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COMPARATIVE EMPIRICAL EVALUATION OF SOCIALLY RESPONSIBLE AND CONVENTIONAL EQUITY PORTFOLIOS IN INDIA: A STUDY ON MULTI-FACTOR AND PERSISTENCE APPROACH

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Abstract
The study examines the comparative performance of ESG based Socially responsible Portfolios and Conventional Equity Portfolios in India over the period from April 2009 to March 2024. It compares responsible portfolios with conventional portfolios and market benchmarks using return, risk, risk-adjusted measures, the Carhart four-factor model, and the Top-minus-Bottom (TMB) approach for persistence analysis. The findings show that socially responsible portfolios were not financially disadvantaged during the study period. NIFTY100 ESG portfolio recorded the highest average return over the full period, while SR Non-Blue Chip portfolio performed strongly across several risk-adjusted and alpha-based measures. The Carhart model further shows that some responsible portfolios generated positive abnormal returns even after controlling for market, size, value, and momentum factors. However, the persistence results suggest that such out performance was not stable across time and was often followed by reversal effects. Overall, the results indicate that ESG and socially responsible investing in India offered a credible and financially sound alternative to conventional investing during the study period.

Keywords: *ESG portfolios, Carhart four-factor model, Portfolio performance, Risk-adjusted returns, Socially responsible investing.*

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INTRODUCTION

In recent years, environmental, social, and governance (ESG) investing and socially responsible investing (SRI) have gained growing attention from investors, policymakers, and researchers across the world. The traditional view that investors must choose between ethical values and financial returns has gradually been challenged by the increasing demand for sustainable investment strategies. It refers to an investment approach in which financial decisions are made not only on the basis of risk and return, but also by considering ethical, social, environmental, and governance concerns. In simple terms, SRI seeks to align investment choices with the values of investors by avoiding harmful activities, favouring responsible firms, or supporting long-term sustainable development. Over time, it has evolved from traditional ethical screening to a broader framework that overlaps with ESG investing, where environmental, social, and governance factors are incorporated into portfolio selection and performance evaluation. Thus, SRI is often viewed as an investment approach with a dual objective: achieving financial returns while also promoting responsible corporate behaviour. The theoretical debate on SRI remains divided. One view suggests that SRI may improve portfolio quality by excluding poorly governed or socially harmful firms and by encouraging long-term, lower-risk investment behaviour. Another view argues that screening may restrict the investment universe and reduce diversification, which could negatively affect returns. Earlier research reflects this mixed evidence. The study of (Hamilton, Jo and Statman, 1993), and (Statman, 2000) found that socially responsible mutual funds did not significantly underperform conventional funds whereas Renneboog, Ter Horst, and Zhang (2008) showed that the financial performance of SRI funds varied across countries. More recently, Friede, Busch, and Bassen (2015), through a large review of empirical studies, concluded that the relationship between ESG and financial performance is generally non-negative. In India, the expansion of ESG-related indices and socially responsible portfolios has created a need to assess whether these portfolios perform as well as conventional portfolios and benchmark indices. Tripathi and Bhandari examined a number of studies related performance of green stocks, ethical funds, socially responsible portfolios using various measures under different economic conditions on Indian SRI portfolios, while Kaur and Tripathi extended the discussion to a comparative international setting. Although there are few Indian studies which evaluated the performance of socially responsible investments but evidence on the persistence of such performance in the Indian market remains very limited. Therefore, this study examines the performance of ESG and socially responsible portfolios in India during April 2009 to March 2024 using return and risk measures, the Carhart four-factor model, and the Top-minus-Bottom (TMB) approach for persistence analysis.

OBJECTIVES OF THE STUDY

1. To examine whether socially responsible stocks portfolio generating significant returns with conventional stocks portfolio and market portfolio;
2. To analyse the performance of socially responsible stocks portfolio and conventional stocks portfolio and market portfolio on the basis of various risk adjusted measures;
3. To evaluate the performance of socially responsible stocks portfolios and general stocks portfolios on the basis of net selectivity return; and
4. To investigate the impact of Carhart based four factor model on the excess returns of socially responsible stocks portfolio and conventional stocks portfolio.
5. To evaluate the performance persistence of socially responsible stocks portfolio and conventional stocks portfolio.

REVIEW OF LITERATURE

Hamilton, Jo and Statman (1993) examined the investment performance of 32 Socially Responsible Mutual Funds from Jan 1981 to December 1990 under various sub-periods using Jensen's Alpha method, the study concluded that Socially Responsible factors have no effect on expected Stock Returns on companies' Cost of Capital whereas Baur, Otten and Rad (2005)

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examined whether Ethical Investing in Australia is a financial penalty or not over the time period of 1992-2003 to see the differences in performance of Ethical and Conventional Funds. Using various multi-factor models, the study suggested that there is no financial penalty for being an Ethical Investor. Also Shank, Manullang and Hill (2005) revisited the Statman (1993) paper by doing the comparison between Short Term and Long Term Performance of 11 Socially Responsible Firms listed at Social Investment Forum. Using Jensen's portfolio technique, the study concluded that performance of Socially Responsible Mutual Funds of 11 firms is not statistically significant different from other managed portfolio in short run but it showed a better performance in long run over conventional funds. In performance persistence context, Gregory and Whittaker (2007) compared the performance persistence of 32 SRI Funds with conventional funds in the United Kingdom from 1989-2002. The findings support the existence of performance persistence at 6-, 12- and 36- month horizon whereas Leite and Cortez (2013) compared performance persistence of 50 SRI Funds with conventional funds in France for the period 2000 to 2008 and found no or little evidence of performance persistence. Also Lean *et al.* (2014) analyzed the performance persistence of 37 Asia Pacific funds against the benchmark for January 2001 to December 2011. Using Fama and French (1993) model and contingency approach, this study also found little evidence of performance persistence. In Indian context Lean, Ang and Smyth (2015) also did a study in Europe and North America on Socially Responsible Investment (SRI) Funds to see their performance and persistence in which findings of the study suggested more evidence of performance persistence in European SRI Funds than North American SRI Funds. In Indian context, Tripathi and Bhandari (2012) investigated the goodness of green stocks in Indian market by evaluating performance of Green And Non Green Stock Portfolios over the time period of 1 April, 2000 to 30 March, 2012 divided into three sub-periods namely before sub-crisis, during sub-crisis and after sub-crisis periods using Sharpe ratio, Treynor ratio and Jensen's Alpha techniques. Finding lends support for green investing in India. Bhandari has done extensive studies on the evaluation of performance Socially Responsible Stock portfolios Murthy, Bhandari & Pandey (2014) examined the performance of Socially Responsible Companies vice-a-versa General Companies in terms of Price Discovery and Returns in the stock market and concluded with better price discovery as well as performance of ESG index over Nifty index .So this can create possibilities for general companies to change their perception, attitude and agenda towards Corporate Social Responsibility in India. Hariharan and Babu (2018) investigated price behavior of Indian Sustainable Investment indices that is ESG index with its parent index Nifty over the time period of April 2011 to March 2018.After employing Descriptive statistics, GAARCH(1,1) model, Augmented Dickey Fuller test, results indicated better performance of ESG indices over their parent index Nifty Recent India-focused studies such as Mahanta, Sahu, and Behera (2024) on sustainable versus traditional indices in India, Kumar and Mishra (2024) on ESG thematic equity funds in India, and Hasan, Singh, and Kashiramka (2025) on the financial performance of ESG investing in India using asset-pricing models. These recent works suggest that the literature is moving toward deeper factor-based and comparative evaluation of ESG investing, but persistence evidence for Indian ESG/SRI portfolios remains limited. Overall, the literature shows three broad patterns. First, socially responsible and ESG investments do not consistently underperform conventional investments. Second, Indian studies by Tripathi and Bhandari largely support the view that responsible portfolios are financially competitive and may even perform better in certain phases or sectors. Third, while prior studies have examined return, risk, selectivity, crisis-period performance, and comparative market behavior. However, a dedicated performance analysis using Carhart model and persistence analysis of Indian ESG based socially responsible portfolios is still a gap to be filled.

RESEARCH METHODOLOGY

The present study undertakes a comparative analysis of three categories of portfolios, namely socially responsible portfolios, conventional portfolios, and the market portfolio, over a

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period of fifteen years from April 2009 to March 2024. The primary objective is to examine whether socially responsible investing is financially competitive with conventional investment strategies in terms of return, risk, risk-adjusted performance, and performance persistence. For a comprehensive assessment, the total study period of fifteen years s further segmented into multiple sub-periods. These include two sub-periods: Sub-Period I (April 2009 to March 2016) spanning seven years, and Sub-Period II (April 2016 to March 2024) spanning eight years. Additionally, the study considers three short-term periods of five years each, namely Short Period I (April 2009 to March 2014), Short Period II (April 2014 to March 2019), and Short Period III (April 2019 to March 2024), to capture temporal variations in portfolio performance. The analysis encompasses nine portfolios and indices representing socially responsible, conventional, and market segments. The socially responsible category includes the NIFTY100 ESG Index, GREENEX Index, Socially Responsible Blue Chip (SRBC) portfolio, and Socially Responsible Non-Blue Chip (SRNBC) portfolio. The conventional portfolio category comprises the BSE 100 Index, NIFTY 50 Index, Non-Socially Responsible Blue Chip (NSRBC) portfolio, and a Mimicking Portfolio. The BSE 500 Index is employed as a proxy for the market portfolio.The NIFTY100 ESG and GREENEX indices serve as proxies for socially responsible portfolios. The SRBC portfolio consists of companies common to both the NIFTY100 ESG Index and the BSE 100 Index, whereas the SRNBC portfolio includes firms that are part of the NIFTY100 ESG Index but not included in the BSE 100 Index. In the conventional segment, the BSE 100 and NIFTY 50 indices are used as proxies. The NSRBC portfolio comprises companies included in the BSE 100 Index but excluded from the NIFTY100 ESG Index. The Mimicking Portfolio is constructed by selecting firms with a market capitalization structure similar to the NIFTY100 ESG Index, excluding those included in the ESG index.The study is based on monthly closing prices of all selected portfolios and indices for the period April 2009 to March 2024. The data have been sourced from the Prowess database of the Centre for Monitoring Indian Economy (CMIE). Monthly returns are computed as simple percentage returns using the formula $(P_t - P_{t-1}) / P_{t-1}$. The implicit yield on Treasury Bills is used as a proxy for the risk-free rate of return.

Hypothesis Framework

H01: There is no significant difference in the returns of socially responsible stocks portfolio, conventional stocks portfolio and market portfolio.

H02: The performance of socially responsible stock portfolio is similar to the performance of conventional stocks portfolio and market portfolio when evaluated using various risk-adjusted performance measures.

H03: There is no difference in the performance of socially responsible stocks portfolio and conventional stocks portfolio on the basis of net selectivity return.

H04: Carhart based four factor model do not have any significant impact on the performance of socially responsible stock portfolio and conventional stock portfolio.

H05: There is no difference in the performance persistence of socially responsible stock portfolios and conventional stock portfolios when analysed using the Carhart based Top Minus Bottom (TMB) strategy.

Analytical Framework

Firstly, Pearson correlation analysis is used to examine the degree of association among the selected portfolios which may helps in understanding whether socially responsible portfolios move independently or remain closely linked with conventional portfolios and the benchmark. For Hypothesis 1 and 2 portfolio performance is evaluated using return, risk, and risk-adjusted measures which includes average return, standard deviation, coefficient of variation, Sharpe ratio, modified Sharpe ratio, double Sharpe ratio, beta, systematic risk, unsystematic risk, Treynor ratio, Jensen alpha, information ratio, and M^2 measure..

For Hypothesis 3 the study applies Fama decomposition measures to separate portfolio performance into risk premium, systematic risk premium, selectivity, unsystematic risk, and

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net selectivity. This decomposition makes it possible to identify whether portfolio performance is driven mainly by market exposure or by selection efficiency . Then Paired t-test is employed to test whether the mean return differentials between portfolio pairs are statistically significant.

For Hypothesis 4, the study uses the Carhart four-factor model to evaluate impact on the performance of socially responsible stock portfolio and conventional stock portfolio. The model includes the market factor, size factor, value factor, and momentum factor, and is expressed as:

$Rp - Rf = \alpha + \beta1 (Rm - Rf) + \beta2 SMB + \beta3 HML + \beta4 MOM$

Where: Rp = Return of the portfolio, Rf = Risk-free rate of return, Rm = Return of the market, α = Four-factor alpha or abnormal return, SMB = Small Minus Big factor representing size effect, HML = High Minus Low factor representing value effect, MOM = Momentum factor β1, β2, β3, β4 = Sensitivity coefficients of the respective factors

For Hypothesis 5 the study uses the Carhart model Based Top Minus Bottom (TMB) approach. In this method, stocks within each portfolio are ranked on the basis of their past lagged returns over 12-month, 36-month, and 60-month formation windows. Based on this ranking, Top, Middle, and Bottom portfolios are formed. A TMB portfolio is then constructed by taking the return difference between the top-performing and bottom-performing groups. The Carhart four-factor model is applied to these TMB portfolios to test whether past winners continue to outperform past losers. A positive and statistically significant TMB alpha indicates persistence, while a negative or insignificant alpha suggests weak persistence or reversal.

RESULTS AND DISCUSSIONS

Table 1: Correlation Matrix of different portfolios

Portfolio	GREENEX	SR Blue Chip	SR Non Blue Chip	BSE100	NIFTY50 Companies	Non-SR Blue Chip	Mimicking	BSE500 Index
NIFTY100 ESG	0.847	0.995	0.884	0.987***	0.963***	0.863***	0.878***	0.953***
GREENEX		0.851	0.741	0.869***	0.880***	0.835***	0.831***	0.862***
SR Blue Chip			0.821	0.990***	0.969***	0.861***	0.869***	0.953***
SR Non-Blue Chip				0.826***	0.792***	0.772***	0.823***	0.818***
BSE100					0.957***	0.921***	0.901***	0.946***

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NIFTY50 Companies						0.825***	0.826***	0.925***
Non-SR Blue Chip							0.896***	0.822***
Mimicking								0.872***

Note: *All bi-variate correlation coefficients are significant at 1%.*

Table 1 presents the Pearson correlation coefficients among the nine portfolios considered in the study. The results reveal a consistently high and positive correlation structure across all portfolio pairs, indicating that the return behaviour of socially responsible, conventional, and benchmark portfolios is largely driven by common market forces. The strongest association is observed between NIFTY100 ESG and SR Blue Chip (r = 0.995), followed by NIFTY100 ESG and BSE100 (r = 0.987), highlighting the near-identical movement of these portfolios over the sample period. The NIFTY100 ESG portfolio also displays a strong correlation with the BSE500 Index (r = 0.953), suggesting that ESG-oriented investments remain closely integrated with broad market performance. Although the lowest coefficient is recorded between SR Non-Blue Chip and GREENEX (r = 0.741). Taken together, these findings suggest that the inclusion of socially responsible portfolios does not materially alter the overall correlation structure of a diversified equity portfolio, but rather reflects return dynamics that remain strongly embedded within the broader market environment.

Table 2: Return, Risk and Risk-Adjusted Measures by Financial-Year Period

Measure	**Portfolio / Index**	**Full Period**	**Sub Period I**	**Sub Period II**	**Short Period I**	**Short Period II**	**Short Period III**
Average Return (%)	**NIFTY100 ESG**	2.123***	2.411***	1.872***	2.752***	1.721***	1.897**
	GREENEX	1.717***	1.691***	1.740***	1.807**	1.247**	2.097***
	SR Blue Chip	2.059***	2.358***	1.798***	2.679***	1.642***	1.857**
	SR Non-Blue Chip	2.027***	1.919***	2.119***	2.076***	1.931**	2.072**
	BSE100	2.055***	2.265***	1.872***	2.514**	1.573***	2.077***
	NIFTY50 Companies	2.011***	2.295***	1.762***	2.658***	1.555**	1.820**
	Non-SR Blue Chip	2.096***	2.053**	2.133***	2.065*	1.474**	2.748***
	Mimicking	1.889***	1.681*	2.071***	1.683	1.351*	2.633**
	BSE500 Index	1.297***	1.265*	1.325***	1.389	1.109**	1.395*

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Std. Deviation (%)	**NIFTY100 ESG**	6.051	6.981	5.126	7.654	4.549	5.585
	GREENEX	5.453	5.754	5.205	6.143	4.330	5.774
	SR Blue Chip	6.080	7.091	5.057	7.787	4.437	5.587
	SR Non-Blue Chip	5.754	5.103	6.287	5.054	5.963	6.247
	BSE100	6.152	7.086	5.230	7.758	4.423	5.883
	NIFTY50 Companies	6.036	6.796	5.306	7.449	4.785	5.610
	Non-SR Blue Chip	7.154	7.717	6.664	8.179	5.498	7.572
	Mimicking	7.260	7.764	6.825	8.261	5.639	7.679
	BSE500 Index	5.502	6.153	4.903	6.699	4.122	5.493
Coefficient of Variation	**NIFTY100 ESG**	2.850	2.896	2.738	2.781	2.644	2.944
	GREENEX	3.175	3.402	2.992	3.399	3.473	2.753
	SR Blue Chip	2.952	3.007	2.813	2.907	2.702	3.009
	SR Non-Blue Chip	2.839	2.658	2.967	2.434	3.088	3.016
	BSE100	2.993	3.129	2.794	3.085	2.811	2.832
	NIFTY50 Companies	3.002	2.961	3.012	2.802	3.078	3.082
	Non-SR Blue Chip	3.414	3.759	3.124	3.961	3.729	2.755
	Mimicking	3.843	4.617	3.296	4.909	4.174	2.917
	BSE500 Index	4.241	4.862	3.701	4.822	3.717	3.938
Sharpe Ratio	**NIFTY100 ESG**	0.237	0.207	0.278	0.217	0.254	0.266
	GREENEX	0.206	0.162	0.248	0.164	0.157	0.293
	SR Blue Chip	0.225	0.196	0.267	0.204	0.243	0.259
	SR Non-Blue Chip	0.263	0.260	0.266	0.298	0.229	0.266
	BSE100	0.222	0.184	0.272	0.184	0.228	0.284
	NIFTY50 Companies	0.224	0.206	0.247	0.224	0.207	0.252
	Non-SR Blue Chip	0.199	0.145	0.253	0.124	0.165	0.309

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	Mimicking	0.175	0.112	0.238	0.097	0.139	0.290
	BSE500 Index	0.142	0.110	0.179	0.122	0.132	0.180
Modified Sharpe Ratio	**NIFTY100 ESG**	0.240	0.217	0.261	0.229	0.256	0.248
	GREENEX	0.205	0.161	0.245	0.162	0.157	0.288
	SR Blue Chip	0.228	0.205	0.250	0.214	0.245	0.241
	SR Non-Blue Chip	0.262	0.260	0.264	0.298	0.232	0.260
	BSE100	0.222	0.190	0.250	0.190	0.229	0.256
	NIFTY50 Companies	0.228	0.215	0.240	0.235	0.213	0.237
	Non-SR Blue Chip	0.193	0.145	0.231	0.124	0.165	0.271
	Mimicking	0.175	0.113	0.231	0.098	0.140	0.277
	BSE500 Index	0.144	0.113	0.170	0.126	0.131	0.171
Double Sharpe Ratio	**NIFTY100 ESG**	3.126	1.867	2.669	1.648	1.936	2.029
	GREENEX	2.733	1.470	2.393	1.248	1.211	2.219
	SR Blue Chip	2.976	1.773	2.568	1.549	1.853	1.975
	SR Non-Blue Chip	3.417	2.303	2.532	2.199	1.718	2.026
	BSE100	2.940	1.664	2.617	1.403	1.743	2.154
	NIFTY50 Companies	2.964	1.859	2.388	1.698	1.584	1.919
	Non-SR Blue Chip	2.633	1.314	2.438	0.945	1.271	2.338
	Mimicking	2.330	1.020	2.296	0.746	1.074	2.198
	BSE500 Index	1.895	0.998	1.736	0.937	1.017	1.380
Beta	**NIFTY100 ESG**	0.968	0.962	0.976	0.947	1.014	0.972
	GREENEX	0.841	0.792	0.909	0.763	0.893	0.925
	SR Blue Chip	0.973	0.984	0.958	0.972	0.984	0.968
	SR Non-Blue Chip	0.942	0.812	1.061	0.752	1.156	0.993
	BSE100	0.983	0.967	1.004	0.949	0.995	1.024
	NIFTY50	0.965	0.988	0.934	0.985	0.917	0.962

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	Companies						
	Non-SR Blue Chip	1.023	0.899	1.190	0.856	1.066	1.239
	Mimicking	1.134	1.070	1.220	1.033	1.191	1.246
	BSE500 Index	1.000	1.000	1.000	1.000	1.000	1.000
Systematic Risk (%)	**NIFTY100 ESG**	5.327	5.921	4.787	6.345	4.182	5.340
	GREENEX	4.629	4.872	4.455	5.111	3.679	5.080
	SR Blue Chip	5.353	6.053	4.698	6.508	4.057	5.316
	SR Non-Blue Chip	4.709	4.118	5.256	3.969	4.839	5.453
	BSE100	5.407	5.953	4.921	6.360	4.100	5.622
	NIFTY50 Companies	5.309	6.079	4.578	6.596	3.780	5.282
	Non-SR Blue Chip	5.626	5.535	5.832	5.734	4.395	6.805
	Mimicking	6.237	6.583	5.980	6.921	4.911	6.843
	BSE500 Index	5.502	6.153	4.903	6.699	4.122	5.493
Unsystematic Risk (%)	**NIFTY100 ESG**	2.871	3.699	1.833	4.281	1.790	1.635
	GREENEX	2.881	3.062	2.692	3.409	2.283	2.743
	SR Blue Chip	2.884	3.692	1.873	4.276	1.797	1.718
	SR Non-Blue Chip	3.306	3.014	3.450	3.129	3.484	3.049
	BSE100	2.933	3.845	1.771	4.442	1.658	1.733
	NIFTY50 Companies	2.872	3.038	2.683	3.461	2.933	1.890
	Non-SR Blue Chip	4.419	5.377	3.225	5.832	3.302	3.322
	Mimicking	3.715	4.115	3.289	4.511	2.771	3.485
	BSE500 Index	0.000	0.000	0.000	0.000	0.000	0.000
Treynor Ratio	**NIFTY100 ESG**	1.481	1.503	1.457	1.754	1.139	1.531
	GREENEX	1.338	1.180	1.420	1.317	0.763	1.826
	SR Blue Chip	1.408	1.416	1.408	1.633	1.094	1.497

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	SR Non-Blue Chip	1.605	1.635	1.574	2.000	1.179	1.675
	BSE100	1.392	1.349	1.417	1.505	1.013	1.630
	NIFTY50 Companies	1.403	1.419	1.406	1.693	1.079	1.468
	Non-SR Blue Chip	1.390	1.243	1.416	1.181	0.852	1.888
	Mimicking	1.124	0.815	1.329	0.779	0.659	1.785
	BSE500 Index	0.783	0.676	0.876	0.820	0.543	0.986
Jensen Alpha (%)	**NIFTY100 ESG**	0.675***	0.795***	0.568***	0.883***	0.604**	0.529**
	GREENEX	0.466**	0.398	0.496*	0.377	0.198	0.779**
	SR Blue Chip	0.607***	0.727***	0.510**	0.789***	0.542**	0.493**
	SR Non-Blue Chip	0.940***	1.072***	0.761**	1.270***	0.781*	0.684*
	BSE100	0.598***	0.651***	0.543***	0.649**	0.468**	0.659***
	NIFTY50 Companies	0.598***	0.733***	0.495*	0.858***	0.491	0.462*
	Non-SR Blue Chip	0.621**	0.510	0.642*	0.308	0.331	1.119**
	Mimicking	0.386	0.149	0.553	-0.043	0.139	0.996**
	BSE500 Index	0.000	0.000**	0.000**	0.000	0.000	0.000
One-Factor Alpha (%)	**NIFTY100 ESG**	0.675***	0.795***	0.568***	0.883***	0.604**	0.529**
	GREENEX	0.466**	0.398	0.496*	0.377	0.198	0.779**
	SR Blue Chip	0.607***	0.727***	0.510**	0.789***	0.542**	0.493**
	SR Non-Blue Chip	0.940***	1.072***	0.761**	1.270***	0.781*	0.684*
	BSE100	0.598***	0.651***	0.543***	0.649**	0.468**	0.659***
	NIFTY50 Companies	0.598***	0.733***	0.495*	0.858***	0.491	0.462*
	Non-SR Blue Chip	0.621**	0.510	0.642*	0.308	0.331	1.119**
	Mimicking	0.386	0.149	0.553	-0.043	0.139	0.996**
	BSE500 Index	0.000	0.000**	0.000**	0.000	0.000	0.000
Informa	**NIFTY10**	0.382	0.501	0.298	0.500	0.341	0.306

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tion Ratio	**0 ESG**						
	GREENEX	0.120	0.086	0.152	0.054	0.059	0.253
	SR Blue Chip	0.342	0.478	0.251	0.470	0.296	0.268
	SR Non-Blue Chip	0.273	0.321	0.235	0.353	0.243	0.222
	BSE100	0.316	0.323	0.309	0.283	0.280	0.393
	NIFTY50 Companies	0.261	0.524	0.162	0.589	0.151	0.224
	Non-SR Blue Chip	0.164	0.099	0.241	0.041	0.110	0.379
	Mimicking	0.137	0.053	0.216	-0.004	0.084	0.331
	BSE500 Index	0.000	0.000	0.000	0.000	0.000	0.000
M² Measure (%)	**NIFTY100 ESG**	1.818	1.864	1.810	2.023	1.612	1.872
	GREENEX	1.650	1.588	1.665	1.664	1.214	2.015
	SR Blue Chip	1.753	1.798	1.757	1.934	1.566	1.833
	SR Non-Blue Chip	1.828	1.912	1.764	2.143	1.525	1.871
	BSE100	1.738	1.723	1.783	1.803	1.505	1.967
	NIFTY50 Companies	1.748	1.858	1.662	2.068	1.418	1.790
	Non-SR Blue Chip	1.607	1.481	1.688	1.397	1.247	2.106
	Mimicking	1.480	1.281	1.614	1.221	1.140	2.000
	BSE500 Index	1.297	1.265	1.325	1.389	1.109	1.395
3-Factor Alpha (%)	**NIFTY100 ESG**	0.662***	0.747***	0.520**	0.881***	0.613**	0.422
	GREENEX	0.291	0.484	0.093	0.404	0.213	0.253
	SR Blue Chip	0.602***	0.695***	0.476**	0.787***	0.552**	0.429
	SR Non-Blue Chip	0.887***	0.963***	0.658	1.297***	0.761	0.422
	BSE100	0.556***	0.606***	0.464**	0.651**	0.467**	0.543*
	NIFTY50 Companies	0.604***	0.763***	0.399	0.862***	0.533	0.378
	Non-SR Blue Chip	0.464	0.416	0.451	0.325	0.287	0.862*

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	Mimicking	0.179	-0.007	0.301	-0.007	0.059	0.509
	BSE500 Index	0.000***	0.000***	0.000	0.000***	0.000	0.000
4-Factor Alpha (%)	**NIFTY100 ESG**	0.737***	0.798***	0.636***	0.910***	0.686***	0.564*
	GREENEX	0.259	0.393	0.220	0.393	0.172	0.430
	SR Blue Chip	0.667***	0.732***	0.565**	0.803***	0.589**	0.546*
	SR Non-Blue Chip	1.016***	1.076***	0.856*	1.404***	0.983*	0.657
	BSE100	0.645***	0.659***	0.626***	0.688**	0.568**	0.727**
	NIFTY50 Companies	0.668***	0.744***	0.575*	0.804***	0.559	0.571*
	Non-SR Blue Chip	0.657**	0.562	0.878**	0.495	0.630	1.310***
	Mimicking	0.358	0.166	0.527*	0.193	0.301	0.699*
	BSE500 Index	0.000***	0.000***	0.000***	0.000	0.000**	0.000

Note: ****,**, * significant at 1%, 5% and 10% respectively*

Table 2 reports the return, volatility, and risk-adjusted performance of the selected portfolios across the full sample and sub-sample periods. Over the full period, NIFTY100 ESG delivers the highest average monthly return (2.123%), followed by Non-SR Blue Chip (2.096%), SR Blue Chip (2.059%), and BSE100 (2.055%), whereas the BSE500 Index records the lowest return (1.297%). This indicates that ESG-oriented portfolios are not associated with lower return generation and, in fact, compare favourably with conventional alternatives.

Risk measures show meaningful cross-portfolio heterogeneity. Mimicking and Non-SR Blue Chip exhibit the highest volatility, with standard deviations of 7.260% and 7.154%, respectively, while GREENEX (5.453%) and the BSE500 Index (5.502%) remain relatively less volatile. In efficiency terms, the Sharpe Ratio identifies SR Non- Blue Chip as the strongest full-period performer (0.263), ahead of NIFTY100 ESG (0.237) and SR Blue Chip (0.225), whereas the benchmark index records the lowest value (0.142). The same ordering is broadly confirmed by the Modified Sharpe and Double Sharpe ratios, reinforcing the superior risk-adjusted performance of SR Non- Blue Chip. Systematic risk estimates suggest that most portfolios remain closely tied to market dynamics. Mimicking shows the highest beta (1.134), indicating above-market sensitivity, while GREENEX (0.841) has the lowest. NIFTY100 ESG posts a beta of 0.968, implying strong market linkage but slightly lower systematic exposure than the benchmark. Treynor ratios again place SR Non- Blue Chip (1.605) ahead of the remaining portfolios, followed by NIFTY100 ESG (1.481) and SR Blue Chip (1.408), while the BSE500 Index (0.783) trails all other portfolios. Abnormal performance measures provide further evidence in favour of selected socially responsible portfolios. Full-period Jensen alpha is highest for SR Non- Blue Chip (0.940%), followed by NIFTY100 ESG (0.675%), Non-SR Blue Chip (0.621%), and SR Blue Chip (0.607%), with most estimates statistically significant. This pattern remains largely intact in the multi-factor models. Under the three-factor specification, SR Non- Blue Chip records the largest alpha (0.887%), while under the four-factor model its alpha rises further to 1.016%. NIFTY100 ESG also maintains positive and significant alpha under both the three-factor (0.662%) and four-factor (0.737%) specifications. These findings suggest that the abnormal performance of certain portfolios cannot be fully explained by standard market, size, value, and momentum factors.

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The sub-period estimates reveal that portfolio leadership is time-varying. NIFTY100 ESG dominates in the earlier period and in Short Period I, whereas Non-SR Blue Chip and Mimicking become stronger in the final short period. Nevertheless, the overall evidence indicates that socially responsible portfolios are not systematically disadvantaged relative to conventional portfolios. On the contrary, several ESG-oriented portfolios exhibit competitive, and in some cases superior, risk-adjusted performance throughout the sample. In particular, SR Non- Blue Chip emerges as the most efficient portfolio across a wide set of measures, while NIFTY100 ESG combines the highest raw return with consistently positive abnormal performance. These results support the view that socially responsible investing can remain financially competitive even after accounting for multiple dimensions of risk.. These findings lead to the rejection of H01 and H02, as the return performance and risk-adjusted performance of socially responsible portfolios were not similar to those of all conventional portfolios and the market portfolio.

Table 3: Fama's Decomposition Measure for ESG Sector Portfolios

Period	Portfolio	Risk Premium	Systematic Risk Premium	Selectivity	Unsystematic Risk	Net Selectivity	Rank
Full Period	SR Non-Blue Chip	1.511***	0.569	0.942***	0.126	0.815	1
	NIFTY100 ESG	1.433***	0.757	0.676***	0.037	0.638	2
	SR Blue Chip	1.368***	0.761	0.607***	0.038	0.570	3
	BSE100	1.367***	0.769	0.599***	0.044	0.555	4
	NIFTY50 Companies	1.353***	0.755	0.598***	0.061	0.537	5
	Non-SR Blue Chip	1.421***	0.800	0.621**	0.173	0.448	6
	GREENEX	1.125***	0.658	0.466**	0.105	0.362	7
	Mimicking	1.273**	0.887	0.386	0.130	0.256	8
Sub Period I	SR Non-Blue Chip	1.326**	0.252	1.073***	0.060	1.013	1
	NIFTY100 ESG	1.445**	0.649	0.795***	0.021	0.774	2
	NIFTY50 Companies	1.400**	0.666	0.733***	0.017	0.716	3
	SR Blue Chip	1.391**	0.664	0.728***	0.020	0.708	4
	BSE100	1.304*	0.653	0.651***	0.034	0.617	5
	Non-SR Blue Chip	1.117	0.607	0.510	0.170	0.340	6
	GREENEX	0.933	0.534	0.399	0.078	0.321	7
	Mimicking	0.871	0.722	0.149	0.105	0.044	8
Sub Period II	SR Non-Blue Chip	1.671**	0.910	0.761**	0.178	0.582	1
	NIFTY100 ESG	1.423***	0.855	0.568***	0.061	0.508	2
	Non-SR	1.684**	1.041	0.643	0.149	0.494	3

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	Blue Chip			*			
	BSE100	1.422***	0.879	0.544***	0.055	0.489	4
	SR Blue Chip	1.349**	0.839	0.510**	0.064	0.446	5
	Mimicking	1.621**	1.068	0.554	0.151	0.403	6
	NIFTY50 Companies	1.313**	0.817	0.495*	0.130	0.365	7
	GREENEX	1.290**	0.795	0.495*	0.134	0.361	8
Short Period I	SR Non-Blue Chip	1.503**	0.231	1.272***	0.063	1.209	1
	NIFTY100 ESG	1.660*	0.775	0.884***	0.026	0.859	2
	NIFTY50 Companies	1.665*	0.806	0.859***	0.019	0.840	3
	SR Blue Chip	1.585*	0.795	0.789***	0.024	0.765	4
	BSE100	1.427	0.777	0.650**	0.042	0.608	5
	GREENEX	1.003	0.625	0.378	0.099	0.279	6
	Non-SR Blue Chip	1.009	0.701	0.308	0.195	0.114	7
	Mimicking	0.803	0.846	-0.043	0.129	-0.171	8
Short Period II	SR Non-Blue Chip	1.361*	0.579	0.782*	0.134	0.648	1
	NIFTY100 ESG	1.153*	0.550	0.604**	0.048	0.555	2
	SR Blue Chip	1.075*	0.533	0.542**	0.050	0.492	3
	BSE100	1.006*	0.539	0.467**	0.042	0.425	4
	NIFTY50 Companies	0.987	0.497	0.491	0.132	0.358	5
	Non-SR Blue Chip	0.907	0.578	0.329	0.145	0.184	6
	GREENEX	0.680	0.484	0.196	0.086	0.111	7
	Mimicking	0.784	0.646	0.138	0.096	0.042	8
Short Period III	Non-SR Blue Chip	2.340**	1.222	1.118**	0.138	0.980	1
	Mimicking	2.225**	1.229	0.996**	0.150	0.845	2
	GREENEX	1.689**	0.913	0.777**	0.125	0.652	3
	BSE100	1.669**	1.010	0.659***	0.047	0.612	4
	SR Non-Blue Chip	1.663**	0.980	0.684*	0.143	0.541	5
	NIFTY100 ESG	1.489**	0.959	0.529**	0.044	0.486	6

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	SR Blue Chip	1.449**	0.955	0.494**	0.049	0.445	7
	NIFTY50 Companies	1.412*	0.949	0.463*	0.059	0.404	8

Note: ****,**, * significant at 1%, 5% and 10% respectively*

Table 3 reports the Fama decomposition estimates for the sample portfolios, allowing performance to be decomposed into risk premium, systematic risk premium, selectivity, unsystematic risk, and net selectivity. The results suggest that portfolio performance is not explained solely by market exposure; rather, selection ability plays an important role in differentiating portfolio efficiency across the sample. Over the full period, SR Non- Blue Chip records the highest net selectivity (0.815), followed by NIFTY100 ESG (0.638) and SR Blue Chip (0.570). This indicates that these portfolios generated relatively stronger performance after adjusting for both systematic and unsystematic components of risk. The strongest result is observed for SR Non- Blue Chip, which combines a significant risk premium of 1.511% with a high selectivity estimate of 0.942%, thereby securing the top rank. The NIFTY100 ESG portfolio also performs well, with a risk premium of 1.433% and selectivity of 0.676%, implying that its return profile reflects not only market participation but also portfolio selection efficiency.

The period-wise results show that SR Non- Blue Chip remains the top-ranked portfolio in Sub Period I, Sub Period II, Short Period I, and Short Period II, confirming the consistency of its performance efficiency. In contrast, the ranking shifts in Short Period III, where Non-SR Blue Chip (0.980) and Mimicking (0.845) overtake the ESG-oriented portfolios. Although NIFTY100 ESG remains positive throughout, its net selectivity declines to 0.486 in the final short period, suggesting some moderation in relative performance in the later phase of the sample. A broader pattern emerging from the table is that ESG-based portfolios, particularly NIFTY100 ESG and SR Non-Blue Chip, frequently rank above conventional alternatives in terms of net selectivity. Therefore, H03 This is important because net selectivity captures the portion of performance attributable to managerial or portfolio selection efficiency after accounting for systematic and residual influences. Accordingly, the evidence suggests that selected socially responsible portfolios were able to deliver competitive returns not merely because of broad market exposure, but because of stronger underlying portfolio quality. Overall, the decomposition results reinforce the argument that the financial performance of socially responsible portfolios can remain robust even after separating market-related returns from selectivity-driven performance. Hence, H03 is rejected, since the evidence confirms that socially responsible and conventional portfolios differ in terms of net selectivity performance.

Table 4: Paired t-Test Results for ESG and BSE with Sector Portfolios

Portfolio	**Paired With**	**Full Period**	**Sub Period I**	**Sub Period II**	**Short Period I**	**Short Period II**	**Short Period III**
NIFTY100 ESG	**GREENEX**	0.406 (1.687)*	0.719 (1.770)*	0.132 (0.477)	0.945 (1.741)*	0.474 (1.474)	-0.200 (-0.583)
	SR Blue Chip	0.064 (1.419)	0.053 (0.952)	0.074 (1.063)	0.074 (1.061)	0.078 (0.936)	0.040 (0.490)
	SR Non-Blue Chip	-0.285 (-1.397)	-0.218 (-0.804)	-0.342 (-1.141)	-0.313 (-0.926)	-0.370 (-0.920)	-0.175 (-0.547)
	BSE100	0.068 (0.935)	0.146 (1.351)	0.000 (0.003)	0.238 (1.770)*	0.147 (1.232)	-0.180 (-1.499)
	NIFTY50 Companies	0.112 (0.922)	0.115 (0.617)	0.110 (0.684)	0.094 (0.380)	0.166 (0.728)	0.077 (0.526)

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	Non-SR Blue Chip	0.028 (0.102)	0.358 (0.855)	-0.261 (-0.749)	0.688 (1.381)	0.246 (0.553)	-0.851 (-1.928)*
	Mimicking	0.234 (0.902)	0.729 (1.876)*	-0.199 (-0.577)	1.069 (2.183)**	0.370 (1.010)	-0.736 (-1.599)
	BSE500 Index	0.651 (5.111)***	0.770 (4.566)***	0.547 (2.920)***	0.841 (3.838)***	0.612 (2.645)**	0.502 (2.369)**
GREENEX	**SR Blue Chip**	-0.342 (-1.431)	-0.667 (-1.650)	-0.058 (-0.212)	-0.871 (-1.612)	-0.395 (-1.267)	0.240 (0.695)
	SR Non-Blue Chip	-0.410 (-1.359)	-0.540 (-1.272)	-0.298 (-0.696)	-0.707 (-1.307)	-0.570 (-1.044)	0.026 (0.053)
	BSE100	-0.338 (-1.490)	-0.573 (-1.458)	-0.132 (-0.528)	-0.707 (-1.352)	-0.327 (-1.149)	0.020 (0.060)
	NIFTY50 Companies	-0.294 (-1.372)	-0.604 (-1.807)*	-0.022 (-0.081)	-0.851 (-1.907)*	-0.308 (-0.883)	0.277 (0.948)
	Non-SR Blue Chip	-0.378 (-1.278)	-0.361 (-0.733)	-0.393 (-1.118)	-0.257 (-0.427)	-0.227 (-0.507)	-0.651 (-1.350)
	Mimicking	-0.172 (-0.565)	0.010 (0.021)	-0.331 (-0.856)	0.124 (0.209)	-0.104 (-0.232)	-0.536 (-1.010)
	BSE500 Index	0.342 (1.606)	0.258 (0.783)	0.415 (1.491)	0.184 (0.418)	0.138 (0.459)	0.703 (1.962)*
SR Blue Chip	**SR Non-Blue Chip**	-0.350 (-1.404)	-0.272 (-0.832)	-0.418 (-1.127)	-0.391 (-0.952)	-0.451 (-0.923)	-0.215 (-0.535)
	BSE100	0.004 (0.067)	0.093 (0.989)	-0.074 (-0.875)	0.164 (1.393)	0.069 (0.692)	-0.220 (-2.097)**
	NIFTY50 Companies	0.048 (0.429)	0.063 (0.355)	0.036 (0.247)	0.021 (0.087)	0.088 (0.439)	0.037 (0.266)
	Non-SR Blue Chip	-0.036 (-0.134)	0.305 (0.734)	-0.335 (-0.943)	0.614 (1.241)	0.168 (0.372)	-0.891 (-1.984)*
	Mimicking	0.170 (0.636)	0.677 (1.727)*	-0.273 (-0.751)	0.996 (2.015)**	0.291 (0.775)	-0.776 (-1.582)
	BSE500 Index	0.586 (4.571)***	0.717 (4.356)***	0.473 (2.462)**	0.766 (3.610)***	0.533 (2.296)**	0.462 (2.072)**
SR Non-Blue Chip	**BSE100**	0.282 (1.135)	0.271 (0.815)	0.291 (0.799)	0.424 (1.023)	0.439 (0.913)	-0.006 (-0.015)
	NIFTY50 Companies	0.385 (1.433)	0.260 (0.698)	0.492 (1.280)	0.303 (0.643)	0.603 (1.137)	0.252 (0.637)
	Non-SR Blue Chip	0.048 (0.146)	0.231 (0.478)	-0.110 (-0.251)	0.529 (0.928)	0.324 (0.569)	-0.677 (-1.237)
	Mimicking	0.270 (0.913)	0.568 (1.338)	0.013 (0.031)	0.862 (1.649)	0.547 (1.043)	-0.561 (-1.172)
	BSE500 Index	0.907 (3.614)***	1.015 (2.889)***	0.813 (2.277)**	1.196 (2.662)**	0.860 (1.848)*	0.677 (1.719)*
BSE100	**NIFTY50 Companie**	0.044 (0.332)	-0.031 (-0.148)	0.110 (0.638)	-0.144 (-0.526)	0.019 (0.074)	0.257 (1.765)*

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	Non-SR Blue Chip	-0.041 (-0.193)	0.212 (0.649)	-0.262 (-0.959)	0.449 (1.169)	0.099 (0.280)	-0.671 (-1.939)*
	Mimicking	0.166 (0.703)	0.583 (1.680)*	-0.199 (-0.622)	0.831 (1.899)*	0.222 (0.693)	-0.556 (-1.250)
	BSE500 Index	0.585 (4.231)***	0.629 (2.943)***	0.547 (3.026)***	0.609 (2.178)**	0.464 (2.169)**	0.683 (3.042)***
NIFTY50 Companies	**Non-SR Blue Chip**	-0.085 (-0.281)	0.243 (0.525)	-0.371 (-0.937)	0.593 (1.066)	0.080 (0.144)	-0.928 (-2.141)**
	Mimicking	0.122 (0.400)	0.614 (1.406)	-0.309 (-0.730)	0.975 (1.792)*	0.204 (0.397)	-0.813 (-1.593)
	BSE500 Index	0.571 (3.486)***	0.725 (4.777)***	0.437 (1.586)	0.846 (4.526)***	0.446 (1.169)	0.425 (1.732)*
Non-SR Blue Chip	**Mimicking**	0.207 (0.843)	0.371 (0.960)	0.063 (0.201)	0.382 (0.809)	0.123 (0.348)	0.115 (0.258)
	BSE500 Index	0.639 (2.191)**	0.442 (0.903)	0.809 (2.361)**	0.190 (0.314)	0.365 (0.853)	1.353 (2.935)***
Mimicking	**BSE500 Index**	0.491 (1.836)*	0.196 (0.482)	0.746 (2.112)**	-0.016 (-0.030)	0.242 (0.650)	1.238 (2.566)**

Note: ****,**, * significant at 1%, 5% and 10% respectively*

Table 4 reports the paired t-test results for all unique portfolio combinations arranged in a portfolio-wise format. The overall evidence suggests that most pairwise return differentials are statistically insignificant, indicating that the selected socially responsible and conventional portfolios exhibit broadly similar return behaviour over the sample period. This implies that, despite differences in screening criteria and composition, the average monthly returns of many portfolio pairs do not differ in a statistically meaningful way. A more distinct pattern is observed when the portfolios are compared with the BSE500 Index. Several portfolios record positive and significant mean return differentials relative to the benchmark, indicating superior average performance over the broad market index. For instance, BSE100 BSE500 Index shows a positive and statistically significant differential of 0.585% over the full period. Similar evidence is observed for other portfolios in comparison with the benchmark, suggesting that the underperformance is more evident at the level of the broad market index than within the set of study portfolios themselves.

The results also vary across sub-periods, which indicates that relative performance was not constant over time. In certain phases, some portfolio pairs become statistically significant, while in others the same pairs remain insignificant. This time variation reflects the changing market environment and suggests that performance differences were period-specific rather than persistent across the entire sample. Overall, the paired t-test findings indicate that socially responsible and conventional portfolios are largely comparable in return performance, while several of them outperform the BSE500 Index, especially during specific phases of the study period.

Table 5: Results of Carhart Four-Factor Model for Overall Period

Portfolio	Multi-Factor Alpha (%)	Market Risk Premium	Size Effect (SMB)	Value Effect (HML)	Momentum Effect (WML)
NIFTY100	0.951***	0.957***	-0.010	-0.047	-0.168***

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ESG					
GREENEX	0.337	0.835***	-0.162***	0.072	-0.048
SR Blue Chip	0.887***	0.967***	-0.023	-0.054	-0.164***
SR Non-Blue Chip	1.060***	0.896***	0.078	0.026	-0.139**
BSE100	0.872***	0.928***	0.018	-0.010	-0.183***
NIFTY50 Companies	0.828***	1.004***	-0.162***	-0.074	-0.141***
Non-SR Blue Chip	0.906***	0.781***	0.181**	0.144*	-0.261***
Mimicking	0.403*	0.856***	0.246***	0.333***	-0.176***
BSE500 Index	1.138**	-0.100	0.026	-0.090	-0.301***

Note: ****,**, * significant at 1%, 5% and 10% respectively*

Table 5 reports the estimates of the Carhart four-factor model for the total study period. The results indicate that the market factor remains positive and highly significant across all portfolios, confirming that market-wide movements continue to be the primary driver of portfolio returns even after controlling for size, value, and momentum effects. The market loading varies from 0.610 for GREENEX to 1.240 for Mimicking, suggesting heterogeneity in systematic risk exposure across the sample. Portfolios such as NIFTY100 ESG (0.957), SR Blue Chip (0.967), BSE100 (0.928), and NIFTY50 Companies (1.004) exhibit market sensitivity close to unity, indicating a strong alignment with overall market performance. The alpha estimates remain positive for most portfolios, implying that selected portfolios continue to generate abnormal returns after adjusting for the four common risk factors. The highest alpha is observed for SR Non- Blue Chip (1.060%), followed by NIFTY100 ESG (0.951%), Non-SR Blue Chip (0.906%), SR Blue Chip (0.887%), and BSE100 (0.872%). These findings suggest that the returns of these portfolios are not fully explained by standard factor exposures. In contrast, the alpha coefficients for GREENEX and Mimicking are statistically insignificant, indicating that their performance is largely captured by the factor structure of the model.

The additional factors provide further insights into return dynamics. The size factor (SMB) is significant only for a limited number of portfolios, with negative exposure in GREENEX and NIFTY50 Companies, and positive exposure in Non-SR Blue Chip and Mimicking. The value factor (HML) is largely insignificant across portfolios, except for Mimicking and Non-SR Blue Chip, where the coefficients are positive and significant. By contrast, the momentum factor (WML) emerges as an important determinant of returns for several portfolios. It is negative and significant for NIFTY100 ESG, SR Blue Chip, BSE100, NIFTY50 Companies, Non-SR Blue Chip, Mimicking, and the BSE500 Index, indicating an inverse association with momentum-based return behaviour over the sample period. The model fit is reasonably strong, with R^2 values of 0.849 for NIFTY100 ESG, 0.849 for Mimicking, 0.843 for SR Blue Chip, and 0.832 for BSE100, showing that the four-factor specification explains a substantial proportion of return variation for these portfolios. At the same time, the relatively lower R^2 values for SR Non- Blue Chip (0.677) and Non-SR Blue Chip (0.675) imply that additional portfolio-specific influences may still be present. Overall, the Carhart results suggest that while market and momentum factors play a significant role in explaining portfolio returns, selected portfolios continue to exhibit positive and significant abnormal performance even under the most comprehensive factor specification used in the study. In particular, SR Non-Blue Chip, NIFTY100 ESG, and SR Blue Chip remain notable performers, indicating that their return advantage cannot be fully attributed to conventional factor exposures alone.

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Accordingly, H04 is rejected signifying a major impact on the performance of both socially responsible and conventional portfolios.

Table 6.1: Performance Persistence of Conventional Stocks Portfolio using TMB approach

Portfolio	Window	Group	Alpha	MF	SMB	HML	WML	N	R^2
BSE100	12M	Top	0.5476*	1.0211***	0.0592	-0.0395	0.0713	121	0.7044
		Middle	0.3853	1.0199***	-0.0401	0.0202	-0.1605***	121	0.7869
		Bottom	1.3209***	1.0387***	0.0416	0.1416	-0.4175***	121	0.6577
		TMB	-1.3009**	-0.0113	0.0150	-0.1775	0.4916***	121	0.2803
	36M	Top	0.7178**	1.0693***	-0.0269	-0.0817	0.0887	64	0.8053
		Middle	0.8160**	0.8536***	-0.0355	-0.0798	-0.2269***	64	0.6799
		Bottom	0.5271	1.0180***	-0.1000	0.2495*	-0.4852***	64	0.6414
		TMB	-0.2777	0.0621	0.0714	-0.3283**	0.5706***	64	0.3868
	60M	Top	0.7323	1.2882***	0.1611	-0.0901	-0.4693*	16	0.904
		Middle	0.5032	0.8611***	0.0652	0.0989	-0.4699**	16	0.849
		Bottom	1.1928	1.0629***	0.0524	0.1090	-0.3092	16	0.8322
		TMB	-0.9379	0.2273	0.1110	-0.2083	-0.1575	16	0.2026
NIFTY50 Companies	12M	Top	0.2614	0.9201***	-0.0367	-0.0171	0.1097**	116	0.7039
		Middle	0.2926	1.0263***	-0.1721***	-0.0097	-0.1783***	116	0.8126
		Bottom	0.7643**	1.1757***	-0.2227***	-0.0137	-0.4155***	116	0.7882
		TMB	-1.0266***	-0.2501***	0.1824**	0.0004	0.5281***	116	0.4215
	36M	Top	-0.042	0.9952***	-0.1563	-0.0087	0.1187	64	0.6922

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		Middle	0.4810	0.8456***	-0.1446	-0.1529*	-0.2107**	64	0.5654
		Bottom	0.5424	0.9832***	-0.2579**	0.2327**	-0.5854***	64	0.7151
		TMB	-1.0530*	0.0229	0.0998	-0.2386*	0.7008***	64	0.3984
	60M	**Top**	0.0980	1.2333***	0.0419	-0.0552	-0.4379	16	0.8617
		Middle	0.1994	0.7195***	-0.0073	0.1374	-0.6510**	16	0.7879
		Bottom	0.1451	0.8242***	0.0904	0.2031	-0.3633	16	0.7887
		TMB	-0.5245	0.4111*	-0.0462	-0.2676	-0.0719	16	0.3367
Non-SR Blue Chip	**12M**	**Top**	1.3959***	1.1862***	0.2691**	-0.1399	-0.0955	116	0.6307
		Middle	0.9281*	0.8484***	0.2028	0.2919**	-0.1406	116	0.519
		Bottom	1.6728***	1.3080***	-0.0689	-0.0463	-0.7779***	116	0.6505
		TMB	-0.8006	-0.1163	0.3345**	-0.0898	0.6853***	116	0.2501
	36M	**Top**	1.8723***	1.0751***	0.0636	-0.0447	0.2387	64	0.4885
		Middle	1.1419	0.8353***	0.2136	0.1301	-0.2940	64	0.3205
		Bottom	0.5732	1.0079***	0.0575	0.2969	-0.3203	64	0.4595
		TMB	0.8307	0.0780	0.0042	-0.3387	0.5557**	64	0.1646
	60M	**Top**	2.0996*	1.2237***	0.1475	-0.0604	-0.2534	16	0.7295
		Middle	0.6014	1.1393***	-0.2651	-0.0700	-0.0988	16	0.879
		Bottom	2.7146**	1.2701***	0.1333	0.2127	0.0326	16	0.7803
		TMB	-1.0923	-0.0444	0.0164	-0.2823	-0.2834	16	0.0835
Mimicking	**12M**	**Top**	1.2165***	1.1162***	0.2786***	0.2934***	0.1644**	116	0.7632
		Middle	0.0370	0.7991***	0.2016**	0.3606***	-0.1884**	116	0.7277

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		Bottom	1.1453***	1.1884***	0.2466**	0.1606*	-0.7723***	116	0.8158
		TMB	-0.4525	-0.0667	0.0285	0.1366	0.9397***	116	0.4613
	36M	**Top**	1.2642**	0.9689***	0.0751	0.1921	0.2857**	64	0.5731
		Middle	0.4322	0.8634***	-0.1291	0.3593***	-0.0626	64	0.5928
		Bottom	0.3973	1.1201***	0.5559***	0.4496***	-0.8460***	64	0.7347
		TMB	0.3986	-0.1403	-0.4826**	-0.2546	1.1284***	64	0.4764
	60M	**Top**	1.1211	1.4473***	-0.3719	-0.4970*	0.4992	16	0.8543
		Middle	-0.1621	0.9776***	0.4099	0.3726*	-0.6002*	16	0.8485
		Bottom	1.1891	1.3194***	0.0716	0.8987*	-0.9991	16	0.673
		TMB	-0.5453	0.1300	-0.4413	-1.4049***	1.5009**	16	0.5591

Note: ****,**, * significant at 1%, 5% and 10% respectively*

Table 4.6.2: Performance Persistence of Socially Responsible Stocks Portfolio using TMB approach

Portfolio	**Window**	**Group**	**Alpha**	**MF**	**SMB**	**HML**	**WML**	**N**	**R^2**
GREENEX	**12M**	**Middle**	0.1943	0.9315***	-0.0699	0.0676	-0.1437**	116	0.6786
		Bottom	0.8877**	1.1129***	-0.2295***	-0.0126	-0.2555***	116	0.7134
		TMB	-1.2733**	-0.2920**	0.1656	0.0398	0.3790***	116	0.2135
	36M	**Top**	-0.3773	0.7354***	-0.1096	-0.0008	0.3811***	64	0.551
		Middle	0.0792	0.8533***	-0.1303	0.1115	0.0164	64	0.5697
		Bottom	0.4400	0.9896***	-0.2951**	0.2343**	-0.5762***	64	0.7175

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		TMB	-1.2856*	-0.2433	0.1838	-0.2322	0.9540***	64	0.4743
	60M	**Top**	-0.0830	1.2848***	0.0480	-0.1055	-0.0713	16	0.8109
		Middle	0.3119	0.6274***	0.1228	0.1704	-0.3950	16	0.5915
		Bottom	0.4643	0.6654***	-0.0478	0.6069**	-0.4384	16	0.7104
		TMB	-1.0246	0.6214**	0.0980	-0.7216**	0.3697	16	0.5679
NIFTY100 ESG	**12M**	**Top**	0.5480**	0.9451***	0.0045	-0.0186	0.1232**	120	0.7503
		Middle	0.2504	1.0461***	-0.0870	-0.0238	-0.1520***	120	0.8021
		Bottom	0.9833***	1.0160***	-0.0694	0.1299*	-0.3810***	120	0.7702
		TMB	-0.9642***	-0.0643	0.0705	-0.1451*	0.5068***	120	0.4469
	36M	**Top**	0.3071	1.0651***	-0.1174	-0.1307*	0.1843**	64	0.7854
		Middle	0.6451*	0.8258***	-0.0261	-0.0945	-0.1809**	64	0.6808
		Bottom	0.4322	1.0430***	-0.1401	0.1988*	-0.5818***	64	0.7059
		TMB	-0.5935	0.0330	0.0209	-0.3265**	0.7628***	64	0.4928
	60M	**Top**	-0.2082	1.2035***	0.1255	-0.0834	-0.3519	16	0.8946
		Middle	0.7142	0.8990***	0.0941	-0.0163	-0.6139***	16	0.8983
		Bottom	0.7502	0.9918***	-0.0060	0.1931	-0.3582	16	0.848
		TMB	-1.4358	0.2138	0.1338	-0.2858	0.0088	16	0.2176
SR Blue Chip	**12M**	**Top**	0.3206	0.9337***	0.0083	-0.0269	0.1096*	120	0.715
		Middle	0.3289	1.0272***	-0.0756	0.0046	-0.1479***	120	0.7943
		Bottom	0.9805***	1.0642***	-0.0820	0.0961	-0.3864***	120	0.7423

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		TMB	-1.1889***	-0.1240	0.0870	-0.1195	0.4986***	120	0.4163
	36M	**Top**	0.2548	1.0219***	-0.1011	-0.1106	0.0728	64	0.7339
		Middle	0.7629**	0.8692***	-0.0613	-0.0973	-0.2246***	64	0.6823
		Bottom	0.5731	1.0373***	-0.1434	0.2118*	-0.5487***	64	0.6671
		TMB	-0.7867	-0.0045	0.0405	-0.3195**	0.6182***	64	0.4289
	60M	**Top**	0.0977	1.2359***	0.2169	-0.0156	-0.5847*	16	0.8481
		Middle	0.7082	0.8270***	0.1211	0.0047	-0.5582**	16	0.8184
		Bottom	0.7807	1.0146***	0.0267	0.1746	-0.4021	16	0.8534
		TMB	-1.1604	0.2233	0.1924	-0.1994	-0.1801	16	0.2455
SR Non-Blue Chip	**12M**	**Top**	1.1785**	1.0306***	-0.0079	-0.0740	0.1214	116	0.4621
		Middle	0.2912	0.9785***	0.1001	-0.0162	-0.0242	116	0.4749
		Bottom	0.8173	0.9683***	-0.2015	0.2007*	-0.4285***	116	0.573
		TMB	-0.1625	0.0678	0.1901	-0.2710*	0.5529***	116	0.2186
	36M	**Top**	0.5569	1.2029***	0.0047	-0.2313	0.3422	64	0.4237
		Middle	0.8765	1.0090***	-0.1972	-0.1922	0.0990	64	0.4381
		Bottom	-0.5371	0.7848***	-0.0157	0.2147	-0.5394***	64	0.4509
		TMB	0.6257	0.4290	0.0186	-0.4432*	0.8783***	64	0.2833
	60M	**Top**	-1.1642	1.6043***	-0.4144	-0.3639	0.0464	16	0.7883
		Middle	0.3155	0.6512**	0.0495	-0.0926	-0.0135	16	0.4364
		Bottom	1.2004	0.9763**	-0.0901	0.2228	-0.5010	16	0.4191
		TMB	-2.8419	0.6300	-0.3221	-0.5959	0.5500	16	0.2075

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Note: ****,**, * significant at 1%, 5% and 10% respectively*

Table 6.1 and 6.2 reports the results of the Top-minus-Bottom (TMB) persistence approach estimated through the Carhart four-factor model. The analysis compares the abnormal performance of portfolios formed on the basis of past returns over 12-month, 36-month, and 60-month ranking horizons. In this framework, a positive and significant TMB alpha indicates performance persistence, whereas a negative or insignificant alpha suggests either the absence of persistence or the presence of return reversal.

The empirical results provide limited support for persistence. At the 12-month horizon, several portfolios exhibit negative TMB alpha, and in a number of cases these estimates are statistically significant, indicating short-term reversal rather than continuation in performance. This pattern is visible for portfolios such as NIFTY100 ESG, SR Blue Chip, BSE100, and NIFTY50 Companies, where the top-ranked portfolios do not sustain their prior out-performance relative to the bottom-ranked portfolios. Although a few portfolios display weaker negative or insignificant TMB alpha, the overall short-horizon evidence does not support stable abnormal return persistence.

At the 36-month horizon, the evidence remains mixed. TMB alpha stays negative for several portfolios, while a few others turn marginally positive; however, these positive estimates are generally weak and statistically insignificant. This suggests that medium-term persistence is not robust across the sample. At the 60-month horizon, the pattern becomes even less supportive of persistence, as most TMB alpha values remain negative or lose significance, indicating that long-horizon past winners are generally unable to maintain superior future performance. Another important finding is that the momentum factor frequently remains significant in the TMB regressions, even when TMB alpha itself is insignificant or negative. This indicates that the spread between top and bottom portfolios is influenced by momentum-related return dynamics, but this does not translate into consistent abnormal persistence. Hence, the return differences captured by the TMB portfolios appear to be driven more by factor exposure than by enduring superior performance.

Overall, the TMB results suggest that performance persistence is weak and unstable across the selected portfolios. Instead of consistent continuation, the findings point more strongly toward reversal effects, particularly at the short and long horizons. Therefore, the evidence from the parametric persistence test does not support the view that socially responsible or conventional portfolios generate sustained abnormal returns over time by accepting H05.

CONCLUSION AND POLICY IMPLICATIONS

CONCLUSION

This study examined the comparative performance and performance persistence of socially responsible portfolios and conventional portfolios in the Indian equity market over the period from April 2009 to March 2024. Using return and risk measures, risk-adjusted performance indicators, Fama decomposition, paired t-tests, the Carhart four-factor model, and the Top Minus Bottom (TMB) approach, the study evaluated whether socially responsible investing in India is financially competitive . The findings indicate that socially responsible portfolios were not at any financial disadvantage during the study period. In particular, NIFTY100 ESG recorded the highest average return over the full period, while SR Non-Blue Chip performed strongly across several risk-adjusted and alpha-based measures. The results therefore suggest that socially responsible investing can generate returns comparable to, and in some cases better than, conventional investment alternatives. The factor-model evidence further shows that portfolio returns were influenced mainly by common market forces, but selected socially responsible portfolios continued to exhibit positive abnormal returns even after controlling for market, size, value, and momentum effects. This supports the argument that socially responsible investing in India can serve as a financially credible investment strategy rather than merely an ethical choice. At the same time, the persistence analysis offers a more cautious result. The TMB approach provides only limited support for stable performance

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persistence, and in several cases findings point to reversal rather than sustained continuation of out performance. Thus, although socially responsible portfolios performed competitively overall, their superior performance was not consistently maintained across time. Overall, the study concludes that socially responsible investing in India represents a viable and financially sound alternative to conventional investing. However, investors should not assume that better past performance will automatically continue in future periods.

The findings of the study have important implications for investors, fund managers, regulators, and policymakers. For investors, the results suggest that socially responsible portfolios can be considered as a serious investment option without fear of systematic under performance. For fund managers and asset management companies, the findings imply that socially responsible products should not be marketed only on ethical grounds, but also on financial merit. For regulators and policymakers, the results support the need for stronger ESG disclosure standards and more transparent sustainability reporting in the Indian capital market. Finally, the weak persistence results suggest that investors and portfolio managers should avoid depending solely on historical out performance while making investment decisions. Socially responsible investing should therefore be supported by continuous monitoring, regular portfolio review, and dynamic strategy adjustments in response to changing market conditions.

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