

HERDING IN THE BANKING SECTOR OF INDIAN STOCK MARKET: AN EMPIRICAL STUDY OF BANKNIFTY

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Abstract *This study examines the herding amongst the investors and the contributors of market in the banking sector of Indian stock market. Examine the herding specifically from the sectoral index (bank) makes this study different from the previous studies as all the studies covered the multisectoral index in an emerging economy. The herding in the banking sector of Indian stock market has been examined by using the methodologies of Christie & Huang (1995) based on Cross-sectional standard deviation (CSSD) and Chang, Cheng and Khoranna (2000) based on Cross-sectional absolute deviation (CSAD). To analyse the data, closing values of CNX BANKNIFTY index and its component securities has been collected for a period of 7 years ranging April '2010 to Oct '2017 from the PROWESS database. Auto-correlation and heteroskedasticity is also checked for the error terms and GARCH (1, 1) model is used to correct the problem of heteroskedasticity. The present study shows no specific affirmation of herding in the banking sector of Indian stock market. An in-depth analysis aimed at measuring herding patterns in bullish and bearish intervals too shows an absence of herding in the banking sector. Herding is also not found in the extreme price movements except in 99% criterion during the extreme down market. So, mild herding is there in the extreme down market situation only. For making better investment strategies and regulations for market, the consequences of the study have meaningful proposition for investors and policy makers.*

Keywords: *Herding, CNX BANKNIFTY, Cross-Sectional Absolute Deviation*

INTRODUCTION

Classical financial theories of asset pricing and market efficiency put more emphasis on rational and utility maximizing investors. They have overlooked that fact that while making investment choices, investors followed the investment patterns in the market and not the fundamentals of the securities. This type of behavior leads to market fluctuations and anomalies. On the other hand, Modern theories put more emphasis to explain the psychology and behavior of stock market participants. In financial markets, herding is that specific issue that gains more interest of both practitioners and academic researchers. "Herding in capital markets is in general described by propensity of an investor to mimic the actions of large group of investors, those he regards as better informed and at the same time neglecting his personal information and expectations (Inna Zaharyeva, 2009)". In financial markets, herding is to be considered as a threat for its functioning. Its' distorting effect range from informational inefficiency to increased stock price volatility or even bubbles and crashes.

The theoretical work of herding came in to existence from the seminal work of Bikhchandani et al. (1992) and Banerjee

(1992). Banerjee (1992) defines herding as "everyone doing what everyone else is doing even when their private information suggests doing something else". Acc. to Nofsinger and Sias (1999), herding can be viewed as "when a group of investors trading in the same direction over a period of time". As per Huang 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." Herding can be viewed from two perspectives: rational or irrational. Devenow and Welch (1996) show the irrational viewpoint of herding; they suggested that investors irrationally follow the actions of others. Investors feel more comfortable when they copy others because they want to earn the desired or confirmed profits. Alternatively, Banerjee (1992); Scharfstein, Stein (1990) showed the rational viewpoint of herding. Acc. to them, herding arises due to informational, reputation and compensational concerns. Investors follow others because they want to save time and cost in getting information and also to conceal his less ability of making investments. Herding in stock markets often results in stock market volatility and also drives its prices way from the fundamental values (Tan et al. 2008).

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The present study aims to identify the existence of herding in the banking sector of Indian stock market. This study is a comprehensive and it contributes to the literature as most of the previous studies focused on the developed economies and also the multisectoral indices. But this study focuses on a particular sector (bank) of an emerging economy such as India to examine the herding during different market periods and situations. Banking stocks are considered to be the lifeline of the Indian stock market. It contributes 18.56% weightages to Nifty50 and 6% to GDP. With the potential to become the 5th largest banking industry in the world by 2020 and third largest by 2025, India's banking and financial sector is expanding rapidly. The Indian banking industry is currently worth Rs. 81 trillion (US \$ 1.31 trillion) (Source: www.sicomindia.com). As per the RBI, India's banking sector is sufficiently capitalized and well-regulated. Despite global upheavals, banking sector in India remained stable, gaining the confidence of investors over the years. In August 2017, Global rating agency Moody's announced that its outlook for the Indian banking system was stable. ICRA estimates that credit growth in India's banking sector would be at 7-8 percent in FY 2017-18 (www.ibef.org). Therefore, the present study takes Bank Nifty index to examine the presence of herding as maximum investments of mutual funds and other institutional investors is in the banking sector followed by auto and IT.

Bank Nifty represents the 12 most liquid and large capitalized stocks from the banking sector which trade on the NSE. It provides market intermediaries a benchmark that captures the capital market performance of Indian banking sector (Source: www.nseindia.com).

The rest of the paper is organized as follows: section 2 covers reviews of literature followed by section 3 where objectives of the study are discussed. Section 4 shows the data and methodology used for the study following the analysis and interpretation of the results in section 5 at the end section 6 presents the conclusion of the present study.

REVIEW OF LITERATURE

There are various studies relating to the herding in the stock markets of developed economies like US and Europe. But very few studies have been conducted in the developing economies - particularly for Indian stock market. Some studies focused on examined the herding in particular stock while some related to market-wide herding. Herding in individual stock means investors focused on one type of securities only and ignored the other securities of the same attributes. Bikhchandani et al. (1992); Banerjee (1992); Welch (1992); Lakonishok et al. (1992); Nosfinger & Sias (1992); Wermers (1999); Shiller & Pound (1986); Scharfstein & Stein (1990); Trueman (1994); Zweibel (1995); Brennan (1993); Roll (1992); Conlisk (1980); Pingle (1995) and

Lux (1995) concluded that herding among investors is due to informational cascades, institutional investment, reputational concerns, compensation problem, psychology and interpersonal communication problems of investors. On the other hand, market-wide herding prevails in the market when investors follow the market trends and move with the actions of others. Many researchers examined the market-wide herding in different financial markets in different scenarios and found mixed results. Some researchers found positive results i.e. they found herding in the stock markets in different phases of the market like (Chang et al. 2000; Chiang & Zheng 2010; Lindhe 2012; Prosad et al. 2012) but there are some who found negative responses (Demirer & Kutan 2010; Garg & Jindal 2014). This section has been divided into two sections which explain the positive and negative responses of herding in different countries' stock markets in different phases.

a) Studies with Positive Responses

Christie & Huang 1995 examines the US stock market and finds that investors are more likely to suppress their private beliefs in favor of consensus during periods of unusual market movement. Chang et al. 2000 examine five different stock markets and find South Korea and Taiwan shows presence of herding, US and HongKong markets show negative results while Japan has mixed responses. Demirer & Kutan 2006 finds small cap stocks and large number of retail investors in non-financial sector has more tendencies to herd. Guo & Shih 2008 study the high tech companies in Taiwan and find herding in high tech stocks as compared to traditional stocks. Fu & Lin 2010 finds herding in the Chinese stock market during the extreme down market. Chiang & Zheng 2010 examine number of countries and found herding in the Asian markets during bull phase except in US and Latin America. Lao & Singh 2010 study Chinese and Indian stock markets and find herding is more prevalent in high volume stocks in Chinese market during the bear phase and in Indian market during the bull phase. My & Troung 2011 also find herding indifferent market periods in Vietnamese stock market. Khan et al. 2011 explore the herding in Great Britain, France, Germany and Italy. Lindhe 2012 analyzes herding in the Nordic countries of Finland, Sweden, Norway and Denmark. Poshakewal & Mandal 2012 find herding in Indian stock market in both bull and bear phases. Yao et al. 2013 find herding in the Chinese B stock market during the extreme down market. Chen et al. 2012 and Hsieh 2013 show the presence of herding among foreign institutional investors in Taiwan in their respective studies. Cakan & Balagyozyan 2015 find herding in all the sectors namely finance, technology and services in highly volatile markets in Turkish stock exchange. Filip et al. 2015 examine the Central and South Eastern European markets and find herding during bear phases in all the markets except Poland. Ramadan 2015 finds the herding patterns in Amman stock exchange.

b) Studies with Negative Responses

In addition to above studies, there are many researchers who analyze the absence of significant herding in stock markets of different countries. The pioneer study by Lakonishok et al. 1992 finds no evidence of herding in Indian stock market. Demirer & Kutun 2006; Lao & Singh 2010 find no evidence of herding in Chinese stock market. Gleason et al. 2003 & 2004 find no evidence of herding in American stock market during extreme market conditions and also among sector ETFs. Prosad et al. 2012; Bhaduri and Mahapatra (2013); Garg & Gulati 2013; Garg & Jindal 2014; Garg, Bharti & Bansal 2016; Garg & Bharti 2017 find no evidence of herding in the Indian stock market in different time periods, conditions and sectors respectively.

Even though the literature on herding is extensive but less research is available for Indian markets. So, the present study tries to examine the herding in the Indian stock market with special reference to banking sector.

OBJECTIVES OF THE STUDY

- To find the presence of herding in the period of market stress as a whole in the banking sector of Indian stock market.
- To explore the non-linearity of herding patterns in the banking sector.
- To look into the herding patterns during bull and bear phases of the market.
- To observe the existence of herding in the extreme up and extreme down market scenario.

DATA AND METHODOLOGY

a) Data

This section of the paper explains the data used for examining the presence of herding in the banking sector of Indian stock market. As previous studies like Christie and Huang (1995) while analyzing the US stock market and Tan et al. (2007) examined Chinese market stated that herding is a short-term fact and it has been observed in daily data rather than weekly and monthly data. So, this study uses daily closing prices of NIFTYBANK index and its component securities for the period of 7 years ranging April 1'2010 to October 31'2017. The closing prices of the individual stocks has been collected from the PROWESS database, which is maintained by Centre for monitoring Indian Economy and closing values of bank index has been retrieved from the website of NSE i.e. www.nseindia.com. The sample consists of 1885 observations having balanced sample of companies listed in the NiftyBank index.

The stock return for all the companies is calculated as follows:

$$R_{i,t} = \ln(P_t - P_{t-1})$$

The market return is also calculated in the same manner:

$$R_{m,t} = \ln(P_t - P_{t-1})$$

b) Methodology

The study uses the methodologies given by Christie and Huang (1995) and Chang et al. (2000) to examine the presence of herding in the banking sector of Indian stock market. CH used the cross-sectional standard deviation (CSSD) measure to find out herding in stock market whereas Chang et al. used the cross-sectional absolute deviation (CSAD) for measuring the herding patterns in different market scenarios in the stock markets.

a) To find out the herding in the period of market stress as a whole in the banking sector of Indian stock market, the CH model has been applied. According to CH, CSSD is the measure of individual return dispersion and is calculated as follows:

$$CSSD_t = \frac{\sum_{i=1}^{N_t} (R_{i,t} - R_{m,t})^2}{N_t - 1} \quad (1)$$

Where, N is the total number of shares in the index. $R_{i,t}$ is the return of individual stock in the index and $R_{m,t}$ is the cross-sectional average return of the N securities in the index at time t .

The following regression equation as given by CH has been run to identify the herding in the banking sector.

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

Where $CSSD_t$ is the cross-sectional sectional deviation, α is the average dispersion of the sample, D_t^L and D_t^U are two dummy variables separating the normal and periods of stress. The stress period took place when the market returns fall in the upper and lower tail of returns distribution. Upper and lower tails were determined at 66%, 95% and 99% levels. The $D_t^L = 1$, if $R_{m,t}$ lies in the lower tail of the return distribution else 0. In the same way, $D_t^U = 1$, if $R_{m,t}$ lies in the upper tail of the return distribution.

As per CH, the negative and significant values of β_1 and β_2 in the regression equation (2) will show the presence of herding in the banking sector of Indian stock market.

(b) To explore the non-linearity of herding patterns in the banking sector, the methodology of Chang et al. (2000) has been used. CCK used cross-sectional absolute deviation (CSAD) to measure the non-linearity and herding in different market scenarios. CSAD is the absolute value of mean of the total of the difference between the stock return and market return. It is calculated as follows:

$$CSAD_t = \frac{1}{N_t} \sum_{i=1}^{N_t} |R_{i,t} - R_{m,t}| \quad (3)$$

As per the CCK model, the following regression equation has been run to explore the non-linear pattern of herding.

$$CSAD_t = \alpha + y_1 |R_{m,t}| + y_2 |R_{m,t}^2| + e_t \quad (4)$$

Where, $|R_{m,t}|$ is the absolute value of market return; $|R_{m,t}^2|$ is the quadratic term of the absolute value of market return. The positive and significant value of y_1 shows the linear relationship between stock return and market return whereas the negative and statistically significant y_2 will show the non-linearity and presence of herding.

(c) To look into the herding patterns during bull and bear phases of the market, the following two regression equations has been run separately:

$$CSAD_t^{UP} = \alpha + y_1^{UP} |R_{m,t}^{UP}| + y_2^{UP} R_{m,t}^{UP^2} + e_t \quad (5)$$

$$CSAD_t^{DOWN} = \alpha + y_1^{DOWN} |R_{m,t}^{DOWN}| + y_2^{DOWN} R_{m,t}^{DOWN^2} + e_t \quad (6)$$

Where, $|R_{m,t}^{UP}|$ is the absolute value of market return when the market is UP and $R_{m,t}^{UP^2}$ is the squared term of the earlier one. Correspondingly, $|R_{m,t}^{DOWN}|$ is the absolute value of market return when the market is down. If the market return is more than zero, the market is up else down. Here also the negative and statistically significant values of y_2 will show the existence of herding.

(d) To observe the existence of herding in the extreme up and extreme down market scenario, the following regressions equations as given by CCK has been used.

$$CSAD_t^{UP} = \alpha + y_1^{UP} |R_{m,t}^{UP}| * D_t^U + y_2^{UP} R_{m,t}^{UP^2} * D_t^U + e_t \quad (7)$$

$$CSAD_t^{DOWN} = \alpha + y_1^{DOWN} |R_{m,t}^{DOWN}| * D_t^L + y_2^{DOWN} R_{m,t}^{DOWN^2} * D_t^L + e_t \quad (8)$$

Where, $D_t^U = 1$, If market return lies in the upper tail of return distribution else 0. In the same way, $D_t^L = 1$, if market return lies in the lower tail of distribution. Upper and lower tails were determined at 66%, 95% and 99% levels.

ANALYSIS AND INTERPRETATION OF OUTCOME

Table 1 shows the descriptive statistics of CSSD based on daily data for the period of study (2010-2017). It has been viewed that the average of CSSD is 1.284 and standard deviation is 0.701 with maximum of 18.892 and minimum of 0.175. Kurtosis is more than 3, so the CSSD series is non-

normal in nature. But the significant values of Jarque-Bera statistics rejected the hypothesis of normal distribution. However, the present study used the OLS regression as the sample size is sufficiently large. The ADF statistics came to be negative and significant, rejecting the null hypothesis, showing the series CSSD is stationary at levels.

Table 1: Descriptive Statistics of the Cross- Sectional Standard Deviation (CSSD)

	Daily CSSD (2010-2017)
Mean	1.29
Median	1.17
Maximum	18.89
Minimum	0.17
Std. Dev.	0.70
Skewness	9.53
Kurtosis	216.62
Jarque-Bera	3612572.
Probability	0.00
ADF Statistics	-10.40
Observations	1885

Note: Descriptive statistics were obtained using EVIEWS 8.0.

Equation (2) has been run with EVIEWS 8.0 software to examine the herding in the period of market stress as a whole during the period of study. Table 2 provides the results of the variables used in the regression equation along with results of the error terms. The coefficient of β_1 and β_2 comes positive and significant in all the three cases. Therefore, it shows that the equity return dispersion based on daily data tends to be increased rather than decreased during the period of study. So, herding is not found in the banking sector of Indian stock market during the study period as the definition of herding as per CH is that CSSD should be decreased. Thus, the results of the study are consistent with the results of CH (1995).

Table 2 also provides the results of residual terms. Breusch-Godfrey Serial Correlation LM Test and ARCH LM Test have been used to check the auto-correlation and heteroskedasticity of error terms respectively. The positive and significant F-value along with observed R^2 shows that there is no auto-correlation and heteroskedasticity in the error terms based on daily data in all the three cases. Therefore, it has been found that the above regression results are valid and robust.

Table 2: Regression Results for Daily CSSD as per Christie and Huang Model, 1995

$CSSD_t = \alpha + \beta_1 D_t^L + \beta_2 D_t^U + e_t$			
Daily			
Mean Equation	66% criterion	95% criterion	99% criterion
α	1.20*	1.25**	1.28***
t-statistic	65.27	76.88	79.53
β_1	0.23*	0.28**	1.05***
t-statistic	4.90	3.01	3.98
β_2	0.40*	0.85**	1.28***
t-statistic	8.43	9.51	4.85
Adjusted R ²	0.04	0.05	0.02
F statistic	42.26	48.94	19.60
Residual Tests			
Breusch- Godfrey Serial Correlation LM Test: F-Value	56.83	55.49	63.05
Obs*R-square	107.47* (0.00)	105.08** (0.00)	118.49*** (0.00)
ARCH Test:			
F-Value	0.13	0.14	0.10
Obs* R ²	0.13* (0.72)	0.14** (0.71)	0.10*** (0.75)

* indicates level of significance at 66%. The test of significance is two-tailed.

** indicates level of significance at 95%. The test of significance is two-tailed.

*** indicates level of significance at 99%. The test of significance is two-tailed.

Results are obtained using EVIEWS 8.0.

Table 3 & 4 give the descriptive statistics of CSAD and market return ($R_{m,t}$) based on daily data, during up and down market. The average of CSAD is 0.094 for the entire sample period, whereas it is 0.095 for up market and 0.092 for down market. The standard deviation is 0.053, 0.064 and 0.037 for entire period, up market and down market respectively. The mean return of the market full the whole study period is 0.001, whereas it is 0.011 for up market and -0.011 for down market. The standard deviation is 0.015, 0.010, and 0.001 for complete data, up market and down market respectively. When comparing the standard deviations of CSAD and Market return series, it has been found that it comes to be low during the down market.

Further, the positive and high values of skewness and Kurtosis shows non-normality of the series CSAD and $R_{m,t}$. But, the significant probabilities of Jarque-Bera Statistics for both the series CSAD and $R_{m,t}$ rejecting the null hypothesis of normal distribution. The ADF- statistics is negative and significant in all the situations for both the series. Hence, both the series are stationary and suitable for OLS regression.

Table 3: Descriptive Statistics of Cross-Sectional Absolute Deviation (CSAD)

	Daily CSAD	During Up Market	During Down Market
Mean	0.09	0.10	0.09
Median	0.09	0.09	0.09
Maximum	1.56	1.56	0.29
Minimum	0.01	0.01	0.03
Std. Dev.	0.05	0.06	0.04
Skewness	12.11	12.66	1.35
Kurtosis	315.47	276.37	6.24
Jarque-Bera	7714814.	3124731.	657.53
Probability	0.00	0.00	0.00
ADF Statistics	-10.81	-11.56	-9.98
Observation	1885	995	890

Note: Descriptive statistics were obtained using EVIEWS 8.0.

Table 4: Descriptive Statistics of Market Return ($R_{m,t}$)

	Daily $R_{m,t}$	$R_{m,t}$ in Up Market	$R_{m,t}$ in Down Market
Mean	0.00	0.01	-0.01
Median	0.00	0.01	-0.01
Maximum	0.09	0.09	-4.79E-05
Minimum	-0.07	1.57E-05	-0.07
Std. Dev.	0.01	0.01	0.01
Skewness	0.15	1.92	-1.56
Kurtosis	5.14	9.61	6.38
Jarque-Bera	4095.70	2426.36	787.46
Probability	0.00	0.00	0.00
ADF Statistics			
Observation	1885	995	890

Note: Descriptive statistics were obtained using EVIEWS 8.0.

Table 5: Results of CCK Model on Daily Basis

Variable	Coefficient	Std. Error	t-statistic	Prob.
α	0.08*	0.00	38.78	0.00
β_1	0.77*	0.26	2.95	0.00
β_2	14.65*	5.95	2.46	0.01
R-squared	0.06	Mean Dependent		0.09
Adjusted R ²	0.06	S.D. Dependent		0.05
S.E. of Regression	0.05	Akaike info criterion		-3.10
Sum Squared Residual	4.97	Schwarz criterion		-3.09
Log Likelihood	2921.46	Hannan-Quinn crite.		-3.09
F-statistic	65.25	Durbin-Watson Stat.		1.61
Prob(F-statistic)	0.00			
Residual Tests		F-Value	Obs*R-square	Prob.
Breusch- Godfrey Serial Correlation LM Test		48.59	92.65	0.00
ARCH Test		0.12	0.12	0.73

*** indicates level of significance at 1%. The test of significance is two-tailed.

** indicates level of significance at 5%. The test of significance is two-tailed.

* indicates level of significance at 10%. The test of significance is two-tailed.

Results are obtained using EVIEWS 8.0.

Herding and asymmetrical behavior has been found during the bull and bear phases of the market in the literature. So, to look in to the herding patterns of the banking sector, separate regression equations 5&6 have been run. Table 6 reports the regression results for bull and bear phases of the market. It is observed that the coefficient β_2 for $R^2_{m,t}$ is positive and significant for both bull and bear market, indicate the absence of herding in the banking sectoral index. Hence, no asymmetry has been found in the behavior of investors in the banking sector. They seem to take rational decisions and not follow the crowd. The results are in accordance with the

Equation 4 has been run to find out the non-linear patterns of herding in the banking sector of Indian stock market for the period of study. Table 5 gives the regression results as per CCK model and it is found that the coefficients β_1 & β_2 are positive and significant, showing the absence of herding and linear relationship between stock return and market return during the study period. The results of the study are not consistent with the results of CCK who found herding in the emerging economies of South Korea and Taiwan.

Residual tests results are also reported in the Table 5. It is found that data based on daily basis is not reflected by the problems of auto-correlation and heteroskedasticity. Hence, the result produced by regression equation is robust and valid.

studies of Lao & Singh (2011); Patra and Kangaraj (2012); Garg & Gulati (2013) and Bhaduri and Mahapatra (2013).

Residual Tests results are also reported in the table 6. It has been found that there is no auto-correlation in both the cases but heteroskedasticity has been found during the bear market. To rectify this problem, the regression equation has been re-estimated by the GARCH (1, 1) Model. The results derived by GARCH remains the same, as the value of the coefficient β_2 is positive and significant. Hence, no herding is there in the bull and bear phases of the market.

Table 6: Regression Results for Bull and Bear Phases of the Market as Per CCK Model

	Bull Market Results	Bear Market Results	Bear Market Results (GARCH)
Mean Equation			
α	0.08***	0.08***	0.08***
t- Statistics	23.58	36.99	36.61
β_1	1.01***	0.63***	0.53
t- Statistics	2.49	2.07	1.62
β_2	13.80***	11.59***	11.56
t- Statistics	1.59	1.53	1.30
Adjusted R ²	0.06	0.07***	0.07
F- Statistic	33.76	36.68	0.01
Conditional Variance Equation			
RESID(-1) ²	-----	-----	0.10***
z-statistic	-----	-----	4.64
GARCH(-1)	-----	-----	0.76***
z-statistic	-----	-----	12.08
Serial Correlation LM Test:			
F-Value	14.57	13.31	-----
Obs* R ²	28.46 (0.00)	25.99*** (0.00)	-----
ARCH Test:			
F-Value	0.01	11.85***	0.01
Obs* R ²	0.01 (0.93)	11.72 (0.00)	0.01 (0.92)

* indicates level of significance at 66%. The test of significance is two-tailed.

** indicates level of significance at 95%. The test of significance is two-tailed.

*** indicates level of significance at 99%. The test of significance is two-tailed.

Results are obtained using EVIEWS 8.0.

To observe the herding during extreme market situations, regression equations 7&8 have been run for extreme up and extreme down market respectively for 66%, 95% and 99% criteria. The table 7 reports the regression results for the extreme up market and it has been found that the coefficient β_2 is positive but insignificant in the entire three criterions

used to define the upper limits. Therefore, no herding is found in the extreme up market situations. No auto-correlation and heteroskedasticity has been found in the error terms of extreme up market.

Table 8 gives the results of extreme down market. It is observed that Coefficient β_2 is positive and insignificant in 66% and 95% criterion but negative in 99% criterion. So, it is concluded that there is a less chance or mild herding in the extreme down market situation. It may be possible that investors in the extreme down market follow the actions of others to make investment decisions and earn profits. The results of the present study are consistent with the results of CH who confirmed that during extreme down market there is herding in the stock market.

Table 7: Results of Extreme Up Market as Per CCK Model

$CSAD_t^{UP} = \alpha + y_1^{UP} R_{m,t}^{UP} * D_t^{UP} + y_2^{UP} R_{m,t}^{UP} * D_t^{UP} + e_t ; R_{m,t} > 0$			
Mean Equation	66%	95%	99%
α	0.09*	0.09**	0.09***
t-statistic	38.69	44.73	46.57
β_1	0.79*	1.45***	-0.60
t-statistic	2.26	2.60	-0.42
β_2	15.23	3.42	29.95
t-statistic	1.80	0.30	1.50
Adjusted R ²	0.06	0.05	0.01
F statistic	33.45	28.85	7.84
Breusch- Godfrey Serial Correlation LM Test:			
F-Value	13.99	16.88	19.24
Obs*R-square	27.35* (0.00)	32.81** (0.00)	37.23*** (0.00)
ARCH Test F-Value	0.01	0.01	0.00
Obs* R ²	0.01 (0.93)	0.01 (0.93)	0.00 (0.95)

* indicates level of significance at 66%. The test of significance is two-tailed.

** indicates level of significance at 95%. The test of significance is two-tailed.

*** indicates level of significance at 99%. The test of significance is two-tailed.

Results are obtained using EVIEWS 8.0

Table 8: Results of Extreme Down Market as Per CCK Model

$CSAD_t^{DOWN} = \alpha + \beta_1^{DOWN} R_{m,t}^{DOWN} * D_t^{DOWN} + \beta_2^{DOWN} R_{m,t}^{DOWN} * D_t^{DOWN} + e_t ; R_{m,t} < 0$						
Daily Data						
Mean Equation	66%	66%	95% (Garch)	95% (Garch)	99%	99% (Garch)
α	0.09*	0.09*	0.09*	0.09**	0.09***	0.09***
t-statistic	62.56	58.54	73.07	65.02	75.69	66.59

CSAD t DOWN = $\alpha + \beta_1 \text{DOWN} R_m, t \text{ DOWN} * D t L + \beta_2 \text{DOWN} R_2 m, t \text{ DOWN} * D t L + e t, R_m, t < 0$						
Daily Data						
β_1	0.44	0.43	-0.79	-0.47	2.69	2.28
t-statistic	1.72	1.53	-1.57	-0.86	1.62	0.50
β_2	13.19	11.20	38.41	29.24**	-20.23***	-14.81***
t-statistic	1.78	1.26	0.09	0.09	0.09	0.09
Adjusted R2	0.07	0.07	73.07	65.02	75.69	66.59
F statistic	35.03	9.71E-05	-0.79	-0.47	2.69	2.28
Conditional Variance Equation						
RESID(-1)^2	-----	0.10*	-----	0.09**	-----	0.10 ***
z-statistic	-----	4.56	-----	4.73	-----	4.09
GARCH(-1)	-----	0.76**	-----	0.79**	-----	0.73***
z-statistic	-----	12.16	-----	13.89	-----	10.32
Residual Tests						
Breusch- Godfrey Serial Correlation LM Test : F-Value	14.15	----	16.41	----	19.04	
Obs*R-square	27.58 (0.00)	----	31.83	----	36.72 (0.00)	
ARCH Test: F-Value	10.91	9.71E-05	10.65	0.05	10.82	0.02
Obs* R2	10.80 (0.001)	9.74E-05 (0.99)	10.55 (0.001)	0.05 (0.82)	10.72 (0.001)	0.02 (0.88)

* indicates level of significance at 66%. The test of significance is two-tailed.

** indicates level of significance at 95%. The test of significance is two-tailed.

*** indicates level of significance at 99%. The test of significance is two-tailed.

Results are obtained using EViews 8.0.

CONCLUSION

The present study focuses to indentify herding in the banking sector of Indian stock markets. As banking sector plays an important role in the economic growth of the country. Number of institutional investors, portfolio managers and asset management companies invest their monies in the banking sector to earn more profits. Considering all these issues, this study aims to examine asymmetric behavior and herding in the banking sector for the period 2010-2017. Using the methodology of Christie & Huang 1995, the analysis of daily returns of BANK NIFTY index provides no evidence of herding in the period of market stress. The empirical results indicate that instead of decreasing the returns dispersions, it shows increasing trend. Hence, it goes against the definition of herding and supports the rational asset pricing model.

The non-linear relationship, herding during bull and bear phases and also in the extreme price movements has been analyzed by using the Chang et al. 2000 model. It has been analyzed that the quadratic term in the regression equation comes positive and significant, indicates the absence of non-

linear relationship between stock returns and market returns. This shows that investors in the banking sector makes rational investment decisions and not follow the crowd. The analysis of bull and bear phases of the market also shows positive and significant results, hence there is no herding in both the phases of the market. Though, the results during the extreme price movements show no significant signs of herding in the up and down market situations using three alternate criterions. But, a little bit sign of herding during extreme down market situation is found only in the 99% criteria. So, it can be concluded that a mild form of herding is found in the extreme down market situation. The results of the study are in line with the results Lao & Singh 2010 and Garg & Jindal 2014 who found herding during the extreme price movements and not in the normal periods. Herding is not found in the Indian banking sector because of more participation of institutional investors and less share of retail investors in the banking sector of Indian stock market. Institutional investors have sufficient number of information in their hands while making investment decisions. So they don't follow the crowd but make rational investment decisions based on their own information.

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