

## ESG Disclosure, IPO Underpricing and First-Day Return Dispersion: Evidence from India

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### Abstract

Investors increasingly judge newly listed firms not only on their growth prospects but on their environmental, social and governance (ESG) credentials, and Indian regulators have moved in the same direction through the Business Responsibility and Sustainability Reporting (BRSR) mandate. This paper asks whether the strength of a firm's ESG disclosure is priced by investors at the moment of listing. We are following a reference study of 100 European initial public offerings (IPOs) from 2017 to 2021 (Ferri et al., 2023), but assemble a substantially larger and more recent sample of 479 Indian IPOs completed between 2016 and 2026, and model first-day underpricing as a function of ESG scores and a set of firm- and issue-level controls. Underpricing averages 20.52 percent in the sample, and the mean ESG score is 58.94 on a 0-100 scale. Three estimation strategies are used: a multiple linear regression with year and sector controls, a mixed-effects specification that treats sector as a random grouping, and a random forest benchmark that imposes no functional form. Across all three, the ESG coefficient is statistically indistinguishable from zero, and a median split between high-disclosure and low-disclosure firms produces a difference in mean underpricing of 2.78 percentage points that is not significant (Welch  $t = -0.872$ ,  $p = 0.384$ ; Mann-Whitney  $p = 0.882$ ). Mean underpricing does fall across the rating categories, from 25.62 percent for the firms rated Weak to 5.89 percent for the twenty firms rated Leadership. That difference is not robust, however. It is significant under a conditional mean model with robust standard errors, but it does not survive size matching, distribution-free tests (Mann-Whitney  $p = 0.349$ ; Brunner-Munzel  $p = 0.340$ ), a comparison of medians, quantile regressions at the 25th, 50th and 75th percentiles, or the removal of the three largest observations in the Weak category. What is consistent across every specification is dispersion: the standard deviation of first-day returns declines monotonically across the rating categories, from 45.69 percent for Weak-rated firms to 14.45 percent for those rated Leadership, a variance ratio of 0.10. ESG disclosure, in other words, is associated with predictability rather than with lower average underpricing in the Indian market, and the link between disclosure and pricing is considerably weaker than in the European benchmark. The study is limited by the cross-sectional nature of the sample and by the high collinearity between issue size and total revenue.

**Keywords: ESG, IPO underpricing, India, Initial Public Offerings, sustainability reporting.**

## Introduction

An initial public offering (IPO) is where a firm's private information becomes public, and the first-day price is the market's verdict on it. Because issuers know more than the subscribing investors, the offer price is set systematically below the eventual trading price. This wedge, underpricing, is among the most robust regularities in corporate finance (Loughran & Ritter, 2004; Ritter & Welch, 2002).

Can a firm narrow that wedge by disclosing more before listing? Sustainability reporting is the fastest-institutionalising channel for non-financial information, and if it reduces information asymmetry, ESG reporting should lower first-day returns. A study of 100 European IPOs from 2017 to 2021 found that publishing a sustainability report before listing cut underpricing by about eight percent (Ferri et al., 2023), a result that became a benchmark claim.

That conclusion rested on a small, institutionally homogeneous European sample in exceptionally accommodative monetary conditions, and it is not obvious that it travels. India offers a sharp contrast: its primary market ranks among the world's busiest, with listing volumes rising from a handful of issues in the mid-2010s to more than a hundred in 2025, and it moved from voluntary to mandatory disclosure under the Securities and Exchange Board of India (SEBI) BRSR framework (Menghnani et al., 2022; Tripathi et al., 2026). Retail participation is high and issues are frequently oversubscribed, so the informational environment is noisier than in Europe.

This paper examines that question on 479 Indian IPOs completed between 2016 and 2026, asking whether an issuer's ESG score, or the rating derived from it, explains variation in first-day underpricing after controlling for firm age, number of shares offered, total revenue and issue size. The sample is roughly five times larger than the reference study's and spans both the pre-BRSR voluntary and post-BRSR mandatory regimes.

Three findings stand out. The raw association between ESG scores and underpricing is negative but negligible (-0.0377). This null is stable across a linear specification, a mixed-effects specification and a non-parametric random forest, ruling out functional form. What is stable everywhere is dispersion, which falls monotonically as disclosure improves.

## 2. Literature Review

### 2.1. Environmental, Social and Governance Risk

ESG risk is the possibility that environmental, social or governance failures damage a firm's cash flows, cost of capital or licence to operate. Such failures are hard to quantify in advance, so they reach investors through uncertainty, and that uncertainty is priced: across more than 2,000 studies, ESG criteria are associated with financial performance more often than not, most strongly as a risk factor (Friede et al., 2015), and investors charge for environmental exposures through the carbon premium (Bolton & Kacperczyk, 2021) and the pollution premium (Hsu et al., 2023).

The theory for the listing context comes from adverse selection: when sellers know more about quality than buyers, a market can unravel unless some mechanism separates good units from bad (Akerlof, 1970). Uninformed investors facing better-informed counterparties suffer a winner's curse and participate only if the offer price is discounted on average (Rock, 1986). Underpricing rises with ex ante uncertainty (Beatty & Ritter, 1986), and uncertainty also governs its volatility (Lowry et al., 2010). The wider the information gap, the deeper the discount (Ljungqvist, 2007), and better disclosure reduces information asymmetry (Healy & Palepu, 2001).

If ESG disclosure narrows that gap it should reduce the discount, and that is the bridge this paper tests. Informationally, ESG reporting supplies data investors would otherwise gather at their own cost, as

voluntary non-financial disclosure lowers the cost of equity capital (Dhaliwal et al., 2011). As a signal, a credible report is more expensive for firms with poor sustainability performance, so willingness to report separates better firms from worse (Spence, 1973), consistent with legitimacy pressures to account publicly (Suchman, 1995).

## 2.2. ESG Factors and Performance

For India the evidence is mixed: studies of NSE 100 ESG, NSE 500 and energy-sector firms find relationships differing across pillars and dimensions (Behl et al., 2022; Dalal & Thaker, 2019; Lunawat & Lunawat, 2022), while the innovation channel suggests the link is mediated by other firm choices (Busch & Schnipper, 2022).

A non-linear, disaggregated study of 305 NSE-listed manufacturing firms found ESG disclosure effects on performance are not uniform (Agarwala et al., 2024); a panel regression of 95 NSE-100 firms found they differ across financial, operating and market-based measures (Shobhwani & Lodha, 2024); a system GMM estimator addressed endogeneity in 59 non-financial NSE companies (Dwivedi et al., 2024); and Bloomberg ESG scores have been combined with Prowess data for Nifty 100 firms (Deb et al., 2026). The correlation is real in India but neither large nor uniform (Khalil et al., 2024).

## 2.3. ESG Factors and the Investments

The investment channel matters because it determines who is at the table when the offer price is set. Investing in socially responsible securities has become an important part of institutional investments, with ESG ratings incorporated in the index construction, mandate screening, and stewardship (Pastor et al., 2021). Companies with good sustainability records find it easier to raise money (Cheng et al., 2014), while the role of analysts has changed from punishment to reward (Ioannou & Serafeim, 2015).

The cross-country study confirmed the existence of the sustainability underpricing relation, despite ESG government ratings and disclosures, with India and South Africa being the countries that scored the lowest on the SDG index among those included in the study (Boulton, 2024a). In Singapore, pre-IPO ESG press attention had an influence on the environmental tone of IPO prospectuses (Kang & Lam, 2023), while voluntary disclosures lowered the likelihood of IPO cancellation worldwide (Jamaani & Alidarous, 2025). ESG signals are noisy: where ratings disagree, prices react more strongly to ESG news (Serafeim & Yoon, 2023).

## 2.4. ESG Factors and the IPO

ESG-IPO linkage in the literature is relatively new and contentious. For the reference outcome, there is data on 100 European IPOs between 2017 and 2021, where the impact of ESG reporting was negatively significant for underpricing, by 8% (Ferri et al., 2023). ESG disclosures in the US registration statements were negatively correlated with underpricing (Fenili & Raimondo, 2021). In Indonesia, issuing a sustainability report prior to an IPO listing reduced underpricing (Rahmatullah & Hakam, 2025).

This has been supplemented later. There is less underpricing during IPO in mandatory disclosure systems of ESG because of information asymmetry and investor attention (Duong et al., 2024), and a similar effect has been found in companies that are affected by mandates due to lower litigation risk and not the investor's preference (Boulton, 2024b). The impact of ESG rating on underpricing IPOs in Europe from 2014 to 2023 was conditional on the market segment (Schmunkamp, 2025), the ASEAN-5 experience shows there is a negative connection (Uy et al., 2026), and a review sees ESG disclosure and underwriter reputation as supplementary (Heltiyani & Wardhana, 2025).

Evidence is scant for India. Reactions to female CEOs during IPOs in India depended on the governance environment and not uniformly positive (Basu & Chakraborty, 2022). Indian MSME IPOs exhibit strong underpricing coupled with considerable first-day price correction, implying that much of the first-day return is due to sentiment (Bhatia & Singh, 2026). Underpricing in India depends more on the

environment than the firm features (Bansal & Khanna, 2013; Pande & Vaidyanathan, 2007), and the underlying distribution has several large observations (Bansal & Khanna, 2012). In India, where retail investors subscribe, the level of oversubscription and grey-market prices become better predictors of the listing day returns than fundamentals (Khurshed et al., 2011; Neupane et al., 2014), even in the context of the listing wave during the pandemic (Maheshwari & Kumar, 2026). Systematic reviews have shown the divergence of the findings in developing countries from those in developed countries (Acharya & Mahadik, 2023) and role of investor attention in listing returns (Mulchandani et al., 2023b), with deliberate and after-market mispricing exhibiting distinct behaviors (Mulchandani et al., 2023a).

## Two hypotheses follow.

**H1.** *ESG disclosure is negatively associated with IPO underpricing in the Indian market.*

The second responds to the non-linearity in the recent literature and to the threshold logic of signalling: if disclosure is credible only when comprehensive, the pricing benefit should not be spread evenly across the rating distribution, particularly when the rating scale is coarse and raters disagree about what they measure (Agarwala et al., 2024; Berg et al., 2022; Schmunkamp, 2025).

**H2.** *The negative association between ESG disclosure and underpricing is concentrated at the upper end of the disclosure distribution rather than being continuous.*

## The Indian Institutional Setting

The sustainability reporting process of India has been through three phases, which have taken place during the sampling period. The first phase was when voluntary sustainability reporting was started in 2012, then in 2015, the phase was changed from voluntary to a mandatory Business Responsibility Report of the 500 biggest listed organizations, which has been replaced by BRSR, which has been made mandatory by SEBI among the 1,000 largest organizations (Tripathi et al., 2026). The BRSR process requires disclosure based on the ESG indicators that include emission, energy, and water usage, along with the welfare of employees and good governance (Debnath & Kanoo, 2022; Menghnani et al., 2022), and South African experience proves that mandating the form increases the volume before quality (Wachira et al., 2020).

Two aspects of the Indian environment that affect the tests are as follows. Firstly, since mandatory reporting eliminates cross-sectional variation by removing discretion on disclosure after the largest firms start disclosing, any variation left in the disclosure quality might be the reason behind the low power of discloser vs. non-discloser test in India. Secondly, there is considerable variation among the disclosures made by BRSR filings despite using a common template (Bhowmick & Mahindrakar, 2026). Thirdly, due to high participation of retail investors and heavy oversubscription (Neupane et al., 2014), returns on the first day contain a large amount of sentiment.

## Materials and Methods

### Data

The sample consists of 479 initial public offerings by Indian companies listed between 2016 and 2026. Each observation is a single listing event, and because all 479 issuers are distinct firms the data form a cross-section rather than a balanced panel. The window begins in 2016, the first year with enough issues carrying complete offer and financial data to support inference, and ends in 2026, a partial year: the sixteen issues recorded for 2026 are those completed to date.

The dataset was built from offer documents filed with the exchanges, listing-day price records, and financial statements for the fiscal year preceding each offering. ESG is captured as a continuous score on a 0-100 scale and as the rating derived from it in four tiers: Weak (17.0 to 44.7), Adequate (45.0 to 59.9), Strong (60.0 to 74.4) and Leadership (75.0 to 88.0). Both assume that a higher score means

better disclosure, which the rating-divergence literature cautions against (Berg et al., 2022; Liu, 2022). Table 1 reports the sample composition.

**Table 1. Sample Description**

| Industry               | N          | IPO Year       | N          |
|------------------------|------------|----------------|------------|
| Industrials            | 171        | 2016           | 22         |
| Consumer Discretionary | 69         | 2017           | 37         |
| Financials             | 68         | 2018           | 20         |
| Health Care            | 41         | 2019           | 15         |
| Materials              | 39         | 2020           | 14         |
| IT                     | 38         | 2021           | 64         |
| Consumer Staples       | 18         | 2022           | 35         |
| Utilities              | 11         | 2023           | 61         |
| Communication Services | 11         | 2024           | 88         |
| Real Estate            | 9          | 2025           | 107        |
| Energy                 | 4          | 2026 (partial) | 16         |
| <b>Total</b>           | <b>479</b> | <b>Total</b>   | <b>479</b> |

Industrials account for more than a third of the sample, so that sector sets the baseline for other sector coefficients. More importantly, 272 of the 479 issues, or 56.8 percent, were completed in 2023 or later, while 2018 to 2020 together contributed only 49, so the sample is weighted towards a period of strongly rising Indian equity markets and the progressive rollout of the BRSR mandate.

The design departs from the reference study, which built a pairwise-matched sample of 50 European firms that published a sustainability report before listing and 50 comparable firms that did not, modelling underpricing on a disclosure dummy (Ferri et al., 2023). That contrast cannot be reproduced in India. Because SEBI's BRSR framework obliges the largest listed entities to report, the decision to disclose no longer separates firms (Menghnani et al., 2022; Tripathi et al., 2026).

## Variables

The dependent variable is underpricing, measured as the first-day return on the listing:

$$\text{Underpricing} = (\text{Listing Price} - \text{Offering Price}) / \text{Offering Price} \times 100$$

Across the 479 issues, underpricing averages 20.52 percent with a standard deviation of 34.83 percentage points: 27.8 percent of issues listed below their offer price and 13.4 percent returned more than 50 percent on the first day. The dependent variable is strongly right-skewed, one reason the diagnostics below fail normality, so the tests are reported as a battery (Lowry et al., 2010).

The independent variable of interest is the ESG score. In the second specification it is replaced by ESG High, a dummy equal to one for firms at or above the sample median of 58.6, yielding 240 high-disclosure and 239 low-disclosure issues.

Five controls follow the reference study's design: Age is  $\ln(\text{IPO Year} - \text{Foundation Year} + 1)$ ; Number of Shares, Total Revenue and Issue Size are the natural logarithms of shares offered, total revenue in crore rupees for the preceding year, and gross issue size in crore rupees. IPO year and sector fixed effects are included throughout. One reference-study control, distinguishing bank-based from market-based financial systems, is not applicable because the Indian sample lies entirely within a single bank-dominated system.

Total Revenue and Issue Size are correlated at 0.9511, so their individual coefficients are estimated imprecisely, as the variance inflation factors in Section 4.3 confirm.

### 3.3. Model

The estimating equation follows the reference study:

$$\text{Underpricing}_i = \beta_0 + \beta_1 \text{ESG}_i + \beta_2 \text{Age}_i + \beta_3 \text{Number of Shares}_i + \beta_4 \text{Total Revenue}_i + \beta_5 \text{Issue Size}_i + \sum \gamma Y_i + \sum \delta S_i + \epsilon_i$$

where ESG<sub>i</sub> is either the continuous score or the high-disclosure dummy, Y<sub>i</sub> is a vector of IPO year fixed effects and S<sub>i</sub> a vector of sector fixed effects.

Three estimation strategies are used. The primary specification is an ordinary least squares regression of underpricing on the ESG measure and controls, with year and sector dummies and conventional standard errors, re-estimated with heteroskedasticity-robust (HC1) standard errors. The second is a mixed-effects model with sector as a random grouping variable, so sector-level variance is estimated as a variance component. The third is a random forest with 1,000 trees, evaluated through its out-of-bag error.

Four diagnostics are reported: variance inflation factors for multicollinearity, with the reference study's threshold of five as the critical value; the Breusch-Pagan test for heteroskedasticity; and the Shapiro-Wilk test for residual normality. Because the dependent variable is skewed, all correlations and the primary regression are also re-estimated after winsorising underpricing at the 2.5th and 97.5th percentiles (-16.41 and 114.73 percent). The results are Breusch-Pagan chi-squared = 46.157, p = 0.0062 and Shapiro-Wilk W = 0.8745, p < 0.001.

## Results

### Descriptive Statistics

Table 2 reports the descriptive statistics for the variables used in the analysis.

**Table 2. Descriptive Statistics**

| Variable              | N   | Mean  | Std. Dev. | P1     | P50 (Median) | P99    |
|-----------------------|-----|-------|-----------|--------|--------------|--------|
| Underpricing (%)      | 479 | 20.52 | 34.83     | -22.82 | 11.25        | 150.49 |
| ESG Score (0–100)     | 479 | 58.94 | 9.55      | 37.00  | 58.60        | 83.65  |
| Age (Ln)              | 479 | 3.06  | 0.62      | 1.32   | 3.09         | 4.49   |
| Number of Shares (Ln) | 479 | 17.13 | 1.12      | 15.26  | 16.91        | 20.54  |
| Total Revenue (Ln)    | 479 | 8.16  | 1.17      | 5.41   | 8.07         | 11.09  |
| Issue Size (Ln)       | 479 | 6.70  | 1.11      | 4.24   | 6.61         | 9.38   |

Mean underpricing of 20.52 percent is economically large and exceeds the figures reported for developed markets (Loughran & Ritter, 2004; Ritter & Welch, 2002). The median of 11.25 percent sits well below the mean, confirming that a minority of very large first-day returns pulls the distribution upwards.

The ESG scores are tightly clustered: the mean of 58.94 sits almost at the midpoint of the scale and the standard deviation of 9.55 is small, with most of the sample between 45 and 75 in the Adequate and Strong tiers; only 27 firms are Weak and 20 Leadership.

## Correlation Analysis

Table 3 reports the Pearson correlation matrix for the dependent variable and the independent variables, with p-values in parentheses.

**Table 3. Correlation Matrix**

| Variable         | Underpricing         | ESG Score            | Age                   | Number of Shares     | Total Revenues       | Issue Size |
|------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|------------|
| Underpricing     | 1.00                 |                      |                       |                      |                      |            |
| ESG Score        | -0.0377<br>(0.411)   | 1.00                 |                       |                      |                      |            |
| Age              | -0.0250<br>(0.585)   | -0.0706<br>(0.123)   | 1.00                  |                      |                      |            |
| Number of Shares | -0.0365<br>(0.425)   | 0.1596***<br>(0.001) | -0.1592***<br>(0.001) | 1.00                 |                      |            |
| Total Revenues   | -0.1015**<br>(0.026) | 0.1299***<br>(0.004) | -0.0383<br>(0.403)    | 0.6510***<br>(0.000) | 1.00                 |            |
| Issue Size       | -0.1062**<br>(0.020) | 0.1216***<br>(0.008) | -0.0377<br>(0.411)    | 0.6932***<br>(0.000) | 0.9511***<br>(0.000) | 1.00       |

*Notes: \* denote statistical significance at the 1, 5 and 10 percent levels respectively; p-values in parentheses.*

The correlation between ESG score and underpricing is -0.0377, not significantly different from zero ( $p = 0.411$ ), the first indication that the European negative relationship does not carry over to India. Firm age is similarly uncorrelated ( $-0.0250$ ,  $p = 0.585$ ). Total revenue ( $-0.1015$ ,  $p = 0.026$ ) and issue size ( $-0.1062$ ,  $p = 0.020$ ) bear significant negative associations, consistent with adverse selection (Beatty & Ritter, 1986; Rock, 1986), and are so closely related that including both splits the effect between them.

ESG score is positively and significantly correlated with number of shares (0.1596), total revenue (0.1299) and issue size (0.1216), consistent with larger firms having more resources for disclosure and being likelier to fall within the BRSR mandate. If underpricing is lower for large issues and large issues have higher ESG scores, any raw benefit attributed to ESG may reflect firm size.

## Multicollinearity

**Table 4 reports the variance inflation factors.**

**Table 4. VIF Test**

| Variable         | VIF   | 1/VIF |
|------------------|-------|-------|
| ESG Score        | 1.03  | 0.970 |
| Age              | 1.04  | 0.962 |
| Number of Shares | 2.01  | 0.496 |
| Total Revenues   | 10.53 | 0.095 |
| Issue Size       | 11.70 | 0.085 |

The ESG score and firm age are effectively orthogonal to the other regressors, with variance inflation factors close to one. Total revenue and issue size have variance inflation factors of 10.53 and 11.70, above the reference study's threshold of five, and their inverse values of 0.095 and 0.085 show that only about nine percent of the variance in each is independent of the other regressors.

### Multiple Linear Regression

Table 5 reports the primary multiple linear regression of underpricing on the ESG score and the controls, with IPO year and sector fixed effects. Standard errors are in parentheses.

**Table 5. MLR Model**

| Variable           | Underpricing     |
|--------------------|------------------|
| ESG Score          | -0.011 (0.167)   |
| Age                | -1.057 (2.572)   |
| Number of Shares   | 3.665* (2.029)   |
| Total Revenues     | 0.756 (4.301)    |
| Issue Size         | -4.975 (4.833)   |
| Constant           | -22.011 (33.114) |
| IPO Year Dummies   | Yes              |
| Sector Dummies     | Yes              |
| Observations       | 479              |
| R Squared          | 0.142            |
| Adjusted R Squared | 0.095            |

Notes: Standard errors in parentheses; and \* denote statistical significance at the 1, 5 and 10 percent levels respectively.

The coefficient on the ESG score is -0.011 with a standard error of 0.167, very slightly negative and statistically indistinguishable from zero. The only variable approaching significance is the number of shares offered (3.665, significant at the ten percent level); its positive sign is counterintuitive given the negative raw correlation and does not survive in the mixed-effects specification.

The model explains 14.2 percent of the variation in underpricing (adjusted R-squared 9.5 percent,  $F = 3.00$ ,  $p < 0.001$ ). H1 is therefore not supported: the 95 percent confidence interval for the ESG coefficient, approximately -0.34 to +0.32, rules out an effect as large as the eight percent reduction reported for Europe (Ferri et al., 2023).

### High Versus Low ESG Disclosure

Because the continuous specification treats a one-point change as equivalent everywhere and the distribution is compressed, a second specification contrasts firms above and below the median. Table 6 reports mean underpricing for the two groups with formal tests.

**Table 6. Underpricing by ESG Disclosure Level**

| Group                         | N   | Mean Underpricing (%) | Std. Dev. | Median (%) | Mean ESG Score |
|-------------------------------|-----|-----------------------|-----------|------------|----------------|
| High ESG (score $\geq 58.6$ ) | 240 | 19.13                 | 31.21     | 10.68      | 66.31          |

| Group                   | N   | Mean Underpricing (%) | Std. Dev. | Median (%) | Mean ESG Score |
|-------------------------|-----|-----------------------|-----------|------------|----------------|
| Low ESG (score < 58.6)  | 239 | 21.91                 | 38.14     | 11.38      | 51.54          |
| Difference (High – Low) |     | –2.78                 |           |            |                |
| Welch t-test            |     | t = –0.872            |           | p = 0.384  |                |
| Mann–Whitney U          |     | U = 28,455.5          |           | p = 0.882  |                |
| Cohen’s d               |     | –0.080                |           |            |                |

Firms with higher ESG disclosure underpriced by 19.13 percent on average, against 21.91 percent for lower-disclosure firms, a difference of 2.78 percentage points in the predicted direction that is not statistically significant. In the reference study, publishing a sustainability report before listing reduced underpricing by approximately eight percent, significant at conventional levels (Ferri et al., 2023).

Replacing the continuous score with the ESG High dummy in the regression of Table 5 yields a coefficient of 0.565 with a standard error of 3.257 ( $p = 0.862$ ), while the rest of the model is essentially unchanged and the R-squared remains at 0.142.

**Table 7. New MLR Model (High/Low ESG Dummy)**

| Variable         | Underpricing     |
|------------------|------------------|
| ESG High (dummy) | 0.565 (3.257)    |
| Age              | –1.026 (2.569)   |
| Number of Shares | 3.652* (2.028)   |
| Total Revenues   | 0.714 (4.299)    |
| Issue Size       | –4.938 (4.833)   |
| Constant         | –22.776 (32.066) |
| IPO Year Dummies | Yes              |
| Sector Dummies   | Yes              |
| Observations     | 479              |
| R Squared        | 0.142            |

Notes: Standard errors in parentheses, and \* denote statistical significance at the 1, 5 and 10 percent levels respectively.

The estimated difference between high- and low-disclosure firms in the full model is 0.57 percentage points, with a confidence interval wide enough to encompass both a five-point reduction and a six-point increase.

### Underpricing Across the ESG Rating Categories

The null result for the average effect does not preclude a pattern in the tails of the disclosure distribution, and Table 8 reports mean underpricing by ESG rating category.

**Table 8. Underpricing by ESG Rating Category**

| ESG Category | Score Range | N   | Mean Underpricing (%) | Std. Dev. | Median (%) | Mean ESG Score |
|--------------|-------------|-----|-----------------------|-----------|------------|----------------|
| Weak         | 17.0 – 44.7 | 27  | 25.62                 | 45.69     | 7.24       | 38.85          |
| Adequate     | 45.0 – 59.9 | 234 | 21.46                 | 35.97     | 12.58      | 53.73          |
| Strong       | 60.0 – 74.4 | 198 | 20.19                 | 33.04     | 11.21      | 65.65          |
| Leadership   | 75.0 – 88.0 | 20  | 5.89                  | 14.45     | 4.39       | 80.57          |

Mean underpricing declines monotonically across the four categories, from 25.62 percent for Weak-rated firms to 21.46 percent for Adequate, 20.19 percent for Strong and 5.89 percent for the twenty Leadership-rated firms. This does not survive tests robust to distributional assumptions: the apparent significance rests on the extreme right tail of the Weak group.

The difference in means between Leadership- and Weak-rated firms is -19.73 percentage points, but the difference in medians is only -2.85. Dispersion differs by more than a factor of three: the standard deviation is 45.69 percent for Weak-rated firms against 14.45 percent for Leadership-rated firms, a variance ratio of 0.10. The Weak group departs violently from normality (Shapiro-Wilk  $W = 0.753$ ,  $p < 0.001$ ) while the Leadership group does not ( $W = 0.959$ ,  $p = 0.528$ ), and the five largest Weak underpricing values are 159.26, 141.50, 92.70, 83.96 and 72.00 percent (Bansal & Khanna, 2012; Bansal & Khanna, 2013).

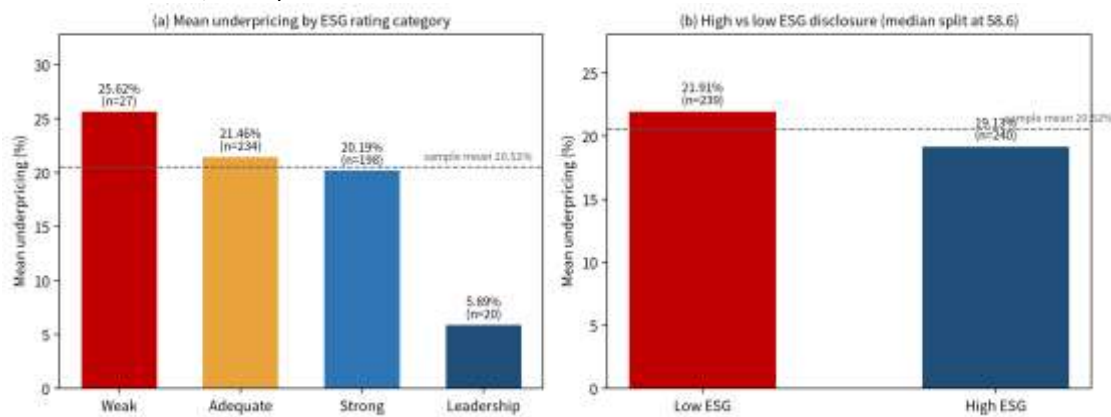


**Figure 1. Underpricing by ESG Rating Category**

**Figure 1. (a) Mean underpricing by ESG rating category; (b) mean underpricing for high- and low-disclosure firms defined by a median split at an ESG score of 58.6.**

**Table 9 reports the contrast under a range of estimators.**

**Table 9. Leadership versus Weak-Rated Firms: Alternative Tests**

| Test                                                    | Statistic          | p-value |
|---------------------------------------------------------|--------------------|---------|
| Welch t-test on means                                   | $t = -2.106$       | 0.043   |
| Student t-test on means                                 | $t = -1.859$       | 0.070   |
| Mann–Whitney U (rank)                                   | $U = 226.0$        | 0.349   |
| Brunner–Munzel (rank, unequal variances)                | $W = 0.964$        | 0.340   |
| Bootstrap 95% CI, difference in means                   | $[-38.80, -2.59]$  |         |
| Bootstrap 95% CI, difference in medians                 | $[-15.39, +7.55]$  |         |
| Drop three largest Weak observations (Weak mean 12.42)  | $t = -1.084$       | 0.285   |
| Drop five largest Weak observations (Weak mean 6.46)    | $t = -0.126$       | 0.900   |
| Leadership dummy, Issue Size + year FE, conventional SE | $-11.718 (7.684)$  | 0.128   |
| Leadership dummy, Issue Size + year FE, HC1 SE          | $-11.718 (3.588)$  | 0.001   |
| Leadership dummy, winsorised dependent variable, HC1 SE | $-11.302 (3.387)$  | 0.001   |
| Leadership dummy, rank-transformed dependent variable   | $-50.685 (23.072)$ | 0.028   |
| Quantile regression, 25th percentile                    | $-1.630 (4.781)$   | 0.733   |
| Quantile regression, 50th percentile                    | $-4.741 (6.190)$   | 0.444   |
| Quantile regression, 75th percentile                    | $-13.166 (9.935)$  | 0.186   |

| Test                                                                 | Statistic | p-value |
|----------------------------------------------------------------------|-----------|---------|
| Size-matched comparison ( $\pm 0.5$ log points), difference in means | -15.06    | 0.017   |

Notes: Standard errors in parentheses. All regression specifications include Issue Size and IPO year fixed effects; the Leadership dummy equals one for firms in the Leadership category. The size-matched comparison pairs each of the twenty Leadership-rated firms with Weak-rated firms whose log issue size falls within 0.5 log points, which was possible for all twenty.

The Welch t-test from a simple mean comparison is significant at the five percent level, but it is the only conventional location test that is. The Student t-test, inappropriate when the variance ratio is 0.10, gives  $p = 0.070$ , and both rank-based tests give p-values above 0.33.

With the Leadership dummy estimated alongside issue size and year fixed effects, the coefficient is -11.718 percentage points with a robust standard error of 3.588 ( $p = 0.001$ ); the winsorised version gives  $p = 0.001$ , the rank-transformed version  $p = 0.028$ , and a size-matched comparison -15.06 percentage points ( $p = 0.017$ ). A difference in mean first-day returns survives controlling for firm size, but no corresponding difference appears in median returns: the difference lies in the right tail.

A decile analysis points the same way. Firms in the top decile of the ESG scale, with scores from 70.3 to 88.0, were underpriced by 15.68 percent, while firms in the bottom decile, with scores from 17.0 to 47.8, were underpriced by 22.63 percent. The difference of 6.95 percentage points is in the expected direction but not significant ( $t = -0.977$ ,  $p = 0.331$ ; Mann-Whitney  $p = 0.826$ ), and the four-category analysis of variance does not reach significance either ( $F = 1.435$ ,  $p = 0.232$ ).

H2 therefore cannot be accepted. The relationship is not a threshold effect at the upper end of the ratings scale. The difference in means between the higher and lower ends exists and is substantial, but it is an artefact of right skew on the lower side rather than evidence that investors reward comprehensive disclosure with a smaller discount. With twenty and twenty-seven observations at the two extremes, and a test statistic whose significance depends on the estimator, no mean difference has been established. The rating tiers are also not finely discriminating (Berg et al., 2022; Gibson Brandon et al., 2021).

What Table 8 does establish, and what no test here overturns, is a monotonic decline in the dispersion of first-day returns as disclosure improves: the standard deviation falls from 45.69 percent for Weak-rated firms to 35.97 percent for Adequate, 33.04 percent for Strong and 14.45 percent for Leadership. Disclosure appears to be associated with predictability rather than level.

#### 4.7. Robustness Tests

Three robustness exercises were conducted. The first re-estimates the model as a mixed-effects regression with sector as a random grouping variable. The second replaces the linear specification with a random forest that can capture non-linearities and interactions.

**Table 10. Mixed Effect Model**

| Variable         | Underpricing    |
|------------------|-----------------|
| ESG Score        | -0.036 (0.166)  |
| Age              | -0.965 (2.538)  |
| Number of Shares | 3.530 (2.005)   |
| Total Revenues   | 0.764 (4.281)   |
| Issue Size       | -5.902 (4.811)  |
| Constant         | -4.639 (31.929) |
| IPO Year Dummies | Yes             |
| Observations     | 479             |

|                                 |              |
|---------------------------------|--------------|
| Variable                        | Underpricing |
| Random-effect variance (Sector) | 20.582       |

*Notes: Standard errors in parentheses. Sector enters as a random-effect grouping variable; the estimated between-sector variance component is 20.582.*

The mixed-effects estimate of the ESG coefficient is -0.036 with a standard error of 0.166, so it remains statistically indistinguishable from zero ( $p = 0.828$ ). The sector variance component of 20.582 confirms that industry shifts underpricing, but through the intercept rather than the ESG slope. The reference study's mixed-effects specification was significant at the five percent level for Europe (Ferri et al., 2023), so the contrast cannot be attributed to the choice of estimator.

**Table 11. Random Forest Model**

|                 |               |
|-----------------|---------------|
| Model           | Random Forest |
| Observations    | 479           |
| Number of trees | 1,000         |
| OOB Error       | 1.028         |
| OOB $R^2$       | -0.028        |

Notes: OOB Error =  $1 - \text{OOB } R^2$ , computed on a RandomForestRegressor with 1,000 trees. Sector and IPO Year were included as predictors.

The random forest returns an out-of-bag R-squared of -0.028, meaning the trees predict out-of-sample outcomes marginally worse than a simple mean. Either the predictor set carries almost no exploitable signal about first-day returns, consistent with the low R-squared of the linear models (Lowry et al., 2010; Ritter & Welch, 2002), or a benchmark making no functional-form assumption also fails to recover an ESG effect, so the null cannot be attributed to linearity.

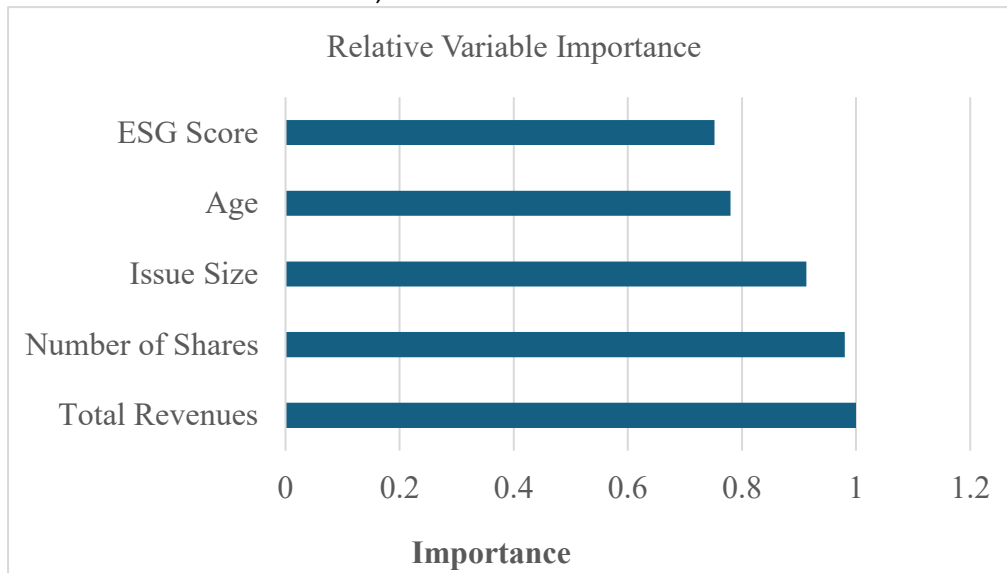


**Figure 2. Relative Variable Importance**

**Figure 2 reports relative variable importance from the random forest, scaled so the most important predictor takes the value one. Issue size, total revenue and number of shares offered**

dominate, at 0.935, 0.982 and 1.000, while the ESG score contributes comparatively little at 0.726, on a par with firm age. What determines first-day returns here is the scale of the offering and the size of the issuer, not the strength of its sustainability disclosure. Figure 2 plots the residuals against fitted values from the primary regression

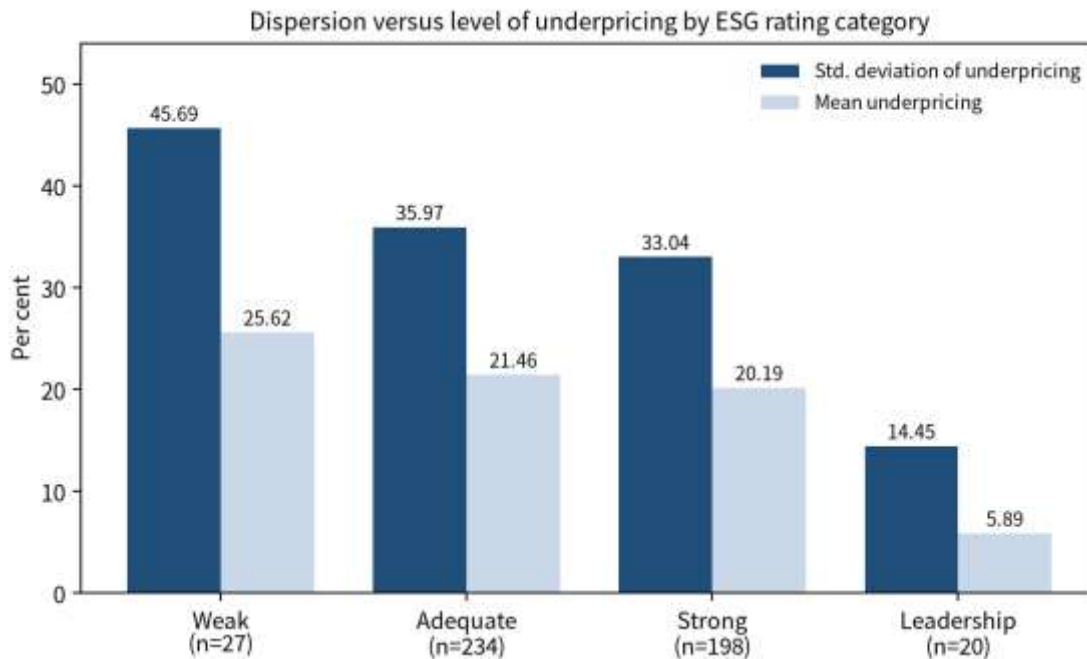


**Figure 3. Standard deviation and mean of first-day underpricing by ESG rating category.**  
Dispersion falls monotonically across the categories while the mean difference is not robust.

and shows the characteristic pattern of a skewed dependent variable, with a dense cluster of small positive residuals and a long tail of large positive ones.

The final checks address the collinearity of total revenue and issue size. Estimating the two subsamples separately reproduces the main result: among high-disclosure firms the ESG coefficient is -0.416 (standard error 0.327,  $p = 0.204$ ; R-squared = 0.207), and among low-disclosure firms 0.228 (standard error 0.401,  $p = 0.571$ ; R-squared = 0.285). Neither is significant. Robust HC1 standard errors leave the coefficient at 0.001 (standard error 0.132,  $p = 0.993$ ), and winsorising alters it only in the third decimal place; the correlation with winsorised underpricing is -0.0327, barely different from the raw -0.0377.

## Discussion

The central result is a null finding, and reading it correctly requires separating two questions the literature often conflates: whether disclosure is associated with the level of underpricing, and whether it is associated with its predictability. On the first the evidence is negative; on the second it is positive, and the second result survives scrutiny.

ESG scores bear no relationship to mean underpricing in any specification estimated here: the raw correlation is -0.0377, the coefficient with year and sector controls is -0.011 (standard error 0.167),

and the estimate is materially unchanged by robust standard errors, winsorisation, a mixed-effects specification and a random forest.

The first is institutional. The reference study's design exploits a genuine choice: European firms could publish a sustainability report before listing or decline, and the choice carried information (Ferri et al., 2023). That choice was progressively removed in India, as SEBI's BRSR framework made reporting mandatory for the largest listed entities and expanded across the window (Menghnani et al., 2022; Tripathi et al., 2026). Once disclosure is mandatory for most firms, the act of disclosing no longer separates better firms from worse; what carries information is the quality of what is filed. Scores are also tightly packed: 432 of the 479 firms fall in the Adequate and Strong categories (Bhowmick & Mahindrakar, 2026; Wachira et al., 2020).

The second explanation is that first-day returns in India are largely a function of sentiment and demand pressure rather than fundamentals. Mean underpricing of 20.52 percent is very high by global standards, the median of 11.25 percent sits far below the mean, 27.8 percent of issues listed below their offer price, and the random forest R-squared is negative, so the dependent variable is dominated by noise. Substantial first-day price correction appears in Indian MSME offerings (Bhatia & Singh, 2026), retail oversubscription predicts listing-day returns (Neupane et al., 2014), grey-market prices point the same way (Khurshed et al., 2011), and Indian underpricing responds to market-level conditions (Bansal & Khanna, 2013). The extreme Weak-group observations, at 159.26 and 141.50 percent, are better read as demand pressure than information.

The third explanation is that the pricing of sustainability disclosure depends on the maturity of the surrounding sustainable-finance infrastructure. The relationship persists across countries, though India and South Africa scored lowest on the SDG Index among those studied (Boulton, 2024a). In Singapore firms respond to ESG-related media attention when drafting prospectuses (Kang & Lam, 2023); where such attention is less developed, the incentive to produce informative disclosure is weaker. Indian evidence fits a relationship that is real but conditional and non-linear (Agarwala et al., 2024; Shobhwani & Lodha, 2024), and disclosure quality can be symbolic where assurance is uncommon (Khan et al., 2021).

The standard deviation of first-day returns falls monotonically as disclosure improves. The mean-based gap between the top and bottom categories is a by-product of dispersion rather than a premium for disclosure. If ESG disclosure reduces ex ante uncertainty (Beatty & Ritter, 1986), the effect should appear in the second moment of the return distribution rather than the first: comprehensive disclosers receive a more predictable discount, not a systematically lower one (Lowry et al., 2010).

The interpretation carries caveats. The relationship between dispersion and disclosure also suffers from this type of confounding because the quality of disclosure is related to firm size and institutional holding, which have an impact on speculative first-day surges; the ESG issue size correlation of 0.1216 indicates that confounding effect exists and cannot be avoided in our analysis.

Limitations of comparison with the reference paper are related to differences in the design. In the reference paper, the authors used a pairwise matched sample with the purpose of identifying the effect of the disclosure decision and found that the specification of the mixed effects model results in a significant coefficient (at the five percent level) (Ferri et al., 2023). This study uses a general cross-section with the ESG variable throughout, and thus, the discrepancy should not be accounted for by the estimators. The advantage of the paper is its scale (479 observations versus 100) and the length of the period (ten years versus four).

## Conclusions

This paper tests whether ESG disclosure quality impacts IPO pricing, based on 479 IPOs in India carried out from 2016 to 2026, following the approach of the European reference paper (Ferri et al., 2023). ESG disclosure quality is not associated with underpricing, but with the predictability of first-day returns.

Underpricing averages 20.52 percent, substantially higher than the norm in mature markets, with a standard deviation of 34.83 percentage points and 27.8 percent of issues underwriting below their offer price; hence, the dependent variable is sentiment driven. In all specifications, there is no meaningful association between the ESG rating and underpricing.

The one contrast that can be made to look significant, mean underpricing of 5.89 percent for the twenty Leadership-rated firms against 25.62 percent for the twenty-seven Weak-rated firms, does not withstand examination. It is significant under a Welch t-test and conditional mean models with robust standard errors, but not under the Student t-test, the Mann-Whitney or Brunner-Munzel rank tests, a median comparison, or quantile regressions (Table 9).

What survives every specification is dispersion. Standard deviations of first-day returns fall monotonically across the ratings, a variance ratio of 0.10 between the top and bottom categories. Given adverse selection theory, whereby underpricing compensates for ex ante uncertainty (Beatty & Ritter, 1986; Lowry et al., 2010; Rock, 1986), comprehensive disclosure appears likelier to make the initial price more predictable than to make it lower.

The study has five limitations. First, the sample is a cross-section of 479 listing events rather than a panel. Second, total revenue and issue size are collinear at 0.9511, with variance inflation factors above ten, so these coefficients are imprecisely estimated and the explanatory power of 14.2 percent should be read in that light. Third, the ESG scores are undifferentiated by pillar (Agarwala et al., 2024), come from a single provider, and capture reported disclosure rather than verified performance, so substantive practice cannot be separated from symbolic reporting (Berg et al., 2022; Khan et al., 2021; Liu, 2022). Fourth, the sixteen issues recorded for 2026 are a partial year.

Four extensions follow. The most valuable would be to replicate the reference study's matched-pair design within India, pairing firms that disclosed comprehensively before BRSR became binding with comparable firms that did not. A second would disaggregate the ESG score into environmental, social and governance components (Agarwala et al., 2024). A third would extend the dependent variable beyond the first day, since sustainability reporting also affects the probability of IPO withdrawal (Jamaani & Alidarous, 2025).

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