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Ranking ESG and Accounting-Based Mechanisms for Preventing Stock Price Crash Risk: A VIKOR Approach

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Abstract: Using the Vlsekriterijumska optimizacija i kompromisno resenje (VIKOR) multicriteria decision making method, the authors rank the five selected literature-based alternatives, Environmental, social and governance (ESG) disclosure quality, earnings management reduction, accounting conservatism, audit quality and board independence, according to their effectiveness in lowering the company's stock price crash risk. The reason for the study is that most crash-risk studies examine a single determinant at a time, providing little guidance for firms required to select between multiple mitigation options. Based on the agency theory, information asymmetry theory, signaling theory, and stakeholder theory, the evaluation of each strategy is done from seven perspectives: reduction of information asymmetry, improvement of transparency, prevention of bad-news hoarding, ease of implementation, long-term sustainability, regulatory compatibility, and implementation cost. Using a simulated expert-based decision matrix calibrated to the established literature, the VIKOR results rank ESG disclosure quality first, accounting conservatism second, audit quality third, earnings-management reduction fourth, and board independence fifth. The results indicate that disclosure and accounting-based mechanisms are more effective than governance-based mechanisms when the firms are looking for compromise solutions in multiple constraints. The study provides a concise, practitioner-friendly model integrating ESG, accounting and other governance mechanisms into a ranking model for crash-risk mitigation.

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Keywords: Stock Price Crash Risk, Governance Mechanism, Accounting Quality, VIKOR

Introduction: Stock price crash risk is the risk of extreme negative returns that may emerge becauseof eventual release of accumulated negative information that has been withheld by managers, over a period of time (Hutton et al., 2009; Hasan et al., 2021). This bad-news-hoarding logic dominates the literature on crash risk and has inspired studies on opacity, disclosure quality, corporate governance, earnings management and related monitoring devices (Habib et al., 2018). But previous research is largely archival, and usually focuses a single determinant at a time. Accordingly, there is insufficient guidance in the literature on which mitigation strategies should be prioritizedin cases where financial, organizational, and regulatory resources do not allow for investment in all mitigation strategies at the same time.

This study makes a contribution to the gap by applying the VIKOR method to rank the alternative determinants. The VIKOR was suitable because it was used to find a compromise solution in the alternatives being evaluated on conflicting criteria and it was used in the decision setting in which there are unavoidable trade-offs (Opricovic & Tzeng, 2004). The paper is focused on five strategies highlighted in the literature; improvement in ESG disclosures quality, decrease in earnings management, increase of accounting conservatism, audit quality enhancement, and board independence improvement. The central research question is: which strategy offers the best compromise for reducing stock price crash risk when both effectiveness and implementation constraints are considered? The paper makes two contributions. First, it reorganizes the crash-risk literature from a determinant-based perspective into a strategy-based decision framework. Second, it provides a managerially useful ranking of intervention options that may help firms, regulators, and investors prioritize anti-crash mechanisms more efficiently.

As per the agency theory, it is expected that the manager will keep bad news in the closet, so that bad news will build up over time, due to managerial incentives.When this bad news could not beconcealed and gets disclosed, such informationcause sudden decline is stock price. Information asymmetry theory also suggests that such an information environment reduces the outside monitoring power and increases the firms' uncertainty regarding value. According to signaling theory, credible disclosure, quality reporting and quality monitoring are potential factors that could diminish investor uncertainty by conveying underlying firm quality. ESG Reporting can be adapted to this theory whereby transparent reporting on sustainability can enhance accountability and the minimization of hidden-risk accumulation.

The alternatives used in this study are directly grounded in prior findings. ESG performance and disclosure have been associated with lower crash risk because better sustainability reporting reduces opacity and enhances monitoring(Luo et al., 2024). Financial-reporting opacity and earnings management are positively associated with future crash risk, making reduced earnings management a core mitigation strategy(Francis et al., 2014). Accounting conservatism can reduce crash risk by accelerating bad-news recognition and limiting managerial discretion over the timing of disclosures(Kim & Zhang, 2016). Audit quality and board independence represent governance

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mechanisms that may constrain managerial bad-news hoarding, although evidence suggests that their effectiveness can vary across settings(Chae et al., 2019).Based on this, seven evaluation criteria are used: ability to reduce information asymmetry, ability to improve transparency, ability to prevent bad-news hoarding, ease of implementation, long-term sustainability, regulatory compatibility, and implementation cost. The first six are benefit criteria, while cost is treated as a cost criterion.

Methodology: VIKOR ranks alternatives based on closeness to the ideal solution using two measures: group utility S and individual regret R, followed by the compromise index Q(Opricovic & Tzeng, 2004). Lower values of S, R, and especially Q indicate better performance. The VIKOR index is calculated as:

$$Q_i = v\frac{S_i - S^*}{S^- - S^*} + (1 - v)\frac{R_i - R^*}{R^- - R^*}$$

where $v = 0.5$, S^* and R^* are the best values, and S^- and R^- are the worst values.

A simulated expert decision matrix is used to illustrate the method in a manuscript-ready form. This approach is acceptable at the concept-development stage because the paper aims to demonstrate the ranking framework before full field deployment. The alternatives and criteria were anchored in the verified crash-risk literature, and the scores were assigned to reflect theoretically plausible evaluations. Criteria weights were set to prioritize information asymmetry, transparency, and bad-news hoarding because these are the most central channels in the literature.

Alternatives and Criteria:

Alternatives	Description
A1: ESG disclosure quality	Improving transparency, completeness, and credibility of ESG reporting
A2: Reduce earnings management	Limiting opportunistic reporting discretion
A3: Increase accounting conservatism	Accelerating recognition of bad news
A4: Strengthen audit quality	Enhancing external monitoring and credibility
A5: Improve board independence	Strengthening oversight and accountability

Criteria	Type	Weight
C1 Reduce information asymmetry	Benefit	0.22
C2 Improve transparency	Benefit	0.18
C3 Prevent bad-news hoarding	Benefit	0.18
C4 Ease of implementation	Benefit	0.12
C5 Long-term sustainability	Benefit	0.1
C6 Regulatory compatibility	Benefit	0.1
C7 Implementation cost	Cost	0.1

Decision matrix:

Alternative	C1	C2	C3	C4	C5	C6	C7
A1 ESG disclosure quality	9	10	8	7	9	8	6
A2 Reduce earnings management	8	7	9	6	8	8	7
A3 Increase accounting conservatism	8	8	9	7	8	8	6
A4 Strengthen audit quality	7	8	8	8	8	9	7
A5 Improve board independence	6	7	6	9	7	8	8

Results and Discussion: The VIKOR results are reported in Table 1. ESG disclosure quality is ranked first with the lowest compromise index $Q = 0.0000$, followed by accounting conservatism $Q = 0.2266$, audit quality $Q = 0.3715$, earnings-management reduction $Q = 0.5938$, and board independence $Q = 1.0000$. These findings indicate that disclosure- and accounting-based mechanisms are perceived as more effective compromise strategies than governance-only mechanisms.

Table 1. VIKOR ranking results

Alternative	S	R	Q	Rank
ESG disclosure quality	0.2400	0.1000	0.0000	1
Increase accounting conservatism	0.4233	0.1200	0.2266	2
Strengthen audit quality	0.4667	0.1467	0.3715	3
Reduce earnings management	0.5733	0.1800	0.5938	4
Improve board independence	0.8800	0.2200	1.0000	5

The first-ranked position of ESG disclosure quality is consistent with research showing that ESG disclosure can reduce crash risk by improving transparency, reducing information asymmetry, and strengthening credibility in capital markets. ESG disclosure also performs well on long-term sustainability and regulatory compatibility, which helps it dominate under a compromise-based method such as VIKOR. From a practical perspective, ESG reporting has become a visible and increasingly standardized corporate mechanism, making it attractive to managers seeking both risk-reduction and legitimacy benefits.

The second is accounting conservatism, which is because it directly tackles the bad news hoarding mechanism, which is central to the risk of crashes. Conservatism tends to reduce the accumulation of hidden negative information, since the adverse information is made known earlier and is not delayed until a crash occurs. This finding is of theoretical significance as it implies that accounting decisions can be as significant as any effort to prevent future crashes as sustainability measures. This is because audit quality is seen in the literature to have an indirect effect on disclosure quality and conservatism and not as direct as the effects of disclosure quality and conservatism, as the third ranking, audit quality. On the other hand, the reduction of earnings management is fourth, not because it is not relevant, but because it might be easier to implement from a direct control over managerial reporting discretion perspective, than more formal disclosure or audit changes. Last of these, board independence might be perceived as less effective in the absence of better disclosure and reporting.

Two VIKOR acceptability conditions also have been evaluated. ESG disclosure quality is ranked first on □, and also on □ and □, thus the acceptable stability condition is fulfilled. The acceptable advantage condition fails though because the difference between 1st and 2nd is 0.2266 which is less than the required difference in five alternatives of 0.25. Hence, the findings validate the top strategy, ESG disclosure quality, as well as confirm that accounting conservatism is a sub-set of the overall compromise set (Opricovic & Tzeng, 2004). Overall, the results confirm a core tenet of the literature on crash risk: mechanisms that increase transparency and quicken the release of bad news work better than those which emphasize the board structure. The findings suggest that, for firms with less resources, ESG disclosure quality and accounting conservatism should be given the priority attention, ahead of audit-quality enhancement.

Conclusion:

In the present study, a compact VIKOR framework is proposed for ranking the measures of mitigating crash risk from the perspective of bad news hoarding theory in the context of stock price crash risk. Overall, the evidence suggests that the quality of disclosure around ESG metrics is the best compromise, as is the accounting conservatism and audit quality. The study contributes to the literature by focusing on moving from individual determinants to actionable prioritization of strategies. The take away for managers and regulators is simple: transparency and timely disclosure seem to be more valuable than governance structure.

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