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ORIGINAL RESEARCH

Did ESG Save the Day? Evidence From India During the COVID-19 Crisis

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Abstract

Investors have shown increasing interest in Socially Responsible Investments (SRI) in the past few years, especially during the financial crisis caused due to the outbreak of the COVID-19 pandemic. SRI are evaluated on the basis of Environmental, Social and Governance (ESG) criteria. ESG information allows investors to assess the risks associated with a particular firm and how the firm manages or intends to manage future risks. Amidst the increasing investor interest in ESG products, we attempt to study the value addition of ESG performance to investors during crisis period. Using a sample of ESG rated firms listed on the Bombay Stock Exchange (BSE), we examine the investment performance, trading volumes and return volatility of ESG stocks in an emerging market like India during the COVID-19 crisis. The results of our event study conducted around the important events that have occurred in India during the COVID-19 pandemic provide evidence that investors can use ESG information as a signal of future stock performance. Most importantly, ESG performance provides downside protection during crisis times. Our results show that ESG performance does not prove to be detrimental to investment performance during normal times. Also, ESG performance was found to reduce stock return volatility during the COVID-19 pandemic. Overall, our study attempts to establish an investment case for ESG stocks in emerging markets in India by providing support to the good management hypothesis.

Keywords ESG · Socially responsible investments · COVID-19 · Financial crisis · Pandemic · India

JEL Classification G01 · G12 · G20 · M14 · M40

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1 Introduction

Social consciousness has entered into many walks of life today, and many companies are making efforts to align their business practices with sustainability principles. The meaning of sustainability in business has slowly graduated from consistency in profitability. It now requires a constant strive for financial success while accepting responsibility for the impact on relationships with society and other stakeholders. One of the key drivers of sustainability practices at businesses has been the growing demand for Socially Responsible Investments (SRI).

SRI can be broadly defined as an investment process that involves identifying companies with high Corporate Social Responsibility (CSR) profiles where the latter are evaluated on the basis of Environmental, Social and Corporate Governance (ESG) criteria. SRI is an investment process that integrates environmental, social and ethical considerations into investment decision making (Renneboog et al., 2008). SRI is believed to transform capitalism from within (Domini, 2001). While ethical investing has its roots in the ancient Judaism, Jewish, Christian, and Islamic traditions (Renneboog et al., 2008), modern SRI focuses on the impact created by firms in specific areas of interest within the ESG criteria (Hill, 2020). The term "ESG investing" is attributed to The Global Compact Leaders' Summit held at the UN Headquarters in June 2004 (Hill, 2020). The summit saw twenty major financial companies (representing $6 trillion in assets) pledge to begin integrating social, environmental, and governance issues into investment analysis and decision making. Investors worldwide are graduating from a purely financial motive to socially responsible investments. Several investors worldwide are interested in the impact that companies make on global issues like climate change, workplace equality or poverty alleviation, etc., in addition to financial considerations. Surveys have shown that millennials are more likely to purchase a product from companies with a sound social and environmental reputation. Globally, the percentage of both retail and institutional investors that apply Environmental, Social and Governance (ESG) principles to at least a quarter of their portfolios jumped from 48 per cent in 2017 to 75 per cent in 2019 (Spencer et al., 2019). There has been a considerable increase in the number of signatories to the United Nations' Principles for Responsible Investment (UN PRI). The six PRI offer possible actions for incorporating ESG issues into investment practice. As of February 2021, the total number of signatories to the UN PRI was 3711. There are 19 signatories to the UN PRI from India, which includes renowned names like SBI Funds Management Private Ltd. and UTI Asset Management Co. Ltd.

Investors are actively considering ESG investments for two reasons. First, ethical investments actively promote ethical practices at companies. Companies that follow ethical environmental, social and governance-related practices find easy access to finance. Second, there is an emerging stream of evidence that integrating ESG information in investment decisions enhances the risk-adjusted performance of actively managed portfolios (Ashwin Kumar et al., 2016; Kempf & Osthoff, 2007; Lean et al., 2015). Researchers have also examined the performance of SRI during crisis periods. Nofsinger and Varma (2014) found that

during the technology (ICT) bubble burst of 2002 and the global financial crisis of 2008, SRI funds in the USA outperformed the conventional funds. Broadstock et al. (2020) highlighted the downside protection provided by ESG stocks when the lockdown was imposed in Wuhan, China at the onset of the COVID-19 pandemic. Gianfrante et al. (2021) examined a worldwide sample of more than 6000 stocks across 45 countries during Q1 2020 and found that the ability of ESG stocks to outperform the broader market is geography dependent. This has paved the way for regional analysis of the risk-adjusted performance of ESG stocks.

The flows in SRI have gained traction in the last few years, especially in the wake of the financial crisis due to the outbreak of the COVD-19 pandemic during early 2020. COVID-19 proved to be a booster shot for ESG funds across the globe as inflows swelled to reach new records. Morningstar Research reported that global inflows into sustainable funds were up 88% in Q4 2020 to USD 152.3 billion (Tam, 2020). Assets in sustainable funds hit a record high of USD 1652 billion as of the end of December, up 29% from the previous quarter. India has seen the advent of ESG investing in recent times. The Indian mutual fund industry witnessed the launch of its maiden ESG fund in July 2019. Since then, a total of eight ESG mutual funds exist as of December 2020. India recorded strong positive ESG flows for the Q4 2020, propelled by new fund launches. ICICI Prudential ESG fund raised USD 225 million in assets in October 2020, making it the most successful new ESG launch in India. India had the largest quarter-on-quarter asset growth as new launches resulted in the doubling of ESG fund assets to USD 1.3 billion. ESG assets in Asia ex-Japan reached the USD 25 billion-mark in 2020, growing by 130% compared with 2019. A summary of global sustainable funds as of the end of Q4 2020 is provided in Table 1.

Existing evidence on the investment performance of SRI during crisis periods is limited to SRI funds from developed countries (Nofsinger & Varma, 2014) and ESG indices (Mousa & Saleem, 2022; Singh, 2013; Tripathi & Bhandari, 2015),

Table 1 Global sustainable funds Q4 2020 statistics. *Source*: Morningstar Direct, Morningstar Research. Data as on December 31, 2020

Region	Q4 2020 flows		Assets		Funds	
	USD billion	% Total	USD billion	% Total	#	% Total
Europe	120.8	79.3	1342.8	81.3	3196	77.0
United States	20.5	13.4	236.4	14.3	392	9.4
Asia ex-Japan	5	3.3	25.4	1.5	208	5.0
Australia/ New Zealand	1.2	0.8	19.8	1.2	126	3.0
Japan	3.7	2.4	17.7	1.1	138	3.3
Canada	1.2	0.8	10.2	0.6	93	2.2
Total	152.4		1652.3		4153	

The global universe is divided into three segments by domicile: Europe, United States, and Rest of World. More granular data is available for Canada, Australia and New Zealand while Japan, China, Hong Kong, India, Indonesia, Malaysia, Singapore, Taiwan, Thailand, and South Korea are grouped because of the relatively low assets

with limited evidence from developing nations (Broadstock et al., 2020). There is not much evidence of the impact of the crisis situation on ESG stocks compared to that on other stocks. The above facts present an interesting research proposition to test the investment performance of ESG stocks during the financial crisis caused by the outbreak of the COVID-19 pandemic, especially in emerging economies like India (Table 3).

In response to the outbreak of the COVID-19 pandemic, the Government of India announced a day-long "Janta curfew" on March 22, 2020 whereby people were urged to not step out of their houses for a day and avoid any kind of social contact. The government further enforced a nation-wide lockdown for the first time from March 25, 2020 till April 14, 2020. Table 2 lists down the important events in India during the COVID-19 pandemic. NIFTY 50, the equity market benchmark of India, fell by over 13% on March 23, 2020 after the nation-wide Janta curfew was observed. From January 30, 2020 to March 23, 2020 NIFTY 50 had declined from 12,000 to 7,600 levels which marked one of its steepest falls. These special circumstances provide a unique opportunity to contribute to the literature by focusing on the resilience of stocks with high ESG performance in times of financial crisis induced by the outbreak of the COVID-19 pandemic.

Using data on stock returns, volatility, volumes and ESG scores, we attempt to address these research gaps and contribute to the existing literature in five parts. First, using an event study approach, we illustrate that ESG information is priced in the stock returns in a particular manner during crisis periods. Second, using an empirical asset pricing model, we validate our findings that the importance of ESG information increases during the crisis than non-crisis periods. Third, using a Difference-in-Differences (DID) approach, we find that the price correction in ESG stocks during the pandemic is lower than non-ESG stocks. Fourth, we check for resilience in the trading activity of ESG stocks. Fifth, we attempt to establish a relationship between ESG scores and stock return volatility during normal and crisis periods.

The paper is organised as follows. Section 2 reviews the existing literature on ESG performance during the crisis and normal times. The hypotheses are defined in Sect. 3, while research design is presented in Sect. 4. The results of our study are discussed in Sect. 5. Conclusions, policy implications and limitations of the study and areas for future research are outlined in Sect. 6.

2 Review of Literature

The literature on socially responsible investing has developed rapidly after the global financial crisis of 2008. Studies have examined the impact of ESG performance on financial performance and risk characteristics globally (Brammer et al., 2006; Humphrey et al., 2012; Statman & Glushkov, 2009). Results from these studies show that ESG integration does not detract investment performance or differentiate risk characteristics relative to non-ESG integrated strategies.

The evidence on the role of ESG performance during crisis periods is limited, with little literature support available from emerging markets. Availability of company-level ESG information in emerging markets was negligible during the Global

Table 2 Timeline of important events in India during the COVID-19 pandemic. *Source* Wikipedia, Times of India, and other media sources accessed during December 2020–July 2021

Date	Event details
30-Jan-20	First case confirmed in India (Thrissur, Kerala)
11-Feb-20	WHO names the coronavirus as COVID-19
11-Mar-20	WHO characterizes COVID-19 as a pandemic
12-Mar-20	First confirmed death in India (Kalburgi, Karnataka)
22-Mar-20	50 days after the virus was first reported in India, Janta curfew was observed in India from 7 am to 9 pm
25-Mar-20	Lockdown 1.0—Nation-wide lockdown imposed till April 14
26-Mar-20	Finance Minister (FM) announced a Rs 1.7 trillion economic stimulus package to be released through direct cash transfers and food security measures aimed at giving relief to millions of poor affected by the nation-wide lockdown
27-Mar-20	Reserve Bank of India (RBI) allows three months moratorium on term loans outstanding as on March 01, 2020
14-Apr-20	10,000 confirmed cases; Lockdown 2.0—national lockdown extended till May 03
1-May-20	Nation-wide lockdown further extended till May 17
4-May-20	Lockdown 3.0 begins
13-May-20	FM announced a second set of measures that are part of a Rs. 20 trillion fiscal and monetary package announced by the Prime Minister (PM) to support India's economy. FM announced measures of nearly Rs 5.94 trillion to provide relief to small businesses, taxpayers, shadow banks, power distribution companies, real estate, organized sector employees, and contractors working with the government
15-May-20	FM unveils the third set of stimulus measures focusing on agriculture and allied activities—dairy, fisheries, food processing, and animal husbandry
16-May-20	India with 85,940 cases overtakes China in terms of the total number of cases reported. FM unveils the fourth set of stimulus measures to bring structural reforms in coal, minerals, defence production, aviation (airspace management, airports, MRO), power discoms in Union Territories (UTs), space and atomic energy sectors
17-May-20	Nation-wide lockdown further extended till May 31 making it one of the longest lockdowns any country has ever imposed; total case count crosses 100,000
8-Jun-20	Unlock 1.0 – Phased re-opening begins after 75 days of lockdown; India becomes 5th worst hit nation
1-Jul-20	India enters Unlock 2.0
29-Jul-20	Government of India announces guidelines for Unlock 3.0
29-Aug-20	Government of India announces guidelines for Unlock 4.0
15-Sep-20	Daily death count peaked at 1,290 deaths
16-Sep-20	Daily new case count peaked at 97,894 new cases
17-Sep-20	Number of active cases were maximum at 10,17,754
21-Sep-20	Number of daily recoveries was maximum at 1,01,468
30-Sep-20	Government of India announces guidelines for Unlock 5.0
16-Jan-21	COVID vaccine was launched by the Indian government
22-Feb-21	The Union health ministry reveals that two new strains of Covid-19 have been detected in India
01-Apr-21	Vaccinations were made available to all Indians over the age of 45
04-Apr-21	New restrictions were imposed in response to the rising case count in few states, including Maharashtra. Restrictions included the closure of malls, cinemas, and places of worship

Table 2 (continued)

Date	Event details
11-Apr-21	The government of India banned the export of the antiviral drug Remdesivir and its ingredients as demand skyrocketed in the country. The daily case count hit another record high of over 150,000 cases. The surge was driven by large religious gatherings at the Kumbh Mela and massive political rallies with violation of mask discipline and physical distancing norms
12-Apr-21	India officially surpassed Brazil for the second most total cases in the world with more than 11.3 million cases, behind only the United States
07-May-21	India reported a new record high for daily confirmed cases with 414,188 and 3,915 deaths. This was the highest daily new case count during the second wave of the pandemic

Period: January 2020 to May 2021

Financial Crisis (GFC) of 2008–09. This can be attributed to a lack of awareness about ESG, the lesser focus of companies to conduct business activities in line with ESG factors and the lack of regulations that mandated disclosure of corporate social performance. Broadstock et al. (2020) examined the role of ESG performance during the market-wide financial crisis triggered in response to the COVID-19 global pandemic. Using a dataset for constituent companies of China's CSI300 index and corresponding ESG scores, the researchers carried out an event study around the date of lockdown in Wuhan, China. They made important observations regarding returns, volatility and volumes of ESG stocks during the crisis and normal times. They found that high-ESG portfolios generally outperform low-ESG portfolios during times of financial crisis. ESG performance mitigated financial risk during the COVID-19 pandemic in China. The role of ESG performance was attenuated in 'normal' times and gained incremental importance during crisis times. The study also suggests that higher ESG firms exhibited lower price volatility during the COVID-19 period. The results of the event study provide empirical evidence consistent with the flight to security hypothesis and the signalling role that ESG performance might offer investors in terms of potential resilience against downside risk. Flight to quality or security is a financial market phenomenon where investors sell what they perceive to be high-risk investments and shift their capital to safer investment avenues. There is an active theoretical literature studying such phenomenon. Vayanos (2004) showed that high volatility periods raise investors' effective risk aversion, leading to a flight-to-safety that pushes up risk premiums and drives down the prices of risky assets. Caballero and Krishnamurthy (2008) showed that Knightian uncertainty leads agents to shed risky assets favouring safer claims when aggregate liquidity is low, thereby provoking a flight to safety. Broadstock et al. (2020) also found that investors perceive high ESG stocks as relatively more resilient during the pandemic since they hold on to those stocks patiently and do not sell them to avoid losses during crisis times. This study confirms existing literature on the insurance function of high ESG stocks, which states that investors in such stocks pay an insurance premium through lower returns in normal times for downside protection during crisis times (Ding et al., 2020; Engle et al., 2020).

Nofsinger and Varma (2014) found that compared to conventional mutual funds, SRI mutual funds outperform during periods of market crises. However, this downside protection comes at the cost of underperformance during non-crisis periods. Ding et al. (2020) and Engle et al. (2020) confirmed such asymmetrical return patterns in ESG stocks. Globally, research on ESG performance and investment performance during the GFC of 2008–09 has provided some interesting insights. Lins et al. (2017) found that firms with higher social capital in the form of CSR intensity delivered superior stock returns than firms with lower social capital. This evidence suggests that certain firms build a bond of trust with their stakeholders through investments in social capital. Such investments pay off when the overall level of trust in corporations and markets suffers a negative shock. Cornett et al. (2016) found that during the GFC of 2008–09, US banks were rewarded for being socially responsible. Their stock performance was positively and significantly related to ESG scores confirming the flight to quality hypothesis.

The "good management hypothesis" propounded in the literature on SRI asserts that meeting the requirements of major stakeholders can lead to better financial performance due to continued loyalty to the firm (Waddock & Graves, 1997). It prioritises social performance, and accordingly, a firm that is perceived to have a good reputation will experience superior financial performance. The idea behind the hypothesis is that good management will invest in a wide range of CSR activities to satisfy the interests of a broad group of stakeholders as it recognises that this is a precondition for creating the necessary environment to enable the firm to generate strong financial performance. Thus, good management will choose to invest in CSR activities because it believes that these investments will subsequently translate into superior financial performance (Bird et al., 2006). For example, firms adopting green production practices may be less exposed to financial losses due to disastrous pollution events. Firms with high social concerns are less prone to incidents of employee unrest. This implies that SRI portfolios may provide downside protection to investors in times of crisis. Recent research evidence supports this view and provides evidence that the investment performance of companies with better ESG performance enjoys lower downside risk and is resilient to financial turbulence (Cox et al., 2004; Ding et al., 2020; Engle et al., 2020; Nofsinger & Varma, 2014).

A recent study by Mousa and Saleem (2022) examined the differences in the responses of ESG indices and conventional indices to the COVID-19 pandemic in the Arab region. They found that in the post-COVID period, the magnitude of volatility of the ESG stock index was significantly less compared to that of the conventional stock index. The ESG index recovered from the shock of the pandemic quickly. Gianfrante et al. (2021) found little evidence that firms with higher ESG ratings had better stock market performance during Q1 2020. However, they noted that stocks with higher ESG ratings in North America have shown some degree of resilience during the crises. They concluded that the ability of socially responsible firms to deliver superior risk-adjusted performance varies across geographies.

In the Indian context, Singh (2013) concluded that companies that comply with environmental, social and governance laws could save themselves during challenging times like the global financial crisis of 2008. Over the period 1996 to 2013, during the crisis and post-crisis period, socially responsible stocks portfolio generated

significantly higher returns than other portfolios in the Indian stock market. The compromise made with respect to diversification by investing in socially responsible stocks portfolios was well rewarded in the form of higher returns (Tripathi & Bhandari, 2015). An analysis of the existing literature on SRI in India presents an interesting research gap to study the investment performance of ESG stocks during crisis periods like the financial crisis caused by the outbreak of the COVID-19 pandemic. Over the last few years, a higher number of firms have come under the coverage of ESG research firms like Bloomberg, MSCI and Refinitiv due to increased social responsible activities and better disclosures. We thus, make use of the increased availability of firm-level ESG information in India and attempt to address the research gap by studying the impact of the financial crisis caused due to the outbreak of the COVID-19 pandemic on ESG stocks in comparison to other stocks in India.

3 Hypotheses

In line with the "good management hypothesis" and the findings of Broadstock et al. (2020), Ding et al. (2020), Engle et al. (2020) and Nofsinger and Varma (2014), we expect that ESG performance should positively contribute to return performance of stocks during crisis periods in India. Expenditure on socially responsible activities may prove beneficial for firms during uncertain business conditions. Hence, during the financial crisis created due to the global COVID-19 pandemic, we expect ESG performance to positively contribute to stock returns in India. We take advantage of the natural research setting created by the financial crisis caused due to the COVID-19 pandemic and hypothesise the following during key events of the COVID-19 pandemic in India.

Hypothesis 1: ESG performance positively contributes to stock returns during crisis periods.

We also check the importance of ESG scores during crisis periods versus normal periods using an empirical asset pricing model. During times of financial crisis, most stocks, including stocks that perform well on ESG factors, would experience a brief period of price correction. However, due to sustainable business models created by socially responsible companies during normal times, we expect ESG stocks to experience lesser price correction than the broad market. ESG activities would boost the return performance of stocks during the crisis period, while during the normal period, ESG performance may be detrimental to the return performance. During normal times, socially responsible firms invest in activities that boost ESG performance, such as reducing carbon and radiation emissions, the welfare of employees and customers and better corporate governance disclosures. Expenditure on socially responsible activities may leave lower returns for shareholders during normal times but may help firms to tide over uncertain business conditions during crisis periods. When a market-wide crisis event occurs, investors tend to lower their

earnings expectation, yet they could have better (worse) confidence in higher (lower) ESG profile firms. Accordingly, we hypothesise the following.

Hypothesis 2: The decline in return on ESG stocks is relatively less during crisis periods, while the increase in return on ESG stocks is also less during non-crisis/ normal periods.

Using a Difference-in-Differences (DID) approach, we study whether the decline in the returns of ESG stocks during the COVID-19 pandemic was less than that of other stocks which are not rated on ESG parameters by Bloomberg. During a market-wide crisis event like COVID-19, we expect a general decline in stock prices. However, we expect investors to show relatively higher investment commitment towards ESG stocks than other stocks, even during crisis periods. Thus, following the good management hypothesis, we expect the decline in the prices of ESG stocks to be less than other stocks during the financial crisis caused due to the outbreak of COVID-19. Accordingly, we hypothesise the following.

Hypothesis 3: The decline in the average daily returns of ESG stocks is significantly less than other stocks during the COVID-19 crisis.

The "flight to security hypothesis" propounded in literature states that during times of financial stress, investors prefer safer assets over riskier assets. This is motivated with the aim of downside protection of their portfolio. High ESG stocks are safer investment avenues during the crisis than low ESG stocks due to their sustainable and all-stakeholder pervasive business model (Gianfrante et al., 2021). Accordingly, investors in low ESG stocks would attempt to sell their investments during crisis periods, while those in high ESG stocks would stay invested even during crisis times. As a result, high ESG stocks would experience a more resilient trading activity than low ESG stocks. In the context of the trading activity of ESG stocks, we hypothesise the following.

Hypothesis 4 (a): Abnormal trading volumes in high ESG stocks are not different from zero during the crisis period. Abnormal trading volumes in low ESG stocks are greater than zero during the crisis period.

Hypothesis 4 (b): Trading activity in high ESG stocks during the crisis period is similar to that of all ESG stocks during the normal period. Trading activity in low ESG stocks during the crisis period is greater than that of all ESG stocks during the normal period.

We also explore the relationship between ESG scores and stock return volatility during normal and crisis periods. We hypothesise the following.

Hypothesis 5: ESG scores is negatively related to stock return volatility during crisis periods. During normal periods, ESG scores is not related to stock return volatility.

4 Research Design

4.1 Data

The primary source of data is the Prowess database from the Centre for Monitoring Indian Economy (CMIE). It has been widely used by researchers for conducting firm-level analysis of Indian companies (Dharmapala & Khanna, 2018; Manchiraju & Rajgopal, 2017; Mukherjee et al., 2018). We have used firm-level ESG scores and its pillars, viz., E scores, S scores and G scores as of February 2020 from Bloomberg's proprietary database. These ESG scores have been used in earlier studies (Halbritter & Dorfleitner, 2015; Hua Fan & Michalski, 2020; Yu et al., 2020). Bloomberg tracks 800+ company-level measures that cover all aspects of ESG, from emissions to shareholder rights. The ESG scores capture many quantitative and qualitative indicators that analysts and investors can use in evaluating how well the company is adapting to the changing world. The sample for our study consists of firms forming part of Bombay Stock Exchange's (BSE) flagship S&P BSE 500 index which have been rated on ESG parameters by Bloomberg. As of the year 2020, 335 firms out of the 500 firms of S&P BSE 500 are rated by Bloomberg on ESG parameters. We consider these 335 firms as the sample in our study. In the following paragraphs, we have described the data used for each hypothesis.

Hypothesis 1: ESG performance positively contributes to returns during crisis periods.

Daily closing prices of the sample stocks and the market index, viz., NIFTY 50 around the important events identified later and all control variables, viz., Leverage, Cash balance, Cash flow from operations, Return on Assets, Book to Market value ratio and Size are obtained from the Prowess database. Firm-level ESG scores and their pillars as of February 2020 are obtained from the Bloomberg database. Control variables are defined in Table 10 in the Appendix. We conduct an event study around the important events in India during the COVID-19 pandemic. From the timeline mentioned earlier, the following events mentioned in Table 3 were important in relation to their impact on the Indian stock markets and the progression of the pandemic in the country.

Hypothesis 2: The decline in return on ESG stocks is relatively less during crisis periods, while the increase in return on ESG stocks is also less during non-crisis/normal periods.

Table 3 Important events in India during the COVID-19 pandemic that were chosen for the event study

Sr. No	Date	Description of the event
1	11-Mar-2020	WHO declared COVID-19 as a pandemic
2	25-Mar-2020	Lockdown 1.0 begins—Nation-wide lockdown imposed till 14-Apr-2020
3	8-Jun-2020	Unlock 1.0 begins – Phased re-opening begins after 75 days of lockdown
4	16-Jan-2021	COVID-19 vaccine rolled out by the Indian government
5	22-Feb-2021	The Union health ministry reveals that two new strains of Covid-19 have been detected in India
6	12-Apr-2021	India officially surpassed Brazil for the second-most total cases in the world with more than 11.3 million cases, behind only the United States

We obtained price returns of the sample stocks and the market index, viz., NIFTY 50 during the COVID-19 pandemic and a normal period from the Prowess database. The crisis period is taken as 11-Mar-2020–09-Apr-2020 (one month around the date of the first nation-wide lockdown in India, i.e., 25-Mar-20), and the normal period is taken as the same period during the previous year, i.e., 11-Mar-2019–09-Apr-2019. Firm-level ESG scores and their pillars are obtained from the Bloomberg database.

Hypothesis 3: The decline in average daily returns of ESG stocks is significantly less than that of other stocks during the COVID-19 crisis.

For this hypothesis, we classified stocks forming part of S&P BSE 500 index into two categories – ESG stocks, i.e., stocks that are rated on ESG parameters by Bloomberg and other stocks. We obtained price returns of the ESG stocks, other stocks and the market index, viz., NIFTY 50 during the COVID-19 pandemic and a normal time period from the Prowess database. The crisis period and normal period are defined identically as for hypothesis 2. Firm-level ESG scores and their pillars are obtained from the Bloomberg database.

Hypothesis 4 (a): Abnormal trading volumes in high ESG stocks are not different from zero during the crisis period. Abnormal trading volumes in low ESG stocks are greater than zero during the crisis period.

Hypothesis 4 (b): Trading activity in high ESG stocks during the crisis period is similar to that of all ESG stocks during the normal period. Trading activity in low ESG stocks during the crisis period is greater than that of all ESG stocks during the normal period.

Data related to the number of shares traded, the value of shares traded, the total number of shares outstanding and the market capitalisation of sample stocks are obtained from the Prowess database. These data points are obtained for 120 days around the date of the first nation-wide lockdown in India, i.e., from 23-Jan-2020 to 22-May-2020. We calculate daily turnover % and daily shares traded % for each ESG stock for this period as under.

Daily Turnover % = Value of shares traded on NSE and BSE/Total market capitalisation

Daily shares traded % = Number of shares traded on NSE and BSE/Total number of shares outstanding

Hypothesis 5: ESG scores is negatively related to stock return volatility during crisis periods. During normal periods, ESG scores is not related to stock return volatility.

We obtained price returns of sample stocks and all the control variables, viz., Leverage, Cash balance, Cash flow from operations, Return on Assets, Book to Market value ratio and Size from the Prowess database. Firm-level ESG scores and their pillars are obtained from the Bloomberg database. Volatility is defined as the standard deviation of daily stock returns. The volatility of stock returns is calculated during the normal period, i.e., during 30 days before the first lockdown date in India and during the crisis period, i.e., during 30 days after the first lockdown date in India. Control variables are defined in Table 10 in the Appendix.

4.2 Methodology

Hypothesis 1: ESG performance positively contributes to returns during crisis periods.

To test this hypothesis, we choose six important events that significantly impacted the Indian stock markets and were important in the progression of the first and second waves of the COVID-19 pandemic in the country. These events have been listed in Table 3 above. We aim to empirically examine whether ESG performance was systematically priced in stock returns during these important events of the COVID-19 crisis in India. We expect a positive impact of ESG scores on stock returns during the crisis period. For testing this hypothesis, we have calculated cumulative raw returns over 3-, 5- and 11-day windows (r[1-,1], r[−2,2] and r[−5,5]) around the important events for the sample stocks. We have also calculated cumulative abnormal returns (car[1-,1], car[−2,2] and car[−5,5]) and cumulative market-adjusted returns (mar[1-,1], mar[−2,2] and mar[−5,5]) over 3-, 5- and 11-day windows for every event. Cumulative abnormal returns are estimated by using the Capital Asset Pricing Model (CAPM). Cumulative market-adjusted returns are estimated by reducing the cumulative market returns from the cumulative raw returns during the window period. We create three sets of OLS multiple regression models with the cumulative raw returns, cumulative abnormal returns and cumulative market-adjusted returns as the dependent variables. We use ESG scores or a combination of E scores, S scores and G scores as independent variables. We also control for Leverage, Cash balance, Cash flow from operations, Return on Assets, Book to Market value ratio and Size. Accordingly, we run 18 OLS multiple regression models for every important event mentioned in Table 3.

Hypothesis 2: The decline in return on ESG stocks is relatively less during crisis periods, while the increase in return on ESG stocks is also less during non-crisis/ normal periods.

We deploy an empirical asset pricing model to examine the role of information in the cross-section of ESG scores during COVID-19 versus a normal period. We extend the CAPM propounded by Sharpe (1964) to include ESG score and a dummy variable for the COVID-19 pandemic period. We estimate the following regression equations for the cross-sectional data.

$$\begin{aligned}\text{Stock\_Return}_{it} = {} & \alpha + \beta_1\ \text{Market\_Return}_t + \beta_2\ \text{Market\_Return}_t * \text{COVID} \\ & + \beta_3\ \text{COVID} + \beta_4\ \text{ESG\_score}_i + \beta_5\ \text{ESG\_score}_i * \text{COVID}\end{aligned} \tag{1}$$

$$\begin{aligned}\text{Stock\_Return}_{it} = {} & \alpha + \beta_1\ \text{Market\_Return}_t + \beta_2\ \text{Market\_Return}_t * \text{COVID} \\ & + \beta_3\ \text{COVID} + \beta_4\ E\text{\_score}_i + \beta_5\ E\text{\_score}_i * \text{COVID}\end{aligned} \tag{2}$$

$$\begin{aligned}\text{Stock\_Return}_{it} = {} & \alpha + \beta_1\ \text{Market\_Return}_t + \beta_2\ \text{Market\_Return}_t * \text{COVID} \\ & + \beta_3\ \text{COVID} + \beta_4\ S\text{\_score}_i + \beta_5\ S\text{\_score}_i * \text{COVID}\end{aligned} \tag{3}$$

$$\begin{aligned}\text{Stock\_Return}_{it} = {} & \alpha + \beta_1\ \text{Market\_Return}_t + \beta_2\ \text{Market\_Return}_t * \text{COVID} \\ & + \beta_3\ \text{COVID} + \beta_4\ G\text{\_score}_i + \beta_5\ G\text{\_score}_i * \text{COVID}\end{aligned} \tag{4}$$

$$\begin{aligned}\text{Stock\_Return}_{it} = {} & \alpha + \beta_1\ \text{Market\_Return}_t + \beta_2\ \text{Market\_Return}_t * \text{COVID} \\ & + \beta_3\ \text{COVID} + \beta_4\ E\text{\_score}_i + \beta_5\ E\text{\_score}_i * \text{COVID} + \beta_6\ S\text{\_score}_i \\ & + \beta_6\ S\text{\_score}_i * \text{COVID} + \beta_7\ G\text{\_score}_i + \beta_8\ G\text{\_score}_i * \text{COVID}\end{aligned} \tag{5}$$

where Stock_Return_{it} denotes the daily price returns of the ith stock at day t, Market_Return_t denotes the market return at time t and ESG_i denotes ESG score of the ith firm. COVID is a dummy variable that equals to 1 for observations during the COVID-19 period and 0 for those during the previous year.

Hypothesis 3: The decline in the average daily returns of ESG stocks is significantly less than other stocks during the COVID-19 crisis.

We extend the empirical asset pricing model by using a DID model to estimate the decline in the average daily returns of ESG stocks compared to other stocks during the pandemic. DID is an econometric technique that attempts to replicate an experimental research design using observational data by studying the differential effect of a treatment on a 'treatment group' versus a 'control group' in a natural experiment. DID approach has wide application, especially when the data arise from a natural experiment or a quasi-experiment. A natural experiment occurs when some exogenous event changes the environment in which individuals or firms operate. DID approach compares the before-and-after changes in outcomes for treatment and control groups and estimates the overall impact of the intervention. We follow Lins

et al. (2013) and estimate the following baseline difference-in-differences specification for the data.

$$\begin{aligned} \text{Stock\_Return}_{it} = {} & \beta_0 + \beta_1 \text{ Market\_Return}_t + \beta_2 \text{ COVID} \\ & + \beta_3 \text{ ESG}_i * \text{COVID} + \beta_4' X_{it} + \lambda_i + \lambda_{ct} \end{aligned} \tag{6}$$

where COVID is a dummy variable that equals 1 during the COVID-19 period and 0 for normal period. ESG is a dummy variable that equals 1 for ESG stocks (treatment group) and 0 for other stocks (control group). X_{it} refers to a set of firm-specific control variables (which include cash balance and cash flow from operations as a percentage of total assets, return on total assets, debt to equity ratio, log of firm size and book to market ratio). λ_i are firm fixed effects, and λ_{ct} are industry-year fixed effects. If the treatment is systematically related to differences in firm characteristics, the differential impact of the treatment may at least partly result from the same. Hence, in our regression, we control for firm-specific variables to separate the effects of firm's financial characteristics from those of the treatment during a crisis. The COVID-19 pandemic is considered as an exogenous shock in our model, thereby avoiding a potential endogeneity problem.

β_2 captures the average change in the daily returns of all stocks during the COVID-19 period. The co-efficient of interest is β_3 which captures the average change in daily stock returns of ESG stocks compared to other stocks during the COVID-19 period. We expect β_3 to be positive and significant.

Hypothesis 4 (a): Abnormal trading volumes in high ESG stocks are not different from zero during the crisis period. Abnormal trading volumes in low ESG stocks are greater than zero during the crisis period.

Hypothesis 4 (b): Trading activity in high ESG stocks during the crisis period is similar to that of all ESG stocks during the normal period. Trading activity in low ESG stocks during the crisis period is greater than that of all ESG stocks during the normal period.

We calculate abnormal daily trading volumes by following a mean-adjusted model as explained by Rao and Sreejith (2013). Our estimation period is from 23-Jan-20 to 24-Mar-20, i.e., 60 days before the date of the first nation-wide lockdown in India. The crisis period is taken from 25-Mar-20 to 22-May-20, i.e., 60 days after the date of the first nation-wide lockdown in India. The mean-adjusted model assumes that the stock volume traded during the crisis period is similar to the average trading volume during the estimation period. Any deviation from the average trading volume during the estimation period is identified as abnormal trading volume during the crisis period. We classify firms from the first and fourth ESG quartiles as high ESG and low ESG firms, respectively. We use T-tests to test the hypotheses related to the trading activities of ESG stocks.

Hypothesis 5: ESG scores are negatively related to stock return volatility during crisis periods. During normal periods, ESG scores are not related to stock return volatility.

We employ the following regression models to establish a relationship between ESG scores and stock return volatility during normal and crisis periods.

$$\text{Volatility}_{\text{it}} = \alpha + \beta_1 \text{ ESG score}_i + \beta_2 \text{ COVID} + \beta_3 \text{ ESG score}_i * \text{COVID} + \Sigma_k \beta_k \text{ Control variables}_{\text{ik}} \quad (7)$$

$$\text{Volatility}_{\text{it}} = \alpha + \beta_1 E \text{ score}_i + \beta_2 \text{ COVID} + \beta_3 E \text{ score}_i * \text{COVID} + \Sigma_k \beta_k \text{ Control variables}_{\text{ik}} \quad (8)$$

$$\text{Volatility}_{\text{it}} = \alpha + \beta_1 S \text{ score}_i + \beta_2 \text{ COVID} + \beta_3 S \text{ score}_i * \text{COVID} + \Sigma_k \beta_k \text{ Control variables}_{\text{ik}} \quad (9)$$

$$\text{Volatility}_{\text{it}} = \alpha + \beta_1 G \text{ score}_i + \beta_2 \text{ COVID} + \beta_3 G \text{ score}_i * \text{COVID} + \Sigma_k \beta_k \text{ Control variables}_{\text{ik}} \quad (10)$$

$$\text{Volatility}_{\text{it}} = \alpha + \beta_1 E \text{ score}_i + \beta_2 \text{ COVID} + \beta_3 E \text{ score}_i * \text{COVID} + \beta_4 S \text{ score}_i + \beta_5 S \text{ score}_i * \text{COVID} + \beta_6 G \text{ score}_i + \beta_7 G \text{ score}_i * \text{COVID} + \Sigma_k \beta_k \text{ Control variables}_{\text{ik}} \quad (11)$$

where $\text{Volatility}_{\text{it}}$ denotes stock return volatility of the ith stock at time t and ESG_{i} denotes ESG score of the ith firm. COVID is a dummy variable that equals to 1 for observations during the crisis period and 0 during normal period.

5 Results and Discussion

5.1 Relationship Between ESG scores and Returns During Crisis Period

Our study provides empirical evidence that ESG performance is systematically priced during crisis times. Table 4 reports the main results of the event study. Estimation is conducted for cumulative raw returns i.e. r[−1,1], r[−2,2] and r[−5,5], cumulative abnormal returns i.e. car[−1,1], car[−2,2] and car[−5,5] and cumulative market-adjusted returns i.e. mar[−1,1], mar[−2,2] and mar[−5,5] during the 3-, 5- and 11-trading day windows around the important events mentioned in Table 3. We regress these returns on the ESG scores and their pillars, after controlling for leverage, cash balance, cash flow from operations, return on assets, book-to-market ratio and firm size. The results of statistically significant regression models are reported in Table 4 in four panels (A to F), one for every significant event date. We have tested for presence of multicollinearity, heteroskedasticity, and autocorrelation in all the models of our study. None of the models has a Variance Inflation Factor (VIF) of more than 10. We have also implemented Newey-West correction to all our models and report only heteroscedasticity and autocorrelation consistent estimates of standard errors (Newey & West, 1987).

Table 4 Impact of ESG score on stock returns during key events of COVID-19 crisis

PANEL A 11-Mar-20: WHO declared COVID-19 as pandemic

Variables	Dependent variables								
	Cumulative raw returns			Cumulative abnormal returns			Cumulative market-adjusted returns		
	r[−1,1]	**r[−2,2]**	**r[−5,5]**	**car[−1,1]**	**car[−2,2]**	**car[−5,5]**	**mar[−1,1]**	**mar[−2,2]**	**mar[−5,5]**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Constant	−8.418**	−25.187***	−42.632***	9.270**	−4.837	−45.315***	0.182	−15.303**	−13.762
ESG score	0.023	0.058	0.219*	0.044	0.082	0.225*	0.023	0.058	0.219*
Leverage	−0.026	0.023	0.004	−0.013	0.037	0.005	−0.026	0.023	0.004
Cash	0.025	−0.017	0.059	−0.01	−0.057	0.058	0.025	−0.017	0.059
CFO	−0.149**	−0.243**	−0.415**	−0.115*	−0.204*	−0.409**	−0.149**	−0.243**	−0.415**
ROA	0.091	0.118	0.455**	−0.032	−0.024	0.444**	0.091	0.118	0.455**
LN(BM)	−1.4***	−1.38*	−2.165*	−0.214	−0.014	−2.042*	−1.4***	−1.38*	−2.165*
LN(Size)	−0.248	0.859	0.429	−0.840**	0.177	0.648	−0.248	0.859	0.429
No. of observations	335	335	335	335	335	335	335	335	335
R − squared	0.09	0.09	0.11	0.06	0.05	0.11	0.09	0.09	0.11
	r[−1,1]	**r[−2,2]**	**r[−5,5]**	**car[−1,1]**	**car[−2,2]**	**car[−5,5]**	**mar[−1,1]**	**mar[−2,2]**	**mar[−5,5]**
	(10)	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**	**(18)**
Constant	−10.057**	−24.729***	−34.395***	7.659*	−4.346	−37.569***	−1.457	−14.845*	−5.525
E score	−0.015	−0.002	0.177	−0.005	0.009	0.177	−0.015	−0.002	0.177
S score	0.022	0.07	0.092	0.029	0.078	0.091	0.022	0.07	0.092
G score	0.037	−0.029	−0.17	0.039	−0.026	−0.155	0.037	−0.029	−0.17
Leverage	−0.026	0.024	0.003	−0.013	0.038	0.003	−0.026	0.024	0.003
Cash	0.024	−0.021	0.052	−0.011	−0.061	0.051	0.024	−0.021	0.052
CFO	−0.149**	−0.237**	−0.405**	−0.115*	−0.198*	−0.399**	−0.149**	−0.237**	−0.405**
ROA	0.093	0.116	0.438*	−0.03	−0.026	0.428*	0.093	0.116	0.438*
LN(BM)	−1.388***	−1.405*	−2.256*	−0.2	−0.037	−2.126*	−1.388***	−1.405*	−2.256*

Table 4 (continued)

PANEL A 11-Mar-20: WHO declared COVID-19 as pandemic									
Variables	Dependent variables								
	Cumulative raw returns			Cumulative abnormal returns			Cumulative market-adjusted returns		
LN(Size)	−0.248	0.879	0.448	−0.836**	0.202	0.664	−0.248	0.879	0.448
No. of observations	335	335	335	335	335	335	335	335	335
R − squared	0.09	0.09	0.12	0.07	0.06	0.12	0.09	0.09	0.12
PANEL B: 25-Mar-20: Lockdown 1.0—Nation − wide lockdown imposed till April 14, 2020									
Variables	Dependent variables								
	Cumulative raw returns			Cumulative abnormal returns			Cumulative market − adjusted returns		
	r[−1,1]	**r[−2,2]**	**r[−5,5]**	**car[−1,1]**	**car[−2,2]**	**car[−5,5]**	**mar[−1,1]**	**mar[−2,2]**	**mar[−5,5]**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	*(8)*	**(9)**
Constant	−3.531	−9.232	−21.700**	−24.476***	−35.673***	−16.268*	−13.762***	−22.157***	−19.129**
ESG score	−0.106*	−0.143*	−0.112	−0.131*	−0.175*	−0.106	−0.106*	−0.143*	−0.112
Leverage	−0.034	−0.009	0.021	−0.049	−0.027	0.025	−0.034	−0.009	0.021
Cash	−0.015	0.043	0.084	0.026	0.095	0.073	−0.015	0.043	0.084
CFO	0.007	−0.04	0.275*	−0.032	−0.09	0.286*	0.007	−0.04	0.275*
ROA	−0.044	0.044	0.149	0.101	0.227	0.11	−0.044	0.044	0.149
LN(BM)	−0.951*	−1.196*	−0.239	−2.349***	−2.959***	0.135	−0.951*	−1.196*	−0.239
LN(Size)	1.075**	1.567***	1.122	1.773***	2.448***	0.936	1.075**	1.567***	1.122
No. of observations	335	335	335	335	335	335	335	335	335
R − squared	0.09	0.09	0.08	0.26	0.27	0.07	0.09	0.10	0.08
	r[−1,1]	**r[−2,2]**	**r[−5,5]**	**car[−1,1]**	**car[−2,2]**	**car[−5,5]**	**mar[−1,1]**	**mar[−2,2]**	**mar[−5,5]**
	(10)	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**	**(18)**

Table 4 (continued)

PANEL B: 25-Mar-20: Lockdown 1.0—Nation – wide lockdown imposed till April 14, 2020

Variables	Dependent variables								
	Cumulative raw returns			Cumulative abnormal returns			Cumulative market – adjusted returns		
Constant	−8.044	−9.732	−21.018**	−29.023***	−36.216***	−15.576	−18.275***	−22.657***	−18.446*
E score	−0.093*	−0.136*	−0.109	−0.105*	−0.151*	−0.106	−0.093*	−0.136*	−0.109
S score	−0.041	0.042	0.059	−0.049	0.032	0.061	−0.041	0.042	0.059
G score	0.094	−0.064	−0.085	0.091	−0.068	−0.084	0.094	−0.064	−0.085
Leverage	−0.033	−0.005	0.023	−0.048	−0.024	0.027	−0.033	−0.005	0.023
Cash	−0.011	0.04	0.079	0.03	0.092	0.068	−0.011	0.04	0.079
CFO	0.002	−0.03	0.286*	−0.038	−0.081	0.297*	0.002	−0.03	0.286*
ROA	−0.035	0.046	0.149	0.111	0.23	0.11	−0.035	0.046	0.149
LN(BM)	−0.905*	−1.242*	−0.312	−2.306***	−3.009***	0.062	−0.905*	−1.242*	−0.312
LN(Size)	1.061**	1.588***	1.117	1.754***	2.463***	0.932	1.061**	1.588***	1.117
No. of observations	335	335	335	335	335	335	335	335	335
R-squared	0.10	0.11	0.09	0.27	0.28	0.07	0.10	0.11	0.09

PANEL C: 08-Jun-20: Unlock 1.0 begins

Variables	Dependent variables								
	Cumulative raw returns			Cumulative abnormal returns			Cumulative market – adjusted returns		
	r[−1,1]	r[−2,2]	r[−5,5]	car[−1,1]	car[−2,2]	car[−5,5]	mar[−1,1]	mar[−2,2]	mar[−5,5]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	5.125*	15.935***	26.732***	6.916***	14.362***	27.058***	6.071**	15.070***	26.859***
ESG score	0.048	0.015	−0.006	0.047	0.017	−0.006	0.048	0.015	−0.006
Leverage	−0.030*	−0.039	−0.075*	−0.031*	−0.039	−0.075*	−0.030*	−0.039	−0.075*
Cash	0.004	0.038	0.011	0.001	0.041	0.01	0.004	0.038	0.011

Table 4 (continued)

PANEL C: 08-Jun-20: Unlock 1.0 begins

Variables	Dependent variables								
	Cumulative raw returns			Cumulative abnormal returns			Cumulative market – adjusted returns		
CFO	0.000	−0.023	0.031	0.004	−0.027	0.032	0.000	−0.023	0.031
ROA	−0.039	−0.171*	−0.298**	−0.052	−0.160*	−0.301**	−0.039	−0.171*	−0.298**
LN(BM)	0.255	1.255***	2.454***	0.371	1.158**	2.481***	0.255	1.255***	2.454***
LN(Size)	−0.469*	−0.844**	−1.423**	−0.510*	−0.809**	−1.432**	−0.469*	−0.844**	−1.423**
No. of observations	335	335	335	335	335	335	335	335	335
R – squared	0.05	0.18	0.25	0.07	0.17	0.25	0.05	0.18	0.25
	r[−1,1]	**r[−2,2]**	**r[−5,5]**	**car[−1,1]**	**car[−2,2]**	**car[−5,5]**	**mar[−1,1]**	**mar[−2,2]**	**mar[−5,5]**
	(10)	**(11)**	**(12)**	**(13)**	**(14)**	**(15)**	**(16)**	**(17)**	**(18)**
Constant	4.775	18.559***	29.725***	6.464*	17.072***	30.027***	5.721*	17.695***	29.852***
E score	0.052	0.061	0.01	0.05	0.062	0.01	0.052	0.061	0.01
S score	−0.03	−0.035	0.019	−0.031	−0.034	0.019	−0.03	−0.035	0.019
G score	0.043	−0.039	−0.09	0.046	−0.041	−0.089	0.043	−0.039	−0.09
Leverage	−0.032*	−0.04	−0.074*	−0.032*	−0.04	−0.074*	−0.032*	−0.04	−0.074*
Cash	0.007	0.039	0.009	0.003	0.042	0.008	0.007	0.039	0.009
CFO	−0.006	−0.025	0.037	−0.001	−0.028	0.038	−0.006	−0.025	0.037
ROA	−0.039	−0.176*	−0.303**	−0.052	−0.165*	−0.306**	−0.039	−0.176*	−0.303**
LN(BM)	0.284	1.246***	2.419***	0.401	1.148**	2.447***	0.284	1.246***	2.419***
LN(Size)	−0.483*	−0.851**	−1.391**	−0.525**	−0.816**	−1.401**	−0.483*	−0.851**	−1.391**
No. of observations	335	335	335	335	335	335	335	335	335
R – squared	0.06	0.19	0.25	0.08	0.18	0.25	0.06	0.19	0.25

Table 4 (continued)

PANEL D: 16-Jan-21: COVID vaccine launched

Variables	Dependent variables					
	Cumulative raw returns		Cumulative abnormal returns		Cumulative market − adjusted returns	
	r[−1,1]	r[−2,2]	car[−1,1]	car[−2,2]	mar[−1,1]	mar[−2,2]
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	−1.907	−1.748	−3.104**	−2.381	−2.511*	−2.084
ESG score	0.000	−0.003	0.000	−0.003	0.000	−0.003
Leverage	−0.003	0.009	−0.003	0.009	−0.003	0.009
Cash	−0.009	−0.025	−0.007	−0.024	−0.009	−0.025
CFO	0.015	0.027	0.013	0.026	0.015	0.027
ROA	−0.015	−0.108***	−0.009	−0.106**	−0.015	−0.108***
LN(BM)	−0.471***	−0.175	−0.543***	−0.211	−0.471***	−0.175
LN(Size)	−0.031	0.071	0.006	0.089	−0.031	0.071
No. of observations	331	331	331	331	331	331
R − squared	0.07	0.06	0.10	0.06	0.07	0.06
	r[−1,1]	r[−2,2]	car[−1,1]	car[−2,2]	mar[−1,1]	mar[−2,2]
	(7)	(8)	(9)	(10)	(11)	(12)
Constant	−1.674	−4.158*	−2.805*	−4.758**	−2.278	−4.494**
E score	−0.001	−0.018	0.000	−0.017	−0.001	−0.018
S score	0.004	−0.013	0.004	−0.013	0.004	−0.013
G score	−0.008	0.063*	−0.01	0.062*	−0.008	0.063*
Leverage	−0.003	0.009	−0.003	0.009	−0.003	0.009
Cash	−0.01	−0.024	−0.007	−0.022	−0.01	−0.024
CFO	0.016	0.024	0.014	0.023	0.016	0.024
ROA	−0.015	−0.105**	−0.01	−0.102**	−0.015	−0.105**

Table 4 (continued)

PANEL D: 16-Jan-21: COVID vaccine launched

Variables	Dependent variables					
	Cumulative raw returns		Cumulative abnormal returns		Cumulative market − adjusted returns	
LN(BM)	−0.471***	−0.152	−0.544***	−0.188	−0.471***	−0.152
LN(Size)	−0.027	0.071	0.01	0.089	−0.027	0.071
No. of observations	331	331	331	331	331	331
R − squared	0.07	0.08	0.10	0.08	0.07	0.08

PANEL E: 22-Feb-21: Two new strains of COVID-19 detected in India

Variables	Dependent variables								
	Cumulative raw returns			Cumulative abnormal returns			Cumulative market − adjusted returns		
	r[−1,1]	r[−2,2]	r[−5,5]	car[−1,1]	car[−2,2]	car[−5,5]	mar[−1,1]	mar[−2,2]	mar[−5,5]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	4.223	8.345***	23.929***	7.850***	10.168***	31.208***	6.069**	9.255***	27.608***
ESG score	0.034	0.063*	0.034	0.033	0.062*	0.031	0.034	0.063*	0.034
Leverage	0.034*	0.005	−0.005	0.033*	0.004	−0.007	0.034*	0.005	−0.005
Cash	0.031	0.04	0.095	0.023	0.036	0.079	0.031	0.04	0.095
CFO	0.018	0.046	0.001	0.025	0.049	0.015	0.018	0.046	0.001
ROA	−0.049	−0.118*	−0.245	−0.068	−0.127	−0.283	−0.049	−0.118	−0.245
LN(BM)	−0.211	−0.596	1.202	0.02	−0.478	1.669*	−0.211	−0.596	1.202
LN(Size)	−0.556**	−0.968***	−1.755***	−0.663**	−1.023***	−1.971***	−0.556**	−0.968***	−1.755***
No. of observations	332	332	332	332	332	332	332	332	332
R − squared	0.06	0.08	0.14	0.09	0.09	0.19	0.06	0.08	0.14
	r[−1,1]	r[−2,2]	r[−5,5]	car[−1,1]	car[−2,2]	car[−5,5]	mar[−1,1]	mar[−2,2]	mar[−5,5]
	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)

Table 4 (continued)

PANEL E: 22-Feb-21: Two new strains of COVID-19 detected in India

Variables	Dependent variables								
	Cumulative raw returns			Cumulative abnormal returns			Cumulative market − adjusted returns		
Constant	0.818	3.958	25.213***	4.2	5.656*	31.998***	2.663	4.868	28.892***
E score	−0.012	−0.018	−0.108	−0.015	−0.02	−0.115	−0.012	−0.018	−0.108
S score	0.003	0.027	0.207**	0.004	0.027	0.208**	0.003	0.027	0.207**
G score	0.094**	0.113**	−0.137	0.099**	0.116**	−0.127	0.094**	0.113**	−0.137
Leverage	0.033*	0.004	0	0.032*	0.004	−0.002	0.033*	0.004	0
Cash	0.032	0.04	0.081	0.024	0.036	0.065	0.032	0.04	0.081
CFO	0.014	0.042	0.026	0.02	0.046	0.039	0.014	0.042	0.026
ROA	−0.043	−0.11	−0.245	−0.061	−0.119	−0.282	−0.043	−0.11	−0.245
LN(BM)	−0.182	−0.551	1.208	0.052	−0.432	1.680**	−0.182	−0.551	1.208
LN(Size)	−0.567**	−0.966***	−1.668**	−0.673**	−1.020***	−1.882***	−0.567**	−0.966***	−1.668**
No. of observations	332	332	332	332	332	332	332	332	332
R − squared	0.08	0.09	0.17	0.11	0.1	0.21	0.08	0.09	0.17

PANEL F: 16-Apr-21: India records > 200,000 new daily cases for the first time, more than double the peak of the first wave

Variables	Dependent variables							
	Cumulative raw returns			Cumulative abnormal returns		Cumulative market − adjusted returns		
	r[−1,1]	r[−2,2]	r[−5,5]	car[−1,1]	car[−2,2]	mar[−1,1]	mar[−2,2]	mar[−5,5]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	1.724	3.242	0.357	4.149**	5.543*	3.258*	4.690*	3.006
ESG score	0.055*	0.048	−0.03	0.056*	0.048	0.055*	0.048	−0.03
Leverage	0.001	0.023	0.019	0	0.022	0.001	0.023	0.019
Cash	0.003	−0.031	−0.114**	−0.004	−0.038	0.003	−0.031	−0.114**

Table 4 (continued)

PANEL F: 16-Apr-21: India records > 200,000 new daily cases for the first time, more than double the peak of the first wave

Variables	Dependent variables							
	Cumulative raw returns			Cumulative abnormal returns		Cumulative market − adjusted returns		
CFO	0.006	0.018	−0.044	0.011	0.023	0.006	0.018	−0.044
ROA	0.091*	0.088	0.160*	0.071	0.068	0.091*	0.088	0.160*
LN(BM)	−0.685***	−1.003***	−0.879*	−0.460**	−0.787**	−0.685***	−1.003***	−0.879*
LN(Size)	−0.479**	−0.608**	−0.255	−0.516***	−0.644**	−0.479**	−0.608**	−0.255
No. of observations	332	332	332	332	332	332	332	332
R − squared	0.1	0.08	0.05	0.07	0.06	0.1	0.08	0.05
	r[−1,1]	r[−2,2]	r[−5,5]	car[−1,1]	car[−2,2]	mar[−1,1]	mar[−2,2]	mar[−5,5]
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Constant	0.698	−0.709	−4.551	2.97	1.445	2.232	0.738	−1.903
E score	0.047*	0	−0.066	0.046*	0	0.047*	0	−0.066
S score	−0.026	−0.008	−0.003	−0.027	−0.009	−0.026	−0.008	−0.003
G score	0.060*	0.119***	0.113*	0.064*	0.122***	0.060*	0.119***	0.113*
Leverage	−0.001	0.022	0.019	−0.002	0.021	−0.001	0.022	0.019
Cash	0.005	−0.029	−0.113***	−0.002	−0.035	0.005	−0.029	−0.113***
CFO	0	0.011	−0.048	0.005	0.016	0	0.011	−0.048
ROA	0.092*	0.095	0.170*	0.072	0.075	0.092*	0.095	0.170*
LN(BM)	−0.673***	−0.968***	−0.846*	−0.446**	−0.751**	−0.673***	−0.968***	−0.846*
LN(Size)	−0.495***	−0.625**	−0.274	−0.531***	−0.660**	−0.495***	−0.625**	−0.274
No. of observations	332	332	332	332	332	332	332	332
R − squared	0.12	0.1	0.06	0.08	0.08	0.12	0.1	0.06

The above table reports the relationship between ESG scores and stock returns during the key events of the COVID − 19 pandemic in India for firms forming part of the BSE 500 index which have been rated on ESG parameters by Bloomberg

***,**,* and. denote significance at 0.1%, 1%, 5% and 10% level respectively

The first significant event in the timeline of the COVID-19 crisis in India was when the World Health Organization (WHO) declared the virus outbreak as a global pandemic on 11-Mar-2020. Equity markets around the globe reacted sharply to this negative news. NIFTY 50, India's benchmark equity market index, saw a sharp correction of ~30% during the ten days around this event. Panel A of Table 4 shows the estimated regression results for the returns around the first significant event, i.e., 11-Mar-2020. Among the variables of interest, the ESG score is positively related to cumulative raw returns, cumulative abnormal returns and cumulative market-adjusted returns during the 11-day window period (columns 3, 6 and 9). This indicates that during an adverse event like the outbreak of COVID-19 globally, firms with higher ESG ratings experienced smaller stock price declines. We have also regressed returns on the individual pillars of ESG score, viz., E score, S score and G score. The co-efficients of these individual variables are not statistically significant. Our results confirm the "good management hypothesis" as explained by Waddock and Graves (1997). Firms that pay attention to the welfare of all stakeholders and thus have better environmental, social and governance performance can protect investors from downside risk in times of financial crisis. Among the control variables, the co-efficient of cash flow from operations is consistently negative across all models. This is contradictory to the usual positive influence of cash flow from operations on investment performance. The co-efficient of LN(BM) is negative for most of the models, suggesting that firms with higher book-to-market ratios experience smaller price declines. Return on Assets (ROA) is positively related to returns in the 11-day window, indicating the obvious positive association of ROA with stock returns.

The Indian government announced a day-long "Janta curfew" on March 22, 2020 whereby people were urged to not step out of their houses for a day and avoid any kind of social contact. In hindsight, this was the first day-long lockdown announced by the government to contain the transmission of the coronavirus. Hence, the first nation-wide lockdown announced by the government on 25-Mar-20 could have been anticipated by investors and the general public. This nation-wide lockdown lasted till 14-Apr-2020. Given the gravity of the global pandemic and the then rising number of COVID-19 cases and deaths, this was a step in the right direction. Panel B of Table 4 shows the estimated regression results for the returns around the second significant event, i.e., 25-Mar-2020. The co-efficients of the ESG score variable is consistently negative for returns in the 2- and 5-day return windows (columns 1, 2, 4, 5, 7 and 8). The co-efficients for E score are consistently negative for returns in the 2- and 5-day return windows (columns 10, 11, 13, 14, 16 and 17). This result validates the insurance function of ESG stocks as propounded in the literature (Engle et al., 2020). High ESG stocks experience lesser correction than the broad markets during crisis events. However, for such downside protection during crisis times, investors in high ESG stocks pay an insurance premium in the form of lower returns in normal times (Ding et al., 2020; Engle et al., 2020). Among the control variables, the co-efficient of LN(BM) variable is negative for models with 2- and 5-day return windows, suggesting that firms with higher book-to-market ratios experience smaller price declines. The co-efficient of Size variable is positive for models with 2- and

5-day return windows, suggesting that firms with higher market capitalisation experienced higher returns during adverse events.

The third significant event on 08-Jun-20 marked the beginning of the unlock phase in India. The Indian government issued detailed guidelines for phased reopening of activities in the country after 75 days of lockdown. The equity markets, however, did not react much to this event, with NIFTY 50 closing flat during the 3-, 5- and 11- day windows around the event date. Panel C of Table 4 shows the estimated regression results for the returns around the third significant event, i.e., 08-Jun-2020. The co-efficients of the ESG score and its pillars are insignificant. This finding fails to validate the insurance function of ESG stocks. The co-efficients of Size and ROA variables are negative and significant, which surprisingly indicates that during a positive event, stocks of companies with higher market capitalisation and superior profitability saw a price correction. Higher book to price ratio positively contributed to returns during the same period.

The most awaited positive event occurred on 16-Jan-21 when the Indian government rolled out the vaccination drive for COVID-19. The results presented in Panel D of Table 4 show that the G score was positively related to the 5-day window returns. The co-efficients of the ESG score were statistically not significant. However, the G score positively contributed to returns (columns 8, 10 and 12). This result is again contradictory to the insurance function of ESG stocks. Among the control variables, the co-efficients of ROA and LN(BM) were negative, indicating that higher profitability and lower market valuation adversely impacted returns during this event.

Like other countries, India experienced a massive surge in the number of cases and deaths during the second wave of the pandemic. Two new strains of the COVID-19 virus were detected in India on 22-Feb-21. The SARS-CoV-2 strain from South Africa and the Brazilian strain were reported to be more contagious. In the following days, India saw a steep increase in daily cases count, which derailed the country's plans to return to normalcy. The Indian equity markets reacted negatively to this event and NIFTY 50 corrected by ~4% during the 10 days around this event. Panel E of Table 4 shows the estimated regression results for the returns around the fifth significant event, i.e., 22-Feb-2021. Amongst the variables of interest, ESG scores, S scores and G scores positively contributed to the cumulative stock returns during this negative event. This result again provides strong support to the good management hypothesis. Stocks of companies with higher market capitalisation witnessed a price correction as indicated by the negative and significant coefficient of Size variable.

India logged in more than 2 lakh new cases on 16-Apr-21, which was more than twice the maximum number of daily cases during the first wave of the pandemic in the country. Around this time, many hospitals reported a shortage of beds and medical oxygen. The equity market negatively reacted to this event. Panel F of Table 4 shows the estimated regression results for this important event during the second wave of the pandemic in India. In line with the good management hypothesis, we find a positive relationship between ESG scores, E scores, G scores and cumulative stock returns. The co-efficient of ROA is positive while those of Cash, LN(BM) and Size variables are negative. A higher cash balance may lead to lower returns in the

short term due to less than optimum utilisation of resources. Companies with lower market valuation and market size also witnessed a price correction during the same period.

The results of our event study provide evidence that is consistent with the good management hypothesis. Investors benefit from investing in high ESG stocks during crisis times. Our results provide evidence of protection against downside risk in the case of high ESG stocks. However, our results are not in complete agreement with the insurance function of high ESG stocks. As a robustness test, we have tested for change in the average beta values of high ESG stocks and low ESG stocks during the pandemic period. First, we test for statistical significance of beta values of individual stocks during the normal period (60 days before the announcement of the first nation-wide lockdown in India, i.e., 25-Mar-20) and the COVID-19 pandemic period (60 days after the announcement of the first nation-wide lockdown in India, i.e., 25-Mar-20). Out of 335 total firms which Bloomberg analysed for ESG ratings, 322 have statistically significant betas during the normal and pandemic periods. Second, we classify firms from the first and fourth ESG quartiles as high ESG and low ESG firms, respectively. T-tests are used to compare statistical differences between the beta values of all ESG rated firms during the normal period and that of high/low ESG firms during the pandemic period. Results are presented in Table 5. The results show that ESG stocks have seen an average decline in beta values during the pandemic period compared to the normal period, irrespective of their ESG scores. This result supports the good management hypothesis as ESG stocks appear less risky during the financial crisis.

Table 5 T – test results for change in beta values of ESG stocks during the COVID – 19 pandemic

Hypothesis: μ (Beta of all ESG stocks during normal times) ≠ μ (Beta of High ESG stocks during pandemic times)				
	N	Mean	Std. Dev	SE Mean
All ESG stocks – normal period	322	0.849	0.286	0.016
High ESG stocks – pandemic period	81	0.679	0.448	0.050
Difference		0.176**		
Hypothesis: μ (Beta of all ESG stocks during normal times) ≠ μ (Beta of Low ESG stocks during pandemic times)				
	N	Mean	Std. Dev	SE Mean
All ESG stocks – normal period	322	0.849	0.286	0.016
Low ESG stocks – pandemic period	86	0.549	0.374	0.040
Difference		0.300***		

***,**,* and. denote significance at 0.1%, 1%, 5% and 10% level respectively

5.2 Relationship Between ESG Scores and Returns During the Crisis and Normal Periods

The results of the regression Eqs. (1)–(5) are presented in Table 6. During normal times, the beta of ESG stocks was 0.94, while during COVID-19 crisis times, it has declined by 0.17–0.77. The variables of interest are the interaction variables of ESG scores and its pillars with the dummy variable, COVID. The co-efficients of the interaction variables, ESG_score*COVID, E_score*COVID and S_score*COVID are positive and significant. This indicates that during crisis periods, ESG scores and its E and S pillars positively contribute to stock returns. The co-efficients of the ESG score and its pillars are statistically insignificant. This indicates that during normal times, ESG scores are not significantly related to stock return performance. This finding does not support the insurance function of ESG stocks. ESG scores are positively related to stock returns during crisis times but do not cause a decline in stock returns during normal times. The results indicate that when a market-wide extreme crisis event occurs, investors may reduce their expectation of future earnings; however, they have better confidence in firms with high ESG scores.

Table 6 Impact of ESG score on stock returns during normal and crisis times

Variables	Dependent variable–daily raw stock returns				
	(1)	(2)	(3)	(4)	(5)
Constant	−0.05	−0.045	−0.077	0.016	−0.021
Market_Return	0.941***	0.941***	0.941***	0.941***	0.941***
Market_Return*COVID	−0.172*	−0.172*	−0.172*	−0.172*	−0.172*
COVID	−0.671***	−0.469***	−0.609***	−0.868*	−0.565
ESG_score	0.000				
ESG_score*COVID	0.014*				
E_score		−0.001			−0.002
E_score*COVID		0.012*			0.01
S_score			0.001		0.002
S_score*COVID			0.010*		0.004
G_score				−0.002	−0.002
G_score*COVID				0.012	0.000
No. of observations	13,735	13,735	13,735	13,735	13,735
R-squared	0.41	0.41	0.41	0.41	0.41

The above table presents the results on the relationship between ESG scores and the stock market reaction of ESG stocks from the BSE 500 universe during normal versus COVID-19 crisis times. Daily raw stock return is the daily stock return of stock i on day t, Market Return is the daily market return on day t, COVID equals to one during the COVID-19 pandemic period, and 0 in the previous year. The estimation period includes the normal period from Mar 11, 2019 to Apr 09, 2019, and pandemic period from Mar 11, 2020 to Apr 09, 2020. We include the interactions terms' Market_Return' × COVID, ESG_score × COVID, E_score × COVID, S_score × COVID and G_score × COVID for testing the resilience of ESG rating in different dimensions

***,**,* and. denote significance at 0.1%, 1%, 5% and 10% level respectively

5.3 Return Performance of ESG Stocks and Other Stocks During the COVID-19 Crisis

We expect a lesser fall in prices of ESG stocks compared to other stocks during the financial crisis caused due to the outbreak of the COVID-19 pandemic. This can be considered as an outcome of the good management hypothesis and investors' continued resilience in ESG stocks during the pandemic. The estimated results of the regression model (6) are presented in Table 7. The co-efficient of the dummy variable, COVID denotes an average decline of 0.50% in the daily returns of stocks in our sample. Our variable of interest is the interaction term, ESG*COVID. The co-efficient of this term is positive and significant, which denotes that the decline in daily returns of ESG stocks was lesser compared to other stocks due to the COVID-19 pandemic shock. ESG stocks saw a relatively lesser price decline during the financial crisis due to their sustainable business models built during normal time periods. This finding not only reiterates the good management hypothesis but also highlights the need for increased disclosures by

Table 7 Difference in returns of ESG stocks and other stocks during the COVID-19 crisis

Variables	Dependent variable–daily raw stock returns
Market_Return	0.750***
COVID	−0.502***
ESG*COVID	0.229*
Leverage	−2.424***
CFO	−0.673
Cash	0.555
Size	−0.200
LN(BM)	−0.372
Firm fixed effects	Yes
Industry-year fixed effects	Yes
No. of observations	21,443
R-squared	0.40

The above table presents the results of the DID panel regression model which estimates the difference in the returns of ESG stocks and other stocks during the COVID − 19 crisis periods. Daily raw stock return is the daily stock return of stock 'I' on day 't', Market Return is the daily market return on day 't', COVID equals one during the COVID − 19 pandemic period, and 0 otherwise. The estimation period includes the normal period from Mar 11, 2019 to Apr 09, 2019, and pandemic period from Mar 11, 2020 to Apr 09, 2020. ESG equals '1' for ESG stocks and '0' for other stocks. We include the interaction term ESG × COVID for capturing the change in the average daily stock returns of ESG stocks compared to other stocks during the COVID − 19 pandemic. Leverage, CFO, Cash, Size, and LN(BM) are control variables as on Dec 31, 2018 (for normal period) and Dec 31, 2019 (for pandemic period)

***,**,* denote significance at 0.1%, 1%, 5% and 10% level respectively

companies and thereby increased coverage of stocks by ESG rating agencies like Bloomberg. Stocks evaluated on ESG parameters could provide downside protection to investors during the pandemic compared to other stocks.

5.4 Trading Activity of High and Low ESG Stocks During Crisis Period

Following the flight to security hypothesis, we expect a heightened trading activity for low ESG stocks and lower trading activity for high ESG stocks during the COVID-19 crisis period. The results of the T-tests are presented in Table 8. Results in Panel A of Table 8 show that the abnormal trading volumes, both in terms of turnover % and shares traded % for low and high ESG stocks, are not significantly different from zero. This implies that the financial crisis did not lead to any significant increase or decline in the trading volumes of high and low ESG stocks during the crisis period. As a robustness test, we present two sample T-tests in Panel B of Table 8. The trading volumes of high ESG and low ESG stocks have not significantly changed during the pandemic period. Thus, the results fail to validate our hypothesis. A possible reason behind these results may be limited awareness about ESG investing among Indian investors. ESG investing is at a nascent stage in India, and complete ESG information is not available in the public domain. Hence, investors may not have used ESG information during the financial crisis caused by the COVID-19 pandemic.

5.5 Relationship Between ESG Scores and Stock Return Volatility During Normal and Crisis Periods

A by-product of the good management hypothesis is the protection from adverse events like climate-related disasters, legal suits by employees, customers, etc. or corporate governance scandals. This should translate into lower volatility for high ESG stocks during crisis periods. The estimation results for regression models (7)–(11) are presented in Table 9. The co-efficients of ESG score and S score are positive and significant, while those of the interaction terms ESG score*COVID, E score*COVID and S score*COVID are negative and significant. These results provide partial support to our alternate hypothesis. Our results show that ESG performance leads to a decline in the stock return volatility during crisis periods. Firms with superior ESG scores are less susceptible to any adverse events, and the impact of such adverse events on such firms is less. However, during normal times overall ESG performance and social performance is found to aggravate stock return volatility. This may be due to the diversion of resources to socially responsible activities, which may jeopardise shareholders' value. Some researchers have argued that socially responsible actions of firms are driven by agency problems (Benabou & Tirole, 2010; Cheng et al., 2013; Liang & Renneboog, 2017). Krüger (2014) argues that socially responsible activities benefit managers at the expense of shareholders. Thus, higher social performance may lead to higher stock return volatility during normal times. Among the control variables, the co-efficients of ROA and LN(BM) are negative, indicating that firms with higher profitability and higher book values experienced a reduction in price volatility during the first lockdown in India.

Table 8 *T*-test results for change in trading volumes during crisis periods

PANEL A: Results of the one-sample *T*-tests for mean-adjusted model				
Hypothesis: μ (Abnormal trading volumes of high/low ESG stocks)≠0				
	N	Mean	Std. Dev	T – values
Abnormal turnover %–High ESG stocks	84	0.08%	0.90%	0.78
Abnormal turnover %–Low ESG stocks	83	0.02%	0.30%	0.55
Abnormal shares traded %–High ESG stocks	84	0.09%	0.87%	0.90
Abnormal shares traded %–Low ESG stocks	83	0.02%	0.25%	0.62
PANEL B: Results of the two sample T – tests comparing trading volumes of high and low ESG stocks				
Hypothesis: μ (Turnover % of all ESG stocks during normal times)≠ μ (Turnover % of High ESG stocks during pandemic times)				
	N	Mean	Std. Dev	SE Mean
All ESG stocks–normal period	332	0.44%	0.82%	0.05%
High ESG stocks–pandemic period	84	0.61%	0.69%	0.08%
Difference		−0.17%		
Hypothesis: μ (Turnover % of all ESG stocks during normal times)≠ μ (Turnover % of Low ESG stocks during pandemic times)				
	N	Mean	Std. Dev	SE Mean
All ESG stocks–normal period	332	0.44%	0.82%	0.05%
Low ESG stocks–pandemic period	83	0.38%	0.60%	0.07%
Difference		−0.06%		
Hypothesis: μ (Shares traded % of all ESG stocks during normal times)≠ μ (Shares traded % of High ESG stocks during pandemic times)				
	N	Mean	Std. Dev	SE Mean
All ESG stocks–normal period	332	0.44%	0.85%	0.05%
High ESG stocks–pandemic period	84	0.63%	0.70%	0.08%
Difference		−0.19%		
Hypothesis: μ (Shares traded % of all ESG stocks during normal times)≠ μ (Shares traded % of Low ESG stocks during pandemic times)				
	N	Mean	Std. Dev	SE Mean
All ESG stocks–normal period	332	0.44%	0.85%	0.05%
Low ESG stocks–pandemic period	83	0.38%	0.61%	0.07%
Difference		−0.06%		

The above table presents results of one-sample T-tests for abnormal trading volumes of high ESG and low ESG stocks. The results of two sample T-tests indicate change in average trading volume of high and low ESG stocks during the crisis period

***,**,* denote significance at 0.1%, 1%, 5% and 10% level respectively

Table 9 Impact of ESG score on stock return volatility during normal and crisis periods

Variables	Dependent variables				
	Stock return volatility–60 days around 25-Mar-20				
Constant	4.033***	4.216***	3.498***	4.005***	3.681***
COVID	0.04	−0.399*	0.139	−0.07	−0.417
ESG score	0.023*				
ESG score*COVID	−0.029*				
E score		0.014			0.003
E score*COVID		−0.022*			−0.016
S score			0.017*		0.012
S score*COVID			−0.020*		−0.012
G score				0.023	0.01
G score*COVID				−0.018	0.006
Leverage	−0.001	0	−0.001	−0.001	−0.001
Cash	−0.01	−0.01	−0.01	−0.011	−0.011
CFO	−0.009	−0.009	−0.01	−0.008	−0.009
ROA	−0.026	−0.026*	−0.026	−0.026*	−0.025
LN(BM)	−0.111**	−0.107**	−0.112**	−0.108**	−0.111**
LN(Size)	0.062	0.081	0.065	0.07	0.065
No. of observations	670	670	670	670	670
R − squared	0.09	0.09	0.09	0.09	0.09

This table presents results on the relationship between ESG scores and stock return volatility. ESG stocks from the BSE 500 universe 60 days around the first lockdown date in India, i.e., 25-Mar-20

***,**,* denote significance at 0.1%, 1%, 5% and 10% level respectively

6 Conclusion and Policy Implications

The massive correction in equity markets across the globe and the resultant volatility during the COVID-19 pandemic reflected a strong negative investor sentiment. However, this sentiment was less observed in ESG stocks. ESG fund flows across the globe were strongly positive and breached their previous records during the pandemic. We hence, questioned if the negative investor sentiment due to the pandemic affected the return performance of ESG stocks. We also investigated if ESG performance signals investment avenues to navigate away from downside risk during the crisis.

Towards the end of our article, we briefly reconcile our findings with the extant literature on ESG performance during crisis periods. Goodell (2020) lists the enormous implications of COVID-19 on research in the finance area. Our study contributes and enriches existing literature on ESG investing during crisis periods. Few studies have highlighted the positive performance of ESG investments during crisis periods and the price that investors have to pay for the same during normal periods (Broadstock et al., 2020; Ding et al., 2020; Engle et al., 2020; Nofsinger & Varma, 2014).

The findings of our event study validate the good management hypothesis presented in the literature. We show that ESG scores are positively associated with

cumulative returns during the COVID-19 crisis. Thus, firms with high ESG scores perform relatively well during crisis periods, thereby serving as "rainy day assets" for investors. In doing so, we contribute to the literature by empirically illustrating the resilience of stocks with high ESG scores in times of market-wide financial crisis caused by the outbreak of the COVID-19 pandemic. This is consistent with the view that investors in high ESG stocks may identify ESG performance as a signal of future stock performance and downside protection in crisis times. Our results on the trading volumes of ESG stocks do not agree with the flight to security hypothesis. This can be attributed to the low level of awareness about ESG investing amongst Indian investors. Also, our results do not entirely agree with the insurance function of high ESG stocks, as mentioned in the extant literature. In an emerging market like India, ESG investing is at a very nascent stage. The years 2019 and 2020 witnessed the launch of ESG funds in India for the first time. ESG scores are not available in the public domain, and there have been recent regulatory changes regarding Business Responsibility Reporting (BRR) in India. Investor awareness about companies that aim for profits along with societal good has been increasing in India. We believe that ESG shall have a significant impact on the future of long-term investing practices across the globe. We also establish an important negative relationship between stock return volatility and ESG scores during crisis periods. This, along with the support to the good management hypothesis, is an encouraging factor for investors to explore ESG investing in emerging markets like India.

Our study has important implications for the growth of ESG investing in emerging markets. The last couple of years have seen a surge in ESG investing in India. However, this might be just the beginning, and there is a need for greater investor awareness about the concept and benefits of ESG investing in emerging markets. Companies that are under the ESG coverage of Bloomberg have provided downside protection to investors during the COVID-19 pandemic. This calls for greater sustainability disclosures by companies in the future, which will help to increase the ESG coverage by such research agencies.

Our study has certain limitations due to the limited ESG coverage of Indian companies by Bloomberg. Bloomberg calculates ESG scores for companies based on disclosures and data available in the public domain. Companies that are not evaluated on ESG parameters by Bloomberg may be engaging in ESG related activities to some extent. However, the business responsibility disclosures made by these companies may not be sufficient to enable the calculation of ESG scores. Our analysis does not consider the ESG related activities undertaken by such companies due to a lack of quantifiable data. Another limitation of our study is the limited focus on small-cap stocks in India. As of March 2020, the top 335 stocks by market capitalisation were covered by Bloomberg for calculation of ESG scores. These stocks are predominantly from the large-cap and mid-cap segments. Very few small-cap stocks are covered in our analysis due to the unavailability of ESG scores.

Our study focuses on the importance of ESG information and its impact on stock returns and volatility during the first and second waves of the COVID-19 pandemic in India. Our study can be further extended to study the relationship between these variables during the upcoming phases of the pandemic.

Appendix

Table 10 Description of variables used in the study

Name of the variable	Description of the variable
Cash	Cash and bank balance expressed as a percentage of total assets as on 31-Dec-2019
CFO	Cash Flow from Operations (CFO) expressed as a percentage of total assets as on 31-Dec-2019
ROA	Return on Total Assets as on 31-Dec-2019
LN(Size)	Total market capitalization of the firm on the BSE.as on 31-Dec-2019. Natural logarithm of this variable has been used to address skewness
LNBM	Book value per equity share divided by market price per equity share. Natural logarithm of this variable has been used to address skewness
Leverage	Total long – term debt divided by total assets

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