THE SUSTAINABLE INVESTMENT RACE: A BOON OR BANE FOR INVESTORS IN INDIA?

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ABSTRACT

This study's objective is to empirically compare the performance of sustainable investments (SI) to general equities and the market. This study compares the return, risk, and performance metrics of all accessible, sustainable investments over the previous twelve years against those of traditional stock and market portfolios. The paper's distinctive contribution is that it is the first study to include omega and kappa as performance indicators in addition to other criteria. The results of this study show that sustainable portfolios showed less risk than traditional stock and market portfolios for the entire investigated period, both before and after COVID.

Keywords: Sustainable Investments, Responsible Investment, ESG, Performance Evaluation, General Stock Portfolio, Market Portfolio.

JEL Classification: G11, Q01, Q56.

INTRODUCTION

Financial markets, regulators, corporations, fund houses, and investors in India and around the world practice the concept of Socially Responsible Investment (SRI) as the world has witnessed a series of corporate frauds, global financial crises, environmental degradation, corporate failure to address societal and economic concerns, achievement of short-term objectives at the expense of long-term goals, investor awareness, and many other factors. As SRI-based investing has gained widespread attention, it has also resulted in a paradigm shift in global investment strategy, as investors seek out and value companies that incorporate environmental, social, and governance factors into their operations. Many pension funds and sovereign wealth funds around the world have stopped investing in companies that have been found to have a negative impact on society and the economy.

Environmental, social, and corporate governance concerns have emerged as critical parameters for investors in India and worldwide. In the recent year 2021-22, the asset size of ESG funds in India has surpassed Rs. 12,300 crores. The Indian National Stock Exchange (NSE) has launched NSE Prime, a framework in which companies submit corporate governance standards that exceed those required by current regulations. On the other hand, market experts are concerned about the possibility of "*greenwashing*" and over-weighting specific stocks while the rest are non-compliant with ESG parameters. Companies in India will be compelled to improve their governance and ethical practices, focusing on social and environmental responsibility, as ESG funds gain popularity. Traditional asset pricing models, such as the Capital Asset Pricing Model, and multifactor models, such as Arbitrage Pricing Theory, are incapable of accounting for ESG risk. A few asset managers have used Fama-French multifactor models to incorporate ESG risk modeling. Furthermore, none of the ESG indicators can be converted into quantitative variables, and there is little response to ESG-

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related factors in fixed-income securities. These issues must be addressed as investors trade off alpha returns and beta risk factors.

Companies with strong ESG credentials performed far better than their competitors in India and abroad during the COVID-19 pandemic and the global financial crisis of 2007-09, resulting in increased integration of ESG into asset pricing. Not only have investors' perspectives on the risk-return trade-off shifted. The United Nations Principles for Responsible Investment (UNPRI) reported a 26% increase in ESG assets in 2021, with $121 trillion under management in the ESG category. Similarly, the number of ESG Exchange Traded Funds (ETFs) has increased from 39 in December 2009 to 221 in June 2022, with AUM increasing at a CAGR of 15.8% since 2009. While ESG investing in India is gaining traction, with inflows into ESG mutual fund schemes rising by 76% in 2021, it is still in its infancy compared to the global trend. The NIFTY ESG 100 sustainability index has outperformed the NIFTY 100. As markets and investors become more optimistic about long-term risk-adjusted stable returns, pension funds have begun incorporating ESG factors.

According to market experts, positive performance of ESG funds and indices is attributed to accounting for ESG risks and creating value through cost reduction through effective resource utilization, investing in sustainable strategies, improving social credibility and image, developing stronger community relations, increased governance, and making long-term investment decisions to reduce the risk of stranded assets.

LITERATURE REVIEW

Sustainable investing, also known as *'ethical investing*,' *'green investing*,' *'impact investing*, '*mission-related investing*,' *'value-based investing*,' or '*sustainable, responsible investing*,' is gaining traction around the world as a growing number of investors, portfolio managers, and institutional investors incorporate it into their investment strategy (Hudson, 2005). It is a type of investment that considers environmental, social, and corporate governance (ESG) criteria when analysing investments and building portfolios across various asset classes to generate long-term competitive financial returns while having a positive and sustainable societal impact.

Because of their personal beliefs and values, some corporations voluntarily incorporate good environmental, social, and governance (ESG) practices into business policies. While for others aligning ESG with profitability goals is a face saver and a way to create a "*brand image*." The "*epistemic CSR community*," which includes regulators, social activists, non-governmental organizations, academia, and think tanks, is increasing international pressure on businesses to contribute to society (Gjolberg, 2009). Growing empirical evidence suggests that CSR generates intangible benefits and has a positive relationship with financial performance (Waddock & Graves, 1997; Wagner, 2005; Artiach et al., 2010). Dunfee (2003) posed several questions to understand investors' attitudes toward social investing better and studied ESG investing to various behavioural traits, including an individual's value system, religious beliefs, social and environmental activism, and a desire for higher returns. The study divided respondents into two categories: The first group is interested in maximizing their investments' financial performance while contributing to the environment and society. They are willing to accept market-rate returns from an SRI-screened portfolio in exchange for some social and environmental well-being (Cullis et al., 1992; Mackenzie & Lewis, 1999; Glac, 2009; Toniic, 2019). The second group prioritizes impact over financial returns and has solid social beliefs and values that apply to their economic decisions. These investors are willing to accept lower-than-market returns to maximize social and environmental impact (Lewis & Mackenzie, 2000; Rosen et al., 1991; Glac, 2009; Toniic, 2019).

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Due to increased concern for environmental protection, corporations and governments have made environmental protection an integral part of their investment decision-making, according to Boulatoff & Boyer (2009). The authors argue that investors prefer to invest in socially responsible stocks or portfolios for the following reasons. Investors want to invest in socially responsible companies for ethical reasons. The second reason is that the pure return profile causes concern. Third, they hope to raise public awareness by favouring socially responsible businesses. Fourth, investors expect to improve their reputation by investing in socially responsible companies.

Hamilton et al. (1993) empirically tested socially responsible funds and discovered that they did not earn a statistically significant excess return over traditional mutual funds. Furthermore, the authors found that the market fails to recognize the value of socially responsible stocks in the economy and society. In a seminal study, Young & Proffitt (2003) discovered that the systematic risk of SRI funds is lower than that of average funds. The authors compared and empirically tested the returns, cost, and risk of SRI-compliant funds and traditional funds, concluding that the absolute risk of SRI funds is nearly identical to that of conventional funds. In contrast, the returns and costs are lower. In contrast to Young &Proffit (2003), RBC Global Asset Management (2007) discovered that the average returns of SRI funds are nearly equal to those of conventional funds.

In a novel but related track, Benson et al. (2006) investigated and discovered a marginal difference in stock-picking ability between fund managers of conventional stocks and socially responsible stocks. The authors also concluded that SRI funds' returns are due to various Industry exposures tapped by their portfolio managers. According to Shank et al. (2005), there is no statistical evidence of investors' preference for socially responsible firms, particularly during economic downturns. Statman (2005) discovered empirically that SRI funds generated higher returns than the overall market return from the 1990s to 2004. Hume & Larkin (2008) found that, contrary to Statman (2005), investors underestimated the benefits of socially responsible stocks/funds. Furthermore, they empirically tested and concluded that before 2000, socially responsible firms outperformed established firms; however, after 2000, conventional firms outperformed socially accountable firms.

In a more focused study that included only environmental firms, King & Lenox (2001) discovered that environmental firms outperformed conventional firms in terms of financial performance. According to Boulatoff & Boyer (2009), who studied and compared 310 traditional and environmentally focused firms, traditional firms outperformed environmentally focused firms on average, contradicting King & Lenox's findings (2001). Dixon's (2010) study produced unexpected results. The study's findings showed that sustainability-based portfolios provided higher returns but also carried a higher risk. Like Dixon (2010) and Tripathi & Bhandari (2012) investigated whether there is a statistically significant difference in the returns of green and non-green stock portfolios. They discovered that green stock portfolios generated significantly higher returns than the overall market. Furthermore, the authors found that green stock portfolios were more profitable during the crisis. Similarly, Elia researched the performance of Shariah Compliant stocks and concluded that their returns demonstrated the effect of favourable net selectivity.

Bhanumurthy (2014) empirically tested and concluded that socially responsible businesses outperform general businesses in terms of return, price discovery, and returns during and after the crisis. As a continuation of previous research, Tripathi & Bhandari (2015) discovered evidence to support the case for social investing in India. According to the authors, investors became more socially responsible after the crisis. Furthermore, the authors concluded that regulators and policymakers should intervene to ensure socially responsible investments at the corporate and fund manager levels. These findings are consistent with Hamilton et al. (1993) and Hume & Larkin (2008). A public interest lawsuit filed against Life

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Insurance of India to divest ITC from their investment portfolio demonstrates how the public has become more aware of organizations' socially responsible behaviour Rukhaiyar.

Socially responsible investment considers social, ethical, and environmental issues when making business and investment decisions. Recent trends show that investors are more aware and do not want to increase their financial return at the expense of the economy's social, ethical, and environmental costs (Statman, 2020; Kumar, 2016; Simon et al., 1972). Thus, SRI is the address for this all-encompassing concern and approach. In other words, investors nowadays use various screens to select stocks and even portfolios. These screens primarily comprise environmental, social, ethical, and governance criteria demonstrating more responsible investor behaviour. Not only are investors more aware of their consumption and investment patterns to ensure a sustainable future for future generations (Nair & Lodha, 2013).

The concept of socially responsible investment was first proposed in the United States in the 1960s, but it did not catch on until the 1990s. Only professional fund managers in the United States, according to USSIF (2016), invest more than 20% of their funds under SRI principles. This percentage was less than 10% in 2006, according to (Kempf & Osthoff, 2007). According to available data approximately 22 to 38% of professionally managed assets in the United States and Canada are invested in SRI-enabled instruments, while this proportion is around 50% in Europe and Australia.

Furthermore, between 2014 and 2015, China and India experienced significant growth rates of 105% and 104%, respectively. According to Monga (2007), the first SRI fund was launched in India on March 5, 2007, but growth has been slow. Corporate social responsibility is gaining popularity around the world, including in India. However, India has insufficient socially responsible funds, and many existing funds invest in SRI funds under Shariah principles (Roy, 2017). Sultana (2017), on the other hand, discovered that the BSE CARBONEX index (which includes Indian firms that address and adhere to climate change norms) outperformed the Sensex.

Tripathi & Bhandari (2015) discovered that the GREENEX and ESG indexes outperformed the market even during the crisis. Many years ago, Lewis & Mackenzie (2000) published intriguing findings, stating that the encouraging performance of socially responsible companies and funds may entice even those who are not particularly interested in social, ethical, or environmental issues. Existing literacy work is diverse, with various antecedents in social responsibility studies. Revelli & Viviani (2015) looked at the performance of SRI vs. non-SRI companies and funds, whereas Demirbag et al. (2017) investigated the relationship between corporate social responsibility and institutional structure. Singh (2009) investigated the relationship between consumer demography and SRI investments, whereas Li et al. (2019) investigated the impact of SRI on debt cost.

Two competing theories exist concerning the economic viability of socially responsible and Islamic investments (Viviers & Els, 2017). According to one theory, incorporating non-financial screening criteria for securities selection has a negative impact on portfolio performance and risk because it results in a less diversified and less optimal investment portfolio with lower returns and higher volatility (Sauer, 1997). According to the author, to follow Sharia/socially responsible principles, investors/portfolio managers must exclude specific sectors and companies, resulting in less optimal portfolios when compared to their unrestricted counterparts. Compliance has a cost, such as screening and monitoring stocks and companies (Bradshaw et al., 2014).

Another point of view is that Sharia/socially responsible screening processes, due to their holistic approach to business management, may result in financially stable, less risky, and profitable companies. The Sharia screening process, according to Hussein & Omran (2005); Abdullah et al. (2007), excludes highly leveraged companies and avoids investing in

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gharar (uncertainty elements) and gambling. According to the authors, this screening criteria leads to sound investment portfolios and lowers overall risk. Both Ghoul & Karam confirmed this (2007).

Non-financial criteria are used by both SRI and Islamic investments to screen out businesses such as alcohol, tobacco, military defence, and pornography. According to Siddiqi (2004), Sharia compliance investments exclude traditional financial companies because debt levels above a certain threshold are not permitted as interest-based activities are not Sharia-compliant. Such constraints, however, do not exist in SRI-based investments. SRI also addresses environmental risk, ethics, and corporate governance issues. Thus, the Sharia investment framework is a subset of the SRI-based framework, and their approaches differ. Dar Al Istithmar also confirmed this (2009). Furthermore, the author believes that the Sharia framework focuses on the output of the business but excludes non-income-generating aspects such as social and environmental concerns. To address this, Dow Jones launched the Islamic Sustainability Index, a subset of the broad Islam index that combines Sharia and sustainability parameters.

BinMahfouz (2016) discovered that Shariah and sustainability-compliant portfolios have no negative impact on portfolio performance or systematic risk compared to general stock portfolios. The authors concluded that investments in such stocks or portfolios have similar risk and return profiles.

In summary, all these studies have increased public awareness of various aspects of SRIs. As a result, on a global scale, a reasonable number of studies addressing multiple aspects of SRI can be found. Such research is critical in India because it is one of the fastest-growing emerging economies, with the Sensex and Nifty crossing the 60,000 and 18,000 point thresholds, respectively. Furthermore, India has announced the establishment of a Social Stock Exchange to address the needs of civil society, demonstrating concern for social, ethical, and sustainable growth alongside economic progress.

The Rationale for the Study

The Global Sustainable Investment Alliance (2016) reported a 25% increase in 2016 to US$22.89 trillion in assets under responsible investment strategies globally, indicating the growing importance and demand for SRI investing. The major markets for SRI were Europe, the United States, Canada, and Australia, with developing countries contributing only a small portion. The investment bias in favour of developed countries was a major motivator for this study to investigate whether adequate SRI investment opportunities exist in developing countries.

Investors frequently wonder what risk and return trade-offs, if any, need to be made when making SRI investments, regardless of the investment style. Theoretically, investors that apply both the financial and social criteria can make money and improve the world, according to proponents of SRI investing and ethical screening (Knoll, 2002). This study attempted to evaluate the portfolio of sustainable enterprises and compare their performance to their conventional counterparts to solve this crucial issue.

In this context, sustainable investing (SI) encompasses various terms and types of assets/portfolios managed under multiple headings such as '*ESG*,' 'green,' '*climate*,' '*SRI*,' '*Shariah compliant*,' '*responsible investing*,' and so on.

The following are the objectives:

1. To compare the returns and risk-adjusted measures of sustainable portfolios to those of general stock and market portfolios.
2. To assess their performance using the net selectivity method.

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The remaining sections of this research are structured as follows.

A review of the literature is presented in Section 2 to look at how the SI-enabled investments have performed compared to more conventional investment indices/portfolios. The research methodology is described in Section 3, data analysis is shown in Section 4, and a discussion of the findings, limitations, and future research opportunities are presented in Section 5.

Sustainable Investment Performance in India

Sustainability indices showed positive average daily returns during the Covid-19 period, with high spikes observed for all sustainability indices' daily average returns between March 2020 and May 2020. The S&P BSE 100 ESG index outperformed the Sensex in one-, three-, and five-year annual returns. Furthermore, all sustainability indices outperformed the Sensex during the Covid-19 crisis. On the other hand, the higher correlation between the three sustainability indices suggests that investors cannot benefit from portfolio diversification by solely investing in sustainability indices.

As most mutual funds and ETFs have lost investments in recent decades, ESG investing has gained popularity and momentum. Those committed to core investing ideologies of sustainable and ethical investing, particularly during financial crises and pandemics, have demonstrated above average or relatively acceptable performance. ESG investing has seen inflows of $168.74 billion in 2020, up from $63.34 billion in 2019.

ESG or SRI-based investing must be evaluated in terms of creating value for stakeholders and the economy. As a result, we need to investigate why ESG/SRI funds outperformed traditional market-based portfolios. Over the last five years, the Nifty ESG Index has outperformed the NIFTY 50 in India. Many AMCs, including AXIS AMC, ICICI Prudential, and Quantum India AMC, have invested in this theme, and Mirae Asset Mutual Fund, among others, has launched an ESG ETF.

Profits were once thought to be the most important metric for investors because they are the easiest to quantify. It has been replaced by the Company's impact on the environment and society. Sustainable impact investing is the right choice and offers numerous opportunities to leverage for long-term returns. Despite the lack of formal or legal rules binding Indian corporations, many large corporations are developing ESG strategies at the board level to attract investors.

Methodology and Data

This section of the paper deals with the data and methodology. It describes the sample, the sample period, the data, the sources, and the methods used in the study.

Data, Sources and Period

The BSE Shariah 500 Index[1], Nifty 500 Shariah, the BSE Carbonnex index, Nifty 100 ESG Index, Nifty 100 ESG Sector Leaders [2]and Nifty 100 ESG Enhanced are used as proxies for sustainable investment (SI) portfolios. As market portfolios, the CNX Nifty 500 index is considered. As a general stock portfolio Nifty 50 and BSE Sensex and BSE 500 are considered.

[1] Bse Shariah 500 index value is missing from the 18th July 2016 to 24th April, 2017.
[2] Nifty 100 ESG Sector Leaders –data are available only from 20th October, 2020.

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From January 1, 2010, to March 31, 2022, daily data from the indices were collected from www.nseindia.com and www.bseindia.com. These values are converted to simple percentage returns using ln (pt/pt-1); this is then converted into a monthly return. We assumed the risk-free rate to be 0.5 percent per month. The study was conducted over 12 years (January 1, 2010, to March 31, 2022), before (January 1, 2010, to February 28, 2022), and after the Covid 19 period (March 1, 2020 to March 31, 2022). This is done to look at the returns over a short period also.

METHODOLOGY

The study has evaluated performance based on conventionally used parameters like Sharpe, Jenson, Treynor, and Fama Performance Measure and the most robust and not used parameters like Omega ratio, Kappa method, M^2 method, and Sortino measures. Further, to achieve the research objectives, the following hypotheses are tested.

H_1: *The SI portfolio generates significant positive returns compared to the Market Portfolio and the three General Portfolios.*

H_2: *The Risk for SI portfolio is significantly lower compared to the Market Portfolio and the three General Portfolios.*

The above two hypotheses are tested for the total period, pre-covid and post covid periods.

Risk-Adjusted Performance Evaluation Methods

Sharpe Ratio

It helps to understand the return of an investment compared to its risk. This index standardizes returns above the risk-free rate by dividing them by return variability. It works on the assumption that investment returns are normally distributed.

If R_p is the average monthly portfolio return, R_f is the risk-free rate, and σ_p is the total portfolio risk, the Sharpe ratio is defined as

$$R_p\text{-}R_f/\ \sigma_p$$

Treynor Method

It is the excess return per unit of the portfolio's systematic risk.

This beta assumes a well-diversified portfolio and standardizes return over a risk-free rate by dividing it by return volatility.

$$R_p\text{-}R_f/\ \beta_p$$

As the measure of the risks used in both parameters differs, the ratios are ranked differently. If portfolios are very well diversified, the total risk becomes equivalent to systematic risk, and both the measures give the same value and rankings; however, if portfolios are poorly diversified, the Treynor ratio comes with a higher order compared to the Sharpe ratio.

Jenson Method or Jensen's Alpha

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This metric determines the excess or abnormal return on a security or portfolio over the expected return. Because it is calculated using a market model, the expected return is theoretical (CAPM). A portfolio with a consistently positive excess return will have a positive alpha and vice versa. It can be calculated as

$$\text{Jenson's alpha} = \alpha = R_p - (R_f + \beta_p(R_m - R_f)$$

Information Ratio

It is also a risk-adjusted measure of a portfolio's or security's return. It is a ratio of expected active return to tracking error, also known as the appraisal ratio, with the active return being the difference between the return of the portfolio or security and the return of a chosen benchmark index and the tracking error being the standard deviation of the active return.

It can be written as

$$\text{Information Ratio} = E(R_p - R_b)/\sigma = \alpha_p/\sigma_{ep}$$

Where α_p is Jenson's alpha or abnormal return of the portfolio, and σ_{ep} is the unsystematic risk of the portfolio.

Sortino Ratio

The Sortino ratio is a variant of the Sharpe ratio that uses the asset's standard deviation of negative portfolio returns, or downside deviation, rather than the total standard deviation of portfolio returns to distinguish between detrimental volatility and overall volatility. The Sortino ratio divides the amount left over after deducting the risk-free rate from the return on an asset or portfolio by the asset's downside deviation.

Fama Performance Measure

Excess return, according to Fama, is caused by several factors, including the security's risk tolerance and stock selection. This is made up of two parts: risk premium (return on risk) and stock selectivity (reward for stock selection). The risk premium is a combination of systematic and unsystematic risk. Only stock selectivity rewards are the difference between the actual return and the sum of the security's other three components.

A methodology was developed by Fama (1972) to evaluate portfolio performance by decomposing it into systematic, unsystematic risk; and net selectivity.

1. Compensation for non-diversification (systematic risk)
2. Compensation for diversification (unsystematic risk)
3. Net selectivity
4. Portfolio total return = Risk-free return (R_f)+ reward for taking Systematic risk+ Reward for taking Unsystematic risk +Reward for pure Stock Selectivity

Fama suggested overall performance

$$\text{Overall performance} = \text{Excess Return} = R_a - R_f$$

Where R_a is the actual return of the portfolio being evaluated.
Fama decomposed overall performance into.

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Overall performance = Portfolio risk + Selectivity

Where
Selectivity = R_a- E($R(\beta_a)$—this measures security selection skill
$R(\beta_a)$ = return on the combination of the risk-free asset and the market portfolio M, which has β_a
β_a- beta of the portfolio, which is going to be evaluated
Portfolio risk component = E $R(\beta_a)$ - R_f, which measures the return required to take the risk which cannot be eliminated.

Omega Ratio

The Omega ratio measures the risk-return performance of an investment asset, portfolio, or strategy. Con Keating and William F. Shadwick invented it in 2002, defined as the probability-weighted ratio of gains versus losses for some thresholds return target. The balance is based on information that the Sharpe ratio ignores.

Omega is calculated by dividing the cumulative return distribution into an area of losses and a place of gains relative to this threshold. The ratio is calculated as follows:

$$\Omega(\theta) = \frac{\int_{\theta}^{\infty} [1 - F(r)]\, dr}{\int_{-\infty}^{\theta} F(r)\, dr},$$

F is the cumulative probability distribution function of the returns and theta is the target return threshold that defines what is considered a gain versus a loss. A higher ratio indicates that the asset provides more gains relative to losses for some theta threshold and is thus preferable to an investor.

It includes all distributions, including normal and skewed to the left or right. It covers every aspect of risk and reward. skewness, kurtosis, standard deviation, and mean. This is the main benefit of utilizing this ratio, which no comparable ratio addresses, making it preferable to others.

Kappa Ratio

$$K_n(\tau) = \frac{\mu - \tau}{\sqrt[n]{LPM_n(\tau)}}$$

M is the mean return, τ is the threshold return, and LPM_n is the n-th order Lower Partial Moment. Higher Kappa values are better.

M^2 Measure

The M^2 measure, an expanded and more practical version of the Sharpe ratio, calculates the portfolio's risk-adjusted return by dividing it by the standard deviation of any benchmark market index, multiplying the result, and then adding the portfolio's risk-free return.

It is straightforward to understand risk-adjusted performance statistics. When compared to the Sharpe ratio from which it is derived, the M2 measure is more informative because it is difficult to interpret the Sharpe ratio when it is negative.

RESULTS AND DISCUSSION

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An empirical result based on the methodology applied is presented in this section. For that, the study shows performance evaluation of all the indices for the total period considered for the study, pre-covid and post covid. The first part gives an overview of the return, risk, alpha, and beta indices considered for the study. The second and third part evaluates all the indices based on risk premium, systematic risk, unsystematic risk, selectivity, Sharpe, Jenson, Treynor, Omega, Kappa, Sortino, and M square.

Table 1
RETURN, RISK, ALPHA, AND BETA FOR A TOTAL PERIOD (2012-2022)

Indices	Mean	Variance	Alpha	Beta
Nifty 500	0.83%	0.26%	0.00%	1.00
Nifty 50	0.82%	0.25%	0.02%	0.96
Sensex	0.82%	0.23%	0.15%	0.80
BSE 500	0.84%	0.26%	0.01%	1.00
BSE Shariah 500 Index	1.29%	0.16%	0.59%	0.64
Nifty 500 Shariah	0.97%	0.14%	0.51%	0.56
Carbonnex index	0.77%	0.26%	-0.01%	0.97
ESG Index	1.07%	0.34%	0.10%	0.96
Nifty 100 ESG Index	0.94%	0.25%	0.10%	0.95
Nifty 100ESG Enhanced	0.95%	0.18%	0.38%	0.65
Nifty 100 ESG Sector Leaders	1.95%	0.14%	-0.29%	0.86

(Sources: calculated by author)

The above Table 1 shows that all sustainable indices' average return and risk are far better or at least at par compared to benchmark indices. BSE Shariah 500 index has shown noteworthy performance in terms of return, risk, alpha and beta. Except for the Carbonnex index and Nifty 100 ESG sector leaders, the alpha of all the sustainable indices are far better than the general or market portfolio. Higher beta of Carbonex Index, ESG Index and Nifty 100 ESG Index indicates more sensitivity to market conditions.

The success of an investment or portfolio is gauged by its alpha, which demonstrates how much a stock or portfolio has outperformed the overall market. It shows that as the market appreciates over time, stocks that make up most of a portfolio add value because of higher or positive alpha. Positive alpha denotes outperformance, and negative alpha indicates underperformance, to put it simply. Every investor looks for investments with positive and increasing alpha. Understanding a stock's alpha is crucial since it suggests the likelihood of future success. Beta provides context regarding the volatility involved, whereas alpha deals with the rewards of the investment. A positive beta value indicates that the stock travels in the same direction as the index.

In contrast, a negative value reveals the opposite way, showing that the stock moves higher when the market declines and vice versa. Beta values greater than one also indicates greater volatility. Savvy investors use high-beta stocks and funds to increase earnings.

Table 2
RISK COMPONENTS AND SELECTIVITY FOR A TOTAL PERIOD (2012-2022)

Indices	Risk premium	Systematic Risk	Unsystematic Risk	Selectivity
Nifty 500	0.33%	0.33%	0.00%	0.33%
Nifty 50	0.33%	0.32%	0.01%	0.32%
Sensex	0.33%	0.27%	0.05%	0.32%
BSE 500	0.33%	0.33%	0.00%	0.34%
BSE Shariah 500 Index	0.59%	0.38%	0.08%	0.79%
Nifty 500 Shariah	0.33%	0.19%	0.06%	0.47%
Carbonnex index	0.30%	0.29%	0.00%	0.27%
ESG Index	0.52%	0.50%	0.01%	0.57%

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Nifty 100 ESG Index	0.39%	0.37%	0.01%	0.44%
Nifty 100ESG Enhanced	0.39%	0.25%	0.07%	0.45%
Nifty 100 ESG Sector Leaders	2.09%	1.81%	0.20%	1.45%

(Sources: calculated by author)

As is well known, systematic risk is caused by general macroeconomic factors that impact all securities. In contrast, unsystematic risk is caused by factors specific to a given security. Unsystematic risk is unique to the particular Company Industry or fund and can be reduced through diversification. In contrast, systematic risk is inherent in the market and can be decreased by asset allocation. The unsystematic risk for well-diversified portfolios is very low or equal to zero. The sustainable portfolios (Carbonnex, ESG, and Nifty 100 ESG Index) had the least unsystematic risk when we compared the portfolios in the Table 2, which suggests that these portfolios are adequately diversified. In addition, compared to regular stock portfolios, the BSE Shariah 500 Index, ESG Index, and Nifty 100 ESG sector leaders exhibit higher levels of systematic risk. Fama's selectivity measure gives the excess return obtained by the manager that cannot have been received by investing in the market portfolio. The SI portfolios and BSE 500 show outstanding performance per Fama's selectivity criteria.

In terms of all risk-adjusted indicators, including the Sharpe ratio, Treynor ratio, Jensen's, Net selectivity, Sortino, M-square, Omega, and Kappa, sustainable investments (SI) outperformed other portfolios and the market portfolio during the 12-year study period (2012-2022). According to financial theory, risk and return move together. Better risk led to higher returns and, as a result, a high-Sharpe ratio, which denotes the highest return per unit of total risk, in portfolios of sustainable stocks Table 3.

Table 3
PORTFOLIO PERFORMANCE EVALUATIONS FOR A TOTAL PERIOD (2012-2022)

Indices	Sharpe	Jensen	Treynor	Net Selectivity	Sortino	M-Square	Omega	Kappa[3]
Nifty 500	6.50%	0.00%	0.33%	0.00%	8.90%	0.00%	119.45%	8.90%
Nifty 50	6.34%	0.00%	0.33%	-0.01%	8.84%	-0.01%	118.80%	8.84%
Sensex	6.62%	0.05%	0.40%	0.01%	9.10%	0.01%	120.68%	9.10%
BSE 500	6.61%	0.01%	0.34%	0.01%	9.03%	0.01%	119.91%	9.03%
BSE Shariah 500 Index	19.68%	0.41%	1.22%	0.32%	30.12%	0.41%	170.44%	30.12%
Nifty 500 Shariah	12.44%	0.28%	0.85%	0.22%	18.76%	0.31%	136.30%	18.76%
Carbonnex index	5.22%	-0.03%	0.27%	-0.03%	7.17%	-0.03%	115.37%	7.17%
ESG Index	9.86%	0.08%	0.60%	0.07%	13.07%	0.07%	135.07%	13.07%
Nifty 100 ESG Index	8.85%	0.08%	0.47%	0.07%	12.68%	0.07%	127.45%	12.68%
Nifty 100ESG Enhanced	10.66%	0.20%	0.69%	0.13%	16.83%	0.16%	132.95%	16.83%
Nifty 100 ESG Sector Leaders	38.80%	-0.36%	1.68%	-0.56%	106.59%	-0.58%	273.33%	106.59%

(Sources: calculated by author)

The highest risk premium and Sharpe Ratio were achieved by Nifty 100 ESG Sector Leaders due to their combination of highest return and lowest risk. All sustainable investments, except for the Carbonnex Index, have produced more excellent risk-adjusted

[3] Kindly note that for kappa n is considered as 2 for all the studied periods.

Citation Information: Pandya, H.F., Deverakonda, S., & Thota, H. (2023). The sustainable investment race: a boon or bane for investors in india?. *Academy of Accounting and Financial Studies Journal, 27*(3), 1-19.

performance. A high Treynor ratio indicates the highest return per unit of total systematic risk. High Jensen's value means that stock portfolios with a sustainable conscience produce the highest abnormal returns.

Additionally, a high Information ratio demonstrates that an investor can increase returns more effectively by increasing risk. The probability-weighted upside divided by the probability-weighted downside is known as the omega ratio. In other words, an investment with a high Omega had a low likelihood of suffering a severe loss. The omega computation uses the actual return distribution instead of the normal distribution. In this way, the risk-return distribution of the investment under consideration has been previously analysed, and the omega ratio appropriately reflects it. A reasonable investor would choose the higher Sortino ratio when comparing two similar investments since it indicates that the investment is earning more return per unit of the adverse risk that it assumes.

Pre Covid

The pre-Covid period also had more potent alpha and beta performance, greater returns, and lower risks for All Sustainable Investing (SI). The Carbonnex Index stood out as an outlier. Carbonnex, Nifty 100 ESG Index, and Nifty 100 ESG Enhanced all have higher beta values, which mean they are more vulnerable to swings in the market Table 4.

Table 4
RETURN, RISK, ALPHA AND BETA FOR A PRE COVID-PERIOD

Indices	Mean	Variance	Alpha	Beta
Nifty 500	0.61%	0.20%	0.00%	1.00
Nifty 50	0.62%	0.20%	0.03%	0.96
Sensex	0.64%	0.17%	0.21%	0.70
BSE 500	0.62%	0.20%	0.01%	0.99
BSE Shariah 500 Index	0.97%	0.11%	0.48%	0.59
Nifty 500 Shariah	0.73%	0.14%	0.26%	0.77
Carbonnex index	0.53%	0.20%	-0.01%	0.96
ESG Index	0.26%	0.14%	0.04%	0.87
Nifty 100 ESG Index	0.70%	0.20%	0.07%	0.98
Nifty 100ESG Enhanced	0.77%	0.19%	0.16%	0.94
Nifty 100 ESG Sector Leaders	na	na	na	na

(Sources: calculated by author)

The sustainable portfolios (except from the BSE Shariah 500 Index) had the most minor level of unsystematic risk, which suggests that these portfolios are properly diversified, when we examine the unsystematic risk of the various portfolios in the table. In addition, when compared to typical stock portfolios, the BSE Shariah 500 Index, and the Nifty 100 ESG enhanced demonstrate higher levels of systematic risk Table 5.

Table 5
RISK COMPONENTS AND SELECTIVITY FOR A PRE COVID-PERIOD

Indices	Risk premium	Systematic Risk	Unsystematic Risk	Selectivity
Nifty 500	0.11%	0.11%	0.00%	0.11%
Nifty 50	0.11%	0.11%	0.00%	0.12%
Sensex	0.11%	0.08%	0.02%	0.14%
BSE 500	0.11%	0.11%	0.00%	0.12%
BSE Shariah 500 Index	0.34%	0.20%	0.08%	0.47%
Nifty 500 Shariah	0.11%	0.09%	0.01%	0.23%
Carbonnex index	0.06%	0.05%	0.00%	0.03%
ESG Index	-0.25%	-0.22%	-0.02%	-0.24%

Citation Information: Pandya, H.F., Deverakonda, S., & Thota, H. (2023). The sustainable investment race: a boon or bane for investors in india?. *Academy of Accounting and Financial Studies Journal, 27*(3), 1-19.

Nifty 100 ESG Index	0.15%	0.14%	0.00%	0.20%
Nifty 100ESG Enhanced	0.15%	0.14%	0.01%	0.27%
Nifty 100 ESG Sector Leaders	na	na	na	na

(Sources: calculated by author)

Sustainable investments (SI) outperformed market portfolio throughout the pre-covid period as well in terms of all risk-adjusted indicators, considering the Sharpe ratio, Treynor ratio, Jensen's, Net selectivity, Sortino, M-square, Omega, and Kappa. Better risk led to higher returns and, as a result, a high-Sharpe ratio, which denotes the highest return per unit of total risk, in portfolios of socially responsible stocks. The highest risk premium and Sharpe Ratio were achieved by Nifty 100 ESG Sector Leaders due to their combination of highest return and lowest risk. All sustainable investments, except the Carbonnex Index, have produced greater risk-adjusted performance. A high Treynor ratio indicates the highest return per unit of total systematic risk. High Jensen's value shows superior performance by sustainable portfolios.

Additionally, a high Sortino ratio demonstrates that an investor can increase returns more effectively by increasing risk. Evaluating all the above portfolios based on M2 method, Omega and Kappa perspectives, all SI funds have performed better except ESG Index. No results are compared for Nifty 100 ESG Sector Leaders as it was constituted in October 2020 Table 6.

Table 6
PORTFOLIO PERFORMANCE EVALUATIONS FOR A PRE COVID-PERIOD

Indices	Sharpe	Jensen	Treynor	Net Selectivity	Sortino	M-Square	Omega	Kappa
Nifty 500	2.53%	0.00%	0.11%	0.00%	3.59%	0.00%	106.65%	3.59%
Nifty 50	2.80%	0.01%	0.13%	0.01%	4.05%	0.01%	107.38%	4.05%
Sensex	3.40%	0.06%	0.20%	0.04%	4.80%	0.04%	109.48%	4.80%
BSE 500	2.57%	0.00%	0.12%	0.00%	3.63%	0.00%	106.82%	3.63%
BSE Shariah 500 Index	14.30%	0.27%	0.81%	0.20%	22.87%	0.24%	144.73%	22.87%
Nifty 500 Shariah	6.14%	0.15%	0.30%	0.14%	8.76%	0.16%	116.41%	8.76%
Carbonnex index	0.62%	-0.03%	0.03%	-0.03%	0.88%	-0.03%	101.59%	0.88%
ESG Index	-6.39%	-0.02%	-0.28%	0.00%	-8.33%	-0.01%	84.83%	-8.33%
Nifty 100 ESG Index	4.47%	0.06%	0.20%	0.05%	6.61%	0.05%	112.25%	6.61%
Nifty 100ESG Enhanced	6.29%	0.14%	0.29%	0.13%	9.47%	0.13%	118.15%	9.47%
Nifty 100 ESG Sector Leaders	na	na	na	na	na	na	na	na

(Sources: calculated by author)

Post Covid

Table 7
RETURN, RISK, ALPHA, AND BETA FOR A POST COVID PERIOD

Indices	Mean	Variance	Alpha	Beta
Nifty 500	1.59%	0.56%	0.00%	1.00
Nifty 50	1.46%	0.54%	-0.09%	0.97
Sensex	1.40%	0.54%	-0.15%	0.97
BSE 500	1.60%	0.56%	0.01%	1.00
BSE Shariah 500 Index	2.04%	0.32%	0.94%	0.69

Citation Information: Pandya, H.F., Deverakonda, S., & Thota, H. (2023). The sustainable investment race: a boon or bane for investors in india?. *Academy of Accounting and Financial Studies Journal, 27*(3), 1-19.

Nifty 500 Shariah	2.05%	0.12%	1.78%	0.17
Carbonnex index	1.50%	0.54%	-0.06%	0.98
ESG Index	1.70%	0.55%	0.14%	0.98
Nifty 100 ESG Index	1.69%	0.48%	0.24%	0.91
Nifty 100ESG Enhanced	1.64%	0.12%	1.32%	0.20
Nifty 100 ESG Sector Leaders	1.95%	0.14%	-0.29%	0.86

(Sources: calculated by author)

Like the total studied period and pre-covid period, from the above Table 7, it can be inferred that sustainable portfolios provide far superior returns and come with lower risk. In other words, they perform better in terms of risk-return trade-off. Nifty 500 Shariah has the highest alpha, followed by Nifty 100 ESG Index. A high alpha value for these indices indicates that these portfolios/indices perform better than market or benchmark portfolios.

Table 8
RISK COMPONENTS AND SELECTIVITY FOR A POST COVID PERIOD

Indices	Risk premium	Systematic Risk	Unsystematic Risk	Selectivity
Nifty 500	1.09%	1.09%	0.00%	1.09%
Nifty 50	1.09%	1.06%	0.01%	0.96%
Sensex	1.09%	1.06%	0.01%	0.90%
BSE 500	1.09%	1.08%	0.00%	1.10%
BSE Shariah 500 Index	1.09%	0.75%	0.06%	1.54%
Nifty 500 Shariah	1.09%	0.18%	0.32%	1.55%
Carbonnex index	1.09%	1.07%	0.00%	1.00%
ESG Index	1.09%	1.07%	0.01%	1.20%
Nifty 100 ESG Index	1.09%	0.99%	0.01%	1.19%
Nifty 100ESG Enhanced	1.09%	0.22%	0.28%	1.14%
Nifty 100 ESG Sector Leaders	2.09%	1.81%	0.20%	1.45%

(Sources: calculated by author)

A fascinating finding from the above data shows that except for Nifty 100 ESG Sector Leaders, all the SI and market portfolios have the same risk-return trade-off. Higher unsystematic risk for SI portfolios shows that they are not adequately diversified post-pandemic Table 8. In comparison, market and general stock portfolios are very well diversified. Further, post-pandemic systematic risk of the SI portfolios is very high compared to other portfolios showing poor asset allocation.

Table 9
PORTFOLIO PERFORMANCE EVALUATIONS FOR A POST COVID PERIOD

Indices	Sharpe	Jensen	Treynor	Net Selectivity	Sortino	M-Square	Omega	Kappa
Nifty 500	14.54%	0.00%	1.09%	0.00%	18.48%	0.00%	155.50%	18.48%
Nifty 50	13.04%	-0.10%	0.98%	-0.11%	16.86%	-0.11%	147.55%	16.86%
Sensex	12.21%	-0.16%	0.92%	-0.17%	15.88%	-0.17%	142.69%	15.88%
BSE 500	14.68%	0.01%	1.10%	0.01%	18.69%	0.01%	156.06%	18.69%
BSE Shariah 500 Index	27.31%	0.78%	2.22%	0.72%	38.93%	0.95%	205.17%	38.93%
Nifty 500 Shariah	45.15%	1.36%	9.21%	1.05%	102.20%	2.29%	327.60%	102.20%
Carbonnex index	13.62%	-0.06%	1.02%	-0.07%	17.55%	-0.07%	151.82%	17.55%
ESG Index	16.27%	0.13%	1.22%	0.13%	21.26%	0.13%	164.76%	21.26%
Nifty 100 ESG Index	17.20%	0.20%	1.30%	0.18%	22.94%	0.20%	166.00%	22.94%

Citation Information: Pandya, H.F., Deverakonda, S., & Thota, H. (2023). The sustainable investment race: a boon or bane for investors in india?. *Academy of Accounting and Financial Studies Journal, 27*(3), 1-19.

Nifty 100ESG Enhanced	33.20%	0.92%	5.67%	0.64%	85.39%	1.39%	255.16%	85.39%
Nifty 100 ESG Sector Leaders	38.80%	-0.36%	1.68%	-0.56%	106.59%	-0.58%	273.33%	106.59%

(Sources: calculated by author)

Like the total period studied and the pre-covid period, the performance of all the Sustainable portfolios is better when evaluated from all the above performance evaluation criteria Table 9. BSE Shariah 500, Nifty Shariah 500 Index, and Nifty 100 ESG Enhanced have shown superior performance.

Hypothesis Tested

H_1: *The SI portfolio generates significant positive returns compared to the Market Portfolio and the three General Portfolios.*

T-tests are conducted for the difference between SI returns, Market Portfolio, and the General Stock Portfolio. In the below table:

1. Differential return (t-value, p-value in percentages)
2. Level of significance 1% ***; 5% **; and 10% *

From the above test, it can be inferred that differential return was only significant at 1% significance level for Carbonnex and all the four indices, namely Nifty 500, Nifty 50, Sensex and BSE 500. For remaining all the SI Portfolios null hypothesis fails to be rejected. For the pre-covid period, only Nifty 100 ESG Index has shown significant mean differential for Sensex at 5% significance level. For the post covid period also, Carbonnex, ESG Index, Nifty 100 ESG Index and Nifty 100 ESG Enhanced had shown significance t value. In summary, it can be concluded that significant positive returns are not generated by SI portfolio compared to the Market Portfolio and the three General Portfolios. This clearly shows that the return of the SI portfolios is not statistically significant above Market Portfolio and the three General Portfolios Table 10.

Table 10
T TEST FOR SI RETURNS AND MARKET PORTFOLIO AND THE GENERAL STOCK PORTFOLIO

Total Period	**Nifty 500**	**Nifty 50**	**Sensex**	**BSE 500**
Differential Return				
BSE Shariah 500 Index	0.45% (0.75; 45.23%)	0.47% (0.79; 43.17%)	0.47% (0.81; 41.72%)	0.45% (0.75; 45.58%)
Nifty 500 Shariah	0.14% (0.27; 78.36%)	0.15% (0.31; 75.83%)	0.15% (0.32; 75.14%)	0.13% (0.27; 79.01%)
Carbonnex index	-0.07% (-0.11 *; 91.03%)	-0.05% (-0.09 *; 92.85%)	-0.05% (-0.09*; 92.76%)	-0.07% (-0.12 *; 90.44%)
ESG Index	0.24% (0.28; 78.09%)	0.25% (0.30; 76.48%)	0.25% (0.31; 75.75%)	0.23% (0.27; 78.44%)
Nifty 100 ESG Index	0.11% (0.18; 85.81%)	0.12% (0.20; 83.78%)	0.12% (0.21; 83.34%)	0.11% (0.17; 86.35%)
Nifty 100ESG Enhanced	0.12% (0.20; 83.97%)	0.13% (0.23; 81.76%)	0.13% (0.24; 81.20%)	0.11% (0.20; 84.54%)
Nifty 100 ESG Sector Leaders	1.12% (0.89; 37.68%)	1.13% (0.91; 36.18%)	1.13% (0.95; 34.16%)	1.11% (0.89; 37.74%)
Pre Covid	**Nifty 500**	**Nifty 50**	**Sensex**	**BSE 500**

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Differential Return				
BSE Shariah 500 Index	0.36% (0.61 ; 53.93%)	0.35% (0.61 ; 54.55%)	0.33% (0.61 ; 54.18%)	0.36% (0.61 ; 54.02%)
Nifty 500 Shariah	0.12% (0.24; 81.12%)	0.11% (0.22; 82.53%)	0.09% (0.20; 84.38%)	0.12% (0.24; 81.34%)
Carbonnex index	-0.09% (-0.15 ; 88.29%)	-0.10% (-0.17 ; 86.80%)	-0.11% (-0.20 ; 84.16%)	-0.09% (-0.15 ; 88.05%)
ESG Index	-0.36% (-0.39 ; 69.56%)	-0.37% (-0.41 ; 68.28%)	-0.38% (-0.45 ; 65.02%)	-0.36% (-0.39 ; 69.35%)
Nifty 100 ESG Index	0.08% (0.14; 88.73%)	0.07% (0.13; 89.98%)	0.06% (0.10 *; 91.71%)	0.08% (0.14; 88.93%)
Nifty 100ESG Enhanced	0.16% (0.27; 78.60%)	0.15% (0.26; 79.73%)	0.13% (0.24; 81.02%)	0.16% (0.27; 78.77%)
Nifty 100 ESG Sector Leaders	na (na na; na)	na (na na; na)	na (na na; na)	na (na na; na)
Post-Covid	**Nifty 500**	**Nifty 50**	**Sensex**	**BSE 500**
Differential Return				
BSE Shariah 500 Index	0.45% (0.24 ; 81.03%)	0.58% (0.31 ; 75.41%)	0.64% (0.35 ; 73.13%)	0.44% (0.24 ; 81.40%)
Nifty 500 Shariah	0.46% (0.28; 78.10%)	0.59% (0.36; 71.68%)	0.65% (0.40; 69.14%)	0.45% (0.27; 78.51%)
Carbonnex index	-0.08% (-0.04 **; 96.90%)	0.05% (0.02 **; 98.15%)	0.11% (0.05 **; 95.95%)	-0.09% (-0.04 **; 96.54%)
ESG Index	0.12% (0.06 **; 95.59%)	0.25% (0.12 *; 90.59%)	0.31% (0.15 ; 88.43%)	0.11% (0.05 **; 95.94%)
Nifty 100 ESG Index	0.10% (0.05 **; 95.98%)	0.23% (0.12 *; 90.82%)	0.29% (0.14; 88.58%)	0.09% (0.05 **; 96.35%)
Nifty 100ESG Enhanced	0.05% (0.03 **; 97.59%)	0.18% (0.11 *; 91.17%)	0.24% (0.15; 88.39%)	0.04% (0.02 **; 98.05%)
Nifty 100 ESG Sector Leaders	0.36% (0.19; 85.30%)	0.49% (0.26; 79.81%)	0.55% (0.29; 77.58%)	0.35% (0.18; 85.67%)

(Calculated by author)

H_2: *The Risk for SI portfolio is significantly lower compared to the Market Portfolio and the three General Portfolios.*

F-test is conducted for the ratio of variances between SI and Market Portfolio and the General Stock Portfolio. In the below Table 11:

1. Variance ratio (F-value, p-value in percentages)
2. Level of significance 1% *** ; 5% **; and 10% *

Table 11
F-test of variances between SI and Market Portfolio and the General Stock Portfolio

Total Period	**Nifty 500**	**Nifty 50**	**Sensex**	**BSE 500**
Variance ratio				
BSE Shariah 500 Index	0.60 (1.66 ***; 0.22%)	0.63 (1.60 ***; 0.42%)	0.68 (1.46 **; 1.66%)	0.61 (1.65 ***; 0.24%)
Nifty 500 Shariah	0.54 (1.85 ***; 0.01%)	0.56 (1.78 ***; 0.02%)	0.61 (1.63 ***; 0.11%)	0.54 (1.84 ***; 0.01%)
Carbonnex index	0.98 (1.02; 45.29%)	1.02 (1.02; 45.29%)	1.12 (1.12; 25.73%)	0.99 (1.01; 46.66%)
ESG Index	1.27 (1.27; 13.14%)	1.32 (1.32 *; 9.68%)	1.45 (1.45 **; 4.32%)	1.28 (1.28; 12.58%)
Nifty 100 ESG Index	0.95 (1.05; 38.46%)	0.99 (1.01; 47.50%)	1.08 (1.08; 31.90%)	0.96 (1.04; 39.77%)

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Nifty 100ESG Enhanced	0.67 (1.49 ***; 0.98%)	0.70 (1.43 **; 1.77%)	0.77 (1.31 *; 5.73%)	0.68 (1.48 **; 1.07%)
Nifty 100 ESG Sector Leaders	0.53 (1.89 **; 2.03%)	0.55 (1.82 **; 2.75%)	0.60 (1.67 *; 5.17%)	0.53 (1.88 **; 2.13%)
Pre Covid	**Nifty 500**	**Nifty 50**	**Sensex**	**BSE 500**
Variance ratio				
BSE Shariah 500 Index	0.54 (1.86 ***; 0.09%)	0.56 (1.79 ***; 0.17%)	0.65 (1.54 **; 1.50%)	0.54 (1.85 ***; 0.10%)
Nifty 500 Shariah	0.71 (1.41 **; 2.45%)	0.74 (1.36 **; 3.92%)	0.86 (1.17; 18.82%)	0.72 (1.40 **; 2.67%)
Carbonnex index	0.96 (1.04; 42.02%)	1.00 (1.00; 49.80%)	1.16 (1.16; 20.65%)	0.97 (1.03; 43.40%)
ESG Index	0.71 (1.40; 10.55%)	0.74 (1.35; 13.15%)	0.86 (1.16; 28.12%)	0.72 (1.39; 10.99%)
Nifty 100 ESG Index	0.97 (1.03; 43.98%)	1.01 (1.01; 48.00%)	1.17 (1.17; 19.54%)	0.98 (1.02; 45.35%)
Nifty 100ESG Enhanced	0.94 (1.07; 36.28%)	0.97 (1.03; 43.74%)	1.13 (1.13; 25.52%)	0.94 (1.06; 37.59%)
Nifty 100 ESG Sector Leaders	na (na na; na)	na (na na; na)	na (na na; na)	na (na na; na)
Post-Covid	**Nifty 500**	**Nifty 50**	**Sensex**	**BSE 500**
Variance ratio				
BSE Shariah 500 Index	0.57 (1.76 *; 7.79%)	0.59 (1.69 *; 9.30%)	0.59 (1.71 *; 8.97%)	0.57 (1.76 *; 7.88%)
Nifty 500 Shariah	0.21 (4.76 ***; 0.01%)	0.22 (4.58 ***; 0.01%)	0.22 (4.62 ***; 0.01%)	0.21 (4.75 ***; 0.01%)
Carbonnex index	0.97 (1.03; 47.30%)	1.01 (1.01; 48.76%)	1.00 (1.00; 49.57%)	0.98 (1.02; 47.56%)
ESG Index	0.98 (1.02; 47.86%)	1.02 (1.02; 48.19%)	1.01 (1.01; 49.00%)	0.98 (1.02; 48.12%)
Nifty 100 ESG Index	0.86 (1.17; 34.76%)	0.89 (1.12; 38.48%)	0.88 (1.13; 37.70%)	0.86 (1.16; 35.00%)
Nifty 100ESG Enhanced	0.21 (4.77 ***; 0.01%)	0.22 (4.58 ***; 0.01%)	0.22 (4.62 ***; 0.01%)	0.21 (4.75 ***; 0.01%)
Nifty 100 ESG Sector Leaders	0.25 (4.00 ***; 0.07%)	0.26 (3.84 ***; 0.09%)	0.26 (3.87 ***; 0.09%)	0.25 (3.99 ***; 0.07%)

(Calculated by author)

It can be concluded from the above table that for total period, pre-covid and post covid period except Carbonex Index, ESG Index, Nifty 100 ESG Index remaining four SI portfolios are able to demonstrate significant lower risk than the Market Portfolio and the General Stock Portfolio. Thus, null hypothesis is rejected, and it can be concluded that the risk of the SI portfolio is significantly lower compared to market portfolio and the general stock portfolio.

CONCLUSION, POLICY IMPLICATIONS AND FUTURE SCOPE

This study aimed to determine whether sustainable investing is more advantageous than traditional investing. It compared the performance of the market portfolio, three general stock portfolios, and all seven sustainable portfolios. For the entire period, pre- and post-covid, sustainable portfolios had a much greater return than other portfolios. This result is consistent with findings from Hamilton, Hume & Larkin, and Tripathi & Bhandari. Regarding risk-adjusted metrics, net selectivity approach, and different performance evaluation factors, including Sharpe, Jenson, Treynor, Sortino, Omega, Kappa, and M^2, sustainable investing beat the market and general stock portfolios. However, returns

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generated by the SI portfolios are not significantly higher than the market and the general stock portfolio. In contrast, the risk of the SI portfolios is considerably lower than the market and the general stock portfolio. Thus, SI portfolios help to reduce risk but not to increase the return.

The implications of these findings for organizations, authorities, decision-makers, and investors are enormous. Regulators and policymakers should take steps to ensure the socially responsible allocation of limited resources since businesses can easily see the advantages of being sustainable and socially accountable, especially during times of crisis. The study does have some drawbacks, though. First, because the Nifty 100 ESG sector leader Index didn't exist only after October 2020, the consistency of the results has been impacted. Second, the study does not consider overseas markets and is solely based on the Indian market. The current work has a huge future potential. First, the performance of sustainable stocks and those that are not can be compared across diverse industries and economic conditions. Second, the three-component Fama-French model can be used to determine the expected return. Third, it is possible to compare the performance of various ethical funds to that of conventional funds. Finally, investors' attitudes and behaviours concerning SI using primary data can be assessed.

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