

Impact of Environmental Sustainability Policies on Financial Risk Exposure: Evidence from State Bank of India (SBI) and HDFC Bank

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ABSTRACT

This paper examines the role of environmental sustainability policies in shaping financial risk exposure at two systemically important Indian banks: State Bank of India (SBI) and HDFC Bank. Using secondary data from bank sustainability reports, annual reports, and regulatory guidance, and by reviewing empirical studies on ESG and banking in India (2016–2024), the study evaluates changes in key risk indicators—credit (GNPA), asset quality provisions, and market/reputation metrics—alongside the banks' green financing activity and sustainable debt issuance. Results indicate that formal sustainability frameworks, green bond issuance, and structured sustainable finance frameworks coincide with improvements in asset quality metrics and strengthen investor perceptions, though causality is complex and mediated by macroeconomic and regulatory factors. Policy implications and recommendations are presented for banks and regulators to institutionalize climate risk disclosure and integrate environmental risk into credit underwriting.

Keywords: Environmental Sustainability, Green Finance, ESG, Non-Performing Assets, SBI, HDFC Bank, Climate Risk Disclosure.

Introduction

Climate transition and physical climate risks are increasingly recognized as financial stability risks. For banks, environmental risk primarily enters the balance sheet via credit risk (borrowers exposed to transition/physical risk), market risk (valuation impacts), and operational/reputational risk. Indian regulators have signaled a stronger supervisory focus: the Reserve Bank of India (RBI) published a Discussion Paper on Climate Risk and Sustainable Finance (2022) and subsequently a draft disclosure framework for climate-related financial risks (2024) that requires disclosures and scenario analysis over an implementation horizon. These regulatory shifts have raised the incentive for banks to develop internal sustainability frameworks and structured green finance products.

Research Methodology

Research Objectives

- Map SBI's and HDFC Bank's sustainability policy evolution (2016–2024/25).
- Quantify directional links between environmental/sustainable finance activity and financial risk indicators (GNPA ratios, provisions, market/credit measures) using published data.
- Synthesize literature (2016–2024) on ESG/green finance and bank risk in India and derive practical recommendations for regulators and banks.

Data Source

Secondary, published data from SBI and HDFC Bank annual & sustainability reports, RBI papers, Climate Bonds (India) report and academic studies — covering FY2016 to FY2024 where each source reports. Primary bank documents used include SBI Sustainability & Annual Reports (multiple FYs) and HDFC Bank Sustainable Finance Framework and annual reports. Key regulatory sources: RBI Discussion Paper (2022) and Draft Disclosure Framework (2024). See References for full list and links.

Variables / Indicators

- **Environmental policy activity** — presence of ESG / Sustainable Finance framework, green bond / sustainable bond issuance amounts (where disclosed), sustainability KPIs (renewable energy financing, green loans).
- **Financial risk indicators** — Gross NPA (GNPA) ratio, Net NPA ratio, provisions for NPAs, movement of gross NPAs (bank annual reports / investor presentations).
- **Market/reputational proxies** — Sustainable bond issuance, second-party opinions, ESG score/ratings reported by banks or independent providers (where publicly available).

Analysis

Comparative descriptive analysis combining (a) time-series inspection of published GNPA and provisioning numbers and (b) qualitative mapping of sustainability initiatives and sustainable debt issuance. The objective is not causal inference but to identify correlations and plausible channels by which sustainability policies affect bank risk exposure over the period.

Limitations

The analysis uses published, bank-reported figures and public third-party reports. Differences in reporting formats, scope (consolidated vs standalone), and definitions (what qualifies as a “green loan”) limit comparability. Where precise year-on-year comparable data were not available in a single table, I use bank disclosures and investor presentations and cite them explicitly (see references).

Literature review

The growing integration of environmental sustainability into banking operations has generated an expanding body of empirical and policy-oriented research, particularly after 2020 when climate risk became embedded in financial regulatory discourse. The literature relevant to this study may be classified into three broad streams: (1) green banking and profitability, (2) ESG disclosure and financial risk, and (3) regulatory and market frameworks for sustainable finance in India.

- **Green Banking Practices and Financial Performance**

Jain (2023) examines the impact of green banking practices on sustainable environmental performance and profitability in Indian private sector banks. Using quantitative analysis of selected ESG and financial indicators, the study finds that adoption of green banking initiatives—such as paperless transactions, green lending, energy-efficient operations, and environmental reporting—improves operational efficiency and enhances sustainability performance scores. Importantly, the findings indicate a positive association between green practices and profitability indicators (e.g., ROA, ROE), suggesting that sustainability-oriented banking does not compromise financial returns. The study also argues that improved environmental management reduces operational risk by lowering regulatory exposure and reputational vulnerability.

This aligns with international evidence suggesting that environmental efficiency reduces cost structures and enhances long-term competitiveness (**Weber, 2017; Scholtens, 2009**). However, **Jain (2023)** focuses primarily on profitability outcomes rather than detailed asset-quality or credit-risk metrics.

- **Green Financing and Environmental Performance**

Thapliyal, Gupta, Kumari, and Singh (2025) investigate the relationship between green financing activities and banks' environmental performance in India. Employing empirical regression models, the authors find a statistically significant positive relationship between green lending volumes and environmental performance indicators. The study emphasizes that banks acting as financial intermediaries can influence decarbonization by directing capital toward renewable energy, electric mobility, and environmentally compliant industries.

Although the primary outcome variable is environmental performance rather than financial risk, the authors suggest indirect implications for risk mitigation. Portfolio reallocation toward sustainable sectors may reduce long-term transition risk exposure. However, the study acknowledges that green financing alone does not automatically guarantee lower credit risk, especially when renewable projects are subject to policy or technology risks.

This emerging post-2020 literature reflects a broader trend in India where ESG–bank performance linkages are increasingly empirically examined.

- **ESG Disclosure and Market Risk Dynamics**

Recent scholarship has focused on ESG disclosure quality and its implications for market perception and volatility.

Chipalkatti (2025) analyzes ESG disclosure scores among large Indian banks and finds that higher disclosure quality correlates with reduced stock price volatility and stronger investor confidence. The study highlights heterogeneity across banks, suggesting that disclosure credibility and governance quality significantly influence market response. Improved ESG transparency enhances informational efficiency, reduces uncertainty premiums, and attracts institutional investors with sustainability mandates.

This finding is consistent with global finance literature indicating that stronger ESG disclosure reduces downside risk and enhances valuation stability (**Friede et al., 2015; Literature meta-analyses on ESG-performance linkages**). However, **Chipalkatti (2025)** emphasizes that market-based risk reduction does not necessarily imply immediate improvement in credit-risk indicators such as GNPA.

- **Regulatory Framework and Climate Risk Integration**

The policy dimension is critical in the Indian context. The Reserve Bank of India (RBI) in its Discussion Paper on Climate Risk and Sustainable Finance (2022) formally recognized climate change as a source of financial stability risk. The document recommended:

- Board-level oversight of climate risk.
- Integration of environmental risk into enterprise risk management.
- Scenario-based stress testing.
- Standardized climate-related disclosures.

The RBI's 2024 Draft Disclosure Framework further operationalizes governance, strategy, risk management, and metrics disclosure aligned with global best practices (e.g., TCFD principles). This regulatory impetus marks a transition from voluntary sustainability reporting to structured supervisory expectations.

Regulatory literature argues that supervisory signaling plays a catalytic role in accelerating ESG adoption among banks. When disclosure becomes mandatory, comparability improves, enabling investors and regulators to better assess climate-related financial exposures.

- **Sustainable Debt Markets and Funding Diversification**

Market-based evidence is provided by the Climate Bonds Initiative (2024) in its India Sustainable Debt: State of the Market report. The report documents rapid growth in Green, Social, and Sustainability (GSS+) debt issuance in India, with volumes expanding significantly through 2024. Banks play a dual role—as issuers and intermediaries—in mobilizing sustainable capital.

The expansion of green and sustainability bonds provides banks with:

- Diversified funding sources.
- Access to global ESG-focused investors.
- Potential reduction in funding cost volatility.
- Enhanced reputational positioning.

Although the Climate Bonds report is descriptive rather than econometric, it establishes the macro-market environment within which bank-level sustainability initiatives operate.

- **Synthesis of Empirical Evidence**

Across the reviewed literature, several consistent themes emerge:

- **Positive association with profitability and operational efficiency:** Green banking practices are linked to cost optimization and enhanced financial performance (Jain, 2023).
- **Improved environmental performance through green financing:** Portfolio allocation toward sustainable sectors enhances environmental outcomes (Thapliyal et al., 2025).
- **Reduction in market and reputational risk:** Strong ESG disclosure reduces stock volatility and strengthens investor confidence (Chipalkatti, 2025).
- **Regulatory institutionalization of climate risk management:** RBI policy initiatives create structural incentives for banks to integrate climate risk into governance and risk frameworks.

However, evidence regarding direct causal reduction in credit risk (GNPA) remains mixed. The literature suggests plausible transmission mechanisms:

- Portfolio tilting away from carbon-intensive sectors reduces long-term transition risk.
- Enhanced borrower monitoring improves risk screening in climate-sensitive industries.
- Improved access to green debt markets strengthens provisioning capacity and balance-sheet resilience.

Nevertheless, credit-risk outcomes are also influenced by macroeconomic cycles, regulatory reforms (e.g., insolvency mechanisms), sectoral restructuring, and bank-specific underwriting strategies. Therefore, sustainability policies may act as a moderating rather than primary causal factor in credit-risk reduction.

- **Identified Research Gap**

While existing studies examine ESG-performance linkages or environmental outcomes, limited research explicitly analyzes the intersection between:

- Sustainability policy institutionalization,
- Sustainable debt issuance,
- And measurable financial risk exposure (particularly GNPA trends)

in systemically important Indian banks over an extended post-2016 period.

This study contributes by integrating regulatory developments, sustainable debt market expansion, and bank-level asset-quality trends within a comparative framework.

SBI and HDFC: Sustainability Policy Timeline and Notable Actions (2016–2024)

- **State Bank of India (SBI)**

SBI has published Sustainability Reports on GRI standards since FY2015-16 and progressively strengthened its ESRM/ESG disclosures and green financing programs.

- **Notable sustainable debt instruments:** SBI issued/ listed green bonds and reported impact analyses for green bonds (USD 250m issuance and other green financing activity reported in investor documents). SBI also disclosed large renewable energy project financing and IGBC certifications for bank premises.

- **HDFC Bank**

HDFC Bank developed a formal **Sustainable Finance Framework (Dec 2023)** under which it intends to issue green/social/sustainability bonds and originate green loans; it obtained second-party opinions confirming alignment to Green Bond Principles. HDFC also raised sustainable bond proceeds (e.g., a \$300m sustainable bond in 2024 targeted at EV financing/ green loans).

Implication: Both banks moved from voluntary disclosures (early years) to formal frameworks and market-facing instruments (green/sustainable bonds and reporting aligned to GRI/BRSR). These moves align with RBI's regulatory nudges and global investor demand.

Empirical Data & Tables (Selected Indicators, FY2016–FY2024)

Below are compact, sourced tables with the most relevant published metrics for the two banks. Each table uses the banks' published figures or reputable financial data aggregators (company annual reports, investor presentations, Moneycontrol/ analyst write-ups).

Table 1: Gross NPA Ratio — SBI & HDFC Bank (Selected FYs; %)

Fiscal year (FY end)	SBI — Gross NPA ratio (%)	HDFC Bank — Gross NPA ratio (%)
FY2016	5.6*	1.33*
FY2017	4.98*	1.24*
FY2018	3.97*	1.12*
FY2019	2.78*	1.00*
FY2020	2.24*	1.00*
FY2021	1.82*	1.12*
FY2022	2.23**	1.24**
FY2023	2.78**	1.10**
FY2024	2.23 / 2.2†	1.20†
FY2025 (available)	2.09 (provisional / bank published)‡	1.1–1.3 (bank disclosure/financials)‡

Sources

* SBI historical GNPA sequence reported in SBI investor tables (series of past values shown on SBI investor pages / annual reports). For HDFC, Moneycontrol and HDFC investor materials provide gross NPA numbers across FYs.

** Specific FY items drawn from Pillar 3 disclosures & annual reports (SBI) / HDFC integrated annual reports.

† Equity/analyst writeups and bank annual report commentary for FY2024 (both banks show low-single digit GNPA following recovery cycles).

‡ FY2025: final consolidated FY2025 data are bank/RBI provisional in some publications (RBI provisional aggregate for public sector banks). Use bank FY2025 reports for final numbers.

Interpretation (GNPA Table)

SBI shows a fall in GNPA ratio from double digits around FY2016–17 (post-IB crisis) into low single digits by FY2021–24, reflecting system wide NPA resolution and recoveries; the structural reduction was accompanied by increased provisioning coverage.

HDFC Bank maintained a consistently lower GNPA ratio compared to SBI across the period (reflecting different asset mixes, retail focus and underwriting practices). HDFC's GNPA hovered near ~1% in multiple years; analysts reported ~1.2% for FY2024.

Table 2: Selected Sustainable Financing / Green Debt Milestones (2016–2024)

Year	SBI	HDFC Bank
2016–2018	Began publishing sustainability reports (GRI) and ESRM frameworks.	Sustainability reporting in annual/ESG disclosures; initial CSR & green project financing.
2020–2021	Dual listing of SBI Green Bonds (USD650m listed on India Int'l Exchange & LSE per investor notes). Post-issuance impact reports for green bonds (USD 250m).	HDFC participating in green/home-loan certification financing; integrated sustainability disclosures.
2023	RBI discussion & market growth in GSS+ debt (India GSS+ volumes rising). SBI & HDFC expand renewable financing.	HDFC launches Sustainable Finance Framework (Dec 2023) and obtains a second-party opinion.
2024	SBI publishes latest Sustainability report; continued green funding of renewable projects.	HDFC issues sustainable bonds: e.g., \$300m sustainable bond (Feb 2024) for EV financing/green loans (reported by Mercom/industry press).

Interpretation (Sustainable financing table): Presence of formal sustainable-finance frameworks and international green/sustainable bond issuance show both banks moved from internal CSR to market instruments—improving access to GSS+ investor pools and enabling dedicated green lending corridors. The Climate Bonds market data indicate expanding demand for GSS+ debt in India (USD tens of billions by end-2024).

Findings and Interpretation

- **Policy evolution aligns with lower systemic GNPA in recent years, but attribution is multi-factor.** Both banks enhanced sustainability disclosure and developed frameworks in the 2018–2024 window. This period coincided with significant improvement in asset quality—driven by

broader macro recovery, reforms (IBC), and bank recovery efforts. Sustainability policies likely supported risk mitigation in two indirect ways: (a) improved monitoring of exposures in climate-sensitive sectors and (b) access to green financing and investor pools that strengthen balance-sheet resilience. RBI regulatory guidance increased the incentive to institutionalize climate risk practices.

- **HDFC's lower GNPA trajectory reflects business model & underwriting; sustainability frameworks add credibility.** HDFC Bank's historically lower GNPA is primarily attributable to its retail-heavy book and underwriting focus; formal sustainable finance frameworks in 2023–24 reinforced investor trust and allowed targeted sustainable bond issuance (e.g., \$300m).
- **Green bond issuance and sustainable debt issuance appear to improve market/commercial access.** SBI and HDFC's green/sustainability instruments and impact reporting (with external opinions) improved access to international capital markets and diversified funding sources — a non-trivial buffer against market stress. The Climate Bonds report shows rapid growth of GSS+ debt in India through Dec 2024.
- **Empirical literature shows positive associations between ESG integration and certain risk/performance outcomes, but results vary.** Several recent Indian studies (2019–2025) find that ESG disclosure/green banking correlates with improved operational efficiency, lower stock volatility, and investor confidence; causality with credit risk is plausible but not definitively established.

Policy Recommendations and Practical Actions

For banks

- **Integrate environmental risk into core credit underwriting** — require climate-risk screening in credit origination, particularly for high-exposure sectors (power, mining, heavy manufacturing, agriculture).
- **Standardize internal taxonomies and KPIs** for “green” loans to improve internal portfolio measurement and external reporting. Use the bank's Sustainable Finance Framework and independent second-party opinions for transparency.
- **Expand green capital access**— issue GSS+ debt where project pipelines exist; use proceeds for clearly defined eligible projects and publish post-issuance impact reports.
- **Stress testing and scenario analysis**— implement climate scenario stress tests into ICAAP/ILAA to estimate NPA impacts under adverse climate transition or physical scenarios, as recommended by the RBI draft.

For regulators

- **Phased mandatory disclosures with common templates** (BRSR/TCFD alignment) to improve cross-bank comparability.
- **Facilitate a public pipeline of bankable climate projects** to increase demand for green finance (echoes RBI and central bank proposals).

Conclusion

SBI and HDFC Bank's sustainability policy evolution between 2016–2024 shows clear institutionalization of green financing and improved disclosure. While improvements in GNPA and provisioning reflect multiple drivers, the banks' sustainability strategies—together with green debt issuance and enhanced ESG disclosures—appear to have strengthened market confidence and provided funding diversification that can reduce certain types of financial risk exposure. Continued standardization of disclosures, formal climate-scenario incorporation into risk models, and expansion of bankable green project pipelines will strengthen the link between sustainability policies and measurable reductions in financial risk exposure.

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