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International Journal of Corporate Governance

ISSN online: 1754-3045 - ISSN print: 1754-3037
https://www.inderscience.com/ijcg

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DOI: 10.1504/IJCG.2023.10054845

Article History:

Received:	10 October 2022
Last revised:	25 January 2023
Accepted:	13 February 2023
Published online:	04 May 2023

Impact of environmental, social and governance engagements on financial distress under competition: evidence from non-financial firms listed in India

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Abstract: Nowadays, environmental, social and governance (ESG) engagements are placed at focal point by the stakeholders in the firms. A strong investment plan now considers ESG aspects for investment decisions to improve risk and engender sustainable benefits for investors. Hence, this study proposes to investigate the impact of ESG engagements on firm's financial distress (FD). A panel data analysis is applied on the dataset of 76 listed non-financial firms in India under BSE100 for the period 2016–2020. The findings reveal that the ESG practices alone do not affect firm's FD. The higher competition increases the FD. However, when ESG works under high competition, it enhances FD or reduces financial stability. The findings give novel and interesting evidence and contribute significantly into the existing knowledge body of ESG and FD. The findings imply and recommend all the stakeholders to consider ESG activities as a critical element for firm's FD.

Keywords: environmental; social and governance; environmental, social and governance; ESG; CSR; distress; competition; panel data; India.

Reference to this paper should be made as follows: Kanoujiya, J., Singh, K. and Rastogi, S. (2023) 'Impact of environmental, social and governance engagements on financial distress under competition: evidence from non-financial firms listed in India', *Int. J. Corporate Governance*, Vol. 13, No. 3, pp.277–296.

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1 Introduction

Corporate environment reporting (CER) presents the status of environmental, social and governance (ESG) activities performed by a firm. It is now globally accepted that ESG activities have an inevitable precedence in a firm's performance (Garcia et al., 2019). The adoption of such practices is not new; it dates back to 19th century. However, the report entitled 'Who Cares Wins?' released by Global Compact in 2004 has initiated the milestone of ESG in corporate (Kell, 2018). This report is an initiative to materialise the development of guidelines to incorporate ESG practices in the organisation. Consequently, in 2005, the United Nations Environmental Program-Finance Initiative (UNEP-FI) has presented the 'Freshfield Report' that suggests for the incorporation of ESG issues in firm's valuation and financial stability. However, the current trend of ESG activities adopted by the firms is fuelled by the global institutional pressures to disclose more information regarding the ECG activities in organisations.

As per the central theory of the Environmental Kuznets Curve (EKC), the economic growth negatively impacts ecological system and it starts improving the ecological system after a turning-point (Kuznets, 1955). According to Asian Development Bank, India's economy is the fastest growing economy in Asia with an expected GDP growth rate of 7.6% in upcoming years (Economic Times, 2018). Thus, India in near future might witness this turning-point where the environment destruction due to economic practices increases. In the past decade, the worlds corporate has realised the lack of governance activities during global financial crises, increasing social, and environmental issues (Dalal and Thaker, 2019). These events have created the concern for awareness on environmental and sociological development, the ethical standards, sustainable growth, and cognitive investment.

The regulatory framework of Indian economy has seen several milestones in policy reforms in last few decades. For instance, the Company's Act amendment in 2013 which includes Section 135 that says eligible companies to spend 2% of net profit (annual) on CSR practices (Companies Act, 2013). As per the investor's perspective, the investors are getting inclined to the selection of ESG based portfolio. Such investment decisions are

gaining popularity among investors due to the institutional pressure on firms from bodies like UNEP-FI. The principles of ESG-based investors lies in the identification and quantification of the intangible value of firms having social and environmental responsibilities assuring good governance practices. It is believed that such firms have better risk management policies based on ESG criteria which result in a long-term value for investors (Dalal and Thaker, 2019).

CSR activity is not only attracting the investors' interest, but it also drawing interest in marketing and product development. There is an abundance of studies on governance, but no study exists on establishing the direct impact of ESG engagements under CSR practices on firm's financial stability. However, few studies demonstrate that CSR activities are influential in adding value to the firm through brand loyalty and improved marketing benefits (Brown and Dacin, 1997; Sen and Bhattacharya, 2001; Linnhoff et al., 2014; Hendijani Zadeh et al., 2022). Similarly, Handelman and Arnold (1999) find that social conducts are the acceptable measure for value addition in firms (Kumar and Sujit, 2022). As per Social Investing Forum, corporate governance, transparency and disclosure, and accountability are key elements for social investment decisions. This implies that corporate governance focusing CSR activities (including ESG) are getting recognised in the market to give an advantage to a firm over other firms (Mishra and Mohanty, 2018; Rahman et al., 2021; Kumar and Sujit, 2022). However, existing literature has very few studies looking for the association of ESG engagements and firm's FD in countries like India where ESG practices are gradually getting an important place in organisations nowadays. Noticing the importance of CSR activities in general and ESG in particular, this study focuses to find the impact of CSR activities on firm's financial distress (FD), particularly excavating the ESG's effect (ESG index) on firm's FD. Moreover, the market-competition is a very critical factor under which firms have to survive. Therefore, this paper has the objective of investigating the impact of ESG index on firm's FD under the influence of competition. ESG engagements are computed as ESG index (Kell, 2018), FD is computed using Altman Zscore (Altman, 1968), and competition is quantified as Lerner index (Lerner, 1934). Thus, this paper aims to find how ESG activities affect the firm's financial health (or FD).

The empirical evidence suggests that the ESG engagements and firm's FD are significantly associated under the impact of market competition. The current finding makes its contribution in the existing literature by augmenting the body of knowledge regarding ESG, FD, and competition. The study gives notable implications to policymakers that ESG practices should be set in a view that it could not hinder firm's financial stability. It should be manageable to resist competition. Furthermore, it suggests that ESG investments should be under the financial capabilities of firms and should be in balance with competition to fight FD.

This paper is arranged in following manner: Section 2 reviews the existing literature and finds research gaps, Section 3 does the hypothesis formation with theoretical background, Section 4 puts light on the data and methodology, Section 5 elaborates results, Sections 6 and 7 discusses the findings and its implications, and Section 8 concludes the paper.

2 Literature review

Literature discusses that ESG factors include several terms such as sustainability practices (Alshehhi et al., 2018; Ameer and Othman, 2012; Vig and Datta, 2018; Giannarakis et al., 2014, 2020; Khan, 2022; Zahid et al., 2019; Ramba et al., 2021), ethical investment (Sparkes, 2001; Michelson et al., 2004), social investment (Dunfee, 2003; Waddock, 2003), responsible investment (Dembinski et al., 2003; Scholtens, 2014), sustainable finance (Sandberg, 2018; Chandrakant and Rajesh, 2022; Khan 2022), and sustainable investment (Cubas-Díaz and Martínez Sedano, 2018; Abate et al., 2021; Mulchandani et al., 2022). According to Fulton et al. (2012), CSR activities convert to ESG over time. Many of the studies have enquired the effects of ESG in separation or in combination on firm's performance. However, there is no common opinion on the association of ESG and performance of an organisation. For instance, Carpenter and Wymen (2009) have performed a literature review of 16 researches pertaining to the association of the level of ESG and firm's performance. They found different outcomes in different studies. Ten out of 16 studies have shown a positive association between ESG level and performance, two studies indicate the negative impact of ESG on performance, the rest of the four studies shows no significant relationship between ESG and firm's performance. They found that diverse results for such association are due to studies performed in different places and samples with different methodologies.

Velte (2017) and Dalal and Thaker (2019) have found a positive connection between ESG and firm's financial performance. Atan et al. (2016) and Abate et al. (2021) also advocate that higher ESG improves performance by providing the empirical evidence from mutual funds in Europe. However, Velte also indicates for a negative relationship when he used Tobin Q as a performance measure. However, Fauzi et al. (2007) argue that there is no significant impact of ESG on firm's performance. On a similar line, Siew et al. (2013) have conducted a study on Australian firms dealing in construction work. They also have found no significant association of ESG with performance for these firms. Chandrakant and Rajesh (2022) have conducted a study on 1,820 firms working across the world and found that ESG significantly improves firm's sustainable performance.

Nakhili et al. (2021) conducting a study on French firms, find different association of ESG and firm's performance. They indicate that there is a negative connection of ESG and firm's performance under the representation of labour board. However, their relation is positive under the influence of board of directors. El Khoury et al. (2022) have shown a concave association of ESG with firm's performance indicating that ESG improves performance to a threshold thereafter it declines performance. Studies investigating the connection of ESG and performance are mostly found in developed economies. Much attention is not given in this direction particularly in emerging economies like India. In Indian context, Dalal and Thaker (2019) and Chelawat and Trivedi (2016) find that companies with higher ESG score have higher performance. Similarly, Ghosh (2013) on applying Ohlson's model finds that larger firms in India have better ESG score and hence they financially perform better than smaller firms. Similar outcomes are also indicated by Drempetic et al. (2020). They find ESG and firm size are positively associated.

As there is a paucity of literature available in emerging economies for ESG and performance and no evidence is found regarding ESG and FD of the firms (particularly non-financial firms in India). Additionally, their connection under competitive environment is not yet investigated however, the competition as an essential market factor under which firms have to operate. Moreover, the past ESG index does not include

major chunks of ESG factors hence this paper applies an advanced version of ESG index which incorporates several important contemporary factors necessary for ESG to deliver a comprehensive idea of a strong ESG assessment of firms in India. Therefore, this study fills the mentioned research gaps through its fresh and robust corroborations.

3 Theoretical background and hypothesis formation

3.1 ESG and financial health

The connection of CSR activity (including ESG) for firm's FD is twisted with two popular perspectives (Zheng et al., 2019). First, the shareholder's perspective argues that the firms invest in ineffective CSR activities to bring advantage to stakeholders. However, these benefits are at the expenses of shareholders. These CSR activities do not help the firm to perform well, rather it squanders the valuable resources (Deng et al., 2013; Aupperle et al., 1985), these resources (most importantly the financial resources) could have been utilised into profit gaining projects which can help in reducing the risk of FD (Ullmann, 1985; Aupperle et al., 1985). Second, the stakeholder's perspective (based on contract theory (Coase, 1937) assuming a firm is association of shareholders and stakeholders). The CSR engagements strengthen this association of shareholders with stakeholders in a firm (Jones, 1995; Donaldson and Preston, 1995). Hence, CSR activities (including ESG) help in reducing firm's FD.

Few studies, for instance, Di Giuli and Kostovetsky (2014), Bhandari and Javakhadze (2017) and Deng et al. (2013) supports the shareholder's view and argue that expenses on CSR engagements increase firm's FD. However, few studies like Jones (1995), Donaldson and Preston (1995), Sharfman and Fernando (2008) and Lins et al. (2017) go in line with stakeholders' perspective. They advocate that CSR investment benefits both shareholders and stakeholders and reduces the risk of FD in a firm. However, Zheng et al. (2019) have shown a differentiated association between CSR and FD. They argue that both perspectives depend on the economic situation. They also indicated during economic downturn shareholders perspective is supportive. There exists no common opinion on CSR for firm's FD. The CSR activities convert to ESG over time (Fulton et al., 2012). Therefore, we frame the following alternative hypothesis:

H1a ESG engagements significantly reduce the firm's FD.

The investments in ESG activities are not always necessary. It can be harmful for the firms while exposing to competitive market-conditions (Deng et al., 2013). An external shock from market can expose firms into debt condition, and a high investment in CSR or ESG activity may push the firm into FD (Zheng et al., 2019). However, El Ghoul et al. (2011) and Hsu and Chen (2015) find that firms investing in ESG activities get more fame from media. Media also scrutinise such firms and provide more information to mitigate the information asymmetry issues (El Ghoul et al., 2011; Hsu and Chen, 2015). These firms also have better credit scores. Hence, these firms have more favourable market condition which results in reduced risk of FD. It is observed from the preceding studies that market conditions including competition, are very critical instruments for the association of ESG and FD in a firm. Hence, the empirical validation of moderating role of market-competition for the association of ESG and FD needs to be tested. Thus, this study assumes the following alternate hypothesis:

H2a ESG engagements significantly reduce the firm's FD under highly competitive market conditions.

4 Data and methodology

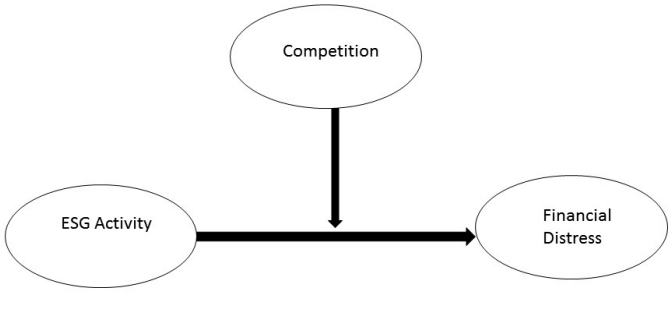
4.1 Data

The panel data of 76 non-financial firms listed in India with a sample period of ten years (2011–2020) has been utilised for this study. The rationale behind the selection of these 76 firms from BSE 100 listed companies is the availability of fine data after data filtration. In order to get strong and reliable outcomes, we have taken ten years period for data coverage to get a large enough data including most recent available data. The industrial classification of sample firms is given in Table A2 (in Appendix 3). The retrieval of secondary raw data is done from CMIE Prowess database, and these raw data are further processed to have clean and required data. Table 1 demonstrates a detail of variables used in this study.

4.2 Methodology

As discussed in previous section, the panel data is incorporated for the study. Hence, the panel data analysis is performed as it attributes the benefits of both time-series and cross-sectional information. Thus, it has more capabilities to provide strong evidence (Hsiao, 2007; Baltagi and Baltagi, 2008). The link between ESG activities and FD is looked at from different angles in this study. Therefore, a total of four models are developed to strongly corroborate the association of ESG with FD in listed NFFs in India. The conceptual model is depicted in Figure 1.

Figure 1 Conceptual model



The specification of the developed models is mentioned in the following equations:

$$DV_{it} = \alpha + \beta_1 esg_{it} + \beta_2 lerneri_{it} + \delta_1 dde_{it} + \delta_2 lnsales_{it} + \delta_3 lnmcap_{it} + u_{it} \quad (1)$$

$$DV_{it} = \alpha + \beta_1 esg_{it} + \beta_2 lerneri_{it} + \beta_3 esglerneri_{it} + \delta_1 l\_mcap_{it} + \delta_2 l\_sales_{it} + u_{it} \quad (2)$$

where $u_{it} = \mu_i + v_{it}$; μ_i signifies individual effect-term (here firm as entity), and v_{it} shows the remainder error term. The α is constant. β_i and δ_i are coefficients for explanatory and control variables, respectively. Furthermore, *DV* is the dependent variable indicating FD with two proxies (zscore1 and zscore2 (please see Appendix 1 for more details). Explanatory variables include *esg* (ESG index), *lerneri* (LI), and the interaction term (*esglerneri* = *esg* × *lerneri*). *lerneri* is moderator in interaction variable. Additionally, three control variables [*dde* (debt ratio), *lnsales* (natural log of sales), and *lnmcap* (natural log of market capital)], are also introduced to get a best fit model (please see Table 1 for a detailed note on used variables).

Table 1 List of variables

SN	*Variable*	*Type*	*Code*	*Definition*	*Citations*
1	Altman Zscore (FD) original	DV	Zscore1	It is the computation of FD by originally developed Altman's Zscore model. A higher Zscore shows lower FD (see Appendix 1 for details).	Altman (1968) and Heine and Altman (2011)
2	Altman Zscore (FD in emerging economies)	DV	Zscore2	To estimate FD of firms in emerging markets, an updated version of Zscore model is employed. See Appendix 1 for details).	Altman (1968) and Heine and Altman (2011)
3	Competition (Lerner index)	MV	lerneri	Lerner's index is used for the estimation of competition. A higher value of LI shows lower competition.	Lerner (1934) and Zhang et al. (2020)
4	Environmental, social and governance (ESG)	EV	esg	It is the total value of inventory preserved by the firm. The value is in terms of INR crore.	Sikacz and Wolczek (2018) and Rajesh and Rajendran (2020)
5	Debt to equity ratio	CV	dde	It shows the leverage used by firms and It is calculated as: *dde* = *debt*/(*debt* + *equity*).	Bhandari (1988) and Marito and Sjarif (2020)
6	Market capitalisation	CV	lnmcap	It represents the measure of a firm's value, and assessed as product of the number of a bank's equities by current market price of the share. Natural log value is taken.	Dias (2013) and Marito and Sjarif (2020)
7	Sales	CV	lnsales	It also indicates the firm's value. The amount of sales in taken in INR. The natural log of sales is taken.	Jayadev (2013) and Dias (2013)

Note: DV, EV, MV, and CV represent the dependent variable, explanatory variable, moderating variable and control variable, respectively.

5 Results

5.1 Descriptive statistics and multicollinearity issue

Table 2 reflects the descriptive statistics of sample data analysed in this research. A total of 760 (76 × 10) observations are taken. The mean values of Zscore1 and Zscore2 are 9.619 and 17.67, respectively. Both values indicate that on average the listed NFFs in India are in safe zone. However, the high value of standard deviation for FD shows that Zscore significantly varies from firm to firm. The mean value of *esg* (ESG index) is 0.46 (slightly closer to MIN) showing a moderate level of ESG engagement in Indian listed NFFs. *lerneri* (Lerner's index) has mean value 0.205 (highly down towards MIN). This indicates that competition level is very high among the sample NFFs in India. *dde* (debt ratio), *lnsales*, and *lnmcap* have average values 0.178, 9.48, and 10.464, respectively. Debt ratio is not very high as its mean value is closer to MIN. The mean values of sale (*lnsales*) and market capital (*lnmcap*) are inclined towards Max showing on average, a good level of firm value for sample NFFs.

Table 2 Descriptive statistics

Variable	*Obs.*	*Mean*	*Std. dev.*	*Min*	*Max*
zscore1	760	9.619	29.999	–38.9	449.42
zscore2	760	17.67	54.294	–65.69	790.09
esg	760	0.46	0.061	0.27	0.61
lerneri	760	0.205	0.17	–0.36	0.97
esglerneri	760	0	0.011	–0.088	0.076
dde	760	0.178	0.196	0	0.9
lnsales	760	9.48	1.476	4.111	13.331
lnmcap	760	10.464	1.285	3.956	13.816

Note: Obs., std. dev., min., and max. are total observations, standard deviation, minimum, and maximum.

Table 3 Correlations and VIFs

Variables		*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*VIF*
(1)	zscore1	1.000								
(2)	zscore2	0.994*	1.000							
(3)	esg	0.021	0.026	1.000						1.04
(4)	lerneri	0.014	0.022	0.018	1.000					1.23
(5)	esglerneri	0.019	0.019	–0.013	0.185*	1.000				1.04
(6)	dde	–0.149*	–0.152*	0.170*	0.056	0.072*	1.000			1.26
(7)	lnsales	0.022	0.021	0.087*	–0.117*	–0.017	0.256*	1.000		2.04
(8)	lnmcap	0.133*	0.158*	0.058	0.203*	0.033	–0.075*	0.590*	1.000	1.97

Note: VIFs < 3 indicate the absence of multicollinearity issue.

The correlation matrix and VIF values are available in Table 3. The correlation coefficient between exogenous variables is found to be maximum between sales and market capital with correlation coefficient 0.590. However, this value is less than 0.80

threshold. Hence, the multicollinearity issue is void. Additionally, the VIF value is also lower than 3, indicating no multicollinearity (Baltagi and Baltagi, 2008).

5.2 Tests for endogeneity

The results of the Durbin-Ch2 test and Wu-Hausman test are conducted by using lag 3 of the potentially endogenous variables as instrument variables. The endogeneity results for the variables of interest exhibit that *esg* have positive but insignificant values for both tests (0.1582 and 0.1570, respectively with p-value > 0.05). The Durbin-Ch2 test and Wu-Hausman test exhibits value 15.2826 and 15.6458, respectively for *lerneri*. The interaction variable *esglerneri* has values 4.336 and 4.34698. However, both tests reveal that there exists endogeneity issue due to *lerneri* and *esglerneri* because a significant p-value (< 0.05) comes out from the tests for these variables. Hence, this study applies instrumental variable regression to overcome the unexpected behaviour of exogenous variables due to endogeneity, therefore, this approach allows consistent estimations (Baltagi and Baltagi, 2008).

5.3 Regression results

Table 4 demonstrates the results of all four models in which models (1) and (2) are base models having zscore1 and Zscore2, respectively as the dependent variables (DV). Additionally, model (3) and (4) includes the interaction variable *esglerneri* (*esg* × *lerneri*) to examine the impact of *esg* while interacting with competition) on FD. On looking at models' diagnostics, the Wald Ch2 test confirms the overall significance of models by exhibiting significant p-values at 1% (< 0.01). The significant p-values of the F-test and Bruesch-Pagan test mystified the suitability of the fixed effect (FE) or the random effect (RE). Hence, we applied the Hausman test which confirms that FE is good fit model in all four cases. The autocorrelation and the heteroscedasticty are also present as confirmed by the Wooldridge test and the Wald test, respectively showing a significant p-value at 1%. Hence, the robust standard error (RSE) should be considered for the outcomes. We have reported the results based on bootstrap standard errors in instrument regression because it is more powerful and do not have the subjectivity of distribution assumption.

In Table 4, *esg* is found insignificant in both models (1) and (2). Therefore, 'esg' (ESG activities) is not significantly impactful for firm's FD. The *lerneri* coefficients are negative with values –37.08 and –67.49, respectively in model (1) and (2) but these coefficients are significant at 1%. This signifies that lerneri negatively associates with zscores (zscore1 and zscore2). It implies that higher market power (or lower competition) decreases financial stability (or increases FD). Only *lnmcap* among control variables is significant and positive.

In models (3) and (4), *esg* is positive (27.24) and significant at 1% significance. It means ESG activities improve Zscore; hence, it reduces firm's FD. However, it is insignificant in model (4). The coefficients of *lerneri* are again significant and negative in both models [model (3) and (4)]. The interaction variable *esglerneri* is significant at 1% with coefficient values –318.2 and –625.5, respectively in models (3) and (4). This shows a negative association of *esg* with zscores (zscore 1 and zscore2). It further implies that the higher level of ESG engagement lowers financial stability (or increases FD) when competition is high or market power is low. Among control variables *lnsales* is positive

and significant in model (3), and *lnmcap* is positive and significant in both models. Additionally, on observing interaction plots given in Figure 2 and Figure 3, the crossed lines confirm that the interaction effect is significant. When ESG level is high and *lerneri* is low than zscores decrease. It is also observed when *lerneri* is high then rising ESG increases zscore (financial stability).

Table 4 Regression and tests results (instrumental regression – IV with FE)

Variables	*(1)*	*(2)*	*(3)*	*(4)*
	zscore1	*zscore2*	*zscore1*	*zscore2*
esg	24.02	37.08	27.24**	43.41
	(17.32)	(33.02)	(11.83)	(31.93)
lerneri	–37.08***	–67.49***	–33.38***	–60.22***
	(4.863)	(9.824)	(6.699)	(11.38)
esglerneri			–318.2***	–625.5***
			(73.81)	(161.3)
dde	19.14	34.68	16.47	29.44
	(14.53)	(35.16)	(15.08)	(36.63)
lnsales	13.67	24.47	14.18*	25.45
	(11.99)	(31.16)	(8.332)	(16.99)
lnmcap	8.971***	18.30***	8.999***	18.36***
	(2.818)	(6.482)	(2.637)	(5.202)
Wald Chi(2)	154.75***	200.96***	175.14***	194.98***
(Overall significance)	[0.000]	[0.000]	[0.000]	[0.000]
F-test	11.32***	11.57***	11.48***	11.76***
(Fixed effects)	[0.000]	[0.000]	[0.000]	[0.000]
Breusch Pagen LM	483.38***	346.616***	479.50***	470.31***
(Random effects)	[0.000]	[0.000]	[0.000]	[0.000]
Hausman test	132.12***	156.24***	132.71***	151.79***
(FE vs. RE)	[0.000]	[0.000]	[0.000]	[0.000]
Modified Wald test	$1.0 \times 10^{+06}$***	$4.8 \times 10^{+05}$***	$9.9 \times 10^{+05}$***	$6.5 \times 10^{+05}$***
(Heteroskedasticity)	[0.000]	[0.000]	[0.000]	[0.000]
Wooldridge test	240.31***	473.73***	240.28***	346.05***
(Autocorrelation)	[0.000]	[0.000]	[0.000]	[0.000]

Notes: RSE s in parentheses (), p-values in square brackets [],***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. The results are based on reported bootstrapped standard errors, and instrumental variable regression with FE s is used.

5.4 Robustness check

A multimodel approach is adapted to confirm the results' robustness. Hence, four models are established two for base variables and two models for interaction variables considering zscore1 and zscore2 as dependent variables. The similar results are obtained

from using two versions of zscores (zscore1 and zscore2). Therefore, the results revealed from the analysis are robust.

Figure 2 Zscore1

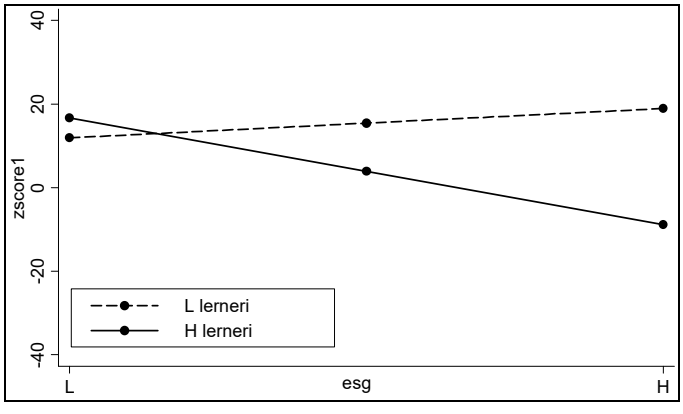
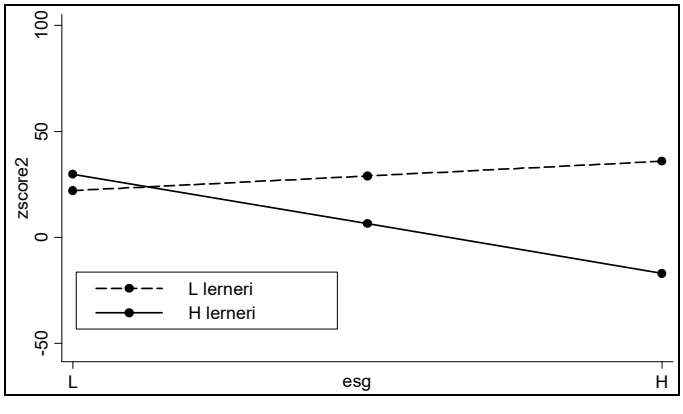


Figure 3 Zscore2



6 Discussion

6.1 Hypotheses discussion

Hypothesis H1a (*ESG engagements significantly reduce the firm's FD*) does not have supportive evidence, hence it is rejected [except in model (3)]. The second hypothesis H2a (*ESG engagements significantly reduce the firm's FD under highly competitive market condition*) also does not have enough evidence in support of it. However, results support the reverse aspect of ESG and FD connection. It indicates that ESG engagements significantly increase the firm's FD under highly competitive market condition. Thus, it follows the very popular theory of Shareholder's perspectives as discussed in the literature section. It says that ESG is not beneficial for firm's financial health. The current results imply that ESG practices do not affect firm's FD. However, higher ESG

engagements may lead to FD if the firm is facing high competition. Moreover, the current results are contradictory for the stakeholder's perspective.

6.2 Comparison with existing studies

The findings of the current study are in line with the shareholder's perspective theory which argues that ESG has an adverse impact on financial stability. Hence, the current findings support (Di Giuli and Kostovetsky, 2014; Bhandari and Javakhadze, 2017; Deng et al. (2013). However, studies like Jones (1995), Donaldson and Preston (1995), Sharfman and Fernando (2008) and Lins et al. (2017) favour the theory of stakeholder's perspective which advocates higher ESG lowers the risk of FD in firms. Their findings are not inline with stakeholders' perspectives. However, Zheng et al. (2019) have blended opinion that the ESG and FD connection is situational. Thus, ESG improves financial stability or increases FD depending on various market conditions. The current findings indicate the positive relationship of ESG to FD under the higher completion. However, under lower competition ESG improves financial stability. Hence, current findings somehow support Zheng et al. (2019).

7 Contribution and implications

7.1 Contribution

CSR activities have now become an important practice followed by firms globally. Among various CSR practices, ESG accounts for a major portion within CSR. Earlier studies mainly look for CSR practices and no attention is drawn towards ESG engagements for firm's FD. Studies on CSR typically tell old story. This study unfolds a new tale through closely looking at ESG scores. Hence, the main focus of this study is to do in depth analysis on ESG practices and estimating its impact on firm's FD in India. The findings exhibit no individual impact of ESG on firm's FD is significant in linear establishment. However, when deepening the analysis under interaction model where market competition is taken as moderator, the findings reflect an interesting outcome for the relationship of ESG and FD. It shows that ESG practices are detrimental for financial stability and increases FD under highly competitive-market conditions. Therefore, the current findings contribute into the existing body of knowledge by adding novel and interesting results into the literature.

7.2 Implications

The current findings indicate that higher ESG activities amplify the firm's FD under high market-competitive. One of the main implications of the study is to treat ESG engagements as a very critical element for firm's FD. Furthermore, under the highly competitive environment, a well-balanced strategy needs to be followed by managers to maintain ESG with competition to fight against FD. It should be taken care that ESG practices should not be done at the cost of firm's financial health. Investors should also be careful with the notion that higher EGS practices always guarantee the firms stability. Policymakers should frame such policies which promotes a sustainable competitive environment resulting in motivation for ESG practices with hindering firm's financial

stability. The study recommends managers that investments in ESG engagements should be in a certain extent. It should not be at the cost of raising firm's FD. Thus, the current study delivers notable implications for managers, policymakers, and investors to consider ESG as an important element in their decision making.

8 Conclusions and future studies

In the current paper, we investigate whether the ESG engagements affect the possibility of firms to face FD. Many of financial and non-financial have been explored but ESG's impact on FD is not much explored particularly in Indian context. This study is further deepened to find the ESG impact in interaction with competition on firms. The results come out with interesting insights. The findings reveal that ESG engagements do not significantly affect FD in firms in India. However, when it interacts with market-competition it enhances the firm's FD, which supports the theory of shareholders perspectives. It implies that under higher competitive environment, higher level of ESG practices lower financial stability or increase FD. The current findings are novel and interesting and contribute significantly into the existing literature concerned with ESG, financial health, and competition. The findings also bring out the important implications for all stakeholders (including policymakers, investors, and managers). It recommends that ESG engagements should be in limited amount under the financial capabilities. To face competition, the ESG investments should not be at the cost of pushing the firms into FD.

This study is limited to the scope of non-financial firms listed in India. Although, we have tried to customise the ESG index to include more advanced attributes in regard to recent needs. However, such indices are not yet standardised. Due to the existing limitations, this study can further be advanced to include more sample firms in future. A global study including multiple countries can also be performed to give a comprehensive status of the connection between ESG and FD. ESG index can be developed including more contemporary elements of ESG activities.

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Appendix 1

Altman Zscore and FD

The FD is quantified by applying Altman Zscore model (Altman, 1968, 2013). Altman (1968) has established a multivariate model using most significant financial ratio identified in his study on 66 manufacturing firms in USA. The higher Zscore value signals higher financial soundness or lower FD. The original model of Altman (1968) is given as:

$$\text{Zscore1} = 1.2 \times F1 + 1.4 \times F2 + 3.3 \times F3 + 0.6 \times F4 + 0.999 \times F5$$

where F_i is financial ratio as discussed below:

$F1$ 'working capital/total assets'

$F2$ 'retained earnings/total assets'

$F3$ 'earnings before interest and taxes/total assets'

$F4$ 'market value of equity/total liabilities'

$F5$ 'net sales/total assets'.

Firms are classified as:

- Z score1 > 2.99 indicates financially sound firms (safe_zone).
- 1.81 < Z score1 < 2.99 indicates that firms may or may not face distress (Grey_zone).
- Z score < 1.81 indicates distressed firms (Distressed_zone).

As the original Zscore has been established for developed economies, it is further amended for firms running in emerging markets (Heine and Altman, 2011). Therefore, we have also considered the amended Zscore for emerging markets (because the study is on firms listed in India). The amended Zscore model is as follows:

$$\text{Zscore2} = 3.25 + 6.56 \times F1 + 3.26 \times F2 + 6.72 \times F3 + 1.05 \times F4$$

$F1$, $F2$, $F3$, and $F4$ are the same financial ratio as mentioned for the original model.

Firms' classification:

- Z score2 > 2.60 indicates financially sound firms (safe_zone).
- 1.1< Z score2 < 2.60 indicates that firms may or may not face distress (Grey_zone).
- Z score2 < 1.1 indicates distressed firms (Distressed_zone).

Appendix 2

ESG index

There are two most popular ESG index available for the assessment of ESG level in a firm; one is Credit Rating Information Services of India Limited ('CRISIL') and another

is Thomson Reuters (TR) ESG scores (Vig and Datta, 2018). ESG index launched by TR in 2017 has been used to proxy the level of ESG engagements in firms. The rationale behind preferring TR ESG index is its strong methodology (Sikacz and Wolczek, 2018). According to Sikacz and Wolczek (2018) and Rajesh and Rajendran (2020), it includes more than 6,000 firms and over 400 different ESG attributes since 2002, hence TR has the most comprehensive ESG scores in the industry. However, CRISIL ESG calculation is based on qualitative and quantitative disclosures of only 225 companies using only 100 ESG attributes. TR ESG index permits customers to integrate and analyse ESG data employing technologies in-depth study. Comparing with CRISIL, TR ESG index transparently and comprehensively and transparently evaluates a firm's relative ESG performance considering ten important categories (Rajesh and Rajendran, 2020). It adds different weights to these categories as per the importance of the category (Rajesh and Rajendran, 2020). Thus, it provides the more advanced and stronger ESG index than other agencies. Table A1 presents the categories involved in index framing with a reference to which earlier studies involves such categories. A higher value of ESG index shows higher ESG engagements.

Table A1 Categories incorporated in ESG score computation

Pillar	*Category*	*Traits*	*Weightage (%)*
Environmental	Resource uses	20	11
	Emission	22	12
	Innovation	19	11
Social	Workforce	29	16
	Human rights	8	4.5
	Community	14	8
	Product responsibility	12	7
Governance	Management	34	19
	Shareholders	12	7
	CSR strategy	8	4.5
Total		178	100

Source: Thomson Reuters ESG Scores (Sikacz and Wolczek, 2018; Jaaffar et al., 2019)

Appendix 3

Lerner index and competition

Lerner index (Lerner, 1934) is used as the proxy for competition level. Lerner (1934) first developed a mathematical establishment for competition hence; it is named after the researcher's name. The LI has its root in price-cost margin (PCM) concept. The mathematical formulation of *LI* is as following:

$$LI = (P - MC) / P \text{ or}$$

$$LI = \text{firm's profit / firm's revenue}$$

where P and MC are price (proxied as revenue) and marginal cost (proxied as operating expenses). LI is further processed to get an LI with industrial effect (it is important consideration as the sample firms belong to different industries). LI with industry effect is calculated as:

$$LI_{IA} = LI_i - \sum_{i=1}^{N} \omega_i LI_i$$

where LI_{IA} signifies Lerner index incorporating industry effect, LI_i represents of i^{th} firm's LI, and ω_i is for the proportion of sales of firm i to the industry's total sales. The higher value of LI indicates higher market power or lower competition and vice-versa.

Table A2 Sample description

Sl. no.	*Sector*	*Count of companies*
1	Automobile	12
2	Energy	12
3	Healthcare	10
4	FMCG	9
5	Construction	7
6	Services	6
7	Chemicals	5
8	Technology	5
9	Metals	4
10	Cons durable	3
11	Communication	2
12	Engineering	2
13	Textiles	1
	Total	*78*

Note: The firm's industrial classification in the sample is based on the Bombay Stock Exchange (BSE), India data representation.