Comparative Study of Sustainability Indices and Traditional Indices Performance During Covid-19 Period

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Abstract:

Environment, Social and Governance have become three major pillars which depicts the sustainability of any organization. Organizations are striving hard to get good ranking for their Environment, Social & Governance reporting practices. The practices not only show the responsible citizenship behaviour of the organization, but also impacts their financial performance in long run. The current study mainly aims to identify, measure and quantify the market efficiency of Sustainability Indices over Traditional Indices, keeping in view the prominence of increased sustainability reporting by various businesses. The study has considered four benchmark indices and two sustainability indices and the data evaluated covers a period of 2 years in both pre and post-Covid era. Computed volatility for sustainability index was 8.85 and 51.62 respectively in the Pre-Covid 19 and the Post Covid-19 respectively; corresponding results for the equivalent index from the Bombay Stock Exchange was 519 and 3019 for the Pre-Covid-19 and Post-Covid-19 respectively. Sustainability indices performed more efficiently in post-Covid era than in pre-Covid era in the portrayal of results, signifying that investors have leaned towards the sustainability-based Indices in the after-math of Covid, thereby suggesting that such portfolios can be considered the future catalyst of investing.

Keywords: Environment, Social & Governance, Market efficiency, Hurst Analysis, Covid-19, Exchange Traded Funds and Mutual Funds, India.

JEL Codes: O53, G28

INTRODUCTION

The spread of Covid - 19 has exposed the entire planet to obstacles of various kinds. The epidemic was first observed in specific parts of China, but it quickly expanded to other countries, causing not only a health problem, but also an economic depression (National Library of Medicine, 2020). This pandemic downturn is different from corporate issues and governance failures, since unlike in institutional problems like the 2008 subprime crisis, this pandemic has impacted several industries and nations besides disrupting their daily routines (Ali et al., 2021; Sangster Jokic & Jokic-Begic, 2022). Infections reduce labour supply and productivity, quarantines and lockdowns are measures adopted to contain spread of the virus; yet they cause supply chain disruptions (Singh et al., 2021) and this uncertainty leads to conserved spending and lay-offs by businesses since they are not able to manage heavy outflows of salaries and huge employment cost during cashflow crunch (Jinjin Mou, 2020).

To fight this global downturn, governments and businesses are acting on all fronts simultaneously, creating greater levels of trust and cooperation. A multi-level governance approach is being administered, heeding the recommendations of the Organization for Economic Cooperation and Development (OECD). Many businesses got impacted adversely due to supply chain disruptions and lack of demand but some are gradually regaining their positions by changing their outlook towards the long-term goal of sustainable development. Investors in alignment with environmental sensitivities are gradually changing their mindset. They are looking for sustainable businesses and indices to hedge their long-term risk and are shifting their focus to environment friendly options which are working towards sustaining the society for present and future generations (McKinsey on Climate Change, 2020). Covid - 19 is a 'late lesson' learnt from an early warning. Researchers are emphasising the fact that Covid-19 can be seen as a small period of unusual tranquillity but the major challenge of climate change and biodiversity loss is yet to be dealt with (Arneth et al., 2020; European Environment Agency, 2022). Portfolio Managers and big fund managers like Vanguard Group and Nuveen are preferring ESG based fund investing since most of the sustainable funds have performed well relative to their conventional peers (Von Wallis & Klein, 2015).

It is clear that the impact of Covid-19 and the global economic crisis triggered thereon has made investors rethink their portfolios and has caused acceleration towards sustainable investing practices (J.P. Morgan Research, 2020). Countries are adopting Sustainable Development Goals (SDG), which are 17 unique developmental goals adopted by world leaders in UN Summit. These SDGs focus on ending all forms of poverty, fight inequalities and tackle climate change as per the *Report on Sustainable Development Goals*, featured in the website of United Nations, www.un.org.

One of the major challenges which nations are facing and occupies prime importance in SDGs is climate change. Large multinational companies like Apple have already initiated their pledge to become 'Carbon Neutral' by 2030 (Kelion, 2020). Microsoft has pledged to become 'Carbon-Negative' by 2030 and by 2050 it will remove all the carbon emitted by it in the environment (Shankland, 2020).

Climate change poses a significant danger to the world's biodiversity and ecosystems, since shifting weather patterns may result in increasing sea levels, ecological collapse, severe unsustainable weather patterns, severe storms, and droughts. While the issues may pertain to macroeconomic or natural phenomena, countries and organizations are responsible to a large extent for the ecological imbalance that has accelerated especially in the last century. To tackle such problems, governments and businesses are focusing on sustainable practices, that not only reduce carbon levels in our atmosphere but also promote a cleaner, greener and a much more renewable energy consumer environment (Seddon, et al., 2020; Tilley & Gold, 2020).

Thus, concerned and conscientious investors are shifting their wealth portfolios to such businesses which are environmentally, socially and governance wise sound and these investors are also betting on long term benefits of their investments, letting go of the short-term risk prone, higher profits.

REVIEW OF LITERATURE

This pandemic has affected the performance of stock markets of both developed and developing economies. BSE SENSEX, fell by about 12.3% on March 23, 2020, and then continued to fall for the next few weeks, whereas the NIFTY 50 fell by a massive 29 percent during this time, and economists have labelled the impact of Covid – 19 as a 'Black Swan Event,' an event whose severity cannot be predicted properly (Bora & Basistha, 2021; Devarajan et al., 2021). On March 31, 2020 S&P Global published their BSEINDIA dashboard and it showed that BSE SENSEX had fallen by 28.35% at quarter-on-quarter basis,

whereas the BSE CARBONEX and BSE ESG 100 had fallen by 29.38% and 29.04% respectively. But the data from Feb 1, 2020 to Feb 1, 2022 the normalized appreciation of BSE SENSEX has been about 48.14%, whereas, in the same time period BSE ESG 100 saw an appreciation of 60.74%, thus ESG 100 outperformed BSE SENSEX based on the data from Bloomberg. Oil futures also witnessed a great decline in their price due to this pandemic. Oil prices plummeted due to a lack of demand and supply chain disruptions, while lockdowns and 'social-distancing' tactics reduced corporate productivity and income. Their operational costs increased while their cash flow decreased.

March 2020 witnessed one of the most dramatic stock market crashes in history due to Covid-19 pandemic. In barely four trading days, DJIA index (Dow Jones Industrial Average) plunged 6400 points, roughly 26% downward fall (Mieszko Mazur, Man Dang and Miguel Vega., 2021). S&P 500 also saw a downward rally and lost 34% of its value in this pandemic, as on August 2020. The drop in the Stock Market was so massive that the New York Stock Exchange suspended trading several times during these days (CNBC, 2020). Japanese stock market experienced a 30% decline between the months of February to March, 2020. Despite having low cases compared to other nations, Japan's flagship index Nikkei 225 was not been able to survive the hit (Takahashi & Yamada, 2021).

Early work within organizations focused more on window dressing using ESG (Porter, et al., 2019) but gradually organizations and external analysts have understood the deeper implications of ESG. Considering the fact that the global economy is interconnected and this has been further emphasized with the Russia-Ukraine war and its fallout on economies across the globe (Mbah & Wasum, 2022) organizations have first-hand seen that scarcity of commodities, rising prices and inflation concerns are very real. Yet, they need to continue their growth-oriented strategies and keep moving. Any inertia on the part of organizations is likely to result in competitors taking away their market share. Hence ESG focus is expected to give them an edge over others.

Climate change, urban pollution, biodiversity loss, and other evidence of human activity have dramatically impacted the biosphere. This strongly indicates that our planet is on an unsustainable path. Despite the clarion calls made by Elkington (1997) advocating the triple bottom line, organizations have not been actively responding to the 'Planet' dimension. However, operationalizing sustainable methods to ensure the well-being of current and future generations has become one of the most pressing concerns of our day (Wu & Wu, 2012).

Yet, even in the last decade of the twentieth century, environment and sustainability did not get sufficient traction within Indian organizations. Most organizations began by looking at broad-based, yet limiting approaches such as Reduce-Reuse-Recycle. Soon it was clear to global investors that such half-hearted measures were not enough to provide credibility and legitimacy. Indian firms began to incorporate environmental-friendly business processes across all functions. In the last ten years however, most companies have gone so far to provide separate sustainability reports (Tewari & Dave, 2012) along with the mandatory annual reports. This had enhanced their credibility in the eyes of global investors.

Government has played a part in the 'social' dimension by nudging corporates first and then mandating them to spend on corporate social responsibility initiatives using the Companies Act 2013 through the Ministry of Corporate Affairs in India. Consequently, we note that for the fiscal year 2021, 9374 Indian companies spent more than the mandated 2% of Post-tax profits on CSR activities (Prasad, 2022). Yet, a questionable point is that this spending has been registered after the announcement of punitive measures stating that there would be a penalty of Rs. 10 million on defaulters. The key concern is that corporates

have started strategic spends on CSR, yet it has been overshadowed by such punitive measures by the government.

On the 'Governance' dimension, considerable strength in implementation has been enabled through the Companies Act in India (Rajagopalan & Zhang, 2008; Goel, 2018). Board structure, the formation of committees, separation of the roles of Chairperson and the Chief Executive Officer, the composition of boards and their conduct have been given sufficient importance; companies have complied with such norms. These have largely been under the umbrella of corporate governance. Enhanced transparency in reporting through voluntary disclosures along with mandatory disclosures in annual reports has now become a regular feature for all the Indian listed entities.

ESG brings mutually reinforcing and synergising characteristics into the intrinsic soft infrastructure of firms. Hitherto, analysts, media and investors were looking at firms merely as vehicles that would generate economic benefits for them. While the landscape of expectations has changed substantially, we note that listed firms which largely ground their business processes in sustainability may come under the purview of a designated 'ESG portfolio'. The stock market has duly been able to assign indices to help investors track the performance of such firms using sustainability indices.

The popular belief that sustainability indices yield lower returns as compared to traditional benchmark indices is becoming counterintuitive by sole reason of significant investments flowing into ESG based portfolios, suggesting that both of them give similar kind of returns with the sustainability-based portfolios giving extra protection to capital with the long- term effect ESG opportunities (Jain et al., 2019). Risk analysis has been a typical approach adopted for long-term investment goals in the capital markets during the last few years, and they help exchanges retain market efficiency thereby satisfying their ESG disclosures (Siddy, 2009). Volatility spill over studies also observed the relevance of sustainability metrics in attracting and retaining larger investments (Spulbar, et al., 2022). Stock screening is critical for ESG investing criteria (Widyawati, 2020) because screening intensity and risk are tightly linked, with more screening resulting in reduced systematic risk, allowing managers to pick low beta stocks to reduce total risk (Darren Lee, 2010).

The ESG profiles and performance of the global and regional MSCI ESG Leaders Indexes differed significantly, although major risk measurements were all reduced (Giese, et al., 2019). Improved measures of ROE, ROA, and stock price result from good corporate management of ESG concerns. Educated investors who want to generate alpha from their portfolios are well aware that companies that manage and perform well on their ESG risk assessments tend to give desirable market returns, if not excess returns, and thus become crucial for improving traditional benchmark investing strategies. They also protect investors from downside risk during economic and social crisis and are thus considered safe for long term (Whelan, et al., 2021). An examination of 2200 individual studies found that positive ESG effect and non-negative firm financial performance were intact and steady over time 90% of the time (Friede, et al., 2015). A study of China's A-listed businesses found that ESG indexes and stock market performance are positively correlated. Further research found that ESG indices have a greater influence on private firms than on state-owned enterprises, and that ESG indices boost secondary industry stock market performance significantly more than tertiary industry stock market performance (Deng & Cheng, 2019). Companies listed on the Moroccan, Egyptian, and Turkish stock exchanges all experienced negative abnormal returns as a result of the COVID-19 crisis; however, ESG oriented companies listed on the Turkish Stock Exchange fared better than non-ESG based companies, while sustainability-oriented companies underperformed on the Moroccan and Egyptian stock exchanges (Harabida et al., 2022).

A recent study found that results were inconclusive as to whether ESG-based indices are safe or not, using CBOE VIX as a robust analysis of market fear proxy; moreover, the study concluded that ESG-based indices are secure for investments (Rubbaniy, et al., 2021). Another study found that high ESG portfolios outperform low ESG portfolios, that ESG performance reduces the relevance of ESG during 'normal times,' and that ESG performance mitigates financial risk during financial crises, proving its additional value during crises (Broadstock, et al., 2020). Machine learning correctly predicts ROA and ROE and reveals the presence of a positive association between ESG practises and financial metrics using an ordered logistic regression model. Furthermore, when businesses engage in environmental innovation, employment productivity, diversity, and equal opportunity regulations, the existing link tends to be more pronounced (De Lucia, et al., 2020).

Most studies discussed so far are oriented towards global ESG indices and do not portray a comprehensive examination of Indian ESG indices. The current research examines the long-term viability of Indian ESG indexes in the pre-covid as well as the post-covid era. BSE ESG 100 and BSE CARBONEX, are the two major sustainability indices of Bombay Stock Exchange, have been compared to four benchmark indices: BSE SENSEX, BSE 100, BSE MIDCAP, and BSE SMALLCAP.

METHODS

The research methodology applied is analytical research where the data has been quantitatively evaluated. The study is based on the secondary data, collected from the website of the Bombay Stock Exchange for six major indices which consist of the two sustainability indices and four other benchmark indices of BSE, for the Pre-Covid and Post-Covid period.

The Returns of these six indices were taken from daily closing prices for two periods respectively:

1. Pre-Covid 19: March 1st, 2018 to February 28th, 2020.

2. Post-Covid 19: March 1st, 2020 to February 28th, 2022.

The specific terms 'Pre-Covid 19' and 'Post-Covid 19' has been duly acknowledged and used as a definable period by Chakrabarti et al. (2021) and Alqahtani et al. (2021). Other research studies in the domain of financial markets have also used similar time periods and corresponding nomenclature. In order to analyse the data, followings methods have been used in the study:

Descriptive analysis: The characteristics of the returns of all six indices has described using descriptive analysis, which mainly consists of average, maximum, minimum, volatility, skewness, excess kurtosis, and median values during pre and post Covid period.

Normality test: Normality test was conducted to measure the normality of the returns of all six indices using White Noise Test, and Normality Test. In order to test the auto correlation in the data, ARCH effect was measured.

Stationarity Test: Stationarity test was used to measure the significance of changes in the return of all six indices over the time. This condition is essential for forecasting and predicting the time series data.

Hurst Analysis: The Hurst exponent is a measure of autocorrelation (persistence and long memory). A value of $0 < H < 0.5$ indicates that the time series has negative autocorrelation. For instance, a decrease between values will probably be followed by another decrease. A value of $0.5 < H < 1$ indicates that our time series shows signs of a positive autocorrelation Even here, an increase between values will probably be followed by another increase. A value of $H = 0.5$ indicates a "true

random walk," where it is equally likely that a decrease or increase will follow from any particular value (E.g. the time series has no memory of previously held values).

RESULTS

The results have been tabulated and explained. Table 1.1 shows the descriptive statistics of the Pre-Covid 19 indices, indicating that the volatility is highest for the four benchmark indices – namely the BSE SENSEX, BSE 100, BSE MidCap and BSE SmallCap, than ESG indices (BSE ESG 100 and BSE CARBONEX). The positive skewness of these four benchmark indices is more than ESG indices, indicating that more values are greater than the sample mean in benchmark indices. Excess kurtosis shows that all indices have a platykurtic distribution. Comparing the values of excess kurtosis, ESG indices have exhibited lower risk than benchmark indices.

Table 1.1 Pre-Covid 19 Analysis

Descriptive Statistics: Pre-Covid 19 (March 1st, 2018 to February 28th, 2020)						
Description	BSE ESG 100	BSE CARBONEX	BSE SENSEX	BSE 100	BSE Midcap	BSE SmallCap
Average	176.15	1853.66	37423.34	11410.75	4789.65	2229.37
Maximum	194.89	2008.87	41952.63	12455.78	5500.53	2778.23
Minimum	157.30	1672.92	32596.54	10266.12	4134.52	1810.58
Volatility	8.85	80.24	2297.38	519.54	330.49	246.64
Skewness	0.14	0.05	0.13	0.13	0.21	0.58
Excess Kurtosis	-0.97	-1.16	-0.92	-1.09	-0.91	-0.66
Median	174.31	1836.06	37327.36	11271.26	4718.96	2175.82

The **Table 1.2** gives the results of the normality test during the Pre-Covid 19 period.

Table 1.2 Normality Test Pre-Covid 19

Normality Test						
Description	BSE ESG 100	BSE CARBONEX	BSE SENSEX	BSE 100	BSE Midcap	BSE SmallCap
White Noise Test						
p-value	0.000	0.000	0.000	0.000	0.000	0.000
Significance	False	False	False	False	False	False
Normality Test						
p-value	0.000	0.000	0.01	0.000	0.000	0.000
Significance	False	False	False	False	False	False
ARCH Effect						
p-value	0.000	0.000	0.000	0.000	0.000	0.000
Significance	True	True	True	True	True	True

White Noise Test was negative for all the indices, implying that results in the time-series will not be random, and each observation is correlated with the other. The normality test results confirmed the rejection of the null hypothesis, and the returns of the indices are not normally distributed. ARCH effect results signify that returns of the indices are auto-correlated.

Table 1.3 Stationarity Test

Stationarity Test					
Indices	**Test**	**Score**	**P-Value**	**C.V.**	**Stationary**
BSE ESG 100	*No Const*	0.4	78.7%	-1.9	FALSE
	Const-Only	-2.1	23.2%	-2.9	FALSE
	Const + Trend	-2.6	0.5%	-1.6	TRUE
	Const+Trend+Trend^2	-2.5	0.7%	-1.6	TRUE
BSE CARBONEX	*No Const*	0.2	74.1%	-1.9	FALSE
	Const-Only	-2.4	15.7%	-2.9	FALSE
	Const + Trend	-2.8	0.3%	-1.6	TRUE
	Const+Trend+Trend^2	-2.5	0.7%	-1.6	TRUE
BSE SENSEX	*No Const*	0.7	85.7%	-1.9	FALSE
	Const-Only	-2.1	25.9%	-2.9	FALSE
	Const + Trend	-2.5	0.6%	-1.6	TRUE
	Const+Trend+Trend^2	-2.4	0.7%	-1.6	TRUE
BSE 100	*No Const*	0.1	71.7%	-1.9	FALSE
	Const-Only	-2.3	18.5%	-2.9	*FALSE*
	Const + Trend	-2.9	0.2%	-1.6	*TRUE*
	Const+Trend+Trend^2	-2.8	0.3%	-1.6	*TRUE*
BSE Midcap	*No Const*	-0.6	46.8%	-1.9	FALSE
	Const-Only	-2.1	25.3%	-2.9	FALSE
	Const + Trend	-2.2	1.5%	-1.6	TRUE
	Const+Trend+Trend^2	-3.0	0.1%	-1.6	TRUE
BSE Smallcap	*No Const*	-1.3	17.9%	-1.9	FALSE
	Const-Only	-1.9	31.5%	-2.9	FALSE
	Const + Trend	-2.5	0.6%	-1.6	TRUE
	Const+Trend+Trend^2	-3.0	0.1%	-1.6	TRUE

From **Table 1.3**, we can confirm that all indices have passed the stationarity test, which signifies that the statistical properties of these indices do not change over time. This condition is essential for forecasting and predicting the time series data.

Table 2.1 Post-Covid 19 Analysis

Descriptive Statistics: Post-Covid 19 (March 1st, 2020 to February 28th, 2022)						
Description	BSE ESG 100	BSE CARBONEX	BSE SENSEX	BSE 100	BSE Midcap	BSE SmallCap
Average	230.8581	2295.041	47194.42	14186.3	4789.65	2789.561
Maximum	308.99	3047.46	61765.59	18799.75	5500.53	4263.74
Minimum	119.63	1229.1	25981.24	7683.09	4134.52	1231.92
Volatility	51.62763	491.1602	9654.478	3019.847	330.49	899.4643
Skewness	-0.29	-0.29	-0.29	-0.26	0.21	-0.04
Excess Kurtosis	-1.18	-1.19	-1.14	-1.20	-0.91	-1.42
Median	242.14	2407.07	49201.39	14811.37	4718.96	2812.03

Table 2.1 displays the descriptive statistics of the study, Post-Covid 19. The data indicates that the volatility is lowest for BSE ESG 100. All indices have shown negative skewness except BSE Midcap, which signifies that more values are lesser than the sample mean. Excess kurtosis results show that all indices have a platykurtic distribution. Analysis of skewness and excess kurtosis revealed that BSE Midcap had outperformed all other indices.

Table 2.2 Normality Test, Post Covid-19

Normality Test						
Description	BSE ESG 100	BSE CARBONEX	BSE SENSEX	BSE 100	BSE Midcap	BSE SmallCap
White Noise Test						
p-value	0.000	0.000	0.000	0.000	0.000	0.000
Significance	False	False	False	False	False	False
Normality Test						
p-value	0.000	0.000	0.00	0.000	0.000	0.000
Significance	False	False	False	False	False	False
ARCH Effect						
p-value	0.000	0.000	0.000	0.000	0.000	0.000
Significance	True	True	True	True	True	True

The normality test of indices was the same for Post-Covid 19, shown in **Table 2.2** was similar to Pre-Covid 19 period. White Noise Test results were negative, indicating that a reasonable prediction is possible. The normality test results confirmed the rejection of the null hypothesis, and the returns of the indices are not normally distributed. ARCH effect results signify that returns of the indices are auto-correlated.

Table 2.3 Stationarity Test, Post Covid-19

Stationarity Test					
Indices	**Test**	**Score**	**P-Value**	**C.V.**	**Stationary**
BSE ESG 100	*No Const*	1.7	97.9%	-1.9	FALSE
	Const-Only	-1.3	64.3%	-2.9	FALSE
	Const + Trend	-2.3	1.0%	-1.6	TRUE
	Const+Trend+Trend^2	-4.4	0.0%	-1.6	TRUE
BSE CARBONEX	*No Const*	1.6	97.1%	-1.9	FALSE
	Const-Only	-1.3	63.9%	-2.9	FALSE
	Const + Trend	-2.4	0.7%	-1.6	TRUE
	Const+Trend+Trend^2	-4.3	0.0%	-1.6	TRUE
BSE SENSEX	*No Const*	1.5	96.5%	-1.9	FALSE
	Const-Only	-1.2	65.7%	-2.9	FALSE
	Const + Trend	-2.5	0.6%	-1.6	TRUE
	Const+Trend+Trend^2	-4.1	0.0%	-1.6	TRUE
BSE 100	*No Const*	1.5	96.9%	-1.9	FALSE
	Const-Only	-1.3	65.0%	-2.9	FALSE
	Const + Trend	-2.5	0.6%	-1.6	TRUE
	Const+Trend+Trend^2	-4.2	0.0%	-1.6	TRUE
BSE Midcap	*No Const*	1.5	96.8%	-1.9	FALSE
	Const-Only	-0.8	81.5%	-2.9	FALSE
	Const + Trend	-2.0	2.2%	-1.6	TRUE
	Const+Trend+Trend^2	-3.6	0.0%	-1.6	TRUE
BSE Smallcap	*No Const*	1.4	95.7%	-1.9	FALSE
	Const-Only	-1.0	76.3%	-2.9	FALSE
	Const + Trend	-2.3	1.1%	-1.6	TRUE
	Const+Trend+Trend^2	-2.9	0.2%	-1.6	TRUE

From **Table 2.3**, which shows the Post Covid-19 results, we can confirm that all indices have passed the stationarity test, which signifies that the statistical properties of these indices do not change over time.

Table 2.4 Hurst Analysis

Indices	Pre covid	Post-Covid	Independent sample t-test value	p-value
BSE ESG 100	0.985871	1.065763	-23.19	0.000
BSE CARBONEX	0.966954	1.063686	-.19.69	0.000
BSE SENSEX	1.018875	1.066404	-21.86	0.000
BSE 100	0.979002	1.063881	-20.11	0.000

| BSE Midcap | 1.024345 | 1.063911 | -20.44 | 0.000 |
| BSE Small cap | 1.021788 | 1.062498 | -13.33 | 0.000 |

Hurst Analysis represented in **Table 2.4** shows that all the indices above have shown values greater than 0.5 during the Pre-Covid and Post-Covid periods. This indicates a definite market trend and a time series with a positive autocorrelation. Post-Covid 19, investors across the globe have shown an increased interest in firms that fulfil ESG norms and looking forward to sustainable development moving ahead.

DISCUSSIONS

The findings of the study are purely based on deep level statistical and sentimental data analysis using well accepted statistical methods. The results showed that in Pre-covid era the benchmark Indices namely- BSE SENSEX, BSE 100, BSE MidCap and BSE SmallCap, than ESG indices (BSE ESG 100 and BSE CARBONEX). The noise test showed a neutral picture of all the indices and no significant difference in ESG and benchmark indices. Analysis of skewness and excess kurtosis revealed that BSE Midcap had outperformed all other indices. Hurst Analysis depicted values for all indices above more than 0.5, giving out a positive correlation during Pre and Post-Covid. Investor sentiment is gradually shifting to ESG based indices also keeping in mind the risk-return hedge for long term perspective.

Related, yet similar studies have suggested that including green bonds into investment portfolios proved to be attractive for investors during the pre-Covid and post-Covid era (Naeem et al., 2021). A study in Taiwan found a bi-directional causality between the clean energy index of NASDAQ and Taiwan's conventional index (Wang, 2022), noting that the pandemic caused the spill over effect to increase.

A study performed through TGARCH model found out that there was not much difference in performance of sustainability indices and market benchmark indices in a single time duration, hence showing that sustainability indices have provided reasonable returns to Indian investors without compromising on financial returns (Jasuja, et al., 2021). While studies compare sustainable indices to conventional indices, a methodology using Thomson Reuters/S-Network by applying the time-frequency-based Granger-Causality test, and further attempt to understand the coherence between these indexes before and during the COVID-19 period by using the Wavelet Coherence and phase-difference mechanisms showed that short-run uni-directional causality from sustainable indexes to conventional indexes whereas bi-directional causality in medium and the long-runs.

The coherence is particularly stronger at low frequencies, indicating the long-run coherence with sustainable indexes in the lead during COVID-19 (Sharma et al., 2021). But probing deeper, another study showed that sustainable indices underperformed than the conventional indices and furthermore the only prudence which was found in these ESG indices were during Covid-19 (Sharma et al., 2022), since at this period they performed almost in line with their benchmark indices. Furthermore, we can see that lack of legislature procedures and implementation of proper policy output make the green funds more questionable: 'are they really green?' (Naqvi, 2021)

CONCLUSIONS

The study aimed at comparing sustainability indices with the benchmark indices in the Indian stock exchange. The method adopted used two sustainability indices, namely the ESG 100 and the BSE CARBONEX and compared them with the benchmark indices, namely the BSE Sensex and the BSE 100 across the Pre-Covid-19 period against Post Covid-19.

Results strongly indicated that there was not much difference between the sustainability / ESG indices and their counterpart benchmark indices in the Pre-Covid era, although the benchmark indices were more volatile as compared to the ESG based indices. Volatility metrics for the ESG100 and BSE CARBONEX Pre-Covid-19 were calculated as 8.85 and 80.24 while corresponding volatility metrics for BSE Sensex and BSE 100 were 2297 and 519 respectively. Post-Covid analysis showed volatility metrics of 51 and 491 for ESG100 and BSE CARBONEX respectively; corresponding results for BSE Sensex and BSE 100 were 9654 and 3019 respectively. Hurst Analysis indicated that both benchmark and sustainable indices performed well and obtained higher amount of investments, but the overall increase from pre covid to post covid was seen more in sustainable/ESG indices indicating that investors prefer to place their bets on such environmentally friendly organizations.

Therefore, it can be concluded that sustainability indices are considered more efficient and resilient than traditional indices since many of these ESG/sustainability indices have out shone benchmark indices and are considered to be less volatile. Companies with high ESG scores are becoming part of safe long-hedged portfolios and various fund managers are now focusing to grow their client's wealth by focusing on green and clean investment strategies. Major stock exchanges throughout the world have started to create ESG-based indices that include firms that meet specified ESG criteria.

Implications for business managers is that due to increased awareness and environmental sensitivity, there is a need to change their approach keeping in view their long-term goals; they know that if they need continuous investments from wealthy individuals and if they want to achieve their strategic goals they must add in sustainable goals also in their vision statement so that it will be helpful to them in completing their developmental goals while attaining sustainable environment for the societal contribution. Foreign institutional investors are attracted towards those countries which are having high ESG scores; even developing countries who are mostly reliant on fossil fuels and cannot immediately remove carbon emissions are trying their best by advising their big businesses to become sustainability practitioners while not foregoing their major business goals. On the whole, it is clear that investors not only want good returns on their portfolio but also want to see the nature of societal impact they make as they continue with the quest for sustainable returns on their hard-earned investments.

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