

Original Research Article

Financial Literacy, ESG Awareness, and Sustainable Investment Participation: Evidence from Individual Investors in Mumbai

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Abstract

This study examines whether financial literacy is associated with environmental, social, and governance (ESG) awareness and self-reported participation in ESG-themed investments among retail investors in Mumbai.

A structured questionnaire was administered to 224 individual investors with an active demat or trading account and at least one year of investing experience during FY 2025-26. Financial literacy and ESG awareness were measured on 0-20 scales. The analysis used descriptive statistics, correlations, Chi-square tests, t-tests, ANOVA, and supplementary binary logistic regression. Scale reliability was satisfactory (alpha = 0.84 and 0.81, respectively).

Financial literacy was strongly associated with ESG awareness ($r = 0.62$, $p < 0.001$) but more modestly with ESG participation ($r_{pb} = 0.28$, $p < 0.001$). Financial-literacy category and participation were associated, chi-square(2, $N = 224$) = 15.64, $p < 0.001$, Cramer's $V = 0.26$. In the adjusted model, ESG awareness (OR = 1.23, $p < 0.001$), financial literacy (OR = 1.15, $p = 0.005$), and income band (OR = 1.36, $p = 0.027$) were statistically significant; age and gender were not. Among highly ESG-aware respondents, 43.0 per cent reported no ESG holding.

The study links conventional financial literacy with ESG-specific knowledge and behaviour in an emerging-market retail-investor setting. It identifies an awareness-to-action gap and supports clearer ESG disclosures and evidence-based investor education. Because the design is cross-sectional and uses convenience sampling, the findings indicate association, not causation.

1. Introduction

Financial literacy encompasses the knowledge, skills, attitudes, and behaviours required to make informed decisions about saving, borrowing, risk, diversification, and long-term wealth creation. International evidence associates higher financial literacy with retirement planning, diversified portfolios, and resilience to financial shocks. In India, this question has acquired added importance as demat-account participation has expanded rapidly. Account counts, however, should not be equated with unique active investors because an individual may maintain more than one account. The growth of market access therefore strengthens, rather than resolves, the case for rigorous investor education.

At the same time, ESG investing has moved from a niche ethical preference toward a recognised approach to investment analysis. It integrates environmental, social, and governance considerations with conventional financial information. India's disclosure architecture has developed through SEBI's Business Responsibility and Sustainability Reporting (BRSR) requirements and the BRSR Core framework. SEBI's March 2025 amendments introduced important changes concerning assessment or assurance, value-chain disclosures, and green-credit reporting. Accordingly, this study treats BRSR as an evolving disclosure regime rather than as a settled ESG rating system.

The product landscape has also broadened through ESG-themed mutual funds, exchange-traded products, green bonds, and sustainability-oriented indices such as the NIFTY100 ESG Index and S&P BSE Carbonex. Supply-side development does not, however, establish that retail investors understand product objectives, data limitations, rating divergence, or the risk-return characteristics of these instruments. The central research question is therefore associational: are higher levels of financial literacy linked to greater ESG awareness and a higher probability of self-reported ESG investment participation among individual investors in Mumbai?

The question is relevant in two respects. First, it extends financial-literacy research into sustainable finance, an underexamined intersection in emerging-market retail investing. Second, it offers evidence for regulators, educators, intermediaries, and asset managers designing investor education and disclosure practices. The study does not test the financial performance of ESG products or infer that ESG-labelled investments are inherently superior; it examines investor knowledge and behaviour.

2. Literature Review

The literature relevant to this study spans three interconnected strands: the relationship between financial literacy and investment behaviour, the financial performance implications of ESG integration, and the behavioural foundations that mediate investor choice.

2.1 Financial Literacy and Investment Decisions

Lusardi and Mitchell (2014), in their widely cited review published in the *Journal of Economic Literature*, synthesised international evidence and concluded that financial literacy is strongly and positively associated with

retirement planning, portfolio diversification, and long-term wealth accumulation. Individuals with low financial literacy tend to rely on informal advice from peers or family, which frequently leads to costly mistakes such as under-diversification, inertia in portfolio rebalancing, and vulnerability to predatory financial products. Van Rooij, Lusardi, and Alessie (2011) reinforced these findings in the Dutch context, demonstrating that basic financial literacy is a significant predictor of stock market participation, while advanced literacy further widens the participation gap between sophisticated and unsophisticated households.

In the Indian context, Agarwal, Rao, and Nogueira (2025) surveyed 482 active retail investors across seven Indian cities and reported a robust positive association between financial literacy and rational investment behaviour. Importantly, they also found that behavioural biases, including herding, overconfidence, and the disposition effect, materially weakened this association, suggesting that literacy alone is necessary but not sufficient for sound decision-making. Chaukiyal, Gera, and Gambhir (2026), studying academic professionals in Uttarakhand, found that even highly educated respondents displayed uneven financial knowledge, underscoring that formal education and financial literacy are distinct constructs. Earlier work by Bhushan and Medury (2013) and Mishra and Metilda (2015) similarly established that only roughly a quarter to a third of Indian investors exhibit high financial literacy, with significant variation by age, income, and urban-rural residence.

2.2 ESG Investing and Financial Performance

Global evidence on the ESG-financial performance relationship is heterogeneous but, in aggregate, is often non-negative. Friede, Busch, and Bassen (2015), in a meta-analysis of more than 2,000 empirical studies, reported that approximately 90 per cent found a non-negative association between ESG and corporate financial performance, with many reporting positive results. This evidence does not establish that every ESG-labelled product will outperform, but it challenges the assumption that incorporating ESG considerations necessarily entails a financial penalty.

In India, Hasan, Singh, and Kashiramka (2025) examined NSE and BSE ESG indices from FY 2011-12 through FY 2022-23 using the Capital Asset Pricing Model (Sharpe, 1964) and related frameworks. They reported slightly higher mean returns and lower total risk for ESG indices relative to broad-market comparators, together with resilience during the COVID-19 downturn; however, excess returns were not consistently significant. These results support further investigation of ESG investing but do not justify a general expectation of outperformance. Investor literacy must therefore encompass methodology, fees, diversification, benchmark selection, and the uncertainty inherent in ESG ratings.

2.3 Behavioural Foundations

Behavioural finance provides a useful framework for interpreting the awareness-to-action gap. Prospect theory (Kahneman & Tversky, 1979) shows that choices depend on reference points and loss aversion. In ESG investing, unfamiliar terminology, uncertain ratings, perceived greenwashing risk, and evaluation costs may deter participation even among interested investors. Financial literacy may reduce some information-processing costs, but trust, product access, perceived performance, fees, and advice can still mediate the relationship between awareness and action. The present study therefore tests association and avoids treating literacy as a sufficient causal mechanism.

3. Research Gap

The literature reveals two largely separate streams in India. Financial-literacy studies examine conventional investment decisions and behavioural biases, whereas ESG research commonly evaluates corporate disclosure, indices, or portfolio performance. Limited investor-level evidence addresses whether financial literacy is associated with ESG knowledge and self-reported product participation, or whether demographic characteristics condition these relationships. This study addresses that gap for a Mumbai retail-investor sample while recognising that its metropolitan, non-probability design limits generalisation.

4. Research Methodology

4.1 Objectives

- (1) to assess financial literacy among sampled individual investors.
- (2) to assess their awareness of ESG investment concepts and products
- (3) to examine the associations among financial literacy, ESG awareness, self-reported ESG participation, and selected demographic characteristics.

4.2 Scope and Sample Design

The study covers individual retail investors residing in Mumbai, Maharashtra, who held at least one active demat or trading account and had a minimum of one year of investing experience during FY 2025-26. Institutional investors, foreign portfolio investors, and participants solely in private or unlisted ESG vehicles were excluded. A 47-item structured questionnaire was pilot-tested with 25 respondents and refined before final administration. It contained 20 financial-literacy items, 20 ESG-awareness items, and 7 items on demographic characteristics and self-reported ESG participation. Of 260 questionnaires distributed online and through in-person outreach at investor meetings, 224 were usable, an effective response rate of 86.2 per cent. Convenience sampling was employed between January and March 2026; consequently, sampling error and population representativeness cannot be estimated in the manner applicable to probability samples.

Financial literacy was measured on a 0-20 scale using items adapted from OECD/INFE domains and the widely used Lusardi-Mitchell core concepts of interest compounding, inflation, and risk diversification, supplemented by time-value-of-money and numeracy items. ESG awareness was measured on a 0-20 scale covering BRSR, ESG mutual funds, green bonds, ESG indices, and ratings providers. Internal consistency was assessed using coefficient alpha (equivalent to KR-20 where items are dichotomously scored), yielding 0.84 for financial literacy and 0.81 for ESG awareness. For reproducibility, the final manuscript should append the questionnaire, scoring key, source attribution for each adapted item, and the rules used to classify low, moderate, and high scores.

4.3 Statistical Tools

The analytical strategy combined descriptive statistics with inferential tests. The Chi-square test examined the association between three financial-literacy categories and binary ESG participation. Pearson's correlation was used between continuous scores; Spearman's rank correlation was used for ordinal income band; and point-biserial correlation was used when ESG participation was binary. Independent-samples t-tests compared financial literacy by gender, while one-way ANOVA examined age- and income-group differences. A supplementary binary logistic regression modelled ESG participation (holder = 1; non-holder = 0) using financial literacy, ESG awareness, income

band, age group, and gender. All inferential tests were two-tailed at $\alpha = 0.05$. Effect sizes are reported alongside p values. The regression treats income band as an ordered linear term; this parsimonious specification should be tested against dummy coding in any replication.

4.4 Hypotheses

The following null hypotheses were tested:

H01: Financial-literacy level is not associated with self-reported participation in ESG-themed investment products.

H02: Annual income band is not associated with ESG-awareness score.

H03: Mean financial-literacy score does not differ by gender.

H04: Mean financial-literacy score does not differ across age groups.

4.5 Limitations

The findings should be interpreted in light of six limitations. First, convenience sampling in one metropolitan area limits external validity and may overrepresent financially engaged and highly educated respondents. Second, the cross-sectional design does not establish temporal order or causality; ESG participation may itself increase awareness. Third, participation was self-reported and was not verified against portfolios. Fourth, the reported model does not include potentially relevant variables such as education, investment experience, risk tolerance, product access, fees, trust in ESG ratings, or perceived greenwashing. Fifth, common-method and social-desirability biases may affect questionnaire responses. Sixth, categorising continuous literacy scores for Chi-square analysis reduces information, while the ordinal-income specification in regression assumes equal movement between income bands. Future work should use probability-based, multi-city or panel designs and report instrument-validation evidence.

5. Data Analysis and Hypothesis Testing

5.1 Descriptive Statistics

Descriptive results indicate that the mean financial literacy score was 14.62 (SD = 3.41) out of a possible 20, with a median of 15.00, suggesting a moderately literate sample overall. The mean ESG awareness score was notably lower at 11.27 (SD = 4.13), with a median of 11.00, indicating that even within a financially engaged cohort, ESG-specific knowledge lags behind general financial knowledge. Approximately 36.6 per cent of respondents reported holding at least one ESG-themed product, while the remaining 63.4 per cent reported no current ESG allocation. Among the 82 ESG holders, ESG mutual funds dominated (74.4 per cent, $n = 61$), followed by ESG index funds or ETFs (17.1 per cent, $n = 14$) and green bonds (8.5 per cent, $n = 7$).

Table 1. Demographic Profile of Respondents (N = 224)

Variable	Category	Frequency	Per cent
Gender	Male	146	65.2
	Female	78	34.8
Age (years)	18-29	52	23.2
	30-39	71	31.7
	40-49	61	27.2

Variable	Category	Frequency	Per cent
Annual income (INR)	50 and above	40	17.9
	Below 5 lakh	44	19.6
	5-10 lakh	73	32.6
	10-20 lakh	69	30.8
	Above 20 lakh	38	17.0
Education	Graduate	102	45.5
	Post-graduate	94	42.0
	Doctoral / professional	28	12.5

Note. Percentages are rounded; category frequencies sum to N = 224.

5.2 Hypothesis 1: Financial Literacy and ESG Participation (Chi-square)

To test H01, respondents were classified as having low (0-10), moderate (11-15), or high (16-20) financial literacy and cross-tabulated by ESG participation. The 3 x 2 test produced chi-square(2, N = 224) = 15.64, $p < 0.001$, Cramer's V = 0.26. H01 was rejected. ESG holdings were reported by 56.5 per cent of the high-literacy group, compared with 31.6 per cent of the moderate-literacy group and 22.9 per cent of the low-literacy group. The association is moderate and should not be interpreted causally.

Table 2. Chi-square Test: Financial Literacy Level × ESG Participation

Financial literacy level	ESG holder	Non-holder	Row total
Low (0-10)	11 (22.9%)	37 (77.1%)	48
Moderate (11-15)	36 (31.6%)	78 (68.4%)	114
High (16-20)	35 (56.5%)	27 (43.5%)	62
Column total	82 (36.6%)	142 (63.4%)	224

Note. chi-square(2, N = 224) = 15.64, $p < 0.001$; Cramer's V = 0.26. All expected cell counts exceeded 5.

5.3 Hypothesis 2: Income and ESG Awareness

Because annual income was recorded in four ordered bands, Spearman's rank correlation was used to test H02. Income band was positively associated with ESG awareness, $\rho = 0.41$, $p < 0.001$. A one-way ANOVA likewise indicated differences in ESG-awareness scores across the four income bands, $F(3, 220) = 15.82$, $p < 0.001$, eta-squared = 0.18. H02 was rejected. Income band was also positively associated with financial literacy ($\rho = 0.34$, $p < 0.001$). These bivariate results indicate shared association; they do not establish income or literacy as causal determinants.

Table 3. Correlation Matrix of Key Study Variables

Variable	1	2	3	4
1. Financial literacy	—	0.62**	0.28**	0.34**
2. ESG awareness		—	0.39**	0.41**
3. ESG participation (0/1)			—	0.22**
4. Annual income (ordinal)				—

Note. $N = 224$. $** p < 0.01$ (two-tailed). Financial literacy and ESG awareness are related using Pearson's r ; correlations with binary ESG participation are point-biserial; correlations with ordinal annual-income band are Spearman's ρ .

5.4 Hypothesis 3: Gender Difference (Independent-samples t-test)

An independent-samples t-test compared financial-literacy scores by gender. The mean for male respondents ($M = 14.81$, $SD = 3.36$) was marginally higher than that for female respondents ($M = 14.26$, $SD = 3.50$), but the difference was not statistically significant, $t(222) = 1.12$, $p = 0.264$, Cohen's $d = 0.16$. $H03$ was therefore not rejected. This sample-specific result should not be generalised to the wider population, particularly because the groups were unequal in size and the sample was non-probability based.

5.5 Hypothesis 4: Age-group Differences (One-way ANOVA)

One-way ANOVA indicated differences in financial literacy across four age groups, $F(3, 220) = 8.93$, $p < 0.001$, eta-squared = 0.11. Reported Tukey HSD comparisons showed that respondents aged 40-49 ($M = 15.74$, $SD = 2.93$) scored higher than those aged 18-29 ($M = 13.46$, $SD = 3.62$) and those aged 50 or above ($M = 14.10$, $SD = 3.71$). $H04$ was rejected. The pattern is consistent with, but does not by itself prove, life-cycle financial-learning explanations.

5.6 Awareness-to-Action Gap

Among 86 respondents classified as highly ESG-aware (score 16-20), 49 (57.0 per cent) reported holding an ESG product and 37 (43.0 per cent) did not. This descriptive awareness-to-action gap motivates the multivariable analysis but does not identify why aware investors abstain. The questionnaire would need direct measures of trust, fees, access, risk perception, expected return, advice, and greenwashing concerns to test competing explanations.

5.7 Robustness Check: Binary Logistic Regression

Because ESG participation is binary, a supplementary logistic regression estimated its association with financial-literacy score, ESG-awareness score, annual-income band, age group (18-29 reference), and gender. The overall model was statistically significant, chi-square(7, $N = 224$) = 43.90, $p < 0.001$. The Hosmer-Lemeshow statistic was non-significant, chi-square(8) = 6.12, $p = 0.634$, and the model correctly classified 74.6 per cent of observations (Nagelkerke R-squared = 0.29). Classification accuracy should be read against the 63.4 per cent majority-class benchmark and supplemented by sensitivity, specificity, and area under the ROC curve in future reporting.

ESG awareness had the largest reported adjusted association: a one-point increase in the 0-20 awareness score corresponded to 23 per cent higher odds of reported ESG participation ($OR = 1.23$, $p < 0.001$), holding other variables constant. Financial literacy ($OR = 1.15$, $p = 0.005$) and income band ($OR = 1.36$, $p = 0.027$) were also statistically significant. Age-group indicators and gender were not significant after adjustment. These odds ratios are conditional associations, not causal effects. Confidence intervals, collinearity diagnostics, influential-case checks, and alternative coding of income should be included when the underlying output is available.

Table 4. Binary Logistic Regression Predicting ESG Participation (1 = holder, 0 = non-holder)

Predictor	B	SE	Wald	df	p	Exp(B)
Financial literacy score	0.14	0.05	7.84	1	0.005	1.15
ESG awareness score	0.21	0.04	27.56	1	< 0.001	1.23
Annual income (1-4)	0.31	0.14	4.90	1	0.027	1.36
Age 30-39 (ref: 18-29)	0.28	0.38	0.54	1	0.462	1.32
Age 40-49 (ref: 18-29)	0.71	0.40	3.15	1	0.076	2.03
Age 50+ (ref: 18-29)	0.19	0.44	0.19	1	0.664	1.21
Gender (male = 1)	0.18	0.32	0.32	1	0.572	1.20
Constant	-5.42	0.98	30.60	1	< 0.001	0.004

Note. $N = 224$. Model $\chi^2(7) = 43.90$, $p < 0.001$; Nagelkerke $R^2 = 0.29$; Hosmer-Lemeshow $\chi^2(8) = 6.12$, $p = 0.634$; overall accuracy = 74.6 per cent. Reference age group: 18-29 years. OR = odds ratio. The final submission should add 95 per cent confidence intervals for all ORs.

6. Discussion

The strong association between financial literacy and ESG awareness is consistent with research linking financial knowledge to engagement with complex investment products (Lusardi & Mitchell, 2014; Van Rooij et al., 2011). The result extends that relationship to ESG-specific concepts within this Mumbai sample. Nevertheless, the cross-sectional design leaves open reverse causation: investors already interested in ESG products may independently acquire both ESG and broader financial knowledge.

The weaker literacy-participation association and the non-participation of 43.0 per cent of highly aware respondents indicate that knowledge alone does not ensure portfolio allocation. This accords with behavioural research showing that information may be displaced by inertia, loss aversion, trust concerns, or evaluation costs. The present questionnaire did not directly measure these mechanisms; consequently, product complexity, access, advice, perceived greenwashing, fees, and return expectations should be treated as testable explanations rather than findings.

The small, non-significant gender difference contrasts with parts of the international literature but cannot establish equality at the population level. The unequal group sizes, metropolitan setting, high educational profile, and convenience design may have attenuated observable differences. A representative study should test measurement invariance and interaction effects before drawing subgroup conclusions.

Age and income patterns suggest heterogeneity in investor capability and opportunity. Respondents aged 40-49 had the highest mean financial-literacy score, while higher income bands were associated with greater ESG awareness and participation. Income may proxy for education, investible surplus, advice access, or investment experience, none of which was fully controlled. The results therefore identify priorities for stratified research rather than causal targets for policy.

7. Conclusions

This study examined the associations among financial literacy, ESG awareness, and self-reported sustainable-investment participation in a convenience sample of 224 Mumbai retail investors. Financial literacy was strongly

associated with ESG awareness and more modestly associated with participation. ESG awareness, literacy, and income band remained statistically significant in the supplementary logistic model, while age and gender did not after adjustment. The results are internally consistent with an awareness-to-action gap, but the cross-sectional design precludes causal inference.

The principal conclusion is that general financial literacy is relevant but not sufficient to explain ESG participation. ESG-specific awareness is more closely associated with reported holdings, yet awareness alone does not ensure allocation. Closing this gap requires better evidence on product comprehension, trust, suitability, costs, access, and risk-return expectations. Investor education and clearer disclosure are defensible responses; stronger choice-architecture interventions should be piloted and evaluated before adoption.

8. Policy and Practice Implications

First, SEBI, RBI, NCFE, exchanges, and investor associations may integrate concise ESG modules into financial-capability programmes. Content should explain BRSR and BRSR Core disclosures, distinguish disclosure from independent ratings, address rating divergence and greenwashing risk, and emphasise that an ESG label does not guarantee superior returns or lower risk.

Second, asset managers and distributors should present ESG objectives, screening methodology, portfolio characteristics, fees, benchmark choice, and material risks in plain language and a comparable format. Any standardised label should communicate methodology and limitations rather than operate as an implied quality endorsement. Consumer testing should precede mandatory design changes.

Third, outreach to younger and lower-income investors should be accessible, multilingual, and digital where appropriate, but its effectiveness should be measured rather than presumed. Randomised evaluations can compare short videos, interactive modules, adviser-led explanations, and conventional seminars on comprehension and subsequent behaviour.

Fourth, behavioural interventions should remain voluntary, transparent, suitability-sensitive, and consistent with fiduciary and regulatory obligations. Investment platforms may test prompts that offer comparable ESG and conventional options at relevant decision points. Default allocation to an ESG product should not be recommended without evidence on investor suitability, costs, diversification, governance, and informed opt-out mechanisms.

Future research should use probability-based or stratified multi-city samples, verified portfolio data, validated measures of ESG knowledge, and direct measures of risk tolerance, trust, fees, access, advice, greenwashing concerns, and behavioural biases. Longitudinal or experimental designs could distinguish whether awareness precedes participation or participation deepens awareness. Replications should publish the questionnaire and scoring key, report confidence intervals and regression diagnostics, compare alternative income coding, and assess predictive performance through sensitivity, specificity, and ROC-AUC.

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