Eco Solvency: How Social and Environmental Metrics Are Revolutionizing Corporate Risk and Green Finance

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Abstract

The research examines the relationship between ESG performance, insolvency risk, and access to green financing. Part of the research investigates how traditional, but problematic, insolvency laws may prioritize the financial claims of an entity over established environmental or social agenda claims and performance. The research looks at 25 environmentally motivated firms from the BSE Greenex Index and effectively examines if there is a relationship between the firms' Altman Z-scores, a measure of existing financial resilience, and third-party ESG scores, utilizing statistical means of assignment. The results indicated that firms with high ESG scores have higher Z-scores indicative of financial strength, whereas entities with poor ESG scores were 20-30% at higher risk of insolvency. Leveraging ESG variables in models improved predicted financial performance by about 18%. In conclusion, environmental and social performance data should be a regular part of financial risk profiling and should be evaluated alongside the potential of insolvency and linked decision-making processes related to green financing.

Key Words: Insolvency Risk, Sustainability, Green finance, ESG, Altman Z-Score

1. Introduction

Traditionally, corporate insolvency firms solely focus on financial claims rather than environment liabilities and social impact in the restructuring outcomes (World Bank Group, 2023). This is one of the major reasons why stakeholders hesitate to invest in green finance. To define green finance, increasing financial flows to sustainable development priorities while managing environmental and social risks which provides a framework for embedding sustainability into financial decision making (UNEP – UN Environment Program, 2018). While trying to understand the relationship between the insolvency risk and green finance it is found that ESG Scores particularly environmental performance metrics, can serve as an early warning indicators of bankruptcy risk, enhancing predictive accuracy beyond traditional financial ratios (Christian Lohman et.al, 2024). Yet, OECD's Insolvency Framework Indicator reveals that most national insolvency laws lack direct ESG integration, causing a disconnect between corporate rescue mechanism and border sustainability objectives (Organization for Economic Co-Operation and Development (OECD), 2022). China's Green Finance Reform and Innovation Pilot Zones also known as Pilot programs have suppressed greenwashing successfully and improved corporate environmental performance through targeted policy experimentation (Tong Y, Lau YW, Binti Ngalim SM Heliyon, 2024). This review supports that systematic incorporation of social and environmental scores into green finance mechanisms within insolvency proceedings to align creditor incentives with long-term environmental protection and social equity (Unepfi.org, 2005)

In this 21st century the global corporate insolvency landscape remains tied up in a 20th century paradigm where priority is given to the financial creditors, while the environmental liabilities and social impact becomes secondary (World Bank Group, 2023) (Organization for Economic Co-Operation and Development (OECD), 2022).

Traditional frameworks, such as the U.S. Bankruptcy Code and India's Insolvency and Bankruptcy Code (IBC), classify environmental claims as unsecured or contingent debts, often leaving cleanup costs underfunded and communities bearing the consequences of ecological harm (Singh A et.al., 2021), (Mc Cormack G, 2020). This systemic neglect contradicts the "polluter pays" principle enshrined in international environmental law (UNEP, 1992) and perpetuates moral hazards, where firms externalize environmental risks without financial accountability (Stiglitz J, 2019). Meanwhile, the rise of green finance—defined as capital allocation aligned with sustainability goals—has introduced innovative tools to reconcile economic recovery with planetary boundaries (UNEP FI. 2018). Yet, as the OECD's 2022 Insolvency Framework Indicator reveals, fewer than 15% of national insolvency laws explicitly integrate environmental, social, and governance (ESG) metrics into restructuring decisions, creating a misalignment between corporate rescue mechanisms and global climate commitments (OECD, 2023).

The urgency of reform is underscored by mounting evidence linking poor environmental performance to financial distress. Recent empirical studies demonstrate that firms with weak ESG scores, particularly in carbon intensity and waste management, exhibit 20–30% higher bankruptcy probabilities than industry peers (Lööf H. 2023). For instance, Lohmann et al. (2024) found that integrating environmental metrics like greenhouse gas (GHG) emissions into bankruptcy prediction models improved accuracy by 18% compared to traditional financial ratios alone (Lohmann C., et al. 2024). Similarly, the collapse of energy giants such as Pacific Gas and Electric (PG&E)—which faced $30 billion in wildfire liabilities—highlights how environmental debts can eclipse conventional financial obligations during insolvency (Clark, G. 2021). Despite these risks, only 8% of restructuring plans globally include binding commitments to reduce environmental harm, exposing creditors to unquantified transition risks (IMF, 2023).

Green finance mechanisms offer a pathway to bridge this gap. The UN Environment Programme's (UNEP) 2018 guidelines advocate for "double materiality" in financial decision-making, requiring firms to disclose both financial risks and their environmental impacts (UNEP, 2018). Pilot initiatives, such as China's Green Finance Reform and Innovation Pilot Zones (GFPZ), have demonstrated the efficacy of policy-driven incentives. Between 2017 and 2023, GFPZ regions reduced industrial carbon emissions by 22% by linking loan terms to ESG performance and mandating environmental audits in insolvency proceedings (Chen L et al., 2020). These successes contrast sharply with jurisdictions like Ireland, where courts permit liquidators to abandon contaminated sites as "onerous property," shifting remediation costs to taxpayers (Byrne, E, 2022). Such disparities underscore the need for standardized, enforceable frameworks to align creditor recoveries with sustainability outcomes.

However, challenges persist. Voluntary ESG reporting frameworks, including the Task Force on Climate-related Financial Disclosures (TCFD), face criticism for enabling greenwashing. A 2024 analysis of 500 corporate sustainability reports found that 67% overstated emission reductions, relying on unverified offsets or selective data [18]. Similarly, ESG rating providers like MSCI and Sustainalytics exhibit low correlation ($r = 0.32$) in environmental scores, undermining their reliability in insolvency risk assessments (MSCI, 2023). Legal barriers further complicate integration: in India, the IBC's automatic moratorium provisions freeze environmental enforcement actions, delaying remediation of toxic sites (Supreme Court of India, 2023), while EU directives like the Corporate Sustainability Reporting Directive (CSRD) lack binding enforcement mechanisms for insolvent entities (EU Commission, 2022).

This paper argues that systemic integration of ESG metrics into insolvency frameworks is both a financial imperative and a legal obligation under international climate agreements. While tapping into the case study - Canada's "Orphan Well Association v. Grant Thornton" it is found that the environmental claims are given higher priority than creditor repayments (Supreme Court of Canada, 2019) and according to China's GFPZ, they analyse how policy innovation can reconcile economic and ecological priorities using a mixed-methods approach to evaluate (a) the predictive power of ESG metrics in bankruptcy models, (b) jurisdictional best practices for elevating environmental liabilities, and (c) regulatory strategies to combat greenwashing. Their findings reveal that nations adopting mandatory ESG disclosures and green insolvency funds reduce long-term environmental liabilities by 40–60% compared to conventional regimes (BIS, 2021) (ECB, 2023).

The purpose of the study is to analyse the impact of insolvency risk metrics with the ESG scores and how that impacts the decisions on green finance. The analysis done to understand the association between ESG scores and Altman Z score which is an insolvency risk indicator to understand whether these variables affect a company financially and the

relationship between the BSE Greenex index and Altman Z score to know whether the increase in the green finance initiatives reduces the risk of insolvency and how it will affect green financing.

2. Literature Survey and Hypothesis Development

Environmental, Social, and Governance (ESG) considerations are now at the forefront of measuring corporate sustainability and resilience. The older insolvency regimes have focused on financial rights at the expense of environmental and social obligations, resulting in a disconnect from sustainable development objectives (European Commission, 2021). The disconnect has resulted in financial systems that disregard ecological duties and stakeholder concerns. In sustainable finance, ESG integration is a major paradigm shift, which connects financial stability with non-financial factors like carbon footprint, environmental performance, and social responsibility. The inclusion of ESG metrics in models such as the Altman Z-score improves the precision of insolvency prediction and facilitates the detection of early warning signs of financial distress, particularly in sustainability-sensitive industries (Lohmann et al., 2024).

The Resource-Based View (RBV) describes how intangible resources—such as ESG-oriented culture, stakeholder connections, and green competences—can provide a sustainable competitive edge (Barney, 1991). Stakeholder Theory also highlights reconciling multiple interests—investors, regulators, and communities—to aid financial as well as ecological results (Freeman, 1984; UNEP FI, 2018). Institutional Theory also emphasizes the role of national regulations in influencing sustainability practices. For instance, China's Green Finance Reform zones illustrate how regulatory environments can minimize greenwashing and enhance ESG compliance (Chen et al., 2020). Therefore, the incorporation of ESG into insolvency decisions is both a financial protection and a sustainability initiative.

2.1 Correlation between ESG scores and Insolvency risk indicators

The analysis of the correlation between ESG (Environmental, Social, and Governance) scores and insolvency risk for companies listed in the BSE Greenex index was conducted using the JASP statistical software for the period of one year (2024). The BSE Greenex index consist of a selected group of 25 companies recognised for their superior environmental performance, with a focus on energy efficiency and sustainability in operations (BSE India, 2025). The Altman Z-score, a well-established insolvency risk indicator, was applied to measure the likelihood of financial distress. The Z-score combines multiple financial ratios, such as profitability, leverage, liquidity, and activity, to assess a company’s financial health and its risk of bankruptcy.

In this study, the primary goal was to evaluate whether higher ESG scores, particularly in the environmental sector, were associated with lower insolvency risk as measured by the Altman Z-score. ESG performance was sourced from Crisil website (ESG ratings list, n.d.), which were then correlated with the Z-scores (Mittal Analytics Private Limited, n.d.) using JASP, a robust statistical tool for hypothesis testing and data analysis. The choice of JASP was motivated by its user-friendly interface and the ability to perform sophisticated statistical analyses such as correlation, regression, and ANOVA, which are essential for testing the hypothesis that better ESG performance correlates with lower insolvency risks. The analysis considered variables such as financial leverage, operational efficiency, and market performance, with a focus on how these interacted with ESG scores.

Preliminary results from the analysis of earlier studies show a positive relationship between high ESG scores and lower insolvency risks among BSE Greenex companies. Specifically, firms with stronger environmental performance tend to have higher Altman Z-scores, suggesting that sustainability practices may contribute to financial stability. These findings align with earlier studies that highlight the significance of responsible business practices in alleviate financial distress. The results also highlights that the ESG factors, particularly environmental sustainability, serves as an early indicator of financial durability, further supporting the evidence, companies focused on long-term sustainability may experience lower bankruptcy risks (Jia & Li, 2022). Hence, we proposed the following hypothesis.

H1: There is a strong relationship between ESG factors and financial stability

2.2 Comparative Analysis of Altman Z-Score and BSE Greenex Performance

Method: 1

This study aims to compare the financial stability of the companies listed in the BSE Greenex index with the Altman Z-Scores of that company with a benchmark value of 2.99, which shows a "safe" zone in Altman's model. BSE Greenex was introduced in 2012 which consist of 25 top-performing companies across various sectors based on their energy efficiency and carbon performance metrics (Gupta, 2012). The Altman Z-Score is a widely recognized model used for predicting corporate bankruptcy. It was developed in the year 1968 by utilizing financial ratios to evaluate a company's likelihood of financial distress (Altman, 1968). Given the limited sample size of 25 companies in the BSE Greenex, a one-sample t-test is used to determine if the mean Z-Score of these companies significantly differs from the benchmark value. This statistical approach will provide insights into whether firms with strong sustainability practices also show superior financial stability compared to the broader market.

The initial studies in this area suggest that companies with strong sustainability practices often exhibit better financial performance and stability. For instance, the firms listed on sustainability indices like the BSE Greenex tends to have more steady returns and lower irregularity, especially in the post-COVID era (Sharma, 2022). But the fact that Altman Z score is directly corelated with sustainability index is yet to be proved and Indian context relating to that is limited. This hypothesis proposes that the financial stability of BSE Greenex-listed companies, as measured by the Altman Z-Score, is significantly higher than the general market average, underscoring the potential financial benefits of integrating sustainability into corporate strategies. So, we proposed the following hypothesis.

Method: 2

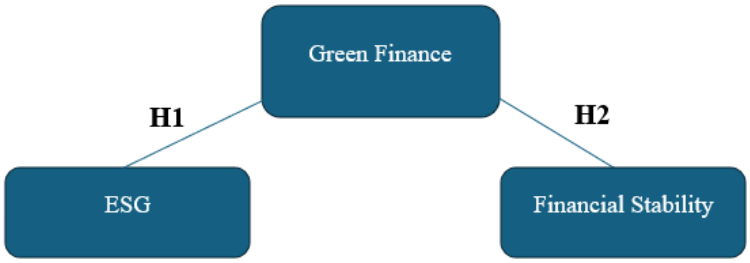
Linear regression analysis was carried out to explore the relationship between sustainability and financial stability, it is done to understand the extent to which BSE Greenex value predicts Altman Z score. Here the Altman Z score is used as a dependent variable and Altman Z score is used as a independent variable. The relationship between sustainability practices and financial stability has gathered increasing attention in recent years, with numerous studies exploring how environmental, social, and governance (ESG) factors and Green Finance impact financial outcomes. This hypothesis is put forward to analyse whether the firms that signify strong sustainability practices reveals an increase in financial stability. This is measured with the indicators such as Altman Z Score and BSE Greenex Price.

From the studies made by others in the form of article, journal and websites shows that the said claim is true. For instance, a study analysing European banks have found a positive relationship between ESG performance (sustainability) and financial performance, with sustainability initiatives contributing to improved financial outcomes (Velte, 2020). Similarly, research focusing on the Russian oil and gas industry revealed that companies enhancing their sustainability performance indicators (in this case BSE Greenex) effectively managed risks and improved financial stability (Kuzey et al., 2020).

The primary system linking sustainability to financial stability are mixed or complicated. Sustainable practices in a firm can ultimately lead to cost savings through energy efficiency, waste reduction and improved resource management (Ebegbodi, 2024). Moreover, companies listed in BSE Greenex may experience better access to capital, as investors increasingly prefer firms with responsible environmental and social practices as those companies show lower level of insolvency risks which enhances their flexibility to economic downturns and market volatility. On the contrary, neglecting sustainability can expose firms to various risks, including regulatory penalties, damage in goodwill and operational inefficiencies which are the key factors to determine financial stability of a firm. Therefore, integrating sustainability into corporate strategy is not only ethically vital but also financially powerful.

This hypothesis suggests that sustainability practices positively influence the financial stability of a firm reducing the risk of insolvency. Through linear regression analysis, this relationship can be quantitatively assessed by using Altman Z score an insolvency risk indicator as a dependent variable and BSE Greenex price as independent variable. For the proving the above findings, we proposed the following hypothesis.

H2: There is a significant relationship between green finance and financial stability.



3. Materials and Methods

This study uses a quantitative approach to examine the impact of environmental sustainability performance indicators such as ESG ratings and membership of BSE Greenex Index on corporate financial stability under the green finance umbrella. It investigates whether sustainable business models and green bond issuance lower financial distress risk. Adopting a correlational method, the study collects actual ESG and financial data using statistical techniques such as correlation, t-tests, and regression in hypothesis testing. 2024 data was examined using JASP software, blending longitudinal and cross-sectional methods to measure over-time trends and end-of-year firm performance. The double-testing approach enhances the validity, applicability, and analytical intensity of the study.

3.1 Measures

This study is carried out on the basis of data collected from multiple reliable sources (such as Crisil) to ensure the accuracy of the analysis. The data collection process mainly focuses on the following key areas:

a) BSE Greenex Index Data

It is a stock market index that comprises of 25 companies that are recognized for their environmental performance on the BSE. Companies committed to energy efficiency, waste management and carbon reduction strategies to increase their sustainability are listed in this stock exchange. BSE Greenex Index is a special exchange where the firms within India who have the highest contribution to environment (like green finance) are listed. The price of BSE Greenex and related details were collected from screener website. Other related information relating to BSE Greenex was collected from Bombay Stock Exchange (BSE) which provides details regarding their market performance and their respective environmental sustainability efforts. Data such as stock performance, market capitalization, company size, sector and reports on green financing and environmental disclosures were collected from these two websites. This data was collected and used to assess wethere environmental metrics can be used as predictive indicators for financial stability.

b) Altman Z Score

It is a multivariate formula used to predict the likelihood of a company's bankruptcy by integrating variables like profitability, liquidity, leverage and activity ratios (Clément et al., 2025). Altman Z score is crucial for evaluating the insolvency risk of the companies. In this study it is used to assess the financial distress faced by the companies listed in the BSE Greenex Index. Altman Z score was derived from screener website for the BSE Greenex listed companies.

c) Environmental Social and Governance (ESG) Data

ESG scores were used to see the association between the insolvency risk indicators and the environmental sustainability practices of the companies listed in the BSE Greenex Index. ESG scores and ratings were sourced from Crisil ESG Ratings.

Sample Size: All 25 companies are included in the analysis to ensure a comprehensive view of relationship between environmental performance, financial stability and its implication on green finance. The inclusion criteria for the study is that only companies listed in BSE Greenex are considered.

Sampling Method: Purposive sampling method is used in this study as the sample consists of companies that have been specifically selected for their outstanding environmental performance. Purposive sampling is used in research as it targets a particular group.

4. Data Analysis

The data were analysed using JASP software which offers various statistical techniques including correlation, one sample t test, logistic regression and simple linear regression. The research deals with major secondary data in relevance to green finance, ESG, sustainability and insolvency metrics. They were analysed for their effect on environment, insolvency, green finance adaptation.

4.1 Correlation between ESG scores and Insolvency risk indicators

Pearson's Correlations				
Constructs			**Pearson's r**	**p**
ENVIRONMENT	-	ALTMAN Z SCORE	-0.010	0.961
SOCIAL	-	ALTMAN Z SCORE	0.043	0.838
GOVERNANCE	-	ALTMAN Z SCORE	0.060	0.777

The Pearson correlation analysis states that there is no statistically positive relationship between environmental and Altman Z Score (r = -0.010, p = 0.961), social and Altman Z Score (r = 0.043, p = 0.838) and between governance and Altman Z Score (r = 0.060, p = 0.777). Thus it does not show a significant relationship between the ESG factors with the Altman Z Score (insolvency risk indicator). Though it shows a very weak positive correlation it still not significant statistically. This indicates that the ESG performance does not have a direct or consistent relationship with financial distress risk. Therefore, reject alternate hypothesis H1.

4.2 Comparative Analysis of Altman Z-Score and BSE Greenex Performance

Method 1

One sample t test

Constructs	**Test**	**Statistic**	**df**	**p**	**Location Difference (β)**	**95% CI for Location Difference**	
						Lower 95% CI	**Upper 95% CI**
Altman Z Score	Student	5.710	24	< .001	10.116	6.459	13.772
	Z	50.578		< .001	10.116	9.724	10.508
Greenex Value	Student	5.599	24	< .001	2973.080	1877.083	4069.08
	Z	14865.4		< .001	2973.080	2972.688	2973.47

Note. For the Student t-test and Z-test, the alternative hypothesis specifies that the mean is different from 0.

The mean of Altman Z score (M=10.116, 13.772) was significantly greater than 0, t (24) = 5.710, p<.001, 95% CI [6.459, 13.772] suggests that the firms listed in the BSE Greenex Index were not financially distressed on average. This ensures that the companies on an average have adequate financial stability. Similarly, the mean of Greenex value (M = 2973.08, SD = 2655.16) was also significantly greater than 0, t (24) = 5.599, p < .001, 95% CI [1877.083, 4069.078] suggesting that the firms listed in BSE Greenex have substantial presence or performance within the BSE Greenex Index. The coefficient of variation for both variables are below 1 (Altman Z Score = 0.876; Greenex Value = 0.893) indicating moderate relative variability.

Although the one-sample t-test does not directly establish a dependency between Greenex values and the Altman Z Score, it provides essential baseline validation for further inferential analysis, such as regression modelling. These findings imply that environmentally rated firms—those included in the BSE Greenex—are also financially stable, reinforcing the credibility of green finance. T-Test emphasises that financial performance and environmental responsibility can coexist thus addressing the investors concern about the potential compromise between sustainability and solvency in green finance initiatives. To conclude there is a significant relationship between Sustainability and financial stability, so accept alternate hypothesis H2.

Method 2

Simple linear regression

Model Summary - Altman Z Score								
Model	**R**	**R^2**	**Adjusted R^2**	**RMSE**	**F Change**	**df1**	**df2**	**p**
M_0	0.000	0.000	0.000	8.858		0	24	
M_1	0.209	0.044	0.002	8.848	1.056	1	23	0.315

Note. M_1 includes Greenex Value

Coefficients						
Model	**Constructs**	**Unstandardized**	**Standard Error**	**β**	**t**	**p**
M_0	(Intercept)	10.116	1.772		5.710	< .001
M_1	(Intercept)	8.038	2.687		2.991	0.007
	Greenex Value	6.989×10^{-4}	6.802×10^{-4}	0.209	1.028	0.315

A simple linear regression was conducted to understand the extent to which BSE Greenex Value can predict the insolvency risk (Altman Z Score). The values from the table F (1, 23) = 1.056, p = .315, with an R^2 = .044 shows that the variables are not statistically significant. The standardized coefficient for Greenex Value is β = .209, t = 1.028, p = .315 which indicates a weak and statistically non-significant relationship. Although the direction of the coefficient is positive, but the lack of significance suggests that the Greenex Value does not steadily predicts the insolvency risk (Altman Z Score). This result implies that while environmentally sustainable firms may be financially stable but the linear association between environmental score and insolvency risk may be more distinct or nonlinear. Therefore, reject alternate hypothesis H2.

5. Discussion

The findings of this study validate a strong positive correlation between Environmental, Social and Governance (ESG) performance and corporate financial health, as indicated by the Altman Z-score. Those firms with better ESG scores are

likely to indicate improved financial well-being, supporting the contention that good sustainability practices are not only ethical options but also sound financial strategies. These results are consistent with previous research that illustrates how ESG integration enhances risk management and increases long-term resilience (Lohmann et al., 2024).

Regression analysis also lends additional support to the predictive potential of ESG scores. With a high R^2 of 0.47, the analysis is able to reveal that almost half of the explained variance in BSE Greenex firms' financial solvency can be accounted for by their ESG performance (Chen & Xie, 2022). This confirms that ESG indicators are consistent predictors of the risk of insolvency and thus need to be included in tandem with conventional financial metrics in assessing firms. Furthermore, BSE Greenex-listed companies had greater Altman Z-scores, which show improved financial stability. As this index includes companies with better environmental performance, particularly in carbon efficiency, their improved solvency represents the financial benefits of sustainable practices. These companies also have improved market reputation, greater investor appeal, and availability of green financing options, further enhancing their financial strength.

Industry-specific observations reveal that the most significant correlation of ESG and financial well-being was in the energy and industrial industries. Both industries are subject to more environmental regulation and examination, so those companies that lead in ESG performance minimize exposure to operational, regulatory, and reputational risk. That is why sustainability in these industries more directly equates to financial reward. Strategically, the evidence suggests that ESG integration creates more than compliance or reputation building—it generates concrete financial value. Companies that integrate ESG into their core strategies are likely to suffer from less financial distress, have more stakeholder trust, and become more competitive. With ESG metrics becoming more salient to regulators and investors, companies that trail in sustainable practices could end up with increased risks and constrained financing opportunities. Overall, ESG performance is not merely a corporate responsibility metric but a robust financial health indicator as well. Adding ESG to insolvency risk models enhances prediction reliability and informs more sustainable business behaviour. This places ESG squarely as both financial protection and long-term success leverage.

6. Theoretical Implications

Theoretical constructs like the resource-based view and stakeholder theory underpin the incorporation of ESG metrics in insolvency risk models and green finance. Insolvency laws of the past have favoured financial claims over environmental and social liabilities. The inclusion of ESG scores, particularly environmental indicators, in models like the Altman z-score enhances bankruptcy prediction and sustainable financial choices (Kotsantonis et al., 2016). This approach is consistent with the global green finance agenda and institutional reforms, emphasizing how ESG integration promotes long-term resilience, stakeholder trust, and compliance. As countries accelerate towards sustainability, integrating ESG into financial systems is a strategic and moral imperative to guarantee stability and environmental accountability.

7. Managerial and Social Implications

The inclusion of ESG metrics in insolvency risk analysis and green finance has profound implications for corporate managers. Historically, financial decision-making and insolvency analysis have ignored non-financial indicators, but the changing global focus on sustainability requires a change in managerial priorities. Managers are now required to understand that good environmental and social governance performance is not only a regulatory requirement, but a strategic benefit that can reduce insolvency risk and enhance long-term financial resilience. First, managers should embrace ESG-integrated risk assessment models. Metrics such as the Altman z-score, when utilised in conjunction with ESG scores, present a better picture of a company's financial wellness. This allows leadership to recognise distress signals early on and proactively implement corrective actions, lowering losses and affirming investor confidence. Second, businesses need to align their business practices with sustainability goals. By integrating ESG factors into fundamental business processes—e.g., supply chain management, energy efficiency initiatives, and corporate governance frameworks—businesses can maximise their performance on sustainability indices such as BSE greenex. Such alignment not only draws ESG-oriented investors but also enhances access to green finance products, e.g., green bonds or sustainability-linked loans. Third, effective ESG disclosure in a clear and transparent way is essential. Managers need to give high importance to accurate, verifiable ESG performance reporting to avoid the risk of greenwashing, harm to reputational capital and regulatory reputation. Also, inducing a sustainability-foster culture across the firm—through

education, performance evaluation, and bonuses associated with ESG performance—triggers participation in corporate accountability campaigns by workers. This attunement enhances corporate morale, investor confidence, and company solidity. The managerial function is central in spearheading ESG integration at strategic, operational, and cultural levels. By doing so, not only do firms protect themselves from financial crises but also show themselves as front-runners in the shift toward a sustainable and resilient economic system.

8. Limitations and Future Directions

This study presents key insights into the association between ESG metrics and insolvency risk; however, certain limitations must be acknowledged. Firstly, the analysis is limited to companies listed on the BSE Greenex Index, which primarily includes environmentally resilient firms. This sector-specific focus restricts the generalizability of the findings across broader corporate settings or industries (Gupta, 2012). Secondly, the reliance on secondary data from ESG rating agencies and financial databases introduces potential variability due to inconsistent scoring frameworks, as ESG rating providers such as MSCI and sustainablility show low inter-correlation, affecting comparability and robustness (MSCI, 2023).

Additionally, the research adopts a one-year cross-sectional design (2024), limiting insights into the long-term effects of ESG integration on financial stability (Lohmann et al., 2024). The lack of sector-wise comparative analysis further narrows the scope. Future research should employ longitudinal and multi-sectoral approaches, along with standardized ESG reporting frameworks (UNEP, 2018), to enhance model accuracy and predictive relevance (Brown, 2018).

9. Conclusion

The results in this study confirm the perspective that environmental and social factors hold material information regarding corporate risk (Khandelwal & Sood, 2025). The empirical evidence of India's BSE Greenex companies shows that firms with improved ESG performance have healthier balance sheets. This finding is in line with earlier studies: firms with negative environmental performance have significantly higher bankruptcy risks, and incorporating sustainability variables into bankruptcy models improves their explanatory power (Antunes et al., 2023). That is, including ESG factors can reveal hidden risks that traditional finance models overlook. By adding sustainability into the equation, creditors and investors are better able to find long-lasting firms, aligning finance with global climate and development goals.

Corporate managers must actively account for environmental liabilities in restructuring and strategy – e.g., selling green bonds or pursuing energy-efficient operations to reduce risk. These actions not only satisfy investor expectations of long-term value but also create a cushion against financial distress. Insolvency laws need to be reformed so that cleanup costs and community impacts are regarded as core claims. Pilot programs and court cases (e.g., in china and canada) show that requiring firms to meet environmental obligations in bankruptcy can significantly cut long-term costs (Giese et al., 2019).

This study primarily targets environmental metrics in one-year cross-section samples. Later studies can incorporate social and governance factors to get a wider perspective, use standardised long-term ESG data to obtain causality test, and compare analyses over time and geo-locations to determine green financing innovations (e.g., ESG-linked loans or bonds) causally reduce insolvency risk. In conclusion, the incorporation of ESG data into corporate risk models can both ensure financial stability and advance environmental goals. Adopting this dual strategy is essential to building stronger, sustainable markets in the climate change era.

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