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Green Finance and ESG Ratings
Their Impact on Investor Confidence, Asset Valuation, and Sustainable Investment Decisions in Emerging Economies

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Abstract: *ESG rating disagreement and green washing risk do not merely weaken the ESG–valuation link in emerging markets — under high disagreement, high green washing risk, and weak institutional quality, they can jointly reverse its sign, so higher reported ESG scores become associated with a higher, not lower, cost of capital.*

This is formalized as a dual-moderation, sign-switching model nested within a triple-interaction institutional-contingency framework, where institutional quality (disclosure-assurance strength) governs whether the sign-switching regime is reached at all. The question shifts from "are ESG effects weaker here?" to "under what institutional conditions does the ESG signal invert?"

The design proposes a quantitative panel centred on India, exploiting the staggered, market-cap-tiered rollout of SEBI's BRSR Core assurance mandate as a quasi-experiment, with other emerging markets used only for external-validity checks, via staggered-adoption-robust difference-in-differences and triple-interaction models. Identification threats — reverse causality, endogenous selection, ESG measurement error, and BRSR Core's bundled-policy nature — are addressed explicitly, and feasibility is shown via a literature-derived benchmark table and sample-power discussion rather than asserted. Findings would inform how SEBI, the RBI, and comparable regulators calibrate disclosure-assurance regimes, and how investors and issuers price ESG credibility rather than ESG level alone.

Keywords: *green finance, ESG ratings, sign-switching, green washing, institutional quality, cost of capital, emerging markets, asset valuation.*

1. INTRODUCTION

1.1 Background

Green finance is now a mainstream capital-markets pillar: emerging-market GSSS bond issuance grew roughly six fold since 2018, to about US$800 billion by 2024 — still only ~2.2% of global fixed-income issuance (IFC & Amundi, 2025). ESG ratings are the main intermediary translating this activity into investment decisions, yet cross-provider ESG correlations range only 0.38–0.71, versus 0.99 for credit ratings (Berg et al., 2022).

Regulators are responding unevenly: India's SEBI introduced BRSR Core in July 2023, mandating third-party assurance for the top 250 listed firms from FY 2024–25, extending value-chain disclosure through FY 2025–26, alongside a separate anti-green washing circular for labelled green debt. This mix of rapid growth, persistent rating disagreement, and uneven regulatory maturity is the paper's empirical starting point.

1.2 Research Gap and Problem Statement

- Gap 1: ESG–cost-of-capital and ESG–confidence evidence is concentrated in developed markets and China; India, Southeast Asia, Latin America, and Africa evidence remains sparse.
- Gap 2: rating disagreement and green washing are usually modelled as separate, additive attenuators of an otherwise-positive ESG effect, not as forces that could jointly flip its sign.
- Gap 3: rating disagreement's documented costs (reduced loan availability, more green washing, complicated cost-of-equity effects) come almost entirely from Chinese samples, leaving other markets untested.

In short: green finance and ESG ratings are expanding in institutional settings whose thinness has not been formally modelled as capable of inverting — rather than merely dampening — their intended effect on investor confidence and asset valuation.

1.3 Positioning, Contribution, and Scope

- Theoretical contribution: the dual-moderation sign-switching model (Section 4), nested in an institutional-quality triple interaction — positioned against Berg et al. (2022), Avramov et al. (2022), and Dang et al. (2024).
- Design contribution: a fully specified, India-centred panel and staggered difference-in-differences strategy built around BRSR Core, including an original Green washing Risk Index (Section 5/6.4).
- Policy contribution: translating the model into implications for SEBI and the RBI (Section 8).

Explicitly out of scope: new firm-level regression estimates (the benchmark table is a feasibility calibration, not primary estimation); direct tests of individual-investor behavioural mechanisms (deferred to Section 10); and treating BRSR Core as a clean, single-purpose assurance shock (addressed in Sections 6 and 9)

2. LITERATURE REVIEW

Six themes anchor the sign-switching claim; tangential literature is excluded to keep the review focused.

ESG rating disagreement

Berg et al. (2022) show ESG divergence (0.38–0.71 correlations) stems from differing measurement, scope, and weighting choices, not differing fundamentals — the foundational fact this paper builds on. Avramov et al. (2022) treat rating uncertainty as a priced risk factor that attenuates the ESG–return relationship; this paper extends that by proposing disagreement plus green washing risk can invert it. In China, disagreement is linked to reduced bank loan availability (Qin & Wang, 2025) and, via a fraud-triangle lens, to more green washing through financing constraints, information asymmetry, and managerial myopia (Hu et al., 2023) — mechanisms the Green washing Risk Index is built to capture.

ESG disclosure and the cost of capital

Dang et al. (2024), using a 62-country DiD design, find mandatory ESG disclosure cuts the cost of equity by ~50 basis points via better information and more ESG-conscious institutional ownership — the benchmark this paper's power calculation uses. Emerging-market firm-level evidence is mixed: governance/ESG scores lower the cost of capital in finance but not robustly outside it (Mohammad et al., 2023), and disclosure's benefit is undermined when paired with real earnings management (Amarna et al., 2024) — evidence that disclosure quantity and credibility are separable, which the sign-switching model formalizes.

Green washing

Green washing and carbon-emission behaviour interact with ESG performance in ways that complicate a simple "higher ESG, lower risk" reading (Treepongkaruna et al., 2024), supporting treating greenwashing risk as a first-class moderator.

Green bonds

The sovereign green bond "greenium" is small in advanced economies (≈2 bps) but roughly three times larger in emerging markets (≈13 bps), growing further with salient climate-transition risk and for lower-rated issuers — consistent with signalling being more valuable where disclosure is weaker. Chinese firm-level evidence, however, suggests issuance is often driven by cheaper financing rather than genuine performance gains, raising the adverse-selection concern the identification strategy addresses.

Institutional and regulatory context

BRSR Core, the RBI's Green Deposits Framework and draft Climate Risk Disclosure Framework, and SEBI's green washing circular together provide the staggered assurance-intensity variation the identification strategy exploits.

Note on evidence quality: causal/quantitative claims draw on peer-reviewed and SSRN sources; institutional/regulatory sources (IFC-Amundi, SEBI/RBI summaries) are used only for descriptive facts, not causal inference.

3. THEORETICAL FRAMEWORK

Four lenses underpin the model directly; a fifth is noted for completeness.

- Signalling Theory — ESG ratings and green-bond labels are meant to be costly, hard-to-fake quality signals under information asymmetry. Implication: the ESG–valuation link weakens, and can reverse, as disagreement erodes signal clarity (H5, H6).
- Information Asymmetry Theory — links disagreement and green washing: investors rely on ratings as an imperfect substitute for unobservable performance. Implication: bid-ask spreads should widen as cross-provider disagreement rises.
- Agency Theory — explains persistent green washing under mandatory disclosure when managerial incentives (e.g., ESG-linked pay) diverge from investors' and monitoring is weak. Implication: firms with ESG-linked pay and weak assurance show a larger disclosure-performance gap.
- Legitimacy Theory — motivates disclosure even absent a proven cost-of-capital benefit, and grounds the institutional-quality moderator; disclosure quality should jump discontinuously around a mandatory assurance regime's effective date.
- Asset Pricing Theory (briefly) — if ESG proxies for previously unpriced risk, higher ESG scores should mean a lower required return, all else equal — the conventional baseline (H1, H2) against which sign-switching (H6) is tested.

4. CONCEPTUAL FRAMEWORK AND MODEL

4.1 The Dual-Moderation, Sign-Switching Model

Departing from a "moderators weaken the main effect" specification: ESG Rating Disagreement and Green washing Risk are joint determinants of the ESG–valuation relationship's sign, not independent additive attenuators. The logic is adverse selection — when disagreement is high (noisy signal) and green washing risk is high (a high score likely reflects opportunism), sophisticated investors may read a high ESG score as a red flag. The ESG coefficient is therefore conditional on both moderators jointly, and can switch from negative (conventional finding) to positive (higher ESG, higher cost of capital) once both cross an identifiable threshold.

4.2 Institutional Quality as the Higher-Order (Triple-Interaction) Moderator

Whether the sign-switching regime is reached is itself governed by institutional quality — disclosure-assurance infrastructure, enforcement capacity, rating-agency oversight. As institutional quality rises, the joint moderating power of disagreement and green washing should shrink, so sign-switching becomes rare or disappears in high-quality settings (consistent with the small, stable, negative greenium in advanced economies) while remaining live in institutionally thin emerging markets. This reframes the claim from "weaker effect here" to "the effect can invert here, and institutional quality decides whether it does."

4.3 Conceptual Model and Construct Table

The conceptual DAG (Figure 1 in the source paper) shows direct paths from ESG Score and Green Bond Issuance to Investor Confidence and Asset Valuation/Cost of Capital; a joint dual-moderation path from ESG Rating Disagreement and Green washing Risk into a regime-switch node conditioning the sign of the ESG–valuation relationship; a triple-interaction path where Institutional Quality governs that regime; and a parallel, market-level Sentiment path that amplifies short-run volatility without being the primary driver.

Construct role	Construct	Theoretical grounding	Hypothesized relationship
Independent	ESG Score (composite, E, S, G)	Signalling, Asset Pricing	Conditional sign → confidence, valuation (H1, H2, H6)
Independent	Green Bond Issuance	Signalling	Negative → cost of debt, net of adverse selection (H3)
Joint moderator	ESG Rating Disagreement	Information Asymmetry	Jointly with GRI: attenuates/reverses sign (H5, H6)
Joint moderator	Green washing Risk (GRI)	Agency, Legitimacy	Jointly with disagreement: attenuates/reverses sign (H4, H6)
Higher-order moderator	Institutional Quality	Legitimacy	Attenuates joint moderation as quality rises (H7)
Parallel driver (not primary)	Market Sentiment	—	Amplifies short-run volatility
Dependent	Investor Confidence / Valuation / Cost of Capital	Asset Pricing, Signalling	—

Table 1. Conceptual Framework — Construct Relationships

4.4 Core Regression Specifications

Equation 1 — Dual-moderation (sign-switching), cost of equity:

$$Cost\ of\ Equity(it) = \beta_1 \cdot ESG + \beta_2 \cdot Disagreement + \beta_3 \cdot Green\ washing + \beta_4 \cdot (ESG \times Disagreement) + \beta_5 \cdot (ESG \times Green\ washing) + \beta_6 \cdot (ESG \times Disagreement \times Green\ washing) + controls + firm/year\ fixed\ effects + \varepsilon.$$

β_1 is the baseline ESG effect (expected negative, H2); β_4 and β_5 are pairwise attenuation (H4, H5); β_6 is the central coefficient — positive and significant means the total marginal effect of ESG can turn positive at high joint moderator levels, the formal sign-switching hypothesis (H6).

Equation 2 — Institutional-quality triple interaction:

$$Cost\ of\ Equity(it) = \beta_1 \cdot ESG + \beta_2 \cdot (ESG \times Disagreement) + \beta_3 \cdot (ESG \times Disagreement \times InstitutionalQuality) + controls + firm/year\ fixed\ effects + \varepsilon.$$

A positive β_3 (opposite sign to β_2) indicates rising institutional quality cancels the disagreement-driven distortion (H7). Cost of Debt and (log) Tobin's Q specifications follow the same structure with the dependent variable substituted; Green Bond Issuance enters as an additional regressor in the cost-of-debt specification for H3.

5. HYPOTHESES

- H1 (baseline, confidence): at low disagreement/green washing, higher ESG scores are positively associated with investor confidence.
- H2 (baseline, cost of equity): at low disagreement/green washing, higher ESG scores are associated with a lower cost of equity (β_1 negative), consistent with Dang et al. (2024) and Mohammad et al. (2023).
- H3 (green bonds, net of adverse selection): conditional on matching/IV correction for issuer self-selection, green bond issuance lowers the cost of debt, proportionally more than in developed markets.
- H4 (pair wise interaction, green washing): green washing risk negatively moderates the ESG–confidence relationship.
- H5 (pair wise interaction, disagreement): ESG rating disagreement negatively moderates the ESG–valuation relationship (β_4 negative), consistent with Avramov et al. (2022).
- H6 (central — sign-switching): the triple interaction (β_6) is positive and significant — at high joint moderator levels, higher ESG scores become associated with a higher cost of capital.
- H7 (institutional-quality resolution): institutional quality positively moderates β_3 in Equation 2, opposite in sign to the disagreement interaction, so the H6 regime is progressively attenuated toward zero as institutional quality approaches developed-market levels.

- H8 (cross-market benchmark): the baseline ESG–confidence relationship (H1) is, on average, weaker in emerging-market sub-samples than in developed-market benchmarks — the "conventional attenuation" finding H6/H7 are tested against.

6. RESEARCH DESIGN AND METHODOLOGY

6.1 Philosophy and Design

A positivist, deductive, quantitative longitudinal panel design, with India as the primary institutional laboratory rather than one of several equally weighted countries — prioritizing deep institutional identification over a diffuse multi-country panel. BRSR Core's staggered, market-cap-tiered rollout is a regulator-generated quasi-experiment in assurance intensity that is difficult to replicate elsewhere. China, Brazil, Indonesia, South Africa, and Mexico form an external-validity panel only, testing whether the India-derived model generalizes.

6.2 Data, Variables, and Sample Feasibility

Data sources: firm-level ESG scores from at least two independent providers (e.g., Refinitiv/LSEG and MSCI); financials from filings and Prowess/CMIE; green bond data from Climate Bonds Initiative and IFC-Amundi; controversy data from RepRisk or bundled provider modules; regulatory timing from SEBI/RBI.

- Independent variables: ESG Score (composite, E, S, G); Green Bond Issuance.
- Dependent variables: Investor Confidence (abnormal volume, price stability, analyst forecast dispersion); Tobin's Q; Cost of Equity; Cost of Debt.
- Moderators: ESG Rating Disagreement (cross-provider SD, per Berg et al., 2022); Green washing Risk Index (Section 6.4); Institutional Quality (Assurance Intensity Index combining a firm-year BRSR-assurance indicator with Worldwide Governance Indicators for the external panel).
- Controls: firm size, leverage, profitability, industry, market capitalization.

Feasibility and power: restricting to firms with ≥5 consecutive years of dual-provider ESG coverage is binding — realistically concentrated in the NIFTY 200–500, implying a working target of ~150–250 India firms over 2018–2025 (an assumption to verify, not a confirmed count). Dual-provider coverage in the external panel is most complete among large-cap Chinese firms, so China risks dominating by count unless capped; this is handled via country/country-year fixed effects, a China-exclusion robustness check, and resting H6/H7 on the India sample alone. With ~150–250 India firms over 6–8 years (~900–2,000 firm-years), and using Dang et al.'s ~50-bps benchmark, the design is powered (80% power, 5% significance, firm-clustered) for main effects of similar magnitude, but likely under-powered for the smallest plausible triple-interaction effect (H6, H7) — an honest limitation. Contingency: if dual-provider licensing is prohibitive, disagreement is proxied instead by textual divergence in sustainability-report sentiment and controversy intensity.

6.3 Identification Strategy

- (i) Bundled treatment — BRSR Core combines mandatory assurance with expanded disclosure scope and format changes at once. Tier-based staggering is used as within-regulation variation to partially isolate the assurance component; results are triangulated against RBI's separately timed frameworks and reported as package effects, with the assurance-specific reading flagged as suggestive.
- (ii) Staggered adoption bias — standard two-way fixed-effects DiD is biased by already-treated comparison groups; the design uses heterogeneity-robust staggered-DiD estimators (Callaway–Sant'Anna-type group-time average treatment effects) plus event-study pre-trend checks.
- (iii) Reverse causality / endogenous selection into ESG coverage and green bond issuance — addressed via Heckman-style selection correction (peer-average issuance intensity as an exclusion restriction), event studies around issuance announcements, and propensity-score/entropy-balanced matching.
- (iv) ESG measurement error — addressed using the cross-provider average as the primary regressor, an industry-year-average instrument for the firm's own score, and provider-by-provider robustness checks.

6.4 The Green washing Risk Index (GRI)

Four source-specific indicators standardized and combined via PCA or, preferably, a confirmatory-factor-analysis latent-variable model (with individual components retained for robustness):

- Disclosure–Performance Gap — sentiment/intensity of environmental-commitment language in BRSR/annual-report text (FinBERT-style classifier) scored against Scope 1–2 emissions-intensity change (CDP/BRSR data).
- Emissions-Reporting Discontinuity — anomalous jumps in the same emissions series relative to production/revenue change (a two-SD outlier rule).
- Media/Controversy Incidents — RepRisk-severity-weighted ESG controversy counts, or bundled Refinitiv/MSCI controversy modules.
- Green-Instrument Non-Compliance — post-issuance proceeds-misallocation findings from SEBI enforcement orders under its green-debt circular, supplemented by Climate Bonds Initiative compliance data for the external panel.

Pilot validation runs first on the top 200 NIFTY-listed firms (2022–2025), testing whether high-GRI firms disproportionately face SEBI enforcement, a downward rating/assurance revision, or negative abnormal returns around controversy revelation; only a GRI with demonstrated predictive validity extends to the full sample and external panel.

6.5 Feasibility Benchmark and Ethics

Table 2 synthesizes literature-reported parameters to demonstrate feasibility, not to substitute for primary estimation.

Parameter	Estimate	Source	Evidence type
Cross-provider ESG rating correlation	0.38–0.71 (vs. 0.99, credit ratings)	Berg et al. (2022)	Peer-reviewed
Cost-of-equity effect, mandatory ESG disclosure	≈ −50 bps	Dang et al. (2024)	Peer-reviewed / SSRN
Sovereign greenium, advanced economies	≈ −2 bps	Section 2	Peer-reviewed synthesis
Sovereign greenium, emerging markets	≈ −13 bps (≈3× proportionally)	Section 2	Peer-reviewed synthesis
EM GSSS bond issuance growth, 2018–2024	≈ 6-fold, to ≈US$800bn	IFC & Amundi (2025)	Institutional (context only)

Table 2. Illustrative Benchmark Parameters

As the design uses only secondary, publicly disclosed data, no primary human-subjects collection is involved; the main ethical considerations are data-provenance transparency and full disclosure of data-licensing constraints.

7. EXPECTED RESULTS AND ALTERNATIVE OUTCOMES

All outcomes are hypothesized, not asserted, since no primary estimation has yet been run.

H6 (central — sign-switching): the triple interaction is expected to be positive and significant, indicating the ESG–cost-of-equity relationship inverts at high joint friction levels. Alternative: the coefficient could be significant but too small to flip the total marginal effect within the observed range — attenuation, not full reversal — still a novel but weaker finding, requiring calibrated conclusions.

H7 (central — institutional resolution): institutional quality is expected to attenuate the H6 effect to statistical indistinguishability from zero at developed-market-comparable assurance strength. Alternative: if institutional quality does not moderate the effect, this points to firm-level (not country-level) frictions, redirecting policy implications toward firm-specific assurance requirements.

H1–H5, H8 (briefly): baseline ESG effects on confidence and cost of equity are expected to be directionally consistent with developed-market findings but weaker in magnitude; the green bond "greenium" is expected to survive adverse-selection correction, though it could shrink toward zero if the raw correlation instead reflects issuer self-selection; the pair wise disagreement/green washing interactions are expected to be individually negative and significant, though a null on either would itself be informative about whether emerging-market investors are pricing these frictions at all.

8. PRACTICAL IMPLICATIONS

- Investors: ESG integration should explicitly weight rating disagreement and green washing risk rather than relying on a single composite score — treating high-disagreement, high-green washing-risk ESG scores as a caution signal, not a straightforward positive.
- Regulators: results would support continued tightening of assurance requirements (BRSR Core, RBI's draft Climate Risk Disclosure Framework) and suggest rating-agency methodology transparency — not only issuer-side disclosure — is a necessary complementary lever.
- Companies: the cost-of-capital benefit of ESG investment is conditional on disclosure credibility; firms pursuing symbolic rather than substantive ESG improvement risk forfeiting — or, per H6, reversing — the benefit that motivates ESG investment, particularly where earnings management accompanies disclosure.

9. LIMITATIONS

- The 150–250-firm India feasibility estimate is a plausible but unverified working assumption; thinner actual coverage triggers the single-provider contingency, weakening the direct disagreement test.
- The panel is plausibly under-powered for the smallest version of the central triple-interaction effect (H6, H7); a null result is consistent with either no sign-switching regime or insufficient power, and the design cannot fully distinguish these ex ante.
- BRSR Core is a bundled regulatory package, not a pure assurance shock; any DiD estimate should be read as a package effect, with the assurance-specific channel isolated only suggestively.
- Reliance on secondary disclosure and controversy data means underlying performance cannot be fully verified independent of provider methodology, leaving residual greenwashing risk unmeasured even after GRI construction.
- The external-validity panel is likely China-dominated and faces cross-country data-comparability challenges, which is why central claims rest on India alone.
- As with any observational panel, causal identification remains subject to confounding regulatory or macroeconomic shocks coinciding with disclosure-mandate changes, notwithstanding placebo and pre-trend checks.
- The market-sentiment construct is deliberately limited to a market-level control and cannot support claims about individual-investor psychological mechanisms.

10. FUTURE RESEARCH DIRECTIONS

- A dedicated behavioural-mechanism study using high-frequency trading or mutual-fund flow data around ESG rating-change events in India and one comparator market, to test herding, overconfidence, and sentiment-driven trading directly at the investor level.
- Longitudinal tracking of ESG rating convergence (or its absence) following BRSR Core and comparable assurance mandates, testing directly whether mandatory assurance narrows the 0.38–0.71 rating-correlation problem documented by Berg et al. (2022) — a direct follow-on to the institutional-quality mechanism (H7).

11. CONCLUSION

This paper sharpens the study of green finance and ESG ratings in emerging markets into a specific, falsifiable proposition: ESG rating disagreement and green washing risk do not merely attenuate the ESG–valuation relationship but, under high joint disagreement and green washing risk combined with weak institutional quality, can invert it — turning ESG scores from a credibility signal into a source of adverse selection.

This reframes the contribution away from "weaker replication of developed-market findings" toward a claim about conditional regime-switching, distinct from and testable against Berg et al. (2022), Avramov et al. (2022), and Dang et al. (2024). India — via the natural experiment created by BRSR Core's staggered rollout — offers a distinctive setting to test whether these frictions cross the threshold from attenuation into reversal. Confirming or disconfirming H6 and H7 through the proposed panel and difference-in-differences design is the necessary next step, with direct implications for how SEBI, the RBI, and comparable regulators calibrate ESG-assurance regimes.

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