

Does Herding behavior exist in Indian Futures Market?

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Abstract

Study aims to make clarity on the herding behavior of Indian futures market by considering near month daily closing return of S&P CNX Nifty 50 and its 15 individual near month futures stock return, applying CSAD model and OLS linear regression for the period of 2001-2018. The whole study period is divided as bull and bear market and makes separate analysis to find the presence of herding behavior in different market situations. The empirical results proved the absence of herding behavior in Indian futures market and very minimal level of mimic characteristics is seen in bear than bull market in India.

Key Words: - Herding Behavior, Futures market, Bull market, Bear market, CSAD Model

Introduction

Herd behavior is an important concept in the field of behavioral finance which is a very common investing psychology seen in most investments. It represents the tendency for an individual to mimic the actions of others (*Chang et al. 2000*). Herd behavior describes how individuals in a group can act collectively without centralized direction (*Harminder Singh 2011*). It is a set of decisions and actions that an individual would not necessarily make on his or her own. Herding, when considered in financial decision making, is phenomenon where an economic agent tends to imitate the investment choice of other investors, or a group, and forsakes their own private information (*Ahmed et al. 2015*). Herding behavior influence the market movements by change in asset prices and increasing price volatility. It is associated with nonlinearities in the structure of returns. In the case of herding, investors make investment decisions based on collective actions of the market, instead of trading based on their individual beliefs. The absence of herding behavior indicates an efficient market. The aim of the present study is to detect whether there is herding behavior in Indian futures market or not. Ultimately futures market for hedging purpose for short term period and it normally follows the trend of the market. The assumption on the futures market and its movements are following a trend of the market. With this presumption, it can be studies that whether the mimic characteristics is the behavior of Indian futures market and this results will help the hedgers and investors to take appropriate action on their financial decisions.

Relevance of the study

Herding behavior may be seen to be individually rational on a number of grounds although it may not necessarily lead to efficient outcomes (*Hwang and Salmon, 2004*). Thus it is important to study the irrational behavior of investors who follow the investment decisions of others in stock market which will help the investors to make strategic investment decisions. An important reason for herd behavior is that the more people make a decision, the less likely it is that the decision is incorrect. Identifying herd behavior will helps the investors to make strategic investment decisions. In Indian context, the behavior and efficiency of stock market were studied by many researchers and found the level of efficiency, different behavioral pattern in various market situations and especially herding behavior of spot market. But it is very rare to see the study which analyses the herding behavior of Indian futures market in a deep manner. Thus, the primary concern of the present study is to test for the presence of herding behavior in Indian futures market. For this purpose, study used the methodology of Cross Sectional Absolute Deviation (CSAD) of returns proposed by Chang et al.

(2000) which is an extension of Cross Sectional Standard Deviation (CSSD) model by Christie and Huang (1995). The analysis is made on the daily closing prices of S&P CNX Nifty-50 index, and its constituent stocks. For getting the clarity of results, the market movements are separated such as bull market and bear market and apply same methodology for the analysis. Herding behavior is the indication of inefficiency of the market for a short period. This result makes more clarity toward the financial decisions of the traders and investors in spot market and its corresponding futures market.

Review of Literature

There are number of research studies all over the world relating to herd behavior in stock markets and the present study reviewed various literatures from this field. Most of the authors empirically investigated the presence of herd behavior in their studies and some others focused on the theoretical part of herding behavior. Gleason et al. (2003) observed the existence of herding behavior in commodity futures traded on European exchanges, Christie and Huang (1995), Nofsinger et al. (1999), Cheng and Khorana (2000), Mamduh M. Hanafi (2003), Chen et al. (2003), Kim et al. (2003), Hwang and Salmon (2004), Kim and Nofsinger (2005), Demirer et al. (2015), Ulussever and Demirer (2017) found no significant effect of herding behavior in different market in developed, developing and under developed economy. Demirer and Kutan (2006) and Hachicha et al. (2007) found absence of herd formation in Chinese markets and Tunisian stock market. Caporale et al. (2008) examined herd behavior in the Athens Stock Exchange and found evidence for its presence while the study by Tessaromatis et al. (2009) found little evidence of herd behavior in the Athens Stock Exchange. Kallinterakis et al. (2009), Shyu et al. (2010), Fu and Lin (2010) Demirer, Kutan and Chen (2010), Chiang and Zheng (2010), Agarwal et al. (2010), Ayhan Kapusuzoglu (2011), Belhoula and Naoui (2011), My and Truong (2011), Khan et al. (2011), Khoshsirat and Salari (2011) found presence of herding behavior in different developed markets. Chiang et al. (2012) in Chinese market, Mohammad Al-Shboul (2012) in Australian Stock, Seetharam and Britten (2013) in the South African, Mohammad Al-Shboul (2013), Javed et al. (2013) and Ahsan and Sarkar (2013) also showed the absence of herd behavior in the Jordanian equity market. The institutional herding and informational bias were identified by Lin et al. (2013) in Karachi Stock Exchange and Ouarda et al. (2013) in European market. The evidence of herding from developed economy in different market movement was proved by Gleason et al. (2004) Tan et al. (2008), Kremer and Nautz (2013), Le and Truong (2014), Ting Lan (2014), Malik and Elahi (2014), Solakoglu and Demir (2014), Loan et al. (2014), Mobarek et al. (2014), Filip et al. (2015), Nha D., Loan T. B. and Nhung T. T. (2015), BenSaida et al. (2015) and Vieira and Pereira (2015). Hilal Humeyra Ozsu (2015) revealed that there was no evidence of herd behavior in both up and down markets. The application of Chang et al. (2000) and Christie and Huang (1995) models found no evidence for many studies made by Sias (2004), Ahmed et al. (2015), Economou et al. (2015), Zafar and Hassan (2016), Cakan and Balagyozyan (2016), Joseph Abuga Orayo (2016) and Setyawan and Ramli (2016), Guney et al. (2016), Gong and Dai (2017) and Brodocianu and Stoica (2017). Chang and Su (2017) revealed that investors in the US stock market have no herding behavior both for general stocks and high-risk stocks while significant evidence of herding was found by Arjoon and Bhatnagar (2017). Lee et al. (2018) made a study to investigate herd behavior in global stock markets and conducted an intercontinental comparison, Kim et al. (2013) and Dhaene et al. (2012) revealed that herd behavior and stock index were negatively correlated. Herding behavior in mutual fund also was studied by many researchers and found the presence and absence of the tendency. The results of the empirical evidence made by Grinblatt, Titman and Wermers (1995), Russ Wermers (1999), Bikhchandani and Sharma (2001), Dasgupta et al. (2011), Paulo Lao and Harminder Singh (2011), Arouri et al. (2013), Banerjee and Padhan (2017) and Kallinterakis et al. (2017) supported the presence of herding in different markets and the absence of such movement is revealed by Anandadeep Mandal (2011), Prosad et al. (2012), Garg et al. (2013), Abbi et al. (2014), Ashish Kumar et al. (2016), Ganesh et al. (2016) and Ashish Kumar and Bharti (2017). A positive influence of FII on mimic tendency was proved by Mangesh Tayde et al (2011), Archana Patro and A. Kanagaraj (2012) and M.V.Lakshman (2013).

Objectives of the Study

1. To study the presence of herding behavior in Indian Futures market
2. To study the existence of herding behavior in Bullish and bearish market trend in Indian futures market

Hypotheses of the Study

- H₀₁ There is no herding behavior in Indian futures Market.
- H₀₂ There is no herding behavior in Bullish trend of Indian Futures market.
- H₀₃ There is no herding behavior existed in bearish trend of Indian Futures market.

Methodology

Variables used in the study

Near Month Daily closing prices and return of S&P CNX Nifty 50 futures index and 15 sample stocks, Dependent Variable – Cross Sectional Absolute Deviation (CSAD), Independent Variable – Market Return (R_{mt}) of NSE Nifty 50 futures index, Where, CSAD is the absolute average of the total of the difference between the return of individual stock futures and the market return futures. In this study, CSAD series are applied to the data. Market Return (R_{mt}) is the return of the Nifty Fifty Index for the period. The value of R_{mt} is squared (R_{mt}^2) and then applied to the formula for the analysis of the data. OLS Regression is used to find the presence of Herd Behavior in Indian Futures market for the period of 2001-2018.

Model Applied for the Analysis

For the purpose of testing the herding behavior in the market the least squares regression analysis is performed using the methodology of Cross Sectional Absolute Deviation (CSAD) proposed by *Chang et al. (2000)*. The model tests whether the relationship between CSAD and futures market return are linear or not and a non-linear relationship is expected for the presence of herding. The daily CSAD values of futures stock returns were computed by using the following equation:

$$CSAD_t = \frac{1}{n} \sum_{i=1}^n |R_{it} - R_{mt}|$$

Where $CSAD_t$ is the Cross Sectional Absolute Deviation of stock returns at time t . It is the absolute value of the average of the total of the difference between the expected return of individual securities and market return. n is the number of securities, R_{it} is the future return on stock i at time t and R_{mt} is the future market return at time t . CSAD decreases if herding is present. The observed stock return for individual company share can be calculated as;

$$R_{it} = \ln\left(\frac{P_t}{P_{t-1}}\right) * 100$$

Similarly, the market return at the time t , R_{mt} can be calculated as;

$$R_{mt} = \ln\left(\frac{CV_t}{CV_{t-1}}\right) * 100$$

The study uses the following OLS regression equation to demonstrate the herd behavior.

$$CSAD_t = \beta_0 + \beta_1 |R_{mt}| + \beta_2 (R_{mt}^2) + \epsilon_t$$

Where β_0 , β_1 and β_2 are the regression coefficients, ϵ_t is the error term and $|R_{mt}|$ is the absolute market return at time t . For herding should be present, β_2 should be negative and significant.

Herding is also examined during bull and bear markets by using the following regression equations:

$$CSAD_t^{up} = \beta_0 + \beta_1^{up} |R_{mt}^{up}| + \beta_2^{up} (R_{mt}^{2up}) + \epsilon_t$$

$$CSAD_t^{down} = \beta_0 + \beta_1^{down} |R_{mt}^{down}| + \beta_2^{down} (R_{mt}^{2down}) + \epsilon_t$$

In this case, the negative and significant β_2^{up} and β_2^{down} indicates the presence of herding. The relationship between CSAD and market returns increase at a decreasing rate, or decrease if herding exists in the market.

Analysis and Interpretation

Descriptive Statistics of Return Series of Nifty 50 Futures Index and 15 Sample Stocks for the period 2001-2018

Stock		Mean	Median	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Prob.	Obs.
NIFTY50	Whole	2.344	3.050	66.011	-0.215	9.41	7120.42	0.00	4141
	Bull	44.346	29.275	46.142	2.630	19.92	28832.80	0.00	2204
	Bear	-45.495	-27.000	51.012	-2.512	14.20	12155.84	0.00	1935
BPCL	Whole	0.047	0.050	15.746	-15.600	513.83	45192799.02	0.00	4141
	Bull	3.566	2.450	11.201	-3.134	85.27	625202.90	0.00	2204
	Bear	-3.956	-3.200	18.911	-18.121	501.63	20152201.49	0.00	1935
CIPLA	Whole	-0.110	0.000	19.489	-36.375	1833.59	579113134.54	0.00	4141
	Bull	2.235	1.750	23.568	-36.547	1585.70	230527543.43	0.00	2204
	Bear	-2.778	-2.050	12.923	-16.051	497.07	19763904.55	0.00	1935
DRREDDY	Whole	0.276	0.750	35.234	-3.772	77.81	975522.13	0.00	4141
	Bull	7.739	5.400	35.146	-4.689	102.64	919859.85	0.00	2204
	Bear	-8.230	-5.900	33.373	-3.344	64.59	309416.29	0.00	1935
GRASIM	Whole	0.175	0.000	75.541	-34.583	1809.28	563765266.29	0.00	4141
	Bull	18.283	11.425	41.063	0.405	21.86	32729.31	0.00	2204
	Bear	-20.454	-10.650	97.443	-34.004	1369.29	150879531.81	0.00	1935
HDFC	Whole	0.289	0.000	50.782	-25.329	1209.87	251754380.33	0.00	4141
	Bull	11.840	6.925	61.009	-27.625	1111.24	113069483.08	0.00	2204
	Bear	-12.866	-6.800	30.907	-2.179	14.57	12321.90	0.00	1935
HINDALCO	Whole	-0.095	0.050	21.887	-45.245	2586.53	1153064712.39	0.00	4141
	Bull	2.628	1.625	28.282	-39.562	1758.75	283667215.34	0.00	2204
	Bear	-3.183	-1.800	9.801	-2.898	23.36	36144.77	0.00	1935
HINDPETRO	Whole	0.031	0.000	16.149	-29.545	1454.33	364037195.01	0.00	4141
	Bull	2.627	2.050	19.795	-30.357	1225.93	137680788.38	0.00	2204
	Bear	-2.927	-2.700	9.769	-0.852	12.58	7641.12	0.00	1935
HINDUNILVR	Whole	0.346	0.000	7.576	0.991	13.31	19025.26	0.00	4141
	Bull	2.457	1.350	7.385	1.860	17.58	20798.69	0.00	2204
	Bear	-2.063	-1.600	7.059	0.111	9.67	3593.64	0.00	1935
INFY	Whole	-0.392	0.850	97.971	-22.376	836.36	120173718.62	0.00	4141
	Bull	19.350	13.050	103.467	-28.873	1150.67	121263901.51	0.00	2204
	Bear	-22.874	-12.350	86.035	-13.878	306.41	7484241.83	0.00	1935
ITC	Whole	-0.093	0.100	29.508	-55.342	3386.00	1976798590.91	0.00	4141
	Bull	2.806	1.600	9.587	-0.467	71.80	434774.08	0.00	2204
	Bear	-3.398	-1.550	41.698	-41.757	1804.75	262296252.06	0.00	1935
M&M	Whole	0.195	0.400	22.406	-15.165	483.92	40064115.80	0.00	4141
	Bull	6.497	5.000	19.769	-11.983	310.61	8742296.66	0.00	2204
	Bear	-6.984	-4.350	23.079	-20.874	712.45	40721186.09	0.00	1935
RELIANCE	Whole	0.171	0.400	35.371	-10.877	335.18	19120854.14	0.00	4141
	Bull	11.413	7.025	30.337	-7.439	283.99	7270992.53	0.00	2204

	Bear	-12.628	-6.900	36.357	-16.190	468.20	17532698.63	0.00	1935
SBIN	Whole	0.014	0.300	52.419	-30.254	1518.27	396794880.72	0.00	4141
	Bull	13.554	5.675	63.182	-32.819	1379.42	174376322.17	0.00	2204
	Bear	-15.404	-6.100	29.801	-1.632	8.84	3608.22	0.00	1935
TATAMOTORS	Whole	0.043	0.250	16.223	-13.669	517.46	45795019.89	0.00	4141
	Bull	5.705	3.700	10.871	0.988	8.19	2835.72	0.00	2204
	Bear	-6.401	-4.000	18.726	-18.554	596.29	28490464.59	0.00	1935
TATASTEEL	Whole	0.115	0.250	12.345	-0.680	12.66	16422.20	0.00	4141
	Bull	5.518	3.800	10.217	1.130	8.43	3181.00	0.00	2204
	Bear	-6.036	-3.850	11.671	-2.184	19.17	22622.46	0.00	1935

Table shows the descriptive statistics of futures returns of Nifty 50 index and 15 sample stocks listed under the index for the period 2001-2018 and the whole period of the study is divided into bull and bear periods. Mean, median, standard deviation, skewness, kurtosis, jarque-bera test value and probability value are measured in order to check the basic behavior of the data series and the normality of the return series. The table shows that the average return of Nifty 50 index is 2.344 for the whole period, and 44.346 and -45.495 for the bull and bear periods respectively. The mid value of the series is 3.050 for the whole period of the study. Standard deviation is the degree of dispersion from the mean value and its value for the whole period, bull period and bear period is 66.011, 46.142 and 51.012 respectively. From the value of skewness, which is the degree of asymmetry of a distribution, it can be observed that the Nifty 50 futures return series during both the whole period and bear period is negatively skewed i.e. the return series has a long left tail where as for the bull period the return series is positively skewed. The value of kurtosis is 9.41, 19.92 and 14.20 for the whole period, bull period and bear period respectively which means that the return series is not normal since the value of kurtosis is not near to the standard value of 3. The probability value is significant at all the times. The jarque-bera test statistic and probability value shows that the return series is not normal for the whole period as well as for the bull and bear periods.

Table also shows the descriptive statistics of return series of each of the sample stocks listed under the Nifty 50 index for the period 2001-2018. It reveals that the stock HINDUNILVR offers the highest mean return for the whole period which is 0.346 and the mid value of the return series for the whole period is higher for INFY (0.850). The mean return of four stocks namely, CIPLA, HINDALCO, INFY and ITC are negative for the whole period of the study. The value of standard deviation shows that the more risky security is INFY (97.971) as it is highly deviated from its mean value. The stock HINDUNILVR offers the least risk (7.576). The value of skewness shows that the return series of all the stocks are negatively skewed except HINDUNILVR during both the whole period and bear period. For the bull period only four stocks namely, GRASIM (0.405), HINDUNILVR (1.860), TATAMOTORS (.988) and TATASTEEL (1.130) have positive skewness. Both the value of skewness and kurtosis is not near to the standard value of 0 and 3 respectively and the value of probability is significant at all the times. Thus, from the values of skewness, kurtosis, jarue-bera test and probability, it can be observed that the futures return series of each of the sample stocks are non-normal in nature for the whole period of the study as well as for the bull and bear periods.

Regression Analysis Results of 15 Sample Stocks listed under the Nifty 50 Futures Index for the period 2001-2018

Stock	Whole period		Bullish period		Bearish period	
	β_2	Significance	β_2	Significance	β_2	Significance
BPCL	-0.27670775	0.68601648	-0.69029495	0.38369004	0.21283854	0.84872717
CIPLA	-0.80927794	0.39651218	0.13631162	0.93503300	-1.48164993	0.14043330
DRREDDY	1.14529534	0.02946227	2.10204856	0.02536570	0.43134306	0.41113347

GRASIM	-0.08870458	0.91594346	-1.20355635	0.04307805	0.95228107	0.53974284
HDFC	-0.21167877	0.81329231	0.75280309	0.67643488	-0.83036033	0.05047215
HINDALCO	0.28836000	0.80736104	-1.68368707	0.47839350	1.85221502	0.00145165
HINDPETRO	0.64381343	0.39029530	-0.75739674	0.58006404	1.73238079	0.01309842
HINDUNILVR	0.80765619	0.01451661	2.36357552	0.00000131	-0.35632423	0.43321281
INFY	0.31561742	0.74224249	0.01405465	0.99306013	0.59964792	0.58646488
ITC	2.55335441	0.06135999	2.38561136	0.00911321	2.78078544	0.27352666
M&M	0.04405639	0.94898945	0.64994245	0.55969162	-0.37174193	0.66087555
RELIANCE	0.35456677	0.52662250	1.54668773	0.05400840	-0.69982026	0.37896798
SBIN	-0.10980151	0.92426185	1.21079562	0.60610751	-1.20217572	0.00768425
TATAMOTORS	-1.51895299	0.08623959	-1.81448414	0.00176267	-1.60672914	0.33029410
TATASTEEL	-0.89715772	0.04971946	-1.18531781	0.05244027	-0.96031667	0.16117048

Table shows the regression analysis results of 15 sample stocks listed under the Nifty 50 futures index for the period 2001-2018. The regression analysis is performed by applying the *Chang et al. (2000)* model in order to test for the presence of herd behavior in the market during the whole period of the study as well as during the bullish and bearish periods. Herd behavior represents the tendency for an individual to mimic the actions of a larger group. Herd mentality describes how people can be influenced by their peers to adopt certain behaviors. It occurs in a stock market when a large group of investors behave similarly because investors are copying the behavior of other investors. Herding behavior is characterized by investors choosing the market consensus over their own beliefs, and thereby reducing dispersion in returns (*Gleason, Lee and Mathur (2003)*). According to *Chang et al. (2000)*, in the presence of severe (moderate) herding, the return dispersions will decrease (or increase at a decreasing rate) with an increase in the market return. The negative and statistically significant coefficient of squared market return, β_2 indicates non-linearity between stock return and market return which results in the presence of herd behavior in the market (*Chang et al. (2000)*). The regression results show that the coefficient of β_2 is negative and statistically significant for only one sample stock namely, TATASTEEL during the whole period of the study. For the bullish period, herd behavior is present for the two sample stocks of Nifty 50 index namely, GRASIM and TATAMOTORS which is due to the significant negative coefficient of β_2 . For the bearish period, only one stock namely, SBIN shows the presence of herd behavior. The empirical results reveal that the regression results of Nifty 50 futures index shows the tendency of mimic behavior is very rare in Indian Futures market and when compared to the bearish period it is more in case of bullish period which is in disagreement with the results of *Chang et al. (2000)* which found significant evidence of herding in South Korea and Taiwan. The results of the study are in support with the study of *Jaya, Sujata and Jhumur (2012)* which found that herding is observed with greater magnitude in bull phase in Indian stock market. *Ashish Kumar, Bharti and Sanchita Bansal (2016)* also supported the findings of the study that the investors in Indian stock market tend to take rational investment decisions and do not indulge in any herd tendency. Thus the findings do not provide any support for the evidence of herding in the Nifty 50 futures market for the period 2001-2018. As per the literature, the semi strong form of the Indian Spot market is questioned by the results of this study. More and deep sense of study is required to make more clarity on the herding behavior and market efficiency of the Indian Futures Market.

Conclusions

The present study intends to examine the presence of herd behavior in Indian futures market as a whole and also during the bull and bear phases by using the near month daily futures return data on NSE S&P CNX Nifty and its 15 individual stocks. Herding behavior is used in the financial world to explain the scenario in which investors, rationally or irrationally, mimic others' decisions and it is believed to be associated with causing market inefficiency and abnormal market volatility (*Lao and*

Singh (2011)). The methodology based on the Cross Sectional Absolute Deviation (CSAD) of returns proposed by Chang *et al.* (2000) is employed in order to detect herd behavior in the market. A non-linear relationship between CSAD and market return indicates the presence of herd behavior. The regression analysis results provide evidence for the absence of herding behavior in Indian Futures market for the period of the study which is in consistent with the study by Garg and Gulati (2013) who found evidence against the presence of herding in Indian stock market. The stock return dispersion does not deviate far from market return and there is an increase in stock return dispersion, rather than a decrease. The findings are in disagreement with the findings of Chang *et al.* (2000) who found the presence of herding in South Korea and Taiwan and Lao and Singh (2011) for Chinese and Indian stock markets. In the present study herd behavior is observed with very less magnitude in bull phase for the Indian futures market. Thus, the Indian hedgers and traders are rational and make investment decisions based on available information in the marketplace and it can be concluded that Indian futures market is free of herding behavior.

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