

ESG Comparison and Stock Price Crash Risk

Minjie Sun

*School of Finance, Zhongnan University of Economics and Law, Wuhan, China
3260876935@qq.com*

Abstract. A firm's ESG score is usually read as a stand-alone measure, even though managers also watch how that score compares with those of industry peers. We use Chinese listed-company data for 2015-2024 to ask whether this relative position is connected to stock price crash risk. The estimated relation is positive and statistically significant. It remains so after lagging the ESG comparison measure, replacing NCSKEW with DUVOL, and using the industry median rather than the mean as the peer benchmark. The financing-constraint tests are consistent with one route through which peer-oriented ESG behavior may translate into crash exposure. The ownership split adds an important boundary: the association is statistically significant for non-state-owned enterprises but not for state-owned enterprises. Taken together, the evidence suggests that competition over relative ESG standing can carry capital-market costs that are obscured when ESG performance is considered only in absolute terms.

Keywords: ESG Comparison, Stock Price Crash Risk, Financing Constraints, State-owned enterprise

1. Introduction

ESG assessments do more than describe a firm's environmental, social, and governance record; they also create a visible basis for comparison with industry peers. In China, that comparative pressure has grown as disclosure rules have become more standardized and the dual-carbon agenda has moved forward. Managers may respond by improving substantive performance, but they may also compete for a better apparent position or resort to greenwashing. The latter responses can widen information asymmetry and mislead investors, conditions associated with crash risk [1, 2]. The incentives also differ across settings. Governance compliance is especially salient in finance [3, 4], firms with heavy capital needs react more strongly to ESG scores [5], and retail-investor attention can influence strategic disclosure [6]. These differences make it important to examine the capital-market consequences of relative, rather than merely absolute, ESG performance.

Against this background, we construct an industry-year measure of ESG comparison for Chinese listed firms from 2015-2024 and relate it to stock price crash risk. The baseline regressions produce a positive, statistically significant coefficient. Alternative timing, crash-risk measures, and peer benchmarks lead to the same inference. When the mechanism is examined, stronger comparison is associated with tighter financing constraints; the ownership split shows that the relation is concentrated among non-state-owned firms.

Existing research usually treats ESG performance as an absolute firm attribute. We instead focus on where a firm stands within its industry, bringing a peer-relative perspective to the study of ESG's economic consequences. This perspective also extends research on stock price crashes by considering ESG-based rivalry as a source of downside tail risk. Evidence on financing constraints connects these two areas and clarifies the channel behind the observed association. For regulators, the result shows why unchecked competition over ESG rankings can create distortions and why those distortions matter for capital-market stability.

2. Literature review and theoretical analysis

Financing constraints provide the starting point for the proposed mechanism. A firm seeking a stronger ESG position than its industry peers may increase ESG-related investment and face additional disclosure pressure [7]. Such actions do not necessarily improve operating efficiency. They may instead encourage opportunistic managerial disclosure or divert resources, leaving outside investors with a less accurate view of the firm's underlying risk [5]. Greater opacity changes the terms on which finance is supplied. Risk-averse intermediaries may impose stricter funding thresholds or require higher risk premiums, thereby raising external financing costs and tightening the firm's financing constraints.

Those tighter constraints can, in turn, affect the release of bad news. When access to finance is under pressure, managers have a stronger reason to preserve market confidence and financing capacity by withholding unfavorable information [8]. Negative news then accumulates inside the firm rather than reaching investors promptly. A change in external conditions or disclosure constraints can cause that information to be released at once, producing a sharp price decline. ESG benchmarking may therefore raise tail risk when it intensifies both financing pressure and the incentive to hoard bad news. This reasoning leads to the following hypothesis:

H1: Stronger ESG comparison is positively associated with stock price crash risk.

3. Research design

3.1. Sample and data

Listed companies from both the Shanghai and Shenzhen exchanges constitute the starting sample for 2015-2024. The start date reflects the gradual standardization of China's ESG market around 2015. Several ESG rating providers, including Shangdao ESG and Wind, also emerged and improved the rationality and comparability of ESG indicators. We apply the usual sample screens by removing companies with an ST designation, financial or insurance businesses, and firms that report negative equity within the sample window. After these exclusions, 34,837 observations remain.

3.2. Variable definitions

NCSKEW is the dependent variable and measures stock price crash risk. Following [1, 9], it is defined as the negative coefficient of skewness. The measure is positively oriented: a larger *NCSKEW* indicates more severe negative skewness in the firm's stock returns in year *t* and, accordingly, a higher level of crash risk.

Our main explanatory variable is *ESG comparison*, which captures the focal firm's position relative to other firms in the same industry. Firm-level ESG performance is represented by the Huazheng ESG rating, following [9]. For each industry-year, we calculate the mean ESG score of

all firms other than the focal company and subtract this peer mean from the focal firm's current-year score. The resulting difference is *ESG comparison*. A larger value means that the firm's ESG performance stands further above the contemporaneous industry average and thus reflects a stronger degree of peer comparison.

Following [1, 9], the specification includes eight firm-level controls: Size, Lev, Roa, Loss, Growth, Dual, Board, and Indep. Size equals the logarithm of a firm's total assets, and Lev divides total liabilities by total assets. Roa uses net income scaled by total assets. Loss is an indicator set to one for a current-year net loss and to zero otherwise. Growth records the year-on-year change in operating revenue. Dual is one when the chief executive also chairs the board; otherwise it is zero. Board is the log of the number of directors, whereas Indep records independent directors as a share of the full board.

3.3. Econometric specification

The following ordinary least squares equation is used to estimate the relationship:

$$NCSKEW_{i,t} = \alpha_0 + \alpha_1 ESG\ comparison_{i,t} + \alpha_2 Controls_{i,t} + YEAR + INDUSTRY + \varepsilon_{i,t}$$

The dependent variable, $NCSKEW_{i,t}$, is negative conditional skewness computed from firm-specific weekly returns for firm i in year t . The variable $ESG\ comparison_{i,t}$ records the focal firm's ESG rating relative to the mean rating of other firms in the same industry-year, and $Controls_{i,t}$ is the vector of controls. YEAR and INDUSTRY are year and industry fixed effects, respectively. The remaining term, $\varepsilon_{i,t}$, captures the regression disturbance; the coefficient of interest is α_1 , whose sign indicates how relative ESG standing is associated with crash risk.

4. Main empirical results

4.1. Descriptive statistics

Table 1 describes 34,837 firm-year observations. Mean NCSKEW is -0.406. The negative average is consistent with a return distribution that has a longer left tail, while the dispersion shows substantial differences across firms. ESG comparison averages 0.054 and varies widely, so firms differ markedly in their ESG standing relative to industry peers. Mean Size, Lev, and Roa are 22.330, 0.416, and 0.030, respectively. Taken together, these values describe firms that are relatively large, carry moderate leverage, and earn low profits on average. Loss observations account for 16.2% of the sample, and Growth displays considerable variation. The CEO and board-chair roles are combined in 32.3% of observations. Board varies within a fairly narrow range; independent directors make up roughly 38% of the board. These distributions provide sufficient cross-sectional variation for the empirical analysis.

Table 1. Descriptive statistics

Variables	Number	Mean	Median	P25	P75	Min	Max	SD
NCSKEW	34837	-0.406	-0.817	-0.359	0.048	-2.662	1.681	0.754
ESG comparison	34837	0.054	-0.409	0.000	0.647	-2.347	2.403	0.877

Table 1. (continued)

Size	34837	22.330	21.410	22.129	23.043	19.986	26.372	1.285
Lev	34837	0.416	0.253	0.407	0.562	0.056	0.895	0.202
Roa	34837	0.030	0.010	0.033	0.063	-0.276	0.199	0.068
Loss	34837	0.162	0.000	0.000	0.000	0.000	1.000	0.368
Growth	34837	0.129	-0.053	0.079	0.234	-0.587	2.074	0.364
Dual	34837	0.323	0.000	0.000	1.000	0.000	1.000	0.468
Board	34837	2.098	1.946	2.197	2.197	1.609	2.565	0.195
Indep	34837	0.379	0.333	0.364	0.429	0.333	0.571	0.053

4.2. Baseline results

The baseline estimates appear in Table 2. Column (1) yields 0.030 for ESG comparison; after firm-level controls are included in Column (2), the coefficient is 0.014. Both estimates are positive and statistically significant. Year and industry fixed effects enter each regression. The smaller but still significant estimate in the fuller model shows that the positive relationship is not confined to the parsimonious specification. The result is also consistent with peer comparison strengthening incentives to overstate performance or withhold unfavorable information.

Table 2. Baseline regression estimates

Variables	<i>NCSKEW</i> (1)	<i>NCSKEW</i> (2)
<i>ESGcomparison</i>	0.030*** (0.000)	0.014*** (0.008)
<i>Size</i>		0.035*** (0.000)
<i>Lev</i>		-0.112*** (0.000)
<i>Roa</i>		0.374*** (0.000)
<i>Loss</i>		0.074*** (0.000)
<i>Growth</i>		0.019

Table 2. (continued)

		(0.113)
<i>Dual</i>		0.018*
		(0.054)
<i>Board</i>		-0.030
		(0.277)
<i>Indep</i>		0.049
		(0.623)
<i>Constant</i>	-0.408***	-1.118***
	(0.000)	(0.000)
<i>Year FE</i>	Yes	Yes
<i>Industry FE</i>	Yes	Yes
<i>Cluster</i>	Firm	Firm
<i>N</i>	34837	34837
<i>Adj.R²</i>	0.020	0.023

4.3. Robustness checks

Table 3 examines three possible sources of sensitivity. Lagging ESG comparison produces a positive and statistically significant coefficient of 0.014, so the association persists when the explanatory variable precedes the outcome. Replacing NCSKEW with DUVOL yields a positive and significant estimate of 0.010. Defining the peer benchmark with the industry median gives a coefficient of 0.015, again positive and significant. The baseline inference is therefore unchanged by the timing choice, the crash-risk measure, or the construction of ESG comparison.

Table 3. Robustness checks

Variables	<i>NCSKEW</i> (1)	<i>DUVOL</i> (2)	<i>NCSKEW</i> (3)
<i>lagESGcomparison</i>	0.014** (0.020)		
<i>ESGcomparison</i>		0.010*** (0.002)	
<i>ESGcomparison2</i>			0.015*** (0.002)

Table 3. (continued)

<i>Controls</i>	Yes	Yes	Yes
<i>Year and Industry FEs</i>	Yes	Yes	Yes
<i>Cluster</i>	Firm	Firm	Firm
<i>N</i>	31259	34837	34837
<i>Adj.R²</i>	0.025	0.024	0.023

4.4. Mechanism analysis

For the mechanism test in Table 4, financial constraints are examined with FC and the SA index. The coefficient on ESG comparison is 0.015 for FC and 0.034 for the SA index, and both are positive and statistically significant. Firms with stronger peer-relative ESG performance therefore also exhibit tighter financing constraints. This pattern is consistent with the proposed channel in which ESG competition worsens external financing conditions; it should not, on its own, be read as definitive proof of causality.

Table 4. Mechanism test results

Variables	<i>FC</i> (1)	<i>SA</i> (2)
<i>ESGcomparison</i>	0.015*** (0.000)	0.034*** (0.000)
<i>Controls</i>	Yes	Yes
<i>Year and Industry FEs</i>	Yes	Yes
<i>Cluster</i>	Firm	Firm
<i>N</i>	29881	30141
<i>Adj.R²</i>	0.799	0.133

4.5. Cross-sectional analysis

Table 5 separates the sample by ownership. For SOEs, the ESG comparison coefficient is 0.007 and is not statistically significant. The corresponding estimate for non-SOEs is 0.021 and statistically significant. Accordingly, the result appears in the non-SOE subsample rather than the SOE subsample. One plausible account is that non-SOEs have less resource support and bear more financing pressure, although the subgroup estimates do not establish the mechanism by themselves.

Table 5. Cross-sectional results

Variables	NCSKEW	NCSKEW
	SOE	NON-SOE
	(1)	(2)
<i>ESGcomparison</i>	0.007 (0.427)	0.021*** (0.001)
<i>Controls</i>	Yes	Yes
<i>Year and Industry FEs</i>	Yes	Yes
<i>Cluster</i>	Firm	Firm
<i>N</i>	10199	23730
<i>Adj.R²</i>	0.027	0.024

5. Conclusion

Evidence from the 2015-2024 panel of A-share firms links a company's ESG standing within its industry to stock price crash risk. Higher peer-relative ESG performance is associated with a statistically significant increase in crash risk. This finding remains when ESG comparison is lagged, when DUVOL replaces NCSKEW, and when the comparison measure is reconstructed with the industry median. The mechanism estimates are consistent with tighter financial constraints as the link: stronger ESG competition coincides with a less favorable external financing environment. Ownership-based results show the larger association among non-SOEs, firms that have weaker resource support and face greater financing pressure.

References

- [1] Serafeim, G., & Yoon, A. (2023). Stock price reactions to ESG news: The role of ESG ratings and disagreement. *Review of Accounting Studies*, 28(4), 1500-1530.
- [2] Lin, X., Zhu, H., & Meng, Y. (2023). ESG greenwashing and equity mispricing: Evidence from China. *Finance Research Letters*, 58, 104606.
- [3] Crespi, F., & Migliavacca, M. (2020). The determinants of ESG rating in the financial industry: The same old story or a different tale? *Sustainability*, 12(16), 6398.
- [4] Mandas, M., Lahmar, O., Piras, L., et al. (2023). ESG in the financial industry: What matters for rating analysts? *Research in International Business and Finance*, 66, 102045.
- [5] Wong, & Zhang. (2022). ESG sensitivity and corporate behavior. *Journal of Corporate Finance*, 76, 102158.
- [6] Li, W., Mao, Z., Ren, X., et al. (2025). Retail investor attention: Guardian of corporate ESG integrity or catalyst for greenwashing? *Energy Economics*, 144, 108361.
- [7] Kim, J. W., & Park, C. K. (2023). Can ESG performance mitigate information asymmetry? Moderating effect of assurance services. *Applied Economics*, 55(26), 2993-3007.
- [8] Bae, J. C., Yang, X., & Kim, M. I. (2021). ESG and stock price crash risk: Role of financial constraints. *Asia-Pacific Journal of Financial Studies*, 50(5), 556-581.
- [9] Feng, J., Goodell, J. W., & Shen, D. (2022). ESG rating and stock price crash risk: Evidence from China. *Finance Research Letters*, 46, 102476.