

The Board of Directors and Firm Value: The Moderating Role of ESG Performance-Evidence from the Financial and Insurance Sector

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Abstract

This study examines the relationship between board characteristics and firm value in Taiwan's financial and insurance sector and investigates the moderating role of environmental, social, and governance (ESG) performance. Using panel data from 52 listed financial and insurance firms during 2015–2022, the study employs pooled ordinary least squares (OLS) regression with year effects and a hierarchical regression approach. The results show that board characteristics have different effects on accounting- and market-based measures of firm value. Board independence is positively associated with both ROE and Tobin's Q, while board meeting frequency is negatively associated with both measures. Board gender diversity is negatively associated with ROE but not significantly related to Tobin's Q, whereas board size is positively associated with ROE. ESG performance significantly moderates several board–firm value relationships. Specifically, ESG positively moderates the relationship between board gender diversity and ROE and strengthens the relationships of board size, board independence, and board meeting frequency with Tobin's Q. These findings suggest that ESG performance may complement board governance, with its moderating effects varying across accounting- and market-based measures of firm value.

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Keywords: ESG, firm value, Board of directors, Financial and insurance sector.

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1. Introduction

The board of directors in companies is the cornerstone and a vital factor in corporate success, as it is the responsibility of the board to appoint the executive director and general manager and determine the functional responsibilities of the company. Birindelli et al. (2018) considered that the success of an enterprise depends largely on the operation of the board, which is mainly responsible for approving and monitoring strategic goals, governance systems, creating a corporate culture, and forming relationships with stakeholders. Therefore, the efficiency of the board of directors depends on a set of characteristics that affect the value of the firm. The backgrounds, abilities, and expertise of different board members actively contribute to the formation and quality of management decisions and help improve firm performance and reduce risks; board members possess board capital, such as relationships and human capital, which can enhance firm value (Hillman and Dalziel, 2003). Pucheta-Martínez and Gallego-Alvarez (2020) found that the board has significant relationships with firm value; board size, board independence, and female directors have a positive influence on firm value. Therefore, this study reveals the impact of board characteristics on firm value, thereby helping board operations develop techniques that ensure the highest levels of firm value. How can enterprises pursue economic performance without causing environmental and social burdens, while contributing to society? Sustainable development has become an important issue in the present and future business worlds. It has become the trend for companies to invest in environmental, social, and corporate governance (ESG). For investors, companies that pay more attention to ESG usually have more transparent financial reports and relatively stable operating conditions. Freeman (1984) proposed the stakeholder theory, which states that companies have the responsibility to consider the interests of all stakeholders affected by corporate actions. An enterprise's commitment to the environment and social responsibilities can signal to stakeholders that the enterprise is trustworthy, reduce transaction costs for both parties, and improve its efficiency of value creation (Freeman and Evan, 1990). Therefore, stakeholders and fund managers perceive firms with adequate ESG disclosures as exhibiting superior performance, higher returns, and lower risk (Shaikh, 2022). When companies incorporate ESG into their decision-making considerations, their operating and financial performances are usually more prominent (Khan et al., 2016). Financial institutions are becoming increasingly important due to ESG trends. Compared to other industries, financial institutions have a greater burden and fulfill corporate social responsibilities, and they are the lifeline of sustainable economic development. Through the promotion of financial institutions, funds can be directed toward investing in ESG development. However, the operation of the board has become critical in the current financial and insurance landscape because it can promote the transparency of corporate information, enhance the company's accountability system, and practice long-term sustainability in line with global efforts and sustainable development goals (Naciti, 2019). Therefore, financial and insurance institutions can enhance firm value through ESG,

which is the key to the overall promotion of sustainable finance.

Our study had three purposes. First, it analyzes the effectiveness of boards of directors in monitoring and advising managers in financial and insurance industries. Our underlying idea is that several characteristics of the board of directors (board size, independent directors, gender diversity, and board meetings) might reflect directors' motivation and ability to effectively monitor and advise managers. We expect that financial and insurance companies with boards are more effective in monitoring and advisory terms are better governed, and thus, better governance creates shareholder value. Second, this study proposes a moderating effect of ESG, which is particularly suitable for combining board of director functions to create corporate value under the current sustainable finance trend. Finally, through the products and services of sustainable finance, the financial and insurance industries assist enterprises in promoting sustainable transformation and have become a key force in motivating enterprises to continue investing in sustainable development. Therefore, value enhancement in the financial and insurance sectors, and the impact of ESG are crucial.

This study enriches this knowledge and fills the gap in the literature. Previous studies on board and firm value have mostly focused on the manufacturing industry or developed countries (Mishra and Kapil, 2017; Anh and Khanh, 2017; Salem et al., 2019; Almarayeh, 2021), with less discussion on the financial and insurance sectors in developing countries. This study provides an important contribution to the boardroom literature on firm value by exploring those sectors, particularly in an emerging Asian economy. This study provides a deeper understanding of board complexities and their implications for value creation. Furthermore, this study highlights the vital role of ESG in moderating this relationship and emphasizes the importance of ESG in boards of directors and governance frameworks. In addition, the findings can be used by regulators and shareholders to ensure good ESG and board decision-making within organizations.

2. Related literature and hypotheses

2.1 The board of directors and firm value

The board plays a vital leadership role in corporate business strategy (Baysinger and Hoskisson, 1990) and is the final decision-making organization for a company's strategic development direction. The core responsibilities of the board are supervision and governance. Through the supervision of the board, it helps ensure that the company's system complies with legal regulations and controls the performance of management, thereby providing shareholders and its related stakeholders with the best interests; thus, a good board can help the company develop better. According to the resource dependence theory, boards of directors are an important interface between the enterprise and the environment. It can provide operators with timely information and key resources. Thus, proper operation of the board can reduce transaction costs, thereby helping a company survive (Pfeffer and Salancik 1978). This study explores the impact of the main

characteristics of the board of directors, including board size, independent directors, gender diversity, and number of board meetings, on firm value. Therefore, some studies suggest that the board of directors has a positive relationship with firm value. Based on resource dependency theory, a large board is more likely to have diverse experiences, skills, and ideas, which is conducive to building relationships and opportunities to acquire resources, thereby improving firm value (Waheed and Malik, 2019). Stakeholder theory posits that independent directors play a role in shaping firm value by promoting balanced decision-making that considers all stakeholders, ultimately enhancing long-term sustainability and a positive reputation (Zhou et al., 2024). This study synthesizes these perspectives, which can be considered complementary in explaining the role of the board of directors. Both perspectives conceptualize the board of directors as an intermediary between the firm and its external environment, representing the interests of stakeholders while providing access to key external resources (Hillman and Dalziel, 2003; Pfeffer and Salancik, 1978; Freeman, 1984). De Andrés and Vallelado (2008) used a sample of 69 boards of large commercial banks in Canada, France, the UK, Italy, Spain, and the US from 1995 to 2005. They found that bank performance has a significantly positive relationship with board meetings and an inverted U-shaped relationship with board size and the proportion of outside directors. Salem et al. (2019) stated that independent directors, board meetings, and board gender diversity is significantly positively related to firm value. In addition, Fariha et al. (2022) examined commercial banks and found that board independence has a negative and significant relationship with return on assets (ROA) and Tobin's Q, while board gender diversity has a negative and significant relationship with ROA and return on equity (ROE). Almaqtari et al. (2022) also revealed that, while board independence and diversity exhibit a significant and positive association with firm value, board size negatively affects firm value. Gender diversity on boards is generally considered a key positive factor affecting firm performance. Female directors can promote balance and independence; thereby improving the board's supervision efficiency and decision-making quality, helping to reduce company agency costs, improving the board of directors, and the effectiveness of internal control. Ultimately, this improves the firm's value and image (Peng and Chandarasupsang, 2023). Conversely, Adams and Ferreira (2009) found that female directors appear to monitor more conscientiously and effectively than men, but such efforts do not necessarily lead to better firm value because strong monitoring is costly and may have the opposite effect. In addition, according to the stakeholder theory, increasing board meetings may strengthen communication and interaction with various stakeholders, ultimately improving the firm's reputation in the long term (Ntim and Soobaroyen, 2013). However, frequent meetings take up managerial time and increase expenses, which may affect enterprise activities within the firm as resources are directed toward less productive activities (Evans et al., 2002) to generate lower financial performance.

This study believes that the operation of the board impacts firm value based on the supervisory efficiency of outside directors and the reduction of transaction costs through abundant resources. Therefore, we propose the following hypothesis:

Hypothesis 1: The board has a significant influence on firm value.

H 1-1: Board size has a significant positive influence on firm value.

H 1-2: Independent directors have a significant positive influence on firm value.

H 1-3: Board gender diversity has a significant positive influence on firm value.

H 1-4: Board meetings have a significant positive influence on firm value.

2.2 ESG and firm value

Stakeholder theory posits that while companies protect the rights and interests of stakeholders, they also allow them to benefit from or reduce harm caused by corporate actions (Freeman, 1984). Better ESG performance helps companies accumulate moral and reputational capital and can exert a certain insurance effect (Lins et al., 2017). This levels the adverse impact of negative events on enterprises, thereby improving sustainable development (Broadstock et al., 2021), allowing companies to obtain relatively high returns on investment. Naeem et al. (2022) demonstrated that ESG scores have a positive and significant relationship with both Tobin's Q and ROA. Tang et al. (2024) examined Chinese listed firms and found that stronger ESG performance enhances investor confidence, which in turn contributes to higher firm value. Conversely, other studies found that ESG performance not only does not positively affect a firm's value, but also that external activities such as industrial development and environmental and social responsibilities increase the firm's cost and waste limited resources, thus damaging the rights and interests of shareholders and ultimately weakening the firm's value (Garcia and Orsato, 2020). By contrast, companies investing in ESG expenditure do not have the best interests of shareholders, as ESG inputs represent a direct outflow of capital that reduces corporate profit (Borghesi et al., 2014; Kao et al., 2018). In addition, some scholars suggest that ESG has no impact on firm value; for example, by studying Malaysian companies, Atan et al. (2018) reported that the impact of ESG on ROA and firm value is not significant. Cheng et al. (2023) found no evidence that ESG performance contributes to firm value in Taiwan. Thus, the literature on ESG and firm value yields mixed results.

2.3 The moderating effect of ESG

ESG is an important strategic decision of a corporation and is therefore inseparable from the board of directors. Prior literature has highlighted the importance of a company's board of directors and management in ESG and believes that they should begin to reposition ESG development strategy, make major commitments, and support, follow, and implement methods (Carroll, 2021). Some studies show that diverse boards are more likely to improve ESG performance and disclose relevant

information (Birindelli et al., 2018; Nuhu and Alam, 2024). The board plays a key role in defining strategic decisions regarding ESG aspects and formulating corporate social responsibility behaviors so that companies can achieve social manageability and sustainable performance. Therefore, the composition of board members has a significant impact on ESG and firm value. Companies that effectively incorporate ESG considerations into their boards and governance frameworks can enhance their reputation, mitigate risks, and build stronger relationships with different stakeholders, ultimately helping increase firm value (Ntim and Soobaroyen, 2013). Khoe et al. (2023) revealed that companies with strong boards and governance mechanisms, particularly those that consider ESG issues, often experience a positive impact on their profitability. These companies are better equipped to manage risk, gain stakeholder trust, and achieve ESG financial returns. Bukari et al. (2024) also indicated that ESG has a significant positive moderating effect on the link between corporate governance and firm value. This study considers that the improvement in ESG in the financial and insurance sectors will affect the value of the firm and have a moderating effect on boards with firm value. Therefore, by combining resource dependence and stakeholder theories, we argue that ESG engagement can enhance the two mechanisms that increase stakeholder legitimacy (Lee and Raschke, 2023) and improve access to external resources (Xu et al., 2025), thus amplifying the positive impact of the board on firm value. Based on these arguments, we formulate the following hypothesis:

Hypothesis 2: ESG has a significant moderating effect on board of directors and firm value.

H 2-1: Board size and firm value are positively moderated by ESG.

H 2-2: Independent directors and firm value are positively moderated by ESG.

H 2-3: Board gender diversity and firm value are positively moderated by ESG.

H 2-4: Board meetings and firm value are positively moderated by ESG.

3. Research design

3.1 Sample and data sources

This study employs an unbalanced sample from an annual panel database of listed companies in Taiwan's financial and insurance industries. The sample includes data from 52 financial and insurance companies in Taiwan from 2015 to 2022. The final unbalanced panel consists of 408 firm-year observations. The data source is collected from Taiwan Economic Journal (TEJ) of TESG sustainability development index (TESG Rating), the ESG evaluation index of Taiwan's listed companies, the Insurance Open Information Observatory, and the public Information Observatory's financial holdings and bank listed companies' annual reports. The data type studied adopts the annual data for statistical analysis.

3.2 Variables measuring

3.2.1 Dependent variables

Firm value is measured using two complementary indicators: Tobin's Q and return on equity (ROE). Tobin's Q is widely used as a market-based measure of firm value (Aydoğmuş et al., 2022) and reflects investors' assessments of a firm's market value and future growth prospects (Dowell et al., 2000). In this study, Tobin's Q is obtained directly from the TEJ database and is used as a market-based measure of firm value. ROE is used as a complementary accounting-based measure of value creation. It reflects a firm's ability to generate returns from shareholders' equity and is widely used to assess profitability and the efficiency of equity utilization (Yang et al., 2010). Accordingly, Tobin's Q captures the market-based dimension of firm value, whereas ROE reflects the firm's realized profitability and return generation for shareholders.

3.2.2 Independent variables

The board of director variables include board size (Menicucci and Paolucci, 2023), independent directors (Khan et al., 2017), board gender diversity (Lagasio and Cucari, 2019), and board meetings (Hanh et al., 2018). This study uses these variables as proxies for the board.

3.2.3 Moderating variables

This study uses moderating variables, namely ESG combined scores, including environmental, social, and governance scores. All ESG scores were obtained from the TEJ database (Chang et al., 2024; Cheng et al., 2023). The TEJ database, developed by a well-known business database company in Taiwan, constructed and released the TES Sustainability Development Index for publicly traded Taiwanese firms in 2015. The variables selected for the TESG Rating followed Global Reporting Initiative standards and were combined with available information in the Taiwanese market to establish three pillars (E, S, and G) and 16 themes. The 16 themes also included the identification of quantifiable variables and degree of information disclosure. The more detailed a company's ESG disclosure is, the more likely it is that ESG improvement measures have been planned or implemented. Companies whose disclosures are confirmed, assured, or guaranteed by accountants or other third parties receive higher performance ratings.

3.2.4 Control variables

This is based on previous studies (Siueia et al., 2019; Zhang and Chen, 2020; Samosir, 2018; Kim et al., 2019). We controlled several factors that have been shown to influence firm value, thereby mitigating potential bias. These factors include firm size, financial leverage, age, external assurances, and financial holdings. Firm size is expected to be positively associated with firm value, and previous research has shown that larger firms tend to perform better financially because of better management (Siueia et al., 2019). Zhang and Chen (2020) found

that financial leverage positively impacts firm value up to a certain threshold, beyond which the effect becomes negative owing to increased financial risk and diminishing firm value. Samosir (2018) indicated that as a firm matures and ages, its uncertainty and risk decrease, thereby attracting more investors to increase firm value. Rahman et al. (2023) also demonstrated a strong association between firm age and profitability. Kim et al. (2019) indicated that corporate social responsibility (CSR) assurance services have a significant impact on corporate financial performance. This finding implies that firms with CSR reports assured by external experts experience much higher financial performance than firms without such assurance services, which can increase firm value. Liebenberg and Sommer (2008) found that financial holding groups are negatively related to insurers' performance. In addition, year dummy variables were used to account for market conditions. The definitions of the variables are listed in Table 1.

Table 1: Definitions of variables

Variable	Definition
Dependent Variables	
ROE	Pre-tax income (losses) /average equity
Tobin Q	Market value of equity+ total liabilities / total asset
Independent Variables	
ESG rating (ESG)	The TESG score is ranged from 0 to100 points, with 0 being the worst and 100 being the best
Board size (BS)	The total number of board members
Independent directors (ID)	Percentage of independent directors on the board
Board gender (BG)	The proportion of female directors to the total number of board members
Board meetings (BM)	Number of board meetings
Control Variables	
Firm size (FS)	Logarithm of total assets of the companies
Financial leverage (FL)	Total liabilities / total assets
Firm age (FA)	Number of years since the firm was established.
External assurance (EA)	This is a dummy variable, which is 1 if the sustainability report is external assurance and 0 if not
Financial holdings group (FH)	Dummy variable equals 1 if financial holding company; 0 otherwise.
Year dummy	Assigned as one if it belongs to that year; otherwise assigned to zero

3.3 Model specification

Given the structure of the dataset, the empirical models are estimated using pooled ordinary least squares (OLS) with year effects. Year effects are included to control for time-specific shocks and macroeconomic or institutional changes that may affect firms across years. The pooled OLS framework is used to examine the overall associations between board characteristics, ESG performance, and firm value. Two empirical equations are specified to examine the direct effects of board characteristics and the moderating effects of ESG performance. The empirical models are specified as follows:

$$\text{Firm Value}_{it} = \alpha + \beta_1 \text{BS}_{it} + \beta_2 \text{ID}_{it} + \beta_3 \text{BG}_{it} + \beta_4 \text{BM}_{it} + \beta_5 \text{FS}_{it} + \beta_6 \text{FL}_{it} + \beta_7 \text{FA}_{it} + \beta_8 \text{EA}_{it} + \beta_9 \text{FH}_{it} + \beta_{10} \text{year}_{it} + \varepsilon_{it} \quad (1)$$

$$\text{Firm Value}_{it} = \alpha + \beta_1 \text{ESG}_{it} + \beta_2 \text{BS}_{it} + \beta_3 \text{ID}_{it} + \beta_4 \text{BG}_{it} + \beta_5 \text{BM}_{it} + \beta_6 \text{FS}_{it} + \beta_7 \text{FL}_{it} + \beta_8 \text{FA}_{it} + \beta_9 \text{EA}_{it} + \beta_{10} \text{FH}_{it} + \beta_{11} \text{ESG} \times \text{BS}_{it} + \beta_{12} \text{ESG} \times \text{ID}_{it} + \beta_{13} \text{ESG} \times \text{BG}_{it} + \beta_{14} \text{ESG} \times \text{BM}_{it} + \beta_{15} \text{year}_{it} + \varepsilon_{it} \quad (2)$$

where i indexes firms and t represents years, and ε_{it} is the error term, α is the intercept; where β_j represents the estimated coefficient of the j -th explanatory variable, where $j = 1, 2, 3, \dots, 15$. Firm value was measured using ROE and Tobin's Q. The moderating variable was ESG. Equation (1) examines the effects of board characteristics on firm value, whereas Equation (2) examines the direct effect of ESG performance and its moderating effects on the relationship between board characteristics and firm value through the inclusion of interaction terms.

4. Empirical results

4.1 Descriptive statistics

As shown in Table 2, the mean values of ROE and Tobin's Q are 0.0743 and 0.1187, respectively, indicating substantial variation in firms' accounting-based performance and market-based valuation. Regarding board size, the minimum number of board members is six, and the average number is 11.808, indicating that the number of board members exceeds the legal minimum standard of three people. The average ratio of female board members is 0.1547, indicating that this proportion in the financial and insurance sectors is still insufficient. The average board independence is 0.2984, indicating that companies in the financial and insurance sectors must pay attention to the allocation of board-independent seats. In addition, the mean of board meetings is 10.8477 and the standard deviation is 4.4602, showing that there is a large difference in board meetings among companies in the financial and insurance sectors.

Table 2: Descriptive statistics of variables

Variable	N	Mean	Median	Std. dev.	Min	Max
ROE	408	0.0743	0.0756	0.0509	-0.3890	0.2740
Tobin Q	408	0.1187	0.1000	0.0780	0.0100	0.4500
ESG	408	56.0497	56.9300	8.6324	37.9800	79.2700
BS	408	11.8084	12.0000	3.4390	6.0000	22.0000
ID	408	0.2984	0.1429	0.0881	0.1818	0.6000
BG	408	0.1547	0.2727	0.1220	0.0000	0.5714
BM	408	10.8477	10.0000	4.4602	3.0000	25.0000
FS	408	20.1224	20.2944	1.7326	16.4594	23.2141
FL	408	0.8885	0.9263	0.0957	0.5068	0.9888
FA	408	30.4349	23.0000	18.3130	5.0000	77.0000
EA	408	0.5479	1.0000	0.4983	0.0000	1.0000
FH	408	0.3120	0.0000	0.4639	0.0000	1.0000

4.2 Correlation matrix and VIF values

Pearson's correlation analysis was conducted to examine the pairwise relationships among the variables and to assess potential multicollinearity. Although some variables exhibit relatively high pairwise correlations, all VIF values are below 5 (Gujarati and Porter, 2009)., indicating that multicollinearity does not appear to pose a serious concern in the regression models. The relatively high negative correlation between Tobin's Q and financial leverage is partly attributable to the construction of the two measures, as both incorporate total liabilities relative to total assets. Therefore, the VIF results provide no evidence of problematic multicollinearity in the estimated regression models.

Table 3: Pearson's correlation matrix and VIF values

	ROE	Tobin Q	ESG	BS	ID	BG	BM	FS	FL	FA	EA	FH
ROE	1											
Tobin Q	0.187***	1										
ESG	0.108**	-0.063	1									
BS	-0.032	-0.017	-0.033	1								
ID	0.189**	0.132***	0.040	-0.714***	1							
BG	-0.147***	-0.005	0.026	0.154***	-0.136***	1						
BM	0.023	-0.0151***	0.271***	-0.233***	0.257***	-0.127***	1					
FS	0.123**	-0.594***	0.473***	0.008	0.182***	0.019	0.375***	1				
FL	-0.113**	-0.932***	0.124***	0.156***	-0.038	-0.042	0.177***	0.515***	1			
FA	0.071	0.477***	0.050	0.014	-0.176***	-0.111***	-0.122***	-0.381***	-0.322***	1		
EA	0.118**	0.066	0.568***	-0.061	0.087	0.014	0.334***	0.436***	-0.090	0.006	1	
FH	0.145***	-0.090	0.397***	0.136***	0.022	-0.016	0.439***	0.614***	0.225***	-0.493***	-0.001	1
VIF			1.80	2.29	1.13	2.30	1.55	4.03	4.82	2.87	2.16	4.20

Notes: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$, BS= Board size, ID= Independent directors, BG= Board Gender, BM= Board meetings, FS= Firm size, FL= Financial leverage, FA= Firm age, EA= External assurance, FH=Financial holdings group.

4.3 Difference analysis

This study explores the differences between the boards, ESG, and firm value of financial and non-financial holding companies. Therefore, a test was conducted to determine the mean value of each variable. Table 4 presents the average value of the difference between the variables pertaining to financial and nonfinancial holding companies. Focusing on the statistically significant differences, the results show that financial and non-financial holding companies are in ROE, Tobin's Q, ESG, board size, board meetings, firm size, financial leverage, firm age, and external assurance. There were significant differences ($p < 0.05$) according to the t-test. Observing the average ROE, we find that financial holding companies perform better than non-financial holdings, indicating that financial holdings have higher returns; however, Tobin's Q shows that non-financial holding companies perform better than financial holdings. One possible reason for this is that financial holding companies have higher costs, which lead to low financial performance. Additionally, financial holding companies perform better than non-financial holdings in terms of ESG, board size, and number of board meetings. This may be because financial holding companies have more resources and financial soundness. The detailed relative test results are presented in Table 4.

Table 4: Difference analysis at company type

Total sample Variables	Company type		
	Non-financial holding	Financial holding	Difference test t value
ROE	0.0702	0.0831	-2.3858**
Tobin Q	0.1235	0.1085	1.7988*
ESG	53.7542	61.1221	-8.7775***
BS	11.4028	12.4252	-2.7934***
ID	0.2997	0.3040	-0.4473
BG	0.1575	0.1532	0.3321
BM	9.5104	13.7323	-9.9156***
FS	19.427	21.7106	-15.8034***
FL	0.8571	0.9200	-4.7017***
FA	36.1389	16.6850	11.5003***
EA	0.4028	0.9055	-10.7140***

Note: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

4.4 Multivariate regression analysis

4.4.1 The impact of the board of directors on firm value

This study uses multiple regression models to examine the relationship between board characteristics and firm value, and the corresponding results are reported in Table 5. Column (1) presents the regression results using ROE as the dependent variable. Board size and the number of independent directors is significantly and positively associated with ROE. The positive association between board size and ROE suggests that larger boards may provide firms with greater access to diverse experience, knowledge, and skills. This finding is consistent with Waheed and Malik (2019) and Ali et al. (2022). The positive association between independent directors and ROE is consistent with Zhou et al. (2024) and Salem et al. (2019), supporting the view that independent directors can enhance board monitoring and decision-making and thereby contribute to firm performance. Board gender diversity is significantly negatively associated with ROE at the 5% significance level. This finding is consistent with Ahern and Dittmar (2012), who report a negative relationship between female board representation and firm performance. One possible explanation is that greater board diversity may be associated with more intensive monitoring and additional coordination costs, which may offset potential benefits to firm performance (Anh and Khanh, 2017). Board meeting frequency is also significantly negatively associated with ROE. This negative association may indicate that firms facing greater organizational complexity or managerial challenges require more frequent board meetings. Column (2) reports the results using Tobin's Q as the dependent variable. The number of independent directors is positively and significantly associated with Tobin's Q, consistent with the result for ROE. This finding suggests that greater board independence may contribute to both accounting-based performance and market-based firm value. In contrast, board gender diversity is not significantly associated with Tobin's Q, consistent with Rose (2007). One possible explanation is that female directors may sometimes be appointed for symbolic or reputational purposes without necessarily having a substantial influence on firm value (Wang, 2020). Board meeting frequency is significantly negatively associated with Tobin's Q, consistent with Vafeas (1999) and Evans et al. (2002), who suggest that frequent board meetings may reflect greater managerial difficulties or divert resources toward less productive activities. Overall, the results provide partial support for H1. Specifically, H1-1 and H1-2 are supported, whereas H1-3 and H1-4 are not supported. Regarding H1-3, the significant negative association between board gender diversity and ROE is opposite to the hypothesized positive relationship. This finding may be interpreted in light of the relatively limited representation of female directors in the sample. As shown in Table 2, female directors account for only 15.4% of board membership on average, suggesting that female representation may not yet be sufficient to exert substantial influence on board decision-making. This finding can be further understood from the perspective of Critical Mass Theory, which suggests that the influence of minority members may be constrained when their

representation remains relatively limited (Kanter, 1977; Torchia et al., 2011). In the context of corporate boards, a relatively small proportion of female directors may limit their ability to substantially influence strategic discussions and decision-making. Consequently, the negative association between board gender diversity and ROE should not necessarily be interpreted as evidence that female directors adversely affect firm performance. Rather, it may reflect the relatively limited representation and influence of female directors within the boardroom. As female representation becomes more substantial, female directors may have greater opportunities to contribute to board deliberations and strategic decision-making.

Table 5: The impact of the board of directors on firm value

Variable	ROE (1)	Tobin Q (2)
Constant	-0.1106** (-2.48)	0.7541*** (28.87)
BS	0.0043*** (5.36)	-0.0001 (-0.23)
ID	0.2119*** (4.80)	0.0351* (1.85)
BG	-0.0638** (-2.68)	0.0187 (1.69)
BM	-0.0012* (-1.85)	-0.0010*** (-3.63)
FS	0.0154*** (4.19)	0.0006 (0.36)
FL	-0.2684*** (-5.11)	-0.7577*** (-19.87)
FA	-0.0002 (-0.10)	0.0004*** (3.62)
EA	0.0040 (0.66)	-0.0018 (-0.49)
FH	-0.0139 (-1.13)	0.0319*** (5.14)
Year effect	Yes	Yes
Observations	408	408
Adj R ²	0.2012	0.8866

Note: t statistics in parentheses, *p < 0.10; **p < 0.05; ***p < 0.01

4.4.2 Moderating effect of ESG

This study follows the hierarchical regression approach proposed by Villa et al. (2003) to examine the moderating role of ESG performance in the relationships between board characteristics and firm value. Specifically, the empirical analysis estimates two regression equations. The first examines the direct effects of board characteristics on firm value, while the second incorporates ESG performance and the corresponding interaction terms to examine its moderating effects. This approach allows the additional explanatory power associated with the inclusion of ESG and interaction terms to be assessed by comparing the changes in (R^2) across the regression specifications (Hayes, 2018). Table 6 presents the results of the moderating effects of ESG performance. The inclusion of the interaction terms increases (R^2) from 0.2012 to 0.2204 for the ROE model and from 0.8866 to 0.8910 for the Tobin's Q model, corresponding to increases in (R^2) (ΔR^2) of 0.0192 and 0.0044, respectively. The increases in (R^2) (ΔR^2) are statistically significant at the 5% level, indicating that the interaction terms provide additional explanatory power beyond the main effects. Column (1) presents the results for ROE. ESG performance has a negative but statistically insignificant direct association with ROE, consistent with Atan et al. (2018). This result may reflect the fact that ESG initiatives require financial and organizational resources and may therefore impose short-term costs that are not immediately reflected in accounting profitability. The interaction terms $ESG \times BS$, $ESG \times ID$, and $ESG \times BM$ are positive but statistically insignificant, indicating that ESG performance does not significantly moderate the relationships between board size, board independence, board meeting frequency, and ROE. One possible explanation is that board size and independence in the financial and insurance sectors are subject to relatively strong regulatory requirements, which may limit the additional influence of ESG practices on these governance mechanisms. In contrast, the interaction term $ESG \times BG$ is positive and statistically significant, indicating that ESG performance significantly moderates the relationship between board gender diversity and ROE. Firms with stronger ESG performance may place greater emphasis on transparency, inclusiveness, and stakeholder engagement, potentially creating conditions in which female directors can contribute more effectively to board deliberations and decision-making. This interpretation is consistent with resource dependence and stakeholder perspectives, under which gender-diverse boards may provide diverse perspectives, knowledge, and stakeholder connections that can contribute to firm performance. Column (2) presents the results for Tobin's Q. ESG performance has a positive but statistically insignificant direct association with Tobin's Q. However, the interaction terms $ESG \times BS$, $ESG \times ID$, and $ESG \times BM$ are positive and statistically significant, indicating that ESG performance significantly moderates the relationships between board size, board independence, board meeting frequency, and Tobin's Q. In contrast, the interaction term $ESG \times BG$ is positive but statistically insignificant, suggesting that ESG performance does not significantly moderate the relationship between board gender diversity and Tobin's Q. Overall, the results provide partial support for H2.

ESG performance significantly moderates the relationship between board gender diversity and ROE, as well as the relationships between board size, board independence, board meeting frequency, and Tobin's Q. An important distinction emerges between Tobin's Q, a market-based measure of firm value, and ROE, an accounting-based measure of financial performance. The moderating effects of ESG performance are more evident for Tobin's Q than for ROE. The differences in the moderating effects across ROE and Tobin's Q suggest that market valuation may respond more strongly to certain longer-term value implications of ESG practices than to their immediate effects on accounting profitability. ESG initiatives often require financial and organizational resources, including investments in environmental practices, employee welfare, stakeholder engagement, and governance systems. Such investments may increase short-term costs and therefore may not immediately translate into higher accounting returns. In contrast, Tobin's Q reflects market expectations regarding future growth opportunities, intangible assets, risk management, and long-term value creation. Strong ESG performance may enhance corporate reputation, stakeholder confidence, and investors' perceptions of a firm's long-term resilience and sustainability. Consequently, ESG performance may strengthen the extent to which certain board characteristics are reflected in market valuation, even when corresponding improvements in short-term accounting profitability are not evident. At the same time, the significant moderating effect of ESG performance on the relationship between board gender diversity and ROE indicates that the role of ESG is not limited to market-based firm value. Overall, these findings highlight the complementary role of ESG performance in corporate governance and suggest that its moderating effects may differ depending on the measure of firm value considered.

Table 6: Moderating effect of ESG on the board of directors and firm value

Variable	ROE (1)	Tobin Q (2)
Constant	-0.1132*** (-2.28)	0.7444*** (27.56)
ESG	-8.55e-06 (-0.02)	0.0004 (0.22)
BS	0.0036*** (3.41)	-0.0003 (-0.69)
ID	0.2092*** (5.31)	0.0264 (1.37)
BG	-0.0680*** (-3.40)	0.0159 (1.40)
BM	-0.0014** (-2.19)	-0.0010*** (-3.39)
FS	0.0162*** (4.97)	0.0014 (1.75)
FL	-0.2701*** (-5.21)	-0.7602*** (-20.34)
FA	-0.0001 (-0.07)	0.0004*** (3.43)
EA	0.0047 (0.70)	-0.0012 (-0.30)
FH	-0.0151 (-1.46)	0.0266*** (4.24)
ESG × BS	-0.0001 (-1.35)	0.0001** (2.15)
ESG × ID	-0.0018 (-1.45)	0.0056*** (2.83)
ESG × BG	0.0059*** (2.78)	0.0006 (0.68)
ESG × BM	0.0005 (0.69)	0.0001*** (3.05)
Year effect	Yes	Yes
Observations	408	408
Adj R ²	0.2204	0.8910

Notes: t statistics in parentheses, *p < 0.10; **p < 0.05; ***p < 0.01

4.5 Additional analyses and robustness tests

4.5.1 Additional endogeneity assessment

To assess potential endogeneity concerns in the relationship between board characteristics and firm value, we conducted the Durbin–Wu–Hausman (DWH) test. The results do not provide statistically significant evidence of endogeneity in the board-related variables ($p > 0.10$). Therefore, the baseline estimates do not appear to be substantially affected by the endogeneity concerns examined in this analysis. Nevertheless, these findings should be interpreted with caution, as the DWH test does not completely rule out potential sources of endogeneity. Accordingly, we do not claim that endogeneity is completely absent from the empirical models. To further examine potential reverse-causality concerns, we re-estimated the models using one-period lagged board characteristics. The results remain broadly consistent with the baseline findings. In the ROE specification, board size and board independence remain significantly positively associated with ROE, whereas board gender diversity remains significantly negatively associated with ROE. In the Tobin's Q specification, board meetings remain significantly negatively associated with firm value. The moderation results are also broadly consistent with those of the baseline models. Overall, these findings provide some support for the robustness of the baseline results with respect to potential reverse causality. However, the use of lagged independent variables does not fully rule out reverse causality, simultaneity, or other sources of endogeneity, particularly those arising from omitted variables. Thus, endogeneity cannot be completely excluded. Future research could employ stronger identification strategies, such as instrumental-variable approaches or quasi-experimental designs, where appropriate.

4.5.2 Robustness tests

To assess the robustness of the main findings, we re-estimate the baseline models using an alternative measure of accounting-based firm performance. Specifically, we replace ROE with ROA. Following Saygili et al. (2021), ROA is widely used as an indicator of corporate financial performance. The results show that board independence and board gender diversity are significantly associated with ROA. Moreover, the interaction terms indicate that ESG performance significantly moderates the effects of board size and board gender diversity on ROA. These findings are broadly consistent with the main analysis and provide additional evidence that the main conclusions are not driven by the use of ROE as the accounting-based measure of firm performance.

5. Conclusion and practical implications

5.1 Conclusion

This study examines the impact of board characteristics on firm value and the moderating effect of ESG performance, using evidence from the financial and insurance sectors. The empirical results reveal that board governance plays a crucial role in enhancing firm value, and that this effect becomes stronger when firms demonstrate superior ESG performance. These findings indicate that independent directors are positively associated with ROE and Tobin's Q. These results indicate that independent directors can effectively monitor managers, improve their performance, and enhance firm value (Almarayeh, 2021). In addition, board meetings were negatively related to ROE and Tobin's Q. Frequent meetings take up managerial time and increase expenses, which may affect enterprise activities within the firm as resources are directed toward less productive activities (Evans et al., 2002) that generate lower firm value. Furthermore, board size is significantly and positively related to ROE, but is not related to Tobin's Q, indicating that a larger board of directors with diversified professional backgrounds, knowledge, and skills (Ilaboya and Obaretin, 2015), can provide management with different strategic perspectives (Husted and de Sousa-Filho, 2019), and thus, make high-quality decisions. A gender-diverse board has a negative correlation with ROE but has no correlation with Tobin's Q. A possible reason is that, in the short term, female directors may have to adapt to board operations and be unable to perform their supervisory functions. The results indicate that ESG performance does not have a significant direct association with ROE or Tobin's Q. However, ESG significantly moderates several relationships between board characteristics and firm value. However, it may indirectly affect firm value as investors appreciate companies that engage in ESG activities. These findings highlight the importance of aligning traditional corporate governance mechanisms with sustainability-oriented strategies to create long-term shareholder and stakeholder value. By integrating ESG considerations into the governance–value framework, this study contributes to the literature by identifying ESG performance as a significant contextual factor shaping the effectiveness of board governance.

5.2 Practical implications

This study has several policy implications. First, this finding suggests that the financial and insurance sectors should strengthen the coordination of partners in board operations and ESG because effective board and ESG practices may be an important mechanism for firm value enhancement. Additionally, more independent directors can increase the objectivity and independence of the board's decisions and improve quality and efficiency. A large board can enhance firm value through the professional backgrounds and skills of the board members. Second, the results show that more frequent board meetings reveal board inefficiencies, leading to poor short-term performance (Prado-Lorenzo and Garcia-Sanchez, 2010). Therefore, policymakers should improve the efficiency of board meetings and avoid

unnecessary meetings to focus on important decisions; that is, focusing on quality rather than quantity, to enhance a firm's long-term value. Third, ESG practices may not substantially boost short-term profitability; they are perceived positively by investors and contribute to long-term market value (Lunawat et al., 2025). The potential impact of ESG can be integrated through the interaction between ESG and the board of directors. For example, good ESG performance helps access green and sustainable capital, supports responsible investing, and reduces long-term financial risk (Habib et al., 2025). Transparent ESG disclosures can enhance the trust of policyholders and investors, thereby improving institutional reputation and market confidence (Hamdouni, 2025; Zairis et al., 2024). Overall, effective ESG integration can improve the financial system's risk resilience, stakeholder trust, and sustainable value creation. Finally, from a practical perspective, the results suggest that policymakers and corporate leaders promote stronger ESG engagement at the board level to enhance transparency, stakeholder trust, and firm value.

5.3 Limitations and recommendations for future research

This study has some limitations. First, from the acquisition of data, the overall sample size is slightly smaller. Second, the board of directors can include other research variables, such as director's education, director attendance rate, or their sphere, so that the financial and insurance sectors can more accurately refer to the development of a more complete board. In addition, in terms of ESG assessment, it is recommended that information from other rating agencies such as MSCI and S&P Global be used to help gain a diversified and objective understanding of the measurement and actual status of ESG ratings in financial institutions. Future research could extend this analysis by exploring cross-country differences, sectoral heterogeneity, and the dynamic interactions between governance and ESG practices over time.

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