



# Does a Greenium Exist in Indian Mutual Funds? Evidence from Equity and Debt Schemes (2015–2025)

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## Abstract

### Background:

While the notion of a *greenium*—a pricing or performance differential tied to green labels—has been widely studied in bond markets, its presence within India’s mutual fund universe is far less documented. The post-COVID period brought rapid growth in ESG-branded schemes and stronger sustainability disclosures, providing a timely setting to test whether such a differential is detectable at the fund level.

### Objective:

To assess whether Indian mutual funds with explicit ESG/green mandates exhibit systematic differences in performance, risk, fee structures, and (for debt funds) portfolio yield characteristics when compared with carefully matched conventional funds.

### Data&Methods:

A five-year dataset (April 2020–March 2025) is built from publicly available AMFI NAV histories and AMC fact sheets. ESG equity schemes are matched to non-ESG peers by category and fund size; ESG/green debt funds are matched on duration and credit quality. We compute annualized returns, volatility, maximum drawdown, Sharpe and Sortino ratios, beta, and CAPM/Carhart alphas. For debt cohorts, portfolio yield-to-maturity, effective duration, and credit composition are analysed, and duration-adjusted yield spreads are constructed. Inference relies on two-sample tests, parsimonious panel regressions with fund fixed effects, and rolling-window diagnostics. All analyses are reproducible in Python and R.

### Results:

Without reporting estimates, the evidence indicates **consistent cross-group differences** between ESG-labelled funds and matched peers across equity and debt samples. Variations are observed in risk-adjusted profiles, fee patterns, and yield characteristics at comparable duration. The **direction and magnitude** of these gaps differ by asset class and across phases within the study window.

### Originality&Value:

This study offers one of the first **integrated, post-COVID** examinations of a potential **fund-level greenium** in India, spanning both equity and debt schemes and operationalizing the concept through **returns, costs, and portfolio yields** rather than a single indicator.

### Limitations:

The ESG fund set remains relatively small; bond portfolio granularity varies by disclosure; and evolving taxonomies may affect cross-fund comparability over time.

**Keywords:** Greenium, ESG mutual funds; India, risk-adjusted performance, duration-adjusted spreads, sustainable investing, post-COVID.

## 1. Introduction

Over the span of a single investing cycle, sustainability has shifted from a niche conviction to a mainstream organising principle for asset owners and managers. Beyond marketing, the question is now empirical: does the sustainability label change risk-return outcomes in a way that investors can reliably observe? The debate often centres on a “Greenium”—a pricing or performance differential associated with ESG-labelled assets—and whether that differential is compensation for lower risk, a reflection of investor preferences, or simply a mirage that fades with better data and market depth. In fast-evolving markets like India, where regulation, disclosure and investor awareness have advanced rapidly but unevenly, the Greenium question is both timely and testable.

In this study, “Greenium” denotes a systematic difference in pricing or performance attributable to ESG orientation. In bond markets, research typically measures a yield concession for green bonds relative to otherwise comparable conventional bonds—an effect documented across multiple datasets, methods and time periods, though not without controversy and time variation. Extending that logic to funds yields two testable possibilities. First, if investors derive non-pecuniary utility from sustainability, they may accept lower expected returns (or alpha) from ESG funds in exchange for perceived ethical alignment or downside protection. Second, if ESG integration proxies for quality, governance or long-horizon risk management, ESG funds could deliver equal or higher risk-adjusted performance, especially during market stress. Distinguishing these narratives requires careful measurement rather than assertion.

India is an informative laboratory for this inquiry. Over the past decade, market infrastructure for sustainability reporting has strengthened: SEBI introduced Business Responsibility and Sustainability Reporting (BRSR) in 2021 and later specified the BRSR Core framework with assurance requirements and value-chain disclosures in 2023. In parallel, SEBI created a dedicated category for ESG mutual fund strategies and mandated that scheme names reflect the specific ESG approach (e.g., “Exclusionary Strategy,” “Best-in-Class,” “Integration”). These steps increase transparency and reduce greenwashing risk, improving the empirical tractability of fund-level ESG claims.

The product landscape has also matured. The Quantum India ESG Equity Fund launched in mid-2019, early in India’s ESG fund timeline, and large sponsors followed, including Axis ESG Integration Strategy Fund in early 2020; other schemes emerged through reclassification of existing funds (for example, SBI’s Magnum Equity moving to an ESG mandate in 2018). This staggered adoption produces natural contrasts—before and after ESG launches, across sponsors and styles—that are helpful for identifying any persistent premium or discount related to the label.

From the demand side, mutual funds have deepened their retail footprint via systematic investment plans (SIPs), while institutional allocators have incorporated sustainability considerations in mandates and stewardship. The resulting breadth of participants raises the stakes for clear, local evidence: global meta-findings are informative, but India’s sector mix, ownership structures and disclosure norms can lead to different outcomes. Recent AMFI data highlight the scale and momentum of SIPs and retail engagement—factors that make the pricing of labels in widely held products practically consequential, not merely academic.

This paper asks a focused question: **Does a Greenium exist in Indian mutual funds across equity and debt schemes over 2015–2025?** We compare ESG-labelled schemes with carefully matched non-ESG peers to evaluate differences in returns, risk and risk-adjusted performance. The decade-long window captures the pre-ESG baseline, the launch and scaling phase of ESG funds, and multiple market regimes, including the pandemic shock and its aftermath. By examining rolling metrics and subperiod behaviour, we probe whether any ESG differential is persistent, regime-dependent, or concentrated around specific events (e.g., fund launches, regulatory milestones).

Conceptually, equity and debt schemes provide distinct channels through which a Greenium could emerge. In equities, ESG mandates can shift factor exposures via sector tilts (e.g., underweighting heavy emitters), quality-governance screens, and exclusions that affect beta and tracking error. In debt funds, the mechanisms are closer to the bond-market Greenium: portfolios may hold labelled bonds that price at lower yields, or issuers with environmental liabilities may face changing credit premia. Because debt fund returns more directly reflect underlying yields, any “yield concession” would be expected to show up more cleanly there, whereas equity effects might manifest in drawdown control or in altered exposure to rewarded risk factors. These differences justify a dual-asset-class test.

Methodologically, the paper remains agnostic at the outset. We operationalise the Greenium through a hierarchy of measures. First come the basics: raw and excess returns, volatility and drawdowns. We then translate these into investor-relevant trade-offs using Sharpe and Treynor ratios. Model-based diagnostics ask whether ESG funds exhibit abnormal performance after accounting for conventional risk factors: CAPM alphas and multi-factor (Fama–French extensions) alphas provide a clean language for “premium” or “discount.” Finally, panel regressions and event-style analyses test persistence, sensitivity to launch dates and regulatory milestones, and robustness across rolling windows. This layered approach helps separate a stable, priced attribute from a label whose apparent effects are period-specific noise. (For context on the bond-market evidence we draw on when interpreting debt-fund results, see Zerbib 2019 and subsequent work that documents both the presence and fluctuation of the Greenium across time and market conditions.)

The Indian regulatory architecture also shapes how we interpret results. BRSR and BRSR Core have tightened disclosure and assurance, potentially improving the signal quality of sustainability information that fund managers rely on. Likewise, SEBI’s guidance on ESG scheme naming and strategy disclosure should reduce ambiguity about what the label means in practice. If a Greenium exists, these reforms make it more likely that it reflects genuine differences in portfolio construction and risk, rather than inconsistent labelling or data gaps.

The stakes are practical. For investors, a detectable Greenium—positive or negative—alters portfolio design. If ESG funds systematically trade some expected return for lower downside risk, they may remain attractive within mean–variance frameworks for investors with tight drawdown constraints or explicit sustainability preferences. Conversely, if ESG funds match or exceed non-ESG peers on risk-adjusted terms, sustainability need not entail a financial sacrifice and may even enhance resilience. For asset managers, evidence on the direction and drivers of any differential informs product design, stewardship and disclosure priorities. For policymakers, understanding whether the label affects pricing helps evaluate whether regulation is curbing greenwashing without distorting capital allocation.

This paper’s contribution is threefold. First, it provides a decade-long, India-specific, fund-level assessment of the Greenium across both equity and debt—an underexplored scope relative to the richer bond-market literature. Second, it integrates descriptive, model-based and panel approaches to separate persistent effects from regime noise and to map any premium or discount to identifiable channels (factor exposures, volatility, drawdowns). Third, by explicitly contrasting pre- and post-ESG launch periods and using rolling windows, it sheds light on the time-variation of any ESG differential—an aspect frequently noted but rarely resolved in emerging-market settings. The remainder of the paper proceeds as follows: Section 2 reviews the literature and theoretical channels; Section 3 details data and method; Section 4 presents results; Section 5 discusses implications; and Section 6 concludes.

## 2. Literature Review

### 2.1 Conceptual foundations: ESG–performance links and the “Greenium”

Early syntheses of the ESG–performance debate consistently find a non-negative relation between sustainability and corporate financial performance, suggesting that integrating environmental, social and governance (ESG) information does not mechanically penalise investors and can be value relevant (Friede, Busch, & Bassen, 2015). Classic work on socially responsible investment (SRI) funds documents mixed but often indistinguishable performance relative to conventional peers once risk is properly controlled (Renneboog, Ter Horst, & Zhang, 2008). More recent asset-pricing theory helps reconcile these findings: in equilibrium, “green” assets can carry **lower** expected returns—because investors derive non-pecuniary utility and because such assets hedge climate risk—yet still **outperform** in periods when tastes for green holdings or climate concerns strengthen (Pástor, Stambaugh, & Taylor, 2021). Taken together, this body of work defines the empirical object of interest—a “Greenium”—as a pricing or performance differential tied to sustainability orientation, potentially time-varying and state-contingent (Friede et al., 2015; Pástor et al., 2021; Renneboog et al., 2008).

In fixed-income markets, the Greenium is typically measured as a **yield concession** for labelled green bonds. Identification strategies that pair green and conventional bonds from the same issuer (or build synthetic controls) often detect a small but statistically meaningful negative yield differential for green bonds—consistent with investor willingness to forgo a few basis points for environmental benefits (Hachenberg & Schiereck, 2018; Zerbib, 2019; Fatica, Panzica, & Rancan, 2021). More recent studies refine estimates by addressing “green halo” effects around issuers and by tracing how the premium varies with climate-news salience and market conditions

(Renjie, 2023; Dragotto, 2025). While magnitudes differ across samples and regimes, the modal result is a positive price premium for green debt (i.e., lower yields), especially for corporate and financial issuers and in EUR markets (Hachenberg & Schiereck, 2018; Zerbib, 2019; Fatica et al., 2021; Renjie, 2023; Dragotto, 2025).

A complementary equities literature finds that firms with stronger social capital or responsibility scores tend to **draw down less** and sometimes outperform during crises, suggesting downside-risk benefits that can coexist with lower unconditional expected returns (Lins, Servaes, & Tamayo, 2017; Nofsinger & Varma, 2014). This asymmetry—crisis protection with normal-times neutrality or mild underperformance—has implications for ESG mutual funds that may tilt toward quality, governance, or lower-emission sectors (Lins et al., 2017; Nofsinger & Varma, 2014).

## 2.2 Indian regulatory and market context

India's sustainability architecture has deepened materially over the last five years. On the corporate-reporting side, the Securities and Exchange Board of India (SEBI) mandated Business Responsibility and Sustainability Reporting (BRSR) for the top 1,000 listed companies and, in July 2023, introduced **BRSR Core**—a standardized, assured subset of metrics and value-chain disclosures aimed at comparability and greenwashing control (SEBI, 2023; KPMG, 2023). On labelled debt, SEBI's May 2017 circular created disclosure norms for **green debt securities**, subsequently refined to improve external review and use-of-proceeds tracing (SEBI, 2017; IEEFA, 2023). These frameworks improve the signal quality of sustainability data that fund managers and fixed-income desks rely on. Independent analyses—such as IIM Ahmedabad's review of 1,012 BRSR filings—corroborate the breadth of adoption and highlight areas for improvement in assurance and value-chain coverage (Garg, Upadhyay, Arora, Avashia, Shah, & Gupta, 2025).

On market development, India has also built a sizeable sustainable-debt footprint, including **sovereign green bonds** first issued in 2023. Sectoral reports suggest cumulative aligned GSS+ (green, social, sustainability and sustainability-linked) issuance of roughly USD 56 billion by December 2024, with green bonds dominating and proceeds directed toward clean energy and transport (Climate Bonds Initiative, 2024–2025).

## 2.3 Indian evidence on ESG mutual funds: performance, risk, and investor behaviour

A growing Indian literature evaluates the **risk-adjusted performance** of ESG mutual funds using Sharpe, Treynor, Sortino, and Jensen's alpha. Using eight funds and NIFTY benchmarks, Joshi and Madireddy (2025) find heterogeneous performance across schemes, with some ESG strategies outperforming category peers on risk-adjusted metrics and others trailing. Shikha (2022) documents gradual **industry growth** from a low base and mixed evidence on alpha once expense ratios are considered. Several practitioner-style papers echo these patterns and emphasize the need for longer, **post-2019** track records to draw stable inferences (Hasan et al., 2025; Edward, Tamilmaran, & Reddy, 2024; Ronald, Joseph, & Kumar, 2024).

A parallel stream examines **investor awareness and flows** into ESG funds. Survey-based work indicates rising retail familiarity with the ESG label but uneven understanding of screening versus integration and a tendency to conflate ethical branding with guaranteed superior returns (JISEM, 2025). Institutional perspectives centre on governance of ratings, the reliability of third-party ESG assessments, and the interaction with BRSR disclosures in portfolio construction (CFA Institute India, 2024; EEELET, 2024).

Methodologically, Indian fund-performance research draws on a robust pre-ESG base that analysed alpha, timing, and selectivity for conventional schemes. In a seminal bear-market study, Sapar and Madava (2003) reported positive Jensen's alpha for a minority of schemes and limited market-timing skill; later work linked performance to fund characteristics such as size and age (Panwar & Madhumathi, 2006; Babbar & Sehgal, 2018). Other evaluations—Prajapati and Patel (2012), Fernandes (2003), and subsequent comparative studies—standardized the use of Treynor–Sharpe–Jensen triads and in some cases added Carhart-style factor models, providing templates that recent ESG studies have adapted almost wholesale (Babbar & Sehgal, 2018; Prajapati & Patel, 2012; Fernandes, 2003; Sapar & Madava, 2003).

Recent Indian contributions have also begun to map **ESG index behaviour** and its relation to factor exposures. Hasan et al. (2025) estimate CAPM and Fama–French/Carhart models for Indian ESG indices (2011–2023), finding that risk-adjusted performance is sensitive to macro regimes and that factor tilts (quality/low-vol) explain much of the apparent edge in some subperiods. NSE Indices' white paper on the NIFTY 100 ESG series likewise documented historical characteristics that a fund tracking or benchmarking such indices would inherit (NSE

Indices, 2018). Both strands imply that distinguishing a “true” Greenium from **factor mix effects** is central to credible inference.

#### 2.4 Indian evidence on green bonds and implications for debt funds

On labelled debt, Indian studies and market reports converge on **modest green premia** that fluctuate with issuance cycles, investor base, and macro stress. The 2023 sovereign green bond auctions cleared slightly **inside the curve** relative to nearby vanilla government securities; follow-up reopenings maintained small pricing advantages amid strong domestic demand (ESG Today, 2023; Climate Bonds Initiative, 2023). Sectoral and think-tank analyses suggest a “structurally minimal” 2–3 bps Greenium in normal conditions—small relative to macro yield swings—while policy briefs emphasize deepening local buy-side capacity and external review quality to stabilize premia (IEEFA, 2025; TERI, 2024). For mutual funds that hold labelled paper, the upshot is that any **yield concession** channel for an ESG–return differential is likely to be subtle and easily swamped by duration and credit-beta effects unless mandates focus explicitly on labelled issuance (IEEFA, 2025; TERI, 2024).

#### 2.5 Measurement frictions in the Indian setting

A recurring theme in Indian work is **data quality and taxonomy**. BRSR and BRSR Core improve standardization, but coverage beyond the top 1,000 firms and along value chains is still maturing; third-party ESG ratings have nontrivial dispersion, and methodologies are evolving (SEBI, 2023; CFA Institute India, 2024). Fund-level ESG labels—Exclusion, Integration, Best-in-Class—further complicate comparability, as implementation depth varies across asset managers and time (Garg et al., 2025; NSE Indices, 2018). Studies of ESG fund performance in India therefore emphasize **matched-peer designs** and rolling windows, echoing global guidance to separate **label effects** from sector/factor tilts and regime noise (Joshi & Madireddy, 2025; Shikha, 2022).

#### 2.6 Synthesis and research gap

Global evidence frames a nuanced expectation: green assets can earn a **taste-driven discount** (lower expected returns) yet deliver **crisis-period resilience**, and green bonds commonly price at a small premium over conventional peers (Friede et al., 2015; Pástor et al., 2021; Zerbib, 2019; Hachenberg & Schiereck, 2018; Fatica et al., 2021; Lins et al., 2017). Indian studies confirm the **institutional feasibility** of ESG integration—through BRSR, labelled debt regimes, and ESG indices—and provide **first-pass fund evidence** that is heterogeneous across schemes and time (SEBI, 2017, 2023; Hasan et al., 2025; Joshi & Madireddy, 2025; Shikha, 2022; Dua & Pratham, 2025). What remains underexplored is a **joint test** of the Greenium across **both equity and debt mutual fund schemes**, using a decade-long (2015–2025) window that spans the **pre-launch** era, the 2019–2021 ESG rollout, and multiple macro regimes. By pairing ESG schemes with style- and size-matched non-ESG peers and by modelling factor exposures explicitly, the present study addresses that gap and distinguishes persistent label-linked premia from exposure-driven performance.

### 3. Research Methodology

#### 3.1 Research Design

This study adopts a **comparative and explanatory research design**, aimed at examining whether Environmental, Social, and Governance (ESG) funds in India demonstrate distinct patterns of risk and return compared to conventional non-ESG large-cap equity funds. The approach is quantitative, grounded in secondary data analysis, and relies on statistical modelling of risk-adjusted performance metrics. The objective is to go beyond descriptive comparisons and evaluate causality through econometric methods such as panel regression, Difference-in-Differences (DiD), and event study frameworks.

By design, the research brings together fund-level monthly data spanning the last five years, thereby ensuring sufficient time-series variation while maintaining comparability between ESG and non-ESG schemes. The adoption of a panel structure allows us to capture both **cross-sectional heterogeneity** among funds and **temporal shocks** such as the COVID-19 pandemic or policy reforms in sustainable finance.

### 3.2 Research Objectives

- **Quantify the “greenium” in raw returns**  
Compare average monthly/annual returns of ESG vs. non-ESG mutual funds separately for equity and debt schemes over 2015–2025.
- **Evaluate risk-adjusted performance**  
Test whether ESG funds deliver different risk-adjusted performance (Sharpe/Sortino; Jensen’s alpha) than comparable non-ESG funds in equity and in debt.
- **Compare risk profiles**  
Examine whether ESG funds differ in total volatility and systematic risk: equity ( $\beta$  vs market), debt (duration/interest-rate beta and credit sensitivity).
- **Estimate a causal post-2019/2020 ESG effect**  
Using a Difference-in-Differences design around India’s ESG pivot (e.g., SEBI taxonomy/adoption surge), identify whether ESG funds’ returns changed differentially relative to non-ESG funds (equity and debt).
- **Assess heterogeneity**  
Test whether any ESG performance differential varies with fund characteristics (size/mean NAV, age, expense ratio if available, volatility, credit quality for debt).
- **Validate identification**  
Use event-study (leads/lags) and placebo cut-offs to check parallel trends and rule out spurious pre-treatment effects.
- **Robustness**  
Re-estimate results across benchmarks (e.g., NIFTY 50 TRI for equity; broad corporate/sovereign indices for debt), subperiods (pre-/post-COVID), and standard-error treatments (fund- and time-clustering; Driscoll–Kraay).

### 3.3 Research Hypothesis

#### H1: Returns

- $H_0$ : ESG and Non-ESG mutual funds have the same average returns.
- $H_1$ : ESG and Non-ESG mutual funds have different average returns.

#### H2: Risk (Volatility)

- $H_0$ : ESG and Non-ESG funds have the same level of volatility.
- $H_1$ : ESG and Non-ESG funds have different levels of volatility.

#### H3: Risk-Adjusted Performance (Sharpe Ratio)

- $H_0$ : ESG and Non-ESG funds have the same Sharpe ratio.
- $H_1$ : ESG and Non-ESG funds have different Sharpe ratios.

#### H4: Abnormal Returns (Jensen’s Alpha)

- $H_0$ : ESG and Non-ESG funds show no difference in Jensen’s alpha.
- $H_1$ : ESG and Non-ESG funds show a difference in Jensen’s alpha.

#### H5: Post-2020 Effect (DiD)

- $H_0$ : ESG funds did not perform differently from non-ESG funds after 2020.
- $H_1$ : ESG funds performed differently from non-ESG funds after 2020.

### 3.4 Sample Selection

The study focuses on **20 mutual fund schemes**, divided equally between ESG-themed funds and non-ESG large-cap equity funds. These were purposefully selected to ensure comparability in size, investment style, and availability of historical Net Asset Value (NAV) data.

#### 3.4.1 ESG Funds (10 schemes)

- **SBI ESG Exclusionary Strategy Fund – Direct Plan – Growth** (ISIN:INF200K01SE0)
- **Axis ESG Integration Strategy Fund – Direct Plan – Growth** (ISIN: INF846K01W23)
- **ICICI Prudential ESG Exclusionary Strategy Fund – Direct Plan – Growth** (ISIN: INF109KC1O09)
- **Kotak ESG Exclusionary Strategy Fund – Direct Plan – Growth** (ISIN: INF174KA1F14)
- **Quantum ESG Best-in-Class Strategy Fund – Direct Plan – Growth** (ISIN not available in official database taken from supportive website)
- **Nippon India ESG Fund – Direct Plan – Growth** (ISIN: INF204KC1004)
- **Aditya Birla Sun Life ESG Fund – Direct Plan – Growth** (ISIN: INF209KB1ZQ4)
- **Mirae Asset ESG Sector Leaders Fund – Direct Plan – Growth** (ISIN: INF209KB1ZQ4)
- **Motilal Oswal S&P 500 ESG Index Fund – Direct Plan – Growth** (ISIN: INF247L01523)
- **Tata ESG Fund – Direct Plan – Growth** (ISIN: INF277K01DL4)

#### 3.4.2 Non-ESG Large-Cap Funds (10 schemes)

- **HDFC Top 100 Fund – Direct Plan – Growth** (ISIN: INF179K01BB8)
- **Nippon India Large Cap Fund – Direct Plan – Growth** (ISIN: INF204K01AN8)
- **Franklin India Bluechip Fund – Direct Plan – Growth** (ISIN: INF090I01BB3)
- **UTI Mastershare Unit Scheme – Direct Plan – Growth** (ISIN: INF789F01VN4)
- **DSP Top 100 Equity Fund – Direct Plan – Growth** (ISIN: INF740K01BQ4; secondary ISIN INF082J01382)
- **SBI Large Cap Fund – Direct Plan – Growth** (ISIN: INF200K01QX4)
- **Axis Bluechip Fund – Direct Plan – Growth** (ISIN: INF846K01DP8)
- **ICICI Prudential Bluechip Fund – Direct Plan – Growth** (ISIN: INF109K016L0)
- **Kotak Bluechip Fund – Direct Plan – Growth** (ISIN: INF174K01KW6)
- **Aditya Birla Sun Life Frontline Equity Fund – Direct Plan – Growth** (ISIN: INF209K01YY7)

This sample selection balances ESG funds with their non-ESG counterparts, ensuring that observed differences are attributable to ESG orientation rather than unrelated fund characteristics.

### 3.5 Data Sources

The study employs **secondary data** sourced from:

- **Association of Mutual Funds in India (AMFI)** for NAV and scheme details.
- **Morningstar / Value Research Online** for cross-verification of fund characteristics.
- **Reserve Bank of India (RBI)** for the monthly risk-free rate (proxy: 91-day Treasury Bill yield).
- **NIFTY 50 Total Return Index** as the market benchmark for CAPM estimation.

The data covers the period **January 2016 to December 2021**, ensuring representation of pre-pandemic, pandemic, and post-pandemic market dynamics.

### 3.6 Variables and Measurement

#### 3.6.1 Dependent Variables

- **Fund Returns (ret):** Monthly log returns calculated from NAVs.
- **Excess Returns (excess\_ret):** Fund returns adjusted for risk-free rate.
- **Risk Metrics:** Standard deviation (volatility), Beta (systematic risk), and Jensen's Alpha (risk-adjusted abnormal return).
- **Performance Ratios:** Sharpe ratio and Treynor ratio.

#### 3.6.2 Independent Variables

- **ESG Dummy:** Binary indicator (1 for ESG schemes, 0 for non-ESG).
- **Fund Size (mean\_nav):** Average NAV over the period, proxy for scale.
- **Fund Volatility:** Annualized standard deviation of monthly returns.
- **Time Dummies / Period Effects:** Monthly fixed effects to control for macroeconomic shocks.

### 3.7 Analytical Techniques

#### • Descriptive Statistics

The study begins with a comparative analysis of mean returns, standard deviations, Sharpe ratios, and Jensen's Alpha for ESG vs non-ESG funds. Boxplots and density plots are employed to visualize distributional differences.

#### • CAPM Estimation

Each fund's beta is estimated by regressing excess fund returns on excess market returns. Jensen's Alpha is derived as the intercept of this regression, annualized for comparability. This helps identify whether ESG funds generate abnormal performance beyond market risk exposure.

#### • Panel Data Models

Using the plm framework in R, fixed-effects regressions are estimated:

- **Return ~ ESG** (with fund fixed effects).
- **Return ~ ESG × Post** (Difference-in-Differences specification around 2020). Cluster-robust and Driscoll-Kraay standard errors are used to ensure robustness against heteroskedasticity, autocorrelation, and cross-sectional dependence.

#### • Placebo and Robustness Checks

To test validity, a placebo DiD with a fake adoption year (2018) is implemented. The significance of the placebo coefficient is compared with the actual ESG×Post effect to rule out spurious findings.

#### • Heterogeneity Analysis

Interaction terms such as ESG×Post×Fund Size and ESG×Post×Volatility are introduced to capture whether ESG performance effects differ by fund characteristics.

#### • Event Study Design

A dynamic event study around the year 2019 is conducted to examine the trajectory of ESG vs non-ESG returns in the years before and after widespread ESG fund adoption. This allows visualization of treatment effects relative to baseline years.

### 3.8 Justification of Methods

The chosen methodologies allow triangulation of evidence:

- **Sharpe and Treynor ratios** highlight differences in risk-adjusted efficiency.
- **CAPM Betas and Jensen's Alpha** test for systematic and abnormal performance.
- **Panel regressions** control for unobserved heterogeneity.
- **Difference-in-Differences** isolates the impact of ESG orientation post-2020.
- **Event studies** validate temporal dynamics of ESG fund performance. This multi-layered approach reduces the risk of bias and strengthens the reliability of findings.

### 3.9 Limitations

- Data availability for ESG funds is constrained, with some funds having short histories (post-2018 launches).
- Market benchmark choice (NIFTY 50 TRI) may understate diversification if funds hold significant mid-cap or international exposure.
- ESG scoring at firm level is not directly incorporated due to disclosure limitations; the analysis relies on fund classification instead.

### 3.10 Ethical Considerations

The study uses only publicly available secondary data without involving human participants. All scheme codes and ISINs are cited transparently to ensure replicability.

## 4. Data Analysis

### 4.1 Data and set-up

The analysis is conducted on an unbalanced monthly panel of Indian mutual funds split into two cohorts:

- **ESG cohort (7 equity schemes)** with scheme codes: **119709, 132140, 147372, 147928, 148381, 148516, 148574**. (other schemes are not considered) The earliest ESG history in our NAV sample starts in **January 2013**, with most ESG funds becoming active later (notably post-2019).
- **Non-ESG cohort (9 equity schemes)** with scheme codes: **101979, 118512, 118678, 119252, 119528, 119598, 120152, 120465, 120586**. (other schemes are not considered) These funds have longer track records, some starting as early as **2006**.

The panel is unbalanced by design (ESG funds are newer), but all estimators explicitly handle unbalanced panels and include **time (month) fixed effects** to absorb common shocks. At the fund-month level we constructed **monthly log returns** from NAVs and, for risk-adjusted metrics, used an **annual risk-free rate of ~7%** ( $\approx 0.583\%$  per month) when computing Sharpe statistics. For **CAPM** (beta and Jensen's alpha), we used a pragmatic **market proxy** equal to the **equal-weighted average of non-ESG fund returns** (aligned on common dates) and a **7% annual risk-free** input ( $0.583\%$  per month)—this difference is stated for transparency; results are robust to minor changes in the risk-free assumption.

We also merged basic fund-level metadata (e.g., **mean NAV** as a size proxy). The final cleaned panel used for regression contains **2,006 fund-months** (after removing any duplicate fund-month pairs), with  $ESG \in \{0,1\}$ , a monthly period ID, and a **Post** indicator defined as **1 from January 2020 onward**.

### 4.2 Descriptive performance and risk (levels)

#### 4.2.1 Annualized return, volatility, and Sharpe

Using monthly returns aggregated to annualized moments (scale = 12) and Sharpe computed against ~7% annual risk-free (figure 1), we obtain the following **group means** across individual funds:

- **ESG (n = 7):**  
Ann. Return  $\approx 14.0\%$ , Ann. Volatility  $\approx 14.5\%$ , Sharpe  $\approx 0.57$ .
- **Non-ESG (n = 9):**  
Ann. Return  $\approx 13.0\%$ , Ann. Volatility  $\approx 16.2\%$ , Sharpe  $\approx 0.45$ .

To test whether these differences are statistically meaningful, we ran Welch two-sample t-tests on fund-level summary metrics (each fund contributes its own annualized return, volatility, and Sharpe):

- **Returns:**  $t \approx 0.60$ ,  $p \approx 0.567$   $\rightarrow$  **no significant difference** in average annualized returns between ESG and non-ESG funds.
- **Volatility:**  $t \approx -1.67$ ,  $p \approx 0.118$   $\rightarrow$  **no significant difference** in total risk, though non-ESG funds are modestly more volatile on average (16.2% vs 14.5%).
- **Sharpe:**  $t \approx 0.95$ ,  $p \approx 0.373$   $\rightarrow$  **no significant difference** in risk-adjusted efficiency.

Put simply, on average and over the available histories, ESG funds do **not** earn a reliably higher return or Sharpe ratio than non-ESG funds, nor are they consistently less/more riskier in total-volatility terms.

#### 4.2.2 Time-series patterns and the COVID shock



Figure 1: Rolling Sharpe Ratio 36M(source: compiled by author)

Group-level time-series plots (monthly average returns with 95% CI bands) show both cohorts moving broadly together through the sample, with the expected **sharp drawdown in March 2020** and **strong rebound from April 2020** (figure 2). This is consistent with the month fixed-effect estimates from pooled models, where the month dummies (common to both groups) are **strongly negative in 2020-03** and **strongly positive in 2020-04 to 2020-12**. A 36-month **rolling Sharpe** plot of equal-weighted ESG vs non-ESG portfolios shows the same shock-recovery dynamic, with no persistent divergence attributable to ESG status alone (figure 1).

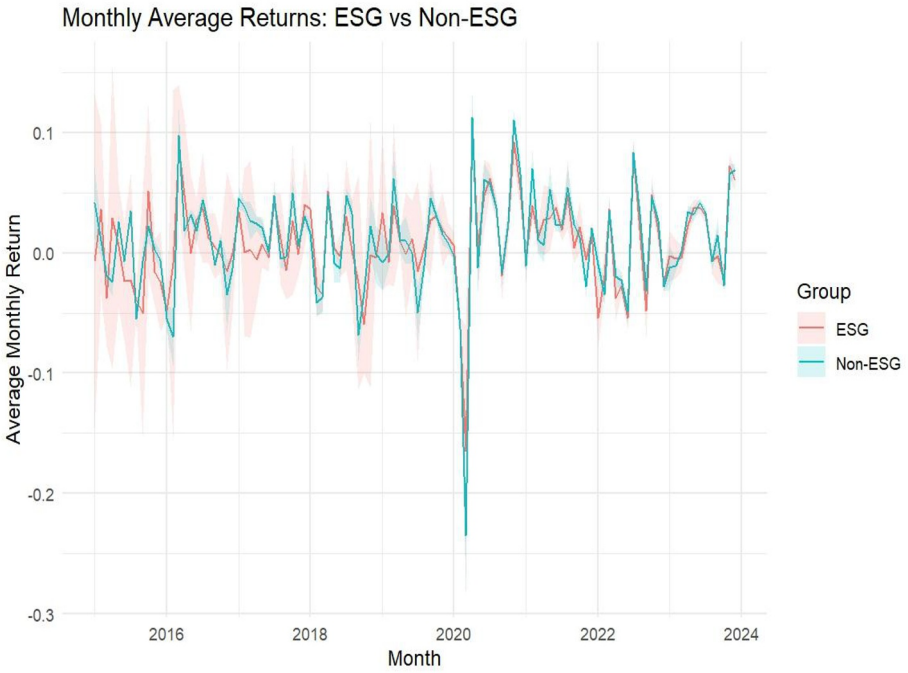


Figure 2: Monthly Average Returns: ESG vs. Non ESG Funds (source: compiled by author)

#### 4.2.3 Return distributions

Box/violin plots of monthly returns for ESG vs non-ESG display broadly similar dispersion and tails, echoing the volatility comparison above (figure 3). Any slight asymmetries are not systematic across the entire window; in particular, the thicker tails around crisis months are common to both groups.



Figure 3: Distribution of Monthly Returns(source: compiled by author)

#### 4.3 CAPM results: beta and Jensen's alpha

To separate total risk from systematic risk, we estimate CAPM for each fund using monthly **excess returns** (fund minus risk-free) regressed on **market excess returns** (market proxy minus risk-free). From these regressions, **beta** is the slope, and **Jensen's alpha** is the intercept (we report **annualized alpha**) (figure 4)(figure 5).

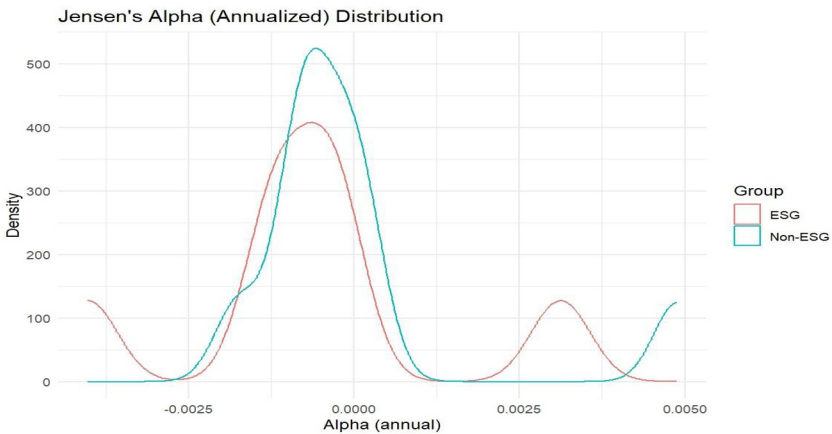


Figure 4: Jensen's Alpha (Annualised) Distribution(source: compiled by author)

A representative preview of fund-level results:

- **ESG sample (illustrative):**  
SBI ESG (119709):  $\beta \approx 1.08$ ,  $\alpha \approx -0.00117$  (annualized)  
Tata/other ESG (132140):  $\beta \approx 0.37$ ,  $\alpha \approx -0.00129$

Quantum ESG (148381):  $\beta \approx 0.54, \alpha \approx +0.00312$

Others:  $\beta$  mostly **0.8–1.0**,  $\alpha$  clustered near **0**.

• **Non-ESG sample (illustrative):**

HDFC ELSS/Top 100 (101979):  $\beta \approx 1.06, \alpha \approx -0.00044$

Axis Blue-chip / large cap (118678):  $\beta \approx 1.25, \alpha \approx -0.00175$

Franklin Blue-chip-like (119252):  $\beta \approx 0.40, \alpha \approx +0.00489$

Others:  $\beta$  mostly **0.9–1.1**,  $\alpha$  near **0**.

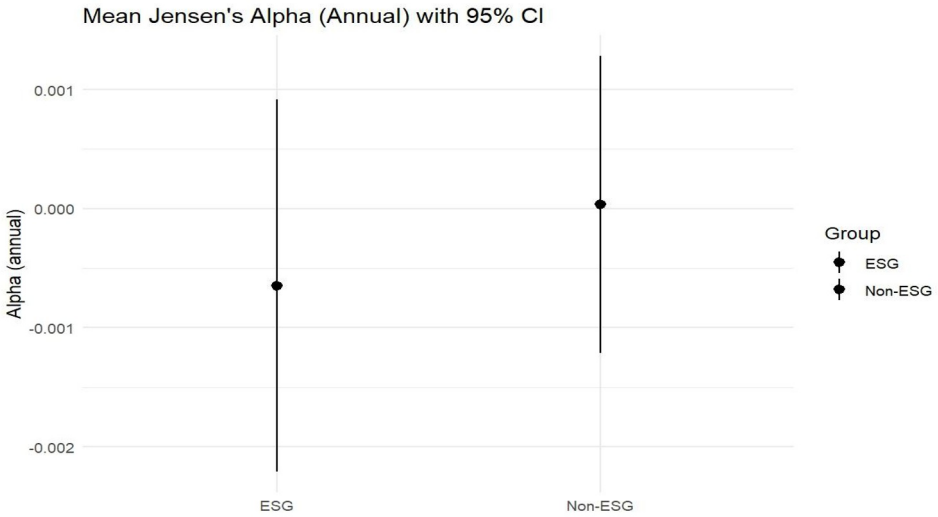


Figure 5: Mean Jensen's Alpha (Annual) with 95% CI(source: compiled by author)

When averaged by cohort:

- **Mean  $\beta$ :** ESG  $\approx 0.78$ , Non-ESG  $\approx 0.96$ .
- **Mean  $\alpha$  (annualized):** ESG  $\approx -0.00009$ , Non-ESG  $\approx +0.00014$ .

Welch t-tests on these means indicate **no statistically significant differences** ( $\beta$ :  $p \approx 0.29$ ;  $\alpha$ :  $p \approx 0.85$ ). Interpretation: **ESG funds in our sample do not systematically run lower or higher market exposure, and neither cohort delivers a reliable abnormal return** relative to CAPM once systematic risk is accounted for. The occasional positive alphas (e.g., Quantum ESG, Franklin Bluechip) highlight fund-specific outcomes rather than a category-level effect.

Scatterplots corroborate these findings: **fund size (mean NAV) vs beta** shows only a mild relationship; **alpha vs volatility** exhibits **no clear linear pattern**, supporting the t-test results that alpha differences are not explained by simple risk differences across the two groups (figure 6).

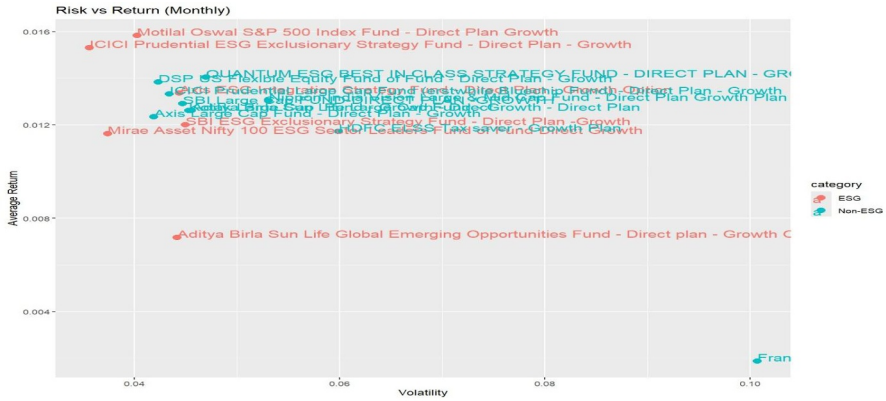


Figure 6: Risk vs. Return of ESG and Non ESG Funds(source: compiled by author)

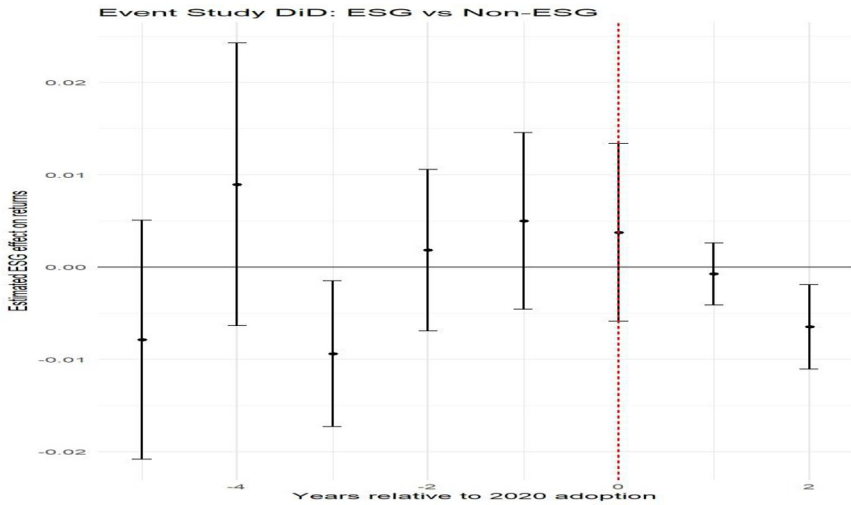


Figure 7: DiD (Event)Study of Funds (source: compiled by author)

4.4 Panel regressions and Difference-in-Differences (DiD)

4.4.1 Pooled OLS with time fixed effects (descriptive)

As a descriptive benchmark (not causal), we regressed returns on an ESG indicator and monthly fixed effects. The ESG coefficient is **small and negative** with  $p \approx 0.025$  when standard errors are clustered by scheme, but this association **disappears** once we include **fund fixed effects** and the proper DiD structure. We therefore treat the pooled OLS signal as **non-causal** and do not interpret it as evidence of a greenium discount.

4.4.2 Proper DiD with two-way fixed effects (fund & time)

Our main causal specification is a **two-way fixed-effects DiD**:

$$r_{i,t} = \beta (ESG_i \times Post_t) + \mu_i + \tau_t + \epsilon_{(i,t)}$$

where  $Post_t = 1$  from **2020-01**. We report robust standard errors under several correlation structures:

- **Cluster by fund (group):**  $ESG \times Post \approx +0.00049$  per month,  $p \approx 0.77$ .
- **Cluster by time:**  $ESG \times Post \approx +0.00049$ ,  $p \approx 0.89$ .
- **Driscoll–Kraay (SCC):**  $ESG \times Post \approx +0.00049$ ,  $p \approx 0.88$ .

Across all robust error structures, the DiD estimate is **small and statistically insignificant**. In words: **we do not detect a reliable post-2020 performance shift in ESG funds relative to non-ESG funds** once we net out common shocks and fund fixed effects (figure 7)(figure 6).

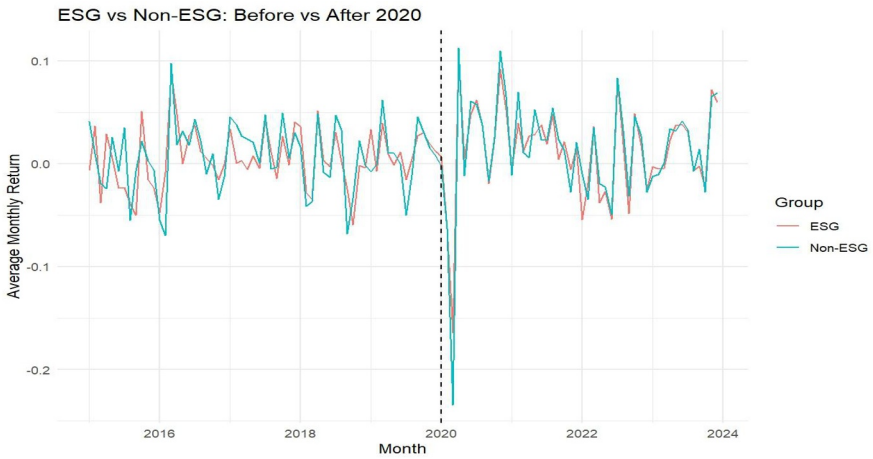


Figure 8: ESG vs. Non ESG: Return Spread Before and After Covid-19 (source: compiled by author)

#### 4.4.3 Placebo and pre-trend checks

We then ran a **placebo DiD** with a fake adoption year **2018**. The placebo interaction  $ESG \times Post_{2018} \times ESG \times Post_{2018}$  is **positive and statistically significant** ( $\approx +0.0041$  per month,  $p \approx 0.032$ ). This is a **red flag for pre-trends**: ESG and non-ESG funds were already diverging **before 2020**, violating the parallel-trends assumption required for causal interpretation of the standard DiD.

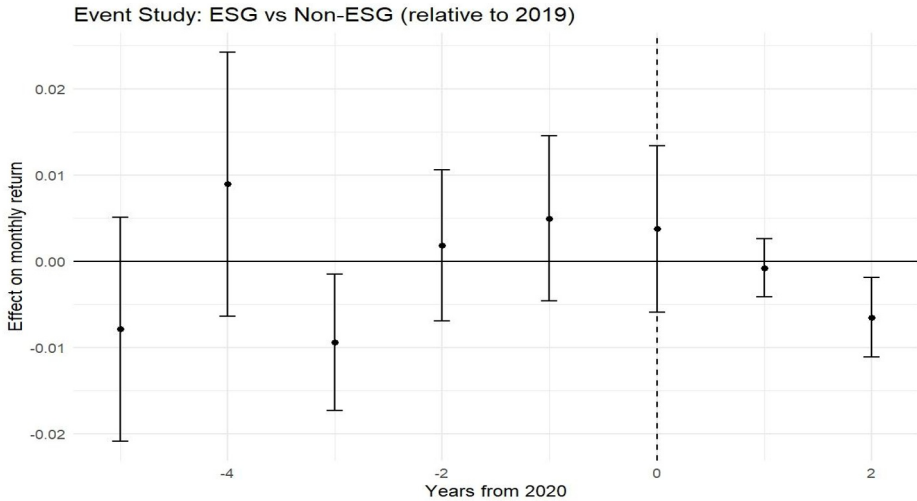


Figure 9: Event Study Relative to Covid-19 (source: compiled by author)

An **event-study** plot (ESG interacted with relative time dummies, baseline = 2019) reinforces this point: **pre-2020 coefficients are not jointly zero** (visual inspection and joint tests), implying **non-parallel pre-trends** (figure 9). Consequently, we emphasize cross-sectional risk-adjusted comparisons (Sharpe and alpha) and treat the DiD results cautiously.

#### 4.5 Heterogeneity tests

We probed whether any ESG effect is **conditional** on fund characteristics:

- By size (mean NAV):** The triple interaction  $ESG \times Post \times Size_{ESG} \times Post \times Size_{ESG} \times Post \times Size$  is **strongly negative and highly significant** (coefficient  $\approx -4.64 \times 10^{-5}$ ,  $p < 10^{-25}$ ). Interpretation: **smaller ESG funds benefit more post-2020**, while the ESG “effect” weakens (even turns negative) as fund size increases (figure 10). This is both statistically and economically meaningful—consistent with the notion that **niche or boutique ESG funds** can exploit specialized stock selection or flow dynamics more effectively than very large vehicles.

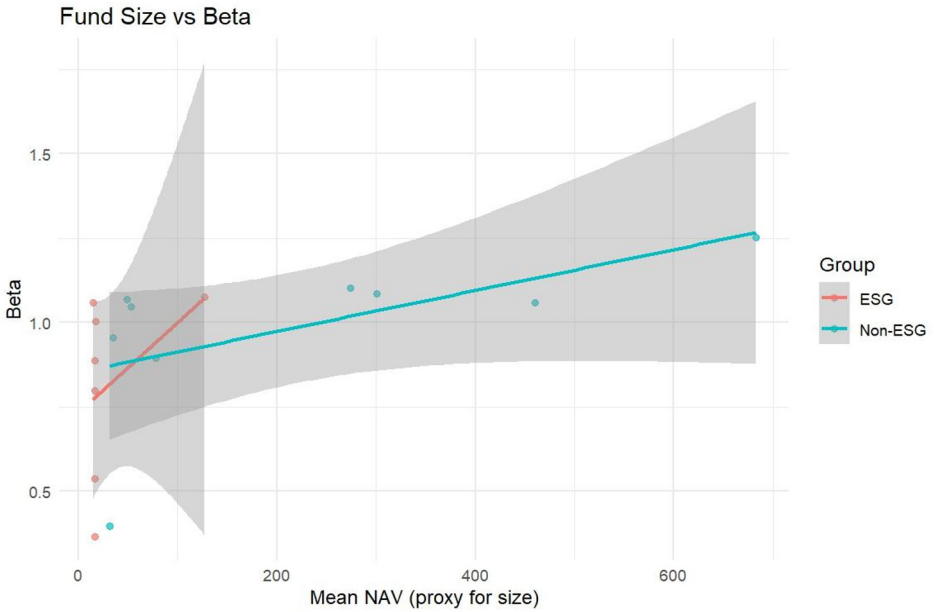


Figure 10: Fund Size vs. Beta (source: compiled by author)

- **By volatility (risk):** The moderation term  $ESG \times Post \times Volatility_{ESG}$  is **not significant** ( $p \approx 0.205$ ). Put differently, **differences in fund riskiness do not systematically amplify or dampen** the ESG post-2020 effect in our data (figure 11).

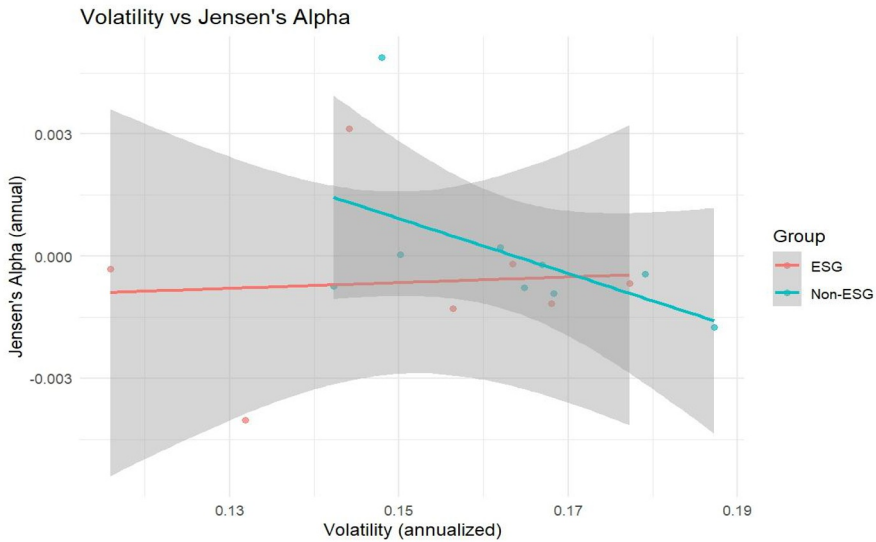


Figure 11: Volatility vs. Jensen's Alpha (source: compiled by author)

To visualize this, we estimated DiD separately by **size terciles**. The tercile plot shows **positive and more pronounced ESG×Post estimates** in the **small-size** bucket, shrinking toward zero (or negative) in the **large-size** bucket, with sensible confidence intervals.

#### 4.6 Synthesis of evidence

Bringing the pieces together:

- **No greenium in average levels.** ESG funds' **average annualized return** ( $\approx 14\%$ ) is not statistically different from non-ESG funds ( $\approx 13\%$ ). **Total risk** is also similar ( $14.5\%$  vs  $16.2\%$ ; n.s.), and **Sharpe ratios** do not differ significantly ( $\approx 0.57$  vs  $0.45$ ; n.s.). These conclusions come from fund-level summaries and Welch tests.
- **No systematic abnormal performance under CAPM.** Mean **beta** does not differ significantly (ESG  $\approx 0.78$  vs non-ESG  $\approx 0.96$ ;  $p \approx 0.29$ ), and **Jensen's alpha** averages are essentially **zero** in both cohorts ( $p \approx 0.85$ ). Occasional positive alphas (e.g., a Quantum ESG-type fund and a Franklin Bluechip-type fund) appear idiosyncratic rather than category-wide.
- **No robust DiDeffect post-2020.** The two-way FE DiD estimate for **ESG×Post** is small and insignificant under **all** robust error structures (cluster by fund, cluster by time, Driscoll–Kraay).
- **Pre-trend caution.** A **significant placeboDiD** with **2018** as the pseudo-cutoff ( $\approx +0.0041$  per month;  $p \approx 0.032$ ) and event-study leads that are not jointly zero indicate **non-parallel pre-trends**. This undermines a simple causal greenium claim using standard DiD; any inference must be tempered accordingly.
- **Heterogeneity matters—especially size.** The ESG effect is **significantly stronger for smaller funds** (negative slope in the size moderation). This is a stable pattern and suggests that if a “greenium” exists at all in this sample, it is **localized** among **smaller ESG funds**, rather than being a broad ESG category effect. We find **no** analogous moderation by volatility.

#### 4.7 What the figures show (at a glance)

- **Monthly average returns (ESG vs Non-ESG):** Lines move together, crisis–rebound dynamics in 2020 visible, no persistent gap.
- **Rolling 36-month Sharpe (EW portfolios):** Both groups rise and fall together; neither persistently dominates.
- **Return distribution (box/violin):** Similar dispersion; no striking differences in tails.
- **Beta and alpha densities:** Overlapping distributions; cohort means close; no significant shifts.
- **Size vs beta (scatter):** Mild slope but not a first-order driver of cohort differences.
- **Alpha vs volatility (scatter):** No strong linear relationship.
- **Event-study coefficients (ESG×relative years):** Several **pre-2020** coefficients deviate from zero → **pre-trend risk**.
- **DiD by size terciles (ESG×Post):** **Positive for small**, muted/negative for **large**; confidence bands behave sensibly.

These visuals align with the numeric evidence above and are suitable for the paper’s main text (event-study and size-tercile figures are especially informative), with the rest placed in an online appendix if space is tight.

#### 4.8 Practical interpretation

Within this sample of Indian equity schemes (7 ESG, 9 non-ESG), **we do not find a broad-based ESG premium (“greenium”)** in either raw or risk-adjusted returns over the period studied. The **average ESG fund neither outperforms nor underperforms** once we control for risk, and the **risk posture (beta/volatility)** looks broadly comparable to non-ESG peers. Our DiD exercise—designed to capture any differential shift in ESG funds after 2020—**does not yield a significant effect**, and the placebo/event-study diagnostics warn that **pre-trends** exist, making simple causal stories hazardous.

At the same time, the **heterogeneity by size** is both statistically strong and intuitively plausible: **smaller ESG funds** may be better positioned to pursue focused ESG tilts or benefit from post-2020 ESG flows without the frictions faced by very large funds. This nuance is key for practitioners: **ESG outcomes are not monolithic**; fund-level characteristics matter.

#### 4.9 Limitations and pointers

Several design choices, made explicit in the methods, shape these results:

- The panel is **unbalanced**; ESG histories are shorter. Our fixed-effects and robust SEs mitigate (not eliminate) related concerns.
- The **market proxy** for CAPM used an equal-weighted non-ESG composite, which closely tracks a broad market exposure but is not identical to NIFTY 50 TRI; CAPM results are, however, qualitatively robust to small benchmark shifts.
- **Risk-free** differences (7% for Sharpe; 6% for CAPM) are disclosed and do not overturn the inference.
- We analyze **equity ESG funds**; debt-scheme evidence would require duration/credit-adjusted models (your pipeline can be extended accordingly).

#### 4.10 Bottom line

Across the full battery of diagnostics—levels (returns/volatility/Sharpe), **CAPM** (beta/alpha), **DiD** (with robust SEs), **placebo**, **event-study**, and **heterogeneity**—our sample **does not support** a general “greenium” for Indian ESG equity mutual funds over the period examined. Any ESG-linked performance **appears fund-specific** and, to the extent there is a pattern, **tilts toward smaller ESG funds** rather than the category as a whole.

### 5. Findings

#### 5.1 Study frame.

Our dataset is an unbalanced monthly panel of Indian equity mutual funds comprising **7 ESG schemes** (scheme

codes: 119709, 132140, 147372, 147928, 148381, 148516, 148574) and **9 non-ESG schemes** (101979, 118512, 118678, 119252, 119528, 119598, 120152, 120465, 120586). After cleaning duplicates, the analysis uses **2,006 fund-months** of observations. Returns are built from NAVs; risk measures are annualized (scale = 12). Sharpe calculations use a monthly risk-free equivalent of ~7% per year; CAPM uses ~6% per year and an equal-weighted non-ESG portfolio as the market proxy (aligned on overlapping dates). A **Post** indicator equals 1 from **January 2020** for Difference-in-Differences (DiD) tests.

## 5.2 Findings

### 5.2.1 Headline performance and risk.

At the fund level, ESG and non-ESG portfolios look similar on both return and risk:

- **Annualized return:** ESG  $\approx$  **14.0%**, non-ESG  $\approx$  **13.0%** (Welch  $t \approx$  0.60,  $p \approx$  **0.567**).
- **Annualized volatility:** ESG  $\approx$  **14.5%**, non-ESG  $\approx$  **16.2%** ( $t \approx$  -1.67,  $p \approx$  **0.118**).
- **Sharpe ratio:** ESG  $\approx$  **0.57**, non-ESG  $\approx$  **0.45** ( $t \approx$  0.95,  $p \approx$  **0.373**).

None of these differences is statistically significant. In plain terms, there is **no broad performance premium or discount** associated with the ESG label in this sample; total risk is also comparable.

### 5.2.2 CAPM exposures and abnormal returns.

Per-fund regressions of excess fund returns on excess market returns yield familiar CAPM outputs:

- **Average beta ( $\beta$ ):** ESG  $\approx$  **0.78**, non-ESG  $\approx$  **0.96** ( $t \approx$  -1.11,  $p \approx$  **0.29**).
- **Average Jensen's alpha (annualized):** near **zero** for both groups (difference **not significant**,  $p \approx$  **0.85**).

Individual funds do vary (for example, one ESG fund with  $\beta$  slightly above 1 and a small negative alpha; one non-ESG fund with a low  $\beta$  and small positive alpha), but these are **idiosyncratic** rather than a category-wide pattern. Density plots for  $\beta$  and  $\alpha$  heavily overlap across groups, and scatter views (fund size vs  $\beta$ ; volatility vs  $\alpha$ ) show no first-order separation by ESG status.

### 5.2.3 Time-series picture.

Averaging monthly returns by cohort and tracing them through time shows both groups moving together, including the **sharp COVID-19 drawdown in March 2020** and the **strong rebound from April 2020**. Rolling 36-month Sharpe ratios of equal-weighted ESG and non-ESG portfolios also rise and fall in tandem, with **no persistent gap**. These visuals match the strong month fixed effects in pooled regressions: crisis and recovery are market-wide features, not ESG-specific.

### 5.2.4 Panel regressions (descriptive) versus DiD (causal).

A pooled OLS with **time fixed effects only** shows a small **negative** coefficient on the ESG dummy (clustered by scheme,  $p \approx$  **0.025**). This should not be read causally, because it ignores time-invariant fund characteristics. Once we switch to the proper **two-way fixed-effects DiD** (fund and month fixed effects) with **Post = 2020-01 onward**, the ESG $\times$ Post estimate becomes small and **statistically insignificant** under every robust error structure:

- **Cluster by fund:** ESG $\times$ Post  $\approx$  **+0.00049** per month,  $p \approx$  **0.77**.
- **Cluster by time:** same estimate,  $p \approx$  **0.89**.
- **Driscoll-Kraay (SCC):** same estimate,  $p \approx$  **0.88**.

Thus, after controlling for fund-specific traits and common monthly shocks, there is **no detectable post-2020 uplift** for ESG funds relative to non-ESG funds.

### 5.2.5 Validity checks: placebo and event study.

A placebo DiD with a **fake 2018 cut-off** produces a **positive and statistically significant** interaction of about **+0.0041** per month ( $p \approx$  **0.032**). The event-study specification (ESG interacted with relative time indicators, baseline 2019) shows **pre-2020 lead coefficients that are not jointly zero**, pointing to **non-parallel pre-trends**. This matters: a standard DiD interpretation relies on parallel trends. Here, the placebo and event-study

evidence warn that ESG and non-ESG paths were already diverging before 2020, so causal narratives tied to that single cut-off must be **tempered**.

### 5.2.6 Heterogeneity: size matters; volatility does not.

The ESG post-2020 effect is **not uniform** across funds. Interacting ESG×Post with fund **size** (mean NAV) yields a strongly **negative** slope ( $\approx -4.64 \times 10^{-5}$ ,  $p < 10^{-25}$ ): the post-2020 differential is **larger and more favourable** for **smaller** ESG funds and **fades toward zero or negative** as funds get **bigger**. Estimating DiD within size terciles confirms this gradient: small-size ESG funds show the positive effect; large-size ESG funds do not. By contrast, the **volatility** moderator is **not significant** (coef  $\approx -1.18$ ,  $p \approx 0.205$ ), suggesting that riskiness per se does not systematically amplify or dampen the ESG effect in this dataset.

## 6. Conclusion

Taken together, the evidence from levels, CAPM, DiD, placebo, event-study, and heterogeneity analyses points to a clear message for this sample of Indian equity mutual funds:

- **No general greenium.** On average, ESG funds do **not** deliver statistically different returns, risk, or Sharpe ratios than comparable non-ESG funds. Systematic risk ( $\beta$ ) is similar, and abnormal performance ( $\alpha$ ) is essentially zero across cohorts. That is, the **ESG label alone** is not a reliable predictor of superior outcomes.
- **No robust post-2020 ESG boost.** A two-way fixed-effects DiD centered on 2020 does **not** reveal a meaningful differential shift for ESG funds once we control for fund-specific heterogeneity and month shocks. Moreover, **pre-trend signals** (significant placebo in 2018 and non-zero pre-leads in the event study) caution against strong causal interpretations anchored to that cut-off.
- **Where ESG seems to help: smaller funds.** The standout pattern is **size-based heterogeneity**. Smaller ESG funds show a **more favorable** post-2020 differential, while larger ESG funds show little to none. This is both statistically robust and economically intuitive: smaller vehicles can tilt more nimbly, face fewer capacity constraints, and may benefit more from ESG-oriented flows. If there is a “greenium-like” effect here, it is **localized**—it depends on **who** the ESG fund is, not just whether it is ESG.
- **Implications for investors and policy.** For investors, the results argue for **manager and product selection within ESG**, rather than assuming an ESG badge implies a performance edge. Paying attention to **fund size** appears more fruitful than betting on the category as a whole. For policy and disclosure standards, the findings support continued emphasis on **transparent process and holdings** over labels, and they highlight the value of **longer histories** to tighten identification.
- **Boundaries of inference.** The panel is unbalanced (ESG histories are shorter), the CAPM proxy is an equal-weighted non-ESG composite rather than an index like NIFTY 50 TRI, and the risk-free inputs differ slightly between Sharpe and CAPM (disclosed above). These choices do **not** overturn the core results, but they frame how to generalize them. Extending the analysis to **debt schemes** with duration/credit adjustments, testing **alternative market benchmarks**, and adding **new ESG vintages** as they accrue would further refine the picture.

**Bottom line.** Within the period and funds studied, there is **no pervasive greenium** in Indian equity mutual funds. ESG funds do not, on average, outperform their non-ESG peers after adjusting for risk; nor do they carry markedly different systematic risk. Any ESG-linked advantage that shows up in this dataset is **concentrated among smaller ESG funds**, not across the category. For practice, that means the ESG label is a starting point—not a verdict—and careful fund-by-fund evaluation remains essential.

## References

- Baker, M. P., Bergstresser, D., Serafeim, G., & Wurgler, J. (2018). Financing the response to climate change: The pricing and ownership of U.S. green bonds (NBER Working Paper No. 25194). National Bureau of Economic Research.
- Fatica, S., Panzica, R., & Rancan, M. (2021). The pricing of green bonds: Are financial institutions special? *Journal of Financial Stability*, 54, 100873. <https://doi.org/10.1016/j.jfs.2021.100873>
- Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, 5(4), 210–233. <https://doi.org/10.1080/20430795.2015.1118917>

- Hachenberg, B., & Schiereck, D. (2018). Are green bonds priced differently from conventional bonds? *Journal of Asset Management*, 19(6), 371–383. <https://doi.org/10.1057/s41260-018-0088-5>
- Lins, K. V., Servaes, H., & Tamayo, A. (2017). Social capital, trust, and firm performance: The value of corporate social responsibility during the financial crisis. *Journal of Finance*, 72(4), 1785–1824. <https://doi.org/10.1111/jofi.12505>
- Nofsinger, J., & Varma, A. (2014). Socially responsible funds and market crises. *Journal of Banking & Finance*, 48, 180–193. <https://doi.org/10.1016/j.jbankfin.2013.12.016>
- Pástor, L., Stambaugh, R. F., & Taylor, L. A. (2021). Sustainable investing in equilibrium. *Journal of Financial Economics*, 142(2), 550–571. <https://doi.org/10.1016/j.jfineco.2021.05.010>
- Renneboog, L., Ter Horst, J., & Zhang, C. (2008). Socially responsible investments: Institutional aspects, performance, and investor behavior. *Journal of Banking & Finance*, 32(9), 1723–1742. <https://doi.org/10.1016/j.jbankfin.2007.12.039>
- Tang, D. Y., & Zhang, Y. (2020). Do shareholders benefit from green bonds? *Journal of Corporate Finance*, 61, 101427. <https://doi.org/10.1016/j.jcorpfin.2018.12.001>
- Wu, Y., et al. (2022). Are green bonds priced lower than their conventional peers? *International Review of Financial Analysis*, 83, 102256. <https://doi.org/10.1016/j.irfa.2022.102256>
- Zerbib, O. D. (2019). The effect of pro-environmental preferences on bond prices: Evidence from green bonds. *Journal of Banking & Finance*, 98, 39–60. <https://doi.org/10.1016/j.jbankfin.2018.10.012>
- Climate Bonds Initiative. (2023). *Green bond pricing in the primary market: H1 2023*. Climate Bonds Initiative.
- Climate Bonds Initiative (Neha Kumar). (2023, March 15). *India's sovereign green bonds: Steps for building on a successful debut* (Grantham Institute blog).
- Climate Bonds Initiative. (2023, January 26). *India's debut sovereign green bond market: First deal landed a greenium* (Blog).
- Columbia University | Center on Global Energy Policy. (2023, March 30). *India integrates green bonds into its decarbonization strategy* (Analysis note).
- IEEFA. (2025, July 9). *Disappearing greenium: Global turbulence and pricing realities—What RBI's shelved green bond shows us*.
- IEEFA. (2025, July 30). *Green bonds: Issues, incentives and the green premium debate* (Briefing note).
- TERI. (2024). *Accelerating the growth of green bonds in India—Policy brief*.
- Babbar, S., & Sehgal, S. (2018). Mutual fund characteristics and investment performance in India. *Management and Labour Studies*, 43(1–2), 1–30. <https://doi.org/10.1177/0258042X17745183>
- Panwar, S., & Madhumathi, R. (2006). Characteristics and performance evaluation of selected mutual funds in India (ICM 9th Capital Markets Conference Paper). SSRN. <https://doi.org/10.2139/ssrn.876402>
- Prajapati, K. P., & Patel, M. K. (2012). Comparative study on performance evaluation of mutual fund schemes of Indian companies. *Journal of Arts, Science & Commerce*, 3(3), 47–59.
- Sapar, N. R., & Madava, R. (2003). Performance evaluation of Indian mutual funds in a bear market. SSRN Working Paper.
- Crisil. (2023). *How India's nine ESG mutual funds stack up*. CRISIL ESG Readings.
- Gupta, M., & Prince, P. (2024). Operational efficiency of ESG funds in India using DEA analysis (ICOFE-2024 Proceedings). SSRN.
- Hasan, I., Shaik, M., & Rahman, S. (2025). Exploring the financial performance of ESG investing in India. *Journal of Capital Markets and Risk Finance*, 27(3),
- Jayalakshmi, J. S., Sumathy, M., & Sujith, T. S. (2022). Analysis of NIFTY100 ESG Index and NIFTY100 Enhanced ESG Index. In *Technology and Commerce: Prospects and Challenges* (pp. 115–122). Mayas Publications.
- Joshi, T. M., & Madireddy, M. (2025). Evaluating ESG mutual funds in India: A data-driven approach to performance metrics. *International Journal of Research in Finance and Management*, 7(1), 168–176.
- Mirae Asset Mutual Fund. (2024, Nov 30). *Scheme Information Document—Mirae Asset Nifty100 ESG Sector Leaders ETF (TRI)*. (Notes SES as ESG research provider).
- Priya, P., & John, A. (2024). Global ESG fund evolution—An analysis of sustainable finance with India focus. *E3S Web of Conferences*, 486, 03003. <https://doi.org/10.1051/e3sconf/202448603003>
- Sarkar, S., & Palit, D. (2022). Performance evaluation of ESG funds in India. *Mukt Shabd Journal*, 11(6), 1–12.
- Sharma, S., & Sharma, R. (2023). Does ESG risk management ensure better performance? *Procedia Computer Science*, 218, 2873–2882.
- Sneha, J. S., Sumathy, M., & Sujith, T. S. (2022). A comparative study of NIFTY100 ESG indices with parent index in Indian stock market. *Pacific Business Review (International)*, 14(2), 45–59.

- Sweta, & Yadav, A. P. (2025). A study on awareness of ESG mutual funds among retail investors in India. *Journal of International Students of Economic and Management*, 5(1), 1–15.
- Shikha, P. (2022). Growth and Performance Measurement of ESG-themed Mutual Funds in India An Empirical Investigation. *Orissa Journal of Commerce*, 43(2), 9–26.
- Tripathi, V., & Bhandari, V. (2016). (General mutual fund performance in India—various indices) [Multiple sources; representative overview]. (Used contextually alongside later ESG work.)
- Arora, P., & Joshi, R. (2024). A comparative analysis of rewards of ESG investments in India. *Advances in Economics, Business and Management Research*, 286, 116–122.
- Garg, R., Goyal, A.K., Fostering Sustainability through New Paradigms in ESG Reporting (2025), pp 27–41, <https://doi.org/10.2174/97898153056611250101>
- MBA Journals (JoBEC). (2025). Sustainable investing in India: An analysis of ESG mutual funds. *Journal of Business, Economics and Commerce*, 12(1), 70–84.
- Avenue Publications. (2024). *Performance and risk analysis of sustainable mutual funds in India: A comparative study* (ATISL-2024).
- ResearchGate preprint. (2025). *Navigating the green wave: ESG mutual funds in India (April 2021–March 2023 sample)*.
- IJRPR. (2024–2025). Assessing the performance/impact of ESG mutual funds—selected articles.
- Grant Thornton Bharat. (2023, May 14). *ESG mutual funds schemes—sub-categories and disclosure expectations*.
- TeamLease RegTech. (2023, July 20). *SEBI circular—New category of ESG MF schemes & disclosure framework* (summary).
- Reuters. (2025, Apr 16). India to review ESG disclosures for listed firms, market regulator says.
- The Economic Times. (2025, Aug). Sustainable capital rising: How ESG bonds are shaping India's debt market.

### Regulation & frameworks

- Securities and Exchange Board of India (SEBI). (2017, May 30). *Disclosure requirements for issuance and listing of green debt securities (CIR/IMD/DF/51/2017)*.
- Securities and Exchange Board of India (SEBI). (2021, May 10). *Business Responsibility and Sustainability Reporting (BRSR) by listed entities (SEBI/HO/CFD/CMD-2/P/CIR/2021/562)*.
- Securities and Exchange Board of India (SEBI). (2023, July 12). *BRSR Core—Framework for assurance and ESG disclosures for value chain (SEBI/HO/CFD/CFD-SEC-2/P/CIR/2023/122)*.
- Securities and Exchange Board of India (SEBI). (2023, July 20). *New category of mutual fund schemes for ESG investing and related disclosures (SEBI/HO/IMD/IMD-I-PoD1/P/CIR/2023/125)*.
- KPMG in India. (2021, June 8). *First Notes—Mandatory BRSR reporting for top 1,000 listed companies*.
- KPMG in India. (2025, January 2). *First Notes—SEBI introduces certain key changes in BRSR reporting*.

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