




Sustainable Portfolios for the Future: A Comparative analysis of the rewards of ESG Investments

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Abstract. The current study aims to examine how investments in ESG affect investor's returns and attempts to determine whether this sustainability component provides a significant difference in financial performance when compared with their non-ESG components. This is an empirical study, using a sample of all ESG funds that are available in the Indian financial market. Utilizing the secondary research data, analysis of various aspects of returns and risks along with several other key performance measures are done. Additionally, T-test is performed to determine whether the return difference is statistically significant, while the Correlation analysis is done to test the connection between the two and lastly the Granger causality test is carried out with a view of ascertaining the cause-and-effect relationship, interdependence and forecasting capability of the returns. The results contribute to the ongoing discussion about sustainable financing. If target stakeholders are more aware of the comparative advantages and challenges in ESG approaches, these persons can exercise careful choices to better match their sustainable and financial goals. Based on the findings of this study, it is expected that ESG investment trust by investors would be enhanced. To the investors, it will provide an assurance that they can invest in ESG and possibly they will not be concerned with how it would impact their set goals. The study is unique in offering understanding of the features and performance of ESG mutual funds as per present dynamic business scenario. Establishment of relationships between benchmark returns and fund returns is also rare in the field.

Keywords: ESG investing, Sustainable Finance, Mutual Fund, ESG fund, Financial Instruments, Environment Social Governance, Risk, Return

1 Introduction

Governments all throughout the world are prioritizing the Sustainable development goals'(SDG's) implementation in light of the growing disparities, social exclusion, and climate change[1][2][3]. This calls for \$5–7 trillion in yearly global investment as per UNCTAD, for combating climate change and mitigating its effects [4]. Less than 1% of the \$4 trillion in total value of global financial assets are required for investments each year and this amount of private co-financing for the green transition is still less than anticipated and remains insufficient[5] [6]. As the finance drives corporate social responsibility [7], so financial institutions should be aligned with sustainable development through investing in public objectives[8][9]. In turn, it was supposed to be stated that the higher availability of the sustainability model in the country's finance, the higher effectiveness in achieving the SDG will be observed [10].

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The term "sustainable finance" usually describes how financial services affect society [11] and how public or private money flows that are allocated in a way that supports sustainable development[6]. Sustainability is becoming important for investors similar to their financial goals, which makes it generalised rather than confined to subject matter only for corporate social responsibility departments [12]. There are three main reasons behind this change: investor's demand, intersection of financial objectives with non-financial objectives and rising acknowledgment of the financial value proposition [13]. ESG investments are a form of sustainable finance that take into account the environmental, social, and governance (ESG) considerations along with financial factors at the time of investment decision-making[14]. The ESG framework evaluates ethical and sustainable impact of investments and companies[15]. Now a days both asset managers, analysts and investors commonly use these criteria in order to improve the returns of their investments with a believe that companies with better ESG performance indicators is in a stronger place to deal with risks as well as seize opportunities in a business environment [16]. In a bid to standardize this disclosure and improve on evaluating ESG factors, SEBI has developed the "Business Responsibility and Sustainability Report" often referred as BRSR, which mandates all public trading companies provide information on nine standards that encompass the environmental and social aspects[17].

Analyzing the role of sustainable investing in the country, the study focuses on ESG funds as the most suitable way to invest in India, which primarily includes bonds and shares investments in companies adhering ESG standards[18]. In India, several mutual fund schemes with specific ESG criteria are available, including "ICICI Prudential ESG Fund", "Invesco India ESG Equity Fund", "Quantum India ESG Equity Fund", "Axis ESG Equity Fund", "Quant ESG Equity Fund", "Kotak ESG Opportunities Fund", "Aditya Birla Sun Life ESG Fund", "SBI Magnum Equity ESG Fund", and "Mirae Asset ESG Sector Leaders FoF" [19]. The entire value of assets under management (AUM) in India has shown significant growth over the past five years .From Rs 12.3 lakh crore in 2015–16 to Rs 38 lakh crore by January 2022, India's AUM increased dramatically [17]. Moreover, ESG fund inflows rose from Rs 2,094 crore in 2019–20 to Rs 3,686 crore in 2020–21, indicating growing investor interest[20]. These patterns highlight the necessity of conducting additional study on ESG funds in India.

Much of the body of current literature around the world, focuses on evaluating the performance of ESG investments[21][22]. Some researchers have conducted comparative performance studies on ESG investments and non-ESG investments [23][24][25] and compares the ESG investment with the benchmark index is also available [26]. Therefore, the present research study can be considered as a useful contribution in the lack of studies specifically centered on evaluating the effectiveness of India's ESG mutual funds. The first goal thus is to rank each ESG mutual fund against their peers and the overall market. Furthermore, the paper aims to approach the following research questions: Is it factual that ESG investment products provide a combination of both low risk and relatively high returns? To answer this, the ESG benchmark index will be compared to a market benchmark index in order to come up with the findings. Thus, with the help of such profound analyses, this study is expected

to clarify the behavior and the overall functioning of the ESG mutual funds in the context of the Indian investment arena.

This research aims to achieve several key objectives:

- To assess ESG funds' performance within their categories and in the overall market.
- To provide greater understanding of ESG mutual fund performance and other attributes using comparative analysis.

The flow of the paper is as follows: section 2 brings into focus the current literature to the research topic and gives an understanding of the available knowledge on the subject. In section 3, hypotheses of the study are provided which explain the expectations of the study. Section 4 provides the details regarding techniques of collection of data and analysis used in the study, with understanding of the study's process. In section 5, the analysis results are presented with the explanations and the insights arisen from the gathered data. Last but not the least, Section 6 will be the end note of the paper to reflect on the findings that were drawn, conclude their importance and recommend research directions for the future.

2 Literature Review

Sustainable finance and socially responsible investing (SRI) are the most discussed concepts in the literature related to sustainability in finance[27] [28] [29] .

SRI is defined as the process of selecting investments on the basis of the returns as well as the social impacts[30]. It entails the integration of decisions within the context of financial systems and ESG, as well includes the negative screening by elimination of investment options that are not in tandem with ESG factor and the investor's values [31][32]. Socially responsible investors invest in the companies that exhibit positive behavioral patterns as opposed to disqualifying companies based on specific products or activities[33].

For the sustainable investment alternative, a variety of green financial products are created, including green bonds, green indices, green guarantees, green banking, green indices, green venture capital, green loans, and risk-sharing instruments [34]. Other instruments for sustainable finance are ESG funds, which are helpful in further enhancing sustainable finance by investing in these companies' environmental, governance, and social criteria [18].

Numerous studies done in the literature seek to assess the performance of ESG funds individually and in comparison. According to a study on mutual funds for European ESG stocks, high-rated ESG funds generally beat low-rated ones, while both underperformed passive benchmarks during the COVID-19 pandemic [35]. A Chinese study showed a positive correlation in between ESG performance and risk during the pandemic [36]. According to another research, even though ESG funds had fewer violations of consumer safety, they performed worse than non-ESG funds when it came to choosing stakeholder-friendly companies [37]. An European study proves high performance of high ESG rated mutual funds [38]. According to a literature, sustainable funds had no performance benefit over traditional ones while they are proved less risky [39]. Furthermore, a study conducted in Australia found SRI funds did not outperform their benchmarks [40]. Additionally, it is concluded that SRI and conventional funds

had similar risk profiles [41] and discovered performance of ethical funds non-distinguishable from non-ethical funds. found, with neither showing market timing ability [23].

While looking up on Indian ESG funds in the literature, the rapid expansion of ESG funds in India was observed [42], and discovered their high returns [21]. While a study found most ESG funds underperformed the benchmark index (NIFTY 100 ESG TR INR) and had poorer risk-adjusted returns [26]. Furthermore, another research says, the ESG mutual fund market in India is still very young and all its sample funds exceeds the market in terms of performance[43]. Another study found ESG Investments more expensive than alternative investment[44].

Literature is providing the sings of positivity towards ESG investments, with studies consistently showing good performance compared to non-ESG instruments. This study aims to verify these results across all ESG funds in Indian Financial market. It is also examining the relationship between Benchmark returns and Funds returns.

3 Research Methodology

3.1. Data Source: Current study is empirical in nature, covering the Time period of five years tenure starting from 1 April 2018 till 31 march 2023, and data for the study is gathered from secondary sources like, AFMI, Mutual fund's respective websites, NSE etc.

3.2. Sample Selection: The study considered all Indian Mutual funds with a label of "ESG" as a sample.

3.3. Limitation with data set: Due to a new and developing fund form for the Indian financial sector, the study is only able to use a restricted number of funds as part of its sample. Additionally, the study has a five-year time frame, but some of the sample funds are new and started within that time, so they cannot cover the entire five years.

3.4. Research Methods/ Techniques: An extensive examination of different financial measures like Return, Risk, Risk-adjusted returns, and other important performance indicators is performed. Return will be calculated on a monthly basis using the NAV of current and previous months.

$$Rp = (NAV_t - NAV_{t-1}) / NAV_{t-1}$$

Risk that an investor should consider consist of two types one is standard deviation, often known as dispersion. The square root of the mean of the square of deviations, which is calculated using the arithmetic mean, is used to compute it. Another measure of risk is beta, which is the indicator of volatility of past prices in relation to stock market index.

$$\sigma = \sqrt{\frac{\sum(x_i - \mu)^2}{N}} \qquad \beta = \frac{Cov(r_s, r_m)}{Var(r_m)}$$

Risk-adjusted performance analysis is also performed which evaluates the performance of any fund. Following measures will be used as risk-adjusted performance (Risk premium) analysis.

Sharpe ratio: This ratio indicates the performance of a fund in relation to risk taken and shows extra return on the basis of the risk taken per unit but here risk is assumed to be standard deviation not only beta, Sharpe, W. F. (1966).

Treynor ratio: This ratio also evaluates how well the funds perform in proportion to risk with the assumption of a well-diversified portfolio. It is measuring the additional return performance against market risk.

$$\text{Sharpe ratio} = \frac{R_p - R_f}{\alpha_p}$$

$$\text{Treynor ratio} = \frac{R_p - R_f}{\beta_p}$$

R_p = Average return of the portfolio

R_f = Risk free return rate,

α_p = Portfolio risk

β_p = Portfolio systematic risk

In addition, the significance of the return difference is verified by the T-test, the relationship between returns is investigated by correlation analysis, and the Granger causality test is used to ascertain cause-and-effect relationship, as well as to examine the interdependency and predictive power of the returns in relation to each other. Microsoft Excel and EVIEWS are the primary tools utilized for analysis.

3.5 Hypotheses Development

This study empirically tests four hypotheses.

ESG investments have been shown in the literature to yield higher returns than non-ESG investments across a range of markets[43][45][37]. Yet, other researchers report that there are no additional benefits of investing in ESG[39][46]. One more study demonstrates that ESG investments yield neither a lower nor a higher return[47]. Results of a study indicate that there is no statistically significant difference in returns between the ESG and conventional indices on a daily basis. On the other hand, ESG indices beat the market as a whole when evaluating rolling one-year returns[48]. Thus, the following hypothesis is brought forward to compare the monthly returns of the sample ESG funds with the designated index return.

H_{a1}: There is a significant difference between the ESG fund return and Index return.

Literature suggests that when compared to normal funds, ESG funds frequently show less risk and volatility[26][39]. The difference in the risk of both kinds of investments is also proved in the literature[49]. According to another research study, the High ESG ranked funds experienced a less relative market value loss during the time of low volatility[50]. Moreover, ESG portfolios offer increased protection against negative risk[48]. By looking over these the following hypothesis is developed:

H_{a2}: There is a significant difference among the ESG fund return variability and index return variability.

As risk adjusted returns are also important for investors, and the capability of the funds to generate these returns are also compared with some measures like Sharpe and Treynor ratios [51]. Literature says that ESG funds may offer greater risk-adjusted returns [40][48]. A study proves that risk-adjusted performance of the energy stock mutual funds beat the benchmarks[52]. Furthermore, SRI funds are generating high risk-adjusted returns for the whole study period but not higher returns always [53]. Another study proves no significant difference between the risk-adjusted return of SRI and conventional funds[54]. Therefore, the following hypothesis is formulated.

H_{a3}: There is a significant difference among the risk premium returns of ESG funds and the benchmarks

Determining the relationship is another evaluation point. It is very important to know whether the ESG funds returns move in the similar way the market moves. Moreover, study of causality relationships is also needed. In the literature the relationship between ESG funds and market benchmarks has been the subject of conflicting research[35][55]. Therefore, the study is examining the connection between the returns of ESG and non-ESG investments. Thus, it is hypothesized that:

H_{a4}: There is a significant correlation and interdependence among the returns of ESG benchmark and the market benchmarks.

4 Data Analysis

4.1. Performance measurement

The current section of the study evaluates the monthly returns, range of returns and risk. As the study period is short due to the short duration of these funds in the Indian market, thus, in order to find the best and comprehensive results, monthly return data is picked for the analysis. Both total risk (Standard Deviation), and systematic risk (Beta), which is non-diversifiable market-induced risk, are taken into account. The range of returns, showing return variability, is also analysed.

Performance Based on monthly returns and Risk of Funds: “Table 1” presents the results based on parameters like: average return and return range. Each sample fund is compared to the two indexes one is ESG Benchmark and other is market benchmark index. Results highlight the strong returns of all the funds. Quant ESG fund leading all with 2.64% monthly return followed by Quantum India ESG Fund, and Axis ESG Fund. When the funds' returns are compared to the Nifty 100 ESG index, five of the eight funds outperformed the benchmark, one matched the monthly return, and only ICICI Prudential ESG Fund and Axis ESG Fund had marginally lower average monthly returns than the benchmark. On the other hand, while comparing with the market benchmark index ICICI Prudential ESG Fund significantly underperformed the market benchmark, whereas three sample funds outperformed it, one had equal returns, and four had lower returns. Aditya Birla Sun Life and Quant ESG Funds showed greater maximum and minimum returns with wider return range and higher volatility. Contrarily, Quantum ESG Equity Fund and Axis ESG Fund exhibited lower volatility.

Table 1. ESG Fund’s Monthly Return Comparison Table (Since Start)

Return	Fund and Index			
	“Aditya Birla Sun Life ESG Fund”	“Nifty 100 ESG TRI”	“Nifty 50”	
Average Return	0.74 %	0.65 %	0.87 %	
Return Range	17.54 %	15.87 %	13.58 %	
	“SBI Magnum Equity ESG fund”	“NIFTY 100 ESG TRI”	“S&P BSE Sensex TRI”	
Average Return	1.03 %	0.93 %	1.04 %	
Return Range	36.53 %	36.76 %	37.47 %	
	“Axis ESG equity Fund”	“NIFTY 100 ESG TRI”	“Nifty 50 TRI”	

Average Return	1.24 %		1.33 %	1.39 %
Return Range	22.95 %		36.75 %	37.92 %
	“ICICI ESG Fund”	Prudential	“Nifty 100 ESG TRI”	“Nifty 500 value 50 TRI”
Average Return	1.11%		1.23%	3.12%
Return Range	12.92 %		16.28 %	28.62 %
	“Invesco India Equity fund”	ESG	“Nifty 100 ESG TRI”	“Nifty 50 TRI”
Average Return	0.82%		0.49%	0.77%
Return Range	16.21 %		15.87 %	13.58 %
	“Quantum India Equity Fund”	ESG	“Nifty 100 ESG TRI”	“S&P BSE Sensex TRI”
Average Return	1.33%		1.18%	1.21%
Return Range	33.06 %		36.76 %	37.47 %
	“Quant ESG Equity Fund”	Equity	“Nifty 100 ESG TRI”	“S&P BSE Sensex TRI”
Average Return	2.64%		0.91%	1.21%
Return Range	22.62 %		15.87 %	14.02 %
	“Kotak opportunities Fund”	ESG	“Nifty 100 ESG TRI”	“Nifty 50 TRI”
Average Return	0.65%		0.65%	0.87%
Return Range	15.71 %		15.87 %	13.58 %

Ha1: There is a significant disparity between the ESG fund return and index return.

An independent sample t-test is performed by contrasting the average return of the sample mutual fund scheme with the average return of the pertinent benchmark indices, to test the first hypothesis. Lovene’s test is also conducted to test the equality of variance for ensuring the validity of the t-test results. This test is particularly useful before conducting statistical tests such as the t-test or analysis of variance (ANOVA) that assume equal variances across groups. If the P value (presuming a significance level) is greater than 0.05, the test findings suggest equal variance. A subsequent t test will be performed in accordance with the assumption of equal variance, and vice versa.

Table 2. T- Test Analysis of Fund Monthly returns and ESG Benchmark

	2018-19	2019-20	2020-21	2021-22	2022-23	5 years
Market						
Return	0.95	-9.25	-5.27	1.86	-0.21	1.31
Fund						
Return	0.81	-5.20	3.68	1.56	-0.58	1.19
T-test						
(p value)	0.94	0.64	0.00	0.38	0.01	0.74

Table 2 above displays the results of the T-test. For the years 2020–21 and 2022–23, the T-test demonstrated a significant difference (5% significance level) among the ESG fund's returns and the corresponding ESG benchmark. As a result, the hypothesis is

accepted for the years 2021 and 2023 and rejected for all other year for years 2019, 2020 and 2022

Table 3. T- Test Analysis of Fund Monthly returns and Market Benchmark

	2018-19	2019-20	2020-21	2021-22	2022-23	5 years
Market Return	0.79	-9.25	4.29	1.86	-0.21	0.92
Fund Return	0.76	-5.20	3.68	4.38	0.17	1.19
T-test (pvalue)	0.98	0.61	0.62	0.00	0.02	0.28

Findings of the T-tests for fund and market index return are shown in table 3 above. For the calculation purpose, average monthly return is utilised. For every year, monthly average return of the available funds is considered as one sample and monthly average return of respective market benchmarks for the similar period of time are considered as another sample. As in the period of 2018, only one fund is available, so monthly returns for the whole year is considered as one sample. Similarly, monthly returns of market index for the same time are considered as another sample. For the years 2022–22 and 2022–23, the T-test demonstrated a significant difference (at the 5% level of significance) between ESG fund’s returns and the corresponding market benchmark returns. Consequently, the hypothesis is accepted for the year 2022 and 2023 and all other year’s hypothesis is rejected. Additionally, when looking at the T-test results for the returns of the preceding five years, from 2018 to 2023, P values indicate the acceptance of the null hypothesis at the 5% significance level, demonstrating the lack of difference between the returns of ESG funds and those of other ESG investments as well as returns of the market. The average returns for ESG funds are higher than those of other funds in the years where the hypothesis is accepted and there is a difference in returns.

Ha 2: There is a significant difference among the ESG fund return variability and index return variability.

The standard deviation measures how far each value in a dataset deviate from the average by quantifying the dispersion of data points around the mean. Greater variability and an increased vulnerability to outliers are indicated by a bigger standard deviation, whereas less variability is indicated by a smaller standard deviation (S.D.). Table 4, reflects the returns on Axis, ICICI, Invesco, and Quantum are less variable. Conversely, the Aditya Birla, Quant, and Kotak ESG funds exhibit greater variability, although SBI's return on variability is nearly identical to that of the other ESG investments. Another way to examine the volatility is Beta. It is the sensitivity of an index's (or security's) returns to changes in another index's (or market's) movements. In particular, beta measures the amount that one index's returns typically fluctuate in response to a change in the other index's returns. All of the funds' beta values compared to the market benchmark are less than one, which denotes lower market volatility. Moreover, the majority of the funds are exhibiting reduced volatility as compared to the ESG benchmark. Overall, it demonstrates that when compared to other ESG

investments and the market, ESG funds are less risky. On the basis of these results the study is not able to completely accept or reject the hypothesis.

Table 4. ESG Fund's Monthly Risk Comparison Table (Since Inception)

Particulars	Fund Name	Benchmark Index	Market Benchmark
	“Aditya Birla Sun Life ESG Fund”	“Nifty 100 ESG Index”	“Nifty 50”
S.D.	4.528936	4.08805	3.971897
Beta		1.01555705	0.9953126
	“SBI Magnum Equity ESG fund”	“Nifty 100 ESG TRI”	“S&P BSE Sensex TRI”
S.D.	5.419361	5.439374	5.509201
Beta		0.96833999	0.9623723
	“Axis ESG equity Fund”	“Nifty 100 ESG TRI”	“Nifty 50 TRI”
S.D.	5.096659	6.231379	6.342795
Beta		0.708849456	0.684014705
	“ICICI Prudential ESG Fund”	“Nifty 100 ESG TRI”	“Nifty 500 value 50 index TRI”
S.D.	3.415245	4.529885	6.998902
Beta		0.66366057	0.29107106
	“Invesco India ESG Equity fund”	“Nifty 100 ESG TRI”	“Nifty 50 TRI”
S.D.	4.135746	4.222317	3.990555
Beta		0.896619	0.896545
	“Quantum India ESG Equity Fund”	“Nifty 100 ESG TRI”	“S&P BSE Sensex TRI”
S.D.	5.271138	5.836025	5.969385
Beta		0.877776	0.842929
	“Quant ESG Equity Fund”	“Nifty 100 ESG TRI”	“S&P BSE Sensex TRI”
S.D.	5.494058	4.235283	4.147872
Beta		0.99924	0.893234
	“Kotak ESG opportunities Fund”	“Nifty 100 ESG TRI”	“Nifty 50 TRI”
S.D.	4.528936	4.08805	3.971897
Beta		1.01555705	0.9953126

4.2. Risk-Adjusted Performance Measurement

Ha3: There is a significant difference among the risk premium returns of ESG funds and the benchmarks

Table 6, displays the excess return over the risk-free return per unit of total risk using Sharpe ratio. The majority of funds have positive Sharpe ratios in 2020-21, indicating

strong performance. With a high Sharpe ratio of 0.83(2021), the Quantum India ESG equities fund carries a high risk per unit. Quant ESG equity fund came in second with a 0.64 return. However, throughout the whole period, the Aditya Birla ESG fund, the Kotak ESG opportunity fund, and the Invesco India ESG equity fund all continuously had a negative monthly Sharpe ratio, indicating that the sample funds were unable to generate risk-adjusted returns per unit. For 2022–2023, the Sharpe ratio for each fund is negative. Moreover, when examining the annualized Sharpe ratio statistics from Table 5, it is evident that all funds are performing poorly with high negative Sharpe ratios. The Quant ESG Equity Fund has the lowest negative annual Sharpe ratio, while the Kotak ESG Opportunity Fund has the highest. A comparison of the sample funds' Sharpe ratios shows that half have it lower than the market index and the ESG Benchmark index, while the other half have it higher. We are unable to accept or reject the Ha3 based on these findings. Although not all indices cover the same time period for comparison, these annualized Sharpe ratio values are tied to indices and pertain to a five-year timeframe. Therefore, year-by-year comparison is carried out in order to improve results. The sample for 2018–19 comprises only one fund, which is underperforming compared to the market benchmark. The sample for 2019–20, which consists of two funds, demonstrates a better Sharpe ratio than the market benchmark. The results of the comparison between the Sharpe ratios of ESG funds and the market benchmark index, however, are inconsistent for the remaining years of the study. When compared to the market benchmark, the Quant ESG Equity Fund is doing well; whereas the Kotak ESG Equity Fund is underperforming. While the results from the other funds in the sample were inconsistent. As a result, the Sharpe basis cannot accept third hypothesis.

Table 5. Risk-adjusted performance of selected ESG Funds (for 5 years ending 31 march 2023)

Fund Name	Sharpe Ratio	Tryner Ratio	Jenson's alpha
“SBI Magnum Equity ESG fund”	-2.28	-0.04	-0.11
“Aditya Birla Sun Life ESG Fund”	-2.61	-0.04	-0.07
“Axis ESG equity Fund”	-1.74	-0.03	0.78
“ICICI Prudential ESG Fund”	-2.89	-0.09	-0.07
“Invesco India ESG Equity fund”	-2.84	-0.04	-0.15
“Quantum India ESG Equity Fund”	-1.83	-0.03	-0.28
“Quant ESG Equity Fund”	-1.02	-0.05	0.08
“Kotak ESG opportunities Fund”	-3.09	-0.04	-0.53

Table 6. Sharpe Ratio (monthly Sharpe ratio)

	2018-19	2019-20	2020-21	2021-22	2022-23
“SBI Magnum Equity ESG fund”	-1.34	-0.95	0.24	-0.54	-1.41
“Aditya Birla Sun Life ESG Fund”	–	–	0.01	0.52	-0.60

“Axis ESG equity Fund”	–	–	-0.78	-0.71	-0.55
“ICICI Prudential ESG Fund”	–	–	0.05	-0.71	-1.71
“Invesco India ESG Equity fund”	–	–	–	-0.35	-1.50
“Quantum India ESG Equity Fund”	–	-0.23	0.83	-1.04	-0.63
“Quant ESG Equity Fund”	–	–	0.64	0.09	-1.07
“Kotak ESG opportunities Fund”	–	–	-0.66	-0.64	-1.31

Table 7. Sharpe Ratio (monthly Sharpe ratio) of benchmark indices.

	2018- 19	2019- 20	2020- 21	2021- 22	2022- 23	Since inception
“S&P BSE Sensex”	-1.28	-1.04	0.22	-0.52	-1.35	-2.25
“Nifty 50”	-1.32	-1.06	0.26	-0.54	-1.34	-2.28
“Nifty 500 value 50 index”	-0.89	-0.95	0.35	-0.17	-0.86	-1.58
“Nifty 100 ESG TRI”	-1.28	-1.12	0.32	-0.54	-1.36	-2.31

The Treynor measure implicitly assumes that the portfolio is well-managed and systematic risk is the measure of risk and measures the portfolio performance relates the excess return given on a portfolio to the portfolio beta for a well-managed portfolio[51].

Table 8 presents the Treynor measure of the portfolio risk premium for each unit of risk. With the exception of the years 2020–21, the sample ESG funds Treynor ratio was negative throughout the whole sample period. In 2020–21, several funds have positive ratios, while others have negative ratios while others have zero ratios. Positive or negative, all of the ratios are around zero. Overall Treynor ratio of Each fund calculated on the monthly return since inception are all negative but close to zero as per table 5.

Table 8. Treynor Ratio

	2018- 19	2019- 20	2020- 21	2021- 22	2022- 23
“SBI Magnum Equity ESG fund”	-0.06	-0.07	0.01	-0.02	-0.06
“Aditya Birla Sun Life ESG Fund”	–	–	-0.02	-0.04	-0.06
“Axis ESG equity Fund”	–	–	0.00	-0.03	-0.06
“ICICI Prudential ESG Fund”	–	–	0.01	-0.16	-0.13
“Invesco India ESG Equity fund”	–	–	–	-0.02	-0.07
“Quantum India ESG Equity Fund”	–	-0.08	0.03	-0.04	-0.06
“Quant ESG Equity Fund”	–	–	-1.56	0.01	0.06
“Kotak ESG opportunities Fund”	–	–	-0.03	-0.03	-0.06

The Jensen measure (1968) has been utilized in the investigation of the capacity of a fund manager to choose securities for their portfolio with the goal of generating additional return which is known as selectivity. An alpha number that is both positive and large indicates that a scheme has outperformed the benchmark return and that the superior selectivity of the fund managers has contributed to the scheme's superior performance. The results of Table 9 are in line with those of Sharpe and Tryner once more; the Jensen measure indicates that Kotak ESG Opportunity Fund is the lowest performer while Quant ESG Equity Fund is doing well. Some funds exhibit inconsistent performance; some years see positive returns, while others see negative ones. However, all of the outcomes are very nearly zero.

Table 9. Jensen Measure

	2018- 19	2019- 20	2020- 21	2021- 22	2022- 23
“SBI Magnum Equity ESG fund”	-0.36	0.65	0.12	-0.16	-0.42
“Aditya Birla Sun Life ESG Fund”	—	—	-0.02	-0.04	-0.06
“Axis ESG equity Fund”	—	—	0.00	-0.03	-0.06
“ICICI Prudential ESG Fund”	—	—	0.01	-0.16	-0.13
“Invesco India ESG Equity fund”	—	—	—	-0.24	-1.08
“Quantum India ESG Equity Fund”	—	-0.08	0.03	-0.04	-0.06
“Quant ESG Equity Fund”	—	—	2.79	1.81	5.15
“Kotak ESG opportunities Fund”	—	—	-0.96	-0.55	-0.19

4.3. correlation Analysis between the indexes.

Ha4: There is a significant correlation and interdependence among the returns of ESG benchmark and the market benchmarks.

To understand the relation among the performance of investment in ESG & non ESG funds in this study correlation analysis of the investment performance of ESG and non-ESG funds is done where “Nifty 100 ESG TRI” is used for ESG investment and “Nifty 50”, “S&P BSE Sensex”, and “Nifty 500 Value 50” are considered for non-ESG investment. A value larger than zero suggests positive correlation while a value less than zero shows negative correlation, A figure of (+1) indicates a perfectly positive correlation, a value of (-1) indicates a perfectly negative correlation. And correlation coefficient closer to - 1 indicates a strong negative or direct relationship between two sets of variables and correlation coefficient closer to 1 indicates strong positive or direct relationship between two sets of variables and near zero and equal to zero indicates no relationship between two variables. In the present study, it has been established that the degree of association is positive and stands at 0.99, 0.99, and 0.79 in relation with “Nifty 50”, “S&P BSE Sensex”, and the “Nifty 500 Value 50” respectively.

Granger, C. W., Propounded An econometric test called Granger causality is used to confirm if a variable is helpful in forecasting another[56]. Since the fund indices show a positive correlation, meaning that they are moving in the same direction, it is

necessary to determine whether one movement is causing another. To do this, the Granger Causality test is run among the sample indices using EViews software.

Table 10. Pair-wise Granger causality Test (2018-2023)

Null Hypothesis	F-test	Probability
“NIFTY 50 does not Granger Cause NIFTY 100 ESG”	1.55292	0.2213
“NIFTY 100 ESG does not Granger Cause NIFTY 50”	1.36000	0.2656
“NIFTY 500 VALUE 50 does not Granger Cause NIFTY 100 ESG”	0.47865	0.6223
“NIFTY 100 ESG does not Granger Cause NIFTY 500 VALUE 50”	0.40777	0.6672
“S & P BSE Sensex does not Granger Cause NIFTY 100 ESG”	2.07155	0.1363
“NIFTY 100 ESG does not Granger Cause S & P BSE Sensex	1.76624	0.1811
“NIFTY 500 VALUE 50 does not Granger Cause NIFTY 50”	0.76580	0.4701
“NIFTY 50 does not Granger Cause NIFTY 500 VALUE 50”	0.15286	0.8586
“S & P BSE Sensex does not Granger Cause NIFTY 50”	0.90740	0.4099
“NIFTY 50 does not Granger Cause S & P BSE Sensex”	0.83807	0.4383
“S & P BSE Sensex does not Granger Cause NIFTY 500 VALUE 50”	0.08378	0.9198
“NIFTY 500 VALUE 50 does not Granger Cause S & P BSE Sensex”	0.95724	0.3906

The null hypothesis in the Granger Causality test is that variable X does not Granger Cause variable Y . In cases where the p value is higher than 0.05, the null hypothesis is accepted. The hypothesis is rejected since the findings confirm that there is no Granger Causality between the indices, as per data in Table 11.

5 Conclusion & Discussion

Investors are using sustainable financial products in order to perform sustainability integrity with the need to preserve finance returns. From the analysis of the study, it can be clearly seen that there is no need for investors with a social consciousness to compromise on their return on investment in order to effect a positive change on the society. Looking into the average monthly return of ESG funds, it can be seen that they outperform the traditional investments and therefore concluding that ethical good and financially rewarding responsible investment is indeed feasible. Additional information that supports the concept of profitable socially responsible investing is also based on year-to-year analysis that proves ESG’s performance advantage. In this regard, it is evident from the study that all the funds have responded with beta values below one in relation to the benchmark of market volatility, hence signifying less variability in risk. Furthermore, when ESG funds are compared to the ESG benchmark, a majority of ESG prove to be even less volatile, which implies less risk. Also, the risk premium returns in all the funds are similar implying market behavior was similar at the various time horizons. Furthermore, Correlation analysis for non-ESG and ESG investments shows direct correlation meaning that while one is high the other is also high making it move jointly without being influenced by the other. This study helps to meet the overarching

goal of investor education because it reveals that sustainable development investments do not need to be detrimental to portfolios' returns. The message presented to them is that investors may secure huge economic gains when they make ethical investment decisions. Therefore, the outcomes have hopefully shown that adopting ESG has a positive financial impact alongside non-financial values and should inspire expanding the implementation of ESG criteria into investors' approaches. This promotes correct investment and aligns money with better principles which are beneficial to the society in the long run.

6 Future Study

Some limitations are recorded in the study. The availability for the required data is limited to the last few years only as ESG funds are not very old in the market. These funds may become considerably more comprehensible in the future research, and, possibly, produce more solid outcomes as these funds accumulate and more powerful, long-term data appears. Secondly, more extensive data will be beneficial in evaluating ESG investments' performance for longer time horizons and in different contexts. Moreover, future research with other measures of the performance can be performed. Furthermore, the comparison of the performance of funds with other funds with in India as well as globally can be conducted in future researches.

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