

# Impact of herding on the ESG sector of Indian Stock market

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## ABSTRACT

**Purpose-** Testimonial of herd behaviour has been conducted on the basis of NSE primary respondents of Indian markets.

**Design/methodology/ approach-** The paper exemplifies the observation by applying the cross-sectional standard deviation method and promulgating on herding among participants who are involved in trading in the Indian stock market (NSE). Further, the study seeks to examine the market-wide herding in the Indian stock market with help of observations of Nifty 50 stock and Nifty 100, of 853 Daily returns for a time- period of three years and six months from January1, 2019 to June 3, 2022, duration of the normal market condition, extreme (Panic) market conditions across five sectors of market.

**Findings –** In a time-period of a observed different market cycles, the results which came out are exhibited that herd behaviour is unsubstantiated in observation of both market condition of examined sectors of Indian stock market.

**Originality/ Value-** The analysis reveals that there is no evidence of herding in the observed sectors of Indian stock market. For both duration extreme (panic) market condition and normal market condition both. It highlights that the investor of the respective sectors are rational during, extreme and normal market condition. The study contributes by usage of different statistical tests to determine the herding and stock returns.

**Keywords:** Herd Behaviour, Indian Stock Market, ESG Sector, COVID-19.

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## INTRODUCTION

According to corporate finance institute overview, 2022 In terms of sustainability issues at play, ESG is a framework that helps stakeholders identify risks and opportunities in the organization. The management of ESG performance reduces environmental risk, increases revenues, and ensures future sustainability. Business leaders must demonstrate their ESG performance with clarity and

confidence so they can reduce environmental risk, increase revenue, and lead organizations into a sustainable future. With growing investor demand for measurable ESG progress, managers need to reduce exposure to environmental risk and increase revenue. Approximately 35.3 trillion dollars were invested in sustainability globally, according to the Global Sustainability Alliance. The same report found that sustainable investment assets under management accounted for a 15% increase over the past decade. According to the Global Sustainability Alliance, approximately 35.3 trillion dollars were invested in sustainability globally for two years. By 2020, more than a third (35.9%) of total assets under management will be managed by hedge funds, up from 33.4% in 2018.

According to Organisation for Economic Co-operation and Development and S&P Global ratings, 2020 following are the sectors which are highly related and has highest impact on environment, sustainability, governance-

- 1). Oil and Gas
- 2). Metals and Mining
- 3). Power Generation
- 4). Refinery

There are literature and previous research available which has proven that there is a significant impact of ESG ratings on organization and on stock market volatility (Eric Burger, Fabian Grba, Thomas Heidon, 2020). ESG Sector has steadily gained traction and influenced financial sectors and investors over the past decade. The purpose of this study is to investigate herd behavior in the ESG sector in accordance with COVID-19 panic situation. In the ESG sector, its importance grows every day, so this study will be helpful for investors who are investing in the stock market and specifically in the ESG sector, it will help to understand how investors react in a panic situation and whether herding occurs in this field.

### **Literature Review**

When security prices are determined by reflecting all relevant information in a market, it is said to be efficient (Samuelson 1965, Fama 1963, 1965). Historically, three types of information sets have been used to distinguish three levels of market efficiency, first proposed by Roberts (1967):

- 1) In its weak form, the EMH states that prices reflect the information contained in historical price sequences. Therefore, an investment strategy that yields abnormal profits cannot be devised purely based on past price trends.
- 2) In its semi-strong form, EMH assumes that current stock prices are not only based on historical prices but also take into account all publicly available information about a company. Since markets are efficient in this sense, an examination of balance sheets, income statements, dividend announcements and stock splits, or any other public information regarding a company will not reveal abnormal economic profits.
- 3) Market prices reflect all the information about the company that is known to any participant in the market. So even those with privileged information are unable to use it to obtain superior investment results. Market prices disclose all private information perfectly.

The efficient market hypothesis was one of the most famous rationality theories, which declared that investors would act rationally, and the stock prices contained all the information they needed. Anyone could not earn subnormal profits because of any private information.

Research and empirical developments, however, have eroded the trust in a theory that claims that stock prices cannot deviate systemically from their fundamental valuation. On the empirical side, the fact stock prices exhibit more volatility than fundamentals or expected returns do (West 1988).

One of the prominent pieces of evidence of irrationality or proof against traditional finance theories such as the efficient market hypothesis is the 'stock market bubble'. A stock market bubble occurs when market participants exacerbate the situation by driving stock prices higher than they should be based on some system of stock valuation (Thomas Lux Source, *The Economic Journal*, Vol. 105, No. 431 (Jul. 1995), pp. 881-896).

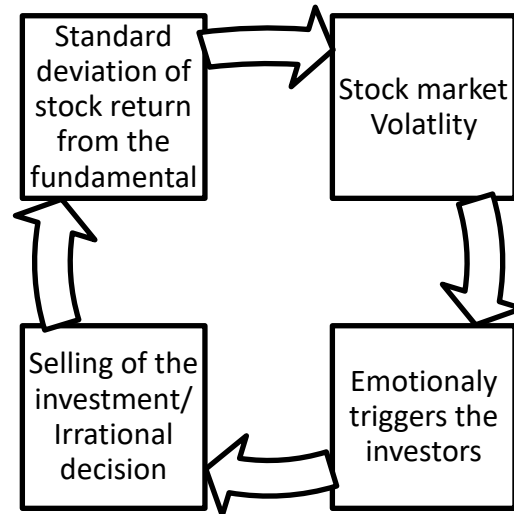
Such bubbles are characterized by a long run of positive abnormal returns (or a long run of price increases) followed by a sudden price crash or price down. In markets traditionally associated with bubbles, these characteristics were evident in the Dutch Tulipmania (1634-1637), the Mississippi bubble (1719-1720), and the South Sea Bubble (1720). Following that, the long sequence of stock price increases followed by a steep price drop in October of 1987 prompted interest in stock market bubbles.

With an annualized return of more than 21% for the S&P500 since the stock market bottomed in March 2009, the US stock market has experienced one of its greatest bull markets in history. While the warning remained in place, the stock market continued to rise and reached an all-time high in 2014. As well as showing inflated stock prices, the widely observed valuation measure Shiller-PE also demonstrated excessive levels. A speculative bubble in the US stock market is evident by the duration and magnitude of price increases.

The reason behind these anomalies was identified by incorporating different perspectives from other studies like psychology and sociology. With these modern theories of finance and the subject of behavioural finance emerged. It identified that the investors are not always rational while making the decision. Statman, (2017) stated that behavioural finance is an advanced field that deals with the behaviors of markets and investors. It is further divided into two branches; one is micro behavioural finance which studies the behaviour of individual investors and the second is macro behavioural finance, it deals with the behaviour of the market. According to behavioural finance theorists, investors being human being is not always rational and is inconsistent in his/her preferences.

With the emergence of behavioural finance, researchers tried to analyze the reasons for the anomalies and market crashes that existed in the stock market. Financial market volatility was a crucial problem in the theoretical and practical applications of asset pricing model and risk management. Although traditional finance considered volatility to be constant but later on after the concept of behavioural finance, many researchers and practitioners recognized stock market volatility. Stock market volatility is the standard deviation or conditional variation of stock return that is not observable directly (P Srinivasan, 2011). Since investors' decisions are based on the

variance of returns that can change over time; it is important to analyse stock market volatility to have a correct forecast about the future prices. Irrational human behaviour and behavioural factors of the investor are both the cause as well as the effect of the volatility in the stock market.



Many studies and research have been conducted that link investor sentiments, overconfidence, and emotional intelligence with volatility. It was observed that there is a lower stock market volatility in Muslim countries during Ramadan, simply due to the optimistic beliefs of the investors during that time (Bialkowski, 2012). A person with higher emotional intelligence is known to manage his/her financial decision in a much better way even in volatile situations (John Ameriks, Tanja Wranik & Peter Salovey). But there are very limited researches that link Herding behaviour with volatility.

While making investment decisions, some investors tend to rely on others' decision-making processes; they make their decisions on the basis of other people's opinions, information, and process. Herding Behaviour is the most impactful and prominent behavioural bias that affects the financial markets. Stock market volatility, disruptions in the market, creation of market 'bubbles'; all are the consequences of herding behaviour among the investors. Banerjee (1992) simplified the explanation of herd behavior by constructing a sequential decision model which depicted that an individual will take actions based on what others are doing and not consider their own judgment.

**Research Gap-**By studying and examining previous research, it can be argued that herding has been one of the main causes of extreme volatility in stock markets (Shiller (1990), Topol (1991), and Banerjee (1993)). Stock market conditions play an important role during the financial crisis; its performance indicates the potential of the country's economy and gives confidence to the shareholders. (Totir and Dragota, 2011). The pandemic situation (COVID-19) bought the Indian economy to a standstill, it affected various industries.

- In recent years ESG has become increasingly important. This paper aims to determine what effect COVID-19 has on the ESG sector and which sectors have the greatest impact.

- Based on a company's environmental, social, and governance (ESG) risk scores, the ESG index should reflect the performance of the company within the ESG Nifty 100 Index. ESG risk scores are assigned to all constituents within the index, and their free-float market capitalization less modified ESG risk scores determine the weights of each constituent. In May 2022, NSE added the nifty 100 ESG Index (NSE, May 30<sup>th</sup>, 2022). I am aware of no testimony concerning herding behavior in this particular area in the Indian stock market context.
- There are many studies that have been conducted to analyze the herding in the stock market in the Indian context but as per my knowledge and research, research related to herding across ESG industries is very limited. Thus, through this paper, we'll understand if there is herding in ESG sector in the stock market across the top 20 high market cap companies and also of high market cap companies of a sector that has an impact on the ESG sector listed on the NSE, to get accurate results.
- Through previous research the impact of COVID-19 on the Indian stock market, in general, can be studied and concluded; along with being industry-specific a longer time period will be considered to compare, contrast, and analyze in more depth the impact of the pandemic. Therefore, for the purpose of the study, we'll be considering a three-time period- pre-pandemic, during the pandemic, and post-pandemic.

### **Research Objective-**

- This report will testify to how COVID-19 Pandemic affects the ESG sector and sectors related to ESG. Which sector has the most impact.
- Conduct exploratory research on the 27 largest market cap ESG listed companies listed on the National Stock Exchange to testify herding.
- A descriptive study was conducted to determine how a financial crisis caused by a pandemic Impacts Indian Stock Market herd behavior.
- By dividing the time intervals into pre-pandemic, during the pandemic, and post-pandemic, the researchers will be able to gain a deeper understanding of the impact of the pandemic.

### **Hypothesis-**

H1: There is a positive and significant relationship between herding and ESG sector. H2: There is a positive and significant relationship between herding and the Refining sector. H3: There is a positive and significant relationship between herding Metals and Mining. H4: There is a positive and significant relationship between herding and Oil, and gas sector. H5: There is a positive and significant relationship between herding and Power generation.

### **Research Methodology-**

**Data Source-** An analysis of the effect of COVID-19 on ESG sector companies with the highest market caps is presented in this study. Several major indices saw panic trading due to COVID-19 (M. P. Yadav, T. A. Wani, 2022). A fall of at least 7% in the S&P 500 in March 2020 was extensively halted (Bloom et al., 2000; Shieber & Crichton, 2020). A 10% fall in the Indian market in March 2020 halted NIFTY 50 and Sensex twice in 15 days (Dasgupta, 2020). Thus, this study is

trying to measure overall market response over the period of 1 January 2019 to 3<sup>rd</sup> June 2022 and measure the evidence of herd behavior. During these years, the market was very anxious, and there was a greater chance to find evidence of herding during panicky times (S. Bikhchandani 2000, Sunil Sharma 2000; Terence Tai-Leung Chong, 2017). We will be taking 28 companies' observations of their respective period.

### Model to detect herd behavior in the market-

Herding can be examined with the help of cross-sectional method for asset returns, since a smaller cross-sectional dispersion indicates a parallel movement towards some form of market consensus, as christie and Huang (1995) argued. When returns fluctuated greatly upward or downward, they used these measures to detect herding. While herding may be more prevalent during turbulent periods of time, that does not necessarily mean that it is always present, neither does limiting the analysis to such times prevent studying how this phenomenon might evolve over time. Market-based herding is the kind of behavior examined by these measures, and it is distinct from herding as generally understood, which refers to groups of investors buying and selling similar assets simultaneously. In the latter case, individual stock returns follow the market return. Asset mispricing can occur under either definition, however. The cross-sectional standard deviation (CSSD) of single stock returns versus market returns was derived by Christie and Huang (1995) as follows:

$$CSSDt = \sqrt{\sum_{i=1}^N \frac{(R_{i,t} - R_{m,t})^2}{N-1}}$$

A cross-sectional average return on the N returns in the market portfolio at time t is defined as  $R_{m,t}$  where  $R_{i,t}$  is the observed stock return of firm i at time t, N being the number of stocks in the market portfolio. A CSSD of returns was then regressed against two dummies and a constant to identify the phases of extreme market returns, in which DL and DU are respectively equal to one of the market returns on date t falls in the extreme lower tail of 1% and 5% of the distribution, and zero if the upper tail of the distribution is equal to 1% and 5%:

$$CSSDt = a + b_1 D_t^L + b_2 D_t^U + e_t$$

If the two dummy (1,0) variables are excluded from the sample, then the \* coefficient represents the average dispersion of the sample. This model indicates the presence of herd behavior if b1 and b2 have statistically significant negative values. The dispersion of individual returns is predicted to be relatively low when individual returns herd around the market consensus. Due to differences in the sensitivity of different assets to market returns, rational asset price models predict an increase in dispersion.

To examine herd behaviour in the NIFTY, we use daily log-differenced returns in our herding tests from January 1, 2019, to June 03, 2022. The data include all the stocks available on day t (minimum 3000 stocks) of 5 Sectors and 27 Industries.

## Results and Discussion-

Using data from ten of the highest market cap companies, we analyzed ESG sector data for four sectors that have an impact on ESG sector.

### Christie and Huang (1995) CSSD regression

*Table 1. Returns and Cross-Sectional Standard Deviation Regression for ESG Sector*

	Percent	Return	
Right Tail	95%	1.69%	
Left Tail	5%	-1.80%	
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	LEFT	RIGHT	Intercept
Coefficient	0.007060846	0.011108	0.014738
Standard error	0.001596223	0.001596	0.000364
	0.071387871	0.010072	
	32.48005774	845	
	0.006589331	0.085714	
t-stat	4.423471773	6.958784	40.44787
p-value	0.00%	0.00%	0.00%

*Table 2. Returns and Cross-Sectional Standard Deviation Regression for Metals and Mining Sector.*

	Percent	Return	
Right tail	95%	0.016952	
Left tail	5%	-0.01867	
	LEFT	RIGHT	Intercept
Coefficient	0.006232	0.006083	0.031482516
Standard <u>err.</u>	0.003175	0.003175	0.000724704
	0.008392	0.020031	
	3.575685	845	
	0.002869	0.339056	
t-stat	1.962872	1.915995	43.44190862
p-value	5%	6%	0%

**Table 3. Returns and Cross-Sectional Standard Deviation Regression for Gas and Oil Sector.**

	Percent	Returns	
Right Tail	95%	1.68%	
Left Tail	5%	-1.80%	
	Left	Right	Intercept
Coeff.	0.005602	0.010102345	0.02133
Standard Error	0.002537	0.002537152	0.000586
	0.022949	0.016186774	
	9.923628	845	
	0.0052	0.22139984	
T-Stat	2.208037	3.981765422	
P-Value	2.75%	0.01%	

**Table 4. Returns and Cross-Sectional Standard Deviation Regression for Power Generation sector**

	Percentage	Return	
Right tail	95%	1.69%	
Left tail	5%	-1.91%	
	LEFT	RIGHT	Intercept
Coefficient	0.00681645	0.007916095	0.019595
Standard Error	0.00205068	0.002050684	0.000465
	0.03201292	0.012922296	
	13.9893059	846	
	0.00467203	0.141269938	
t-stat	3.32399019	3.860221826	42.18531
p-value	0.09%	0.01%	0.00%



**Table 5. Returns and Cross-Sectional Standard Deviation Regression for Refinery sector**

	Percent	Return	
Right Tail	95%	0.013206	
Left Tail	5%	-0.01862	
	LEFT	RIGHT	Intercept
Coefficient	0.011426652	0.007324	0.022172
Standard error	0.002276473	0.001636	0.000534
	0.04738644	0.014341	
	21.01667625	845	
	0.00864462	0.173784	
t-test	5.019453805	4.476315	41.48474
p-value	0.00%	0.00%	0.00%

There is a rational market if the cross-sectional standard deviation increases overall market volatility. In contrast, if the relationship is inverse most prominently, then herding is most definitely occurring (Guglielmo Maria Caporalea, Fotini Economou and Nikolaos Philippas, 2008; Cuiting Shen 2018; Teng-Ching Huang & Kuei-Yuan Wang, 2017; John Wei-Shan Hu, Yen-Hsien Lee, Ying-Chuang Chen, 2018; Hui HONG, Shulin XU, Chien-Chiang LEE, 2020; Chia-Lin Chang, Michael McAleer, Yu-Ann Wang, 2020)

Table 1. Figures are indications of Returns and Cross-Sectional Standard Deviation for ESG sector. Return indicate on right tail is 1.69% and on left tail it is -1.80%. Analysis of the same data of right tail and left tail yields T-statistics test stats values of 4.423471773 and 6.958784, respectively. Using the Christie Huang CSSD regression 1995, the market behaves rationally, showing no signs of purging deviation p in either the left or right tail, suggesting that investors do not flock to market signals or key influencers.

Table 2. Contains an analysis of 852 stocks across three industries. The total number of stocks being analysed is 2556. 0.016952 and -0.01867 are the returns from the metals and mining sector. In calculating the t-test, we obtain values of 1.062872 for the right tail and 1.915995 for the left tail. This sector analysis shows rationality when the p-value calculation is 5%, 6%, and 0% in the direction of volatility. In other words, investors are not herding toward market signals. Table 3. According to this table, after analyzing 4265 stocks of the Gas and Oil sector, the market appears to behave rationally with no indication of purging deviations p, in the left and right tail, suggesting that investors are not bound to the opinions of market influencers.

In table 4. Based on the fact that the measured p-value is not inversely related to market returns and volatility, this market appears to be rational and does not herd (Shan Lu, Jichang Zhao, Huiwen Wang, Ruoen Ren, 2018).

In the last table of analysis that is table 5. There was no irrationality in the market during the pandemic period as indicated by the p-value, which is neither inverse nor negative.

The above tables are analyzed using the Christie and Huang CSSD (1995) model. The purpose of this testimony is to find evidence of herding in the Indian stock market, specifically within the ESG sector that was introduced to BSE newly, during a period of panic like COVID-19. This analysis covers the period from 1st January 2019 to 30th June 2022. As a result of COVID-19, 2020 and 2021 were the most affected years (The Committee for the Coordination of Statistical Activities (CCSA)), which caused a panic situation for the market as well (Qiuyun Wang and Lu Liu, 2022; Štefan Lyócsa, Eduard Baumöhl, Tomáš Výrost, Peter Molnár, 2020).

Using Christie & Huang's (1995) CSSD model for individual stock returns, Cross-Sectional Standard Deviation is calculated and then regressed with two dummy variables designed to depict extremely positive and negative returns. According to this model, when market stress occurs, rational price valuations of assets indicate positive coefficients, whereas the presence of herd behavior indicates negative coefficients (Hilal Humeysra Özsu, 2015; Jaya M. Prosad, Sujata Kapoor and Jhumur Sengupta, 2012; Soosung Hwang and Mark Salmon, 2001; David Hirshleifer, 2015).

The coefficients on the dummy variables in the five sectors are positive in the analysis above. Based on the daily returns of the above stocks for the past three years and six months. There are no signs of herding in the above sectors during the panic situation of COVID-19.

## **Conclusion**

Having a sense of belonging to a group is natural for human beings. Consequently, people follow the herd. Moving with the herd, however, magnifies psychological biases. The herdsman must choose between rigorous independent analysis and the feel of the herd. In cases involving high uncertainty, this tendency is exacerbated (Devrshi Upadhyay and Paresh Shah, 2019). To demonstrate herding and quantify investor reactions to panic situations in the market, particularly in the ESG sector, as well as in sectors that have one of the highest impacts on that sector. Apart from the ESG sector. Oil and gas. Metals and mining, refinery, and power generation sectors have been analyzed in this study. The study has taken place for three years and six months. The analysis suggests that there is no evidence of herding in these sectors.

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