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Evidence of Herding in Indian Stock Market during Chinese Stock Market Turbulence: An Empirical Analysis

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Abstract:
Behavioral researchers claim that investors are compelled by their personal beliefs and opinions and are inclined to make cognitive errors. These errors can lead to market inefficiencies and can get predictable in the form of biases like cognitive bias and emotional bias which lead to many speculative bubbles like the dot-com bubble, subprime mortgage and credit crisis which led to a bubble burst in 2007. These gave rise to a new discipline named behavioural finance which explains how the cognitive errors and emotions of investors influences their decision making process. Out of all biases prevailing in the Indian Capital market, Herding is considered to be the most common behavior biases found among investors. The present study focuses on investigating the presence of herd behavior in the Indian Capital market during the Chinese Stock Market Turbulence. BSE 500 index data has been used in the analysis and the entire data period of 2013-2019, is classified into three phases pre-crisis(13-14), during crisis(15-16), post – crisis(17-19).CSSD and CSAD regression models have been used in the analysis. It was found that there is no evidence of herding in the Indian Stock market during pre-crisis, during crisis and post crisis of the Chinese Stock market Turbulence.

Keywords*: Behavioral Finance, Herding, Chinese Stock Market Turbulence, CSSD, CSAD.*

Introduction

This paper analyses the presence of herd behavior in the Indian Stock Market during Jan 2013 to June 2019. A critical Incident Analysis has been done by using the Chinese Stock Market Turbulence incident. The analysis has been done by using the methodology given by 'Christie and Huang', 1995 model and 'Chang et. al. 2000 model'. This methodology analyses the linear relationship between the dispersion of stock returns and the nonlinear relationship between the stock return and the market return during the pre-crisis, during crisis and post-crisis period as well as the bull and bear phase of the market. The study was conducted on BSE 500 companies from the period 2013 to 2019 using the monthly, weekly and daily data and analyzing the extreme price movement in the market during that particular incident. Hence, this paper examines the existence of herding during the pre-crisis, during crisis, post-crisis period as well as the bull and bear phase of the Indian Capital Market.

Literature Review

Bikhchandani and Sharma (2001) have conducted a study on 'Herd Behavior in financial markets' with an objective to analyse herd behaviour in oil financial markets. It examined the theoretical and empirical aspect of herd behaviour in oil financial market and explains the meaning, causes and effect of herding on oil financial markets. It also examines the success of existing studies in identifying the phenomenon. The findings were the evidence

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suggests that investment managers do not exhibit significant herd behavior and the tendency to herd is highly correlated with a manager's tendency to pursue momentum investment strategies.

Welch (2012) has conducted a study on 'Herding among security analysts' with an objective to study the effect of buy or sell recommendations on stock market given by security analyst and how it influences the recommendations of others through consensus herding. The data has been collected from Zack's historical Recommendations Database covering 3,02,458 individual recommendations given by 226 brokers during the period 1989 to 1994. The analysis has been done by using transition probability matrix and it was found that consensus herding has stronger influence hen market conditions are favourable and can influence the bull market but in a fragile manner even with poor information.

Chiang and Zheng (2010) have conducted a study on 'An empirical analysis of herd behaviour in global stock markets' with an objective to study the presence of herding in the advanced markets. The advanced markets used in study were Australia , France, Germany, Hong Kong, Japan, the United Kingdom , and the United States; Latin American markets: Argentina, Brazil, Chile, and Mexico; Asian markets: China, Indonesia, Malaysia, Singapore, South Korea, Taiwan, and Thailand. The data has been collected from 4/25/1989 to 4/24/2009 and analysis was done with the help of dummy regression method of CSAD (Cross Section Absolute Deviation) and it was found that Evidence of herding was found in Asian markets and advanced markets except US and Latin America. Herding was present in both the up market and down market. During crisis period herding was evident also in US and Latin American markets. As crisis triggers herding in the country of origin and has contagion effect on the neighbouring countries.

Wylie (2005) in his study titled 'Fund manager herding: A test of the accuracy of empirical results using UK data' examined the evidence of herding through LSV model among UK mutual fund manager. The data has been collected from January 31, 1986, to December 31, 1993 from the portfolio holdings of 268 U. K. equity mutual funds derived from London Share Price Database of The London Business School. The LSV Model the Lakonishok, Shleifer, and Vishny (1992) has been used and it was found that the existence of herding among fund manager in the largest and smallest individual U. K. stocks but little herding in the stocks aggregated by industry. U. K. mutual fund managers tend to herd out of large stocks after high excess returns.

Yao, Ma, He and Peng (2014) have conducted a study on 'Investor herding behaviour of Chinese Stock Market' to examines the existence and prevalence of investor herding behaviour in a segmented market setting, the Chinese A and B stock markets. For the analysis daily and weekly data on stock prices for all firms listed on the Shanghai Stock Exchange (SHSE) and the Shenzhen Stock Exchange (SZSE) over the period from January 1, 1999 to December 31, 2008 has been used which has been collected from the Thomson DataStream database, the analysis was conducted by using CSSD (Cross Section Standard Deviation) and CSAD (Cross Section Absolute Deviation) models. It was found that herding exists in B share markets. It was also find that across markets herding behaviour is more prevalent and stronger at industry-level, for the largest and smallest stocks, the growth stocks relative to value stocks. Herding behaviour is also more pronounced under conditions of declining markets. It will help the policy makers to make some regulatory reforms in China aiming to improve market integration and information efficiency.

Demirer, Kutan and Chen (2010) have conducted a study on 'Do Investors herd in emerging stock markets?: Evidence from Taiwanese market' in order to examine the evidence of herding in Taiwanese stock exchange. The daily returns for 689 Taiwanese stocks traded on the Taiwan Stock

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Exchange over the period January 1995–December 2006 obtained from the Taiwan Stock Exchange Corporation (TSEC) has been used for the study. The CSSD, CSAD and H &S model namely the cross-sectional standard deviation (CSSD), the non-linear model cross section absolute deviation (CSAD), the state space based models of Hwang and Salmon (2004) have been used. It was found from the CSSD methodology that stock market yields no significant evidence of herding. But CSAD & H & S model indicate strong evidence of herding in all the sectors of Taiwanese Stock Exchange. It was also found that the herding effect is more prominent during periods of market losses.

Research Objectives:

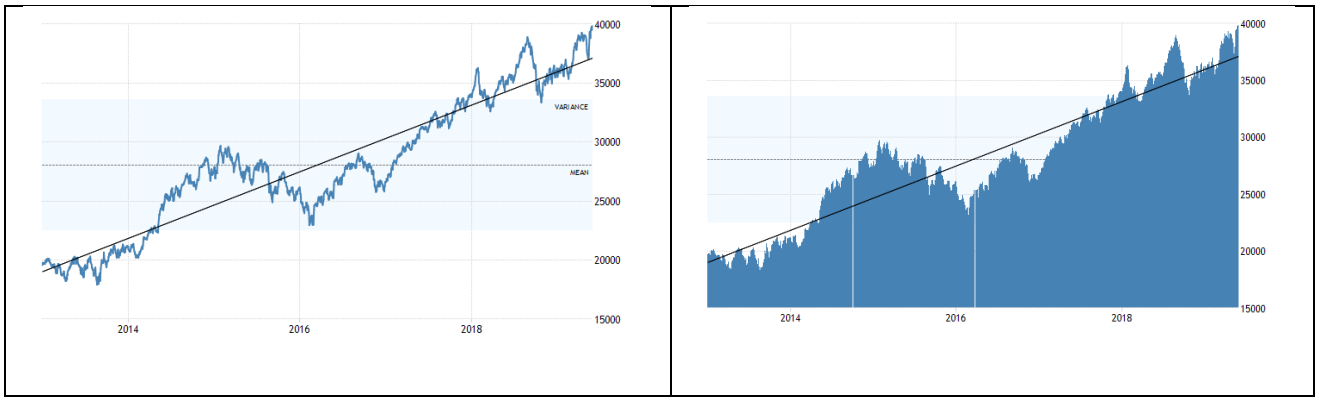
(i) To examine the presence of herd behavior in the entire Indian capital market during Chinese Stock Market Turbulence.

(ii) To examine the presence of herd behavior during extreme price movements during Chinese Stock Market Turbulence.

Data Period:

Time period from Jan 2013 to May 2019 has been considered for the study. The monthly, weekly, daily data of all securities listed in BSE 500 was used to investigate the same. The reason behind selecting this period is this period has recorded the all-time major single day fall of 1624 points in Sensex on August 24, 2015 and the year 2015 and 16 was the considered as the market crash period. The reasons behind the crash were the period has marked the Chinese market slowdown which reduced the confidence of investors and sooner there was a rapid selling of stocks. For the study the entire period of 6 years has been divided into three phases, pre-crash period (2013-14), during crash period(15-16) and post -crash period(17-19).

Graph 1



Source: Trading Economics

Methodology:

The methodology adopted in the study is through CSSD model and CSAD model.

Specific Objectives:

The following objectives have been framed from the above stated research questions:

1. Is Indian Stock Market influenced by Herd behavior during during Chinese Stock Market Turbulence (2013-17)?
2. Is Indian Stock Market influenced by Herd behavior during pre-market crash period of Chinese Stock Market Turbulence (2013-14)?
3. Is Indian Stock Market influenced by Herd behavior during market crash period of Chinese Stock Market Turbulence (2015-16)?
4. Is Indian Stock Market influenced by Herd behavior during post-market crash period of during Chinese Stock Market Turbulence (2017-19)?
5. Is Indian Stock Market influenced by Herd behavior during the extreme price movements (bullish and bearish phase) of during Chinese Stock Market Turbulence?

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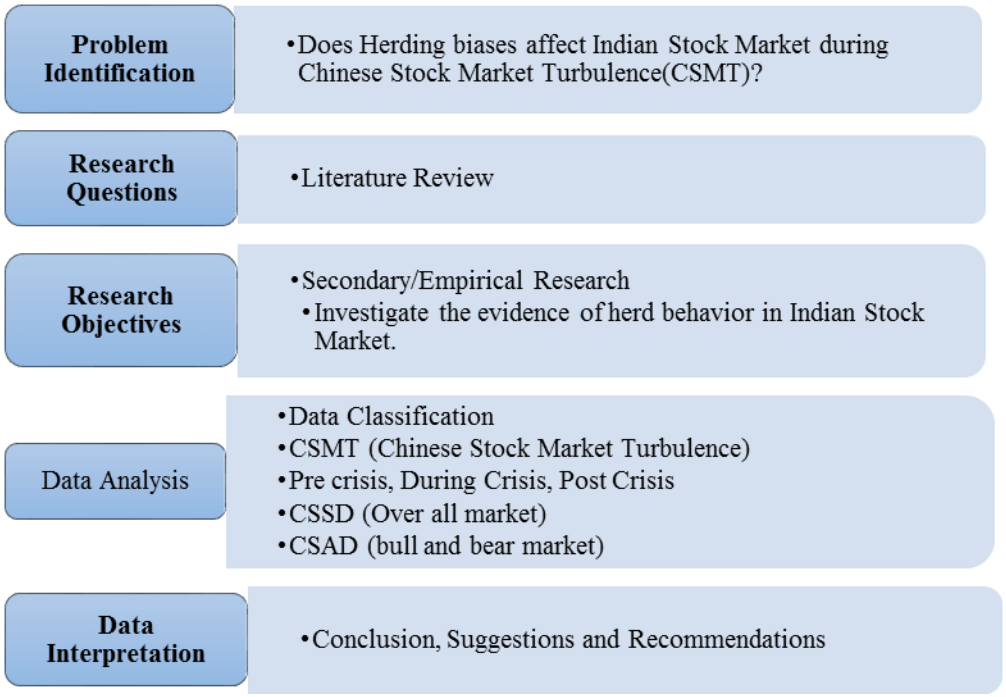
Fig 1.1: Research Design



Empirical Results

Detection of herding through CSSD model during during Chinese Stock Market Turbulence in the entire Indian Stock Market.

$H_0$1: There is no significant presence of herd behavior in the Indian stock market during Chinese Stock Market Turbulence (2013-19).

$H_0$1.1: There is no significant presence of herd behavior in the Indian stock market during pre-crisis period of Chinese Stock Market Turbulence (2013-14).

$H_0$1.2: There is no significant presence of herd behavior in the Indian stock market during crisis period of Chinese Stock Market Turbulence (2015-16).

$H_0$1.3: There is no significant presence of herd behavior in the Indian stock market during post-crisis period of Chinese Stock Market Turbulence (2017-19).

Table 1: Regression Results for $CSSD_t$ (CH Model)
($CSSD_t = \alpha + \beta_1 D_t^L + \beta_2 D_t^U + e_t$)

CHINESE STOCK MARKET BEFORE (2013– 14)					t statistics	β_1	t statistics	β_2	t statistics	AR(1)	t statistics	Adjusted R^2	F statistics	ARCH F statistics	Observed R^2	Durbin - Watson
	Daily	5%	0.0015***	3.925	0.0182***	11.01	-0.0265***	-16.71	0.2177	4.845	0.4908	156.55***	2.0215	14.299	2.02
		2%	0.0013***	2.512	0.0218***	7.23	-0.0312***	-10.55	0.1798	3.989	0.2689	66.909***	3.6862	3.6269	2.01
		1%	0.0012***	2.102	0.0265***	5.76	-0.0336***	-7.65	0.2056	4.595	0.2002	41.396***	3.6862	3.6269	2.01
	Weekly	5%	0.0531***	37.89	0.0418***	5.91	0.0129***	2.27	0.275	2.779	0.3470	19.071***	1.4891	14.299	2.02
		2%	0.0531***	39.83	0.0427*	5.96	0.0158*	2.24	0.219	2.185	0.3459	18.980***	0.1582	0.1611	2.01
		1%	0.0531***	38.73	0.0416***	5.85	0.0144***	2.23	0.238	2.381	0.3459	18.980***	3.6745	3.6147	2.01

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		Monthly	5%	0.1175***	21.88	0.0344**	1.93	0.0025***	0.144	-	-	0.0706	1.8747***	0.0186	0.0203	1.95
			2%	0.1198***	24.84	0.0504**	2.18	-0.0314**	-1.35	-	-	0.1750	3.4409**	0.1199	0.1306	1.89
			1%	0.1234***	22.36	0.0412*	2.17	-0.0323**	-1.347	-	-	0.1654	3.4457**	0.1074	0.1214	1.88
	DURING (2015-16)	Daily	5%	0.0135***	10.15	0.0124**	4.35	-0.0281***	-9.289	0.481	11.95	0.3607	93.358**	0.1582	0.1611	2.37
			2%	0.0131***	9.607	0.0168***	3.73	-0.0345***	-7.341	0.477	11.92	0.3080	73.871**	0.1582	0.1611	2.34
			1%	0.0129***	9.369	0.0194***	3.01	-0.0412*	-6.346	0.4776	11.91	0.2839	65.901***	0.1543	0.1571	2.34
		Weekly	5%	0.0503***	46.73	0.0039***	0.51	0.0012*	0.157	-	-	-0.016	0.1382	0.1582	0.1611	2.00
			2%	0.0471***	46.71	0.0026*	0.52	0.0021*	0.145	-	-	-0.0141	0.1248***	0.1456	0.1547	2.01
			1%	0.0503***	47.08	0.0101*	0.92	0.0012*	0.161	-	-	-0.0107	0.4394*	0.1543	0.1571	2.00
		Monthly	5%	0.1016***	22.18	0.0433**	3.53	-0.0121*	-0.866	0.1544	0.685	0.3434	4.8355*	0.0478	0.0522	1.75
			2%	0.1045***	20.61	0.0188**	0.86	-0.0159***	-0.711	0.0736	0.319	-0.0767	0.4784*	0.3601	0.3878	1.83
			1%	0.1105***	23.65	0.0146**	0.61	-0.0128***	-0.6475	0.0925	0.312	-0.0176	0.5714*	0.2510	0.2564	1.95
	AFTER (2017-19)	Daily	5%	0.0227***	50.09	0.0017**	0.85	0.0015***	0.794	-0.0026	-0.46	0.0256	50.5047*	0.4261	0.4317	1.91
			2%	0.0227***	51.86	0.0048**	1.52	0.0038**	1.246	-0.0028	-0.48	0.0819	1.3407**	0.4261	0.4317	1.92
			1%	0.0228***	52.53	0.0071**	2.74	0.0052***	1.225	-0.0028	-0.48	0.0015	1.3104***	0.2612	0.2650	1.92
		Weekly	5%	0.0476***	49.54	0.0181***	2.69	0.0054***	0.826	0.1119	1.23	0.0529	3.2356***	0.4261	0.4317	1.97
			2%	0.0467***	49.28	0.0171***	2.58	0.0052**	0.811	0.1025	1.314	0.0452	3.9277**	0.4150	0.4201	2.02
			1%	0.0477***	48.82	0.0231***	2.49	0.0053**	0.807	0.1251	1.378	0.0424	2.7747**	0.2612	0.2650	1.97
		Mon	5%	0.0962***	26.90	0.0297**	2.77	0.0132*	1.552	0.3108	1.515	0.2931	4.5940*	0.6212	0.6547	2.05
			2%	0.0981***	23.56	0.0154**	1.12	0.0111*	0.802	0.3247	1.647	0.0488	1.4447*	0.1441	0.1548	2.00
			1%	0.0824***	34.25	0.0147**	0.82	0.0171*	0.746	0.3125	1.524	-0.0157	0.7652*	0.1332	0.1514	1.95

****p<0.01, **p<0.05, *p<0.1*

In order to find out the presence of herding in the study, the event taken in the study is Chinese Stock Market Turbulence (Jan 2013- May 2019). The entire sample period of Chinese Stock Market Turbulence has been classified into three sub samples which is pre-crisis period (2013-14), during crisis period (2015-16) and post crisis period (2017-19). A separate regression equation as suggested by CH (1995) model has been used. Each subsample is again analysed using the CSSD along with three different criteria of 5%, 2% and 1%. In order to decide about the extreme price movements these three criteria have been used 5%($R_{m,t} + \sigma$), 2% ($R_{m,t} + 2\sigma$) and 1% ($R_{m,t} + 3\sigma$). The 5%, 2% and 1% criteria for the extreme price movement restricts D^U_t to 5%, 2% and 1% of the upper tail and D^L_t to 5%, 2% and 1% of the lower tail of the market return distribution respectively. As there is no proper definition for extreme price movement, the study has chosen these three criteria to chose about upper and lower tail of market dispersion on the basis of previous studies. (Prosad et al., 2012, Garg and Jindal, 2014).

The analysis has been done by using the regression equation mentioned below:

$$CSSD_{t=} \alpha + \beta_1 D^L_t + \beta_2 D^U_{t+} e_t$$

As given by CH 1995, where CSSD, the cross section standard deviation is the dependent variable and the two dummy variable (D^L_t and D^U_t)act as the independent variable. The analysis has been done on the monthly, weekly and daily data for 5%, 2% and 1% criteria for the specified study period.

During the pre-crisis period (2013-14), the α, β1, β2 &AR(1) are positive and significant for daily data except one which is negative but significant i.e.; for 5% α, β1, β2 &AR(1) are 0.0015, 0.0182, -0.0265 and 0.2177 respectively, for 2% α, β1, β2 &AR(1) are 0.0013, 0.0218, -0.0312and 0.2056& for 1% α, β1, β2 &AR(1) are 0.0012, 0.0265,-0.0338 and 0.2056 respectively, hence stating no presence of herding during the pre-crisis period. Ar(1) has been separately used to remove the problem of auto correlation. The residual term shows that the series has no auto correlation from Durbin Watson test and to check heteroscedasticity, ARCH LM test has been used and the data is found to be homoscedastic in nature for the daily data.

The α, β1, β2 &AR(1) are positive and significant for weekly data i.e.; for 5% α, β1, β2 &AR(1) are 0.0531, 0.0418, 0.0129 and 0.275 respectively, for 2% α, β1, β2 &AR(1) are 0.0531, 0.0427, 0.0158 and 0.239& for 1% α, β1, β2 &AR(1) are 0.0518, 0.0384, 0.176 and 0.2762 respectively, hence stating no presence of herding during the pre-crisis period. Ar(1) has been separately used to remove the problem of auto correlation. The residual term indicates that the series is free from auto correlation from Durbin Watson test and to check heteroscedasticity, ARCH LM test has been used and the data is found to be homoscedastic in nature for the weekly data.

The α, β1 & β2 are positive and significant for monthly data i.e.; for 5% α, β1 & β2 are 0.1175, 0.0344 and 0.0257 respectively, for 2% α, β1 & β2 are 0.1198, 0.0504 and -0.0314& for 1% α, β1 & β2 are 0.1234, 0.0412&-0.0321 respectively, hence stating no presence of herding during the pre-crisis period. The residual term shows that the series has no auto correlation from Durbin Watson test and to check heteroscedasticity, ARCH LM test has been used and the data is found to be homoscedastic in nature for the monthly data.

During the crisis period (2015-16), the α, β1, β2 &AR(1) are positive and significant for daily data except one which is negative but significant i.e.; for 5% α, β1, β2 &AR(1) are 0.0135, 0.0124, -0.0280and 0.4814 respectively, for 2% α, β1, β2 &AR(1) are 0.0131, 0.0168, - 0.0345, 0.4775& for 1% α, β1, β2 &AR(1) are 0.0129, 0.0194, - 0.0412 and 0.4775 respectively, hence stating no presence of herding during the crisis period. Ar(1) has been separately used to remove the problem of auto correlation. The residual term indicates that the series is free from auto correlation from Durbin Watson test and to check heteroscedasticity, ARCH LM test has been used and the data is found to be homoscedastic in nature for the daily data.

The α, β1 & β2 are positive and significant for weekly data i.e.; for 5% α, β1 & β2 are 0.0503, 0.0039 and 0.012 respectively, for 2% α, β1 & β2 are 0.0.0471, 0.0026 and 0.0021& for 1% α, β1 & β2 are 0.503, 0.0101 & 0.0012 respectively, hence stating no presence of herding during the crisis period. The residual term shows that the series has no auto correlation from Durbin Watson test and to check heteroscedasticity, ARCH LM test has been used and the data is found to be homoscedastic in nature for the weekly data.

The α, β1, β2 &AR(1) are positive and significant for monthly data except one which is negative but significant i.e.; for 5% α, β1, β2 &AR(1) are 0.1016, 0.0433, -0.0121 and 0.1544 respectively, for 2% α, β1, β2 &AR(1) are 0.1045, 0.0188, -0.0159 and 0.0736& for 1% α, β1, β2 &AR(1) are 0.1105, 0.0146, -0.0128and 0.0925 respectively, hence stating no presence of herding during the crisis period. Ar(1) has been separately used to remove the problem of auto correlation. The residual term shows that the series has no auto correlation from Durbin Watson test and to check heteroscedasticity, ARCH LM test has

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been used and the data is found to be homoscedastic in nature for the monthly data.

During the post crisis period, the α, β1, β2 &AR(1) are positive and significant for daily data i.e.; for 5% α, β1, β2 &AR(1) are 0.0227, 0.0017, 0.0015 and 0.0026 respectively, for 2% α, β1, β2 &AR(1) are 0.0227, 0.0048, 0.038 and 0.0028& for 1% α, β1, β2 &AR(1) are 0.0221, 0.0071, 0.0005 and 0.0028 respectively, hence stating no presence of herding during the post-crisis period. Ar(1) has been separately used to remove the problem of auto correlation. The residual term shows that the series has no auto correlation from Durbin Watson test and to check heteroscedasticity, ARCH LM test has been used and the data is found to be homoscedastic in nature for the daily data.

The α, β1, β2 &AR(1) are positive and significant for weekly data i.e.; for 5% α, β1, β2 &AR(1) are 0.0476, 0.0181, 0.0542 and 0.1119 respectively, for 2% α, β1, β2 &AR(1) are 0.0.0467, 0.017, 0.0052 and 0.1025& for 1% α, β1, β2 &AR(1) are 0.0487, 0.0162, 0.0057 and 0.1154 respectively, hence stating no presence of herding during the pre-crisis period. Ar(1) has been separately used to remove the problem of auto correlation. The residual term shows that the series has no auto correlation from Durbin Watson test and to check heteroscedasticity, ARCH LM test has been used and the data is found to be homoscedastic in nature for the weekly data.

The α, β1, β2 &AR(1) are positive and significant for monthly data i.e.; for 5% α, β1, β2 &AR(1) are 0.0962, 0.0297 and 0.0132, 0.3108 respectively, for 2% α, β1, β2 &AR(1) are 0.0981, 0.0154, 0.0101 and 0.3247& for 1% α, β1, β2 &AR(1) are 0.0824, 0.0147, 0.0171 and 0.3125 respectively, hence stating no presence of herding during the post crisis period. Ar(1) has been separately used to remove the problem of auto correlation. The residual term shows that the series has no correlation from Durbin Watson test and to check heteroscedasticity, ARCH LM test has been used and the data is found to be homoscedastic in nature for the monthly data.

<u>Detection of herding through CSAD model during during the bear and bull phase of Chinese Stock Market Turbulence.</u>

$H_0$2: There is a significant presence of herding in Indian stock market during the bear phase of Chinese Stock Market Turbulence.

$H_0$3: There is no significant presence of herding in Indian stock market during the bull phase of Chinese Stock Market Turbulence.

Table 2: Regression Results for $CSAD_t$ (CCK Model) (Bear Phase)
($CSAD_t = \alpha + \beta_1 |R_{mt}| + \beta_2 R_{mt}^2 + e_t$)

			α	t statistics	λ_1	t statistics	λ_2	t statistics	Ar(1)	t statistics	Adjusted R^2	F statistics	ARCH F statistics	Observed R^2	Durbin-Watson
CHINESE STOCK MARKET MELT DOWN	BEFORE (2001– 06)	**Daily**	0.0177***	25.991	-0.000769*	-0.734	0.0004*	1.268	0.2829	4.011	0.078	6.32	0.472	0.476	2.08
		Weekly	0.0329***	17.716	0.2762*	2.763	4.1939*	2.667	0.5893	4.580	0.854	83.28	1.372	7.970	1.98
		Monthly	0.0802***	4.808	0.8333**	0.970	-11.59*	-1.233	-	-	0.062	0.003	0.985	1.152	2.20
	DURING (2007	**Daily**	0.0162***	22.133	0.0017*	1.798	-0.0002*	-1.773	0.3049	4.604	0.095	1.781	0.004	0.522	2.04

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		Weekly	0.0292***	21.529	0.3087***	3.283	4.3084***	3.54	0.0377	0.205	0.902	127.70	0.996	1.021	1.94
		Monthly	0.0785***	6.421	0.4344*	0.532	-4.1230*	-0.491	-	-	-0.233	0.1491	0.304	0.375	1.96
	AFTER (2009-12))	**Daily**	0.0074***	14.604	0.9818***	366.11	0.0081***	4.481	-0.1338	-1.562	0.999	291285.0	15.92	14.46	2.00
		Weekly	0.0151***	1.503	0.5048***	4.892	1.9253**	1.071	0.9147	13.27	0.907	167.97	0.182	0.189	2.53
		Monthly	0.0455***	2.366	1.3323***	1.475	-8.4432**	-1.219	-	-	0.0398	1.207	0.326	0.392	2.01

****p<0.01, **p<0.05, *p<0.1*

Table 3: Regression Results for $CSAD_t$ (CCK Model) (Bull Phase)

($CSAD_t = \alpha + \beta_1 R_{mt} + \beta_2 R_{mt}^2 + e_t$)

		□	t statistics	□1	t statistics	□2	t statistics			Adjusted R^2	F statistics	ARCH F statistics	Observed R^2	Durbin – Watson
CHINESE STOCK MARKET TURBULENCE	BEFORE (2013– 14)	Daily	0.0174***	25.07	0.0005*	0.566	6.99E-05*	0.212	0.3466	6.172	0.126	14.56***	0.48	0.486	2.14
		Weekly	0.0311***	26.59	0.3107**	5.127	3.731***	6.727	0.1856	1.297	0.928	252.88***	1.92	1.930	2.02
		Monthly	0.0972***	3.803	0.0663*	0.091	-0.126**	-0.0304	-	-	-0.149	0.0256***	0.14	0.166	1.99
	DURING (2015-16)	Daily	0.0169***	33.14	0.0014*	0.957	-0.0006*	-0.818	0.2733	4.796	0.069	7.8515***	1.65	8.185	2.02
		Weekly	0.0309***	27.23	0.1053*	1.236	6.9207**	5.48	0.1920	1.461	0.833	100.77***	0.013	0.013	2.00
		Monthly	0.0804***	5.858	-0.245**	-0.43	4.2302*	0.861	-	-	0.015	1.1012***	0.263	0.304	2.02
	AFTER (2017-19)	Daily	0.0118***	3.624	0.9802**	47.47	0.0048***	0.658	-	-	0.963	5959.81***	7.91E-05	7.32E-05	2.00
		Weekly	0.0209***	3.902	0.2991**	3.273	5.1427*	3.071	0.8717	12.76	0.847	133.89***	6.65E-05	7.95E-05	2.61
		Monthly	95.351***	3.001	0.7471**	1.205	-10.918*	-1.787	0.9999	2.888	0.473	5.501***	0.215	0.244	1.66

****p<0.01, **p<0.05, *p<0.1*

The above table 2 and 3 shows the results to prove the existence of herd behavior in Indian Stock market during the increasing or bullish phase and decreasing state or the bearish state. The positive co efficients of the square terms of the daily market return indicate the absence of herding behavior in Indian Stock market in increasing state, λ1 Is mostly positive but sometimes negative but significant and λ2 is positive and significant in case of daily , weekly and monthly market stating absence of herding behavior .

The residual term of both the table shows that the series has no auto correlation from Durbin Watson test and In order to check heteroskedasticity ARCH LM test has been used and the data is homoscedastic.

Both the table shows regression results to validate the existence of herd behavior when the stock

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market is in decreasing state , λ1 Is mostly positive but sometimes negative but significant and λ2 is positive and significant, therefore violating the presence of herd behavior in Indian Stock market as the Durbin Watson is close to 2 which implies there is co serial correlation and daily weekly and monthly data is free from heteroscedasticity.

During the pre-crisis period (2013-14) of the bullish phase, the α, λ1, λ2 & AR(1) are positive and significant, the α, λ1, λ2 & AR(1) are 0.0174, 0.005, 6.99E-05 and 0.3466 respectively, for weekly data, the α, λ1, λ2 &AR(1) are positive and significant, theα, λ1, λ2 & AR(1) are 0.0311, 0.3107, 3.731 and 0.1856respectively&for monthly data, the α, λ1 & λ2 are positive and significant for monthly data except one which is negative but significant, the α, λ1 & λ2 are 0.0972, 0.0663 & −0.1261 respectively, even though one of them is not positive but all of them are statistically significant, hence stating no hence stating no presence of herding during the pre-crisis period. The residual term shows that the series has no auto correlation from Durbin Watson test and to check heteroscedasticity, ARCH LM test has been used and the data is found to be homoscedastic in nature during the bull market of the Chinese Stock Market Turbulence.

During the crisis period (2015-16) of the bullish phase, the α, β1, β2 & AR(1) are positive except one which is negative but significant, for daily data the α, λ1, λ2 & AR(1) are 0.0169,0.0014, -0.0006 and 0.2733 respectively, the α, β1, β2 &AR(1) are positive and significant for weekly data except one which is negative but significant, theα, λ1, λ2 & AR(1) are 0.0309, 0.1053, 6.9207 and 0.1921&the α, λ1 & λ2 are positive except one which is negative but significant, for monthly data, the α, λ1 & λ2 are0.08041, −0.2451 & 4.2302 respectiv ely, even though one of them is not positive but all of them are statistically significant, hence stating no hence stating no presence of herding during the pre-crisis period. The residual term shows that the series has no auto correlation from Durbin Watson test and to check heteroscedasticity, ARCH LM test has been used and the data is found to be homoscedastic in nature during the bull market of the Chinese Stock Market Turbulence.

During the post-crisis period (2017-19) of the bullish phase, the α, λ1 & λ2 are positive and significant, the α, λ1 & λ2 are 0.0118, 0.9802 and 0.0048respectively, for weekly data, the α, λ1, λ2 & Ar(1) are positive and significant, theα, λ1 & λ2 are 0.0209, 0.2991, 5.1427 and 0.871797 respectively&for monthly data, the α,λ1 & λ2 are positive and significant for monthly data theα, λ1 & λ2 are 0.0729, 0.2374 & 1.4299 respectively, even though one of them is not positive but all of them are statistically significant, hence stating no hence stating no presence of herding during the pre-crisis period. The residual term shows that the series has no auto correlation from Durbin Watson test and to check heteroscedasticity, ARCH LM test has been used and the data is found to be homoscedastic in nature during the bull market of the Chinese Stock Market Turbulence.

During the pre-crisis period of the bearish phase, the α, λ1, λ2 & AR(1) are positive for daily data except one which is negative but significant, the α, λ1, λ2 & AR(1) are 0.0177, -0.0007, 0.0004 and 0.2829respectively, for weekly data, the α, λ1, λ2 &AR(1) are positive and significant, theα, λ1, λ2 & AR(1) are 0.0329, 0.2762, 4.1931 and 0.5893 respectively& for monthly data, the α, λ1 & λ2 are positive and significant for monthly data,except one which is negative but significant, theα, λ1 & λ2 are 0.0802, 0.8333 & -11.52 respectively, even though one of them is not positive but all of them are statistically significant, hence stating no hence stating no presence of herding during the pre-crisis period. The residual term shows that the series has no auto correlation from Durbin

Watson test and to check heteroscedasticity, ARCH LM test has been used and the data is found to be homoscedastic in nature during the bear market of the Chinese Stock Market Turbulence.

During the crisis period (1997-98) of the bearish phase, the $\alpha, \lambda1, \lambda2$ & AR(1) are positive and significant for daily data except one which is negative but significant, the $\alpha, \lambda1, \lambda2$ & AR(1) are 0.0162, 0.0017, -0.0002 and 0.3049 respectively, the $\alpha, \lambda1, \lambda2$ &AR(1) are positive and significant for weekly data, the$\alpha, \lambda1, \lambda2$ & AR(1) are 0.2921, 0.3087, 4.3084 & 0.2052&the $\alpha, \lambda1, \lambda2$ &AR(1) are positive and significant for monthly dataexcept one which is negative but significant, the $\alpha, \lambda1$and $\lambda2$ are0.0785, 0.4344 & – 4.1201 respectively, even though one of them is not positive but all of them are statistically significant, hence stating no hence stating no presence of herding during the pre-crisis period. The residual term shows that the series has no auto correlation from Durbin Watson test and to check heteroscedasticity, ARCH LM test has been used and the data is found to be homoscedastic in nature during the bear market of the Chinese Stock Market Turbulence.

During the post-crisis period (1999-00) of the bearish phase, the $\alpha, \lambda1, \lambda2$ & AR(1) are positive for daily data,the $\alpha, \lambda1, \lambda2$ & AR(1) are 0.0743, 0.9818, 0.0081 and 0.1338 respectively, for weekly data, the $\alpha, \lambda1, \lambda2$ & AR(1) are positive and significant, the$\alpha, \lambda1, \lambda2$ & AR(1) are 0.0151, 0.5048, 1.9253 & 0.9147respectively&for monthly data, the $\alpha, \lambda1$ & $\lambda2$ are positive and significant except one which is negative but significant, for monthly data the$\alpha, \lambda1$ & $\lambda2$ are 0.0455, 1.3323 and -8.443 respectively, even though one of them is not positive but all of them are statistically significant, hence stating no hence stating no presence of herding during the pre-crisis period. The residual term shows that the series has no auto correlation from Durbin Watson test and to check heteroscedasticity, ARCH LM test has been used and the data is found to be homoscedastic in nature during the bear market of the Chinese Stock Market Turbulence.

Table 4: Brief summary of findings according to hypothesis

Sl. No	Main Hypothesis	Sub Hypothesis	Result	Variables	Findings
1	$H_0$1: There is no significant presence of herd behavior in the Indian stock market during Chinese Stock Market Turbulence (2013-19).	$H_0$1.1: There is no significant presence of herd behavior in the Indian stock market during pre-crisis period of Chinese Stock Market Turbulence (2013-14).	Hypothesis Accepted	Herd behavior and Indian stock market during pre-crisis period of Chinese Stock Market Turbulence (2013-14).	No presence
		$H_0$1.2: There is no significant presence of herd behavior in the Indian stock market during crisis period of Chinese Stock Market Turbulence (2015-16).	Hypothesis Accepted	Herd behavior and Indian stock market during crisis period of Chinese Stock Market Turbulence (2015-16).	No presence

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		$H_0$1.3: There is no significant presence of herd behavior in the Indian stock market during post-crisis period of Chinese Stock Market Turbulence (2017-18).	Hypothesis Accepted	Herd behavior and Indian stock market during post-crisis period of Chinese Stock Market Turbulence (2017-18).	No presence
2	$H_0$2: There is no significant presence of herd behavior in the bull market during Sub Prime Mortgage Crisis.	-	Hypothesis Accepted	Herd behavior and Indian stock market in the bull market during Sub Prime Mortgage Crisis.	No presence
3	$H_0$3: There is no significant presence of herd behavior in the bull market during Asian Financial Crisis.	-	Hypothesis Accepted	Herd behavior and Indian stock market in the bull market during Asian Financial Crisis.	No presence

Findings:

Evidence of Herding was not found in Indian Capital Market during the time period 1st Jan 2013 - 31st May 2019 through cross section standard deviation and cross section absolute deviation, it is found that there was no presence of herding during, before and after and in the bull and bear phase of Chinese Stock Market Turbulence.

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