable them to reduce conflicts and build consensus by considering the interests of all stakeholders (Yan et al., 2024).

In addition to examining the contributions of female executives, numerous studies focus on the role of female members in the BOD. Greater board gender diversity has been shown to improve firm profitability and performance (Low et al., 2015; Lien & Thuy, 2024; Basdekis et al., 2023; Alotaibi & Al-Dubai, 2024), as well as increase firm value (Awad et al., 2023; Carter et al., 2003). These findings are explained by the idea that board gender diversity brings a variety of viewpoints and perspectives, which helps to minimize errors in decision-making and improve overall organizational outcomes (Laique et al., 2023). While most studies emphasize the positive contributions of female executives and gender-diverse boards to company performance, some have found negative or no significant effects (Endraswati, 2018; Li & Zeng, 2019; Baloyi & Ngwakwe, 2017; Saleh et al., 2021).

2.2. Stock price crash risk

Two theoretical frameworks are commonly used to explain stock price crash risk: agency theory and investor behavior theory. According to agency theory, managers' actions to conceal or accumulate bad news about the company can create a potential risk for future stock price crashes (the bad news hoarding hypothesis). Due to various managerial incentives, such as concerns about career advancement and compensation, managers are often motivated to withhold bad news from external investors for an extended period (Jin & Myers, 2006; Hutton et al., 2009; Kothari et al., 2009). However, when a company accumulates too much negative information and reaches a tipping point, the costs of hoarding bad news will outweigh the benefits (Hutton et al., 2009). When this bad news eventually emerges, investors will quickly adjust their expectations about the company's future growth prospects, causing stock prices to plummet.

Investor behavior theory suggests that investors may overreact to new information and tend to follow the crowd, leading to panic selling when they observe others selling stocks. This collective behavior amplifies downward pressure on stock prices. It is driven by fear, uncertainty, and a lack of independent analysis among investors (Easley et al., 2016; Goldstein & Yang, 2017).

Consistent with the bad news hoarding hypothesis, empirical studies have found that certain managerial characteristics, such as male CEOs (Jin et al., 2019), young CEOs (Andreou et al., 2016), overconfident CEOs (Qiao et al., 2022), CEOs with early-life disaster experience (Chen et al., 2021), or chief financial officers (CFOs) with greater compensation incentives and power (Kim et al., 2011a), as well as CEOs from individualistic cultures (Dang et al., 2019), are positively associated with future stock price crash risk. Internal firm decisions can also influence stock price crash risk. For instance, the involvement of professional audit firms in financial reporting (Robin & Zhang, 2015), the adoption of International Financial Reporting Standards (IFRS) (DeFond et al., 2015), and companies with strong corporate integrity, codes of conduct, and business ethics (Jin et al., 2019), or those that disclose CSR information (Thuy et al., 2022, Dai et al., 2019), can reduce stock price crash risk.

Aligning with investor behavior theory, factors such as the level of institutional investor participation (Callen & Fang, 2013) and the quality of the information provided by professional analysts (Xu et al., 2017) can also influence stock price crash risk. Le Hai (2024) shows that higher investor attention in the market tends to increase the risk of stock price crashes, especially for large and highly liquid companies. External factors, particularly economic policy uncertainty (EPU), are positively and significantly associated with stock price crash risk (Dai et al., 2019). Research by Luo and Zhang (2020) indicates that the relationship between EPU and crash risk is stronger for firms with higher EPU income beta, as well as for younger, smaller, more volatile firms with greater growth potential. Meanwhile, Jin et al. (2019) suggest that EPU volatility before a crash is more evident in companies with higher information asymmetry and greater disagreement among investors.

2.3. Executive gender and stock price crash risk

There is extensive literature on stock price crash risk. However, the impact of gender leadership and board gender diversity on stock price crash risk has not been sufficiently researched. Generally, female managers are considered more risk-averse, less optimistic, and less overconfident than their male counterparts. As a result, they tend to avoid risky investments and are more likely to terminate losing projects early, which means they are less likely to encounter bad news in the first place. Additionally,

female executives are more likely to comply with financial market regulations and report high-quality financial information than male executives. Consequently, firms led by female executives are less likely to intentionally withhold bad news when it arises (Li & Zeng, 2019; Chen et al., 2021).

Empirical research on the impact of female executives on stock price crash risk has been conducted across various markets. In developed markets, including the UK, USA, Canada, Australia, Germany, France, the Netherlands, and Belgium, most studies consistently show that the presence of female board members has a positive impact in reducing the risk of stock price crashes (Le et al., 2022; Li & Zeng, 2019). In developing and emerging markets such as China (Gull et al., 2024; Kong et al., 2023), Malaysia (Lee et al., 2019), Taiwan (Wang & Fung, 2022) as well as regional markets like Asia-Pacific (Qayyum et al., 2021), results have varied. While the positive relationship between leadership gender and reduced crash risk has been confirmed in India and China, studies conducted in Taiwan show an inverse relationship. In these markets, senior female leadership may increase the risk of stock price crashes due to pressures to take higher risk-taking (Wang & Fung, 2022; Faccio et al., 2016), pressure to prove oneself (Francis et al., 2015), and more limited management experience compared to men (Khan & Vieito, 2013).

The impact of executive gender on stock price crash risk may also be influenced by factors such as executive age (Andreou et al., 2016), company size (Callen & Fang, 2013; Li & Zeng, 2019), the company's reputation, or its industry (Feng & Xiang, 2023). Therefore, we propose the following hypotheses:

H1: Companies with female chief executive officers are likely to reduce stock price crash risk.

H2: The impact of female chief executive officers on the stock price crash risk depends on the age of the executives, the size of the company, the company's history of establishment, and the company's industry.

A gender-balanced leadership structure is believed to enhance efficiency and innovation in business operations, as well as reduce corporate fraud and information asymmetry (Le et al., 2022). When a company's BOD maintains an appropriate male-to-female ratio, it limits the management's ability to conceal bad news, potentially reducing the risk of stock price crashes (Le et al., 2022). Specifically, companies with three or more female board members are less likely to experience a significant drop in stock prices (Qayyum et al., 2021). However, the male-to-female ratio on the BOD may vary across different types of businesses, depending on industry, market, and the company's development goals. Imposing a uniform ratio for all companies may not always effectively reduce stock price crash risk; in some cases, it may even exacerbate the risk. For example, Ahern and Dittmar (2012) found that the mandatory 40% female representation on boards in Norway led to a sharp decline in stock prices.

Based on these arguments, we propose the following hypotheses:

H3: Companies with a higher proportion of female members on the board of directors are likely to reduce stock price crash risk.

H4: The impact of female members on the board of directors on stock price crash risk depends on the size of the company, the company's history of establishment, and the company's industry.

3. RESEARCH METHODOLOGY

3.1. Sample

To assess the impact of executive gender and the gender diversity of the executive board on stock price crash risk, this study uses trading data and financial reports of all listed companies on the Ho Chi Minh Stock Exchange (HOSE) from 2013 to 2022. Consistent with previous studies, the sample excludes: 1) stocks of financial institutions (banks, securities, and insurance companies); 2) stocks of companies that were delisted during the study period; and 3) stocks with insufficient historical trading data. After these exclusions, the final dataset consists of 148 companies (see Table A.1 in Appendix). These 148 companies represent 15 sectors (see Table A.2 in Appendix).

The study period (2013–2022) encompasses a significant phase in the Vietnamese stock market, which recovered from the 2008 financial crisis, gradually stabilized, and subsequently experienced robust growth, with a remarkable 123% increase in market capitalization in 2021.

Table 1 provides the descriptive statistics for the variables included in the study. On average, the proportion of female executives in the sample is notably small. In the BOD, men make up 86.89% of the members, while women account for only 13.12%. The average proportion of male board members is nearly seven times higher than that of female members. The high standard deviations for gender-related variables indicate considerable variation in the proportion of men to women on the boards across companies. In contrast, the remaining variables exhibit relatively low standard deviations, suggesting stability in these variables over the observation period.

Table 1. Descriptive statistics

Variables	*Observations*	*Average*	*Std. dev.*	*Min*	*Max*
Crash	1480	0.1838	0.3874	0	1
Ncskew	1480	-0.1159	1.001	-3.573	4.3347
Duvol	1480	-0.0392	0.196	-0.6643	0.7994
FeCEO	1480	0.1135	0.3173	0	1
FeBo	1480	13.116	16.8419	0	100
Leverage	1480	0.1398	0.1466	0	0.7182
Sigma	1480	0.0441	0.0194	0.008	0.1429
Return	1480	-0.001	0.0073	-0.041	0.0271
Size	1480	27.7319	1.5528	22.1456	33.5904
Mtb	1480	1.2968	1.3522	0.12	35.44
ROA	1480	0.0589	0.0843	-0.996	0.7837
CEOAge	1480	56.696	8.1614	32	81
Reputation	1480	32.3182	12.8853	8	97
Industry	1480	0.4527	0.4979	0	1

Source: Authors' elaboration.

Table 2 presents the correlation matrix of the explanatory variables for the period 2013–2022. The results show that all correlation coefficients are below 0.4, indicating that the explanatory variables exhibit low correlations with one another. According to Pearson correlation analysis, this suggests that the variables are not highly collinear, making them suitable for use in the regression model.

Table 2. Correlation matrix

Variables	*FeCEO*	*FeBo*	*Leverage*	*Sigma*	*Return*	*Size*	*Mtb*	*ROA*	*CEOage*	*History*	*Industry*	*VIF*
FeCEO	1.0000											1.06
FeBo	0.2344	1.0000										1.07
Leverage	-0.0447	-0.0400	1.0000									1.11
Sigma	0.0654	0.0825	0.0062	1.0000								1.22
Return	-0.0235	-0.0091	-0.0090	0.0192	1.0000							1.98
Size	0.1229	0.0088	0.0808	-0.0841	0.1272	1.0000						1.31
Mtb	0.0922	-0.0368	-0.0644	-0.0211	0.1274	0.3789	1.0000					1.24
ROA	0.0460	-0.0836	-0.2073	-0.2826	0.1922	0.2370	0.2466	1.0000				1.30
CEOAge	-0.0355	-0.1128	-0.0678	-0.1404	0.0575	-0.0533	0.0043	0.0856	1.0000			1.03
History	0.0189	0.0004	-0.1729	-0.0377	0.0006	-0.1010	0.0787	0.0461	0.0693	1.0000		1.06
Industry	0.1795	0.2240	-0.0919	0.0424	-0.0048	0.0852	0.0595	0.0083	-0.0164	0.0103	1.0000	1.05

Note: VIF — variance inflation factor.
Source: Authors' elaboration.

3.2. Variables and measures

3.2.1. Dependent variables

To examine the impact of executive gender on future stock price crash risk, this study employs three specific measures of past stock price crash risk for each firm, as established in prior literature (Andreou et al., 2016; Hutton et al., 2009; Kim et al., 2011a, 2011b). These measures include: *Crash*, *Ncskew*, and *Duvol*.

Table 3. Calculation of dependent variables

Dependent variables	*Calculation*
$Crash_{j,T}$	Equals 0, if the firm did not experience any collapse weeks during the fiscal year *T*, and 1, if the firm experienced one or more collapse weeks during the fiscal year *T*.
$Ncskew_{j,T}$	$Ncskew_{j,T} = -\frac{n_{j,T}(n_{j,T}-1)^{\frac{3}{2}}\sum_{t=1}^{n_{j,T}} W^3{}_{j,t}}{(n_{j,T}-1)(n_{j,T}-2)\left(\sum_{t=1}^{n_{j,T}} W^2{}_{j,t}\right)^{\frac{3}{2}}}$, where, $n_{j,T}$ is the number of weeks the firm *j* experiences price fluctuations during the fiscal year *T*.
$Duvol_{j,T}$	$Duvol_{j,T} = ln\left\{\frac{(n_{u,j,T}-1)\sum_{t=1}^{n_{d,j,T}} W^2{}_{j,t}}{(n_{d,j,T}-1)\sum_{t=1}^{n_{u,j,T}} W^2{}_{j,t}}\right\}$, where, $n_{u,j,T}$ $(n_{d,j,T})$ is the number of weeks of stock price up (down) for firm *j* during the fiscal year *T*.

To calculate the three indices representing the stock price crash risk, $Crash_{j,T}$, $Ncskew_{j,T}$ and $Duvol_{j,T}$, the study first computes the weekly return for company *j* in week *t* ($W_{j,t}$) using the equation:

$$W_{j,t} = ln(1 + \epsilon_{j,t}) \quad (1)$$

where, $\epsilon_{j,t}$ represents the weekly residual return for company *j* in fiscal year *t*, obtained from the regression of the extended market index model as follows:

$$r_{j,t} = \alpha_j + \beta_{1,j} r_{m,t-2} + \beta_{2,j} r_{m,t-1} + \beta_{3,j} r_{m,t} + \beta_{4,j} r_{m,t+1} + \beta_{5,j} r_{m,t+2} + \varepsilon_{j,t} \quad (2)$$

In this equation, $r_{j,t}$ is the return of stock *j* in week *t* and $r_{m,t}$ is the return of the Vietnam index (*VNIndex*) in week *t*. To account for asynchronous trading, the study includes two leading and two lagging variables in the market index model (Dimson, 1979). The weekly returns of each company are computed from the company's closing stock prices, using RStudio. The results from RStudio are further computed in Excel to finalize the data for the dependent variables: *Crash, Ncskew*, and *Duvol*. For the analysis, these three measures are shifted one year forward to represent value for the next year's stock price crash risk.

3.2.2. Independent and control variables

The main independent variables in the study are those related to the gender of the executive, such as:

- $FeCEO_{j,T}$ — a binary indicator variable that equals 1 if the CEO of company *j* is female in fiscal year *T*, and 0 otherwise;
- $FeBo_{j,T}$ — the proportion of female members on the BOD of company *j* in fiscal year *T*.

The control variables include:

- $Sigma_T$ — the standard deviation of weekly returns for a specific company within the fiscal year;
- $Return_T$ — the average weekly stock return of the company;
- $Size_T$ — the natural logarithm of the market capitalization;
- Mtb_T — the market-to-book ratio of equity;
- $Sigma_T$ — the ratio of long-term debt to total assets;
- ROA_T — return on assets.
- $CEOage_T$ — the age of the CEO;
- $History_T$ — the number of years from the company's establishment.

The variables related to stock price crash risk and some control variables such as $Sigma_T$ *and* $Return_T$ are calculated based on the closing prices collected from CafeF. Data on executive gender ($FeCEO_{j,T}$ and $FeBo_{j,T}$) and some control variables

like $Leverage_T$, ROA_T, $CEOage_T$, and $HistoryD_T$ are collected and computed from the audited annual reports of the companies. The variables $Size_T$, and Mtb_T are calculated using data from CafeF and the annual reports.

Table 4. Summary of variables

Variables	Description	Reference
Dependent variables: Measures the stock price crash risk		
$Crash_{T+1}$	An indicator variable for companies experiencing at least one week of stock price decline during a year	Hutton et al. (2009), Kim et al. (2011a, 2011b), Callen and Fang (2015), Li and Zeng (2019)
$Ncskew_{T+1}$	The negative coefficient of the weekly return deviation of a specific company in the fiscal year	Hutton et al. (2009), Chen et al. (2001), Kim et al. (2011a, 2011b), Callen and Fang (2015), Li and Zeng (2019)
$Duvol_{T+1}$	The fluctuation of the weekly returns of a specific company during a fiscal year	
Independent variables: Executive gender		
$FeCEO_{i,T}$	Equals 1 if the CEO is female and 0 otherwise	The research team's propose
$FeBo_{i,T}$	The proportion of female members on the BOD	
Control variables		
$Leverage_T$	The ratio of long-term debt to total assets measured at the end of the fiscal year	Andreou et al. (2016), Callen and Fang (2015), Li and Zeng (2019)
$Sigma_T$	The standard deviation of the weekly returns of a specific company during the fiscal year	
$Return_T$	The average value of the weekly returns of a specific company during the fiscal year	
$Size_T$	The natural logarithm of market capitalization at the end of the fiscal year	
Mtb_T	The market-to-book ratio of equity	
ROA_T	Return on assets	Kim et al. (2011a, 2011b), Li and Zeng (2019)
$CEOage_T$	CEO's age	Andreou et al. (2016)
$IndustryD_T$	Equals 1 if the industry has more female workers than the average and 0 otherwise	The research team's proposal, based on Le et al. (2019) and data from an industry with large female workers from Statista (Galan, 2025)
$History$	The age of the company from its founding year to 2024	The research team's proposal, based on Le et al. (2019)
$CEOageD$	Equals 1 if the CEO age is greater than the median (57) and 0 otherwise	
$SizeD_T$	Equals 1 if the size is greater than the median (27.6025) and 0 otherwise	
$HistoryD_T$	Equals 1 if reputation is greater than median (30) and 0 otherwise	

Source: Authors' elaboration.

3.3. Methodology approach

3.3.1. Baseline models

In order to test the impact of female executives and female proportion in the BOD on stock price crash risk (*H1* and *H3*), the baseline models are developed based on the studies of (Kim et al., 2011a, 2011b; Andreou et al., 2016) and are formulated as follows:

$$Crash\ risk_{i,T+1} = \beta_0 + \beta_1 Crash\ risk_{i,T} + \beta_2 Gender_{i,T} + \beta_3 Control\ variables_{i,T} + \alpha_i + \gamma_t + \varepsilon_{i,T} \quad (3)$$

where,

- i represents the *i*-th firm observed at time T (with $i = \overline{1,148}$ and $T = \overline{2013,2022}$);
- *Crash risk* is measured by three indicators: *Crash, Ncskew*, and *Duvol*;
- *Gender* is represented by two variables: a dummy variable for female executives (*FeCEO*) and the proportion of female members on the BOD (*FeBo*);
- Control variables include factors such as *Size, Leverage, Sigma, Return, Mtb, ROA,* and *CEOage* as discussed earlier.

In this model, the coefficient β_2 captures the effect of executive gender and gender diversity on stock price crash risk. To account for potential unobserved heterogeneity between firms over time due to common macroeconomic developments, we estimate the panel regression with firm-fixed (α_i) and time-fixed (γ_t) effects.

3.3.2. Extended models

In order to examine whether the impact of female executives and gender diversity boards may differ across firm characteristics (such as CEO age, company size, company history of the establishment, and industries with high female labor participation) as proposed in *H2* and *H4*, the extended models have been developed with interactive variables:

$$Crash\ risk_{i,T+1} = \beta_0 + \beta_1 Crash\ risk_{i,T} + \beta_2 Gender_{i,T} + \beta_3 Control\ variables_{i,T} + \beta_4 Interactive\ variables_{i,T} + \alpha_i + \gamma_t + \varepsilon_{i,T} \quad (4)$$

In this extended model, the interaction term β_4·interactive variables helps to assess whether the impact of female executives or board gender diversity differs in firms of varying CEO ages, sizes, histories, and industries. Following Le et al. (2019), the sample companies are divided into large and small categories based on their total assets, with companies above the median classified as large and those below the median classified as small. A dummy variable, *SizeD*, is created, which takes the value of 1 for large companies and 0 for small companies. Similarly, a dummy variable *IndustryD* is used, which equals 1 if the industry has a higher

proportion of female workers than the industry average, and 0 otherwise (Galan, 2025). Additionally, *CEOageD* is a dummy variable that equals 1 if the CEO's age is above the median age and 0 otherwise. *HistoryD* is another dummy variable that takes the value of 1 if the company's years of establishment are greater than the median, and 0 otherwise.

3.3.3. Regression and estimation

For the dependent variable of *Crash* (a binary outcome), logistic regression is used, as it is a dichotomous variable (0 = no crash, 1 = crash).

For the dependent variables of *Ncskew* and *Duvol*, the study employs several regression models: OLS, FEM and REM. To choose between FEM and REM, the Hausman test is applied. The regression models are then tested for:

- multicollinearity using the VIF;
- heteroscedasticity using the Breusch and Pagan Lagrangian multiplier (LM) test;
- autocorrelation using the Wooldridge test.

To address any imperfections identified, the study applies feasible generalized least squares (FGLS) estimation following the approach outlined by Hansen (2007).

4. RESULTS AND DISCUSSION

4.1. Results

4.1.1. Baseline models

Table 5 presents the regression results for the baseline models, examining the impact of leadership gender on stock price crash risk (Panel A of Table 5) and the influence of the proportion of female board members on stock price crash risk (Panel B of Table 5). The results show that both female executives (*FeCEO*) and a higher proportion of female board members (*FeBo*) have a significant negative impact on stock price crash risk (measured by *Duvol*) at the 1% and 5% significance levels, respectively. This suggests that companies with female CEOs and a higher proportion of female board members are less likely to experience stock price crashes in the following year. These findings are consistent with those of Qayyum et al. (2021), Le et al. (2022), and Gong et al. (2022). Furthermore, CEO age is also found to have a negative impact on stock price crash risk in both baseline models. In contrast, weekly return, a standard deviation of weekly return, company size, and market-to-book ratio of equity all exhibit a positive relationship with stock price crash risk.

Table 5. Baseline model results

Variables	*Panel A: Impact of female CEO to stock price crash risk*			*Panel A: Impact of BOD female member proportion to stock price crash risk*		
	$FeCEO_T$			$FeBo_T$		
	$Crash_{T+1}$	$Ncskew_{T+1}$	$Duvol_{T+1}$	$Crash_{T+1}$	$Ncskew_{T+1}$	$Duvol_{T+1}$
	Coefficient (std. error)			*Coefficient (std. error)*		
$Crash_T$	-0.0725 (0.1942)			-0.083 (0.1946)		
$Ncskew_T$		0.0708** (0.0359)			0.0711** (0.0359)	
$Duvol_T$			0.191*** (0.0279)			0.189*** (0.0279)
$FeCEO_T$	0.0909 (0.2236)	-0.0102 (0.074)	-0.0323*** (0.0124)			
$FeBo_T$				0.00475 (0.0043)	-0.000252 (0.0014)	-0.000555** (0.0002)
$Leverage_T$	0.317 (0.4903)	0.0799 (0.1693)	0.0211 (0.0306)	0.335 (0.4912)	0.0796 (0.1696)	0.0175 (0.0307)
$Sigma_T$	7.523* (4.2690)	6.896*** (1.4821)	0.607** (0.2605)	7.589* (4.2340)	6.858*** (1.4727)	0.511** (0.2585)
$Return_T$	17.43 (10.6754)	20.41*** (4.9058)	4.072*** (0.6577)	16.87 (10.6494)	20.52*** (4.8975)	4.201*** (0.6579)
$Size_T$	0.0211 (0.0506)	0.0754*** (0.0171)	0.0111*** (0.0032)	0.0226 (0.0503)	0.0754*** (0.0171)	0.0103*** (0.0031)
Mtb_T	0.0289 (0.0475)	0.0678*** (0.0233)	0.0207*** (0.0052)	0.0322 (0.0475)	0.0678*** (0.0233)	0.0213*** (0.0053)
ROA_T	-0.301 (0.9054)	0.331 (0.3556)	0.00964 (0.0612)	-0.219 (0.9063)	0.323 (0.3562)	-0.0139 (0.0617)
$CEOage_T$	-0.00193 (0.0088)	-0.00532* (0.0028)	-0.00138*** (0.0005)	-0.000994 (0.0088)	-0.00538* (0.0028)	-0.00158*** (0.0005)
$History_T$	0.00826 (0.0053)	0.00193 (0.002)	0.00038 (0.0004)	0.0082 (0.0053)	0.00193 (0.002)	0.000367 (0.0004)
$Industry_T$	-0.17 (0.1454)	-0.123*** (0.0468)	-0.00677 (0.0083)	-0.196 (0.1474)	-0.122*** (0.0469)	-0.005 (0.0085)
_cons	-2.501 (1.5541)	-2.246*** (0.5254)	-0.309*** (0.0954)	-2.646* (1.5502)	-2.239*** (0.5247)	-0.269*** (0.0948)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	1332	1332	1332	1332	1332	1332

*Note: t statistics in brackets * p < 0.1, ** p < 0.05, *** p < 0.01. The dependent variables are companies experiencing at least one week of stock price decline (Crash), the negative coefficient of the weekly return deviation (Ncskew), and the fluctuation of the weekly returns (Duvol). The independent variables are the female CEO (FeCEO) and the proportion of female members on the BOD (FeBO). The control variables include the ratio of long-term debt to total assets (Leverage), the standard deviation of the weekly returns (Sigma), the average value of the weekly returns (Return), the natural logarithm of market capitalization (Size), the market-to-book ratio of equity (Mtb), return on assets (ROA), CEO's age (CEOage) and the age of the company from its founding year to 2024 (History).*
Source: Authors' elaboration.

4.1.2. Extended models

Table 6 presents the regression results for the extended models, assessing the impact of female executives and the proportion of female board members on stock price crash risk, in different CEO age, company size, company history of the establishment, and industry. The results in Table 6 show that the effect of female executives on reducing stock price crash risk is more pronounced in firms with older female CEOs, at a 5% significance level. However, the results also indicate that stock price crash risk increases with company size, even when the company is led by a female CEO, with a 10% significance level. This positive relationship between company size and stock price crash risk persists even in firms with a higher proportion of female board members, as shown in Panel B of Table 6. Other interactive variables, such as company history of establishment and industry, do not have a statistically significant impact on stock price crash risk.

Table 6. Extended model results

Variables	*Panel A: The impact of female CEO on stock price crash risk with interactive variables*			*Panel B: The impact of BOD female member proportion on stock price crash risk with interactive variables*		
	$FeCEO_T$			$FeBo_T$		
	$Crash_{T+1}$	$Ncskew_{T+1}$	$Duvol_{T+1}$	$Crash_{T+1}$	$Ncskew_{T+1}$	$Duvol_{T+1}$
	Coefficient (std. error)			*Coefficient (std. error)*		
$Crash_T$	-0.0945 (0.1952)			-0.0819 (0.1946)		
$Ncskew_T$		0.0641* (0.0359)			0.0705** (0.0359)	
$Duvol_T$			0.188*** (0.0279)			0.189*** (0.0279)
$FeCEO_T$	0.676 (0.4295)	0.0805 (0.1492)	-0.0374 (0.0254)			
$FeBo_T$				0.000889 (0.0076)	-0.00275 (0.0026)	-0.000738* (0.0004)
$Leverage_T$	0.231 (0.4962)	0.0497 (0.1704)	0.0221 (0.0311)	0.365 (0.4954)	0.123 (0.1710)	0.0192 (0.0307)
$Sigma_T$	6.505 (4.3298)	6.695*** (1.4982)	0.635** (0.2631)	7.869* (4.2648)	7.185*** (1.4763)	0.555** (0.2599)
$Return_T$	17.64* (10.6683)	19.53*** (4.8905)	4.088*** (0.6631)	16.67 (10.6794)	20.11*** (4.9001)	4.186*** (0.6578)
$Size_T$	0.0344 (0.0530)	0.0721*** (0.0178)	0.00987*** (0.0034)	0.0199 (0.0558)	0.0636*** (0.0188)	0.0113*** (0.0036)
Mtb_T	0.0349 (0.0477)	0.0702*** (0.0233)	0.0199*** (0.0053)	0.0319 (0.0475)	0.0690*** (0.0235)	0.0210*** (0.0053)
ROA_T	-0.371 (0.9027)	0.355 (0.3542)	0.0211 (0.0609)	-0.198 (0.9125)	0.277 (0.3579)	-0.014 (0.0619)
$CEOage_T$	0.00215 (0.0092)	-0.00372 (0.0029)	-0.00118** (0.0005)	-0.00155 (0.0089)	-0.00599** (0.0028)	-0.00167*** (0.0005)
$History_T$	0.0109** (0.0055)	0.00246 (0.0020)	0.000446 (0.0004)	0.00643 (0.0062)	0.000343 (0.0022)	0.000053 (0.0004)
$Industry_T$	-0.111 (0.1532)	-0.111** (0.0493)	-0.00583 (0.0088)	-0.252 (0.1909)	-0.110* (0.0589)	-0.00638 (0.0112)
$FeCEO * CEOageD_T$	-0.37 (0.6015)	-0.455** (0.1923)	-0.0791** (0.0356)			
$FeCEO * SizeD_T$	0.382 (0.5359)	0.391** (0.1744)	0.0665** (0.0297)			
$FeCEO * HistoryD_T$	-0.76 (0.5175)	-0.0879 (0.1736)	0.016 (0.0328)			
$FeCEO * IndustryD_T$	-0.573 (0.5133)	-0.145 (0.1700)	-0.00868 (0.0282)			
$FeBo * SizeD_T$				0.000691 (0.0078)	0.00453* (0.0027)	-0.000206 (0.0004)
$FeBo * HistoryD_T$				0.00378 (0.0080)	0.00444 (0.0027)	0.000644 (0.0004)
$FeBo * IndustryD_T$				0.00355 (0.0092)	-0.00239 (0.0031)	0.0000834 (0.0005)
_cons	-3.154* 1.6573	-2.261*** 0.5507	-0.292*** 0.1026	-2.479 (1.6888)	-1.856*** (0.5710)	-0.283*** (0.1071)
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
N	1332	1332	1332	1332	1332	1332

*Note: t statistics in brackets * p < 0.1, ** p < 0.05, *** p < 0.01.*
Source: Authors' elaboration.

4.2. Result discussion

The findings suggest that female CEOs and a higher proportion of female board members can reduce the risk of stock price crashes. These results align with previous studies in both developed and emerging stock markets (Le et al., 2022; Gull et al., 2024; Kong et al., 2023; Lee et al., 2019). The results contribute to agency theory by illustrating how female managers tend to be more prudent and less inclined to withhold or manipulate information. Previous research has consistently shown that female executives are generally more risk-averse than their male counterparts, addressing potential issues early before they escalate into significant stock price fluctuations (Le et al., 2022; Li & Zeng, 2019). Furthermore, female leaders are often more diligent in adhering to tax regulations, business ethics,

financial reporting standards, and market regulations (Chen et al., 2021). Additionally, a board with a higher proportion of female members acts as a better agent for controlling risk because it minimizes the ability to conceal bad news, thereby enhancing transparency and lowering the risk of stock price crashes.

This pattern is also observed in Vietnam, where Hoang et al. (2019), and Vo et al. (2021) concluded that female CEOs experience less systemic risk and higher profitability compared to firms led by male CEOs. Nguyen (2024) found that female CEOs and female chief accountants in Vietnam can enhance the quality of financial reporting within firms. Consequently, the female managers's risk-averse characteristics and lower propensity to conceal or accumulate negative information reduce the likelihood of stock price crashes.

The findings also contribute to investor behavior theory, suggesting that investors may place greater trust in female leaders compared to their male counterparts. This trust is rooted in the perception that female managers are more prudent and honest, leading investors to be less likely to engage in panic-selling when negative news emerges from women-led firms (Breuer et al., 2023). This result is particularly noteworthy in the Vietnamese market, where deep-rooted gender stereotypes have traditionally shaped perceptions of leadership. The reduced likelihood of panic-selling may reflect a shift in investor confidence, as female leaders are perceived as more transparent and reliable, especially patriarchal culture.

Furthermore, the study finds that the risk of stock price crashes is lower when the CEO is older, regardless of gender. Older CEOs of both genders tend to be more prudent in managing the company and disclosing information. From the perspective of investor behavior theory, investors may trust older CEOs, believing that their experience and confidence equip them to handle potential risks more effectively. This finding aligns with Andreou et al. (2016), who suggest that age brings wisdom and risk aversion, which, in turn, reduces the likelihood of stock price crashes.

The study also reveals that having female executives or highly gender-diverse boards does not reduce stock price crash risk in large companies. This suggests that large companies often suffer from stock price crash risks regardless of whether they are led by male or female executives. Previous studies explain that larger companies are more exposed to systemic risks because their performance is often closely linked to the overall financial and economic system. As a result, negative news in a large company can have widespread effects, which increases the risk of stock price crashes (Andreou et al., 2016; Li & Zeng, 2019). While, in general, the presence of female CEOs and female board members can enhance information transparency, this is not the case in Vietnam. Nguyen (2024), in his study on the impact of women in top executive positions on financial reporting quality in Vietnam, found that female CEOs are positively associated with financial report quality in small firms. However, this effect was not observed in larger firms. This suggests that effectively managing large enterprises and ensuring accurate information disclosure is a challenging task for both male and female executives. Similarly, achieving consensus within a large, diverse board becomes more difficult as company size increases. The findings indicate that, for larger companies, having effective control and monitoring systems in place is crucial.

The interactive effects of female executives and gender-diverse boards on companies with a long history of establishment, as well as those in industries with high female labor force participation, are not statistically significant. However, when compared to industry-specific variables, industries with a higher proportion of female workers show a negative effect on stock price crash risk. Although Hoang et al. (2019) assert that female CEOs are more likely to lead in less risky industries, this study does not confirm the hypothesis that female CEOs and female board members reduce stock price crash risk in firms with a long history of establishment or in industries dominated by women.

5. CONCLUSION

In this paper, we focus on the contribution of top gender executives and its impact on stock price crash risk. Using a sample of 148 Vietnamese public non-financial firms during 2013–2022, we find a significant negative relationship between female CEOs, female members of BOD, and future stock price crash risk. The results support the agency theory in the notion that female CEOs and female BOD members play a vital role in reducing risk and improving the transparency and compliance of enterprises. We further find that the empirical relation between the female CEOs, the proportion of female members in BOD, and crash risk is more pronounced for firms with older female CEOs. These findings enrich our understanding of the influence of executive gender on crash risk and shed light on how firm characteristics interact with executive gender to mitigate the stock price crash risk. The research findings provide recommendations for promoting female executives and gender diversity in corporate leadership, encouraging and supporting women in accessing and advancing in leadership careers. The findings also imply that big enterprises need an effective internal control and monitoring system to control the risk of stock price crashes.

Our findings are useful to firms (and investors) who want to manage "tail risk" in stock prices. However, the study has several limitations that future research could address. Firstly, the sample consists of only 148 listed companies over a 13-year period, and the proportion of observations with female CEOs is relatively small (11.3%), which may lead to potential bias or skewed results. Secondly, the classification of industries as dummy variables, based on statistics from Statista (Galan, 2025) and the ILO's report on Vietnam's labor force in 2020 (ILO, 2021), may not be fully accurate. While both reports suggest a similar categorization of industries with high female labor force participation, there is no detailed and precise dataset available to comprehensively categorize industries based on female workforce involvement. Lastly, future research could extend the sample size and incorporate more control variables related to corporate governance characteristics, financial reporting quality, and market behavior, to provide deeper insights into the topic.

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APPENDIX

Table A.1. List of stock tickers of the firms used in the study

No.	*Ticker*	*No.*	*Ticker*	*No.*	*Ticker*	*No.*	*Ticker*	*No.*	*Ticker*
1	AAA	31	DTT	61	KBC	91	PJT	121	TIX
2	AAM	32	DXG	62	KDC	92	PNC	122	TLG
3	ANV	33	ELC	63	KDH	93	PNJ	123	TLH
4	ASM	34	FCN	64	KHP	94	POM	124	TMP
5	ASP	35	FMC	65	KMR	95	PTB	125	TMS
6	BBC	36	FPT	66	KSB	96	PTL	126	TMT
7	BTP	37	GAS	67	LAF	97	PVD	127	TNA
8	BTT	38	GDT	68	LCG	98	PVT	128	TRC
9	C47	39	GIL	69	LGC	99	QCG	129	TTF
10	CCL	40	GSP	70	LGL	100	RAL	130	UIC
11	CDC	41	HAG	71	LHG	101	RDP	131	VCF
12	CII	42	HAP	72	LIX	102	REE	132	VCG
13	CLW	43	HAS	73	LSS	103	SAM	133	VFG
14	CMG	44	HBC	74	MHC	104	SAV	134	VHC
15	CNG	45	HDC	75	NAV	105	SBA	135	VIC
16	COM	46	HMC	76	NBB	106	SBT	136	VIP
17	CSM	47	HPG	77	NKG	107	SC5	137	VMD
18	CTI	48	HQC	78	NNC	108	SCR	138	VNE
19	D2D	49	HRC	79	NSC	109	SFC	139	VNG
20	DAG	50	HSG	80	NTL	110	SGT	140	VNL
21	DBC	51	HT1	81	NVT	111	SHI	141	VNM
22	DLG	52	HTI	82	OGC	112	SHP	142	VNS
23	DMC	53	HTL	83	OPC	113	SJD	143	VOS
24	DPM	54	HVX	84	PAC	114	SJS	144	VSC
25	DPR	55	IDI	85	PAN	115	SMC	145	VSH
26	DQC	56	IJC	86	PDN	116	SRC	146	VSI
27	DRC	57	ITA	87	PDR	117	SZL	147	VTB
28	DSN	58	ITC	88	PET	118	TDC	148	VTO
29	DTA	59	ITD	89	PGD	119	TDH		
30	DTL	60	JVC	90	PHR	120	TDW		

Table A.2. List of industry

No.	*Industry*	*No.*	*Industry*
1	Retail	9	Chemicals
2	Real estate	10	Automobiles and parts
3	Technology	11	Basic resources
4	Oil and gas	12	Food and beverage
5	Utilities	13	Media
6	Travel and leisure	14	Construction and materials
7	Industrial goods and services	15	Health care
8	Personal and household goods		