

# Performance of Conventional and Sustainable Index in Pre and During the COVID-19 Pandemic : A Comparative Analysis

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## Abstract

**Purpose :** There has been a significant increase in the demand for ESG (environmental, social, and governance) investment by investors in recent years. Investors are recognizing that companies that prioritize ESG factors in their operations are more likely to be sustainable and resilient in the long term. The purpose of this study was to examine whether the ESG-responsible firms are performing better than the other firms in the pre-COVID and during the COVID periods. The paper also tried to investigate the impact of COVID-19 cases on the index movement.

**Methodology :** The study employed the descriptive analysis on the financial data of NSE NIFTY 500 and NIFTY 100 Enhanced ESG index. The EGARCH model was applied to estimate the effect of COVID-19 on the volatility of the NIFTY 100 Enhanced ESG index.

**Findings :** The results showed that there was no leverage effect in the ESG index in both periods. That means that the ESG Index can act as a cushion during the pandemic period. The ESG Index outperformed the conventional market index, thus acting as a COVID-19 safe asset class. This gives an opportunity to investors and fund managers to diversify their risk by acting sustainably responsible for society.

**Practical Implications :** This study compared the performance of ESG-indexed firms with that of other firms in the pre-COVID and during COVID time period to check whether there was any difference between them. This study provided empirical evidence for practitioners, policymakers, and academicians in support of ESG investment as it showed that the ESG Index performed better than the conventional index during the COVID period.

**Originality :** This study used secondary data to study the performance of the ESG firms in the pre and during COVID period in order to compare with the other firms. In the context of India, this study may be the first one to compare the performance of the ESG firms with the normal firms in the pre and during the COVID period.

**Keywords :** COVID-19, pandemic, NIFTY 100, CSR, ESG, sustainable development goals, EGARCH, return

**JEL Classification Codes :** G10, G11, G15

**Paper Submission Date :** July 5, 2022 ; **Paper sent back for Revision :** January 15, 2023 ; **Paper Acceptance Date :** March 5, 2023 ; **Paper Published Online :** May 15, 2023

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The need for ESG (environmental, social, and governance) investment is becoming increasingly important as companies face growing pressure to address climate change, social justice, and ethical business practices. ESG investment considers a company's environmental impact, treatment of employees and stakeholders, and corporate governance structure. According to a Global Sustainable Investment Alliance report, as of 2020, sustainable investing assets reached a record \$35.3 trillion globally, indicating the growing interest and demand for ESG investments. Investors recognize that companies prioritizing ESG factors in their operations are more likely to be sustainable and resilient in the long term. A study by MSCI found that companies with strong ESG ratings had higher profitability and lower volatility over the long term. In addition, a report by Harvard Business School found that companies with high ESG performance outperformed their peers in terms of stock price and financial performance.

ESG investment is also seen as a way to mitigate climate change and social inequality risks. As the global climate crisis intensifies, companies that fail to address their environmental impact are at risk of facing regulatory penalties, reputational damage, and financial losses. Similarly, companies that do not treat their employees and stakeholders fairly may face legal and reputational risks. By investing in companies that prioritize ESG factors, investors can help encourage positive change while mitigating risks. Hence, the need and importance of ESG investments is becoming increasingly clear as investors recognize the potential for long-term sustainability, profitability, and risk mitigation. As the global community faces growing challenges related to climate change, social justice, and ethical business practices, ESG investment will continue to play an important role in shaping the future of investing.

India's ESG investment industry is still nascent but has seen significant growth and development in recent years. According to a report by the Responsible Investment Association of India (RIAI), the total assets under management (AUM) of ESG funds in India stood at approximately INR 12,447 crore (\$1.50 billion) as of March 2022, which is a significant increase from INR 2,750 crore (\$370 million) in December 2018. Additionally, there has been a growing trend of ESG integration in investment decisions by institutional investors such as mutual funds, pension funds, and insurance companies. The Indian government has also taken initiatives to promote ESG investments. The Securities and Exchange Board of India (SEBI), the regulatory body of the securities market in India, has mandated the disclosure of ESG-related information by the top 100 listed companies in India. This move aims to increase transparency and accountability in the corporate sector and promote sustainable business practices. This trend has been accelerated by the COVID-19 pandemic, highlighting the importance of sustainability and social responsibility in business practices. The pandemic has also underscored the need for ESG-focused investments prioritizing companies with strong governance, resilient supply chains, and low environmental impact.

## Need for the Study

A study in the Indian context is required to examine the status of ESG investments in India, their performance in terms of return and volatility, and how the COVID-19 pandemic has affected it. In this paper, we attempt to study the impact of the COVID-19 crisis on the volatility of the NSE NIFTY 100 and NSE NIFTY 500 Enhanced ESG Index in order to compare the volatility caused by the COVID-19 pandemic. The prime objective of this paper is to compare the volatility of the sustainability index in the pre and pandemic periods by applying the EGARCH model. The study's findings will help provide clarity to various investors, policymakers, and business people. It will also reveal whether a sustainable investment is a cushion in the crisis period. The indices considered as a proxy for the conventional index are NSE NIFTY 500, and the sustainable index, the NIFTY 100 Enhanced ESG Index.

## Research Gap

There is limited research on the impact of pandemics on ESG investing, particularly in the context of developing countries such as India. Thus, a research gap exists in understanding how the COVID-19 pandemic has affected ESG investing in India. Moreover, while ESG investing has gained momentum in recent years, little is known about the behavior of investors during a crisis. The COVID-19 pandemic has created a significant economic impact globally, and the Indian economy is no exception. However, there is a research gap in analyzing the performance of ESG investments during the pandemic in India. Thus, there is a need for empirical research on the performance of ESG investments in India during the pandemic. Lastly, while ESG investing has gained popularity in developed countries, it is still a relatively new concept in India. There is a research gap in understanding the current state of ESG investing in India, including its performance in terms of return and volatility compared to the traditional indices in India.

## Literature Review

Various studies related to the performance of the ESG Index and the effect of COVID-19 on its performance have been reviewed and are presented in this section.

Studies have shown that stakeholders' welfare contributes to investors' value (Borghesi et al., 2014; Ferrell et al., 2016). The idea is deeply entrenched in popular CSR theories, including, among others, the stakeholder, institutional, and legitimacy theories. In addition, according to McKinsey's 2019 Global Survey on Environmental, Social, and Governance (ESG) programs, a sizable proportion of executives and investment specialists believe ESG regulations increase shareholder value. Still, there is a lot of back-and-forth about whether or not "doing good is good for business" (investing in ESG) and whether it would increase shareholder value in good times and in bad, and whether or not it will make a difference at all.

Dey and Sharma (2022) conducted an impact assessment with the help of a panel data regression analysis for the short-run and long-run concerning the Government initiatives and control measures. They found a strong negative relationship between daily reported COVID infections and stock market indices. Similarly, Mangala Minutha and Jagannathan (2022) found that the pandemic did not affect alternative investment funds much. Vevek et al. (2022) investigated the impact of events (shocks) on the Nifty 50 index using the GARCH Model. They found that the Indian secondary market experienced unanticipated volatility during the study period.

Veeravel et al. (2021) found that daily total confirmed and death cases influenced the stock market returns. Also, it was established that the total confirmed cases positively affected the stock market returns; whereas, the total confirmed death cases negatively affected the market returns. Dey and Brown (2021) showed that just as fast as the Indian stock market experienced a situation of high panic during the onset with high volatility, it recovered from instability with reduced volatility as pre-COVID conditions in the later phases and also surged to cross the 50,000 mark in the shortest time by February 2021.

In the USA, Jo and Na (2012) examined the nature of CSR and the risk of controversial firms and concluded that total and systematic risks negatively correlated to the firms' CSR. They also found that economically and statistically, the risk of controversial firms reduced more through CSR engagement than non-controversial firms. Hartzmark and Sussman (2019) declared that the market perceived the sustainability score as a positive attribute of the company's future performance. According to Alsayegh et al. (2020), it is crucial to a firm's competitive advantage and credibility. However, various studies have shown little or no connection between ESG and a company's financial performance (Carpenter & Wyman, 2009; Dhaliwal et al., 2011; Fauzi et al., 2007; Siew et al., 2013; Zhao & Murrell, 2016).

After the COVID-19 breakdown, researchers became interested in studying the performance of ESG stocks.

Still, the role of ESG risk and performance during crisis periods is limited, with little literature support available from emerging markets (Beloskar & Nageswara Rao, 2023; Estrada et al., 2020). The available literature also provides us with inconclusive results. Demers et al. (2020) claimed that ESG is not reflected in the performance during the COVID-19 pandemic after controlling for industry, market, and accounting risk measures. Additionally, during the “recovery” period of 2020, ESG returns were negatively associated with returns. Albuquerque et al. (2020) and Ding et al. (2021), who largely focused on the developed market, demonstrated that high ESG-rated enterprises displayed superior performance during the current COVID-19 crisis, as measured by higher stock returns and lower stock volatility. Hwang et al. (2021) also claimed that profit and loss were less severe with high ESG scores. Hence, a company's ESG performance is significantly related to financial outcomes. They stated that the performance of nonfinancial operations provides useful information for decision-making by stakeholders in the context of market instability. Rubbaniy et al. (2022), on the other hand, said that ESG stocks don't have the properties of a safe haven, i.e., these stocks cannot be considered for hedging in portfolios during crises. This made the researchers investigate if sustainable stocks help their investors survive market downturns in India.

According to research by Engelhardt et al. (2021), firms with higher ESG scores exhibited lower idiosyncratic risk in nations with low levels of trust. ESG is extremely important in nations with lax security and disclosure regulations. In the case of developing nations, Singh et al. (2021) studied the impact of COVID-19 on sustainable investment and came up with the result that the volatility and return of most of the currencies have been impacted, but COVID-19 has not impacted the return and volatility of the BSE ESG index. In the case of China, the ESG portfolio performs better than the other portfolio during the COVID-19 period (Broadstock et al., 2021). Vadithala and Tadoori (2021) concluded that ESG indices have performed better in post-COVID-19 than in the pre-COVID-19 period and considered ESG as a COVID - free index. Widya Mitra and Pria Anas (2021) claimed that in Indonesia, the environmental factor has a major influence on the companies' performance in the pre-pandemic period. During the pandemic, ESG (environmental, social, and governance) factors that mostly affected companies' performance are social and governance.

In developed countries, before the pandemic, mutual fund inflows with higher sustainability ratings experienced a sharper decline than those with lower ratings. In times of economic downturn, sustainable retail investment is viewed as indistinguishable from the demand for luxury goods (Kim & Döttling, 2020). During the COVID-19 market crash in Europe, companies with a strong social score outperformed the market. Still, investors also had to deal with these companies faltering and lagging after the crash period (Rasimäki, 2021). After going through the literature of these studies, we have tried to cover the research gap of time. The time considered for this study is two years, more than the time taken by the other research papers focusing on COVID-19. As per the given literature review, most studies are on the effect on the performance of sustainable funds, portfolios, or indices. There is still scope to estimate the effect on volatility. In this study, the volatility of the sustainable index has been estimated using the ARCH family model.

## **Objectives of the Study**

The study's main objective is to fill the research gap by analyzing the stock market data of the select NIFTY indices for the impact of the COVID-19 pandemic. The specific objectives of the study are as follows:

- (1)** To study the effect of the COVID-19 cases on the indices' movement.
- (2)** To investigate the impact of COVID-19 on the volatility of the NIFTY 100 Enhanced ESG index.

(3) To compare the returns of conventional (NSE NIFTY 500) and sustainable index (NIFTY 100 Enhanced ESG).

## Research Methodology

This section presents the sample used in the study, the research approach, and the techniques employed to analyze the data.

### *Sample of the Study*

NSE NIFTY 500 was selected as the sample for this study to represent the general index as it reduces 96.1% of the free float market capitalization of companies listed on the NSE; it serves as a stand-in for the market. Additionally, as of the end of March 2019, the aggregate value of all constituent index trades represented roughly 96.5% of the aggregate value of all equities traded on the NSE (NSEIndia). The index includes 500 listed businesses across 20 categories. The data selected to represent the sustainable index is the NIFTY 100 Enhanced ESG Index. This index in India includes firms with at least 50% of the normalized ESG score. It also uses the negative screening method to exclude stocks from the NIFTY 100 index, i.e., companies in tobacco, gambling, controversial weapons, and alcohol. The number of companies in the index is 81 and constitutes 16 sectors. The data to calculate return and volatility will be the average daily return of the indices for the period mentioned below:

The periods considered to represent the pre and COVID-19 periods are:

↳ **Pre- COVID-19 Period** : February 1, 2019 – January 31, 2020.

↳ **During COVID-19 Period** : February 1, 2020 – January 31, 2021.

The first case of COVID-19 was reported in India on January 27, 2020, in Kerala by a lady who returned from Wuhan (Andrews et al., 2020). Thus, the time considered for COVID-19 is from February 1, 2020 – January 31, 2021, and the pre-COVID-19 period is exactly one year before COVID-19, i.e., February 1, 2019 – January 31, 2020.

### *Techniques*

To accomplish the first goal, graphs showing the daily new instances reported in India and the daily stock price movement of both indices have been created. It will help us to compare and analyze the movement of both indices. For the second objective, the methodology employed is descriptive analysis and the EGARCH model. In the third objective, data from pre-COVID-19, during, and overall time periods is used to calculate the average daily return of both indices. These returns are then analyzed to compare the traditional and sustainable indices. Descriptive statistics have been used to assess the variables' statistical characteristics. EGARCH reveals leverage effect, volatility persistence, and volatility clustering in the data. According to volatility clustering, significant price swings in stocks are followed by larger ones, and smaller ones follow smaller price changes, thus illustrating that asset returns are not independent across time. Financial time series data is mostly leptokurtic, and volatility clustering can be observed (Mandelbrot, 1963).

When negative news/returns have more effect on future price volatility than the positive, it results in a leverage effect. The ARCH and GARCH models cover both leptokurtic and volatility clustering, but they are unable to capture the leverage effect. The TGARCH model is introduced to cover the leverage effect. But it can give a negative value of variance, which can't be true because variance is a square term. To overcome these limitations,



EGARCH is proposed. Exponential GARCH was proposed by Nelson (1991). EGARCH takes the logarithmic form of a conditional variance equation, always exhibiting a positive variance value. It also provides us with the leverage effect/asymmetry of information, meaning the market reacts more to negative news than to positive.

Eviews software has been used for the EGARCH model. The daily log return of the NIFTY 100 Enhanced ESG Index was applied to estimate the variance. The following are the mean and variance equations of the model:

Mean equation :

$$Y_t = c + \epsilon_t \quad (1)$$

Variance equation :

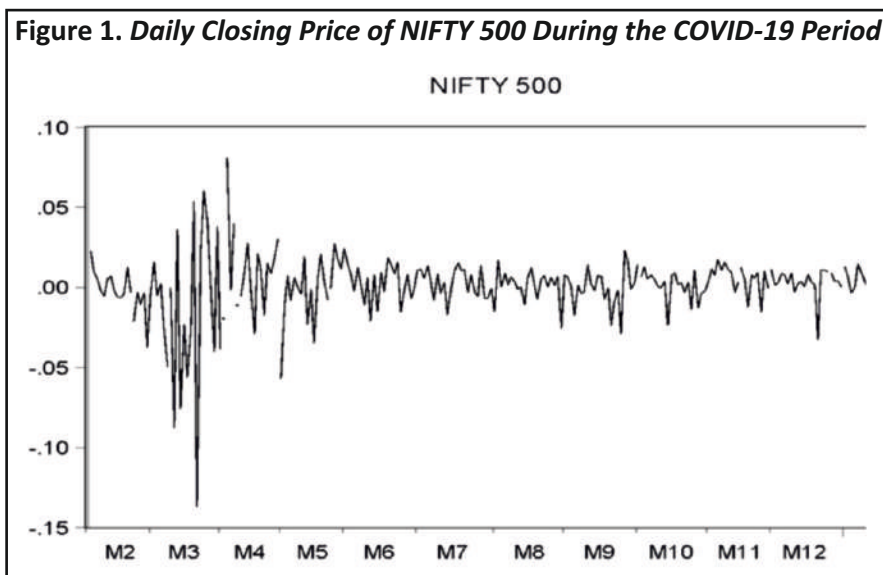
$$\ln(\sigma_t^2) = \alpha_0 + \alpha_1 \frac{|\epsilon_{t-1}| + \gamma_1 \epsilon_{t-1}}{\sigma_{t-1}} + \beta_1 \ln(\sigma_{t-1}^2) \quad (2)$$

The above equation represents the GARCH term, and  $\beta$  represents the ARCH term and the EGARCH term. The ARCH term will explain the level of volatility clustering, GARCH represents volatility persistence, and EGARCH will tell us about the leverage effect.

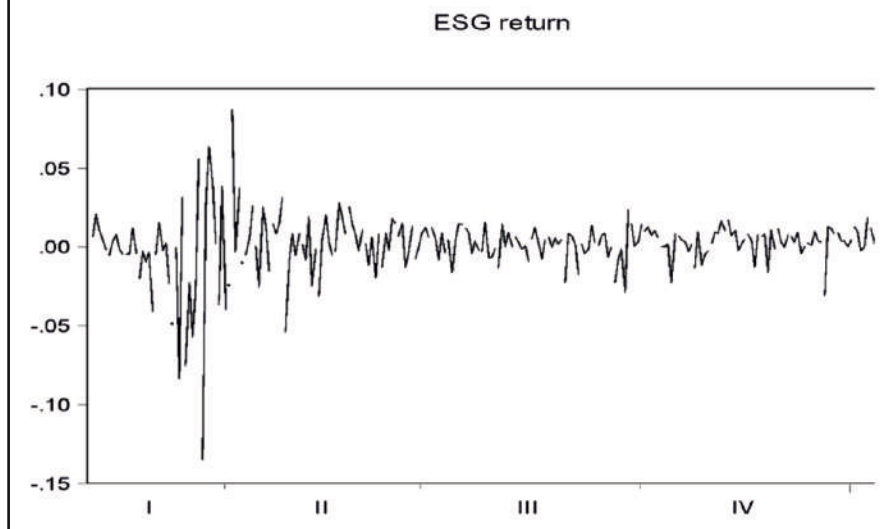
## Analysis and Results

The following section presents the objective wise analysis of the indices' data followed by a discussion of the findings. The graph shows the daily closing price movement of the NIFTY 500 index. As per Figure 1, the highest volatility in the index was in the first quarter of the year, and the same is the case with the NIFTY 100 Enhanced ESG Index shown in Figure 2.

The graph depicts the highest volatility from M3 (month third) to M5 (month fifth). As lockdown was implemented in India in March and continued through the end of May, accounting for the indices' fluctuation. All businesses, financial institutions, trades, and places of employment came to a complete halt during this time. There was no treatment for or vaccine against this virus. Unanswered questions about the severity of this pandemic caused the stock market to be volatile.



**Figure 2. Daily Closing Price of NIFTY 100 Enhanced ESG During the COVID-19 Period**



**Figure 3. Daily New Cases of COVID-19 in India**

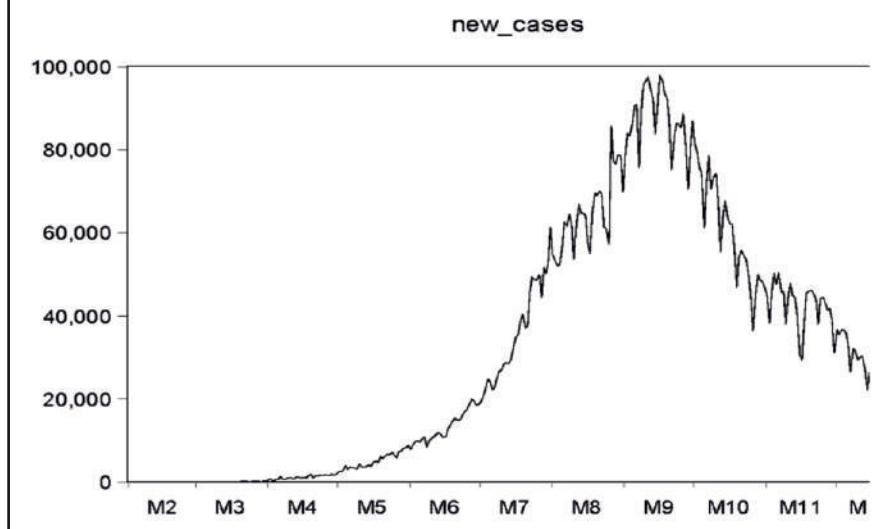


Figure 3 depicts the number of daily new cases, which peaked in the ninth month, but index volatility peaked in the third, thus demonstrating that there is no connection between the increase in daily new case volume and index movement. The lockdown was the cause of the third month's volatility. Fear was sparked by the shutdown of everything, which raised concerns about the virus's severity, prognosis, and timeliness. The world was looking for solutions and means to deal with this infection without interfering with their daily activities.

The descriptive statistics in Table 1 give the summary of the basic information of the data, like mean, median, mode, standard deviation, skewness, and kurtosis. It describes and organizes the characteristics of the data set. The NIFTY 500 index's mean was somewhat higher than the mean of the NIFTY 100 Enhanced ESG indexes, but throughout the COVID-19 period, the ESG index's mean return exceeded that of the NIFTY 500 index. Although the standard deviations of the two indexes are virtually similar, the ESG index is still on the lower end. During the

**Table 1. Descriptive Statistics of NIFTY 500 and NIFTY 100 Enhanced ESG Index**

|               | NIFTY 500 |              | NIFTY 100 Enhanced ESG Index |              |
|---------------|-----------|--------------|------------------------------|--------------|
|               | Pre-COVID | During-COVID | Pre-COVID                    | During-COVID |
| Mean          | 0.000393  | 0.000615     | 0.000322                     | 0.000864     |
| Median        | 0.000500  | 0.002608     | 0.000424                     | 0.002704     |
| Maximum       | 0.052357  | 0.080907     | 0.052605                     | 0.086790     |
| Minimum       | -0.021542 | -0.136951    | -0.020246                    | -0.134770    |
| Std. Dev.     | 0.008783  | 0.019717     | 0.008610                     | 0.019522     |
| Skewness      | 1.036132  | -1.824397    | 1.079846                     | -1.673943    |
| Kurtosis      | 8.267844  | 15.52752     | 8.588053                     | 15.57995     |
| Jarque – Bera | 321.7798  | 1737.994     | 364.8878                     | 1751.122     |
| Probability   | 0.000000  | 0.000000     | 0.000000                     | 0.000000     |
| Sum           | 0.094655  | 0.150733     | 0.078633                     | 0.214223     |
| Sum Sq. Dev.  | 0.018514  | 0.094856     | 0.018013                     | 0.094132     |
| Observations  | 241       | 245          | 244                          | 248          |

COVID-19 period, both indices are negatively skewed. High kurtosis and J.B. depict that none of the return series is normally distributed. It is leptokurtic and has a fatter tail than the normal distribution.

### **EGARCH Model**

The GARCH family models are considered the most suitable to estimate stock market volatility. For instance, Wei-Chong et al. (2011) utilized the GARCH family model to examine how the subprime crisis affected the volatility of the U.S. stock market. Using the GARCH and EGARCH models, Miyakoshi (2002) investigated how information affects conditional volatility in the Japanese stock market. To investigate the impact of COVID-19 on the volatility of the ESG Index, the study uses the EGARCH model. Before and following the COVID-19 period, the time was bifurcated, and the least squares approach was used on both. Due to the presence of the ARCH effect, the EGARCH model was implemented. The ARCH effect was tested using Correlogram Q-stats at 36 lags and a heteroskedasticity test on the residuals. The test's *p*-values were less than 5%, and the null hypothesis (i.e., no ARCH effect) was rejected at a 1% significance level. Thus, it confirms the presence of ARCH effects in the residuals of the time series model. The results are given in Table 2.

The ARCH value indicates the volatility clustering, the GARCH values tell us about the volatility persistence, and EGARCH explains the leverage effect of the index. The values of EGARCH are negative and significant, which depicts no leverage effect in both periods. The leverage effect means the market shows more volatility during negative shocks than positive news. Positive news can also be said to have less effect on conditional

**Table 2. EGARCH Model**

| Period        | Index                  | ARCH  | GARCH  | EGARCH | Significance |
|---------------|------------------------|-------|--------|--------|--------------|
| 2019–2021     | NIFTY 100 Enhanced ESG | 0.139 | 0.972  | 0.135  | Yes          |
| Pre- COVID    | NIFTY 100 Enhanced ESG | 0.459 | -0.406 | -0.199 | Yes          |
| During- COVID | NIFTY 100 Enhanced ESG | 0.026 | 0.967  | -0.212 | Yes          |



**Table 3. Average Percentage Daily Returns of NIFTY 500 and NIFTY 100 Enhanced ESG Index**

|                        | 2019 – 2021 | Pre Covid-19 return | During Covid-19 return |
|------------------------|-------------|---------------------|------------------------|
| NIFTY 500              | 0.0562%     | 0.0433%             | 0.0688%                |
| NIFTY 100 Enhanced ESG | 0.0663%     | 0.0359%             | 0.0960%                |

variance than negative news. It means that the leverage effect does not play any role in explaining the conditional variance of the ESG index in both periods.

The ARCH values are negative but insignificant during the COVID-19 period, but significant in the pre-COVID period. Hence, there is an ARCH effect in the pre-COVID period but not during the crisis. The positive and significant GARCH value represents the volatility persistence during 2019–2021 and the pandemic. The positive GARCH value during these periods shows that volatility will persist. Hence, risk in the ESG index does not have a leverage effect and volatility clustering during the COVID-19 period, but the shock of volatility can persist. We are supporting the study by Engelhardt et al. (2021) and Singh et al. (2021) that companies with good ESG scores are less risky.

Table 3 displays the average percentage daily returns of the conventional and sustainable index for the pre-COVID-19 and during the COVID-19 period. The results of calculations unveil that the ESG index has outperformed the NIFTY 500 index during the COVID-19 period, though it was underperforming in the pre-COVID-19 period. Hence, it can be concluded that sustainability can act as insurance during the crisis, as the pre-COVID-19 period returns were below the conventional market index returns.

Even if we consider the two-year returns of both indices, the ESG index has outperformed the conventional one. The study's outcome is in sync with the studies done by other researchers (Broadstock et al., 2021; Tripathi & Bhandari, 2015; Tripathi & Kaur, 2020).

## Findings and Conclusion

The dramatic fall in the stock market globally raises the question of a haven for investors. Does this negative sentiment affect all the asset classes equally, or can sustainability act as insurance during this crisis period? This study attempts to address some of the issues at that time. The ESG index outperformed the conventional market index, thus acting as a COVID-19 safe asset class. This allows investors and fund managers to diversify risk by acting sustainably for society. The EGARCH model also justifies that no leverage effect in the ESG index in pre and during the crisis period provides a safe haven to investors. The study also concludes that increased daily new instances do not affect the index movement. The recent increase in ESG investments in India may only be the beginning. However, there is still a need to increase investors' awareness. This research influences the expansion of ESG investments in emerging markets by providing a base that good ESG performers are also providing better financial returns during crises.

## Implications

### *Theoretical Implications*

The paper provides some important theoretical as well as managerial implications. The study has highlighted the importance of sustainable investing and its potential to provide comparatively stable and better returns than

conventional investing during volatile times like the COVID-19 pandemic. Moreover, it also contributes to the growing body of literature on sustainable investing and its potential to provide financial benefits to investors. The research emphasizes the need to consider sustainability factors in investment decision-making processes, especially in the wake of the COVID-19 pandemic.

### ***Managerial Implications***

The study offers some insights for the practitioners also, such as companies with good sustainability practices and reporting are better positioned to weather economic shocks like the COVID-19 pandemic. The study underlines the importance of diversifying investment portfolios to include sustainable investments, which can provide a hedge against market volatility. Institutional investors, individual investors, high-net-worth individuals, and public investors will be better positioned to finalize their investment and hedging strategies to take advantage of opportunities to diversify investment risk and earn high returns during times of economic distress. It will also motivate businesses to increase their information disclosure, thereby becoming more sustainably responsible, which will assist research agencies in expanding their ESG coverage.

### **Limitations of the Study and Scope for Future Research**

Every study suffers from some limitations, and this study is no exception. There are some limitations of this study, such as it focuses on the index performance of the top market cap stocks, thus ignoring the mid and small ones. Secondly, it is also limited to the data of developing country represented by India only. Thirdly, there could be external factors that impact the performance of conventional and sustainable indices, such as changes in regulations or policies, which could affect the findings of the study and finally, the chosen methodology could have its limitations, which could impact the reliability and validity of the findings.

The extent of the research can be broadened in the future by segmenting the data into different areas and contradicting how COVID-19 affects each one. Even if the study's ESG companies perform at least 50% better than their normalized ESG scores, they can still be divided into mediocre, good, and exceptional performers. To determine if there are any differences based on ESG ratings during an exogenous event, their risk and return performance can be validated by comparison.

### **Authors' Contribution**

This paper is the outcome of a collaborative effort. Manpreet Kaur Makkar came up with the idea and created quantitative models for empirical research. E-Views software was used to analyze the data, and the results were interpreted. Dr. Atif Ghayas assisted in concept generation, extracted research papers from prestigious publications, reviewed the analytical procedures, and supervised the execution of the study. Dr. Nitin Gupta assisted in manuscript preparation and research supervision.

### **Conflict of Interest**

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

## Funding Acknowledgment

The authors received no financial support for the research, authorship, and/or for publication of this article.

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