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Herd Behaviour among Investors in Indian Stock Markets: An Evidence from Information Technology Sector

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Abstract

The study aims at examining the existence of herding behavior patterns specifically in one of the sectoral index (IT) in contrast to the multi-sectoral benchmark index in an emerging economy like India. It also looks for the existence of herd behaviour in two opposite market conditions: bearish and bullish in the Indian Stock Market using Cross Sectional Absolute Deviation (CSAD) which is the absolute average of the total of the difference between the return of individual securities and the market return, as dependent variable and market return as independent variable using OLS Regression. The analysis is based on the daily closing values of S&P BSE IT index and its 30 constituents' scripts for a period of six years ranging from April 1, 2013 to March 31, 2019 for identifying the presence of herd behaviour. The coefficients of squared market return for these selected constituent companies of S&P BSE Information Technology Index are not negative in the whole period; but negative in cases of Mphasis Ltd and Tanla Solutions Ltd in the bullish period and Tanla Solutions Ltd in the bearish period, showing no conclusive evidence of herding behaviour in the S&P BSE Information Technology Index as a whole and also herding behaviour is not prevalent in any of the market scenarios in the Indian stock market which indicates that the investors are rational in investment decisions.

Keywords: *herding behaviour, bull markets, bear markets, S&P BSE Information Technology Index, Cross Sectional Absolute Deviation*

I. INTRODUCTION

The modern financial theory is distinct from classical finance theories as it has placed people and their psychology in the center of the debates because market participants make errors and are guided by behavioral patterns in making investment choices and decisions which dilutes the efficiency of the market and excessive

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transition of certain behaviour, spread the issues, led to instability, anomalies and fluctuations and even collapse of the market. Beacuse of such irrational human behaviours, global financial market overvaluations and eventual crises across time has taken place and its relevance has lead to the emergence of behavioral finance. One such irrational pattern as observed among the investors is herding behavior (Lakonishok et al., 1992; Christie and Huang, 1995) which involves mimicking the actions of other investors, which constitute the market consensus (Bikhchandani and Sharma, 2000). As per Hwang and Salmon (2004) "herding arises when investors decide to imitate the observed decisions of others or movements in the market rather than follow their own beliefs and information." Banerjee (1992) defines herding as "everyone doing what everyone else is doing, even when their private information suggests doing something quite different." Hirshleifer and Teoh (2003) defines herding as any behavior similarity or dissimilarity brought about by the direct or indirect communication of individuals. The presence of herd behaviour often leads to market anomalies and brings volatility in the stock market (Christie and Huang, 1995; Chang et al., 2000; Avramov et al., 2006) and has the tendency to make prices away from their fundamental values (Tan et al., 2008).

Most of the studies relating to herd behaviour investigated developed economies. The present study aims to study the stock market of an emerging economy- India, to study the presence of herd behaviour. The present study examines the prevalence of herd behavior during bull and bear phases and whole period for the S&P BSE Information Technology index and included the constituent companies. Also extensive research studies conducted in the area till date has focused more on studying the multi-sectoral benchmark index of the country and only a few studies have studied a particular sector for behavior patterns. The IT sector has provided a major boost to economic growth of the country and led it to come out as a global force. India's IT industry contributed around 7.7 per cent to the country's GDP and is expected to contribute 10 per cent of India's GDP by 2025 (NASSCOM, DPIIT, Aranca Research, 2019). Also the Asset Management Companies (AMCs) and portfolio managers readily track IT specific sector index as a benchmark for managing active portfolios which was another reason for studying the sector. Against this setting, it is vital to select the IT sector for examining the herding pattern.

II. REVIEW OF LITERATURE

Most of the existing studies on herd behavior focused on the developed economies of USA and Europe. And in Asian economies, especially in the Indian stock market, there has been only a limited research which studies herd behavior. The researchers across the globe have showed non uniform herding patterns and have mixed observations. Some research studies pointed out that herding behaviour exists significantly across different market phases and conditions (Chang et al., 2000; Chiang and Zeng, 2010, Lindhe, 2012; Prosad et al., 2012), and some others suggest that financial markets are efficient and no such pattern is observed (Demirer and Kutan, 2010)

Investors are considered to be herding if the investment decisions change in congruence with others, even when their information tells them to act otherwise (Ferruz and Vergas, 2007). Christie and Huang (1995) argued that investors are more likely to suppress their private beliefs in favour of consensus during periods of unusual market

movements. Chang et al. (2000) argued that herd behavior lead to biased opinions which cause dispersions in valuations and lead to incorrect decision making and this aggravates the volatility in returns and thereby causing destabilizing impact on the financial system (Hadiwibowo, 2010) specifically during a crisis period (Demirer and Kutan,2006). Lee et al. (2012) studied the Chinese stock market and observed the presence of herding. Belhoula Naoui (2011) argued that not all traders react logically to any new information. Guo and Shih (2008) examined the herding pattern in high tech stocks in Taiwan and concluded that more significant evidence of return dispersion in high-tech industries than found in traditional industries. Wermers (1999) observed weak evidence of herding in pension stocks whereas Pirinsky (2002) and Sias (2003) evidenced significant level of herding in an average stock by institutional investors. Cakan and Balagyozyan (2015) studied the Turkish stock exchange found significant herding in all sectors namely finance, services and technology in a highly volatile market. Demirer and Kutan (2006) argued that small capitalization stocks, large number of retail investors in non financial sectors are more likely to herd. Fu and Lin (2010) concluded that the asymmetric reactions exist in the stock market. Investors' tendency toward herding is saliently higher during market downstream. Lao and Singh (2010) made a study in the Indian and Chinese markets and provided the evidence for presence of herding. Choe et al. (1999) followed the model of Wermers (1999) and Lakonishok et al. (1992) for studying the herding pattern by foreign investors on Korean stock exchange and witnessed the evidence of herding during the end of Korean crisis in 1997. Nofsinger and Sias (1999) too reported the presence of institutional herding in US market. Kim and Nofsinger (2005) found a high price effect of institutional herding in the Japanese stock market. Jeon and Moffet (2010) also reported similar results in their study in context of Korea.

In contrast to the above studies, some researchers are of the opinion that significant herding does not exist. The pioneer study which was made by Lakonishok et al. (1992) on Indian market concluded that pension fund stocks showed no evidence of herding. Javed et al.(2013) examined the KSE 100 index of Karachi using monthly data failed to find any evidence of herding. The study by Christie and Huang (1995) used daily and monthly returns for NYSE and Amex firms and found no herding in these markets. In contrast to the study by Lao and Singh (2010), Demirer and Kutan (2006) found no evidence of herding in Chinese stock markets. Chang et al. (2000) conducted a study in Taiwan and South Korea markets by developing a non-linear model found herding and no evidence of herding is observed in Japan, Hong Kong and US markets. Intraday data of American Stock Exchange is analyzed by Gleason et al. (2004) and evidenced no herding among the ETFS sector. Gleason et al. (2003) rejected the presence of herding in American stock market during extreme market fluctuations. Henker et al.(2006) found no market wide herding in Australian market. Patterson and Sharma (2005) analyze the intra-day herding phenomenon which is consistent with the models put forward by Avery and Zemsky (1998) and Banerjee (1992). Overall, they observed evidence for the market efficiency hypothesis but no significant evidence of herding. Garg and Gulati (2013) found no significant herd pattern in Indian stock markets.

In view of the above studies, the present paper tries to examine the existence of herding pattern in Indian stock market with special reference to information technology sector.

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III. OBJECTIVES OF THE STUDY

The main objectives of the study include the following;

- To find the evidence of herd behaviour in the Indian IT sector index.
- To observe the herd pattern in Indian IT sector index during bear and bull markets.

IV. DATA AND METHODOLOGY

The study makes use of the daily closing values of the S&P BSE Information Technology index of the Bombay Stock Exchange and its constituent companies over a period of 6 years from April 1, 2013 to March 31, 2019. The data consists of 1483 observations. The historical data comprising of the daily closing price of securities to find the herd behavior has been retrieved from www.bseindia.com.

Calculation of stock returns

The present study makes use of Chang et al. (2000) methodology of cross sectional absolute deviation (CSAD) to examine the concept of herding. This is a modified version of cross sectional standard deviation (CSSD) as proposed by Christie and Huang (1995). CSAD is the absolute value of the average of the total of the difference between the expected return of individual securities and market return. According to CSAD model, the absolute dispersion between the market return and individual stock return decreases as the investors imitate the action of others and rely on the crowd information thereby ignoring their individual information and begin to herd. The CSAD model is not affected by outliers, unlike CSSD.

$CSAD_t = \frac{1}{N}\sum_{i=0}^{N}|Rit - Rmt|$ → (1) Where, n is the number of securities, r_{it} is the return on individual stock at time t, r_{mt} is the market return calculated on daily basis at t. The observed stock return for individual company share, r_{it} is calculated as:

r_{it} = **((Pt-Pt-1) ÷ Pt-1)×100** → (2) where Pt is the price of the stock at time t and Pt-1 is the price at time t-1 and t stands for the specific day. Similarly, market return at time t, r_{mt} has been calculated as:

r_{mt} = **((Cv-Cv-1) ÷ Cv-1) × 100**→ (3) where CV is the closing value of the S&P BSE IT index at time t. The study uses OLS regression to demonstrate the herd pattern in Indian stock market. Accordingly, the following regression equation is proposed to study if herding exists in S&P BSE IT index:

$\mathbf{CSAD_t = \beta_0 + \beta_1 |r_{mt}| + \beta_2 (r_{mt}^2) + €_t}$ → (4) Where β0, β1and β2 are regression coefficients and $€_t$ is the error term. The term $|r_{mt}|$ is the absolute market return for the time t. For herding to be present, β2 should be negative and significant. The bullish and bearish trend of the market is identified by analyzing the daily market return. If $r_{mt} > 0$, the market shows bullish trend and if $r_{mt} < 0$, the market is in bearish trend. The following OLS Regression is used to identify the herding behaviour in the bullish and bearish market respectively.

$\mathbf{CSAD_t^{bull} = \beta_0^{bull} + \beta_1^{bull} |r_{mt}^{bull}| + \beta_2^{bull} (r_{mt}^{2bull}) + €_t^{bull}}$ →(5)

$\mathbf{CSAD_t^{bear} = \beta_0^{bear} + \beta_1^{bear} |r_{mt}^{bear}| + \beta_2^{bear} (r_{mt}^{2bear}) + €_t^{bear}}$ →(6)

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Estimates of Herding Behaviour

Regression thus shows us how variation in one variable occurs with variation in another. The study runs regressions by selecting the specified variables in model no. (4), that is

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

Where, β_0, $\beta_1$and β_2 are regression coefficients and ϵ_t is the error term. The term $|r_{mt}|$ is the absolute market return for the time t. For herding to be present, β_2 should be negative and significant.

V. DATA ANLYSIS AND DISCUSSION

Table 1: Descriptive Statistics of r_{mt} and CSAD for Whole Period, Bull Period and Bear Period

Descriptive Statistics	Whole Period		Bull Period		Bear Period	
	CSAD	rmt	CSAD	rmt	CSAD	rmt
Mean	1.8266	0.8451	1.866104477	0.858849	1.782472573	0.829726956
Standard Deviation	0.66	0.815579409	0.644358064	0.772176	0.683150312	0.861719108
Kurtosis	15.43843807	20.65244947	3.993102856	5.807258	26.28408466	31.18348603
Skewness	2.375495629	2.892293491	1.512327374	1.81683	3.231579916	3.750929236
Minimum	0.551539741	0.001021975	0.725370044	0.001022	0.551539741	0.001870014
Maximum	9.593448835	11.09357982	5.584668436	6.463467	9.593448835	11.09357982
Count	1483	1483		782	701	701

Source: Computed data

Table 1 shows the summary of descriptive statistics for CSADt and market return of S&P CNX Nifty IT index for the complete period, bull period and bear period for the time period under study. From the table 1, it is observed that average of CSADt for the entire period is 1.8266 and the standard deviation is 0.66 while the IT index records a mean return of 0.8451. Kurtosis is greater than 3, implying that the market return and CSADt series are non-normal in nature. Therefore, the daily closing prices of 30 selected companies of S&P BSE Information Technology Index are converted in to log form, for the purpose of smoothening the data so as to

facilitate the use of parametric statistical tools. However, as the sample is sufficiently large, the paper employs the OLS regression for identifying the herd behaviour.

Table 2.Regression Estimates under different market conditions (Whole Period, Bull and Bear Period)

	Whole	Bull	Bear
Multiple R	0.4715868	0.409832412	0.531699008
R Square	0.2223941	0.167962606	0.282703835
Adjusted R	0.2213433	0.165826438	0.280648545
Standard Error	0.5859832	0.588512211	0.579411131
Observations	1483	782	701
F-statistic	211.639	78.628	137.5493739
Prob (F-statistic)	0.0000*	0.0000*	0.0000*

Source: Computed Data

*significant at 5 % level

Table 3. Model Summary

Mo	Coefficie	S	t	Sig.
Whole Period				
CS	1.6538	0	65	0.0
rmt	0.1116	0	3.	0.0
r^2m	0.0569	0	9.	0.0
Bull Period				
CS	1.6795	0	43	0.0
rmt	0.1117	0	1.	0.0
r^2m	0.0679	0	4.	0.0
Bear Period				
CS	1.6437	0	46	0.0
rmt	0.0638	0	1.	0.1
r^2m	0.0599	0	8.	0.0

Source: Computed data

*significant at 5 percent level

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From Table 3, Coefficient value of r^2_{mt} (β_2) is 0.0569 which is an insignificant positive value. For herding to be present, β_2 should be negative and significant. So there is no herding in the IT sector Index of BSE during the whole period. Also the Coefficient value of r^2mt (β_2) is 0.0679 which is a positive and insignificant value which implies no herding in the IT sector Index of BSE during the Bull period. From Table 3, Coefficient value of r^2mt (β_2) is 0.0599 which is also a positive value. So there is no herding in the IT sector Index of BSE during the Bear period. The result is in contrast to the one concluded by Chang et al. (2000) which confirmed the presence of herding in emerging economies of Taiwan and South Korea. Table 3 represents the coefficient β_2 of r^2mt is positive for both the phases of capital market and no asymmetry is observed in the IT sector of Indian stock market. This is in accordance with the studies conducted by Lao and Singh (2011); Bhaduri and Mahapatra (2013) and Garg and Gulati (2013).The results show that the investors tend to take rational investment decisions and thus the Indian IT sector index is efficient.

Herding Behaviour of Indian Stock Market

In order to find the herd behaviour of Indian stock market, the index and the individual companies are compared as per Chang et.al. (2000) model, the market return and the individual return are compared. For this, the value of Cross Sectional Absolute Deviation (CSAD) is calculated for each selected company using equation (1). CSAD is the absolute average of the total of the difference between the return of the individual securities and the market return. CSAD is the dependent variable of the model. When the CSAD increases or decreases in relation with market return is analyzed and the coefficient of r_{mt} is taken to consideration. If the value is negative and significant, then it can be argued that herding behaviour is present or not. The CSAD is computed and taking it as dependent variable and series of market return (r_{mt}) and squared market return (r^2_{mt}) as independent variables, OLS Regression is run to identify the coefficients and error using equation (4), (5) and (6) for whole period, bullish period and bearish period respectively.

Regression Results for Whole Period, Bullish Period and Bearish Period of Individual Companies

Companies	Whole		Bull Period		Bear Period	
	β2	Significance (p)	β2	Significance (p)	β2	Significance (p)
3i Infotech Ltd	0.0537	0.0655	0.0419	0.5793	0.0648	0.0639
8k Miles Software	0.0692	0.0388	0.0626	0.5368	0.0749	0.0232
63 Moons	0.0858	0.019	0.1318	0.172	0.0995	0.0204
Aptech Ltd	0.0593	0.0147	0.0568	0.4107	0.0725	0.0061
Birlasoft Ltd	0.0491	0.0186	0.0397	0.5269	0.0562	0.0067
Cigniti Technologies	0.0553	0.003	0.095	0.0579	0.0692	0.0012
Cyient Limited	0.0619	0	0.1198	0.0035	0.0532	0.0011

D-Link (India) Ltd	0.0538	0.0288	0.0441	0.5161	0.0716	0.0094
Firstsource Solutions	0.0585	0.0022	0.0285	0.5895	0.0891	0
Hcl Infosystems Ltd	0.0691	0.0085	0.1752	0.0122	0.0638	0.0371
Hcl Technologies Ltd	0.079	0	0.0374	0.0995	0.0833	0.0008
Hexaware	0.058	0.0001	0.021	0.6074	0.0706	0.0001
Infosys Ltd	0.0656	0.0057	0.0569	0.4356	0.0659	0.0036
Mastek Ltd	0.0242	0.422	0.068	0.3219	0.0072	0.8563
Mindtree Ltd	0.0441	0.0588	0.0918	0.1639	0.0419	0.0999
Mphasis Ltd	0.0312	0.0278	-0.0357	0.3513	0.0379	0.02
Nelco Ltd	0.0717	0.006	0.1206	0.0895	0.0737	0.0133
Niit Ltd	0.0313	0.1224	0.0952	0.1083	0.0364	0.0825
Niit Technologies Ltd	0.062	0.0001	0.0673	0.1147	0.0659	0.0004
Oracle Financial	0.056	0	0.037	0.159	0.0656	0
Persistent Systems Ltd	0.0593	0.0027	0.1052	0.1054	0.0543	0.0007
Rolta India Ltd	0.058	0.0095	0.1011	0.1051	0.0593	0.0167
Sasken Technologies	0.047	0.0321	0.0578	0.3219	0.0458	0.0737
Sonata Software Ltd	0.0733	0.0001	0.1346	0.0115	0.0649	0.0019
Tanla Solutions Ltd	0.002	0.939	-0.0159	0.8141	-0.0015	0.9635
Tata Elxsi Ltd	0.0938	0.0001	0.1103	0.1394	0.0889	0
Tata Consultancy	0.0654	0	0.043	0.4242	0.0671	0
Tech Mahindra Ltd	0.0755	0.0008	0.0212	0.4436	0.0818	0.02
Wipro Ltd	0.0333	0.0487	0.0658	0.0414	0.0277	0.2486
Zensar Technologies	0.0606	0.0268	0.0599	0.5137	0.0475	0.022

The regression statistics reveals that there is no such a case where coefficient of r^2_{mt} is negative and significant in whole period, bullish period and also in bearish period. In all the situations, no company's coefficient of squared market return becomes negative and significant, when the OLS regression is run at 95% confidence level. So it is evident that there no herding behaviour persisting in Indian stock market during the study period.

While considering individual Companies during the study period, no company has a negative Coefficient of r^2mt (β_2) during the whole period. So there is no herding in individual companies during the period.

Coefficient value of r^2mt (β_2) is negative in bull period only for two companies; Mphasis Ltd and Tanla Solutions Ltd with insignificant values -0.0357 and -0.0159 respectively. So in that case also, there is no herding with regard to those companies during the study period.

r^2mt (β_2) is negative only for one company during bear period, that is, Tanla Solutions with value -0.0015 which is insignificant too. It indicates that herd behaviour is not found for individual companies in the bear period also.

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VI. Conclusion

The aim of the present study is to focus on the herding pattern among IT stock index in India. A time span of only six years has been considered for examining the herd behaviour in the Indian stock market. The analysis of the results of the study as performed using regression show no conclusive evidence of herding in the IT sector stocks in Indian stock market. The research also conducted a deeper analysis aimed at herding during bear and bull phases. The empirical results too revealed that the herd behaviour is not prevalent in any of the market scenarios in India. The reason for absence of herding can be assigned to the rational mentality of the individual investors. The reason for absence of herding can also be assigned to the maximum participation by institutional investors in Indian equity market who have access to the relevant information and are more skilled to use it while making investment decisions. There is little scope for these large investors to herd and follow the "crowd" when they are already in possession of the private information. The share of participation by retail investors is only a small percentage of the total and even if the herd pattern exists amongst this group, it is not significant enough to provide any significant results. The results of our study have meaningful implications for the policy makers for regulation of the markets and for investors in chalking out their investment strategies. The study presents an integrated approach of investors towards asset pricing and indicates that investors do not indulge in "imitation buying" and make decisions based on their information. The existing foundations of financial theories of market efficiency and asset pricing are based on the premise of rational and utility maximizing investors. However, researchers across the globe have been keen to investigate a new dimension to investor behavior and psychology. The study can be extended from IT index to other indices and even to global markets for identifying herd behaviour.

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