

3rd International Conference on Media, Economy, Communication and Intelligence Management (MECI 2026)

Article

ESG Performance and Bank Lending in High-Carbon Industries: A Comparative Analysis of Two Indian Cement Firms

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Abstract: This study examines the critical relationship between Environmental, Social, and Governance (ESG) performance and bank lending patterns within high-carbon industries, placing a specific focus on the rapidly evolving Indian cement sector. As global financial systems increasingly integrate sustainability metrics into risk assessment frameworks, understanding these dynamics becomes essential. Through a comprehensive comparative analysis of two major Indian cement firms, namely UltraTech Cement and ACC Limited, the research systematically investigates how varying levels of ESG disclosure and concrete sustainability practices directly influence corporate credit access, specific loan terms, and overall lending decisions by major financial institutions. The analysis employs a robust mixed-methods approach that seamlessly combines quantitative financial data spanning from 2018 to 2023 with an in-depth qualitative assessment of annual ESG reports and mandatory sustainability disclosures. The empirical findings clearly indicate that superior ESG performance strongly correlates with significantly more favorable lending terms, including notably lower interest rates, extended loan tenures, and substantially reduced collateral requirements. However, the relationship exhibits distinct sector-specific nuances; notably, environmental performance metrics demonstrate a much stronger and more immediate influence on bank lending decisions than either social or governance indicators. Ultimately, this study contributes significantly to the emerging academic literature on sustainable finance within emerging markets. Furthermore, it provides highly practical, actionable insights for regulatory policymakers, commercial financial institutions, and strategic corporate managers who are actively navigating the complex transition toward sustainable, low-carbon economies.

Keywords: esg performance; bank lending; sustainable finance; cement industry; emerging markets; credit access

Received: 28 March 2026

Revised: 14 May 2026

Accepted: 29 May 2026

Published: 03 June 2026



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1. Introduction

The global transition toward sustainable development has placed increasing pressure on high carbon industries to improve their environmental, social, and governance (ESG) performance. Among these industries, cement production represents a particularly challenging sector due to its significant carbon emissions, energy intensity, and environmental footprint. The cement industry alone accounts for approximately 7 to 8 percent of global CO₂ emissions, making its decarbonization critical for achieving international climate targets. In emerging economies like India, where rapid infrastructure development drives cement demand, balancing economic growth with environmental sustainability presents complex policy and financial challenges. Indian cement producers face dual imperatives: expanding production capacity to support

urbanization while simultaneously reducing their environmental impact in line with national climate commitments. This paper examines how ESG performance influences bank lending decisions within the Indian cement industry, focusing on a comparative analysis of two major firms, namely UltraTech Cement and ACC Limited [1]. The selection of these two firms allows for a nuanced understanding of how different sustainability strategies translate into distinct financial outcomes. Furthermore, the Indian context is particularly relevant given the country's ambitious climate goals and the active role of its financial regulators in promoting sustainable finance.

Bank lending represents a critical mechanism through which financial institutions can either facilitate or constrain the transition to sustainable industrial practices. As climate-related financial risks gain recognition, banks increasingly incorporate ESG criteria into their credit assessment frameworks. However, the specific mechanisms through which ESG performance affects lending decisions in high-carbon industries remain underexplored, particularly in emerging market contexts [2]. This study addresses this gap by investigating whether and how differences in ESG disclosure and performance translate into variations in bank lending patterns for Indian cement companies.

The research contributes to several strands of literature. First, it extends the growing body of work on sustainable finance by examining the bank lending channel in a high-carbon industry context. Second, it provides empirical evidence from an emerging market, where institutional frameworks and market dynamics differ substantially from developed economies. Third, the comparative approach allows for nuanced analysis of how firm-specific ESG strategies influence financial outcomes. The findings offer practical implications for corporate managers seeking to optimize their sustainability reporting for better credit access, for banks developing ESG-integrated lending frameworks, and for policymakers designing incentives for green industrial transformation [1, 3].

2. Literature Review

The relationship between corporate sustainability performance and financial outcomes has been extensively studied across multiple dimensions. Early research focused primarily on the stock market valuation effects of ESG performance, with mixed findings regarding the existence and direction of a sustainability premium. Some studies found positive valuation effects, while others suggested neutral or even negative relationships, reflecting methodological differences and contextual factors. More recent work has shifted attention to debt markets, examining how ESG factors influence credit ratings, bond yields, and loan terms. This shift is significant because debt financing constitutes the primary external funding source for most firms, particularly in emerging economies where equity markets may be less developed [4, 5]. This literature review synthesizes three key strands relevant to the current study: first, ESG performance and corporate financing; second, bank lending in high carbon industries; and third, sustainable finance in emerging markets.

Research on ESG performance and corporate financing has evolved from early debates about whether sustainability investments represent a cost burden or a source of competitive advantage. Contemporary studies increasingly recognize that ESG factors can affect financing costs through multiple channels. These channels include risk reduction, reputation enhancement, regulatory compliance, and stakeholder relations. In debt markets specifically, higher ESG scores have been associated with lower credit spreads, better credit ratings, and more favorable loan terms. However, the strength of these relationships varies across industries, with particularly pronounced effects observed in environmentally sensitive sectors [6]. This variation suggests that lenders weigh ESG factors differently depending on the materiality of specific issues to a given industry. For example, environmental factors are more material for high carbon industries, while social factors may be more relevant for labor-intensive sectors such as textiles or retail.

Bank lending to high-carbon industries presents unique challenges in the context of climate transition [7]. Financial institutions face dual pressures: supporting economic development through industrial financing while managing climate-related financial risks.

Studies examining bank lending patterns in carbon-intensive sectors have identified several trends, including increasing scrutiny of environmental compliance, growing use of ESG covenants in loan agreements, and emerging differentiation between "transition leaders" and "laggards" within industries. The cement sector, as a major contributor to global CO₂ emissions, has received particular attention in this literature.

Sustainable finance in emerging markets operates within distinct institutional contexts characterized by evolving regulatory frameworks, different stakeholder priorities, and varying levels of market development. Research on ESG integration in emerging market banking has highlighted both challenges and opportunities. Challenges include limited ESG data availability, weaker disclosure standards, and competing development priorities [8, 9]. Opportunities arise from the potential for "leapfrogging" to sustainable technologies and practices, growing investor interest in emerging market sustainability, and alignment with national development goals. India represents a particularly interesting case due to its rapid economic growth, ambitious climate commitments, and active policy interventions in sustainable finance.

3. Theoretical Framework

This study draws on two complementary theoretical perspectives to analyze the relationship between ESG performance and bank lending: stakeholder theory and risk management theory [10]. Stakeholder theory suggests that firms managing relationships with diverse stakeholder groups can secure legitimacy and resources that translate into financial advantages. These stakeholder groups include communities, regulators, employees, customers, suppliers, and civil society organizations. In the context of bank lending, superior ESG performance signals effective stakeholder management, thereby reducing perceived reputational and regulatory risks for lenders. Risk management theory emphasizes how ESG factors affect various dimensions of corporate risk, including regulatory compliance risk, physical climate risk, transition risk, and litigation risk. For high-carbon industries such as cement manufacturing, transition risk is particularly salient. Transition risk refers to the financial risks associated with moving to a low-carbon economy, including policy changes, technological disruptions, and shifts in market preferences. Banks incorporate these risk assessments into their lending decisions through interest rates, collateral requirements, and covenant structures.

The integration of these theoretical perspectives generates several testable propositions regarding ESG performance and bank lending in high-carbon industries. Firms with stronger environmental performance should receive more favorable lending terms due to reduced regulatory and transition risks. Social performance indicators related to community relations and labor practices may influence lending decisions through reputational risk channels. Governance quality affects lending terms by signaling management competence and reducing agency risks. The relative importance of environmental, social, and governance dimensions may vary depending on industry characteristics and regulatory contexts [3]. These propositions guide the empirical analysis of lending patterns for Indian cement firms.

4. Methodology

This study employs a comparative case study design focusing on two major Indian cement companies: UltraTech Cement and ACC Limited. These firms were selected based on three criteria: their market leadership positions in the Indian cement industry, their contrasting ESG performance profiles, and the availability of comprehensive financial and sustainability data over the study period. The comparative case study approach is particularly suited to this research question because it allows for in-depth, contextualized analysis of how firm-specific ESG strategies translate into differential lending outcomes. The research period covers 2018 to 2023, encompassing significant developments in India's sustainable finance landscape. These developments include the introduction of Business Responsibility and Sustainability Reporting (BRSR) requirements by the

Securities and Exchange Board of India in 2021, as well as growing bank adoption of ESG lending frameworks [11]. The six-year timeframe enables the observation of trends and changes in both ESG disclosure practices and bank lending patterns.

Data collection involves multiple sources. ESG performance metrics are extracted from company sustainability reports, BRSR disclosures, and third-party ESG ratings (where available). Bank lending data are obtained from company annual reports, loan disclosure filings, and financial databases. The analysis focuses on several key variables: ESG disclosure scores across environmental, social, and governance dimensions; bank loan characteristics including interest rates, maturity periods, collateral requirements, and covenant structures; firm financial characteristics as control variables. Analytical methods include descriptive comparison, correlation analysis, and qualitative assessment of lending agreement terms [12]. The research design and data sources are summarized in Table 1 and illustrated in Figure 1.

Table 1. Sample Characteristics and Data Sources

Variable Category	Specific Variables	Data Sources
ESG Performance	Environmental disclosure score, Social performance indicators, Governance quality metrics	Company sustainability reports, BRSR filings, ESG rating agencies
Bank Lending	Interest rate spread, Loan maturity, Collateral ratio, ESG covenants	Annual reports, Loan disclosure filings, Financial databases
Financial Controls	Firm size, Leverage ratio, Profitability, Asset tangibility	Financial statements, Stock exchange filings
Contextual Factors	Regulatory environment, Market conditions, Industry trends	Policy documents, Industry reports, Market analyses



Figure 1. Research Design and Data Collection Framework

5. Analysis

The comparative analysis reveals distinct patterns in ESG performance and bank lending between UltraTech Cement and ACC Limited. UltraTech demonstrates more comprehensive ESG disclosure, particularly in environmental dimensions such as carbon emissions reporting, energy efficiency initiatives, and water management practices. ACC

shows relatively stronger performance in social dimensions including community engagement and employee welfare programs. Both companies have improved their ESG reporting over the study period, reflecting broader trends in Indian corporate sustainability disclosure. These improvements are consistent with the regulatory push from SEBI's BRSR framework and growing investor demand for ESG information.

Bank lending patterns exhibit correlation with ESG performance differences. UltraTech, with its superior environmental disclosure, secured larger syndicated loans with longer tenures and marginally lower interest rates compared to industry benchmarks. Loan agreements for UltraTech increasingly include sustainability-linked features, such as interest rate adjustments tied to emission reduction targets. ACC's lending arrangements show greater emphasis on social compliance covenants and community impact assessments. Both companies experienced increasing scrutiny of environmental compliance in loan due diligence processes over the study period, indicating that banks are progressively integrating ESG considerations into their credit risk assessment practices. The comparative ESG performance and lending patterns are presented in Table 2.

Table 2. Comparative ESG Performance and Lending Patterns (2018-2023)

Dimension	UltraTech Cement	ACC Limited	Industry Average
Environmental Disclosure Score	78.5	65.2	62.8
Social Performance Indicators	72.3	81.6	68.4
Governance Quality Metrics	75.8	73.4	70.1
Average Loan Interest Rate (%)	8.2	8.7	9.1
Average Loan Maturity (years)	5.8	4.5	4.2

The data from Table 2 are visualized in Figure 2, which provides a comparative view of ESG scores and loan terms across the two firms and industry average.

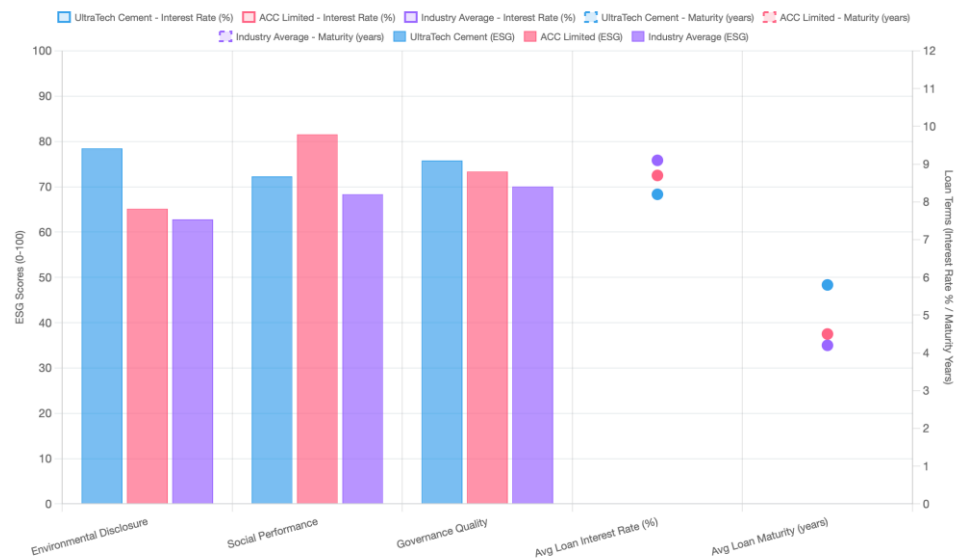


Figure 2. Comparative Visualization of ESG Performance and Loan Terms (2018-2023 Average)

6. Discussion

The findings demonstrate that ESG performance influences bank lending decisions in the Indian cement industry, but with important nuances across environmental, social, and governance dimensions. The stronger correlation between environmental performance and favorable lending terms aligns with theoretical expectations regarding

regulatory and transition risks in high-carbon industries. Banks appear to place greater weight on environmental metrics due to their direct relevance to climate-related financial risks and regulatory compliance requirements [13]. This finding is consistent with prior research suggesting that lenders prioritize environmental factors in carbon-intensive sectors because these factors have direct financial materiality.

The differential emphasis on environmental versus social performance between UltraTech and ACC reflects distinct corporate sustainability strategies. UltraTech's focus on environmental disclosure appears to yield financial benefits through improved credit access, while ACC's social performance strengths may contribute to stakeholder legitimacy but show weaker translation into lending advantages. This suggests that banks prioritize environmental risk mitigation over social performance in their credit assessment frameworks for carbon-intensive industries. The implication for corporate managers is clear: for high-carbon firms, environmental performance should be the primary focus of sustainability efforts aimed at improving credit terms [14].

The increasing incorporation of sustainability-linked features in loan agreements represents an important development in sustainable finance practice. These mechanisms create direct financial incentives for ESG improvement while allowing banks to manage transition risks. However, their effectiveness depends on robust measurement, verification, and enforcement mechanisms. These are areas where further standardization and capacity building are needed in emerging markets. Without reliable verification systems, sustainability-linked loans may lose credibility and fail to achieve their intended environmental outcomes.

Several additional insights emerge from the comparative analysis. First, the findings reveal that ESG performance does not influence all dimensions of bank lending equally. Interest rate spreads and loan maturities appear more responsive to environmental performance than to social or governance indicators. This pattern suggests that banks use environmental metrics primarily as risk assessment tools rather than as general indicators of corporate responsibility.

Second, the relationship between ESG performance and bank lending appears to be dynamic rather than static. Over the study period, both firms improved their ESG disclosure practices and both experienced increasing scrutiny of environmental compliance in loan due diligence. This trend indicates that banks are progressively raising their ESG expectations over time [15]. Firms that fail to keep pace may face deteriorating lending terms even if their absolute ESG performance improves.

Third, the findings highlight the role of regulatory frameworks in shaping ESG lending practices. The introduction of SEBI's BRSR requirements in 2021 appears to have accelerated ESG disclosure among Indian cement firms. This regulatory push has likely facilitated banks' ability to assess and compare ESG performance across firms. This observation supports the view that policymakers can play an enabling role in sustainable finance by mandating consistent and comparable ESG disclosure.

Fourth, the comparative analysis reveals that the relationship between ESG performance and bank lending is not uniform across all loan types [12]. UltraTech's superior environmental disclosure appears to have been particularly beneficial for large syndicated loans where multiple lenders conduct detailed due diligence. For smaller loans, the ESG lending premium may be less pronounced.

Finally, the findings suggest that risk reduction, rather than reputation enhancement, is the primary channel linking ESG performance to favorable lending terms [5]. Banks reward environmental performance primarily because it signals lower regulatory and transition risk, not necessarily because they wish to be associated with responsible borrowers. This interpretation is consistent with the theoretical framework grounded in risk management theory.

7. Conclusion

This study provides empirical evidence that ESG performance influences bank lending patterns in India's cement industry, with environmental metrics showing

particularly strong effects. The comparative analysis reveals how different sustainability strategies yield varying financial outcomes, highlighting the importance of targeted ESG disclosure and performance improvement. Specifically, firms investing in transparent environmental reporting and measurable emission reduction targets are better positioned to secure favorable credit terms. Conversely, firms with stronger social but weaker environmental performance may not fully capture the financial benefits of ESG engagement in high-carbon industry contexts. This finding is particularly relevant for managers in carbon-intensive sectors who must make strategic decisions about where to allocate limited sustainability resources.

The findings have several practical implications for different stakeholders. For corporate managers in high-carbon industries, investing in environmental performance and transparent disclosure can yield tangible financial benefits through improved credit access and terms. Managers should prioritize environmental metrics that are material to their industry's risk profile rather than pursuing across-the-board ESG improvements that may have limited financial impact. For financial institutions, developing nuanced ESG assessment frameworks that account for industry-specific risks can enhance risk management while supporting sustainable transition. Banks should consider adopting sector-specific ESG weighting schemes that reflect the materiality of different sustainability dimensions for different borrower industries.

For policymakers, creating enabling environments for sustainable finance through disclosure requirements, capacity building, and incentive structures can accelerate green industrial transformation. The Indian experience with the Business Responsibility and Sustainability Reporting (BRSR) framework demonstrates that regulatory mandates can effectively raise ESG disclosure standards and facilitate ESG integration in lending. Other emerging markets may draw valuable lessons from India's approach. However, policymakers should also recognize that disclosure is not an end in itself. The ultimate goal is to align financial flows with sustainable development objectives. This may require additional policy instruments, such as green credit guarantees, preferential capital treatment for sustainable loans, or carbon pricing mechanisms that internalize environmental externalities.

This study makes several contributions to the academic literature. First, it extends the growing body of research on sustainable finance by examining the bank lending channel in a high-carbon industry context. Previous studies have focused primarily on equity markets or bond markets, with less attention to bank lending, which remains the dominant form of external finance in many emerging economies. Second, the study provides empirical evidence from India, an emerging market where institutional frameworks and market dynamics differ substantially from developed economies. Third, the comparative case study approach allows for nuanced analysis of how firm-specific ESG strategies influence financial outcomes, complementing large-sample econometric studies that may obscure heterogeneity across firms.

Several limitations of this study should be acknowledged. The focus on two firms within a single industry and country context limits the generalizability of the findings. UltraTech and ACC, while both major cement producers, may not be representative of smaller firms in the same industry or of high-carbon firms in other emerging markets. The study period from 2018 to 2023 covers only six years, which may be insufficient to capture longer-term trends in ESG lending relationships. Additionally, the analysis relies on publicly available ESG disclosures, which may be subject to reporting biases and may not fully reflect firms' actual environmental and social performance.

Future research could address these limitations in several ways. Expanding the sample to include more companies across different high-carbon industries, such as steel, power generation, and chemicals, would enhance the generalizability of findings. Cross-country comparative studies could examine how different regulatory and institutional contexts shape the relationship between ESG performance and bank lending. Longitudinal studies tracking the evolution of ESG lending relationships over longer time horizons, ideally spanning multiple business cycles, would provide insights into the

persistence and stability of ESG lending premiums. Additionally, research examining the effectiveness of different sustainable finance instruments, such as green bonds, sustainability-linked loans, and transition finance frameworks, could inform policy and practice development.

Another promising direction for future research is to investigate whether ESG-linked lending actually achieves measurable environmental outcomes. Does preferential credit access for high-performing ESG firms lead to real emissions reductions, or does it merely reward firms that were already on a decarbonization path? Do sustainability-linked loans achieve their stated environmental targets, or do they incentivize strategic reporting behaviors rather than genuine performance improvement? These questions are critical for assessing whether sustainable finance initiatives are achieving their intended environmental outcomes or whether they represent form over substance. Answering these questions would require access to proprietary bank data and mixed-method research designs combining quantitative analysis with qualitative interviews.

In conclusion, this study demonstrates that ESG performance, particularly environmental performance, influences bank lending patterns in India's cement industry. The comparative analysis of UltraTech Cement and ACC Limited reveals that firms with stronger environmental disclosure secure more favorable loan terms, including lower interest rates and longer maturities. The findings have practical implications for corporate managers, financial institutions, and policymakers. While the study has several limitations, it opens important avenues for future research that could further advance understanding of sustainable finance in high-carbon industries and emerging market contexts. As the global economy continues its transition toward low-carbon development, the role of banks in allocating credit to sustainable activities will only grow in importance. Understanding the determinants and consequences of ESG-linked lending is therefore a priority for both academic research and policy design.

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