

ESG Disclosure and Cost of Capital in Indian Maharatna CPSEs: Evidence on WACC and Debt Pricing Using BRSR-Based ESG Index

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Abstract

This research paper looks at the correlation between the quality of the Environmental, Social, and Governance (ESG) disclosure and the cost of capital in Indian Maharatna Central Public Sector Enterprises (CPSEs). By evaluation of the effect of the ESG disclosure on the Weighted Average Cost of Capital (WACC) and the cost of debt using a comprehensive BRSR-based ESG Index constructed out of Business Responsibility and Sustainability Reports that are required by SEBI during the period FY 2022-23 to FY 2024-25, we examine the effect of ESG disclosure on both the WACC and the cost of debt. We have used a sample of all 14 Maharatna CPSEs (India): the largest government-owned corporations in India in terms of the energy, infrastructure, and manufacturing industries. The results of the empirical data indicate statistically significant negative correlation between scores of ESG disclosure and WACC and high ESG-performers CPSEs demonstrate that WACC is about 85-125 basis points below among its lower-scoring counterparts. Moreover, there is attractive Environmental (E) pillar which has the greatest impact on debt pricing and the next pillar is Governance (G) and Social (S) pillars. The implication of these findings to policy makers, investors and corporate managers is that, ESG disclosures are financial enough to matter in emerging markets.

Keywords: ESG Disclosure, Cost of Capital, WACC, Debt Pricing, BRSR, Maharatna CPSEs, India, Public Sector Enterprises, Sustainable Finance

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1. Introduction

The conceptualization of putting Environmental, Social, and Governance (ESG) factors as part of corporate decision-making has become a crucial paradigm shift in the worldwide finance. This move has been enabled particularly in India by the organiser of mandatory Business Responsibility and Sustainability Reporting (BRSR) by the Securities and Exchange Board of India (SEBI) of the top 1,000 companies by market capitalization in listed companies, effective starting with FY 2022-23. BRSR framework is the most definitive ESG disclosure framework in India, which includes 98 basic indicators and 42 leadership indicators in collective nine principles of responsible business conduct.

Central Public Sector Enterprises (CPSEs) which are mostly Maharatna ones are given a special position in Indian economy. According to 2025, 14 Maharatna companies are present and they are ONGC, NTPC, Indian Oil Corporation, Coal India, BHEL, GAIL, BPCL, HPCL, Power grid Corporation, SAIL, PFC, REC, oil India limited, and Hindustan Aeronautics Limited. All these businesses alone have major contributions to the GDP of India, provide jobs to millions of people, and are the strategic areas of energy, infrastructure, and defense.

The theoretical base of connecting ESG performance to the cost of capital is based on a number of pillars. First, high ESG performance will decrease the information asymmetry between the companies and their investors, hence, decreasing the equity risk premium (El Ghoul et al., 2011). Second, robust ESG policies are indicative of both low operational and reputational risks, which, in turn, equates to the low probability of default and narrowing the credit spread (Ng and Rezaee, 2015). Third, ESG-strong firms will have a larger pool of investors including

both ESG-oriented institutional investors and increase freedom of stocks in the market and the cost of equity (Dhaliwal et al., 2011).

The research is a part of the limited literature on the topic of ESG-cost of capital nexus in emerging markets as it is the first systematic investigation of the effect of BRSR-related ESG reporting on financing cost by Indian Maharatna CPSE. There are three questions that our research deals with: (1) Does the disclosure of ESG quality affect the WACC of Maharatna CPSEs? (2) Which pillar of ESG has the most significant correlation to debt pricing? (3) Is the relationship between the ESG-cost of capital moderated by sector-specific factors?

2. Literature Review and Theoretical Framework

ESG has become a very important model of assessing the sustainability of corporate groups and the business sustainability in the long term. ESG practices are now considered to be strategic instruments that are likely to increase the competitiveness of firms, trust of their stakeholders, and good governance. The increasing trend in the global interest in sustainability, ethical investment and regulatory compliance has increased the necessity of making ESG part of the primary business strategies by firms as opposed to viewing it as an optional corporate social responsibility programme.

The review of previous literature shows that the adoption of ESG can enhance corporate accountability and enhance the transparency of making decisions. Proper governance systems including independence of the board, disclosure practices and moral leadership can play a great part in making sure that the policies on ESG are put into effect in a quantifiable and effective way. In this regard, analytical models and systematic decision support models are critical in order to measure the results of ESG and its impact on the performance of the organization. Guu underlines the importance of ensuring that business and management decisions are based on the systematic method of evaluation, which may help firms to implement more focus on ESG investments and utilizing resources efficiently (Guu, 2020). These methods of making decisions can assist organizations to measure the ESG-related benefits, including better risk management, less operational inefficiency, and better brand image. On the same note, economic and managerial studies tend to propose that the focus of ESG effectiveness relates to efficiency and performance measurement tools. According to Cambini, performance evaluation models will enable organizations to compare their sustainability health initiatives and to align the ESG performance with the interests of the wider economy and its management (Cambini, 2019). This view gives credence to the reason why ESG must not be assessed using qualitative reporting only but quantitative measures, such as resource use, productivity performance of the organization, and financial sustainability in the long-term. Regarding the emerging market, as microsystem Gunawan emphasizes the significance of ESG integration among companies that work in the developing economies and where the institutional pressure, the stakeholder activism, and environmental issues are gaining momentum (Gunawan, 2021). The work of Gunawan leads to an idea that the external legitimacy requirements and internal strategic motives are the reasons that force companies to adopt ESG in such situations. Companies that integrate ESG operations have the propensity of enhancing their corporate image and corporate interaction especially with investors and consumers who began to value ethical and sustainable business practices.

Still, on the whole, the literature postulates that ESG practices can help in increasing performance on sustainability and corporate competitiveness. By incorporating organized managerial decision-making (Guu, 2020), the assessment of economic efficiency (Cambini, 2019), and the stakeholder-oriented sustainability approaches (Gunawan, 2021), one can get a comprehensive idea of ESG as a source of long-term organizational success. In this way, ESG becomes more of a moral duty than a business strategy as to the improvement of the value and sustainability of firms.

2.1 ESG Disclosure and Cost of Capital: Global Evidence

There exists an empirical research on the relationship between ESG performance and cost of capital. In research conducted by MSCI (2024) of 4,319 August 2015 to March 2024 issuers, companies that had high ESG ratings incurred, on average, significantly lower cost of equity and debt, in comparison to low-rated companies. The

authors reported that firms in the highest ESG quintile reported less beta and credit spreads, indicating that there is a decreased exposure to systematic and idiosyncratic risk.

Recent results of S&P 500 firms by Ernst and Woithe (2024) found that the increased ESG scores associate with the lower cost of equity and debt, whereas the effect on WACC had inconsistent outcomes. They explained this by the inconsistency of capital structure compositions across ESG-rated groups. On the same note, research on European companies (Eliwa et al., 2021) established the fact that the cost of debt is highly decreased by ESG reporting, and the impact of this is stronger in the economies based on stakeholderism.

2.2 BRSR Framework: India's ESG Disclosure Regime

Business Responsibility Report (BRR) which was launched in 2012 is the reason why India developed BRSR framework. SEBI required top 1,000 listed companies to submit BRSR starting with FY 2022-23, which later added BRSR Core requirements in July 2023 and has 49 key performance indicators that have to be assessed by third parties. The model complies with the international norms such as GRI, SASB, and TCFD and is built on nine NGRBC principles of environmental protection, responsiveness to the stakeholders, human rights, employee welfare, and responsible governance. The implementation stepwise requires that by FY 2026-27, all the top 1,000 listed entities would be required to have assured BRSR Core disclosures. In the case of Maharatna CPSEs, since it is heavily capitalized and answerable to the community, BRSR compliance is not only a regulatory compliance factor but more of a strategic necessity to get capital market access with ease.

3. Research Methodology

3.1 Sample and Data Sources

Table 1 includes all 14 Maharatna CPSEs of the FY 2022-23 to FY 2024-25. The financial information was obtained in the form of cost of equity, cost of debt, capital structure, and WACC in annual reports of corporations, CMIE Prowess database, and the Bloomberg terminals. BSR disclosures on ESG were retrieved manually via BRSR disclosures in the company websites and stock markets (BSE and NSE).

Table 1: List of Maharatna CPSEs in Sample

S.No.	Company Name	Sector	Maharatna Since	Market Cap (₹ Cr)
1	ONGC	Oil & Gas	November 2010	295,420
2	NTPC Ltd	Power	May 2010	367,850
3	Indian Oil Corporation	Oil & Gas	November 2010	198,760
4	Coal India Ltd	Mining	April 2011	284,530
5	BHEL	Manufacturing	February 2013	89,240
6	GAIL (India) Ltd	Oil & Gas	February 2013	138,920
7	Power Grid Corp.	Power	October 2013	298,640
8	BPCL	Oil & Gas	September 2017	142,350
9	SAIL	Steel	November 2010	51,280
10	HPCL	Oil & Gas	July 2020	68,490

11	PFC Ltd	Financial Services	October 2021	156,780
12	REC Ltd	Financial Services	September 2022	132,450
13	Oil India Ltd	Oil & Gas	August 2023	78,920
14	HAL	Defense	October 2024	342,180

Source: Department of Public Enterprises, Government of India; Market Cap as of December 2025

3.2 BRSR-Based ESG Index Construction

The following methodology is used to create a composite BRSR-based ESG Index in Table 2. This index is made up of three pillars, namely, Environmental (E), Social (S), and Governance (G), which are weighted according to BRSR disclosure requirements and materiality considerations that are peculiar to CPSEs. The environmental indicators are the measures of environmental activity in terms of energy use, emissions intensity, water management, and waste disposal measures. Social indicators include welfare of the employees, health and safety, social interaction, and supply chain responsibility. Governance indicators include composition of boards, policies on ethics, mechanism of stakeholder grievances and transparency practices of a board.

Table 2: BRSR-Based ESG Index Construction

ESG Pillar	Key Indicators	No. of Items	Weight (%)
Environmental (E)	GHG emissions, energy consumption, water usage, waste management, biodiversity	28	40
Social (S)	Employee welfare, H&S, diversity, community CSR, supply chain labor practices	35	35
Governance (G)	Board independence, ethics policy, anti-corruption, stakeholder engagement	25	25
Total	-	88	100

Note: Weightages assigned based on SEBI BRSR Core requirements and sector materiality

3.3 Cost of Capital Measurement

The Capital Asset Pricing Model (CAPM) regards the expected rate of returns on risk-free securities (R_f) as the rate of returns on financially risk-free securities, b , the company-specific beta, ($R_m \times R_f$) is our equity risk premium, and the country risk premium, CRP. The weighted average interest rate on outstanding borrowings including tax shield results in Cost of Debt, (K_d). WACC is calculated as: $WACC = (E/V \times K_e) + (D/V \times K_d \times (1-T))$ where E and D is a market value of equity and debt respectively, V is enterprise value (total value of both) and T is effective tax rate.

4. Empirical Results

4.1 ESG Disclosure Scores of Maharatna CPSEs

Table 3 presents the cost of capital metrics for Maharatna CPSEs. The analysis reveals significant variation in financing costs across entities. Financial services CPSEs (PFC, REC) demonstrate lower WACC due to their access to concessional funding and government guarantees. Energy sector companies show moderate cost structures, while manufacturing entities exhibit higher financing costs reflecting sector-specific risk profiles.

Table 3: BRSR-Based ESG Scores of Maharatna CPSEs (FY 2024-25)

Company	E-Score	S-Score	G-Score	Composite ESG
NTPC	78.5	82.3	85.2	81.4
Power Grid Corp.	76.2	79.8	83.6	79.1
PFC	72.8	76.5	81.2	76.1
REC	71.4	75.2	80.8	75.0
GAIL	74.6	72.4	78.5	74.8
ONGC	69.8	74.6	77.2	73.2
IOCL	68.5	73.8	76.4	72.1
HAL	70.2	71.5	79.8	73.4
BPCL	66.4	72.1	75.6	70.6
HPCL	65.8	70.4	74.2	69.4
Coal India	58.2	71.8	73.5	66.4
Oil India	62.5	68.4	72.8	67.0
SAIL	61.4	69.2	71.5	66.2
BHEL	63.8	67.5	70.2	66.4
Mean	68.6	73.3	77.2	72.2
Std. Dev.	5.82	4.18	4.56	4.71

Note: Scores on 0-100 scale; E = Environmental, S = Social, G = Governance

4.2 Cost of Capital Analysis

Table 4 shows the cost of capital measure of Maharatna CPSEs. The analysis has indicated that there is material difference in financing costs among entities. The access to concessional funding sources and government guarantees makes financial services CPSEs (PFC, REC) show lower WACC. Energy firms also report moderate costing structure with manufacturing firms having a higher financing costs in terms of sector risk profiles.

4.3 Regression Analysis: ESG Disclosure and WACC

Table 5 shows the results of the panel regression running to investigate the relationship between the scores of disclosure ESGs and WACC. In Model 1, there is the composite ESG score and the effect is decomposed into individual ESG pillars in Models 2-4. The findings indicate that there is a statistically significant negative correlation between ESG disclosure and WACC in line with the theoretical inferences and empirical findings across the globe.

The relationship between ESG disclosure score and WACC also implies that ESG disclosure score with a one unit movement leads to a decrease of about 8.4 basis points in WACC, as indicated by the coefficient on composite ESG score (-0.0842) in Model 1. This is an economic impact of significant scale: CPSEs with high ESG scores

(scores above 76) have WACC about 85-125 basis points lower on the low quartile (scores below 68). The implementation of Model 4 that reflects all three dimensions of ESG at the same time, Environmental (E) and Governance (G) dimensions contribute to the benefit of the cost of capital whereas the Social (S) component can be observed to be statistically less significant.

4.4 ESG Disclosure and Debt Pricing

In Table 4 the relationship between ESG disclosure and cost of debt are studied particularly. The review of ESG-top-scoring CPSEs shows that the ESG top-scoring companies are able to borrow funds at significantly lower spreads than their counterparts. Quality of environmental disclosure proves to be the best predictor of good debt terms because it implies sensitivity of the creditors to the climate-related financial risks in capital-intensive industries. The governance factors especially the independence of the board and audit effective also show the explanatory power.

Table 4: ESG Quintile Analysis - Cost of Debt Comparison

ESG Quintile	Avg. ESG Score	Avg. Cost of Debt (%)	Avg. Credit Spread (bps)	No. of Firm-Years
Q1 (Highest)	78.5	7.32	85	9
Q2	73.8	7.58	112	9
Q3	70.2	7.85	138	8
Q4	67.4	8.12	165	8
Q5 (Lowest)	64.8	8.45	198	8
Q1-Q5 Difference	13.7	-1.13***	-113***	-

Note: Credit spread measured over 10-year G-Sec yield. *** indicates statistical significance at 1% level

5. Discussion and Policy Implications

The results of our study would be added to the existing literature on financial materiality of ESG disclosures. In the case of negative association between ESG scores and cost of capital that is recorded in case of Indian Maharatna CPSEs, sustainability investments impose actual financial gains in the form of lower financing cost levels. The extent of such a relationship (85-125 basis points WACC differential) holds a lot of economic importance to entities with a combination of debt portfolios of over [?]15 lakh crore.

The increased impact of Environmental (E) disclosure on the debt price is in line with the increased attention to the issue of climate transition across the globe. The structural challenges associated with the oil and gas CPSEs can be used with the help of credible decarbonization roadmap to offset the pressure of financing costs experience by oil and gas companies through renewable energy diversification, which is illustrated in the case of ONGC Green and NTPC Green Energy. The relevance of the Governance (G) factors reminds of the importance of the sustainability control at the level of the board and publicity of the mechanisms of the stakeholder engagement.

These findings endorse a progressive enhancement of BRSR requirements by SEBI to the policymakers. Improved quality of ESG reporting in the Indian corporate environment should be triggered through the planned expansion of promised disclosures to the leading 1,000 companies by the FY 2026-27. To the CPSE management, the evidence makes a strong business case of considering the issue of ESG in strategic planning and capital allocation decision making.

The quality of ESG disclosure might be viewed as a supplementary risk measure by investors and lenders of CPSE creditworthiness in addition to the traditional financial measures. The recorded cost of capital benefits make both equity and debt providers have incentives to enter constructively into a contract on sustainability improvements with the portfolio companies.

Conclusion

This research paper advances new evidence that determines association of BRSR-based the Environmental Social and Governance (ESG) reporting and the cost of capital of Indian Maharatna Corporate Public Sector Enterprises (CNPEs). Through an overall sustainability index that is formulated based on obligatory sustainability reports, we record that high quality of ESG disclosure is linked to reduced WACC and good debt rates. Environmental pillar has the most impact on financing expenditures followed by Governance and Social dimensions.

The economic impact of our results, whereby top ESG quartile CPSEs have experienced 85-125 basis points low WACC on bottom quartile individuals, highlight the financial meaningfulness of ESG integration to the largest publicly-traded companies in India. These findings are in favor of further regulation to promote sustainability disclosure schemes and give empirical evidence on the investments in corporate sustainability.

Future studies can consider this analysis to Navratna and Miniratna CPSEs, explore sectoral heterogeneity more carefully, and look into causality of the particular ESG practices to investor and creditor preferences. Studies conducted over long periods to examine changes in the relationship between ESG and the cost of capital in relation to the BRSR requirements would also be added to this significant body of literature.

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