

## Examining Herding in the BSE100 Pre and During Pandemic Era: Does Governance Matter?

Ahmad Fawwaz Mohd Nasarudin<sup>1</sup> and Lubainah Ateeq<sup>2</sup>

<sup>1</sup>*Department of Finance, Kulliyah of Economics and Management Science, International Islamic University Malaysia, Malaysia. E-mail: fawwaz@iium.edu.my Country: Malaysia*

<sup>2</sup>*Safra Company Ltd., PO Box: 2824, 3rd Floor, Xenel Building, Jeddah-21461, Saudi Arabia. E-mail: lub98.ateeq@gmail.com Country: India*

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**Abstract:** This study investigates herding towards market consensus in the Indian market by examining the stocks that constituted the Bombay Stock Exchange 100 (BSE100) pre and during pandemic situations using the Cross Section Absolute Deviations of Return (CSAD). We document a stronger herding activity during the pandemic against the period before the COVID-19 discovery. We also examine if governance scores influence herding decisions on the firms and reported no herding activity in the period before the pandemic. The findings on firms with lower governance scores indicate less severe herding activity during the pandemic time. Herding is more perilous among firms with higher governance scores during pandemic time suggesting rational herding practice with investors imitating the market movement only on selected firms with lesser governance risk but refuse to follow the sentiment on a perceived riskier investment.

**Keywords:** Herding, Governance, COVID-19, BSE100.

**JEL Classification Codes:** G14, G11, G12, G15

### 1. Background of the Study

On March 11, 2020, the World Health Organization (WHO) declared COVID-19 as a pandemic amidst an unremitting number of new cases and death reported globally. By December 2020, the cases have surpassed 70 million cases globally recording a petrifying 1.6 million deaths. While it is not the first time human are facing a major pandemic outbreak, it still seems that not much has been learned. An important lesson from the previous pandemics would help us to understand the worldwide

chaos and stay vigilant before medicine/vaccines were found to cure or control the diseases. The beginning of a pandemic is very disturbing and devastating because there are no ways to deal with it while it is all emerging. This generates uncertainty and wreaks havoc worldwide. The anxiety created by the pandemic sent a major shockwave through the whole system including financial and economic activity. Arguably, the global economy is facing the most gloomy days due to the market participants are facing the backlash of the pandemic. Baker *et al.* (2020) reckon that no previous pandemic or endemics, has influenced the stock market as powerfully as the COVID-19.

Indian market is one of the worst afflicted by Covid-19. Before the Covid-19 period, the BSE was having another positive period and blossoms as Asia's third-largest economy. The market capitalization of each major exchange was about \$2.16 trillion and before the pandemic, there were close to 30 firms already filed for IPO in the first quarter of 2020. As the number of Covid-19 cases increase, the Bombay Stock Exchange (BSE) plummeted and foreign investors fled the market panicky. The Security Exchange Board of India response by restricting short selling and several alterations to future contracts to maintain market stability. Experiences suggest that pandemics like Covid-19 could have a black swan impact on the stock market. This uncertainty leads to cognitive abnormalities including herding (Dhall & Singh, 2020). A large number of studies have proposed that in general, herding is present during times of market uncertainty or increased levels of stress (Ganesh, Naresh, & Thiyagarajan, 2019; Kremer & Nautz, 2013a; Lao & Singh, 2011).

Herding indicates how the behavior of a group or a particularly influential individual influences the decisions of another individual. In finance, herd instinct is the sensation where investors- instead of using their evaluation- follow what they regard various other investors are doing. An investor showing herd instinct would tend to lean towards similar investments decision based entirely on the fact that many others are purchasing (selling) the securities. The fear that a lucrative investment design will be lost is often the driving force behind herd instinct. Herding has a background of starting massive, misguided market rallies and also sell-offs causing asset bubbles (Gleason, Mathur, & Peterson, 2004; Lux, 1995; Mobarek, Mollah, & Keasey, 2014; Prieto & Perote, 2017). An asset bubble is characterized by an escalation of asset prices not precipitated by the underlying fundamental factors. The burst of the bubble will lead to dramatic market volatility, resulting in significant investor losses (Caparrelli, D'Arcangelis, & Cassuto, 2004; Nasarudin *et al.* 2017). The presence of herding intensifies market volatility and

deviates assets prices from their intrinsic value thus creating price inefficiencies (Bouri, Demirer, Gupta, & Nel, 2020; Lao & Singh, 2011). Inherently, it questions the legitimacy of the Efficient Market Hypothesis (EMH) which assumes that all investors are rational and have the same information set and thus, in the same way, shape the expected stock price. Consequently, the stock price will represent the available market information and the true value of the security. However, as aforementioned, herding behavior shows that investors are not inherently rational and do not always determine the share price from rational company analysis, but through monitoring and following the conduct of other investors. In the current context of the pandemic, the herding practice could become a disaster if not regulated carefully. Given the anxiety and uncertainty in the market, practicing herding could be mistakenly viewed as practical but it could prove perilous in the longer term.

Several herding-based studies on India were documented in the past. Poshakwale & Mandal (2014) investigated the Indian stock market but reported no herding activity in the Indian markets during a normal period. However, upon further testing, herding was observed to be existing in the bullish period when extreme market fluctuations occur. It suggested that when the market is rising, investors follow the market crowd rather than following when a market is declining. Similarly, Garg & Gulati (2013) reported the no activity of herding behavior in the Indian Stock Market using daily, weekly, and monthly data during the span of 2000-2013. Evidence of herding in India was reported by the likes of Batra (2003), Celiker, Chowdhury, & Sonaer, (2015), Lakshman, Basu, & Vaidyanathan (2013), and Patro & Kanagaraj (2012). Despite the number of existing literature on the topic, we feel the need to revisit herding study on India particularly due to the situation of the pandemic. We aim to examine herding activity on the Bombay Stock Exchange 100 top firms (BSE100) pre and during the pandemic to find any discrepancies of herding activities between the two different market conditions. We also try to understand if herding tendency is influenced by governance factors. By classifying their governance score into percentiles, we investigate if firms with higher (lower) governance scores would exhort the herding inclination. The findings of this study would have important implications for the regulators of BSE especially related to the containment of herding and irrational behavior during the period of market stress. It also contributes to the works of literature on herding with special attention on the practice during the crisis in the Indian market. We also hope to prove that the governance factor plays a role in tempting investors to practice herding.

## 2. Literature Review

Scholars provide a different reason behind the herding inclination that could drive the value from the fundamentals. Among the common believes is that herding is a result of cognitive biases (Durand, Limkriangkrai, & Fung, 2014; Fernández, Garcia-Merino, Mayoral, Santos, & Vallelado, 2011; Galariotis, Krokida, & Spyrou, 2016) where human shows more tendency to group as a herd. The uncertainty and fear of losing out tempted them to follow what other people are doing and neglect their knowledge and views. Li, Rhee, & Wang (2017) argue that this is the case for individual investors practicing irrational intentional herding because they perceive themselves as less-informed traders. Findings on institutional investors show they could be influence by the reputational (Bikhchandani & Sharma, 2000; Casavecchia, 2016; Chen, Yang, & Lin, 2012; Lugo, Croce, & Faff, 2015; Scharfstein & Stein, 1990) and firm's stylized facts (Edelen, Ince, & Kadlec, 2016; Kremer & Nautz, 2013b; Leece & White, 2017; Nofsinger & Sias, 1999).

Most scholars differentiated the motives and implications of herding into two types, i.e., rational and irrational herding. While the action is still centered on the act of mimicking, the nature of the two is disparate. A plethora of research discusses these terms extensively given the implication they could bring to the financial market. Irrational herding is a psychological act of ignoring systematic analysis and blindly following what other investors are doing. Fernández *et al.* (2011) believe that investors doing irrational herding were not conscious of the quality of the information inherited from the prior investors' trading decision and this will lead to a catastrophe. The practice is against the rational pricing model where investors will react upon their diversity of privilege information and proliferate the return dispersion on aggregate. In the case of irrational herding, non-systematic information lead to price inefficiencies and cause mispricing (Devenow & Welch, 1996; Froot, Scharfstein, & Stein, 1992; Hirshleifer, Subrahmanyam, & Titman, 1994; Hwang & Salmon, 2004; Lin *et al.*, 2013).

Devenow & Welch (1996) asserts rational herding as indistinguishable heuristic decision-making of investors following difficulties in the imperfectly informed market. Practicing rational herding is often associated with one of two factors; First, reputational herding where less capable investment managers decided against making their own decision to not jeopardize their reputation. Herding happens when low-capacity managers blatantly overlook their personal information because they feel others' decisions are better, purposely imitate the actions of more senior investors.

These investment professionals with lower ability tend to “hide in the herd” in order not to be evaluated and “ride in the herd” when they are required to issue a forecast. A study on this behavior is well documented in research (see, among others study by Casavecchia, 2016; Holmes, Kallinterakis, & Ferreira, 2013; Jiao & Ye, 2014; Leece & White, 2017; Scharfstein & Stein, 1990 and Sias, 2004). Second, investors could herd rationally due to information cascades. Here, later investors choose to ignore their information believing it is less profitable after inferring more reliable information from prior investors (Venezia, Nashikkar, & Shapira, 2011; Vieira & Pereira, 2015). The public access trading activity will create a behavioral trend and induce awaiting investors to herd as reported in previous studies (Banerjee, 1992; Bikhchandani, Hirshleifer, & Welch, 1992; Doherty, 2018; Liao, Huang, & Wu, 2011; Welch, 2000). The information cascades are sometimes deriving from the Bayesian model. Under Bayesian rule, investors can reduce the risk and make an analysis that is more accurate by collecting more information. Investors with information disadvantages could trigger herding tendencies (Fernández *et al.*, 2011).

There is almost complete unanimity by scholars that irrational herding is having more precarious effects on market stability. Fernández *et al.* (2011) claim rational herding will be corrected by aggregate and arbitrage activity of rational agent thus leading to fundamental value. The same would not materialize in the case of irrational herding because arbitrage could not eliminate the behavioral factors. Comparatively, most studies also consensually agree that herding is more likely to aggravate during a period of uncertainty.

Since the global outbreak of Covid-19, researchers have been conducting a series of studies on its ill effect on the financial market. In most studies, quantifying the uncertainties induced by disastrous factors seems to have been an obstacle. (Baker *et al.*, 2020) believe the detrimental effects of pandemics are attributable to government restrictions. The magnitude of the pandemic and its containment policies leads to uncertainty and non-predictable movement in the market, which could propel herding activity (Heyden & Heyden, 2021; Hwa, Yong, & Laing, 2021; Luu & Luong, 2020). Following the tempestuous period like pandemics, market participants would be dealing with a lot of uncertainty. During these periods, the governance would play pivotal roles in ensuring the stability of the market. (Chung & Zhang, 2011) asserts that the proportion of investors’ ownership on individual stocks increases positively with the governance level of the firm. Stronger governance contributes to a higher level of trust and eradicates information dissemination issues within the market

(Nasarudin *et al.*, 2017). Some researchers established a connection between herding tendency and governance. Past researchers established a linear relationship between poor information dissemination management and transparency with a higher herding rate. When investors believe there is a lack of governance in monitoring information and projecting transparency, they might look up to certain influential individual trading decisions or simply conform to the market movement as an act to follow.

Mobarek *et al.*, (2014) assert that every market has a different level of transparency and information disclosure due to heterogeneous firms and structures in their respective market. They discovered that herding was not detected during the normal period, but significantly appears during the period of market turbulence and crises, subject to the level of governance and asymmetric market condition. Nasarudin *et al.* (2017) investigates if the country-level governance could influence herding decisions and found herding activity will be practiced more in the country where the information dissemination is less efficient due to its less-strict governance level. In their study on 60 countries, they found herding is less practice in the market with good governance but the severe result was reported in markets with moderate and weak governance. Their work commemorates previous studies that detected herding in developing markets including the test conducted by Balcilar, Demirer, & Hammoudeh (2014), Bhaduri & Mahapatra (2013), Chang, Cheng, & Khorana (2000), Chen *et al.* (2012), Guney, Kallinterakis, & Komba (2017) and Lao & Singh (2011).

While past studies tend to agree that herding is found in lesser governance surroundings, we decided to re-examine the idea considering the unprecedented effects of the pandemic. The selection of BSE100 constituents in this study is because besides being one of the largest developing markets in the world, India is the epicenter of the particular second wave of the pandemic. We also examine if the governance score would also influence herding activity. Unlike previous work by Nasarudin *et al.* (2017), we use the firm's score-rather than country rating- to test for herding.

### **3. Data and Methodology**

The CSAD or the Cross-Sectional Absolute Deviation, developed by Chang *et al.*, (2000), is the technique used in this study to detect and evaluate herding behavior. The goal of this study is to discover a definitive link between herd mentality and stock market performance in India. CSAD is the mean of the aggregated disparity amongst individual securities' projected returns and market returns. The rational asset-pricing model states that in the absence of herding behavior, the nature of the relation between

CSAD and the aggregate market return is favorable. Whereas this relationship tends to be unfavorable and non-linear if the presence of herding behavior is found. This negative relation is due to an increase in the value of absolute market return and a decrease in the CSAD. Cross-Sectional Absolute Deviation is a measure of return dispersion. In addition, the relationship between average market return ( $R_{m,t}$ ) and CSAD should be linear thus enabling  $\gamma_2$  equals 0. Whereas when the presence of herding is notable then the CSAD does not share a linear relation with the average market return anymore. Thus, as a result, CSAD will decrease giving a negative value. The Cross-Sectional Absolute Deviation (CSAD) model is equated as follows

$$CSAD_t = \alpha + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \epsilon_t \quad (1)$$

According to Chang *et al.*, (2000), in times of economic stress, the relation between and should be nonlinear, such that if herding persists, then at times of greater aggregate market fluxes there will be lesser return dispersion throughout the country. To detect herding, a simple regression analysis was done.

We use daily price data of firms listed on the BSE100 in the analysis. The stock price data of these were downloaded from Yahoo Finance. Data on the governance score for each firm is available on the Yahoo Finance Website under the Sustainability section. The data consist of the environmental risk score, social risk score, and governance risk score. This study use only the governance risk score as a parameter, given it, is more relatable with herding activity. The score is the range between 0 (less risk) and 100 (more risk). Due to data limitations as the score was not fully disclosed to the public, some firms were omitted from further analysis. In total, only 59 governance scores from the list of the top 100 BSE firms were taken into the next step. From the selected 59 governance score, this study calculate the median (30.1) to rank the firms into the category of better governance and low governance. In total, 30 firms were categorized as having better governance with risk score lower than the median indicating these firms is better governed. The other 29 firms with higher risk scores are categorized as low governance firms.

#### **4. Analysis and Discussion**

This study aims to see if herding exists in the Indian stock market and to test if the governance score and COVID-19 had any role to play in stirring this behavior. The CSAD measure of return dispersion, descriptive statistics, and a simple regression model is applied to evaluate our hypotheses. The results are further explained below.

**4.1. Descriptive Statistics****Table 1: Descriptive statistics for the whole samples**

|                     | <i>N</i> | <i>Minimum</i> | <i>Maximum</i> | <i>Mean</i> | <i>Std. deviation</i> |
|---------------------|----------|----------------|----------------|-------------|-----------------------|
| <b>Pre-COVID</b>    |          |                |                |             |                       |
| RM <sup>2</sup>     | 221      | .00000         | .62711         | .0294335    | .05453385             |
| CSAD                | 221      | .11060         | .56145         | .2203607    | .07168797             |
| Valid N (listwise)  | 221      | -              | -              | -           | -                     |
| <b>During COVID</b> |          |                |                |             |                       |
| RM <sup>2</sup>     | 269      | .00002         | 4.72364        | .0984450    | .36735237             |
| CSAD                | 269      | .10380         | .976013        | .2819849    | .13754286             |
| Valid N (listwise)  | 269      | -              | -              | -           | -                     |

Table 1: Descriptive statistics for daily market return (RM<sup>2</sup>) and return dispersion (CSAD) for the pre-Covid period (1 January 2019 until 30 November 2019) and during the Covid period (1 December 2019 until 31 December 2020)

Table 1 represents the descriptive statistics for RM<sup>2</sup> (daily market return) and CSAD (return dispersion) in the pre-COVID era that is from 1 January 2019 until 30 November 2019 and during the COVID era that is from 1 December 2019 until 31 December 2020. Before the Covid era, the mean daily market return for all 59 firms is 0.0294335 with a minimum of 0.000 and a maximum of 0.62711. The standard deviation is at 0.0545, which means the values are moderately spread from the mean value. In the period with Covid, the aggregate market return increase to 0.0984450 with a much higher standard deviation of 0.3674 as captured in the maximum of 4.7236 but a minimum of 0.00002. This higher SD might be attributed to unusual market fluctuations brought on by market uncertainty. Indirectly, it also indicates the non-customary market movement under the period of Covid. Interestingly, the return dispersion represented by CSAD also increase during the Covid period relative to the prior Covid period. The mean increase from .2203607 to 0.2819849 while the standard deviation increased from .07168797 to .13754286. Perhaps most notably is the increase in the daily market return is synchronized with the return dispersion indicating the chances of herding is slightly lesser than expected.

**4.2. Regression Analysis**

Regression analysis is a method used to estimate the connection between one or more independent variables and a dependent variable. For our study, this analysis



shows us if there is any presence of herding behavior across our dataset. First, we examine the existence of herding using the whole sample during the period before and during Covid-19. The result is prepared in Table 2 below:

**Table 2: Herding Examination using all samples**

|              |                      |                      |                       |
|--------------|----------------------|----------------------|-----------------------|
| Pre-COVID    | 0.244***<br>(23.675) | 0.076***<br>(3.979)  | 0.048**<br>(1.295)    |
| During COVID | 0.419***<br>(19.961) | 0.251***<br>(10.513) | -0.019***<br>(-2.484) |

This table reports the regression results of  $CSAD_t = \alpha + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \varepsilon_t$  the CSAD test using all samples based on the equation of . The numbers in the parentheses are t-statistics.

\*Statistical significance at the 10% level.

\*\* Statistical significance at the 5% level.

\*\*\* Statistical significance at the 1% level

The findings from the table indicate that the model is statistically significant especially in the period of COVID. To determine herding activity, the focus should be on the coefficient of  $\gamma_2$ . A negative  $\gamma_2$  reflects the inverse relationship between return dispersion and aggregate daily fluctuations thus implying herding. We manage to capture a statistically significant herding activity in the period of COVID with a coefficient of -0.0019 and t-stat of -2.484. There is no herding activity in the period before COVID which lends support to our predictions that investors tend to practice herding during the period of uncertainty and stress. Next, we segregate the firms into the governance score level and repeat the same analysis.

**Table 3: Herding Analysis on Firms with Low Governance Score**

|              |                      |                     |                    |
|--------------|----------------------|---------------------|--------------------|
| Pre-COVID    | 0.174***<br>(15.489) | 0.396***<br>(3.988) | 0.057<br>(0.318)   |
| During COVID | 0.215***<br>(12.147) | 0.501***<br>(5.834) | -0.035<br>(-0.627) |

This table reports the regression results of the CSAD test using firms with low governance scores based on the equation of  $CSAD_t = \alpha + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \varepsilon_t$ . The numbers in the parentheses are t-statistics.

\*Statistical significance at the 10% level.

\*\* Statistical significance at the 5% level.

\*\*\* Statistical significance at the 1% level

The herding examination on firms with low governance scores was conducted separately into two different periods, before and during pandemic involving 29 firms from BSE100. Table 3 represents the regression analysis for both periods. A comparative analysis between the tables disclosed that herding was not practiced on the firms with low governance scores before the pandemic as reflected by a positive  $\gamma_2$  coefficient. There was evidence of herding during the pandemic as the  $\gamma_2$  coefficient is negative albeit not statistically significant. A negative  $\gamma_2$  coefficient indicates the existence of herding practice in the market. It explained the inverse relationship between the market return ( $r_{mt}$ ) and daily return ( $r_t$ ) with the CSAD. Under this condition, the equation would be against the idea of the rational asset pricing model, which predicts a wider movement between returns due to constant changes in the transaction. If investors practice herding, the return dispersion is narrowed. This finding indicates that a low governance score does not significantly factor in the by the investors in practicing herding. There are several justifications for this. First, this result could indicate that investors view low governance score firms as riskier due to lack of transparency and information. Secondly, it could also be due to the facts the investors largely reduce their trading activity on these firms and chose to invest more in firms with better information dissemination as argued by Choi & Skiba (2015) and Galariotis, Rong, & Spyrou (2015).

**Table 4: Herding Analysis on Firms with High Governance Score**

|              |                      |                      |                       |
|--------------|----------------------|----------------------|-----------------------|
| Pre-COVID    | 0.156***<br>(23.594) | 0.194**<br>(2.594)   | 0.457***<br>(2.954)   |
| During COVID | 0.157***<br>(21.229) | 0.460***<br>(11.399) | -0.087***<br>(-3.366) |

This table reports the regression results of the CSAD test using firms with higher governance scores based on the equation of  $CSAD_t = \alpha + \gamma_1 |R_{m,t}| + \gamma_2 R_{m,t}^2 + \varepsilon_t$ . The numbers in the parentheses are t-statistics.

\*Statistical significance at the 10% level.

\*\* Statistical significance at the 5% level.

\*\*\* Statistical significance at the 1% level

Next, the test was repeated on the samples of firms with a better governance score. Results were prepared in Table 4. Similar to the case of low governance score, the result shows that investors do not herd on the firms with higher governance score pre-COVID-19 era but evidence pointed to the herding were found in the

period during pandemics. A significant statistically negative  $\tilde{\alpha}_2$  coefficient indicates a strong case for herding. This result proves that investors have a herding tendency towards firms with better governance during the period of turbulence. The inclination towards the firms with better stock could be associated with investors looking for a haven to invest during a period of uncertainty. It could be interpreted that investors are rationally herding; only following the market movement on selected firms with lesser governance risk but refusing to follow the sentiment on a more risky investment.

## **5. Conclusion**

The ongoing COVID-19 pandemic has generated an atmosphere of confusion and panic in financial markets, resulting in high uncertainty, heavy concentration on the market, poor yields, and relatively high difficulty to leverage newer investments. This study, therefore, investigates the likelihood of herd behavior in the Indian stock market. Utilizing the daily data from the BSE100 and employing the CSAD model for our investigation, we found that for the whole sample, herding was practiced during the pandemic era but not in the antecedent period.

Next, we divided the firms into two groups based on the governance score and discovered the absence of herding activity for both groups before COVID. The test also revealed investors' tendencies to herd during the period of uncertainty as we reported a strong case for herding behavior on the group of firms with higher governance scores in the period of COVID. As for the low governance score firms, the result failed to provide statistically significant support to herding activity thus suggesting that low governance score does not significantly factor in investors practicing herding. There are several justifications for this. First, this result could indicate that investors view low governance score firms as riskier due to lack of transparency and information. Secondly, it could also be because investors largely reduce their trading activity on these firms and choose to invest more in firms with better information dissemination as argued by Choi & Skiba (2015) and Galariotis *et al.* (2015). In the case of firms with better governance scores, statistically significant herding behavior was found during the COVID era. The herding inclination towards the firms with better stock could be associated with investors looking for a safe haven to invest during a period of uncertainty. It interprets that investors are indeed rationally herding; by only following the market movement on selected firms with lesser governance risk but refuse to follow the sentiment on a riskier investment. We believe our findings contribute to the existing studies on herding especially during

the pandemic and periods of stress. We also believe it could prove to be a catalyst for future research on the relationship between herding and governance.

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