

A review of literature on short term overreaction generated by news sentiment in stock market

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Abstract: This paper is an attempt to revisit the overreaction effect studied in the past and explore if such effects have any linkages with specific news events. According to overreaction effect, there is tendency for loser stocks in one period to become winners in the next period and vice-versa and thus providing possibilities for predictability of stock price movement. Early research on overreaction was focused more from long term perspective and later on relatively shorter terms as well, but not much attention has been given to specific information. Now, because of aggressive media coverage on various global events relevant to stock market, there is a tendency for market participants to get affected by the news sentiment enticing them to take some decision. So, in such environment possibility of occurrence of overreaction is high and opportunities exist for contrarian strategies to generate above normal returns. This paper thus forms a basis for future research to test whether news sentiment generated by specific news leads to overreaction in stock prices.

Keywords: Sentiment, Overreaction, behavioral finance, momentum, contrarian strategies, news sentiment.

I. Introduction

In today's world of information and communication technology, news about any event happening anywhere in the world is spread across the globe at a lightning speed. People also provide their opinions and reactions about the event via social media or news media in quick time. In such information-centric environment, it is worthwhile to find out if information about any event relevant to stock market can make a difference in the stock returns. Behavioral finance practitioners and academicians using behavior patterns of human decision making identify various regularities like "underreaction", "overconfidence", "overreaction", "representative heuristics", "self-attribution bias", etc. and their impact on stock price behavior. Although past research reveals occurrence of overreaction in the long run, this paper attempts to examine whether news announcements can lead to overreaction in very short term. Following sections are covered in this paper:

- Definition of news sentiment

- Role of news sentiment in stock market
- How do news stories impact investor sentiment?
- Overreaction and its causes
- Research gaps and further study
- Conclusion
- Managerial Implications

II. Definition of News Sentiment

Literature on behavioral finance uses the term “sentiment” quite often but doesn’t seem to agree on any universal definition. Some researchers have used it in the context of either investors, overall market or media. Charles & Dahlquist (2007) define sentiment as the net amount of any group of market players' optimism or pessimism reflected in any asset or market price at a particular time. Earlier work in the area of sentiment was aligned more towards understanding investor sentiment (Barberis, Shleifer, & Vishny, 1998), (Long, Shleifer, Summers, & Waldmann, 1990), (Shefrin & Statman, 1994), (Bandopadhyaya & Jones, 2006). Baker & Wurgler, 2007 define investor sentiment as a belief about future cash flows and investment risks that is not justified by the facts at hand. Most of these studies evolved out of the market anomalies (Shefrin & Statman, 1994) found against the efficient market hypotheses proposed by (Fama,1970) and Capital Asset Pricing Model (Sharpe, 1995). Two methods which were prominent in studies related to investor sentiment were survey of investors and financial or economic indicators as sentiment proxy (Baker & Wurgler, 2007). Quite often in the financial literature, the term “Investor sentiment” is used interchangeably with “market sentiment”, although some researchers consider it much wider in terms of inclusion of other factors like market environment, Volatility Index (VIX), etc.

Traders and investors keep an eye on events happening in economy, industry or a particular company. With the advent of electronic media, news of the event as well as opinions of industry experts, bureaucrats and heads of government regulatory bodies, financial institutions, companies have gained a lot of importance in making trading and investing decisions. Hence news and opinions contain implicit mood about behavior of stock, industry or economy as a

whole and (Cahana, Chen, & Nhut, 2013), (Kraussl & Mirgorodskaya, 2014) call it as media sentiment. Thus, media sentiment can be defined as implicit mood contained in the content of media which has a potential to change the investor psychology about a stock at a given point in time. Although, media sentiment can also be obtained from sources like social media, the focus of this paper is on news media sentiment (or simply, news sentiment).

III. Role of news sentiment in stock market

News is a key resource for trading and investment decision. With entire globe being connected via electronic communication, news from any remotest part of the world is accessible to us in quick time. Any significant event happening around whether it is related to politics, economy, industry, or some company is covered by media and we often find investors and traders reacting to this by updating their beliefs about the market environment. These updated beliefs are potential drivers for change in their behavior resulting in buying or selling of stock. This action of investors and traders is reflected in the stock market with a particular stock or group of stocks showing abnormal movement either against the current trend or with the trend with higher volumes.

IV. How do news stories impact investor sentiment?

As stated earlier, investor sentiment is defined broadly as a belief about future cash flows and investment risks that is not justified by the facts at hand (Baker & Wurgler, 2007). This means that investors have some bias towards a stock, thus defying current fundamentals of such stock. This may be because of their prior experience with the same stock or similar stocks, price movement exhibited by it in the recent past or influence by friends, media, etc. While early research in classical finance on asset pricing focused mainly on the rational behavior of investors and gave no room for irrationality, work of researchers from behavioral finance provides empirical evidence to show importance of irrationality exhibited by some investors. Proponents of behavioral finance argue that standard economic and financial models are not complete and accurate as they assume perfect information accessibility and processing capabilities, decision making alternatives and consequences of actions. In reality, humans have limited processing capabilities which makes it difficult for them to select a particular decision choice from large set. For example, (Barber & Odean, 2012) proposes a model of decision making wherein they find that unlike institutional investors, when individual investors are subjected to decision of selecting

stocks from a large pool, they primarily pick up those stocks that have attention attractive qualities. However, the same is not true when selling stocks; the reason being that they tend to hold few stocks, thus having limited decision choices to make. They list three attention attractive ways which are followed by individual investors. These are stock's abnormal daily trading volume, the stock's (previous) 1-day return, and whether the firm appeared in that day's news. One implication of attention based buying by many investors is that stock price might go up for a brief period followed by disappointing subsequent returns.

There are two categories of research models found in behavioral finance; sociological and psychological. Sociological models identify sociological bias as one of the reasons for exuberance in stock price movement which may happen because of tendency of investors to either follow others' actions leading to herd behavior (Bikhchandani & Sharma, 2001) or act as a carrier for social or psychological influence in direct or indirect contacts between individuals and their environment. Psychological models considers psychological bias being one of the factors in individuals exhibiting irrational behavior. The model of bounded rationality in economic behavior by (Simon, 1957) as cited in (Fenzl & Pelzmann, 2012) allows for lack of information, missing alternatives, uncertainty about endogenous or exogenous events, and the impossibility of taking all possible outcomes and consequences into account. So, within a dynamic market set up, investors react with their inherent beliefs to new information updates about endogenous and exogenous events. Barberis et al. (1998) presents a model of investor sentiment based on psychological evidence of underreaction and overreaction to news. According to them, stock prices are considered to be underreacted if average return on the company's stock in the period following an announcement of good news is higher than the average return in the period following bad news. That is, stock has shown underreaction to good news (a mistake), corrected in the following period giving higher returns. This finding goes well with the "conservatism" phenomenon from psychology described by Psychologist Edwards in 1968 who states that individuals are slow to change their beliefs in the face of new evidence. When applied to investors, conservatism here means that investors partially update their prior information on news announcements. Dhankar & Maheshwari (2011) cites disposition effect (see (Shefrin & Statman, n.d.), (Grinblatt & Han, 2001)) to give an explanation for underreaction to occur in stock market. According to disposition effect, at the time of positive news, disposition investors sell their stocks rapidly to realize gains before subsequent decline and during negative news they

hold them expecting the price to recover. Due to this conservative nature of disposition investors, prices never reach their intrinsic value. To overcome this difference, rational investors generate momentum in stocks to push them towards their intrinsic value.

In contrast, according to (Barberis et al., 1998), stock prices are considered to have overreacted if the average return following not one but a series of announcements of good news is lower than average return following a series of bad news announcements. This can be attributed to the fact that an investor after getting series of good news becomes over-optimistic and assumes that future announcements will also be good and hence overreacts sending stock price to higher levels. Subsequent, news announcements contradicts his optimism and thereby leads to lower returns. Overreaction can be explained using representativeness heuristics, a phenomenon described by (Tversky & Kahneman, 1974) that evaluates the probability of an uncertain event, or a sample, by the degree to which it is (i) similar in its essential properties to the parent population, (ii) reflects the salient features of the process by which it is generated. When applied to investor behavior, this phenomenon describe situation in which investors assume past history as representative of the future growth potential undermining the fact that history of high earnings growth is unlikely to repeat itself; they overvalue the company, and get disappointed in the future when forecasted earnings growth fails to materialize.

Although behavioral finance research shows that each of the regularities discussed above as important for understanding the movement of stock prices, the focus of this paper is only on “overreaction”.

V. Overreaction and its causes

Thaler & De Bondt, 1985 explains overreaction effects as follows:

“If stock prices systematically overshoot, then their reversal should be predictable from past return data alone, with no use of any accounting data such as earnings. They suggest two hypotheses: (a) Extreme movements in stock prices will be followed by subsequent price movements in the opposite direction (Directional Effect) (b) The more extreme the initial price movement, the greater will be the subsequent adjustment (Magnitude Effect).” (Brown & Harlow, 2000) includes intensity effect in overreaction which is stated as “the shorter the duration of the initial price change, the more extreme the subsequent response”.

Thaler & De Bondt, 1985 gives empirical evidence for presence of overreaction over long periods (3 or more years) by creating winner and loser portfolios each consisting of 35 stocks from NYSE and then computing cumulative average returns. Loser portfolios of 35 stocks outperform the market by, on average 19.6%, thirty-six months after portfolio formation. Winner portfolios, on the other hand, earn about 5.0% less than the market. So the difference in cumulative average residual between the extreme portfolios, equals 24.6% (t-statistic: 2.20).

Dhankar & Maheshwari (2011) examines momentum along with overreaction effect for various time periods starting from 3 months to 3 years in the Indian Stock Market. They find overreaction effect for formation-holding periods of 36 months producing abnormal returns of 35.7% and momentum effect for formation-holding periods of 3 to 12 months giving abnormal profits of 7.7%.

Causes of Overreaction:

Findings from past literature gives two schools of thought for overreaction to occur:

1. *Underreaction leading to Overreaction followed by long run reversal:* As defined by (Barberis et al., 1998) stock prices are considered to have overreacted if the average return following not one but a series of announcements of good news is lower than average return following a series of bad news announcements. This means that there is some expectation built into the stock because of series of good news in one direction which makes investors overconfident and they take buy position before the news arrives only to find that their expectations are not met as the announcement comes as a bad news. The critique to this is that every time good news comes, investor reacts to this by buying stocks; which is fair (rational) considering it is a good news and price goes up. This means that at this point in time, investor is just reacting and not overreacting. Only time when an investor buys stock based on expectation using his representative bias (i.e. investors mistakenly conclude that the past growth of the firm will continue in the future) without waiting for news to come (being overconfident), he becomes irrational and exhibits overreaction and then sells stocks if news turns out to be bad forcing the prices to go down to their fundamental levels.

For a stock to overreact, it goes through a process as described in unified model of underreaction and overreaction (Hong & Stein, 1997). They considers two types of agents “newswatchers” and

“momentum traders”. They further make three assumptions- (i) The newswatchers make forecasts based on their private signals they observe about future fundamentals and they disregard current or past prices. (ii) Momentum traders base their forecast only on changes in past prices (iii) Private information diffuses gradually across the newswatcher population. Based on these assumptions it follows that initially (at $t=0$), when only newswatchers are active, prices adjust slowly to new information but not far enough; there is underreaction but never overreaction. As momentum traders base their forecast on this gradual increase in price and enter at $(t+1)$, they force the price to go higher resulting in some profit. However, later momentum buyers entered at time $(t+i$ for some $i, i>1)$ lose money as at that time, price gets above the long-run equilibrium and reversal happens.

2. Overconfidence and self-attribution leading to overreaction followed by long run reversal: *Daniel et al. (1998)* model of overreaction is based on two psychological regularities: overconfidence and attribution bias. According to them, investors overestimate their abilities and view themselves having better abilities to value securities as compared to what others think about them. This leads to overconfidence. Secondly, this confidence grows when public information is in agreement with his information, but it does not fall commensurately when public information contradicts his private information thus exhibiting self-attribution i.e. people tend to credit themselves for past success, and blame external factors for failure. The effect of overconfidence is that overreaction drives the prices higher than the fundamental value and thereafter a long run reversal occurs.

VI. Research gaps and further study:

Literature review shows that overreaction has been studied across various global markets over last three decades using definitions provided by (Barberis, 1998) and (Thaler & De Bondt, 1985) as given in the earlier sections. Taking a lead from research done in US markets, other global markets have also been examined for overreaction over long term horizon (3 years or more) and relatively shorter period (3 months to less than 3 years) as summarized in Table 1.

Stock markets often show significant change in price for a short time on news announcements regardless of past series of good news or bad news. This is also followed by reversal in short run. This behaviour is exactly similar to overreaction build up on series of good or bad news, but happens as a knee-jerk reaction. Such overreaction behavior which diverts slightly from

overreaction definition given by (Barberis, 1998) doesn't have any conclusive evidence from past research.

Table 1: Summary of research done on overreaction across various global stock markets

Stock Market	Author(s)	Sample period	Results on overreaction
Spain	Alonso and Rubio (1990)	1967 to 1984	Strong and systematic overreaction was observed. Overreaction effect gets stronger when longer formation and testing periods were used.
Canada	Kryzanowski & Zhang (1992)	January 1950 to December 1988	Insignificant overreaction over longer formation/test periods of 12, 24, 36, 60, 96 and 120 months was observed.
UK	Campbell and Limmack (1997)	January 1979 to December 1990	Overreaction was experienced over each of years 2 to 5. For a period less than 1 year, no overreaction was observed in general but reversal was observed for smaller loser companies
Malaysia	Ali, Ahmad, & Anusakumar, (2012)	January 2000 to October 2010	Find strong evidence in support of the overreaction for periods ranging from 1 to 52 weeks. In particular, the overreaction is stronger for holding periods of 1 to 4 weeks. Also concludes that there is a negative relationship between trading volume and overreaction.
Hong Kong	Otchere & Chan, (2003)	March 1996 to June 1998	Find evidence of short term overreaction in prior to the Asian financial crisis. The overreaction phenomenon is more pronounced for winners than losers. However, abnormal profits thus obtained are economically insignificant after accounting for transaction costs.
India	Tripathi & Aggarwal, (2009)	March 1996 to 2007	Provides an evidence for presence of statistically significant but asymmetric overreaction effect over periods of 6, 12, 18, 24, 30 and 36 months formed as formation and holding periods.

Overreaction has been explained taking good news or bad news, with many studies focusing only on earnings news. There is not enough evidence to show how different types of news show overreaction behavior. Types of news could be scheduled news or unscheduled news, macroeconomic, industry or company specific, new or old (linked to past news), etc. So determining sentiment of news is required. While it is easier to differentiate news that contains earnings news as good or bad looking at the numbers from past and present, it is far more challenging to do this for all types of news and more specifically the ones which are of textual nature. For such unstructured data, sentiment analysis and news analytics are appropriate solutions.

There are studies like (Khatua & Pradhan, 2014) which have focused on how overreaction differs across stocks of different sizes (market capitalization), under volatility of market and types of news (good or bad or no news of quarterly earnings) in Indian Stock Market. This study can be extended further to test overreaction in extremely shorter periods.

VII. Conclusion

Research on overreaction has been done as a long term phenomenon while some recent studies have also attempted to examine its presence in relatively shorter periods. Researchers have explored US and other developed markets but literature shows that emerging markets like India needs to be examined (Supriya Maheshwari, 2014). Many of these studies doesn't focus on specific information content which in today's information-centric environment is vital and needs to be studied for extremely short periods. Impact of such news may happen to certain type of stocks belonging to one particular industry, particular index or few stocks. Overall, this research would be useful in cases where traders want to use contrarian strategies with the expectation that price will reverse in the short term.

VIII. Managerial Implications

One often finds investors and traders taking their positions in stock market based on some news stories like banking rate cut, inflation rates, ban on some products, corruption cases, etc. Some of them anticipate stocks to get affected positively (negatively) from the actions taken by the concerned authorities for a short period. This paper has a relevance towards contrarian strategies adopted by traders and further research into this news-based overreaction will be useful to design appropriate strategies. For investors, research in this area would be useful in terms of safeguarding their portfolio in short term turbulent times using stop losses or contrarian positions in cash or derivative markets. Algorithms using News Analytics and Sentiment Analysis can be built into trading desktops of investors and traders for improving effectiveness of their decisions.

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