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An Enquiry into the Existence of Herding in National Stock Exchange - CSAD Model Approach

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Abstract: ***Herding is an important behavioural anomaly for investors. It is the result of greed and fear of investors. Probability of herding is expected more in the crisis than the normal economic situation. Crisis period like depression, recession and economic slowdown instigate the fear of losing money. This fear forces the naïve investors to follow others and reap maximum benefit from their investment at the earliest. The present study tries to examine the existence of herding behaviour in the stock market during the economic slowdown period in India. For the purpose of the study, historical data has been retrieved from the official website of the National Stock Exchange. The Cross-Sectional Absolute Deviation (CSAD) model has been used to determine the presence or absence of herding in the NIFTY50 index. The paper found that herding is absent in the overall market during the study period. This study is beneficial for companies to understand the behaviour of their investors. It is also beneficial for the investors as they would be able to understand the pattern of investment and can protect themselves from becoming the prey of herding.***

JEL Category: G4 – Behavioural Finance, G40 - General

Keywords: Herding behaviour, Growth Recession, CSAD model, National Stock Exchange

1. Introduction

Standard Financial Theories are based on the concept ofrationality of investors. It assumes that the stock markets are efficient and the investors possess all the information about individual stocks and the market. It is believed thatthe action or decisions of investorsare based on rational calculations derived from such pieces of information. However, on various occasions, investors have shown entirely different behaviour than the assumptions proposed in these theories. This behavioural anomaly of investors isstudied under the domain of Behavioural Finance, and this paper is focused on one such type of anomaly, known as Herding Behaviour.

Herding is following others even when the personal evaluations directs to do something else (Banerjee, 1992). According to Bikhchandani & Sharma (2000), herd behaviour refers to the behaviour of replicating others' actions refuting their assessment. An investor tends to herd when he is not sure about his information and he doesn't want to take the risk. Recently, the similar situation of ignoring the information and following the mass has been observed in the Indian Stock market. On 26th August 2019, RBI released the annual report for the FY 2018-2019. The report confirmed that the Indian Economy is going through a rough phase and also validated the speculations of the economic slowdown. Following the annual report, the press release by the Ministry of Statistics and Programme Implementation on the falling GDP growth rate also surfaced in the market. The report revealed that in the 1st quarter of FY 2019-2020, the GDP growth rate has slipped to 4.5%, lowest since January – March 2013 quarter. These reports exposed the true condition of the economy and substantiated that currently, the economy is facing the growth recession and slowly it is moving towards a serious economic crisis. Going through the assumptions of standard financial theories, in such a negative environment, investors should have disinvested their money from the stock market. Conversely, instead of leaving the market, investorsnot only retained their position, but the market also showed an upward trend. The central idea of this paper is to investigate the actual reason for the conflicting behaviour displayed by investors. The main objective is to enquire the presence or absence of herding behaviour in the market during thegrowth recession. The paper also tries to trace the existence of herding among the individual stocks of the NIFTY50 index of the National Stock Exchange (NSE).

Ample research work has been done in this area, but they are primarily focused on checking the herding either in the general time period or during the financial crisis. It is significant to understand that there is a huge difference between the financial crisis and growth recession period, which make this study different from the reviewed literature. Apart from this, all the previous studies are post mortem examination, but this study is trying to know about the current situation of the market. The paper has been divided into following sections: Introduction in section I, review of literature in section II, section III and IV are devoted to research methodology and Findings and Interpretation of results, respectively followed by the conclusion in section V.

2. Literature Review

Literature review is an imperative part of any research work. It helps in building a good theoretical framework as well as finding the research gap. As it seems important to understand the psychology of herding and its influence in finance, the first part of this section is devoted to the theoretical analysis of herding whereas second part deals with the analysis of the findings of similar studies on herding behaviour.

In psychology, herding has been explained as an animal instinct. Herding refers to the tendency of following the

crowd, which doesn't have any centralised idea or any leader. Members of that crowd just imitate the action of the other member. A group of animals fleeing together show herd behaviour (Hamilton, 1971). Generally, it is observed that a group of animals flee together in order to protect themselves from a predator. To reduce the danger to itself, each member tries to remain in the centre of the fleeing group. Basically, a sense of fear makes the animals flee in a group. Humans also reflect herding behaviour. Innumerable researches in psychology strongly suggest that aping others or imitation is essentially a human activity. There could be various possible reasons behind herding, such as emotional contagion, facial mimicry, mirror neurons, social norms, mutual expectations, rational conformity and information cascades (Tatsuya Kameda, et.al, 2014). Humans act of imitation can be voluntary or involuntary. People follow others while making important decisions of their lives such as, while choosingeducational institution or deciding avenues for investment. The theories of behavioural finance believe that herding behaviour isexhibited by investors while making investment decisions. Investors do herding to protect themselves from loss and to reap some profit from their investment. The sense of greed and fear is the main driving force behind herding in individual investors. As investors are loss averse, they follow the crowd's investment behaviour (Ganesh et al., 2016). Societal pressure is another reason for herding by investors. Protecting the reputation is also a major reason for herding behaviour in investors (Bikhachandani& Sharma, 2000). Investors of the developing economy herd more than the investors of a developed economy. Financial awareness and economic environment also play a crucial role in portrayingherd behaviour. There are multiple reasons behind the mechanism of herding and numerous studies have been conducted to check its existence in different conditions.

Enough work has been conducted around the globe to inspect the existence of herding. In some studies, herding is evident while in some it is not. In 2000, Chang, Cheng and Khorana gave the famous CSAD model of measuring Herd behaviour. They conducted empirical research to study the existence of this behavioural anomaly within five international markets (U.S., Hong Kong, Japan, South Korea, and Taiwan). Their result documented the presence of herding in South Korea and Taiwan. Whereas, partial herding in Japan and no herding in the U.S. and Hong Kong. Furthermore, they also diagnosed that macroeconomic information plays a more important role in herding behaviour than firm-specific information.In the study of Prosad, Kapoor and Sengupta (2012), herding is present during the bull phase of the market stress period in Indian Equity Market. Angela Filip et al. (2015) proved thatthe CEE stock market investors herdduring the crisis period. They also concluded that investors behave differently during the pre and post-crisis period in comparison to the crisis period. Thepresence of herding is also evident in the Amman Stock Exchange (Ramadan, 2015). Ganesh, Naresh and Thiyagarajan (2016) found that industrial herding is absent in the Indian stock market. Convincing data of herding found in Turkish Stock exchange by Cakan and Balagyozan (2016) during the study period. Their result affirmed herding in the financial, services and technology sectors during the bullish as well as the bearish phase of the market. Kumar and Bharti (2017) found the absence of herding behaviour from the Information Technology sector during the study period. Investors of china have shown significant herding behaviour from 1st January 1999 to 31st December 2014 in general as well as specified market conditions (Munkh-Ulzii, 2018). Jose, Varghese and Surendran(2018), studied herd behaviour in the Indian Stock Market from 2007 to 2016. They deduced that it cannot be identified during the study period. BenMabrouk (2018) examined cross herding behaviour between the crude oil market and the stock market. He concluded that herding exists in both market and lack of information in one market leads to the herding in the other market.

The current study is singular in terms of the time period taken for the study. Besides this, all of the previous works have taken a market or a sector for studying the herding behaviour. However, this paper is trying to detect the herding behaviour in the Indian stock exchange along with the individual stocks of the NIFTY50 Index of the NSE during the study period. Furthermore, the study is using the standard model developed by Chang, Cheng and Khorana (2000) to check the presence or absence of herding behaviour and trying to validate the result through traditional financial models.

3. Research Methodology

Data:- For the present research work, daily closing prices of 50 companies constituting the NIFTY 50 index have been retrieved from the official website of NSE. Data has been taken for a period of seven months, i.e. from 1st April 2019 to 31st October 2019. The time frame has been divided into three parts, 1st Quarter (April – June), 2nd Quarter (July – September) and the month of October. This period of 7 months, has been strategically selected. The 2nd Quarter has been taken because all the major reports and information about the receding economy were released in this quarter, 1st Quarter was the normal quarter as the information of growth recession was not available to the general public and lastly, the month of October because financial commentators and reputed economists believed that the growth recession is the cyclical one and economy will revive during the festive season.

Statistical Tools:- To achieve the main objective, the current work is using Cross-Sectional Absolute Deviation (CSAD) developed by Chang, Cheng and Khorana (2000). This model is also known as CCK model. CSAD explains that in the case of herding the absolute deviation between market return and individual stock return tends to decrease; also, there would not be any linear relationship between equity return dispersion and the market return. The formula of CSAD is as follows:-

$$\text{CSAD}_{t} = \frac{1}{N}\sum_{i=1}^{n} |R_{it} - R_{mt}|$$

Here, N = number of firms included in the market

R_{it}= observed stock return on firm i at time t

R_{mt}= cross-sectional average of the N returns in the aggregate market portfolio at time t

To compute the return of individual stocks, i.e. R_{it} following formula has been used:-

$$R_{it} = \left(\frac{Pt}{P(t-1)} - 1\right) * 100$$

Here, P_t is the closing price of the i^{th}stock at date t, $P_{(t-1)}$ is the closing price of the previous day of the i^{th}stock.

$R_{mt}$is the cross-sectional average ofN returns in the aggregate market portfolio at time t. To compute R_{mt} the current paper has taken the average return of individual stock daily returns at time t instead of taking daily returns of the market index.

In the formula, $R_{mt}= \frac{1}{N}\sum_{i=1}^{N} Rit$

Since the current paper has taken the 50 constituents company of NIFTY 50 for the study, so $R_{mt}$is the daily average of daily returns of 50 Stocks. As the constituents of the NIFTY50 index keep changing, it would be better to compute the R_{mt}on the basis of returns of the once selected 50 constituent companies rather than to compute it as the daily return of the NIFTY50 index. This computed average of daily returns will truly define the meaning of "cross-sectional average".

Apart from the formula to compute $CSAD_t$, CSAD model gives a regression equation also to check the existence of herding in the stock market. The regression equation is -

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

Here, $CSAD_t$ = the cross-sectional absolute deviation at time t.

α, β_1 and β_2 = regression coefficients, and

ϵ_t = the error term.

Negative and significant β_2 is the evidence of presence of herding behaviour in the stock market.

CSAD model has been used in this paper to check the presence or absence of herding behaviour in the stock market. The secondary objective of this paper is to check the existence of herding among the individual stock of NIFTY 50. To fulfil the secondary objective, fundamental testing is done on the basis of signs of herding behaviour observed from the review of literature. Following changes takes place in individual stock in the presence of herding:-

1) Increase in volatility (Bikhchandani and Sharma, 2000).
2) The stock return will remain closer to or will not deviate from market return (Ramadan, 2015).

These signs have been tested for individual stocks to check the presence or absence of herding behaviour.

4. Findings and Interpretation of Results

1) **Descriptive Statistics:-** To check the normalcy descriptive testing has been done for the study period. Table 1 shows the reports of descriptive analysis of daily data of R_{mt} and $CSAD_t$.

Table 1: Descriptive Statistics of $CSAD_t$ and R_{mt}

	$CSAD_t$	R_{mt}
Mean	0.013269	0.000043
Standard deviation	0.0043406	0.112962
Minimum	0.0071	-0.0228
Maximum	0.0379	0.0546
Skewness	2.478	0.773
Kurtosis	10.467	3.096

Source: Author's Calculations

The Descriptive analysis shows that the mean of CSADt for the whole period is 0.0132, whereas the cross-sectional average is 0.000043. The skewness and kurtosis are far away from their standard values of 0 and 3 respectively in case of CSADt. Skewness and kurtosis of R_{mt} are also slightly deviated from their standard values. This deviation shows that the data is not normal. However, as the data is sufficiently large, the regression method can be used to check the herding irrespective of the non-normalcy of data (Kumar and Bharti, 2017).

2) **Checking of Herding:** Table 2 represents the result of the regression equation of the CSAD model.

Table 2: Summary of Regression Equation

	Unstandardized coefficients	t-statistic	Significance (at 5% level)
Constant	0.011	19.499	0.000
$\|R_{mt}\|$	0.202	2.550	0.012
$(R_{mt})^2$	4.663	2.297	0.023

Source:- Author's Calculation

The result of the regression equation clearly shows the absence of herding during the study period as the coefficient of $(R_{mt})^2$ is positive and significant. According to the CSAD model, the coefficient of $(R_{mt})^2$, i.e. β_2 must be negative and significant. A positive and significant coefficient is the evidence that investors are taking a rational decision and not following the mass. From the result, it is evident that herding is not present during the study period in the stock market, but herding may exist among the individual stocks. Next step is to examine the signs of herding among the individual stocks.

A. Increase in Daily Volatility in the stocks:- It has been discussed that the period has been divided into three parts to check the increase or decrease in the volatility. Q1, which is the normal time, Q2 when herding is expected because information of growth recession flooded the market during this period and the month of October, as it is the festive month and revival of the economy was assumed during this month. Chart 1 is representing the volatility of50 companies in aforesaid three-time frames.

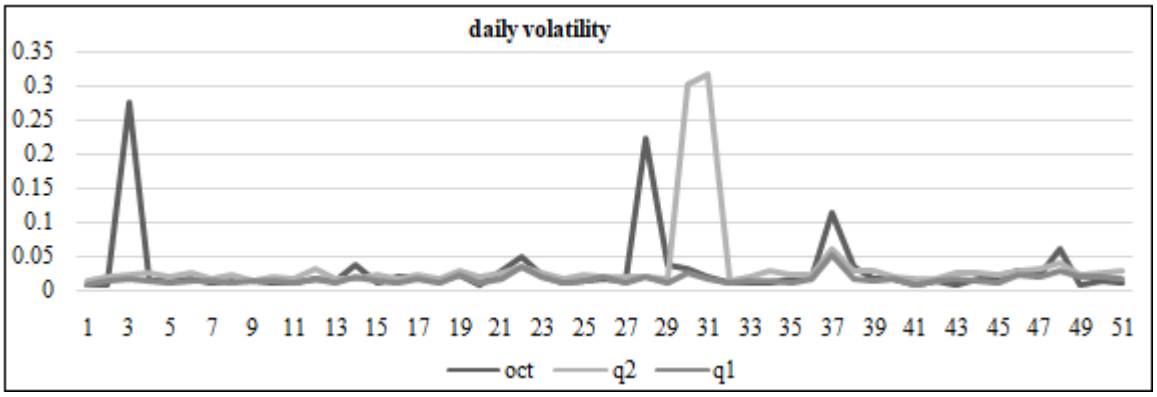

Chart 1: Daily Volatility in Q1, Q2 and October
Source: Author's Calculation

The schedule of this graph with the names of companies is shown in appendix 1. In this chart, number 1 represents the total volatility of the market and numbers from 2 to 51 are representing the 50 companies constituting NIFTY50 index. From the graph, it is clearly visible that there are no such ups and downs in the Q1. Herding is expected in the 2nd quarter. In this period, only two companies (30 and 31) are showing a huge increment in volatility in comparison to Q1.The two companies are IndusInd Bank and Eicher Motors. The daily volatility of three companies has shown a major hike in the month of October in comparison to Q1. These companies are Bharti Airtel (3rd), GAIL (28th) and Yes Bank (37th).

It is required to check which of the following companies have satisfied the second condition also to prove the existence of herding.

B. Convergence of individual stock return to market return:- It has been mentioned in the literature that during herding individual stock return converges with the market return. Chart 2 depicts the same relationship between individual stock return and market return.

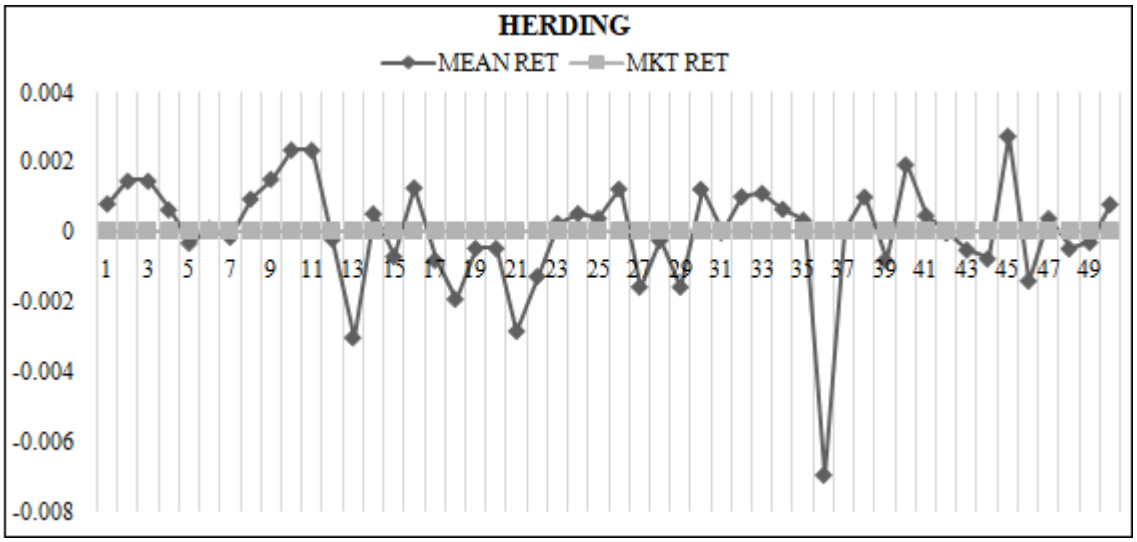

Chart 2: Relation between individual stock returns andthe market return
Source: Author's calculation

The mean return in Chart 2 is the mean of individual stock daily returns and the market return is the average of daily market returns (R_{mt}), over seven months. The chart is clearly showing that the mean return of 6th, 7th, 12th, 23rd, 28th, 31st, 37th, and 42nd company converges with the market return. These companies are Dr Reddy, Axis Bank, Tech Mahindra, PowerGrid, Infosys, Wipro, SBI, and UPL, respectively.

Taking the combined effect of both the signs of herding behaviour, none of the companies are satisfying them together. Some companies are satisfying the first condition, while some companies are satisfying the second condition only. Assuming that the change in volatility and convergence of returns to the mean return may have occurred due to other reasons, the absence of herding among individual stocks can be inferred.

5. Conclusion

Herding is essentially an act of following others, keeping your personal information aside. It means trusting others' information and investment decisions. Going through the theories of standard finance, investors must disinvest their money from the stock market as all the negative information about the economy is floating in the market. Irrespective of these pieces of depressing information, the investors are

smart enough to make rational decisions and invest their money in profitable stocks. The result of the present study validates that herding is absent in the NIFTY50 index and among its 50 constituent stocks during the study period. The study reaffirms that herding is a short term concept as any investor follows the mass until he is unable to portrait the actual situation of the stock market. In the long run, investors are not naïve; they know the situation of the market and are capable of analysing the reaction of any past information. The result also illustrates that herding cannot be present in individual stock if it is not present in the overall index. However, few companies have reflected the signs of herding, but none of them has shown both the signs simultaneously. The absence of a combined effect on any stock does not motivate to conclude the presence of herding among the individual stock.This shows that investors are rational and can make their investment decisions without becoming the prey of herd mentality. They can identify the profitmaking stocks during the unfavourable economic situation and invest their hard-earned income judiciously. To validate this result, similar studies can be done by taking a different set of stocks in other stock exchange markets. Further, this paper has taken only 7 months for study; this work can be extended to check the presence or absence of herding when the economy overcomes the current growth recession period.

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Appendix 1

Schedule of Graph 1

Stocks	October	2nd Quarter	1st Quarter
1. Market	0.009687	0.013474	0.009114
2. HDFC	0.010112	0.019783	0.01466
3. BHARTI ARTL	0.27668	0.021493	0.019351
4. TITAN	0.016192	0.025757	0.013955
5. HDFC BANK	0.014395	0.017859	0.010806
6. M&M	0.018038	0.026155	0.015185
7. DRREDDY	0.012053	0.014946	0.01405
8. AXISBANK	0.01597	0.020991	0.013547
9. TCS	0.014408	0.013442	0.014977
10. ASIANPAINTS	0.012794	0.018606	0.014139
11. NESTLEIND	0.013096	0.015756	0.012166
12. BAJFINANCE	0.016918	0.03038	0.01718
13. TECHM	0.013552	0.01584	0.013027
14. INFRATEL	0.037145	0.016119	0.021433
15. LT	0.010926	0.022086	0.015987
16. CIPLA	0.019763	0.015545	0.013511
17. ICICIBANK	0.020224	0.022166	0.017265
18. ITC	0.014078	0.016062	0.012007
19. TATASTEEL	0.024919	0.027528	0.024204
20. NTPC	0.010006	0.018421	0.012634
21. GRASIM	0.028891	0.024945	0.019174
22. ZEEL	0.05017	0.03339	0.036394
23. JSWSTEEL	0.023937	0.025828	0.022497
24. POWERGRID	0.011065	0.015759	0.013098
25. RELIANCE	0.013612	0.021193	0.015733
26. ADANIPORTS	0.018557	0.020012	0.01967
27. KOTAKBANK	0.014492	0.018363	0.011297
28. GAIL	0.22275	0.018148	0.022583
29. INFY	0.039557	0.016837	0.011161
30. INDUSINDBK	0.030945	0.30008	0.028312
31. EICHERMOT	0.021094	0.31603	0.018694
32. WIPRO	0.011764	0.013917	0.011303
33. BAJAJ-AUTO	0.01125	0.018588	0.013955
34. BAJAJ FINSV	0.013087	0.028877	0.013911
35. BRITANNIA	0.016986	0.021662	0.013196
36. ULTRACEMCO	0.02144	0.021955	0.017284
37. YESBANK	0.1162	0.061807	0.054053
38. SBIN	0.033936	0.026689	0.018306
39. MARUTI	0.016642	0.026868	0.016299
40. HINDALCO	0.016395	0.019495	0.01698
41. HINDUNILVR	0.008871	0.015899	0.010422
42. HCLTECH	0.014935	0.015159	0.013609
43. UPL	0.010005	0.02589	0.018878
44. ONGC	0.018512	0.024125	0.01574
45. COALINDIA	0.019416	0.023299	0.013233
46. BPCL	0.028512	0.028836	0.022811
47. VEDL	0.023588	0.030947	0.020619
48. TATAMOTORS	0.062215	0.038547	0.030736
49. SUNPHARMA	0.010098	0.022586	0.020592
50. IOC	0.013463	0.025222	0.019887
51. HEROMOTOCO	0.012929	0.028644	0.017776

Appendix 2

Schedule of Graph 2

Stocks	MEAN RET	MKT RET
1. HDFC	0.000842	4.28E-05
2. BHARTI ARTL	0.001497	4.28E-05
3. TITAN	0.001493	4.28E-05
4. HDFC BANK	0.000668	4.28E-05
5. M&M	-0.00029	4.28E-05
6. DRREDDY	0.000124	4.28E-05
7. AXISBANK	-0.00012	4.28E-05
8. TCS	0.000978	4.28E-05
9. ASIANPAINTS	0.001546	4.28E-05
10. NESTLEIND	0.002389	4.28E-05
11. BAJFINANCE	0.002378	4.28E-05
12. TECHM	-0.00018	4.28E-05
13. INFRATEL	-0.00301	4.28E-05
14. L&T	0.000554	4.28E-05
15. CIPLA	-0.00068	4.28E-05
16. ICICIBANK	0.001298	4.28E-05
17. ITC	-0.00078	4.28E-05
18. TATASTEEL	-0.0019	4.28E-05
19. NTPC	-0.00044	4.28E-05
20. GRASIM	-0.00044	4.28E-05
21. ZEEL	-0.00282	4.28E-05
22. JSWSTEEL	-0.00125	4.28E-05
23. POWERGRID	0.000283	4.28E-05
24. RELIANCE	0.00056	4.28E-05
25. ADANIPORTS	0.000423	4.28E-05
26. KOTAKBANK	0.001265	4.28E-05
27. GAIL	-0.00155	4.28E-05
28. INFY	-0.00022	4.28E-05
29. INDUSINDBK	-0.00155	4.28E-05
30. EICHERMOT	0.00126	4.28E-05
31. WIPRO	1.65E-05	4.28E-05
32. BAJAJ-AUTO	0.001046	4.28E-05
33. BAJAJ FINSV	0.001143	4.28E-05
34. BRITANNIA	0.000685	4.28E-05
35. ULTRACEMCO	0.000368	4.28E-05
36. YESBANK	-0.00696	4.28E-05
37. SBIN	7.59E-05	4.28E-05
38. MARUTI	0.001037	4.28E-05
39. HINDALCO	-0.00078	4.28E-05
40. HINDUNILVR	0.001962	4.28E-05
41. HCLTECH	0.000506	4.28E-05
42. UPL	2.04E-06	4.28E-05
43. ONGC	-0.00049	4.28E-05
44. COALINDIA	-0.00074	4.28E-05
45. BPCL	0.002781	4.28E-05
46. VEDL	-0.00138	4.28E-05
47. TATAMOTORS	0.000419	4.28E-05
48. SUNPHARMA	-0.00045	4.28E-05
49. IOC	-0.00027	4.28E-05
50. HEROMOTOCO	0.000822	4.28E-05