HERDING BEHAVIOUR IN STOCK MARKET OF INDIA DURING FINANCIAL CRISIS & COVID-19 PANDEMIC

Dr Dhanraj Sharma[1] Dr. Ruchita Verma [2] Heavendeep Singh [3]

ABSTRACT

Investors sometimes decide on their investment based on overall market direction and believe that smart money or big investor has better information than them and they overlook analysis on their own and start doing what mass or crowd is doing and that's the situation of herding. Where they forget the fundamental of a particular stock and start deciding according to the market and make irrational decisions and the market inefficient. So, in this paper, we study the herding behaviour during the global financial crisis and the Covid-19 pandemic Indian stock market (NSE). We collect data on the daily closing of 132 companies and the Nifty 50 from the official website of NSE. We calculate daily return from daily closing price by using log return. Data consist of 132 companies belonging to 19 different Industries. Nifty 50 daily return is taken as the market return to check the deviation of stock returns from the market. The study period for this study is 1st April 2000 to 31st March 2021. The study period is further divided into sub-period of 5 pre-financial crisis, during the financial crisis, after the financial crisis, covid-19 pandemic, post covid-19 pandemic (starting of unlocking) to analyse the herding behaviour in the stock market of India. We are using Chang et. al. (2000) CSAD Regression methodology for the analysis of herding. The result are showing no herding behaviour in the stock market of India during any period of the study.

Keywords: Indian stock market, Anomalies, Herding, CSSD & CSAD

INTRODUCTION

When it comes to money & finance the people are so cautious about these things. They do all the research and the effect while investing the money or park the money in any type of assets class.

1 Assistant Professor, Central University of Punjab, India, dhanrajsharma@cup.edu.in
2 Assistant Professor, Central University of Punjab, India, ruchitaverma@cup.edu.in
3 Research Scholar, Central University of Punjab, India, singhheavendeep@gmail.com

They behave rationally in this regard. If we think about this that's half true as there some situations arise in the stock market where the investor overlook their research and think that others who have better funds & resources have better information & idea they start to follow them and make their decision on the influence of other and overlook their study and analysis in this regard. That's lead to irrational decision making. Guo, W. C., & Shih, H. T. (2008). When the crowd start moving one side that is herding. They forget about the stock quality that they are holding and sell them in case of crash & do not even think about the potential of the company.

The Fama (1970) EMH (efficient market hypothesis) sys that the market price of the share includes all the information available in the stock price & no one can beat the market. But there is the situation where the market behave inefficiently & one of the cases is the herding behaviour where the investor does not behave efficiently & rationally instead they follow the crowd. This creates the opportunity for the traders to take the advantage of the inefficiency of the market & earn supernormal returns. (Tversky & Kahneman 1986) Some anomalies happen once & vanished from the stock market & some anomalies remain continually in the market. Herding behaviour is normally considered a short duration phenomenon. Happened in a short period & disappeared. In countries with high inefficiency, it remains in long run.

The researcher found different empirical evidence from the different stock markets regarding the herding behaviour like herding behaviour at a firm-level like Ferreruela & Mallor (2021) Ouarda, Bouri & Bernard (2013) & also herding behaviour at fund manager level like Yan & Zhang (2020), Liao, Huang & Wu (2011) & Burch, Emery & Fuerst (2016). Some others even say that the herding behaviour is short inefficacy and in long run, it is not there in the market. There are different types of the study conducted to understand the reason behind the herding behaviour. This study found that at the level of retail investor there is some behaviour factor that causes the herding behaviour such as underestimating own analysis, fear & Overconfidence Kahneman, D. and Riepe, M. (2003). In the case of the fund manager, the herding behaviour Yan & Zhang (2020) found because of performance pressure of funds. That's why they buy the same stocks in their portfolio which is mostly picked by the experience fund manager. This paper is organized into 5 sections first introduction & second section deal with a brief literature review, research gap, objectives & hypothesis formation in the third section we discuss the Research methodology used for data

collection, sampling, study period & analysis model in the fourth section we discuss the results of the study in the fifth section we discuss the conclusion & implication of the study.

LITERATURE REVIEW

Behavioural finance is the new recent developed branch of finance but herding behaviour is well documented in the literature. There are lots of studies that have been done at national & international levels as well. At the international level Adem, & Sarıoğlu (2020) measure the herding behaviour in the Istanbul stock market Blasco, Corredor & Ferreruela (2012) focused on analyzing Herding behaviour in the Spanish stock market. Chiang & Zheng (2010) measured the herding behaviour in 18 different countries during the different market conditions Economou et al. (2011) examined the potential asymmetries of herding effects concerning the sign of the market return, trading activity and volatility in Portuguese, Italian, Greek and Spanish market (PIGS). Economou, Hassapis & Philippas (2018) analyzed the herding behaviour during the up & down market condition in the developed market of the USA, UK & Germany. Filip, Pochea & Pece (2015) investigated herding behaviour in CEE (Czech Republic, Poland, Hungary, Romania and Bulgaria) countries Chiang et al. (2013) conducted the study in 5 developed stock market names as Australia (AU), Japan (JP), Hong Kong (HK), Singapore (SG), and the United States (US) and also included 5 emerging markets name as China (CN), South Korea (KR), Thailand (TH), Indonesia (ID), Malaysia (MA), and Taiwan (TW). Kabir & Shakur (2018) conducted a study in Asian and Latin American Stock markets regarding the herding behaviour

At the national level, we have Lao & Singh (2011) conducted a study on the top 2 most populated countries stock market based on the total number of people to analyse the herding behaviour in these Asian stock markets including India. Dhall & Singh (2020) applied the event study methodology to examine the herding behaviour during the whole, pre-and post-coronavirus disease 2019 in the Indian stock market. Bharti & Kumar (2021) examined the herding behaviour in the Indian stock market by taking the market-wide index nifty fifty during the covid-19. They also considered the government measurement to reduce the herding behaviour in the market

In recent times Researchers were interested in analyzing the herding behaviour during the COVID-19 pandemic time in different stock exchanges Ferreruela & Mallor (2021) analysed the herding behaviour in Portugal and Spain stock market. The study period of January 2000 to May 2021

includes 5 sub-periods as well. Akhtaruzzama, Boubaker & Sensoy (2021) in China & G7 countries Hsiao (2014) on Chinese stock market to examine the impact of Covid-19 on the outcome of the stock market of China. Bharti & Kumar (2021) examined the herding behaviour in the Indian stock market by taking the market-wide index nifty fifty during the covid-19. Dhall & Singh (2020). Most of the studies above were conducted on the market level but there is some study that was conducted on the sector level as Kabir (2018) examined herding behaviour at the market level, Financial Sector level & Sub financial sector level. Akhtaruzzama, Boubaker & Sensoy (2021) for financials & non-financials frim to check how financial contagion

Herding did not remain limited to retail investors some studies also study the retail investor while others have done on fund manager herding behaviour. Al-Awadhi et al. (2020) conducted the study by using event study methodologies of Baltagi (2008) Hudson, Yan & Zhang (2020) used cross-sectional dispersion of portfolio betas for analysis of the existence of herding behaviour in institutional level investors in the UK stock market. Herding was found in this study among the fund's managers on the market portfolio, size, and value factors. Liao, Huang & Wu (2011) by using the trinomial-distribution approach to measure manager herding & Lakonishok et al. (1992) method, conducted a study in the US market regarding the role of investor sentiment in funds managers herding behaviour. The study found a significant role of investor sentiment in funds manager herding, a more significant role on the sell-side in the herding of funds manager. Burch, Emery & Fuerst (2016) used the microstructure trading measures to examine the trading and volume pattern among different investors category (retail and Institutional) during the 9/11 attack in the us stock market. The study found selling pressure from a retail investor with volume can impact the stock price even the institutional investor trading the other side. In some cases, the retail investor decision was not impacted by the institutional investor selling pressure maybe because of retail investor diversified the portfolio in a better way.

Studies found mixed results in their studies during the full period of study they found herding in some sub-periods Ferreruela & Mallor (2021) the study found that more herding behaviour in this market pre-financial crisis but not during the financial crisis and come back after and not found during the Covid-19. Akhtaruzzama, Boubaker & Sensoy (2021) The study found more financial contagion in financial firms in these countries than non-financial maybe because of the more important role played by this sector. Ouarda, Bouri & Bernard (2013) found strong evidence of

herding behaviour in a bearish market and the most impact of herding was found in the financial and technology sector during the financial crisis. Adem, & Sarıoğlu (2020) found investor behave rationally when the market rises and do herd when the market fall and take the irrational decision. Blasco, Corredor & Ferreruela (2012) study result showed herding behaviour exist in the market and consider rational and irrational factor in the intensity of the herding. Chiang & Zheng (2010) Study found herding in advanced stock markets (except the US) and in Asian markets and in both market conditions up and down markets. Vieira & Pereira (2015) results show that herding intensity is negative and statistically significant, to conclude that we can say that investors systematically mimic each other. Economou et al. (2011) study found herding behaviour at Greek & Italian Stock market. Economou et al. (2015) found herding behaviour. Economou, Hassapis & Philippas (2018) study found asymmetric herding behaviour under different sub-periods & market states and also found Cross market herding behaviour as well in the selected market. Filip, Pochea & Pece (2015) study found asymmetric herding behaviour under different sub-periods, market states and cross-market herding as well. Kabir (2018) study found the greater influence of the global financial crisis on herding for commercial and investment banks, and in the down market such herding increases. Bharti & Kumar (2021) the study found that the measurement taken by the government during the pandemic was successful in reducing the herding behaviour in the market. Dhall & Singh (2020) The result showed three outcomes anti-herding before Covid 19 period & found herding during the outbreak of covid 19 after that during the post covid period herding behaviour was found at the industry level only.

Lots of studies have been done on herding behaviour in different countries at the international level & national level. Herding behaviour is well documented in the literature review. In recent times the study is not done in Indian stock related to herding behaviour using this many companies. The study is done in COVID-19 related at the industry level by taking the industry index. No study is taken the nifty 500 index & this many companies as the sample. But as the literature defines the herding behaviour is the small period scenario that happened and disappear. So it is important to study this scenario in recent times. This study will provide the literature with a better view it is considering more companies. The companies' most liquid stocks of the market give a better overlook of the Indian stock market. From the point regulator point view, the regulator can use the outcome of the study to make them more efficient & better for investors & traders.

The study primarily focuses on the analysis of the herding behaviour of investors in the Indian stock market during the global financial crisis and the Covid-19 pandemic. Do investors herd or take decisions rationally related to their investment.

RESEARCH METHODOLOGY

Data & Study Period

The data for this study is collected from the official website of NSE for all the companies. We collect data from 1st April 2000 to 31st March 2021. We collect data closing price of all securities and further calculated the daily returns from the daily closing price. We are using NSE 500 index daily returns as a market return for analyzing herding behaviour. The whole Study period is further divided into 5 sub-period.

Table 1 s shows the study period that is used for the study we study the herding behaviour in 5 sub-study periods as well. The complete study period is from 1-04-2000 to 31-03-2021 recent 21 financial years. The first sub-period is from 01-04-2000 to 30-08-2008 as the pre-financial crisis period as the financial crisis is hit after that. The second sub-period is the financial crisis that is from 01-09-2008 to 01-04-2009 as the financial crisis period. The third sub-period is the post-financial crisis that is from 06-04-2009 to 24-01-2020. The fourth sub-period is from 28-01-2020 to 29-05-2020 which is the Covid-19 pandemic period. This period is taken as covid-19 pandemic as on 28-01-2020 first covid-19 case was found in India. The last of the fifth sub-period is from 02-06-2020 to 31-03-2021 which is Post-Covid 19 Unlocking Phase. The first unlock phase started in was 02-06-2020.

Table 1 - Study Period Considered

Sr No.	Study Period	Number of trading Days	Type
1	01-04-2000 to 31-03-2021	4991	Complete
2	01-04-2000 to 30-08-2008	2131	Pre-Financial Crisis
3	01-09-2008 to 01-04-2009	119	Financial Crisis
4	02-04-2009 to 24-01-2020	2446	Post-financial Crisis
5	28-01-2020 to 29-05-2020	83	Covid 19 Pandemic
6	01-06-2020 to 31-03-2021	212	Post-Covid 19 Unlocking Phase

Sources- The Authors

Sampling and Sample Profile

In literature, we found that (Ferreruela & Mallor (2021) Ouarda, Bouri & Bernard (2013), Blasco, Corredor & Ferreruela (2012), Vieira & Pereira (2015), Economou et al. (2015) Filip, Pochea & Pece (2015)) these studies are using market indices return & individual stocks return as variable to analysis the herding behaviour. We are using the purposive sampling method of Non-probability sampling for data collection. We select the companies which are under the Nifty 500 Index only. We have 501 companies that are included in NSE 500 index. We eliminates all those companies which we listed during the period of study so the remaining companies were 190. We further eliminated those companies for which data is not available any time during the study period due to any reason delisting demerger, merger or data missing. So after all eliminations, we ended up with 132 companies as the sample that belongs to 19 different Industries.

Table 2 is showing the sample profile of the companies which are taken as the final sample. As we can see that we have total companies of 132 from the NIFTY 500 index as final companies as the sample. Further, we can see these companies belong to 19 different industries. We have the top three industry consumer goods with 21 companies & Industrial Manufacturing companies that are equal to 21 & 15 pharma companies.

Table 2:- Sample Profile

SR. NO.	INDUSTRY	NUMBER OF COMPANIES
1	AUTOMOBILE	10
2	CEMENT & CEMENT PRODUCTS	9
3	CHEMICALS	10
4	CONSTRUCTION	1
5	CONSUMER GOODS	21
6	CONSUMER SERVICES	1
7	FERTILISERS & PESTICIDES	3
8	FINANCIAL SERVICES	14
9	HEALTHCARE SERVICES	1
10	INDUSTRIAL MANUFACTURING	21
11	IT	8
12	METALS	3
13	OIL & GAS	6

14	PAPER AND JUTE	1
15	PHARMA	15
16	POWER	3
17	SERVICES	3
18	TELECOM	1
19	TEXTILES	1
TOTAL COMPANIES		132

Sources: Compiled from NSE Website

Methodolgy

Literature is showing the different types of methodology Dynamic Conditional Correlations (DCCs) & VARMA (1,1) DCC GARCH model used by Akhtaruzzama, Boubaker & Sensoy (2021). Vieira & Pereira (2015) used the Schmeling (2009) and Vieira (2011) methodology. Patterson and Sharma (2006) used Blasco, Corredor & Ferreruela (2012) methodology. Economou, Hassapis & Philippas (2018) followed Chiang and Zheng (2010). The most used methodology by the researcher are CSAD or CSSD or both is mostly used methodology in literature Ferreruela & Mallor (2021) Ouarda, Bouri & Bernard (2013) Adem, &Sarıoğlu (2020) Chiang & Zheng (2010) Economou et al. (2011). Economou et al. (2015) Filip, Pochea & Pece (2015). Mobarek, Mollah & Keasey (2014),

We are using Chang et. al. (2000) CSAD Regression methodology to analyse the herding behaviour in the stock market during the different periods of the study. Christie and Huang (1995) gave Cross-Sectional Standard Deviation (CSSD) method to analyse the herding behaviour. In this methodology, they use a linear regression model. Herding is measured in two different situations of the market. Market up & market down. Right tale & left tale is used as a dummy variable in this methodology. The equation of the methodology is given below.

CSSD equation

$CSSD= a+b_1UP+b_2DOWN+e$

(Here CSSD is cross-sectional standard deviation, a is constant, b_1UP is an upmarket condition, b_2DOWN is the market down condition & e is the error term)

Chang et. al. (2000) gave Cross-Sectional Absolute Deviation (CSAD) Regression method to analyse the herding behaviour as there was some problem with the previous method given by Christie and Huang (1995) further as improvement this method by adding a total of three variables. This method is better for detecting herding behaviour. In this method instead of using standard deviation, the absolute deviation is used. In the method, the deviation is calculated from the market return. In this method deviation is calculated from the market, absolute deviation and square market deviation is used. The equation of this model is given below.

Equation for CSAD

$CSAD= a+b_1r_m+b_2|r_{m|}+b_3r^2_m+e$

(Here CASD is cross-sectional Absolute Deviation, a is constant, b_1r_m is the deviation of market return from CASD, $b_2|r_m$ is the absolute deviation of market return from CASD $_|+b_3r^2_m$ is square of deviation of market return from CASD & e is error term)

In this study, we are using the CASD model for analysis of herding behaviour as it gives better results in the case of detecting herding behaviour compare to the previous method.

In this method, if the $b_3r^2_m$ is found to be negative significantly then that means there is herding behaviour in the market. If that's positive that means the market behave significantly rationally.

RESULTS AND DISCUSSIONS

Descriptive Statistics

We are using a descriptive status for analysis. As we can see from table number 3 we have descriptive stats for the different periods for market returns & CSAD returns. We have a different number of observations for the different periods. We have a maximum observation of 4991 for the complete period & a minimum observation of 83 for the COVID-19 period. We have a maximum mean return for the market is in the post-Covid 19 periods with .20 % daily return & negative daily means returns is -0.24% in the period of covid-19. That means there was €v shape recovery during the post-covid 19 periods. The maximum one-day negative market return was 12.98% during the pandemic time. The maximum return per day for the market is 17.74% during the post-financial crisis. The highest volatility in the market was during the financial crisis as we can see the highest standard deviation & variance during that time & lowest during the post-covid 19 phases.

Table 3- Descriptive Stats of Market & CSAD Returns

	Complete		**Pre-Financial Crisis**		**Financial Crisis**		**Post-financial Crisis**		**Covid-19 Pandemic Period**		**Post-Covid-19 Unlocking Phase**	
	CSAD	MKT	CSAD	MKT	CSAD	MKT	CSAD	MKT	CSAD	MKT	CSAD	MKT
N	4991	4991	2131	2131	119	119	2446	2446	83	83	212	212
Mean	2.15	0.06	2.43	0.06	3.58	-0.17	1.85	0.06	2.76	-0.24	2.08	0.20
Median	1.96	0.10	2.27	0.15	3.05	0.02	1.73	0.06	1.95	-0.18	1.91	0.28
Variance	0.69	2.11	0.62	2.58	2.06	10.15	0.34	1.25	3.95	9.79	0.41	1.23
Std. Deviation	0.83	1.45	0.78	1.61	1.44	3.19	0.59	1.12	1.99	3.13	0.64	1.11
Minimum	1.05	-12.98	1.29	-12.24	1.98	-12.20	1.05	-5.91	1.19	-12.98	1.24	-3.76
Maximum	15.34	17.74	10.60	8.30	10.85	6.99	15.34	17.74	13.03	8.76	5.56	4.74
Skewness	3.83	-0.20	2.73	-0.48	2.00	-0.34	6.71	1.64	2.74	-0.79	1.87	-0.35
Kurtosis	32.05	11.00	14.93	4.24	5.45	0.92	121.88	27.40	9.35	3.65	5.10	1.63

Sources- The Authors

Herding behavior Result

We are using the CSAD model for the analysis of herding behaviour. As we can see the result of herding behaviour is shown in table number 4. As we can see that we have three different variables in this model. Deviation returns from the market, Absolute deviation returns & Square deviation returns. R Square values are showing the model how much percentage of the dependent variable is explained by the independent variables. As we can see that the values are in the case of R square in most of the period except the Post-Covid-19 Unlocking Phase.

Table 4 – Herding Behavior Result

Complete Period					
	Constant	$b_1 r_m$	$b_2 \lvert r_m \rvert$	$b_3 r^2_m$	R Square
Coefficient	0.016^{***}	0.016^{***}	0.530^{***}	2.285^{***}	0.743
T-stat	166.997	3.887	56.830	17.477	
P-value	0.000%	0.010%	0.000%	0.000%	
Pre-Financial Crisis Period					
Coefficient	0.019^{***}	0.029^{***}	0.392^{***}	3.864^{***}	0.708
t-stat	116.194	4.975	23.331	13.048	
P-value	0.000%	0.000%	0.000%	0.000%	
Financial Crisis Period					
Coefficient	0.022^{***}	0.068^{***}	0.396^{***}	3.712^{***}	0.905
t-stat	26.754	4.999	8.159	6.471	
P-value	0.000%	0.000%	0.000%	0.000%	
Post-financial Crisis Period					
Coefficient	0.014^{***}	-0.003	0.503^{***}	1.890^{***}	0.722
t-stat	148.161	-0.588	46.799	14.433	
P-value	0.000%	55.63%	0.000%	0.000%	
Covid-19 Pandemic Period					
Coefficient	0.012^{***}	0.014	0.608^{***}	2.652^{***}	0.989
t-stat	31.581	1.657	24.100	10.021	
P-value	0.000%	10.14%	0.000%	0.000%	
Post-Covid-19 Unlocking Phase					
Coefficient	0.018^{***}	-0.009	0.160	14.984^{***}	0.485
t-stat	27.260	-0.319	1.583	4.779	
P-value	0.000%	74.99%	11.49%	0.000%	

Sources- Authors Computation

*(*** Means Results are statistically significant at 1 % level)*

R square value for the different periods can be seen from table 4 as we have the highest value of 0.989 which means the model ability to explain the dependent variable value from the independent variables is almost 98.9% for the period of the Covid-19 Pandemic Period and we have the lowest value of R square is 0.485 which means we are to explain 48.5% of the dependent variable using the independent variables. For the complete period, we have an R square value is 0.743 which means 74.3% of we can able to explain dependent variable using independent variables.

As we can see from table No. 4 we have a different period for analysis of the herding behaviour. We have a total of 6 periods to analyse the herding behaviour. As we discuss in the methodology part as well, in the case of the CSAD model we need to see the Square deviation returns to see the herding behaviour if the Coefficient of the Square deviation returns is negative & we have a statically significant value then we can say that there is herding behaviour in that stock market. As we can see from table 4 we do not have any negative coefficient value for any of the periods of square deviation returns. In Post-financial Crisis Period & Post-Covid-19 Unlocking Phase we can see negative value in case of deviation returns but that is not significant. So as a finding we can say that market is performing efficiently during the complete study period as well as sub-periods as well when we use the return of multi-cap index of nifty as NIFTY 500. And the selected companies as the sample.

CONCLUSION

We analyse the herding behaviour using the Nifty 500 index as a market return for the Indian stock market. We collected closing price data from NSE official website for 132companies & Nifty 500 index data from 1-4-01- to 31-3-21 & we further divided the study period for a different event to analysis period according to as mentioned in the lecture, herding is a short term scenario. We used the CSAD method over the CSSD for analysis purposes as it has advantages over CSSD as it uses non-linear regression.

Our study did not find any herding behaviour during the complete period. Further after dividing the complete period into sub-period still, we were unable to find any evidence of the herding behaviour in our study. Our study results are the same previous done study by Satish (2018) who conducted the study in the Indian stock market during the financial crisis & did not find any

evidence of herding while Gupta (2019) & Chauhan et. al. (2019) found herding behaviour in the Indian stock market that is different from our result. That may be because of the study period & lower sample in that study. In the recent period, the study that is conducted in the Indian market is by Dhall & Bhanwar (2020) in this they took sector indices & sectoral stock to study the herding behaviour and found herding behaviour in sector indices but our study use market indices of multi-cap which is not showing herding behaviour that is different from the result of Dhall & Bhanwar (2020) study result. But for the covid –19 period, our results are matching with Ferreruela & Mallor (2021) study result that also did not find any herding behaviour at Spain & Portugal stock market.

This study result will be helpful for the researcher to help them to search further related areas by taking the herding behaviour in other class assets with the share price. For investors & traders to help them take the better decision using these results as the traders & investors become emotional & take the decision wrongly in short scenario volatility. Results are also helpful for the regulator to make the market more efficient & protect investor interest.

The study has its limitation as we are using the nifty 500 as market returns Nifty 50 can be used as market returns we also have another market as well Bombay stock exchange where we have the Sensex index which also can be used as market return. We are using the limited stock as a sample due to the longer period and unavailability of data. In the shorter period, we can increase the number of companies to analyse the herding behaviour that can give a good picture as well. The study is limited to market returns only we are not taking particular sector or theme indices to analyse herding behaviour.

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