A Test of Herding in Investment Decision : Evidence from Indian Stock Exchange

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Abstract

Herding is very common in extreme market situation; the article tests the evidence of herding in both pre- and post-crisis periods on Daily and Monthly investment patterns. The empirical results do not reveal any strong proof of market-wide herding during study period. However, some weak evidences of herding were reported during movements in market. Even the periods of extreme movements do not show any strong evidence for same, which strengthen the idea of asymmetric nature of herding. In fact, Investment pattern shows evidences of rationality in investment decision based on information. This might be a major cause of mild effect of financial crisis 2008 in India.

Keyword: Herding Behaviour; Cross-Sectional Absolute Deviation; Financial Crisis; Behavioural Finance.

JEL CODES : C21; G01; G12

Introduction

The incidences of herding take place when people discount explicit information about firm and chase the market trend for making their investment decisions. The stock exchange is flooded with tons of information every day, however, investors do not show confidence in using these information for making investment decisions. The common phenomenon is to copy the behavior of others investors, the 'imitative behavior' in investment is called herding. Banerjee (1992) studied existence of herd behaviour in case "everyone doing what everyone else is doing, even when their information suggests doing something different."

Herd behavior of investors is likely to be noticed in stress market conditions. Christie and Huang (1995) believe investors behave rationally, as explained in asset valuation theories, in their investment decision during normal market conditions. However, extreme situations force to produce intense emotions and people look to find comfort in following the crowd, as in the case of the financial market collapse in 1987, (Shiller, 1990) and in currency market (Frankel & Froot, 1986).

Caparrelli et al. (2004) studied the herd behaviour of investors by a very attractive illustration of two restaurants. One night, a customer decided to take his dinner in restaurant "A" on suggestion of an extremely reliable source. He observed full occupancy, with customers

waiting, in another restaurant "B" whereas restaurant "A" hardly had any customer. So, he followed crowd and changed his choice to eat in restaurant A. He purely discarded his possessed information and went with crowd presuming that they had better knowledge. His conviction in the knowledge of mass may go wrong if some patrons had behaved in same manner and man who entered restaurant B initially may have wrong perception. Such fear of be a part of isolated consumers force to avoid restaurant "A" and become a part of the crowd by entering restaurant "B". Such similar behaviours may be observed by investors in stock markets. In case of extreme disaster, 'herd behaviour' is reported as common term as a symbol of irrationality in market behaviour. Herding may direct towards mispricing of shares as capacity of decision making has been affected by subjective analysis of predictable systematic risk and return (Hwang & Salmon, 2004)

An effort has been made in this, to examine the evidence of herd behaviour in stock exchange of India, including period of recent financial crisis. The review of literatures explores asymmetry in herding behaviour with direction of market-wide return.

To provide a systematic approach to the study, the research paper has been divided into following sections; the review of past and published literature along with the argument on research have been discussed in section 2,Section 3 provides details of techniques need and methodology applied. The empirical evidences of herding in context of Indian share market have been covered in section 4 of the study while Section 5 presents the final outcome of study and section 6 discusses the limitations and scope for future research

Review of Literatures

In last few years, empirical literatures signifying the existence of herding in finance market has became popular in academic research. The section is dedicated to review significant literatures published on herding in different stock markets.

The literature of Shiller and Pound (1986), has initiated the empirical study on herding behavior in stock market. This literature is a summary of a survey to show the influence of information by professionals on investment of major institutional investors in stock market. Banerjee (1992), developed an empirical model to show the impact of asymmetry of information and costly acquisition on investment pattern. Investors chase the market consensus by neglecting the intrinsic value of stock, which results to inefficient market condition. Lakonishok, et al. (1992),found a little evidence for presence of herding behavior in high capitalized stocks , while small stocks trading are being highly influenced by optimistic trading feedback among major corporate investors. Grinblatt et al.

(1995), found proof for anti herd behavior in investment pattern in mutual funds , whereas the literature of Wermers (1999), reported evidences of herding activity in investment pattern of some small mutual funds mainly in growth oriented schemes. Christie and Huang (1995), supported efficient market theory for US stock market (NYSE) as herding behaviour are not used as a factor for while calculation return. The extension of their work by Chang et al. (2000), studied herding behavior of investors in major stock exchanges of different countries, i.e., Hong Kong, USA, Taiwan, South Korea , and Japan. This literature reported absence of herding in stock exchanges of Hong Kong and USA, fractional presence of herding in Japanese market, and prominent presence in emerging markets of Taiwan and South Korea. Caporale et.al. (2008), tested behaviour in unfavorable market situations in ASE (the Athens Stock Exchange), and reported significant evidence of herd behaviour during the period of 1998-2007. Lodetti and Kallinterakis (2009), reported absence of herd behaviour in the Stock Exchange of Montenegro. Economou et al. (2011) and Singh and Lao (2011), supported that the possibility of presence of herding is more likely in stock exchanges of emerging economies. Many studies (Chang et al., 2000,McQueen et al., 1996;; Lee et al., 2013; Tan et al., 2008) have given evidence of directional asymmetry in price, i.e., return dispersion of a stock as a derivation of absolute market-wide return. The evidence of herding is stronger in downward movement condition in the financial market. Some researches (Chiang et al., 2013; Caparrelli et al., 2004; Chang et al., 2000) have supported the evidence of strong herding during unfavorable market condition in different stock exchanges.

The results of theses literatures hold a lot of significance with regard to recent economic crisis as extreme volatility has been observed during event time. As financial markets in India offer a higher growth, studies pertaining to herding behaviour have gained lot of prominance. Prasad et al. (2012) study efficiency of Indian stock markets and resulted as absence of herding .Lakshman et al. (2013) reported mild existence of herding in the stock exchange of India. Lao et al. (2011) , Poshakwale et.al. (2014) reported herding in the stock exchanges on India during big market-wide movements.

There is non-uniformity among researchers with regards to herd behaviour, mainly in context to India Stock markets. Due to indefiniteness about the existence of herd behaviour in investment pattern in markets, the study re-examines one of the most debated topics "Existence of herding in the stock behaviour of Indian market". The major objective of this paper is to investigate existence of asymmetric relation between movements of stock and market-wide herding in a prominent Indian stock exchange, BSE. The paper examined the market-wide herding behaviour in extreme market condition in 2008 economic crisis.

Research Methodology and Description of Data

Methodology

In this section, we explain an empirical methodology used to find the evidence of herding in stock markets investment pattern .The empirical models given by Christie and Huang (1995) which was extended by Chang, Cheng and Khorana (2000) explained, herd behaviour can be assessed by cross-sectional methods of asset valuation, and minor cross-sectional dispersion on estimated market returns shows parallel along with the average return, such movement indicates some kind of market consensus. The approach is evolved around the thought that calculate return dispersion, considered by CSAD (cross-sectional absolute deviation) will be small throughout the herding duration. It depends on the conviction that herding cannot permit deviation in a stock returns from the average market return.

Chang et al. (2000), CSAD calculation is extended version of return dispersion model. Christie and Huang (1995) explained return dispersion as the best indicator for evidence of herding. Return dispersion indicates deviation in return of single stock from mean return in market. The measurement of cross-sectional standard deviation (CSSD) of return indicates the evidence of market herding. They also indicated the market movement between extreme and normal phases, and an investor would take investment decisions depending on the market average return during extreme movements while in normal condition, people invest rationally. As a effect, a stock returns will be in cluster in extreme market conditions, reducing CSSD in comparison to normal market condition. This is a disparity in balanced expectation of general asset valuation model, as dispersion grows in extreme market condition since each stock has dissimilar level of sensitivity to market mean performance.

Christie and Huang (1995) calculated value of CSSD for individual shares by equation (1). A small CSSD may indicate spurious and intentional herding.

$$CSSD_t = \sqrt{\frac{\sum_{t=1}^{N}(R_{I,t} - R_{M.t})^2}{N-1}} \qquad (1)$$

RI.t = Return of share I at time t;

RM ,t = Mean return of N returns for time t.

N= Total no. of shares in sample.

The calculated values of CSSD on returns over time were regressed to a constant and two dummy variables in order to recognize the extreme market condition. Dummy variables has been used with DU = 1 for returns lies in the acute right of return distribution, i.e. 1% to 5% of upper tail (or else ZERO) and DL = 1 for market returns lies in acute left of the same data distribution, i.e. 1% to 5% of lower tail (or else ZERO). Market-wide herding is reported by statistically significant negative values of coefficients in regression as per equation (2). Probable value of a coefficient denotes mean dispersion of returns without time period in selected sample correspondence to dummy variables of equation.

$$CSSD_t = \alpha + \beta_1 D_t^U + \beta_2 D_t^L + e_t \quad \text{-----------} \ (2)$$

Even if the cross-sectional standard deviation (CSSD) of stock returns is used as an instinctive measure to study herd behaviour of investors, it can significantly impact the presence of outliers. To reduce the effect of such outliers, Christie and Huang (1995) and Chang et al. (2000) projected exercise of the cross-sectional absolute deviation, (CSAD), as a improved gauge of dispersion as show in equation (3) and performed regression similar to equation (2) in correspondence with equation (3) as shown in equation (4). Similarly statistically significant and negative values of β1 and β2 would indicate the presence of market-wide herding.

$$CSAD_t = \frac{\sum_{t=1}^{N}|R_{I,t} - R_{M.t}|}{N} \qquad \text{--------} \ (3)$$

$$CSAD_t = \alpha + \beta_1 D_t^U + \beta_2 D_t^L + e_t \ \text{---------} \ (4)$$

To measure herding on whole market return instead of only distribution on extremes market-wide returns as projected by Chang et al. (2000) and Christie and Huang (1995) is shown in equation (5):-

$$CSAD_t = \alpha + \gamma_1|R_{M,t}| + \gamma_2(R_{M,t})^2 + e_t \quad \text{-------} \ (5)$$

The result of regression derives on relation between market return and CSAD, the regularly used asset valuation model assumes that returns dispersion has linear relation with market return .The positive value of γ_1 in equation-(5) shows absence of herding. However, if herd behaviour is there, dispersion would increase or decrease considerably in less amount of the market returns. Square values of market returns are included to confine this impact in the model, and subsistence of non-linearity by significant and negative value for Υ_2 also act as evidence of herding.

Chang et al. (2000) studied for existence of asymmetric association between herding and directional movement of financial market. The above hypothesis has been tested using regression method as equations (6) and (7). As observed in early cases also, in presence of herding, CSAD have a non-linear relation to market-wide returns but a linear relation indicates absence of herding. The non-linear relationship will be proved by statistically significant negative value of coefficient γ_2.

$$CSAD_t^{UP} = \alpha + \gamma_1^{UP}|R_{M,t}^{UP}| + \gamma_2^{UP}(R_{M,t}^{UP})^2 + e_t$$

where, $R_{M,t} > 0$ - -(6)

$$CSAD_t^{DOWN} = \alpha + \gamma_1^{DOWN}|R_{m,t}^{DOWN}| + \gamma_2^{DOWN}(R_{m,t}^{DOWN})^2 + e_t$$

where, $R_{M,t} < 0$ --- (7)

We are concerned with amount of the stock return, not with its sign so absolute values $|R_{M,t}^{UP}|$ and $|R_{M,t}^{Down}|$ are being used in model. This also makes a right comparison between γ_2^{up} and γ_2^{Down} possible. The study calculates evidence on herding on daily as well as monthly frequency from selected data set.

Data Collection

The study is conducted with the data obtained from the BSE Ltd, oldest stock exchange of India. As none of Indian stock exchanges has index for all listed shares, study is based on the broadest benchmark index, the S&P BSE All Cap Index. The Index is a broad index representing approx 95% of the total market capitalization and comprises more than 910 shares that are listed on the BSE from various sectors mainly like finance, IT, FMCG , Transport Equipments, healthcare, Oil and gas, Capital Goods, Metals and Chemicals etc. Although this index is started in second quarter of 2015 but historical data has been made available from Sep 2005 by method of back calculation for constituent stocks. The study is based on data collected for period Sep-2005 to Mar-2016, incorporating the period of pre and post financial crisis 2008.

The impact of recent global financial crisis can be identify from 21st of Jan 2008 by single day fall of 1408 points, and became severe in month of Sept- 2008 on collapse of top investment bank Lehman Brothers and many more. So, the data sample has been divided into 2 broader categories of Pre i.e.   Sept-2005 to Dec-2008 and Post i.e. Jan-2009 to Mar-2016. The return from all cap index has been treated against return from market (BSE SenSex) for the same period on daily as well as monthly basis to find the herding in Indian stock exchange during study period.

Empirical Evidence

The section of literature highlights empirical results in context to identified research problem. Table 1 contains summary of descriptive statistics for return of market portfolio (Rm,t) on daily and monthly data. Aggregate data for Sep- 2005 to Mar-2016 showed that return of constituent stocks are extremely volatile in the limit of 26.06%. Predictably, this observed volatility in study time is due to consideration of recent financial crisis. Minimum daily return of –10.48% was recorded on 24th October 2008 and maximum daily return of 15.57% was recorded on 18th May 2009.

Table- 1: Descriptive statistics on return on market

	Daily Data			Monthly Data	
	Market	CSAD		Market	CSAD
Observation	2612	2612		127	127
No of '-ve' return	1166	NA		51	NA
No of '-ve' return	1446	NA		76	NA
Minimum	-10.483	0.800		-26.910	3.016
Maximum	15.573	9.977		32.730	20.967
Mean	0.053	2.661		1.156	6.180
Median	0.134	1.701		1.088	3.667
Standard Deviation	1.487	2.147		1.089	4.669

Source: Compiled by Researcher

Negative return of 1166 days and 51 months has been observed during the study period of, as up to 5% of tail either in case of upper limit or case of lower limit will assign value of 1 for dummy variables DU and DL respectively. Table-2 reports the regression result for CSAD t as per model proposed in Eq-4.

Table-2: Regression Result for CSADt (as per Eq-4) at 99% Significance Level

Daily Data				
	Coefficients	S. E.	t Stat	P-value
α	2.442603078	0.045552204	53.62206144	0
β₁	1.753404135	0.264014637	6.641314108	3.76949E-11
β₂	2.384192384	0.298646901	7.983315326	2.11453E-15
Monthly Data				
α	4.838959768	0.496993047	9.736473776	4.80426E-17
β₁	1.464839946	2.789366558	0.525151469	0.600400759
β₂	-2.307396311	3.208076323	-0.719246077	0.473321176

Pre crisis (daily data)			
α	2.001316621	0.08479974	23.60050433	1.1487E-86
β_1	2.944911925	0.473412473	6.220604844	9.5278E-10
β_2	2.474747284	0.473412473	5.227465314	2.40727E-07
Post crisis(daily data)			
α	2.534848423	0.055111392	45.99499917	2.6121E-305
β_1	0.645447185	0.417257591	1.54687943	0.122069587
β_2	2.080632344	0.696515712	2.987200875	0.00285382
During Crisis(daily data)			
α	2.860465707	0.180477538	15.84942782	2.75289E-39
β_1	2.00158135	0.509284554	3.930182711	0.000110828
β_2	2.254250743	0.486508886	4.6335243	5.87696E-06

Source : compiled by researcher

Table 2 shows the result of regression of subgroups of sample, as daily data on daily return for whole sample period, monthly data on monthly return for whole sample period , Pre-crisis on daily return for period Sept-05 to Dec-08 , Post-crisis on daily return for period Jan-09 to Mar-16 and during crisis on daily return for period Jan-08 to Dec-08. All variable α , β1 and β2 are statistically significant since, P-values are less than 5% .There is no prominent evidence of herding during study period as the values of all coefficients are positive, except value of β2 in case of monthly data. The negative significant value of β2 proves herding in case of falling market on monthly investment pattern. Other values of co-efficient show strong evidence of anti-herding for study period in daily as well as monthly investment pattern.

Table- 3: Regression Result for CSADt (as per Eq-5) at 99% Significance Level

	Coefficients	S. E.	t Stat	P-value
Daily Data				
A	2.382715181	0.046005032	51.7924907	0
γ_1	-0.044428888	0.029576965	-1.502144944	0.133180697
γ_2	0.075551855	0.006104426	12.37656903	3.13504E-34
Monthly Data				
A	4.853503917	0.530654962	9.146251836	1.30043E-15
γ_1	0.073470114	0.065987709	1.113390888	0.2676601
γ_2	-0.00193058	0.003913687	-0.4932892	0.622666927
Pre Crisis (Daily Data)				
A	1.790025973	0.089931961	19.9042248	1.76299E-67
γ_1	0.08488491	0.054551628	1.556047236	0.12024611
γ_2	0.162272127	0.016849126	9.630892853	1.86593E-20
Post crisis(Daily Data)				
A	2.489850179	0.055616982	44.76780421	4.4881E-294
γ_1	-0.053401881	0.045729954	-1.167765893	0.243057165
γ_2	0.048848429	0.00875161	5.581650283	2.74851E-08
During Crisis(Daily Data)				
A	2.701466318	0.173615666	15.56003776	2.63752E-38
γ_1	0.001146205	0.057100879	0.020073339	0.984001409
γ_2	0.088415462	0.011788553	7.500111792	1.20667E-12

Source : Compiled by Researcher

Table-3, represent the total market regression result as per equation 5 with the significant values of dummy variables. The positive and statistically significant values of y1 and y2 are evidence for absence of Herding in sub groups. Negative value of y1 in daily return of whole sample is caused by weak evidence of herding in post crisis period in Indian stock exchange, the negative value of y2 shows asymmetry non-linear relation of CSAD along with RM,t in study period. Furthermore, these resulted values are supporting consistency in investment pattern. Table-4 and Table-5 show results of regression for directional market movements to check the asymmetric relation between Market return and CSAD.

Table- 4: Regression Result for CSADt for Upward Market (as per Eq-6) at 99% Significance Level

	Coefficients	S. E.	t Stat	P-value
Daily Data				
α	2.259845035	0.093584658	24.14760168	1.6296E-108
γ_1^{UP}	0.217533759	0.092639333	2.348179252	0.018999543
γ_2^{UP}	0.035592632	0.012312348	2.89080782	0.003899919
Monthly Data				
α	3.179559273	1.163172107	2.733524345	0.007812344
γ_1^{UP}	0.424367507	0.263031182	1.613373378	0.110863457
γ_2^{UP}	-0.012794906	0.010175062	-1.257476937	0.212482496

Source: compiled by researcher

Table-4 show regression results for upward direction of market , $R_{M,t} > 0$, and all values of y_1^{UP} and y_2^{UP} are significant and positive. This indicates anti-herding in Indian stock exchanges in daily investment pattern even in upward movement of market. Since y_2^{UP} has negative value for monthly return pattern, it leaves a slight hope for evidence of directional herding in upward movement.

Table-5: Regression Result for CSADt for Downward Market (as per Eq-7) at 99% Significance Level

	Coefficients	S. E.	t Stat	P-value
Daily Data				
α	2.206631118	0.109305631	20.18771668	6.59603E-78
γ_1^{DOWN}	-0.122124467	0.118519202	-1.030419248	0.303028035
γ_2^{DOWN}	0.085756636	0.020583347	4.166311412	3.32538E-05
Monthly Data				
A	5.672086162	1.39174471	4.075521984	0.000167747
γ_1^{DOWN}	0.171305228	0.366566768	0.467323398	0.642340127
γ_2^{DOWN}	0.000482643	0.016509391	0.029234477	0.976796332

Source : Compiled by Researcher

In similar way Table-5 presents regression result for downward direction of market , RM,t < 0, and negative value of y1 DOWN indicates presence of herding in daily investment pattern of Indian market in downward movements, which leads to conclusion that returns of stocks may show a convergence in falling market condition for some little extent. But other values for y1 DOWN and y2 DOWN do not support herding in large extent.

Conclusion

This literature has examined the existence of market-wide herding in the stock exchange of India during 2005–2016, a period before, during and after recent financial crisis of 2008. The study has been divided into subgroups and based on daily as well as monthly return data. The analysis of empirical results in section-4 does not completely disclose any strong proof of market-wide herding in during study period. However, some weak evidences of herding were reported during movements in market. Even the periods of extreme movements do not show any strong evidence for same, which strengthen the idea of asymmetric nature of herding. In fact, Investment pattern shows evidences of rationality in investment decision based on information. This might be a major cause of mild effect of financial crisis 2008 in India. It evidences a very positive outlook of investment in the Indian stock exchange mainly after global turmoil of 2008.

Limitations and Direction of Future

The research work has been conducted on constituents' shares of All cap Index i.e. 910 in numbers having 95% market capitalization, not on all listed shares in Indian stock exchanges. The other major limitation of the study is that, the paper only discusses the existent of herding not the cause. Further studies in this context must consider various sector and industry wise factors for better understanding of herding in investment pattern in Indian stock exchanges.

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