Do female directors influence the relationship between environmental, social and governance scores and firm market value in emerging economies?

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Abstract: This study explores the impact of female directors (FD) on board on the relationship between environmental, social and governance score (ESGS) and the firm's market value (FMV) in developing markets such as India. Using the panel data regression approach on the sample of 253 public listed firms from India from 2016 to 2021, the association between the ESGS of Indian firms and their market value was investigated and scrutinising the effect of females on board on this relationship. Further, the dynamic GMM method was used to strengthen the conclusions and combat endogeneity bias. The results show that the FD on board do not affect the relationship between the combined ESGS, environmental and governance score and firm market value. However, the findings also show that the FD positively and significantly influences the relationship between the social score and firm market value. Further, this study suggests practical implications and future research directions.

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1   Introduction

There has been a decreasing trend in the financial markets since the onset of COVID-19 (Beloskar and Rao, 2022; Goodell, 2020; Umar and Gubareva, 2020). The pandemic has forced organisations to consider sustainable development as part of their value-creation strategies (Kurucz et al., 2009; Malik, 2015; Mukanjari and Sterner, 2020). Previous studies have demonstrated that the firms with stronger environmental, social and governance (ESG) performance have outperformed their non-ESG peers in terms of market capitalisation (Bodhanwala and Bodhanwala, 2018). Considering this, firms started disclosing their sustainability performance separately in their annual reports and their corporate websites (Bender et al., 2019; Kitzmueller and Shimshack, 2012). Hence, the ESG factors are combined with firms' operations and strategy to meet stakeholders' expectations (Bhardwaj, 2016; Lassoued, 2018; Lokuwaduge and Heenetigala, 2017; Shrivastava and Addas, 2014).

The ESG-related issues are being disclosed in the sustainability reports (Kumar and Singh, 2022). These reports emphasise the sensitivity of business activities to the environment and society, impacting future generations (Nasrallah and El Khoury, 2022). Considering stakeholders' theory, these reports are prepared with greater transparency (Johnson and Greening, 1999), more accountability towards actions (Minor and Morgan, 2011) and adoption of best practices for long-term survival and competitive advantage (Fisher-Vanden and Thorburn, 2011). Previous studies have shown that higher ESG disclosures enhance brand image, brand reputation, and brand awareness and increase trust among investors and stakeholders (Lee and Rhee, 2023), leading to higher market value (Orlitzky et al., 2003). ESG performance also affects financial performance (Campbell, 2003; Kumar and Firoz, 2022), reduces cost burden (Sarumpaet et al., 2017), increases customer satisfaction (Nilsson et al., 2014), improves brand loyalty (Lee and Rhee, 2023), attracts quality workforce (Jin and Kim, 2022), appreciates the value of intangible assets (Jun et al., 2022) and therefore, contributes to the overall increase in this firm value (Harjoto et al., 2015; Husted and Sousa-Filho, 2019).

With the objective of optimising firm value, the firms respond to their operating environment (Wong et al., 2020). However, the increase in spending towards sustainable development may affect the firm's profitability and consequently, may affect the company's value (Rao and Tilt, 2016). The increased demand from investors and other stakeholders over the last decade has led to a rise in the use of ESG reporting in developed countries (Behl et al., 2022). There has been an increase in research coming out of developed nations as a result of growing public consciousness and the availability of massive amounts of data (Beji et al., 2021). The role of ESG scores (ESGS) on market values are recently researched topic globally yet not found any conclusive evidence and results. Hu et al. (2018) and Cordazzo et al. (2020) report finding substantial 'positive' and 'negative' results, respectively. Academic studies have paid little consideration to

this phenomenon in developing nations (Behl et al., 2022). Therefore, this research contributes to existing literature within the framework of stakeholders' theory (Jones, 1995) by examining how ESG disclosure practices influence the firm's market value (FMV) in emerging markets like India. The adoption of ESG practices in developing economies is important as it promotes sustainable development (Almasarwah, 2019; Shrivastava and Addas, 2014), mitigates risks (Díaz et al., 2022; Dorfleitner et al., 2015), address social issues (Kumar and Singh, 2022), environment protection (Pisani and Russo, 2021), attracts investments (Bhardwaj, 2016), enhance access to global markets (Behl et al., 2022), improves reputation (Lee and Rhee, 2023), competitive advantage (Jeffrey et al., 2019), and contribute to the long-term economic stability (Edmans, 2012).

The recent literature although has witnessed upsurge in number of studies examining the direct impact of firm's ESG commitment on various firm level characteristics or capital market performance, but there could be various governance factors that could affect the said relationship (Alodat and Hao, 2024; Matta et al., 2022). For instance, advocates of ESG have highlighted that the presence of female directors (FD) on board is one of the key drivers to the sustainable growth of an organisation (Orazalin and Baydauletov, 2020), and a critical and cardinal component of the social dimension of the ESG framework (Girardone et al., 2021). Additionally, women are stereotypically seen to be more sympathetic to social and environmental problems than males, making them more likely to take a stakeholder perspective when making decisions (Dah et al., 2018; Kumari et al., 2022; Liu, 2018). The sustainable development goals (SDGs) of the United Nations, particularly, SDG 5, (i.e., gender equality) aims to provide equitable opportunities for women in leadership and decision-making positions (United Nations, 2016). Consequently, there has been an increased participation of women directors in business activities at various levels of management. Also, Section 149 of the Companies Act, 2013 mandates the appointment of minimum one female director on the board (Khetan et al., 2021). In line with this, studies have revealed that higher board gender diversity results in increased innovation, better decision-making, positive public image of the firm, and greater financial and capital market performance. Fayyaz et al. (2023) stated a positive relationship between gender diversity and firm performance. Likewise, studies have also demonstrated direct positive association among board gender diversity, ESG performance and financial performance (Pucheta-Martínez and Gallego-Álvarez, 2020; Kahloul et al., 2022). Considering the vital role of board gender diversity, (i.e., number of FD on board) and dearth of studies in a developing economy context that examines the moderating role of FD in assessing the relationship between ESG and FMV, our study fills this gap. Additionally, studies on board diversity and women's participation at the corporate level display positive impacts on corporate decisions, especially concerning socio-environmental issues. Hence, our study concerns whether FD improves the association between ESG and FMV.

The motivation behind our study is driven by multiple factors. Firstly, with the advent of increasing global focus on adopting sustainable practises and aligning of firm's goals with SDGs, it has become vital for policymakers, regulators and investors to understand how ESG practices are influencing the firm performance, and its capital market returns (Alazzani et al., 2021). Secondly, considering the upsurge in investments in financial markets from domestic and international investors due to the recent economic transformations, investors are keen to understand how non-financial information disclosed by companies in their annual reports affects the market values (Alahdal et al., 2024). Thirdly, this study becomes more relevant because India has pledged to improve

its ESG performance as outlined in the 2015 Paris Agreement, which calls for 'a reduction in the intensity of greenhouse gas emissions by 33%–35% over 2005 levels and the achievement of 40% of electric power from renewable energy sources by the year 2030'. Also, in the wake of the global COVID-19 pandemic, there has been a heightened focus on incorporating ESG considerations into investment strategies and efforts to foster a more resilient business environment. Lastly, the second clause in Section 149(1) of the Companies Act, 2013 mandates the requirement of female director on firm's board highlighting the growing importance of gender diversity in Indian firms. Therefore, it creates a need to investigate the role of FD in influencing ESG performance and value of the firm.

This study makes several important contributions to the existing literature. To begin with, it expands the canon of knowledge from developing economies' viewpoint, which are latecomers to the field of sustainable practises but could one day make a huge difference. Secondly, as far as we know, no study has looked at how having women as directors' influences the relation between a firms's ESG score and its market value in the Indian setting. Thirdly, during the study period, it was observed that governance played a more prominent role in Indian enterprises compared to social and environmental reporting. This is because Indian regulators, led by SEBI, have emphasised good corporate governance practises at the expense of social and environmental considerations. Fourthly, our findings highlight the problem of inadequate female representation on company boards in India to the attention of policymakers. The management team reportedly favours hiring people who share their beliefs, social status, and hobbies. Fifthly, corporate directors are increasingly concerned about climate change, social impact, and corporate governance as a result of investors' heightened focus on ESG. Insights like these help policymakers better adopt gender equality and environmentally sound methods.

2   Theoretical framework, literature review and hypothesis development

2.1   Theoretical framework

The theoretical foundation of this study is based on the stakeholders' theory and agency theory. In light of the stakeholder theory, a firm is responsible for its business activities towards all its stakeholders (investors, employees, suppliers and customers, government, and other associated people) (Freeman, 2010; Lee and Isa, 2020). Stakeholder theory proposes that firms which engage their business activities beyond the objective of profit maximisation are better able to create wealth for themselves and their stakeholders. The sustainable development framework as the 'triple bottom line' was introduced by Elkington (1994) and explained how a firm can integrate and incorporate both the social and economic dimensions of its operations to attain sustainable development objectives. Elkington (1994) argues that firms should actively focus on their sustainable development strategies, which can optimise their profits, their performance and their relationship with stakeholders and consequently, will be a 'win-win' strategy. This aligns with the principles of stakeholder theory, where a firm can create value by acting more responsibly towards its stakeholders.

The stakeholders' theory clearly advocates that it is important for an organisation to manage relationships with its stakeholders to survive and continue. ESG reporting is a

transformative tool to communicate, attract and retain stakeholders. It is challenging to meet the diverse needs of the stakeholders and ensure that the right information is communicated to the stakeholders at the right time. Additionally, addressing the needs of the stakeholders helps in improving the firm performance by enhancing the motivation and morale of the employees, increasing the loyalty of customers, strengthening stakeholder relationships, improving the firm's reputation and overall firm value. Therefore, this study measures the relationship between ESG and FMV.

Further, this study refers to the agency theory. The concept of agency theory elucidates the role of management in improving the relationship between the company and its stakeholders. This study emphasises that it is the tendency of the management to prioritise short-term financial gains over long-term sustainability. This results in the misalignment of objectives between the shareholders (principal) and the management (agent). To address these issues, management engages in the disclosure of financial and non-financial information to its stakeholders, hence, reducing the agency costs.

Based on the agency theory, women on board promote ESG practices to enhance the principal-agent relationship and align stakeholders' interests more effectively. Furthermore, the inclusion of women on board tends to mitigate biases during the development of new strategies and addressing the issues, while also introducing a distinct viewpoint to strategic decision-making. Also, there is a perspective that female board members are more effective than male counterparts. Hence, this study further examines how FD enhances the relationship between ESG and FMV.

2.2   ESG and FMV

Corporations can enhance their financial performance by maintaining good relationships with their stakeholders. ESG reporting is seen as an effective communication tool to meet the expectations and information needs of the stakeholders and therefore, improving the firm performance in light of the stakeholders' theory. The existing literature has found that ESG performance can significantly enhance financial performance (Asiedu et al., 2020; Ates, 2020), whereas some studies showed contradictory and insignificant results (Atan et al., 2018).

Further, the current literature shows that ESG disclosure practices impact stock volatility (Abousamak and Shahwan, 2018; Baker et al., 2020; Khan, 2019), and investment decisions (Efimova, 2018; Fiskerstrand et al., 2020; Khan, 2019; Tasnia et al., 2021). The influence of ESG performance, specifically the environment pillar, on stock price was studied by Jacobs et al. (2010). They reported that when they combined announcements of corporate environmental initiatives (CEIs), the market showed no reaction. They did, however, discover notable market responses for specific classes of CEI products. The news of charitable donations to environmental organisations and ISO 14001 certifications were viewed favourably by the market, but voluntary emission reductions were regarded unfavourably. Market value dropped for firms who joined Climate Leaders and committed to reducing their carbon footprint, according to research by Fisher-Vanden and Thorburn (2011). Also, some studies show that ESG disclosure impacts security returns positively (Nerlinger, 2020), while some studies suggest impacting stock returns negatively (Landi and Sciarelli, 2019). According to the research of Krueger (2015), 'more openness boosts business value' because of higher stock liquidity and fewer informational imbalances. Customers and investors both have a favourable impression of environmental reporting, and they prefer to favour businesses

that have a strong track record in this area (Radhouane et al., 2018). How a company's competitiveness translates to market value was examined by Orlitzky et al. (2003). It was also shown by Hillman and Keim (2001) that fostering positive connections with the company's most important constituents may boost its intangible worth.

Further, most of the studies suggest that there is an inverse relationship between the firm ESG performance and corporate governance (AlHares, 2021; Uyar et al., 2020; Yu et al., 2018). Furthermore, some studies suggest that ESG disclosure practices positively influence the firm performance (Buallay, 2019; Pandey and Hassan, 2020), while some suggestively impact the firm performance negatively (Hassan and Roychowdhury, 2019; Lee et al., 2016).

The existing literature is mainly dominated by the developed economies and limited focus has been directed towards emerging economies due to the unstructured and less regulatory ESG framework in place. However, in developing economies such as India, where the Securities and Exchange Board of India (SEBI), the securities and market regulator requires the top 1,000 publicly listed companies, determined by market capitalisation, to report on their ESG performance in the form of a specific 'Business Responsibility and Sustainability Report (BRSR)' from the fiscal year 2022–2023 (Narula et al., 2024). This report aims to enhance compliance, more transparency in stakeholders' communication and a better sense of social responsibility and accountability.

Considering this, the following hypothesis is formulated:

H1   Association exists between the ESG score of the Indian firms and their market value.

   H1a   Association exists between the environmental pillar score and the market value of the Indian firms.

   H1b   Association exists between the social pillar score and the market value of the Indian firms.

   H1c   Association exists between the governance pillar score and the market value of the Indian firms.

2.3   ESG, FMV and FD

The ESG performance and its efficiency are influenced by the composition of the board (Velte, 2016) and the corporate board is the critical resource of the firms (Post et al., 2015). Female board members hold their diverse opinions and perspectives, therefore facilitating firms to make compassion-driven decisions that enhance ESG performances (Kagzi and Guha, 2018; Kyaw et al., 2017). Moreover, previous research has confirmed that improved ESG decisions contribute to enhancing the financial performance of firms (Adams and Ferreira, 2009).

Board gender diversity brings diverse perspectives, experiences, and cognitive styles to boardrooms, thereby enriching the decision-making processes within companies. Research indicates that diverse boards, including gender diversity, tend to exhibit better decision-making capabilities. FD often offers fresh insights and alternative viewpoints, leading to a more comprehensive assessment of risks and opportunities, especially concerning sustainability initiatives. Moreover, FD often possesses strong communication and interpersonal skills, fostering a more inclusive boardroom environment. This inclusive culture promotes collaborative discussions, encourages

innovation, and nurtures a culture that values sustainability, all of which contribute to enhancing the firm's overall performance (Sen and Mukherjee, 2019).

It is evident from the fact that FDs are more mindful of non-financial consequences than financial outcomes in comparison to their male counterpart. The involvement of women at various levels, including on the board, profoundly influences both corporate governance and the achievement of SDGs. Hence, in accordance with section 149 of the Company Act 2013, it is mandated to designate at least one female as director on the board to bring in gender diversity and positive outcomes. Although female representation on the board of directors has gone up to 17% in India, it is less in comparison to European countries of 40%. The female director has a substantial influence on the implementation of CSR initiatives and on social accomplishments (Zhang et al., 2013; Bhatia and Marwaha, 2022).

An analysis of 812 companies across 22 European countries revealed that higher gender diversity on boards positively correlated with improved ESG performance, leading to enhanced firm value (Qureshi et al., 2020). This finding lends credence to the idea that board gender diversity has a favourable effect on sustainability practices and performance. Existing research emphasises gender diversity, seeing it as an essential element of the ESG framework as a whole, one that helps sustain the organisation's values and its long-term success. Empirical research in India by Pareek et al. (2023) found that Indian-listed companies with a board of directors comprising diverse members were found to have a higher likelihood of disclosing ESG issues. On the contrary, Nguyen et al. (2021) found that board diversity does not have a conclusive impact on the environmental performance of the firm.

Arayssi et al. (2020) highlighted the significance of more FD on the board and improving the company's image because it represents that the company care about its community. Kagzi and Guha (2018) showed that board gender diversity positively and significantly linked with the ESG performance of the companies. Further, Arayssi et al. (2020) represented that more FD are positively linked with financial performance. While Nadeem et al. (2019) highlighted that FD are negatively and insignificantly associated with the profitability of the firms. Additionally, Mohammad et al. (2018) showed an insignificant link between board gender diversity and company performance.

Prior research has exclusively concentrated on the role of FD in influencing the ESGS of the firms (Kagzi and Guha, 2018; Kyaw et al., 2017) or the market performance of the firm (Velte, 2016) at a broader level, but very limited attention is given to the moderating role of FD between ESGS and market value of the firm. Considering this, we have developed the subsequent hypothesis:

H2 The presence of FD influences the relationship between the overall ESG score and the firm market value.

    H2a The presence of FD influences the relationship between the environmental pillar score and the firm market value.

    H2b The presence of FD influences the relationship between the social pillar score and the firm market value.

    H2c The presence of FD influences the relationship between the governance pillar score and the firm market value.

3   Research methodology

3.1   Data sources and sample selection

This study considers the ESG pillars score from the Eikon Refinitiv database, to measure the ESG performance of listed firms in India from 2016 to 2021, as our sample. These listed firms disclose their annual financial and non-financial information during the selected period and become the source for tracking the ESG performance of companies by Refinitiv's database. Over the period 2016–2021, the ESG score of a total of 341 companies out of the top 500 companies listed on the National Stock Exchange in India could be derived. Out of the total 341 companies, 88 entities are eliminated due to missing data in any of the sample periods. Rest 253 firms are selected for the period 2016 to 2021, which forms the balanced panel data for our analysis. Amongst 253 sample firms, the financial sector (18%) comprises the largest share, with the pharmaceutical industry (10%) following closely. Further classification of firms on the basis of industries is presented in Figure 1.

Figure 1   Industry composition in our sample
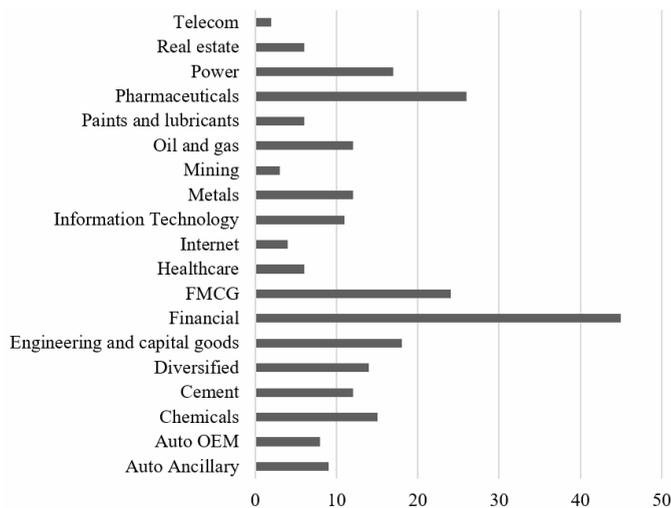
Note: Horizontal axis denotes the number of firms in respective industries and vertical
     axis highlights type of industries in our sample.

3.2   Measures

The measure of the dependent variable, FMV, is of significant importance in this study. It serves as a key indicator of the financial worth or valuation of the companies included in the analysis.

3.2.1   Dependent variable

The study's focus lies on assessing the FMV as the variable under examination, which is quantified using the natural logarithm of the market value (Ersoy et al., 2022). This

logarithmic transformation of the market value serves as the measurement approach employed to capture the financial valuation of the firms under investigation.

3.2.2 Independent variable

The independent variables are the environmental pillar score (E_Score), social pillar score (S_Score), governance pillar score (G_Score) and the overall ESG score (ESGS). The ESG pillars score are derived from Refinitiv's database. Refinitiv's database computes the ESG individual scores based on the set of ten factors, while the combined ESG score is considered a distinct set of three factors. ESGS are a measure of how well an organisation is doing in terms of the environment, society, and governance. The environmental pillar score (E_Score) takes into account resource consumption, emission levels, and creative problem-solving. Workforce, product responsibility and human rights are the factors in the social pillar score (S_Score). Corporate social responsibility (CSR) and shareholder rights are two groups included in the governance pillar score (G_Score) (Refinitiv, 2020).

3.2.3 Moderating variable

To explore the moderating influence of the FD on the association between the ESGS and FMV, the study utilises the count of FD on the board as a measure. In this analysis, the number of FD is multiplied by the ESGS of the firms to examine their combined effect.

3.2.4 Control variables

This study incorporates various control variables to account for additional factors that may influence the outcomes, such as firms' size (F_Size), quantified by number of employees (Clarkson et al., 2008), firms' profitability (F_Prof), assessed by the annual profits of the firm (Li et al., 2014), firms' age (F_Age), taken in terms of the number of years since its incorporation (Kumar and Firoz, 2018), the return on assets (F_ROA) ratio (Seth et al., 2024) and the sales growth rate (F_SGR), measured by the sales growth divided by the sales of the last year.

3.2.5 Research model specification

To facilitate the analysis of panel data, we employed an empirical panel regression model approach. This approach enables the examination of relationships between the variables of interest by considering both cross-sectional and time-series variations within the dataset. By incorporating panel data analysis techniques, we aim to capture the complexities and dynamics inherent in the data, leading to a comprehensive understanding of the relationships under investigation. Multiple models for 253 companies from 2016 to 2021 are formed. Separate models are being created for the individual ESG pillars alongside the comprehensive ESG score (models 1, 2, 3 and 4). For estimation, the following regression equations are formed:

$$Model\,1: FMV = a_1 + b_1{}^* ESGS + b_2{}^* F\_Size + b_3{}^* F\_Prof$$
$$+ b_4{}^* F\_Age + b_5{}^* F\_ROA + b_6{}^* F\_SGR + e$$

$$\text{Model 2}: FMV = a_2 + b_7{}^*E\_Score + b_8{}^*F\_Size + b_9{}^*F\_Prof$$
$$+ b_{10}{}^*F\_Age + b_{11}{}^*F\_ROA + b_{12}{}^*F\_SGR + e$$

$$\text{Model 3}: FMV = a_3 + b_{13}{}^*S\_Score + b_{14}{}^*F\_Size + b_{15}{}^*F\_Prof$$
$$+ b_{16}{}^*F\_Age + b_{17}{}^*F\_ROA + b_{18}{}^*F\_SGR + e$$

$$\text{Model 4}: FMV = a_4 + b_{19}{}^*G\_Score + b_{20}{}^*F\_Size + b_{21}{}^*F\_Prof$$
$$+ b_{22}{}^*F\_Age + b_{23}{}^*F\_ROA + b_{24}{}^*F\_SGR + e$$

In the above equations, FMV indicates firm market value; *ESGS* denotes environmental, social, and governance scores; *E_Score* shows environmental score; *S_Score* reveals social score and *G_Score* indicates governance score of firms; *F_Size*, *F_Prof*, *F_Age*, *F_ROA* and *F_SGR*, signifies control variables, (i.e., size, profitability, age, return on assets and sales growth rate); *e* designate error term; a_1, a_2, a_3, a_4 indicates constant term; b_1 to b_{24} reveals estimated coefficients.

Further, an empirical panel regression model is formed to explore the effect of FD on the association between ESG score and market value of the 253 firms from 2016 to 2021 (models 5, 6, 7 and 8).

$$\text{Model 5}: FMV = a_1 + b_1{}^*ESGS + b_2{}^*WOM + b_3{}^*WOM * ESGS + b_4{}^*F\_Size$$
$$+ b_5{}^*F\_Prof + b_6{}^*F\_Age + b_7{}^*F\_ROA + b_8{}^*F\_SGR + e$$

$$\text{Model 6}: FMV = a_2 + b_9{}^*E\_Score + b_{10}{}^*WOM + b_{11}{}^*WOM * E\_Score + b_{12}{}^*F\_Size$$
$$+ b_{13}{}^*F\_Prof + b_{14}{}^*F\_Age + b_{15}{}^*F\_ROA + b_{16}{}^*F\_SGR + e$$

$$\text{Model 7}: FMV = a_3 + b_{17}{}^*S\_Score + b_{18}{}^*WOM + b_{19}{}^*WOM * S\_Score + b_{20}{}^*F\_Size$$
$$+ b_{21}{}^*F\_Prof + b_{22}{}^*F\_Age + b_{23}{}^*F\_ROA + b_{24}{}^*F\_SGR + e$$

$$\text{Model 8}: FMV = a_4 + b_{25}{}^*G\_Score + b_{26}{}^*WOM + b_{27}{}^*WOM * G\_Score + b_{28}{}^*F\_Size$$
$$+ b_{29}{}^*F\_Prof + b_{30}{}^*F\_Age + b_{31}{}^*F\_ROA + b_{32}{}^*F\_SGR + e$$

In the above equations, *FMV* indicates firm market value; *ESGS* denotes environmental, social, and governance scores; *E_Score* shows environmental score; *S_Score* reveals social score and *G_Score* indicates governance score of firms; *WOM* denotes number of FD on board; *F_Size*, *F_Prof*, *F_Age*, *F_ROA* and *F_SGR*, signifies control variables, (i.e., size, profitability, age, return on assets and sales growth rate); *e* designate error term; a_1, a_2, a_3, a_4 indicates constant term; b_1 to b_{32} reveals estimated coefficients.

4 Results and findings

4.1 Descriptive statistics

Based on the sample of 253 Indian firms (Table 1), *G_Score* is greater as compared to other individual scores which indicate strong governance dimension and framework. An average age of the firm is 43 years which indicates the long corporate history. Also, the mean number of FD on the board is two, with a maximum of five.

In this research, the variable under investigation is the firm market value, is calculated by applying the natural logarithm to the market value of the firm. The average FMV is estimated to be around 5.09.

Table 1   Descriptive statistics

Variable	Mean	S.D	Min.	Max.	Observations
FMV	5.0932	0.6920	1.0931	7.1317	1,518
E_Score	19.8237	14.3150	10.2011	77.2878	1,518
S_Score	22.9229	10.2903	8.3289	69.8911	1,518
G_Score	77.0985	8.7148	27.1523	98.6153	1,518
ESGS	37.8539	10.6006	20.3198	77.6078	1,518
F_Age	43.0533	24.5486	1	125	1,518
F_ROA	6.4680	13.052	–279.7641	77.5753	1,518
F_Size	3.0014	1.5415	1.4392	5.5569	1,518
F_Prof	2.8377	1.6172	1.3252	5.5460	1,518
F_SGR	1.19598	3.015343	–15.02	15.44	1,518
WOM	2.26	1.08156	0	5	1,518

Source: Author(s) compilation

4.2   *Correlation matrix*

The correlation between the variables is demonstrated in Table 2. Before applying the regression analysis, we investigated the multicollinearity of variables of our interest. The multicollinearity of independent variables and autocorrelation in the residuals is not a problem in the sample data set using variance inflation factor (VIF) and Durbin-Watson (DW) statistics.

In this study, we observed a favourable correlation between the ESG score, and the scores associated with each of the ESG pillars, indicating a robust relationship. Moreover, the firm's ESG score, and the individual pillar scores display positive associations with another variable, referred to as the firm's age (*F_Age*). Examining Table 2, we observe that the ESG score and the respective pillar scores exhibit positive correlations with the firm's size, profitability, return on assets, sales growth rate and the representation of FD.

4.3   *Empirical findings*

In our analysis, we employ panel data regression techniques, specifically utilising both fixed-effect and random-effect models, to investigate the association between companies' market value and their ESG score, as well as the scores for individual ESG pillars. A p-value below 0.05 is an indication that the fixed-effect model is more suitable, thus providing additional support for its utilisation in our analysis.

Tables 3 and 4 summarise the fixed-effect panel model and random-effect model's panel data regression findings, respectively. According to the F-statistic, all eight models are statistically significant ($p < 0.01$) (Bhattacharyya et al., 1979).

Table 2   Correlation matrix

Variables	E_Score	S_Score	G_Score	ESGS	F_Age	F_ROA	F_Size	F_Prof	F_SGR	WOM
E_Score	1									
S_Score	0.7542*	1								
G_Score	0.3920*	0.3486*	1							
ESGS	0.9189*	0.8593*	0.5865*	1						
F_Age	0.0714*	0.0330	0.1154*	0.0385	1					
F_ROA	0.1275*	0.0797*	0.1556*	0.1576*	0.0457	1				
F_Size	0.2998*	0.2084*	0.2962*	0.3318*	0.0222	0.5399*	1			
F_Prof	0.3226*	0.2408*	0.2783*	0.3570*	0.0425	0.7704*	0.7348*	1		
F_SGR	0.0329	0.0872*	0.0376	0.0576*	0.0839*	0.0414	0.0581*	0.0544*	1	
WOM	0.0046	0.0639	0.0674	0.0027	−0.0197	0.0706	0.0142	0.0402	0.0866	1

Note: $*p < 0.05$.

Source: Author(s) compilation

Table 3   Panel regression results for testing Hypothesis 1

Panel regression results	Model 1 (ESGS)		Model 2 (E_Score)		Model 3 (S_Score)		Model 4 (G_Score)	
Independent variables	Dependent variable: FMV		Dependent variable: FMV		Dependent variable: FMV		Dependent variable: FMV	
ESGS	0.0017546 (0.000)*	0.0183141 (0.000)*						
E_Score			0.000847 (0.000)*	0.007641 (0.000)*				
S_Score					0.0001486 (0.000)*	0.011962 (0.000)*		
G_Score							0.0013066 (0.005)*	0.0071905 (0.001)*
Control variables								
F_Age	0.0380411 (0.000)*	0.0011068 (0.028)*	0.011357 (0.000)*	0.0016228 (0.012)*	0.2107618 (0.000)*	0.0029217 (0.030)*	0.0036586 (0.000)*	0.0057554 (0.002)*
F_ROA	0.1813870 (0.001)*	0.0014346 (0.009)*	0.302268 (0.000)*	0.0857977 (0.014)*	0.101421 (0.003)*	0.0822603 (0.017)*	0.0015808 (0.000)*	0.0867179 (0.016)*
F_Size	0.041458 (0.012)*	0.0051683 (0.011)*	0.022476 (0.000)*	0.0299766 (0.063)	0.0630256 (0.023)*	0.0721083 (0.071)	0.0362217 (0.001)*	0.0836304 (0.011)*
F_Prof	0.0034023 (0.760)	0.0212386 (0.112)	0.0451588 (0.064)	0.0723759 (0.049)*	0.0061741 (0.899)	0.072912 (0.045)*	0.0091904 (0.537)	0.0428056 (0.076)
F_SGR	0.0070356 (0.429)	0.0023098 (0.106)	0.0083941 (0.071)	0.0018216 (0.003)*	0.0006715 (0.112)	0.0078848 (0.061)	0.0785518 (0.936)	0.0104758 (0.065)
Type	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random
Year fixed effect	Yes	No	Yes	No	Yes	No	Yes	No
Industry fixed effect	Yes	No	Yes	No	Yes	No	Yes	No
Sample size	253	253	253	253	253	253	253	253
Adjusted R square	0.2165	0.2232	0.2154	0.1847	0.1953	0.1973	0.2057	0.1455
F statistics	26.61		34.46		34.55		34.51	
Chi-Sq. statistics		117.31		108.21		128.48		106.14
Probability	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Hausman test	<0.05		<0.05		<0.05		<0.05	
VIF	<10		<10		<10		<10	

Note: $*p < 0.05$.

Source: Author(s) compilation

Table 4   Panel regression results for testing Hypothesis 2

Panel regression results	Model 5 (ESGS)		Model 6 (E_Score)		Model 7 (S_Score)		Model 8 (G_Score)	
Independent variables	*Dependent variable: FMV*		*Dependent variable: FMV*		*Dependent variable: FMV*		*Dependent variable: FMV*	
ESGS	0.0008659 (0.003)*	0.0133468 (0.000)*						
E_Score			0.000438 (0.001)*	0.0062996 (0.000)*				
S_Score					0.0004506 (0.002)*	0.010311 (0.000)*		
G_Score							0.0021084 (0.006)*	0.00285 (0.020)*
Moderating variables								
WOM	0.072258 (0.651)	0.004552 (0.076)	0.004301 (0.611)	0.002128 (0.206)	0.0010193 (0.088)	0.0045391 (0.109)	0.037828 (0.112)	0.00168 (0.422)
WOM*ESGS	0.0003787 (0.225)	0.0007245 (0.060)						
WOM*E_Score			0.000498 (0.162)	0.0012716 (0.036)				
WOM*S_Score					0.0007918 (0.000)*	0.001851 (0.000)*		
WOM*G_Score							0.0000642 (0.038)	0.00077 (0.000)*

Note: $*p < 0.05$.

Source: Author(s) compilation

Table 4   Panel regression results for testing Hypothesis 2 (continued)

Panel regression results	Model 5 (ESGS)		Model 6 (E_Score)		Model 7 (S_Score)		Model 8 (G_Score)	
Control variables								
F_Age	0.065107 (0.000)*	0.0017822 (0.204)	0.037968 (0.000)*	0.0017134 (0.040)*	0.0772185 (0.000)*	0.0022346 (0.098)	0.0770461 (0.000)*	0.00882 (0.041)*
F_ROA	0.101858 (0.003)*	0.1013809 (0.007)*	0.149618 (0.004)*	0.1303728 (0.008)*	0.1090641 (0.004)*	0.0887011 (0.010)*	0.1082459 (0.003)*	0.08347 (0.015)*
F_Size	0.0365025 (0.019)*	0.0061903 (0.541)	0.037330 (0.019)*	0.0205639 (0.170)	0.0328081 (0.018)*	0.0125977 (0.195)	0.0635709 (0.020)*	0.02279 (0.134)
F_Prof	0.0036261 (0.785)	0.017382 (0.212)	0.0043978 (0.741)	0.0189815 (0.176)	0.0039431 (0.767)	0.0217847 (0.118)	0.0027309 (0.837)	0.01792 (0.196)
F_SGR	0.0006169 (0.970)	0.0766391 (0.089)	0.0075798 (0.741)	0.0078174 (0.762)	0.0040552 (0.767)	0.0068771 (0.102)	0.0016298 (0.504)	0.00678 (0.910)
Type	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random
Year fixed effect	Yes	No	Yes	No	Yes	No	Yes	No
Industry fixed effect	Yes	No	Yes	No	Yes	No	Yes	No
Sample size	253	253	253	253	253	253	253	253
Adjusted R square	0.2152	0.2229	0.2155	0.1927	0.216	0.1841	0.2147	0.1464
F statistics	34.41		34.47		34.58		34.3	
Chi-Sq. statistics		152.63		141.26		154.49		116.48
Probability	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hausman test	< 0.05		< 0.05		< 0.05		< 0.05	
VIF	< 10		< 10		< 10		< 10	

Note: *$p < 0.05$.

Source: Author(s) compilation

Table 3 summarises the panel data regression results from the fixed-effect and random-effect for models 1, 2, 3 and 4, respectively. To differentiate between individual fixed effects and random effects, we conducted the Hausman test. The results indicate that the fixed-effects model is more suitable than the random-effects model. While empirically testing, the link between ESG score and FMV (H1) and the link between individual pillars score and FMV (H1a, H1b and H1c), the analysis demonstrates a strong positive relationship between the FMV, the dependent variable, and the ESGS (model 1) and individual pillars score (model 2, 3 and 4) at $p < 0.05$. Hence, we support H1, H1a, H1b and H1c. The findings support the previous studies (Gregory, 2022).

Further, in terms of control variables, the age of the firm is positively linked to the market values of the firm at $p < 0.05$ in each model (models 1, 2, 3 and 4). This might be because established firms with a long history of profitability may enjoy higher market valuations due to their track record and brand recognition. Also, the firms' size is positively associated with the market values of the firm at $p < 0.05$ in each model (models 1, 2, 3 and 4). This might be because larger firms may enjoy economies of scale, access to capital, and greater market share, potentially leading to higher valuations.

The relationship between the firm's return on assets (ROA) and the market value is found to be positive and statistically significant at $p < 0.05$ in each model (models 1, 2, 3 and 4). One possible explanation for this pattern could be that companies with higher return on assets (ROA) are perceived more favourably by investors, which can potentially result in higher market valuation. However, we observed that the profitability and sales growth rate of the firm are insignificant to the market value ($p > 0.05$). This could be attributed to the inclination of investors to assign a higher value to companies that prioritise sustainability and social responsibility, irrespective of their profitability and increase in sales.

Table 4 presents a summary of the panel data regression outcomes for models 5, 6, 7, and 8, employing fixed-effect as well as random-effect panel models. The application of the Hausman test allows us to distinguish between the presence of individual fixed effects and random effects. The results show that the fixed-effects model is preferable over the random-effects model. To better understand the moderating effect, we multiplied the number of FD on board with the ESG score and individual pillars score. To empirically test, how FD moderates the link between ESGS and FMV (H2) and the link between individual pillars score and FMV (H2a, H2b and H2c), the findings indicate a strong positive relationship between the dependent variable, namely the FMV, and the ESGS (model 5) and individual pillars score (model 6, 7 and 8) at $p < 0.05$. However, the FD has no impact on the FMV ($p > 0.05$) in each model (model 5, 6, 7 and 8).

Further, the number of FD in the board was found to be insignificantly ($p > 0.05$) influencing the association between the ESG score and FMV (model 5). Hence, we do not support H2. Similarly, in models 6 and 8, the FD was found to be insignificantly ($p > 0.05$) influencing the association between *E_Score* and *G_Score* and FMV and previous studies support these findings (Post et al., 2015; Nguyen et al., 2021). Therefore, we do not support H2a and H2c.

However, the FD positively and significantly ($p < 0.05$) influenced the relationship between social pillar score and FMV. Therefore, the number of women on boards may impact the ESG framework's social component, which requires companies to report on their efforts to serve people both within and outside the company. Hence, we support H2b.

Table 5   Dynamic GMM results for testing Hypothesis 1

Dynamic GMM results	Model 1 (ESGS)	Model 2 (E_Score)	Model 3 (S_Score)	Model 4 (G_Score)
Independent variables	Dependent variable: FMV	Dependent variable: FMV	Dependent variable: FMV	Dependent variable: FMV
ESGS	0.00312544 (0.000)*			
E_Score		0.0053063 (0.000)*		
S_Score			0.00063762 (0.001)*	
G_Score				0.0020964 (0.006)*
Lag.FMV	0.0065711 (0.021)*	0.0471471 (0.001)*	0.4791092 (0.015)*	0.735413 (0.006)*
Control variables				
F_Age	0.0054137 (0.000)*	0.0073694 (0.000)*	0.0350949 (0.000)*	0.0608596 (0.000)*
F_ROA	0.4799361 (0.001)*	0.0741678 (0.000)*	0.0087068 (0.088)	0.3673263 (0.000)*
F_Size	0.0176295 (0.000)*	0.0036693 (0.000)*	0.0039951 (0.000)*	0.0243110 (0.001)*
F_Prof	0.00472276 (0.204)	0.0062016 (0.761)	0.0052486 (0.569)	0.0035993 (0.963)
F_SGR	0.008711 (0.433)	0.0017084 (0.602)	0.0022627 (0.510)	0.0019757 (0.744)
AR (1) p-value	0.000	0.001	0.000	0.000
AR (2) p-value	0.685	0.516	0.584	0.513
Sargan p-value	0.106	0.268	0.117	0.169
Wald test p-value	0.000	0.000	0.000	0.000

Note: *$p < 0.05$.

Source: Author(s) compilation

4.4   Robustness test

The current literature indicates that employing ordinary least squares (OLS) regression with fixed or random effect models may yield inconsistent estimators. This inconsistency arises due to the inability of these models to adequately address a dynamic panel structure and the violation of certain underlying assumptions (Pareek et al., 2023). Following Arellano and Bond (1991) advice, we used dynamic GMM as the estimator because it is more robust than OLS. The dynamic generalised method of moments (GMM) estimator is based on the premise that estimation is a dynamic process, where optimal outcomes are achieved when none of the moment conditions are satisfied such as strictly exogenous variables, no multicollinearity, no autocorrelation and homoscedasticity are not satisfied (Wooldridge, 2002). GMM acts as an additional check to ensure that our outcomes are not severely impacted by the probable occurrence of endogeneity (Gerged et al., 2023). Additionally, GMM aids in addressing concerns about omitted factors and reverse

causality that could potentially influence the association between a firm's sustainable performance and capital market returns (Zahid et al., 2023). Specifically, in line with the literature (such as Gerged et al., 2023; Lakhal et al., 2023), this study employs GMM to address the endogeneity issue arising from the reverse causality relationship between ESG and firm value. The GMM approach yields the findings shown in Tables 5 and 6.

Table 6   Dynamic GMM results for testing Hypothesis 2

Dynamic GMM results	Model 5 (ESGS)	Model 6 (E_Score)	Model 7 (S_Score)	Model 8 (G_Score)
Independent variables	Dependent variable: FMV	Dependent variable: FMV	Dependent variable: FMV	Dependent variable: FMV
ESGS	0.0063937 (0.000)*			
E_Score		0.0087035 (0.000)*		
S_Score			0.0004179 (0.001)*	
G_Score				0.007187 (0.006)*
Lag.FMV	0.0360566 (0.001)*	0.0411854 (0.009)*	0.0614309 (0.003)*	0.5130961 (0.006)*
Moderating variables				
WOM*ESGS	0.0005668 (0.186)			
WOM*E_Score		0.0087594 (0.310)		
WOM*S_Score			0.00010282 (0.004)*	
WOM*G_Score				0.00043382 (0.432)
Control variables				
F_Age	0.0060891 (0.000)*	0.0082888 (0.000)*	0.0394733 (0.000)*	0.0846525 (0.000)*
F_ROA	0.0398129 (0.000)*	0.0834209 (0.000)*	0.00799730 (0.000)*	0.0413153 (0.000)*
F_Size	0.0198892 (0.000)*	0.0041271 (0.001)*	0.0044936 (0.000)*	0.0027344 (0.001)*
F_Prof	0.0053174 (0.517)	0.0069753 (0.884)	0.0059034 (0.532)	0.0004048 (0.493)
F_SGR	0.0060314 (0.496)	0.090839 (0.699)	0.0007941 (0.380)	0.0001549 (0.271)
AR (1) p-value	0.000	0.002	0.000	0.000
AR (2) p-value	0.762	0.556	0.472	0.631
Sargan p-value	0.257	0.328	0.451	0.235
Wald test p-value	0.000	0.000	0.000	0.000

Note: *$p < 0.05$.

Source: Author(s) compilation

Table 7   Sensitivity analysis for testing Hypothesis 1

Panel regression results / Independent variables	Model 1 (ESGS) Dependent variable: TQ		Model 2 (E_Score) Dependent variable: TQ		Model 3 (S_Score) Dependent variable: TQ		Model 4 (G_Score) Dependent variable: TQ	
ESGS	0.0042808 (0.000)*	0.0098273 (0.000)*						
E_Score			0.0068872 (0.000)*	0.0026912 (0.000)*				
S_Score					0.0004783 (0.000)*	0.018935 (0.000)*		
G_Score							0.0076599 (0.000)*	0.0007601 (0.000)*
Control variables								
F_Age	0.0361028 (0.000)*	0.0042717 (0.000)*	0.015565 (0.000)*	0.0069593 (0.002)*	0.0004119 (0.000)*	0.0047637 (0.000)*	0.0074637 (0.000)*	0.0027571 (0.001)*
F_ROA	0.0376135 (0.000)*	0.0008753 (0.002)*	0.0017241 (0.000)*	0.0022849 (0.001)*	0.0019899 (0.003)*	0.0006371 (0.007)*	0.800021 (0.000)*	0.0157196 (0.002)*
F_Size	0.0011867 (0.002)*	0.0015739 (0.011)*	0.0013714 (0.000)*	0.0543186 (0.003)	0.053469 (0.013)*	0.013995 (0.001)	0.005319 (0.007)*	0.0104221 (0.021)*
F_Prof	0.0025798 (0.217)	0.0024003 (0.153)	0.0007629 (0.560)	0.0002004 (0.461)	0.0647217 (0.830)	0.0446443 (0.028)*	0.0212328 (0.483)	0.0179598 (0.578)
F_SGR	0.0019403 (0.794)	0.0007358 (0.263)	0.0061559 (0.088)	0.0048663 (0.000)*	0.0006472 (0.126)	0.0046143 (0.227)	0.0006675 (0.827)	0.0015067 (0.493)
Type	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random
Year fixed effect	Yes	No	Yes	No	Yes	No	Yes	No
Industry fixed effect	Yes	No	Yes	No	Yes	No	Yes	No
Sample size	253	253	253	253	253	253	253	253
Adjusted R square	0.2251	0.2223	0.1941	0.1846	0.1935	0.1867	0.1917	0.1139
F statistics	26.92		40.17		30.58		31.04	
Chi-Sq. statistics		146.02		128.73		139.56		111.68
Probability	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hausman test	< 0.05		< 0.05		< 0.05		< 0.05	
VIF	< 10		< 10		< 10		< 10	

Note: *$p < 0.05$.

Source: Author(s) compilation

Table 8   Sensitivity analysis for testing Hypothesis 2

Panel regression results	Model 5 (ESGS)		Model 6 (E_Score)		Model 7 (S_Score)		Model 8 (G_Score)	
Independent variables	*Dependent variable: TQ*		*Dependent variable: TQ*		*Dependent variable: TQ*		*Dependent variable: TQ*	
ESGS	0.0065084 (0.000)*	0.001502 (0.000)*						
E_Score			0.000489 (0.000)*	0.001648 (0.000)*				
S_Score					0.000908 (0.008)*	0.005182 (0.000)*		
G_Score							0.009402 (0.001)*	0.003610 (0.001)*
Moderating variables								
WOM	0.096118 (0.851)	0.002147 (0.916)	0.002308 (0.512)	0.000138 (0.125)	0.002383 (0.088)	0.009546 (0.104)	0.013187 (0.155)	0.005018 (0.547)
WOM*ESGS	0.004681 (0.383)	0.000711 (0.060)						
WOM*E_Score			0.003105 (0.472)	0.000788 (0.093)				
WOM*S_Score					0.000446 (0.182)	0.000471 (0.000)*		
WOM*G_Score							0.000233 (0.085)	0.000625 (0.000)*

Note: *$p < 0.05$.

Source: Author(s) compilation

Table 8   Sensitivity analysis for testing Hypothesis 2 (continued)

Panel regression results	Model 5 (ESGS)		Model 6 (E_Score)		Model 7 (S_Score)		Model 8 (G_Score)	
Control variables								
F_Age	0.0127137 (0.000)*	0.001127 (0.033)*	0.033745 (0.001)*	0.002411 (0.011)*	0.007908 (0.001)*	0.004137 (0.020)*	0.039664 (0.000)*	0.003555 (0.000)*
F_ROA	0.0107504 (0.003)*	0.002245 (0.008)*	0.057178 (0.000)*	0.085607 (0.018)*	0.011216 (0.004)*	0.082361 (0.011)*	0.034747 (0.000)*	0.083616 (0.006)*
F_Size	0.0332057 (0.017)*	0.040473 (0.010)*	0.024382 (0.004)*	0.017075 (0.088)	0.026377 (0.000)*	0.016003 (0.089)	0.010325 (0.001)*	0.028610 (0.001)*
F_Prof	0.0170021 (0.408)	0.0110258 (0.102)	0.020289 (0.818)	0.006287 (0.003)*	0.017265 (0.401)	0.016832 (0.040)*	0.011587 (0.382)	0.012784 (0.063)
F_SGR	0.0067137 (0.609)	0.0081766 (0.773)	0.0071382 (0.294)	0.0022975 (0.241)	0.0283376 (0.749)	0.0183173 (0.429)	0.0058328 (0.306)	0.0023559 (0.513)
Type	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random
Year fixed effect	Yes	No	Yes	No	Yes	No	Yes	No
Industry fixed effect	Yes	No	Yes	No	Yes	No	Yes	No
Sample size	253	253	253	253	253	253	253	253
Adjusted R square	0.1988	0.2363	0.1974	0.2334	0.2038	0.1826	0.1914	0.1765
F statistics	27.83		28.31		28.14		28.86	
Chi-Sq. statistics		117.53		131.36		118.28		116.16
Probability	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Hausman test	<0.05		<0.05		<0.05		<0.05	
VIF	<10		<10		<10		<10	

Note: $*p < 0.05$.

Source: Author(s) compilation

The findings from the dynamic GMM approach align largely with those obtained from the fixed-effect model, indicating consistency between the two. The results indicate that the ESGS and individual pillar scores are positively and significantly lined with the FMV at $p < 0.05$ (Table 5).

Further, the findings from the dynamic GMM approach indicate that the FD does not exert any significant influence on the relationship between the ESGS and FMV ($p > 0.50$). Moreover, the presence of FD in the board does not influence the association between the individual pillars score and FMV (Table 6). One possible explanation for this finding is that FD may have limited participation in the decision-making, resulting in a lack of power and influence.

4.5 Sensitivity analysis

The current literature has also measured the market value of an entity by Tobin's Q (TQ) (Zhou et al., 2022; Buallay, 2019). In order to further increase the relevance of the present study, we further employed Tobin's Q (TQ) as an alternative measure of market value. TQ is measured by the FMV to its total assets (Zhou et al., 2022; Buallay, 2019).

Table 7 and 8 summarises the panel data regression results from the fixed-effect and random-effect for all the models (1–8), considering an alternative measure of market value. The findings indicate a positive relationship between the dependent variable, FMV, and the ESGS (model 1 and 5) and individual pillars score (model 2, 3, 4, 6, 7 and 8) at $p < 0.05$. However, the FD has no impact on the FMV ($p > 0.05$) in each model (model 5, 6, 7 and 8). The findings align largely with those obtained from the fixed-effect model, indicating consistency between the two. Additionally, the number of FD in the board was found to be insignificantly ($p > 0.05$) influencing the association between the ESG score and individual pillars score and FMV (model 5, 6, 7 and 8).

5 Conclusions and implications of this study

This study enriches the existing literature by addressing the examination of the association between the ESG score and the market value of Indian firms using stakeholders' theory. The panel data regression models are employed to analyse data spanning from 2016 to 2021. The results reveal a robust and statistically significant positive relationship between the market value of firms and both the overall ESG score (model 1) and the scores about individual ESG pillars (models 2, 3, and 4). Our findings are consistent with previous research (Fatemi et al., 2018; Hu et al., 2018), which claim a positive impact of ESGS on the market value of firms. Further, this study investigated the nexus and role of FD in the relationship between ESG-FMV from agency theory viewpoint. According, the impact of FD on the association between FMV and ESGS (model 5) and individual pillar scores (models 2, 3, and 4) is explored. Our research demonstrates that the FD has no impact on the relation between a company's market value and its ESGS. There is no difference in the relation between firm market value and environmental and governance pillar score, regardless of the number of FD. These findings are in line with prior research conducted in this field (Nguyen et al., 2021; Yadav and Prashar, 2023; Alodat and Hao, 2024; Bhatia and Marwaha, 2022) that concluded female board members had little impact on companies' ESG performance.

Women are underrepresented in leadership positions in Indian organisations, which may explain why the average percentage of FD is predicted to be about 17% in 2020. Therefore, it may be difficult for them to have an impact on the final choice.

However, the findings show that the women on board noteworthy, statistically and positively influence the relationship between social pillar score and FMV. One possible explanation for this phenomenon is that women on board may contribute a unique perspective to discussions concerning social issues, such as employee relations, community engagement, and human rights.

Consequently, this study has practical implications for various industries. It suggests reorganising their board of directors, especially about more participation and involvement of FD. This shall help to enhance the ESG initiatives and bring varied strategic perspectives. Also, this study is helpful for policymakers. This study helps to build gender-balanced approach and ESG practices. Additionally, this study is useful for regulators as well. The findings of this study benefit regulators by reframing the rules and regulations to make the companies more accountable for their actions and increase participation of FD in board. As a result, it fosters good governance practices.

6   Limitations and future research directions

Like other studies, this research has limitations too. Firstly, this study is in Indian context only. The results cannot be generalised to other nations, most likely as a result of variations in laws, policies, and economic growth phases. Hence, a potential research gap in the existing literature lies in the comparative analysis of the effects of sustainable practices between developed and developing nations. Secondly, the assessment of ESGS varies among the rating agencies due to varying methods of assessment. Therefore, it becomes difficult to reach consistent conclusions and thirdly, ESG issues vary between the industries in which firms operate. Hence, future research in assessing the ESG performance among different sectors and industries can be investigated. This approach would provide an opportunity for a more extensive investigation of the relationship in diverse geographical contexts. Further research, for an example, longitudinal studies to investigate the development of these relationships over time, qualitative research on different stakeholders' perspectives of ESG performance can be explored.

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