

Risk–Return Profile of Nifty100 ESG versus Nifty 50: Evidence on Sustainable Investing in India

Dr. Riddhi Sanghvi¹, Dr. Jay Talati²

¹Noble University, Junagadh, drriddhitalati@gmail.com

²Noble University, Junagadh, drjaytalati@gmail.com

Abstract.

This study compares the risk–return characteristics of the NIFTY100 ESG with the NIFTY 50 using daily closing index values from the National Stock Exchange of India from January 1, 2020, to December 31, 2025 (1,491 trading days). The study figures average daily returns (0.062% for ESG vs. 0.058% for NIFTY 50), standard deviation (1.121% vs. 1.138%), annualised Sharpe ratios (0.540 vs. 0.473), and beta (0.963). Independent-samples t-tests reveal that there is no difference in mean returns ($p = 0.919$) or variances (Levene's test, $p = 0.820$). The ESG index shows reasonably better performance with lesser volatility, supporting its viability for achieving the goal of sustainable investing. These findings also confirm that ESG indices can deliver strong financial performance while fulfilling the sustainability objectives, contributing to the transformation of India's capital markets investments towards accountable investing.

Keywords. NIFTY 50, NIFTY 100 ESG, risk–return, sustainable investing.

1. INTRODUCTION

ESG investing integrates sustainability and governance factors into financial decisions. In India, the NIFTY100 ESG was launched in 2019, but research comparing its risk–return performance with the NIFTY 50 remains limited. This study compares both indices from 2020–2025 to evaluate returns, volatility, Sharpe ratio, and systematic risk.

2. RELATED WORK

Table 1. Comparison of the Research carried out:

Related work	ESG 100 Index	Nifty 100	Other comparables
[1]Abraham M (2025)	Yes	No	82 companies' data compared on Earnings Management
[2]Sultana and Gaud (2022)	Yes	Yes	Time frames up to 31 st August, 2022
[3]Karki C (2023)	Yes	Yes	Time frame adopted 2014-15 to 2019-20

			Checked for financial sustainability
[4]Khuas and Samal (2024)	Yes	Yes	Time frame adopted from 2014 to 2024
This work	Yes	Yes	Time frame adopted from 2020 to 2025 Comparing daily return volatility, mean returns and estimated beta through regression

Source: Compilation by the author

3. METHOD AND RESULTS

The study uses secondary data comprising daily closing values for the NIFTY100 ESG and the NIFTY 50 Index. The data are obtained from the National Stock Exchange of India (NSE) historical index. The sample period ranges from January 1, 2020, to December 31, 2025, totaling 1,491 daily observations (trading days) for both indices after accounting for market holidays and weekends.

3.1 Variable Construction

Let P_t symbolize the closing index level on the trading day t . The daily simple return for each index is calculated as:

$$R_t = \frac{P_t - P_{t-1}}{P_{t-1}} \times 100 \quad (3.1)$$

The following summary statistics and performance measures are calculated for both indices:

1. **Mean return ($\bar{R}$):** The arithmetic average of daily returns over the sample period, calculated as:

$$\bar{R} = \frac{1}{T} \sum_{t=1}^T R_t \quad (3.2)$$

where T is the total number of observations (1,491 trading days). Mean return represents the average daily percentage gain or loss over the study period and serves as a chief measure of investment performance.

2. **Standard deviation (σ):** The standard deviation of daily returns, calculated as:

$$\sigma = \sqrt{\frac{1}{T-1} \sum_{t=1}^T (R_t - \bar{R})^2} \quad (3.3)$$

Standard deviation quantifies the volatility or dispersion of returns, serving as a measure of total risk. A lower standard deviation suggests more stable returns.

3. **Sharpe ratio:** The Sharpe ratio adjusts mean returns for risk by dividing excess return over the risk-free rate by the standard deviation of returns as follows:

$$\text{Sharpe Ratio} = \frac{\bar{R} - R_f}{\sigma} \quad (3.4)$$

The daily risk-free rate is based on the assumed 6% annual yield of 91-day Indian Treasury Bills, converted by dividing by 252 trading days. The daily Sharpe ratio is annualised by multiplying by $\sqrt{252}$. A higher Sharpe ratio indicates better risk-adjusted returns.

4. **Beta (β):** Beta measures the systematic risk of the NIFTY100 ESG relative to the NIFTY 50 as the benchmark index. It is estimated using the following simple linear regression:

$$R_t^{\text{ESG}} = \alpha + \beta R_t^{\text{NIFTY50}} + \varepsilon_t \quad (3.5)$$

where R_t^{ESG} and R_t^{NIFTY50} are the daily returns of the NIFTY100 ESG and the NIFTY 50, respectively, α is the constant, and ε_t is the error term. A beta less than 1 explains that the ESG index is less volatile than the market, while a beta greater than 1 explains ESG index is more volatile than the market.

Table 2: List of variables and their formula (T = 1,491 trading days, Jan 1, 2020 – Dec 31, 2025)

Variable	Description	Formula	Source
P_t	Closing index level on day t	—	NSE
R_t	Daily return (%)	Equation 1	Calculated
$\bar{R}$	Mean daily return (%)	Equation 2	Calculated
σ	Std. deviation of returns (%)	Equation 3	Calculated
Sharpe	Risk-adjusted return (annualized)	Equation 4 $\times \sqrt{252}$	Calculated
β	Systematic risk (beta)	Equation 5	Calculated

Source: Compilation by the author

4. DISCUSSIONS

Table 3: Descriptive statistics: (Jan 1, 2020–Dec 31, 2025; N = 1,491)

Statistic	NIFTY100 ESG	NIFTY 50
Mean daily return (%)	0.0620	0.0577
Median daily return (%)	0.1015	0.0881
Standard deviation (%)	1.1206	1.1378
Minimum (%)	-12.58	-12.98
Maximum (%)	9.09	8.76
Skewness	-1.25	-1.35
Kurtosis	19.07	20.02
Correlation	0.9776	

Annualized return (%)	16.89	15.66
Annualized volatility (%)	17.79	18.06

Source: Data Analysis in SPSS by the author

Table 3 shows that the NIFTY100 ESG achieved slightly higher mean returns (0.0620%) and lower volatility (1.1206%) than the NIFTY 50 (0.0577%, 1.1378%). Annualised volatility was 17.79% versus 18.06%, with a very high return correlation of 0.9776.

Table 4: Risk–return and beta comparison (Jan 1, 2020–Dec 31, 2025; N = 1,491)

Metric	NIFTY100 ESG	NIFTY 50	Remarks
Mean daily return (%)	0.0620	0.0577	NIFTY100 ESG outperforms NIFTY 50
Standard deviation (%)	1.1206	1.1378	NIFTY100 ESG is less volatile than NIFTY 50
Sharpe ratio (annualized)	0.5403	0.4733	NIFTY100 ESG outperforms in reward to volatility ratio NIFTY 50
Beta (vs. NIFTY 50)	0.9629***	1.00	NIFTY100ESG is less sensitive to NIFTY 50
Alpha (% per day)	0.0064***	—	A positive alpha value indicates a higher average return of ESG index
R^2	0.9557	—	NIFTY 50 explains 95.57% variance in NIFTY100 ESG index returns
t-statistic (mean diff.)	0.1021	Accepted: H ₀₁ : There exists no difference in mean daily returns between the NIFTY100 ESG and NIFTY 50 (t-test).	
p-value (mean diff.)	0.9187		
Levene statistic (variance)	0.0517	Accepted: H ₀₂ : There exists no difference in daily return volatility between the NIFTY100 ESG and NIFTY 50 (Levene's test).	
p-value (variance)	0.8201		

Source: Data analysis and explanation by the author

5. CONCLUSIONS

The findings suggest that ESG investing can provide competitive financial returns while supporting sustainability objectives. Investors and institutions can consider ESG indices as viable investment options without significantly compromising financial performance. The study also provides a basis for future research on ESG indices and companies..

6. REFERENCES

- [1] M. Abraham, "Do the ESG performance metrics mitigate managerial discretion? Insights from Nifty ESG 100 index," Vilakshan - XIMB Journal of Management, pp. 1–23, Nov. 2025, doi: 10.1108/xjm-03-2025-0027.
- [2] Sultana Nazia and Goud Matur, "Madhya Bharti (मध्य भारती)," Madhya Bharti, vol. 82, pp. 12–19, Dec. 2022.
- [3] C. Kakri, "A Study of Financial Sustainability under ESG Approach: An Empirical Analysis of Nifty 100 Index Companies," Orissa Journal of Commerce, vol. 44, no. 1, pp. 91–101, 2023, doi: 10.54063/ojc.2023.v44i01.08.
- [4] S. Khuas Research Scholar, A. Samal, A. Professor, and G. Kumar Panda, "Long-term Examination of Volatility and Returns: An Analysis of NIFTY 100 and NIFTY 100 ESG Indices," 2024.

Biographies



Dr. Riddhi Sanghvi is a Professor of Management and Commerce and currently serves as Dean, Faculty of Doctoral Studies at Noble University, Junagadh, India. She holds a PhD in Finance (2019), an MBA in Finance, an MCom in Banking & Finance, and a BCom in Accounting & Finance.



Dr. Jay Talati is a Professor of Management and Commerce and currently serves as an Incharge Registrar and Dean at Noble University, Junagadh. He holds a PhD in Finance, an MBA and MCom.