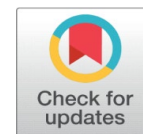# SUSTAINABLE INVESTMENT VERSUS CONVENTIONAL INVESTMENT: A STUDY FROM INDIAN STOCK MARKET DURING COVID-19 PANDEMIC

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ABSTRACT

Purpose: The study seeks to evaluate the sustainable investment performance from the Indian stock market. Then compares it with the performance of conventional investment during five different Covid phases; pre-Covid-19 Phase, Complete Lockdown, Partial Lockdown, Complete Unlock with Restrictions, and Post Vaccination.

Design/methodology/approach: The study measures the portfolio's performance through Sharpe Ratio, excess Standard Deviation Adjusted Returns (eSDAR), Fame Decomposition Model, CAPM, and other Regression Models with Dummy variables.

Findings: The study reveals that sustainable portfolios significantly underperform their conventional peers for the whole sample period. However, phase-wise outcomes show that during the 'pre-Covid-19' phase, sustainable portfolios are underperforming their conventional counterpart significantly, but this underperformance disappears during the following Covid phases. Finally, underperformance recurs during the 'post vaccination phase', but it is not significant.

Practical Implications: Similar performance of sustainable investment during Covid phases and afterward shows the royalty of sustainable investors towards socially sustainable companies. Individual investors, policymakers, and portfolio managers can use the findings of this study to play an active role by making demand for sustainable investment to put pressure on the corporate house to be sustainable.

Limitations: The scope of this study is limited to passive investment, i.e., index listed on Bombay Stock Exchange with the single-factor model. However, future studies may perform a cross-country analysis using the multi-factor model taking active sustainable financial instruments to see the impact of Covid-19 on their performance with a larger span of the study period as Covid-19 is still an ongoing pandemic.

Originality/value: The overall findings suggest that during market shocks, because of stringent actions taken by the government, investors can fulfil their Expressive(values) and Emotional (virtuous feeling) benefits above practical benefits from their investment.

1. INTRODUCTION

Sustainable investment refers to the investment screened on the environmental, social, and governance factors. Since the inception of sustainable investment, it has been one of the fastest-growing investment

practices of the financial market. As per the World Investment Report 2021, the investment in sustainability-linked products increased to $3.2 trillion in 2020, more than 80 percent compared to 2019. Further, Bloomberg Intelligence projects that Global ESG assets will exceed $53 trillion, accounting for more than one-third of the total projected assets under management by the year 2025. The question that follows is 'why the sustainable investment has increased exponentially?' even after the Covid-19 shocked the market in a more drastic way than the Great Financial Crisis of 2007-08 (World Economic Forum).

Two main theoretical foundations, i.e., degree for portfolio diversification and cost of screening, give the basis of the difference between sustainable and conventional investment performance. Small stocks universe does not allow diversifying the risk and thus disbalances the risk-return trade-off Markowitz, 1952. we can diversify the company-specific risk of the portfolio by increasing the number of stocks in the portfolio. However, the selective approach causes a sector bias. It thus reduces the investment opportunities Clow, 1999, which further leads to poorer performance of sustainable portfolios by shifting down the efficient frontier Maux and Saout 2004.

Outstanding work by researchers around the globe has been done to compare the performance of a sustainable investment with conventional investment to invalidate the notion that "it pays to be sustainable". Jawa et al. (2020) integrate this volume of literature on the performance of sustainable portfolios and find that the market turmoil significantly increases (decreases) the probability of outperformance (underperformance) of sustainable investment. Considering the fact, the first objective of the study is to evaluate the performance of sustainable investment during this pandemic period as the announcement of a global pandemic by the World Health Organisation WHO shows a chaos in the financial markets across the world Zhang et al. (2020). Further, Jawa et al. (2020) analysed 35 studies with 864 experiments, and most of these experiments belong to developed countries only. Very few analyses have been done to analyse sustainable investment performance in developing countries. While developing countries account for 5 % of total sustainable assets under management UNCTAD 2021. Therefore, the next objective of this paper is to evaluate the impact of Covid-19 on the performance of sustainable investment from the Indian stock market, one of the fastest-growing economies in the world. Since the inception of Covid-19, the announcement of stringent actions taken by the government to contain the spread of this pandemic is creating shocks in the stock market. For example, with the announcement of complete lockdown on March 23rd, 2020, the market benchmark S&P BSE Sensex dropped over 13 percent. Considering this fact, this paper evaluates and compares the performance following the significant announcements of sustainable investment with their performance in a normal market environment and traditional investment. For this purpose, the authors divide the whole study period into different time horizons following the significant announcements. And then compare the performance by using different portfolio performance measures. Finally, ranked it using the Fame Decomposition net selectivity model.

The rest of the paper proceeds as follows: section second provides a short review of the existing literature, and the third section of data and methodology. In Section 4, the paper presents the study's empirical findings with discussions. The final section concludes the paper, followed by the implications of the study.

2. LITERATURE REVIEW

Existing studies have done analyses to evaluate the impact of sustainable screening on investment performance. Among them, some studies have separately performed experiments to measure the impact of the market downturn on sustainable investment performance.

2.1. STUDIES PERFORMED SEPARATE ANALYSES DURING MARKET DOWNTURN

Statman (2005) compare the returns of S&P 500 with returns of DS 400 Index and Calvert Index for the boom of the late 1990s and the bust of the early 2000s. Renneboog et al. (2008) performed 148 experiments, out of which 18 experiments for the financial crisis period among 17 countries from three regions: North America, Europe, and Asia-Pacific. They find that screening intensity and management fees significantly impact risk-return optimization. However, they do not find any significant underperformance during the crisis period. All 18 experiments show the similar performance of SRI and conventional funds. Liedeker et al. (2011) compare the performance of sustainable funds with their traditional counterparts during the crisis and non-crisis periods and find no significant difference among their performance.

On the other hand, Varma & Nofsinger (2012) performed 19 experiments to compare the performance of SRI to match conventional funds during the crisis period from the US stock market. They find that SRI either outperforms or performs similar to conventional funds during market crises. However, this dampening of downside risk comes at the cost of underperformance during everyday market scenarios. Muñoz et al. (2014) and Lesser et al. (2015) also find the similar performance of the two during the crisis period.

The findings of the analyses from other studies based on the Indian stock market such as Tripathi and Bhandari (2012), Tripathi and Bhandari (2016), and Tripathi and Kaur (2020) also support the notion that "it does not pay to be sustainable".

2.2. STUDIES EVALUATE THE IMPACT OF COVID-19

Ashraf (2020) segregates the announcements based on their positive and negative impact on the performance of stock returns. During this pandemic period, the conventional investment negatively relates to the statements like social distancing and lockdown. The announcements regarding public awareness programs, testing and quarantining policies, and income support packages give positive returns. At the same time, other studies that analyse sustainable investment performance are very few in numbers. Folger-la Ronde et al. (2020) finds that in the period of market turmoil, the significant sustainability performance does not safeguard the investment from financial losses. Similarly, Sherif (2020) uses daily data over the period January 20th to May 20th and finds the severity of the pandemic negatively impacted the performance of Dow Jones faith-based ethical (Islamic) index compared to its UK counterpart, but not significantly. In contrast, Albuquerque et al. (2020) show that Environmentally and Socially (ES) screened stocks with higher ES ranking have significantly higher returns and lower volatility

during this pandemic period. Another study from the Taiwan stock exchange finds that companies committed to corporate social responsibility (CSR) were less affected by the outbreak; their stock prices were relatively resistant to the fall, and they recovered faster Lee and Lu (2021). At the same time, Charles et al. (2021) find that community-related CSR activities support stock returns more strongly and immediately than customer and employee-related CSR activities. Among other studies, Broadstock et al. (2021) and Omura et al. (2020) confirmed the outperformance of SRI portfolios during the pandemic period. In contrast, Chiappini et al. (2021) show that sustainable indices from the US and Europe were negatively impacted by the pandemic but did not show significant abnormal returns.

Although the primary studies show the positive performance of sustainable investment during market downturns caused by financial and other crises, the latest literature concludes mixed findings regarding the impact of pandemic over sustainable investment performance. Besides inconclusive findings of the past studies, they are very few. Further, we hardly find any study performed analyses to evaluate the impact of Covid-19 on the performance of sustainable investment based in India.

3. OBJECTIVES OF THE STUDY

The main objective of this study is to analyse the performance of sustainable portfolios during this pandemic period from the Indian stock market. And also, to compare it with the performance of traditional investment. The objectives of the study are as follow:

1. To evaluate sustainable investment performance from the Indian stock market during the Covid-19 pandemic.

2. To examine the impact of stringent actions taken by the government on the performance of the sustainable investment.

To compare the sustainable investment performance with the performance of conventional investment during different phases followed by the government's announcement.

4. MATERIALS AND METHODS

4.1. DATA

To measure sustainable investment performance, the authors take the S&P BSE 100 ESG and CARBONEX as the proxies of the sustainable portfolio. S&P BSE SENSEX is used as a market benchmark, whereas S&P BSE 500 is the proxy of conventional investment. Daily price data of indices has been downloaded from the website of the Bombay Stock Exchange (https://www.bseindia.com/). In comparison, the weekly data for 91-days treasury bills as the risk-free rate is downloaded from the website of the Reserve Bank of India (https://www.rbi.org.in/scripts/BS/). The study period spans from the launch date of the S&P BSE 100 ESG index, October 27, 2017, to May 21, 2021, for which risk-free data is available on the RBI website.

Further, to see the impact of major announcements and the persistence in the performance, the entire sample period is divided into five sub-study periods named as pre-Covid-19 Phase, Complete Lockdown, Partial Lockdown, Complete Unlock with Restrictions, and Post Vaccination. The authors develop (N - 1) = 4 dummies for five sub-study periods and use the pre-Covid-19Phase (Normal Phase) as the

benchmark category. All the information regarding the announcements like complete lockdown, guidelines of unlocks and emergency use of Covid-19 vaccine, etc. have been taken from the respective websites of newspaper and news channels detail is given in Appendix 1.

Table 1 Summary of the Portfolios				
Overall Study Period	Mean	Sta. Dev.	Sharpe Ratio	eSDAR
ESG	0.078	2.091	0.0166	0.002
CARBONEX	0.065	2.061	0.011	-0.01
BSE 500	0.064	2.005	0.01	-0.011
SENSEX	0.076	2.104	0.015	Nil

4.2. RESEARCH METHODS

Log returns of the indices are calculated by using the following equation. R_p represents portfolio return, P_1 is current price, and P_0 is the day before price.

$$R_p = ln(P_1/P_0) \ldots\ldots\ldots$$
<div align="right">**Equation 1**</div>

Then the authors measure the significance of the difference among the average raw returns of five sub-study periods. Equation 2, i.e., regression with dummy variables for sub-study periods with "pre-covid" phase as the base category employed individually for each portfolio.

$R_{p,t} = \alpha + Y_1\,Complete\,Lockdown + Y_2\,Partial\,Lockdown + Y_3\,Complete\,Unlock\,with\,Restrictions + Y_4\,Post\,Vaccination + \varepsilon_t$

OR

$$R_{p,t} = \alpha + \sum_{i=1}^{n=4} Y_i D_i + \varepsilon_t \ldots\ldots\ldots$$
<div align="right">**Equation 2**</div>

Where $R_{p,t}$ stands for portfolio return at time t, α represents the average returns for pre-Covid-19phase, and Y is differential returns for i sub-study periods. D_i and ε_t stand for dummy categories and idiosyncratic return, respectively. But it might ignore the plausible interaction between return and risk (Sauer, 1997). Therefore, the authors use Jensen's Alpha (1968), and other risk-adjusted measures as follows.

Risk-Adjusted Performance

The authors used the Capital Assets Pricing Model (CAPM) to assess the portfolio performance, based on the capital asset pricing theory of Sharpe (1994), Lintner (1965), and Mossin (1966). It is implicitly assumed that a single-index model can sufficiently explain portfolio returns' variation Ito et al. (2013). The equation is given as follow:

$$R_{p,t} - R_{f,t} = \alpha + \beta\,(R_{m,t} - R_{f,t}) \ldots\ldots\ldots\ldots$$
<div align="right">**Equation 3**</div>

where $R_{p,t}$ is the return of the portfolio in time t, $R_{f,t}$ stands for return on a risk-free deposit (91-day T-bills), $R_{m,t}$ is return of a local equity market index (S&P BSE SENSEX), β is factor loading on the market portfolio, ε_t is idiosyncratic return, and α stands for Jensen's Alpha, risk-adjusted average abnormal return above a market benchmark introduced by Jensen (1968).

In addition, to measure the significance of the difference among the alphas for sub-study periods regarding the pre-Covid-19phase considers as the normal scenario, the authors perform the following Equation 4 where λi represents the differential Alpha for i = 1, 2, 3, 4.

$$R_{p,t} - R_{f,t} = \alpha + \beta (R_{m,t} - R_{f,t}) + \sum_{i=1}^{n=4} \lambda iDi \ .... \qquad \textbf{Equation 4}$$

Although analysis of the exposure towards the systematic risk of a well-diversified investment Markowitz, 1952 is sufficient, it is not sufficient to measure the risk-adjusted performance of a less than well-diversified portfolio considering only systematic risk. Therefore, Sharpe ratio is more a appropriate measure which represents the excess return for each unit of total volatility Sharpe (1994).

$$\text{Sharpe Ratio} = \frac{Rp - Rf}{\sigma p} \ .... \qquad \textbf{Equation 5}$$

where σ_p is the standard deviation of returns on portfolio, R_p stands for returns on the portfolio, and R_f represents risk-free rate of return.

But the difficulty in the interpretation of negative Sharpe ratio or comparison among two negative Sharpe ratios does not determine how good or bad one portfolio performance is from another. Therefore, to overcome this problem Statman (1987) and Modigliani and Modigliani (1997) introduce a modified version of the Sharpe ratio know as excess-Standard-Deviation-Adjusted-Return (eSDAR); the equation is given as follow

$$\text{eSDAR} = R_f + \left\{ \frac{Rp - R_F}{\sigma p} \right\} \sigma_m - R_m .... \qquad \textbf{Equation 6}$$

where σ_m and σ_p stand for the standard deviation of market benchmark and portfolio return, respectively. eSDAR is the excess return of the portfolio over the return of the market benchmark Statman (2005).

The authors convert risk-free weekly percentage rate data into daily rate via the following equation Schmitz (2009). $R_{f,d}$ and $R_{f,w}$ stands for risk-free daily rate and risk-free weekly rates, respectively.

$$R_{f,d} = (1 + R_{f,w})^{1/5} - 1$$

Fama Model of Net Selectivity

Finally, with the help of Fama's Decomposition model, the authors ranked the performance of the portfolios for each phase. The Fama model of net selectivity

decomposes the excess return into systematic risk premium and selectivity. Excess return can be explained as the difference between the portfolio's total return and the risk-free return. The systematic risk premium is that portion of the return explained by the portfolio's beta. At the same time, the selectivity is made up of two components, i.e., diversification (premium for unsystematic risk) and net selectivity. The net selectivity measures the premium that comes from including a particular stock in the portfolio. So, the equation of Fama's net selectivity model can be defined as:

Net Selectivity Premium = $R_p - [R_f + \beta_p (R_m - R_f) + [\{R_f + \sigma_p / \sigma_m (R_m - R_f)\} - \{R_f + \beta_p (R_m - R_f)\}]$

Now, if there is no difference among the returns of security market line and capital market line then the premium for unsystematic risk would be zero, which means the portfolio is fully diversified and premium for net selectivity would be:

Net Selectivity Premium = $R_p - [R_f + \beta_p (R_m - R_f)]$

If not, then the premium for net selectivity would be as:

Net Selectivity Premium = $R_p - [R_f + (\sigma_p / \sigma_m)(R_m - R_f)]$

5. RESULTS AND DISCUSSIONS

Performance Outcomes

Table 2 Comparison of Mean Returns			
Economic Phases	ESG	CARBONEX	BSE 500
Pre-Covid-19Phase (Base Category)	-0.047	-0.056	-0.064
Complete Lockdown D1	0.586*	0.561*	0.542*
Partial Lockdown D2	0.319	0.267	0.293
Complete Unlock with Restrictions D3	0.531*	0.584**	0.593**
Post Vaccination D4	0.228	0.215	0.254
F-statistic	1.97408	2.039215	2.233388
Prob(F-statistic)	0.09646	0.086986	0.063688

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 2 shows regression output and compares the portfolio's average return for the 'pre-Covid' phase (normal phase) with other Covid phases. Findings show sustainable, as well as conventional portfolios, give negative average returns for normal periods. Consequently, sustainable investors would bear less loss than traditional investors during a normal market scenario. The differential return is consistently higher for corresponding phases than the respective 'pre-Covid-19phase' for each portfolio. Moreover, returns for the period of 'complete lockdown' and 'complete unlock with restrictions' are significantly better than their returns in the normal period. Compared to conventional portfolio sustainable investment, giving lower differential average returns during the 'post-vaccination phase'.

Rationally it is important to consider the risk while comparing the performance of two investments. Thus, the authors analyse the performance while considering the systematic risk and total risk of the portfolios.

Outcomes of Table 3 and Table 4 give the estimated alpha for the CAPM single factor model while Equation 3 and Equation 4 run respectively on the portfolios.

Table 3 Outcomes of 1-Factor Model (Overall Study Period)			
Portfolio	**Alpha**	**Beta**	**Adj. R-Square**
ESG (1)	0.002-0.24	0.982(160.113) ***	0.976
CARBONEX (2)	-0.01(-1.155)	0.972(241.445) ***	0.985
BSE 500 (3)	-0.01(-0.739)	0.934(148.267) ***	0.961
Difference Portfolio			
(1)-(3)	-0.031(-2.837) ***	0.047952(9.265) ***	0.088
(2)-(3)	-0.043(-6.488) ***	0.038(11.992) ***	0.139

*** p<0.01, ** p<0.05, *p<0.1

Table 3 shows the estimation for the whole sample period; the corresponding t-statistic value is given in parentheses for each parameter. Findings indicate that the ESG index outperforms the market for the entire sample period while CARBONEX and BSE 500 underperform the market, but not significantly. One of the primary objectives of the study is to compare the performance of sustainable investment and conventional investment. The results for 'difference portfolios' show that both sustainable portfolios significantly underperform their conventional peers.

Table 4 Outcomes of 1-Factor Model (Phase-wise Jensus Alpha)						
Portfolio	**Pre-Covid-19 Phase (Base Cat.)**	**Complete Lockdown (D1)**	**Partial Lockdown (D2)**	**complete Unlock with Restrictions(D3)**	**Post Vaccination (D4**	**Beta**
ESG (1)	-0.021	0.013***	0.096**	-0.053	0.111***	0.981***
CARBONEX (2)	-0.031***	0.106***	0.047	0.007	0.099***	0.971***
BSE 500 (3)	-0.041**	0.105*	0.082	0.039	0.143***	0.933***
Difference Portfolio						
(1)-(3)	-0.028**	0.033	0.028	-0.076*	-0.019	0.048***
(2)-(3)	-0.038***	0.012	-0.021	-0.017	-0.031	0.038***

*** p<0.01, ** p<0.05, *p<0.1

Considering the market benchmark, the findings of Table 4 show significant underperformance of CARBONEX and BSE 500 during the 'pre-Covid' phase (normal phase). Further, for the period of the 'complete lockdown' and 'post-vaccination' phases, both conventional and sustainable investment significantly outperform the market benchmark. Compared to traditional investments, sustainable portfolios show significant underperformance during the 'pre-Covid-19phase', indicating that sustainable portfolios pay a premium for being sustainable during normal market conditions Varma and Nofsinger (2012). Although, sustainable portfolios

outperform their conventional peers for the phase of complete lockdown (Varma & Nofsinger, 2012 and Tripathi and Bhandari (2016). Then, the underperformance of sustainable portfolios reappears in the following phases. However, this out-or-underperformance is not significant Varma and Nofsinger (2012).

Table 5 Outcomes of Sharpe Ratio				
Economic Phases	ESG	CARBONEX	BSE 500	Sensex
Pre-Covid-19Phase	-0.056	-0.062	-0.067	-0.045
Complete Lockdown	0.096	0.09	0.089	0.074
Partial Lockdown	0.137	0.106	0.121	0.097
Complete Unlock with Restrictions	0.302	0.343	0.362	0.364
Post Vaccination	0.072	0.062	0.082	0.028

Outcomes of Sharpe ratio in Table 5 show that excess returns of the ESG index for taking each unit of real risk are better than the BSE 500, and the market benchmark for each phase except the phase of 'complete unlock with restriction'. The ESG index gives a 9.6% return for each unit of total volatility compared to BSE 500 and Sensex, giving 8.9% return and 7.4% return respectively for the phase of a complete shutdown of economic activities. Taking the positive performance during a market downturn, the investors could divert their investment towards sustainable financial instruments to pressure firms to be sustainable. Further, it could be seen that in the following two phases, the phase of 'partial lockdown' and the phase of 'complete unlock with restrictions,' the performance of sustainable investment has been improved. Although, during the 'post-vaccination phase,' per unit return started to decline but not as bad as per unit return in the 'pre-Covid-19phase' and per unit return of the market benchmark for the same phase.

It is difficult to interpret and compare the negative Sharpe ratios during the 'pre-covid' phase. Therefore, the authors measure eSDAR for the returns of the portfolios. The eSDAR shows excess returns of respective portfolios over market benchmark SENSEX.

Table 6 Outcomes of eSDAR			
Economic Phases	ESG	CARBONEX	BSE 500
Pre-Covid-19Phase	-0.018	-0.028	-0.037
Complete Lockdown	0.118	0.088	0.082
Partial Lockdown	0.079	0.015	0.041
Complete Unlock with Restrictions	-0.091	-0.03	-0.003
Post Vaccination	0.091	0.071	0.111

As Table 6 shows, during the 'pre-Covid' phase, both sustainable and conventional portfolios give less return than the market. However, after the announcement of complete lockdown, ESG and CARBON EX are giving 11.8% and 8.8% excess returns over the return of SENSEX. Which is better than the excess return of the BSE 500 over the market benchmark for the same phase. Although the returns of sustainable portfolios fall during the 'unlock phase' worse than the return of conventional peers, they rise again during the 'post-vaccination phase' slightly lower than the traditional benchmark.

Selectivity Based Ranking

Table 7 Ranking Based on Fama Decomposition Model						
	ESG		CARBONEX		BSE 500	
Economic Phases	Premium for net Selectivity	Rank	Premium for net Selectivity	Rank	Premium for net Selectivity	Rank
Overall Study Period	0.002	1	-0.01	3	-0.011	2
Pre-Covid-19Phase	-0.019	1	-0.029	2	-0.037	3
Complete Lockdown	0.001	3	0.083	1	0.074	2
Partial Lockdown	0.07	1	0.015	3	0.038	2
Complete Unlock with	-0.092	3	-0.03	2	-0.003	1
Restrictions						
Post Vaccination	0.09	2	0.068	3	0.103	1

Table 7 shows the outcomes for Fama's model of net selectivity. The authors mark the rank of each portfolio based on their absolute performance after adjusting for systematic and unsystematic risk during the overall study period and each phase. ESG index is the top ranker for the entire study period, which gives 0.2% return, whereas CARBONE and BSE 500 give -1.0% and -1.1% return, respectively.

Then absolute returns after adjusting for systematic and unsystematic risk are harmful to the 'pre-covid' phase. But still, sustainable portfolios perform better than their conventional peers in terms of net selectivity. For the following Covid phases, either CARBONEX index or ESG index performs better than the BSE 500 except for 'complete unlock' and 'post-vaccination' phases. During these phases, the BSE 500 gives a higher net selectivity premium than sustainable portfolios.

6. DISCUSSION

Our findings show that sustainable portfolios are giving higher average annual returns as well as higher risk adjusted returns as compared to the returns on traditional portfolios. This is a positive indication for the investors to move their investment from traditional to sustainable. However, analyses based on sub-study periods show that sustainable investment gives negative average annual returns during normal phases. Whereas their returns are significantly better for the phases of 'complete lockdown' and 'complete unlock with restrictions' as compared to the normal phase. In addition, during the phase of 'complete lockdown', the risk-adjusted returns on sustainable portfolios are higher compared to the market benchmark and that on the conventional portfolios. The investment managers should take into consideration such results while making their investment decisions. In contrast to the notion "it pays to be sustainable", ESG index earns positive abnormal return for the overall study period. During the phase of "complete lockdown", sustainable portfolios show significant positive alpha, and they are performing similar to their conventional counterparts. Our findings suggest that the costs borne by the investors to screen investment opportunities over sustainable criteria are rewarding when hardly any economic activity was allowed. The phase-wise outcomes for the single factor model confirm the finding of Jawa et al. (2020)

that the market turmoil significantly increases (decreases) the possibility of outperformance (underperformance) of sustainable investment.

7. CONCLUSIONS AND RECOMMENDATIONS

Recent reports from prominent data management organisations show a significant increase in the fund linked to sustainable investment. Moreover, different organisations around the globe spread awareness about sustainable investment. But existing literature shows poor performance of sustainable investment except for the period of market crises. The reason could be that the companies' characteristics, such as sustainable policies and good corporate governance, provide them a shield against risky market environments. Considering this fact, it is vital to analyse the performance of sustainable portfolios during this pandemic period. After the announcement of the global pandemic, stock markets around the world start to tumble. Therefore, the study analyses the performance of socially sustainable portfolios, i.e., ESG index and CARBONEX index, and compares their performance to the conventional benchmark BSE 500. Daily price data of indices are used for analyses. The entire study period is further divided into five different phases according to the major announcement made by the country's government to compare the performance among these phases.

Overall Study Period: for the entire study period ESG index and CARBONEX index give 1.67% and 1.1% returns for taking each unit of total risk. While the conventional portfolio is giving only1% return for each unit of total volatility. The authors find that the ESG index insignificantly outperforms the market and earns 0.2% abnormal return. CARBONEX as well as the BSE 500 underperformed the market, but not significantly. Further, the "difference portfolios" show that both sustainable portfolios significantly underperform their conventional peers. Finally, the ESG index gives a positive return after adjusting for systematic as well as unsystematic risk.

Pre-Covid-19 Phase: the authors take this period as a normal phase during which CARBONEX significantly underperforms the market benchmark as well as their conventional counterpart. Both sustainable and conventional portfolios give a negative average return. However, the risk-adjusted performance of sustainable portfolios is better as compared to conventional portfolios. Further, they are top performers for this phase while comparing their performance with their conventional peers.

Complete Lockdown: After complete restraint of economic activities, the sustainable indices give significantly better average returns than everyday scenarios. Further, the ESG index CARBONEX significantly outperformed the market benchmark and earned 11.7% and 8.8% extra returns, respectively, from SENSEX. While adjusting their returns for total volatility, they give a higher per-unit return compared to the return of conventional and market indices. Furthermore, after adjusting for systematic and unsystematic risk, the positive returns make the CARBONEX index the top performer for this phase.

Partial Lockdown: Sustainable index ESG gives a higher differential return while comparing to the normal phase. The ESG index gives a 7% net selectivity premium which is far better than other portfolios. It also beats the market and performs similarly to its conventional counterparts. In addition, ESG indexes give a higher return for taking each unit of total volatility compared to other portfolios.

Complete Unlock with Restrictions: the announcement of unlocking revives the economy. Both conventional and sustainable portfolios give significantly better returns than their respective returns in the normal phase. The underperformance of sustainable portfolios recurs in respect to a conventional benchmark. They are providing better returns for each unit of volatility but not as much as traditional and market benchmarks. The traditional portfolio is the top performer for this phase.

Post-Vaccination Phase: Now, this phase is important because the government has announced the emergency use of the vaccine of Covid-19. For this phase, although the sustainable portfolios significantly outperform the market benchmark, their underperformance reoccurs with their conventional peer, but not considerably. Further, their raw, as well as risk-adjusted returns, are both lower as compared to the conventional benchmark. Again, the conventional portfolios perform better after adjusting their returns for systematic and unsystematic risk.

8. LIMITATIONS

There are also a few limitations. Firstly, the authors only use a single-factor model. However, it is vital to evaluate the exposure of sustainable investment towards value and growth stocks during this pandemic. Secondly, the analysis is confined only to the sustainable indices based on the Indian stock market, which is one of the major drawbacks of this study. Sustainable indices from other countries could also be included to make a comparative analysis. Future studies could also analyse the impact of variations in the confirmed cases of Covid-19 on the performance of a sustainable investment. Also, the outcomes of this study could further be modified by increasing the span of the study period as Covid-19 is still ongoing.

9. POLICY IMPLICATIONS

The impact of the Covid-19 on the performance of sustainable investment is an emerging issue as the sustainable investment has increased exponentially during this pandemic period. This study contributes to the understanding of performance of sustainable investment during the pandemic in the Indian stock market. It is generally assumed that transition from conventional investment to sustainable investment could cost the investors. In contrast, the findings of this study indicate that the sustainable investments have benefited the investors over and above their conventional counterparts at least during the lockdown phases. Individual investors, policymakers, and portfolio managers can use the findings of this study to make future decisions wisely by including the sustainable financial instruments at the time of market downturn. In addition, the individual investors can play an active role by making demand for sustainable investment to put pressure on the corporate house to be sustainable.

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APPENDIX

Appendix 1 Description of the Phases			
Phase	Duration	Specification	References
II	23rd March 2020-7th June, 2020	Complete Lockdown	https://www.business-standard.com/article/current-affairs/here-s-a-timeline-of-events-since-lockdown-was-imposed-in-india-120070201413_1.html
III	8th June 2020-30th Sep, 2020	Announcement of Unlock 1.0, Unlock 2.0, unlock 3.0, Unlock 4.0	https://www.business-standard.com/article/current-affairs/here-s-a-timeline-of-events-since-lockdown-was-imposed-in-india-120070201413_1.html https://www.business-standard.com/article/current-affairs/here-s-a-timeline-of-events-since-lockdown-was-imposed-in-india-120070201413_1.html https://indianexpress.com/article/india/unlock-3-0-guidelines-rules-whats-allowed-whats-not-6529596 https://indianexpress.com/article/explained/explained-what-all-changes-when-the-delhi-metro-restarts-6570692/
IV	1st Oct 2020-2nd Jan, 2021	Unlock 5.0, Unlock 6.0 and Unlock 7.0 for the month of Oct, Nov, and Dec respectively	https://indianexpress.com/article/india/unlock-5-Covidvirus-guidelines-6619158/ https://www.financialexpress.com/lifestyle/health/unlock-6-0-guidelines-mha-announces-re-opening-rules-heres-what-is-allowed-what-is-not/2115361/

			https://odishabytes.com/unlock-7-0-restrictions-on-certain-activities-to-continue-in-dec-details-here/
V	3rd Jan 2021-	COVID-19 vaccines approved by the Central Drugs and Standards Committee (CDSCO) Post Vaccine period	https://www.thehindu.com/news/national/drug-controller-general-approves-covishield-and-covaxin-in-india-for-emergency-use/article33485539.ece