Summary and Conclusions

A huge body of literature exists that suggests that the security returns are predictable. A large number of studies have been conducted to provide an evidence that trading strategies based on the direction of past securities’ returns can generate superior returns. The evidence was initially tested and reported for the U.S. Stock market in the two seminal articles by De Bondt and Thaler (1985) and Jegadeesh and Titman (1993) which primarily documents two opposite stock market phenomena: return reversals and price continuations. De Bondt and Thaler (1985) documented the reversals in the direction of security prices and reported that extreme movements in the securities’ long-term returns over past three to five years is followed by subsequent returns in the opposite direction. They based their findings on the tendency of the investors to overreact to unexpected good and bad news whereby initial price reaction is followed by subsequent correction in the form of return reversals such that contrarian investment strategy that calls for buying past losers and selling past winner stocks generate above normal portfolio returns. They attributed these findings to the presence of ‘Overreaction Effect’ in the stock market. In contrast, Jegadeesh and Titman (1993) found evidence of price continuations over intermediate horizon of few months and attributed it to the presence of ‘Momentum Effect’ in stock returns. They argued that the investors tend to underreact to the new information such that the security prices do not adjust rapidly to the new information. Consequently, the extreme movements in the security’s short term returns are followed by subsequent return movements in the same direction such that the momentum strategy that buys past winners and sells past loser stocks has been found to generate superior returns. More recently,
several studies namely Howe (1986), Bremer and Sweeney (1988), Pritamani and Singal (2001), Larson and Madura (2003) and others have also tested and documented a mixed evidence of reversals and continuations in the direction of security returns measured over very short intervals of few days.

These findings infact present a sharp challenge to the Efficient Market Hypothesis that suggests that securities are rationally priced to reflect all publicly available information and that it is not possible to devise a trading strategy based on past security prices that can beat the market and provide excess returns. Following these rather startling findings for U.S. stock market, these two opposite phenomena were subsequently investigated and supported by a number of other studies covering different stock markets worldwide.

A number of studies have been conducted to provide an explanation behind the existence of such a predictability in the direction of subsequent security returns based on their past price behaviour. Related literature suggests various alternative explanations of the sources of abnormal profits of momentum and contrarian strategies. One of the explanations is based on behavioural irrationality of investors which postulates that investors’ psychological and other biases in the reaction to new information cause systematic overreaction and underreaction to previous large price changes. The second line of explanation is based on the risk accompanying the contrarian and momentum strategies that argues that the excess returns to these investment strategies are a normal compensation for their time-varying risk. Chan (1988) argued that both winner and the loser portfolios experience large changes in their market values with the extreme rise or fall in the security prices. Taking the market value (market capitalisation) as a good proxy for risk, as suggested by the size effect literature, a decline in the price of a stock leads to a reciprocal increase in the leverage and its risk. As a result,
loser stocks happens to be much smaller and consequently much riskier than the winner stocks after the happening of an event of extreme price decline and thus, the higher returns to a loser stock subsequent to extreme price decline are a normal compensation for their increased risk and vice-versa for winner stock. Yet another line of explanation argues that market microstructure effects, namely bid-ask bounce effect and infrequent trading, contributes to the observed predictable patterns in security prices.

With more and more research effort concentrated in the area of investigating the predictability of security returns based on their past prices and exploring the possible reasons behind it, there emerged an extensive body of literature documenting the “Prior Return Effect”. However, the prior-return effect, which has been found to be well documented for U.S. and other more matured stock markets of the world, has not yet been probed well for the emerging capital markets of the world as there exists very inadequate evidence of the presence or the absence of the overreaction effect and the momentum effect in these markets which can contribute towards the literature documenting the prior-return effect or to develop an explanation to the previous findings of U.S. and other international markets.

Thus, in the present study, we investigate the Indian Stock Market as a distinct market to explore the evidence of prior return effect in the cross-section data of daily and intra-day returns of Indian stocks. Today, the opportunities of intra-day trading are increasingly being exploited by the investors in the stock markets. However, majority of studies in this line of research have based their investigation on monthly or the daily returns data of the sample stocks. Hence, in our study, we investigate the applicability of this well documented effect using high frequency data, i.e. the intra-day stock price data observed over very short intervals of few minutes or hours within a trading day in addition to the use of daily closing price data in the Indian
capital market which is at present, one of the leading emerging capital markets of the world. This is particularly important in the light of the fact that there is no or very little work published on the investigation of prior return effect using high frequency data especially in the context of the emerging capital markets which continuously strive to move towards greater market efficiency. Further, Indian stock market differs from other stock markets in terms of institutional structures, cultural backgrounds, attitude of people towards stock market etc. which may affect the patterns in security returns in Indian market from those found for other stock markets.

Further, in the light of the possible explanations behind the existence of predictable patterns in subsequent security returns, we also investigate whether the observed behaviour of security returns subsequent to extreme price changes is captured by the risk related explanation based on size effect or it is a phenomenon distinct from it. Also, the value effect and the overreaction effect both seems to capture the similar sub-optimal behaviour of typical investors and thus we also investigate whether the observed patterns in subsequent security returns are another manifestation of value effect or it is a phenomenon distinct from it. We also test the possibility of implementing a trading strategy, based on the observed market behaviour following price shocks, which can beat the market on consistent basis and provide superior returns to investors.

The empirical testing procedures used to test and verify the prior return effect in stock prices are primarily based upon a design of event study methodology whereby we focus on stocks that have shown extreme price movements and consequently the extreme market adjusted excess returns in either direction for a day and during a day, to identify our winner and loser securities to observe their subsequent price behaviour over five days of extreme daily price changes and over five ticks, one tick of 30 minutes each, of
extreme intra-day price changes. Stocks forming part of S&P CNX 500 Equity Index forms the basic sample for our study. To examine the prior return effect over short horizon of few days following extreme daily price changes, we considered the daily closing adjusted share prices of all the stocks in the sample for a period of five years beginning from 3rd July, 2006 to 30th June, 2011. Taking each trading day as event day (t = 0), we selected 3 securities with highest abnormal returns and 3 securities with lowest abnormal returns as winners and losers for that day which is done for each trading day in our study period. For the investigation of prior return effect over very short horizon of few hours after an event of large intra-day price changes, we have considered the intra-day share prices at interval of 30 minutes each during a period of one year beginning from 4th January, 2010 to 31st December, 2010. Taking into consideration the possibility of a difference in market reaction to extreme price changes occurring at the beginning of a trading day and the market’s reaction to extreme price changes occurring at the mid of trading day, we have divided the trading hours during each trading day in our study period into two parts: pre-noon hours and the post-noon hours. Accordingly, we have observed the subsequent behaviour of security returns at the intervals of 30 minutes and upto five ticks, one tick of 30 minutes each, following an event of extreme price change observed separately at 9:15 a.m. daily to investigate market’s abnormal reaction to extreme price changes at the opening of trading day and another at 12:15 p.m. daily to investigate market’s abnormal reaction to extreme price changes during the mid of the trading day, to identify the winner and loser securities separately for pre-noon and post-noon trading hours.

After identifying the securities experiencing events of extreme price change, we excluded certain securities in accordance with the methodology followed by Lobe and Reiks (2011), on the grounds of market-microstructure related issues namely bid-ask bounce effect and infrequent trading biasing
our results. For this purpose, we excluded all events where the selected security had a closing price of Rs. 10 or less on the event date (for daily price changes) and a price of Rs. 10 or less at event tick (for intra-day price changes) from our sample to avoid the biases caused by lower priced stocks and higher proportional bid-ask spreads. We also excluded all the events that do not show any non-zero return on at least two out of five trading days or trading ticks after an event to ensure that infrequently traded stocks are not included in our sample. From the remaining selected securities we form two portfolios, one for the winners that have experienced extreme rise in their prices and another for the losers that have experienced an extreme decline in their prices. To investigate the existence of prior-return effect in Indian stock market, we have analysed the portfolios average abnormal returns, cumulative average abnormal returns as well as their holding period returns for five days subsequent to the event of extreme daily price changes and five ticks (each tick of 30 minutes) subsequent to the event of extreme intra-day price changes. Following the previous studies like that of Larson and Madura (2003), we have also captured the abnormal returns of our two portfolios for the previous five days and five ticks respectively prior to the event of extreme daily price change and extreme intra-day price change, to see if the security prices are influenced by any insider trading activities based on leakage of information before the event of extreme price change.

We also observed that during our total study period of five years, Indian stock market was faced with three different market conditions. Initially, during July 2006 to August 2008, a bullish trend is noticed in Indian stock market which witnessed unprecedented growth in index values with most of the stocks experiencing increase in their market valuations. This period of rising market was followed by a period starting from September 2008 to February 2009 when stock markets experienced a declining trend in security prices majorly on account of the impact of recent global financial
crisis on Indian stock market thus marking a bearish phase. Subsequently, the Indian stock market started recovering from this bearish phase since March, 2009 when the market indices started rising again, closing on higher side. Thus, we have also analysed the behavior of Indian investors following abnormal changes in securities’ daily closing prices in three different market conditions faced by Indian stock market during our study period. For this purpose we have divided our total study period into three sub-periods viz., July 2006 to August 2008, September 2008 to February 2009 and March 2009 to June 2011 corresponding to the three different market conditions of bullish phase, bearish phase and the recovery phase respectively. Similar analysis is conducted on the average abnormal returns of three sub-periods separately to analyse the behaviour of Indian investors following abnormal changes in securities’ daily closing prices in different market conditions.

We have also tested the market’s abnormal reaction to daily price shocks by considering the non-overlapping five day test period. This is done by selecting the event days at every interval of five trading days, including the event day and testing the subsequent price behaviour over next five days. This is done with a view that in our previous analysis, five day test period subsequent to each trading day taken as event day turns out to be overlapping with the days of next few test periods, which may give rise to a possibility that the test period behaviour of successive events is influenced by the test period behaviour of previous events. Thus, to confirm that our results are not driven by selection of overlapping test period days, we have also conducted similar analysis on non-overlapping test period’s average abnormal returns, buy-and-hold abnormal returns and cumulative average abnormal returns.

We also attempted to explore the question as to what may be the possible reasons or the factors which can possibly explain the predictable
patterns in security returns following extreme daily as well as intra-day price changes. This is done by investigating whether the observed behaviour of security returns subsequent to extreme price changes is captured by the risk related explanation based on size effect or it is another manifestation of value effect or it is a phenomenon distinct from it. For this purpose, we run the multiple regression (equation 4.19) on our post event Buy-and-hold average abnormal returns calculated for five different holding periods, ranging from one day holding period to five days holding period subsequent to event of extreme daily price change, by incorporating the independent variables for size factor proxied by firm’s market capitalisation (MCAP) on event day and the value factor proxied by firm’s book-to-market ratio (BTM) on event day. Further, we incorporated the event day abnormal returns (AR) as an independent variable in our regression analysis to analyse if the magnitude of subsequent returns is related to the magnitudes of initial gains or losses on event day as documented by De Bondt and Thaler (1985). Similarly, we run multiple regression (equation 4.20) on our post event Buy-and-hold average abnormal returns calculated for five different holding periods, ranging from one tick holding period to five ticks holding period subsequent to event of extreme intra-day price change observed separately at 9:15 a.m. and 12:15 p.m., by incorporating the independent variables for firms’ MCAP, BTM and AR at the time of event.

To test the possibility of implementing a profitable trading strategy, based on the observed market behaviour following price shocks, which can generate excess returns, we formed zero-investment portfolio, which buys the negative event securities forming part of our loser portfolio and short sells the positive event securities forming part of our winner portfolio on each of the five trading days after the event of extreme price change from one trading day to another trading day and at each of the five consecutive ticks (of 30 minutes each) after the event of extreme price change, observed at 9:15 a.m. daily and
12:15 a.m. daily, with respect to previous tick. Taking into account the short selling restrictions in Indian stock market where short-selling is restricted to only one trading day, we also restrict our holding period to one trading day only and thus we considered the average returns of our event losers and winners measured individually for five subsequent days vis-à-vis previous day. Accordingly, to maintain the uniformity of our results, we have considered the average returns of our event losers and winners measured individually for five subsequent ticks vis-à-vis previous tick for our intra-day trading strategy as well. Capital Asset Pricing Model (CAPM) has been used to test the level and significance of the returns generated by our zero-investment portfolio. We postulate that statistically significantly positive $\alpha$ coefficients of our regression model (CAPM) will imply excess returns generated by contrarian investment strategy and alternatively, statistically significantly negative $\alpha$ coefficients will imply excess returns generated by momentum investment strategy.

On the basis of our overall findings, we document that in Indian stock market, security returns do exhibit predictable patterns following extreme daily as well as intra-day price shocks. They exhibit a reversal in their direction during few days subsequent to an event of extreme rise in security’s daily closing prices. Conversely, after experiencing an extreme decline in their daily closing prices, they continue to follow the downward journey recording lower prices on few days subsequent to the day of extreme price decline. On the other hand, in a very short term of few minutes and hours following the event of extreme intra-day price changes, the investors in Indian stock market tend to overreact to almost any kind of news, good or bad, causing the stock prices to jump up high accompanying favourable developments and to decline acutely following unfavourable developments, which is subsequently followed by return reversals immediately within few minutes upto few hours within a trading day itself.
Findings of the Study

A. For extreme daily price changes

1) Our initial evidence for the cross-sectional behaviour of security prices after an event of extreme price rises from one trading day to another trading day came in line with the evidence from U.S. and other stock markets. Evidence found from our sample suggests that full sample of winners experienced overreaction; an initial investor overreaction causing a sharp rise in daily stock prices is followed by a correction and a return reversal whereby extremely positive returns earned by winner sample on day 0 turned significantly negative on the following days. This is consistent with the findings of Howe (1986), Akhigbe, Gossnel and Harikumar (1998), Larson and Madura (2003), Ma et al. (2005) for U.S. stock market, Vardar and Okan (2008) for Istanbul stock exchange, Lobe and Reiks (2011) for German Stock Exchange amongst others documenting short-term overreaction to extreme daily price rises.

2) On the other hand, contrasting evidence has been found for loser portfolio which suggests that the full sample of losers experienced underreaction; the investors react slowly to incorporate the impact of bad news in the stock prices such that the prices of loser stocks are found to fall further for many days after the event of extreme decline in securities daily closing prices. This is in sharp contrast to the evidence from most of studies which documented short-term overreaction to extreme price increases as well as declines, except few including Pritamani and Singal (2001) and Larson and Madura (2003) amongst others who reported evidence of short-term underreaction to extreme daily price declines.

3) Prices of the winner securities are found to be rising over two to three days prior to the event of extreme price fall which probably indicates
leakage of information and insider trading in anticipation of the good news. However, no such evidence of leakage of information or anticipation regarding the bad news is found prior to the event of extreme price fall.

4) Similar behaviour has been observed in the three different market conditions as well. Findings reveal that in short term, the investors in Indian stock market tend to overreact to good news and underreact to unfavourable news in almost any kind of market condition. Irrespective of the prevailing market sentiments, favourable events are found to be accompanied by overreaction, causing the stock prices to jump high, which is subsequently corrected in the following few days such that security returns experience a reversal in their direction following the event of extreme price rise. However the speed with which the correction takes place is slightly different in different market conditions. On the contrary, they react slowly to unfavourable news events, dragging the stock prices down gradually over few days following the release of bad news such that stock prices appear to follow a continuation pattern in their direction on days following the day of extreme fall.

5) Findings from the non-overlapping test period’s returns also came largely in uniformity with the previous findings; for non-overlapping test period days as well, evidence indicates overreaction for the winner portfolio and underreaction for the loser portfolio.

6) Results obtained from multiple regressions revealed that neither of the two alternative explanations i.e. the size and the value effect, play any significant role in capturing the observed overreaction for our winner portfolio nor we found any evidence for the presence of magnitude effect in our winner sample.
7) Also, as expected, these factors are not found to play any role in explaining the level and significance of subsequent returns for our loser portfolio. This is in fact because of the reason that size effect, value effect and the magnitude effect are all the explanations behind the phenomenon of return reversals after extreme price shocks, while our loser portfolio has been observed to experience return continuation (instead of return reversals) on days subsequent to day of extremely negative returns.

8) Supportive evidence is found for the similar regression analysis conducted for the three sub-periods representing the three different market conditions in Indian stock market as well as for non-overlapping test period days. Overall, the evidence revealed that the patterns of return reversal and return continuation observed for our winner and loser portfolio respectively are neither found to be driven by the change in firm’s size and a consequent change in firm’s risk due to extreme daily price changes nor is it found to be another manifestation of value effect.

9) Predictable patterns observed in cross-sectional behaviour of security returns following extreme daily price changes cannot be exploited profitably by implementing an investment strategy based on zero investment portfolios.

Thus, on the basis of our overall findings, we also document that in Indian stock market, security returns do exhibit predictable patterns following extreme daily price shocks. They exhibit a reversal in their direction during few days subsequent to an event of extreme rise in security’s daily closing prices. Conversely, after experiencing an extreme decline in their daily closing prices, they continue to follow the downward journey recording lower prices day after day for as long as two to three days of extreme price decline. These findings indicate that investors in the Indian Stock Market are
overoptimistic. When repricing stocks in response to new information, their immediate reaction causes the stock prices to be above their adjusted expected values. On an arrival of some good news, they tend to overreact to news in a way that the stock prices shoot up to reach a level beyond their adjusted expected values which is subsequently corrected by reversal in subsequent days and winner stocks experience negative returns post one-day price rise. On the other hand, when some bad news reaches the market, the investors again behave in an optimistic manner such that the immediate fall in stock prices is not sufficient enough to drag the prices down to their adjusted expected values and consequently the loser stock’s prices keep on falling in the subsequent days, i.e. stock prices adjust slowly to bad news. These findings are similar to the findings of Larson and Madura (2003). Further, size and value based explanations does not explain the cross-sectional return behaviour following extreme daily price shocks in Indian stock market. Thus, going by the explanation based on the irrational behavioural tendencies exhibited by market participants, we contended that our results are primarily indicative of short-term overreaction to the favourable developments relevant to the value of stock causing extreme rise in price of the stocks which is followed by consequent correction and subsequent return reversals over following few days and short-term underreaction to the unfavourable developments pertinent to the value of stock causing the prices to fall down gradually over few days of negative event, depicting in turn a price continuation pattern.

B. For extreme intra-day price changes

1) In a very short term, the investors in Indian stock market tend to overreact to almost any kind of news event, positive or negative, causing the stock prices to reverse their direction within few minutes of extreme price rises as well as declines.
2) Stock market has been found to overreact to any kind of news event during pre-noon trading hours as well as during post-noon trading hours. That is, consistent evidence has been found for the cross-sectional behaviour of security prices following extreme price changes observed at the opening of the trading day, at 9:15 a.m. daily as well as during the mid of the trading day, at 12:15 p.m. daily.

3) After experiencing an extreme rise in their prices, securities forming part of winner portfolio have been found to reverse their direction in as soon as few minutes of the event which continues upto few hours, during pre-noon as well as post-noon trading hours.

4) Similarly, after experiencing an extreme fall in their prices observed either at 9:15 a.m. or at 12:15 p.m., a reversal is observed in the direction of the prices of loser securities on the upward side such that the average abnormal returns of our loser portfolio turned extremely positive during the following hour generating significantly positive returns over half an hour following the event.

5) However the speed with which the correction takes place is slightly different for good news events and bad news events. The subsequent correction following extreme price falls occurs as soon as within few minutes of negative events with almost entire correction taking place in next 30 minutes itself. On the other hand, the subsequent correction of extreme price rises accompanying favourable developments though occurs within few minutes of overreaction but it continues upto few hours subsequent to that. This is also indicative of the optimism on the part of Indian investors who immediately brings stock prices up following unjustified extreme price falls but takes time to bring stock prices down following unjustified extreme price rises.
6) Neither of the two alternative explanations i.e. the size and the value effect, capture the observed overreaction for our winner portfolio formed either from extreme price changes observed at 9:15 a.m. or at 12:15 p.m. and also there is no evidence found for the presence of magnitude effect in our winner sample.

7) For our sample of loser stocks experiencing extreme price fall at 9:15 a.m., firm’s size has been found to play an important role in explaining the post negative event holding period returns generated during the same day. However, it alone do not capture our observed post negative event abnormal returns as the intercept coefficients of our regression results are found to be statistically significantly positive for all the holding periods analysed and thus there are some other important factors, probably the investor overreaction, which seems to play significant role in explaining the return reversals observed for loser portfolio within few hours following extreme price falls.

8) Evidence for loser portfolios’ subsequent returns during the post-noon trading hours indicate that the observed reversals are neither captured by the well documented size effect nor they can be said to be the another manifestation of value effect. However, we have found an association between the magnitudes of loser portfolios’ subsequent holding returns with the magnitudes of initial losses which indicates that in our loser portfolio, the securities which experienced largest price declines observed at 12:15 p.m. daily have experienced largest price reversals in the subsequent hours of trading. This validates the findings of De Bondt and Thaler (1985) for long term overreaction.

9) Assuming that transaction costs do not influence winner-loser returns, superior returns can be earned within few minutes to an hour of extreme
price change observed in intra-day prices by executing a contrarian investment strategy. Evidence also indicates that the returns generated through the execution of contrarian investment strategy within few minutes to two hours of extreme intra-day price changes are not a compensation for the corresponding market risk of this strategy and thus they represent the excess returns or the superior returns generated from this investment strategy. This is consistent with the overreaction hypothesis which suggests that if both the losers and the winners had overreacted to price shocks, the contrarian investment strategy of forming a zero-investment portfolio that buys past losers and short-sells past winners will generate returns in excess of market risk premium. However, these findings are conditional based on the validity of the CAPM.

10) Further, it is found that it is more profitable to execute this strategy in response to extreme price movements in the opening prices of the securities as compared to its execution during the middle of the trading day. The strategy has been found to generate average excess returns to the extent of 1.3% within 30 minutes of extreme price change observed at 9:15 a.m. as compared to 0.5% excess returns on average generated within 30 minutes of extreme price change observed at 12:15 p.m. These findings are consistent with the findings of Wang et al. (2009) who documented the profitability of intra-day contrarian strategies for Taiwan stock market, however, the magnitude of excess returns to contrarian strategies found in our results are much larger than the magnitude of the abnormal returns documented by them.

Thus, on an aggregate basis, these findings reveal that in a very short term also, security returns do exhibit predictable patterns following extreme intra-day price changes in Indian stock market. They exhibit a reversal in their direction within few minutes of extreme price rises as well as price falls. We
document that the patterns of intra-day return reversals observed for our winner and the loser portfolio are basically driven by the behavioural biases on the part of market participants to overreact to unexpected information in a very short term.

These findings lend a further support to short-term overreaction literature which documents that market participants tend to overreact to any kind of news event in a short term of few days. These findings are infact an addition to this literature as it suggests that not only in short-term of few days, but in a very short-term of few hours within a trading day as well, there is a strong evidence of overreaction to good as well as bad news. All the more important is the fact that these findings serves as a proof of predictability of future stock prices and consequent returns on an intra-day basis as well.
Implications of Research Findings

Findings of our study have important implications for the policy regulators, investors, traders and the fund managers.

I. Implications for Policy Regulators

Our results cast serious doubts on the efficiency of the Indian stock market. Contrary to the findings of some initial studies investigating the applicability of Efficient Market Hypothesis in the context of Indian securities market which documented that Indian stock market is semi-strong as well as strong form efficient, our findings indicate that the Indian stock market is not even weak form efficient. By tracking the direction of security prices on day to day basis as well as within a day, it has been found to be possible to predict the direction of subsequent security returns and to exploit them profitably, which in turn suggests that the Indian stock market is not even weak form efficient. Thus, there is a scope for improved policy regulations; policy regulators need to focus more on the operational and informational efficiency of Indian stock market to improve the market microstructures.

II. Implications for Small and Retail Investors

At the same time, for small and retail investors, these findings present important implications. Since, the timing of their investment is very crucial for long term returns, if small and retail investors enter the market at a time when the security prices are quiet away from their fundamental values, as in the case of overreaction and underreaction, there is a possibility that they may lose. Our results indicate that the Indian securities market is subject to over optimism and at times driven by sentiments.

III. Implications for Traders and Fund Managers

Our findings have important investment implications for traders and fund managers as well who are continuously engaged in designing a trading
strategy that can outperform the market. They can improve their investment performance simply by executing the contrarian investment strategy in a very short term of trading hours within a day, without getting involved into the intricacies of the fundamental and the technical analysis for investment management. However, implementation of these strategies also requires handling the transaction costs as much of the potential profits from these strategies may be eliminated if the transaction costs are not managed well.
Contribution of Study

In our knowledge, there exists no published study on the investigation of Prior-return Effect in Indian stock market using daily and more importantly the intra-day stock price data, which has become all the more important in the wake of recent financial crisis which has given rise to increasing intra-day volatility in the stock markets across the globe. Thus, our study has contributed to the literature on short term prior return effect:

1) It captures Indian stock market which is at present the most emerging capital market of the world.

2) It uses intra-day stock price data in addition with daily closing prices to investigate the behaviour of Indian investors over a very short horizon of few hours following extreme price changes within a day, which has not been done prior to our study for Indian stock market.

3) It do not attempt to study particularly the overreaction effect or the underreaction effect but attempts to analyse the patterns exhibited by subsequent security returns in relation to its immediate past behaviour.

4) The time period of five years covered in this study, for investigating the subsequent behaviour of security returns following extreme daily price changes, is one which encompasses a period of unprecedented growth in the Indian stock market as well as the impact of the recent global financial crisis and the subsequent recovery. Accordingly, it also tested the cross-sectional behaviour of security returns following extreme daily price changes in the three different market conditions by dividing the total study period into three sub-periods, which has not been done previously.

5) In addition to the investigation of predictable patterns exhibited by subsequent security returns following extreme daily price changes as well as intra-day price changes, it also provide evidence of investor’s
behavioural irrationality causing such patterns as against time-varying risk accompanying such changes.

6) It also tests the feasibility of designing and implementing a profitable investment strategy based on the observed behaviour of Indian investors in a very short term.
Limitations of the Study

Present study suffers from the following limitations:

1. Study covers the period of only five years beginning from July, 2006 till June, 2011 to study the cross-sectional return behaviour following extreme daily price changes and it covers a period of only one year beginning from January, 2010 till December, 2010 to study the cross-sectional return behaviour following extreme intra-day price changes. This is done primarily with a view to keep the data within manageable limits as number of daily price observations over a period of five years and number of intra-day price observations at intervals of 30 minutes over a period of one year for 500 securities itself amounts to huge quantum of data.

2. The sample comprises of 500 stocks listed on NSE and forming part of S&P CNX 500 Equity index. The sample, although very large and fairly representative of the entire market, does not cover all listed stocks (about 5100) in India.

3. In our study, we have investigated the general behaviour of security returns following extreme daily and intra-day price rises and declines without taking into account the possible news event or the information causing such an extreme price change. Taking into account the events causing such extreme price changes may provide deeper insights into the behavioural patterns exhibited by market participants to different kinds of news events.
Scope for Further Research

Further research can be conducted on the overreaction effect in the following domains:

1. More frequent high frequency data can be used to investigate the issue of predictable patterns exhibited by security returns following extreme price changes in a very short term.

2. Event can also be defined differently. For example, news specific instance of extreme price changes can be used to test the subsequent behaviour of security returns to different kind of news announcements.

3. Sample of a larger size can be used. For instance, all the stocks listed on NSE can be used to investigate the applicability of prior return effect in Indian stock market. Similarly, an extended time period can also be covered.

4. Prior-return Effect can also be tested using the stock prices of some other stock exchange, like the Bombay Stock Exchange (BSE), so as to widen its acceptance for the Indian equity market.

5. Similarly, industry specific analysis can also be done to investigate the difference in the attitude of market participants to the unexpected events belonging to different industry segments.

6. Applicability of prior return effect can also be tested for different sectors of the economy using the stock price data from different sectoral indices.

7. Securities forming part of different stock indices can be used as a sample to compare the results over different stock indices.
8. Stock price data can be obtained from different stock exchanges listed in different countries to compare the behavioural patterns following extreme price change events across countries.