“Influence of news on rational decision making by financial market investors”

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INFLUENCE OF NEWS ON RATIONAL DECISION MAKING BY FINANCIAL MARKET INVESTORS

Abstract

The impact of news on individual investor decision is explicit as investors need to update, adapt and forecast returns with constraints of time, uncertainty and resources to be successful. The aim is to understand and review the influence of news on individual investor's decision making in stock markets and identify the impact of different type of news on individual investor's decision making in stock markets, assess the behavioral reaction and investment decisions made by investors before and after there is news item, identify the linking effect on behavioral theories and biases, develop a generalized decision making conceptual model to understand the impact of news on investor's reaction, decision and its linkages along with the behavioral bias. Theoretical basis/methodology for processing of news by investors is assumed to be based on Broadbent's filter theory (1958) and due to cognitive informational inefficiency of investors it assesses the attention and the investor's reaction of overreaction and underreaction, which do not comply with efficient market hypothesis theory. The reasons for its noncompliance are found by relating it with behavioral theories. The results explain how investor screens with filters and give attention to news only when it affects their portfolio or investment objective and strategies. It is concluded that investor's decision making depends on degree of information penetration, information content, information influence, specific internal factors and generic external and on investors prevailing at that given circumstances. This gives us the solution to comprehend the investor's reaction, decision and unresolved reversals, short- and long-term overreaction.

Keywords overreaction, underreaction, heuristics, bias, behavioral finance, efficient market hypothesis, attention

JEL Classification D91, G14, G41

INTRODUCTION

News is "something new relating to current events from North, South, East and West". It is inevitable for an investor to be abreast of all the recent news, stock quotes, charts, economy, investment sites, blogs, etc., which will well equip investors to be aware of the market trend and helps them to make profitable trading and investment decisions.

News which provides information to the investors has been categorized from broad to specific for our study such as macroeconomic news, firm or company specific news and market news. Investors rely on each type of news, which contributes a ripple effect in the minds of the investor in predicting the future, as well as decision making with conditions of uncertainty and time constraints. Finally, investors due to lack of time to process huge information land up in irrational decision making, which shows its effect on the secondary markets.

This study brings about the end results of the study that attention of investors is based on the information content and influence on their

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portfolio or investment strategy. Inattention of investors is caused if it is against their belief and causes cognitive dissonance. Investors underreact to public information and overreact to private information and get overloaded with information and face cognitive errors and resort to heuristics. The comprehended information after the various news passes through many filters aids in decision making. This filter changes as individual may differ based on internal factors like bias, emotion and background and investment period and external factors like differences in states of the economy and market.

Investors analyze a news taking into account his/her stock holding, risk tolerance, time horizon and financial capacity. Investors assess the information according to his/her expectations and give more importance to information, which they judge would affect the stock prices in specific and stock markets as a whole. There is always a difference between analyzing and availability of access to the recent news, all investors though are given equal chance of information access, the reaction of each investor is not uniform or rational, they all are subject to different kind of bias in each situation, since each investor is unique in their thinking, understanding, expectations of returns, risk taking ability.

So, financial market's performance and investor psychology are interdependent on one another. Hence, to understand this, theories and influence of various types of news governing behavioral aspects have been reviewed.

1. THEORETICAL BASIS

1.1. Methodology

The processing of news by investors is assumed based on Donald Broadbent's filter model of attention theory 1958 (appendices) with acceptance for cognitive informational inefficiency of investors. The filters scrutinize the information and allow only needed information to pass through to the next level for comprehension and others are ignored. The next level of increased attention and limited attention depends on the type of information and circumstances. The limited attention of investors is due to underreaction and the reason for momentum in the market. The types of reaction can be either overreaction or underreaction. These both reactions show noncompliance with efficient market hypothesis theory. Overreaction is substantiated to reversal trends and underreaction to momentum. In the short run, investors plan for contrarian method and in the long run opt for momentum and relative strength styles. Underreaction can be related to conservatism bias and overreaction to optimism and representativeness. DeBondt and Thaler (1985) propounded the long-term reversal in markets. Short-term and medium-term momentum was explained by Jegadeesh and Titman (1993). The underreaction happens as investors assume the change is momentary and overreaction occurs as investors' trend will reoccur again. Few studies assumed it depends on the investors' viewpoint and confidence level (Barberis et al., 1998). Other studies were similarly based on confidence built upon the end results and specific events result was a method adopted to overcome the pricing discrepancies (Daniel et al., 1998). Another explained the system neglect hypothesis, which assumed that investors underreact to reliable information under vague circumstances and overreact to accurate information in unreliable circumstances (Massey & Wu, 2005).

Thus, we take the building blocks of the Broadbent's filter model, overreaction, underreaction, attention, limited attention and cognitive informational inefficiency for our conceptual model. The various types of news variables considered are macroeconomic news, corporate news and market news. The influence on investor's reaction and investment decision and its linkages to behavioral theories is studied. Investor's reaction elements are overreaction and underreaction and the underlying concept of attention and inattention hypothesis is also examined. The external factors of economy and market conditions, internal factors of investors like heuristics, bias and emotions and other individual elements in particular are taken into account. Now we proceed to review each variable influence and other elements involved in our study.

1.2. Macroeconomic news influence

Economic news is important as when an economy faces up and down situations, an investor needs to understand and adapt their investment style to match with the economic cycles. Economic news has an impact on stock prices, total stock return (Cutler et al., 1989), forex and futures and rates of interest, but observed to respond relatively more in equity markets (Ederington & Lee, 1993). Stock prices react immediately to unfavorable news during boom compared to recession time period. The study of investor's reaction to both positive and negative news during economic boom and recession revealed that investors overreact to bad news during economic boom and underreact to bad news during economic depression. It is noticed that after declaration of news, the shares show less negative stock return compared to non-announcement of news (Cox, Dayanandan & Donker, 2016).

Result 4: Underreaction of investors occurs when we have favorable, certain and public information

Example for present day scenarios that influence the stock markets based on political news is the Pulwama attack that affected Indian capital markets as Sensex dropped down successively for nine days. In addition to this, the panicked foreign investors withdrew about 62 billion within three days of this event (Dhillon, 2019). Based on world news and economic news, Robert Muller's report against US president Trump invited media attention and injected uncertainty, volatility in the market, as a result, treasury bill yield dropped down (Matthews, 2019). Further world news affect economic news as unfriendly business policies made by Trump on removing the waiver on Iran will affect the supply of petroleum products to India. This would affect India's balance of payment and inflation rates (BL, 2019). Similarly to recent threat of Mexico tariffs on June 3 has hit the bond markets and dropped by 2% (Domm, 2019).

1.3. Corporate news influence

Corporate news updates company's actions, which can be voluntary, mandatory or mandatory with choice. It is of paramount importance as any type of action done by a corporation affects the financial performance, stakeholders, and company's performance, profitability and stock prices. Especially investors need to be competent enough to comprehend this effect and make trading decisions as to buy or sell or hold on.

A recent example based on company news Jet Airways publicly declared temporary deferment of flight operations as they faced a financial crisis of 260 crores. As a result, the share market faced a flood of selling orders and it collapsed by 45% in 3 days to 10-year low and led to unemployment of many (BL, 2019).

The effect of corporate announcements around four events like seasonal equity offerings, repurchases, merger done by stock and cash acquisition resulted in investors to reduce stock positions in good times and moderately increase stock positions in bad times. This results also indicate that attention is one source of the cost of monitoring portfolios and news sensitive investors are more subject to the disposition effect (Kadiyala & Rau, 2004).

Impact of merger on stock price and how prices and investors react was investigated especially towards highlighted hot stocks and hot mergers. When a positive rate of change is observed, it tends to persist positively. When merger is announced for top stock, it reacts positively compared to less demanded poor performing stocks. As investors think, those stocks would result in higher return and remain positive, but get decreased as investors react negatively after declaration of merger financial reports. Further, situations like change in management and other cross industrial acquisitions do cause emotional and informational shock to investors (Rosen, 2005).

Result 6: Informational and Emotional shock is faced by investors when exposed to any new information due to cognitive informational inefficiency, mental frame and heuristics

Apart from studying the effect of corporate news on stock prices and investors reaction,

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some researchers studied the effect of absence of news coverage on corporate events though it has occurred, if so, how it affects stock prices and investor's reaction. It deduced that even though no news was broadcasted, the merger reflected significant investor behavior (Giglio & Shue, 2014).

Researchers also found that in addition to economic news, times of earnings disclosure and its intrinsic content make investors react either positively or negatively. However, good news doesn't have a great impact on the investor as the bad news. The reason is good news will motivate the investor to hold on for a while expecting increase in price as the investor's tend to protect themselves from loss of revenues and high risk. Interestingly, the positive earnings shows at least two days of effect compared to only one day effect of bad earnings (Garcia, 2014).

Some studies highlighted that individuals are net buyers after both negative and positive important earnings announcements (Hirshleifer et al., 2008). Earnings news and its effect on sports and religious holidays was assessed by the researchers using univariate, multivariate, delayed ratio, stock response and volume response tests and sub-sample tests, since two geographical samples are chosen for their study. The results showed that investors with less attention are not affected by mood content. When investors are in a negative mood, they would give more attention to negative news, while pay more attention to good news compared to bad news when in good mood (Ucar, 2013).

Result 3. Inattention of investors is caused if it is against their belief or goals, causes cognitive dissonance, irrelevant information to their portfolio and investment objective

The role of mood in investor's reactions was examined in particular to analyst recommendations revisions based on mood maintenance hypothesis in financial markets (Isen et al., 1987). It is assumed in this hypothesis that investors in good mood are risk averse and investors in bad mood are risk inclined. The influence of good mood decreases investor's analytical judgment, information analyzing capacity and response to news leading to biasness. The investors in good mood generally show robust reaction to each and every news, whereas in bad mood react positively only to good news. Negative returns are more during downgrades and during day increase than day decrease. Positive abnormal returns during upgrades are more in day increase due to shallow thinking and are more influential than sunray cloudy effect and reverse otherwise (Kliger & Kudryavtsev, 2014).

Apart from mood, some researchers state that timing of results announcement also plays a role in management decisions of corporates. Factors such as abnormal returns and earnings per share have its impact at times of stock split news in stock markets (Klein & Schmid, 1987). The study also highlights the role of analysts' predictions after result announcement.

Another study on analyst tested for availability bias based on outcome derived using stock index returns and risk level using abnormal share price in response to analyst affirmations. When both stock price movement and market index are buoyant, analyst's ratings are also positive (upgrades) and more affirmative in nature. When both stock price movement and market index are weak, analyst's ratings' also show negative (downgrades) indicates based on the availability of final outcome effect. The stock price evidenced frailer reaction to increased analyst ratings and robust reaction to decreased analyst ratings indicates availability based on risk taking (Isidore & Christie, 2018; Kliger & Kudryavtsev, 2010).

Further to the above discussed corporate events, unanticipated earnings announcement is also one of the factors that have influence in stock markets (Frieder, 2003). However, the researcher identified that this news has high influence during progressive stage and less during assenting stage of the company. The same study has highlighted the availability bias as well, stating that availability bias influence stock prices due to media, expert's recommendation, recent information, unanticipated earnings, as well as economic conditions prevailing. Similar studies that researched in depth have found that during boom and recession, experts prediction of

company's growth based on price earnings ratio differs accordingly making experts sure of incremental price earnings ratio during boom period (Lee et al., 2007).

Reaction of investors to dividend declaration in European market of France and Portugal revealed that UK markets react positively and show high investor sentiment (ISENT), whereas depict low ISENT and be less sensitive to decrease in dividends. It is obvious that small and new firms in UK found earnings announcement to have higher impact than normal dividend announcements (Elisabete, 2011). This was agreed by other authors regarding the dominance of dividend over earnings announcement and the role of investor sentiment on the market's mean-variance trade-off (Yu & Yuan, 2011).

1.3.1. Overreaction and underreaction

Indication of overreaction with or without stock specific public announcements in Indian stock market study concluded India to be influenced to a great extent due to overreaction. Stock overreact to specific events than unspecified in boom period and underreact towards specified events and overreact towards unspecified events during recession period (Khatua & Pradhan, 2014) and the effect stayed so for two to three days subject to price adjustments. Similarly, to check its market efficiency prevalence in Indian Information Technology (IT) sector, twenty stocks were selected for study stated that investors overreact due to leakage of information by bad news, asymmetry of unspecified events such as quarterly earnings and dividend announcements will make investors to underreact to specific or unanticipated events. Study concluded that Information Technology (IT) sector and non-IT sectors both reflected the same overreaction response to quarterly announcements (Manickam, 2009).

Investors' reaction to fundamentals and corporate news was researched by Montier (2004). He also further stated that human psychology affects the market price and its fundamental values, since there is a gap between classical finance theories and anomalous behavior of individuals. He concluded that investors overreact to dividend omissions, earnings, analyst opinions-scores, buybacks on value stocks, goodwill write offs and valuations and underreact to initial public offering (IPO's), buybacks on growth stocks, high earnings growth and announcements of quarterly earnings in countries like UK, US, Singapore, Japan and Hong Kong. This model gave several empirical facts about the reaction of stock returns to news, such as time-varying and state-dependent reaction, asymmetric reaction to extreme news and stronger reaction to more precise signals (Montier, 2004).

Result 5. Overreaction of investors occurs when we have favorable, uncertain and private information

The barometer to measure behavioral factors gave a new insight about the two quantifiable indicators put-call ratio and A-50 moving average, which can act like a barometer of investor behavior and stock prices was studied at New York stock exchange. The put-call ratio where put to be bearish and call to be bullish decide and forecast the future market trend and the stock above the A-50 moving average if traded will indicate the stock movement are based on board based stocks or few stocks to reveal the mass or crowd psychology, which is also called herding. It hence proves that self-deception errors, prospect and heuristics bias is clearly reflected in the various sentiments and behavior of the investors (Bhattacharya, 2012) as cited in Derek Polcyn (2006).

Assumption 4. There is relationship between the news influences on investor's reaction and their investment decision, which is attributed due to heuristics and bias

1.4. Market news influence

Stock price reaction in Sweden towards public financial information was experimented in terms of cognitive ability, content, using interactive text pack and computer based regression analysis with extended scope for how firms should release financial information to investors and other biases to be studied in detail as to how new information is being viewed and comprehended by different type of investors. It deci-

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phered that there exists positive correlation between stock market and financial information (Wetterlind, 2005).

Assumption 1. There is a relationship between stock price and new information

Stock price reaction in Chinese market to financial announcements was studied by dividing them into two groups: those traded in domestic currency and other dealing with foreign currency. Further, the other constraints of non-transparency and private information have made the market into two unlinkable segments. Foreign investors overreact to bad news than good news and shares traded in foreign currency receive information pretty sooner than domestic currency due to variations in their accounting standards (Huang, 2004).

Large firms react intensely to macroeconomic news than value and growth stocks (Ljungqvist et al., 2006). Value stocks price adjustments at a slower rate than growth stocks (Doukas & Li, 2009).

Assumption 4. Investor's cognitive inefficiency, mental frame and heuristics are responsible for slow market response to new information

When both market news and firm specific news are announced on the same day, the market news dominates the investor attention than the firm news, but a situation of series of announcements will dilute the attention of investors. Whereas, depicts less negative stock return reaction after the announcement compared to non-announcement of news.

Assumption 2. There is a relationship between market and decision making of investors

1.5. Investor's attention

During announcements of firmspecific or macroeconomic news like economic, political, policies and world news, the individual investor first reacts i.e. information and emotional shock followed by the next process of increased attention activities of gathering more information and monitoring the further updation in the news, which he believes would impact the company's future performance and demand, especially for large caps (Cenesizoglu, 2010).

Result 2. Investors give attention to news only when it affects their portfolio or investment strategy

Result 6. Informational and Emotional shock is faced by investors when exposed to any new information due to cognitive informational inefficiency, mental frame and heuristics

Investors analyze all types of news and strategically evaluate the situation and decide to give attention to various types of news weighing both pros and cons and arrive at a decision on a contingency approach. Underreaction of stock prices to recent news explain the fact that investors face cognitive bias of analyzing and interpreting the various sources of updated news at a given time, which leads to inattention of investors (Ljungqvist et al., 2006).

Result 3. Inattention of investors is caused if it is against their belief or goals, causes cognitive dissonance, irrelevant information to their portfolio and investment objective

The abnormal volume trading returns whether negative or positive after the news are remarkably seen on that day of announcement and do not diminish, but sustain to show its effect for few days. Further, the abnormal volume trading combined with the upcoming news and stock prices reaction act as a reminder and solve the inattention of investors, which catalyzes the speed or magnitude of price adjustments. It claims to state that stocks without any media coverage tend to perform better than those with more media coverage. The originality of this study is identification of the reason for magnitude of price adjustments is unique (Azuma et al., 2014).

1.6. Investor's inattention

Normally, after the news (as given in Figure 1) the investors face an informational and emo-

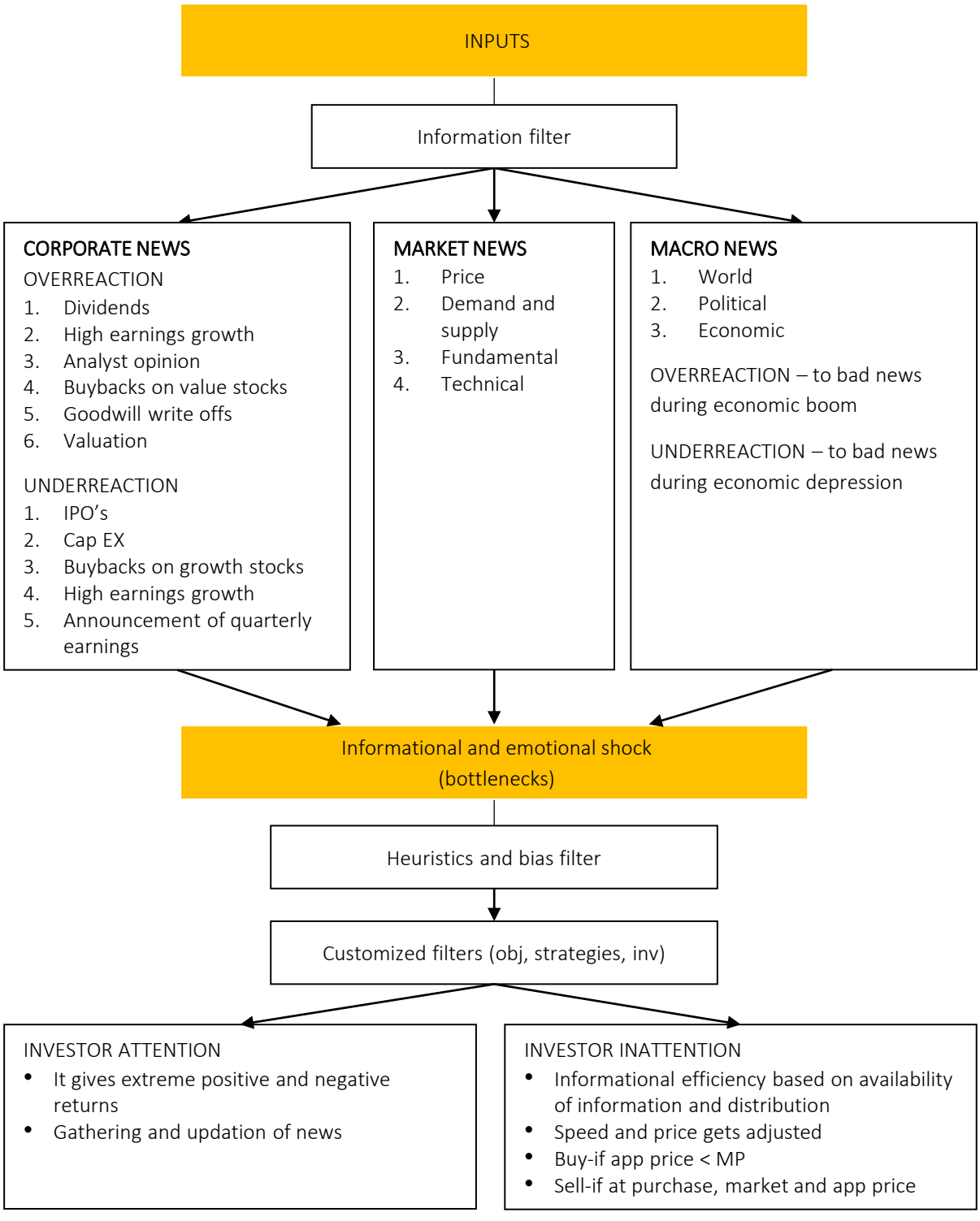

Figure 1. Conceptual model which explains different news items that influence an investor's decision making in stock markets

tional shock, which limits their capacity to make decisions so the investors undergo a state of investor inattention and attention due to cognitive processing of big data. Investor's inattention hypothesis is based on cognitive behavior model, which has led to development of a new theory called inattention hypothesis. It also examines with prime importance the speed with which the

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stock prices get adjusted by anchoring and availability bias. Appropriate price is assigned to each stock by an individual based on the economic conditions, company related news and stocks recent performance. Investor decides to buy at times when the appropriate price is less than the current market price, decides to sell based on purchase price of the stock, market price and appropriate price to earn profit or to avoid loss. The investors thus create a frame of reference and get anchored to a particular value of the stock based on the available information that gets adjusted gradually.

Result 1. Attention of investors is based on the information content and information influence

Unlike efficient market hypothesis theory, the cognitive model informational efficiency is dependent on distribution and availability of information linked with investor's behavior upon news (Tetlock, 2007).

Assumption 4. Investor's cognitive inefficiency, mental frame and heuristics are responsible for slow market response to new information

However, some argue that it depends on portfolio and knowledge of individuals in selection of portfolio, since all the individuals may not be having expertise and resource to evaluate portfolio investment options leading them to emotional driven investment activity than attention driven investment activity. An attention driven behavior arises when recency bias prone investors make decisions based on recent attention grabbing news. An investor makes his\her decision based on the recent attention grabbing news irrespective of small or large cap. This type of behavior is termed as attention driven behavior of investors in response to news. Investors' attention hypothesis describes that an individual investor when he decides to sell the stocks is confined to few stocks in his portfolio and therefore it is easier compared to the buying decision. The reason is that he/she has the freedom of choice to buy any share of his choice, but to choose the best among all the alternatives becomes highly difficult and cumbersome for an individual to keep track of all the stocks and decide as an individual compared to professional investors.

Result 2. Investors give attention to news only when it affects their portfolio or investment strategy

As a professionals they do not show the attention driven buying behavior as they possess the expertise and needed resources. It states that when a stock is in news, it experiences extreme positive and negative returns or when stocks are highly traded, it implies clearly the behavioral attention of investors, which is an indication of availability bias and herding effect (Barber & Odeon, 2008). This attention behavior is due to investors' rapid response to news, especially firms with recurrent promotion in media affirm the chance of investors to pick such stocks. Thus investors' attention is a influencing factor in the stock selection of investor.

Past reviews were based on single event rather than a holistic approach and only few studies comprehend the interrelationship between the effect among macro and micro events in various world markets. The overall literature study on all events was needed to understand the influence of different type of news on individual investor's decision making in stock markets and attributing its effect to behavioral theories and biases in each category.

2. RESULTS

Results obtained after investigation:

1. Attention of investors is based on the information content and information influence.
2. Investors give attention to news only when it affects their portfolio or investment strategy.
3. Inattention of investors is caused if it is against their belief or goals, causes cognitive dissonance, irrelevant information to their portfolio and investment objective.
4. Underreaction of investors occurs when we have favorable, certain and public information.
5. Overreaction of investors occurs when we have favorable, uncertain and private information.

Table 1. Influence of different type of news on individual investor's decision making in stock markets and its linking effect on behavioral theories and biases

Type of news	Behavioral reaction	Investment decision	Linking effect-bias
Economic cycle	Underreaction – to bad news during economic depression Overreaction – bad news during boom It is noticed that after declaration of news, the shares show less negative stock return compared to non-announcement of news	Bad news effect stays for 2 days. Investors hold on to stock when good news is announced	Underreaction-anchoring Overreaction-representativeness Hold on loss aversion, disposition effect and risk aversion Pre and post announcement- anchoring
Macroeconomic news	Negative to non-announcement Reputed firms react robustly to macro news compared to value and growth stocks	Indirect and direct effects	Representativeness
Market news	Barometer and selective stock selection	Market news dominates more when compared to company news	Recency bias-market news Barometer of put-call ratio-herding bias
Corporate news	Announcements, timing of announcements	Emotional and information shock so increased attention to specific info Reduce stock positions in good times and moderately increase stock positions in bad times	Announcements-status quo anchoring, cognitive dissonance, availability Position-loss aversion and risk aversion bias
Company specific news	Positive – growth Negative – pre announcements	It gives more weightage to news whose effect is immediate than the future upcoming news	Weightage-recency bias and availability bias
Corporate news	Overreaction – dividend omissions, earnings, analyst opinions-scores, buybacks on value socks, goodwill write offs and valuations	Underreaction IPO's, buybacks on growth stocks, high earnings growth and announcements of quarterly earnings	Underreaction-anchoring Overreaction-availability Representativeness
Merger	Hot merger and hot stocks-prices increase and drops gradually after post-merger results. No news-significant	Emotional& Information shock so increased attention to specific info	Specific info-availability, anchoring, price drop-adjustment, representativeness Attention-representativeness, cognitive dissonance
Recent news	Under reaction to recent news	Cognitive bias and lack of information processing or over load	Representativeness, cognitive dissonance
Analyst recommendations	Upgrade-price increase and Indices rise Downgrade-price decrease and Indices drop	Upgrade-downgrade-sell and dispose	Price move-confirmation indices-representativeness
Moods	Investors who are in a negative mood would give more attention to negative news and who are in good mood would show more attention to good news compared to bad news	Investor attention Investor inattention	Affect heuristics-feeling and mood Investor attention -confirmation Investor inattention-availability Adjustment

6. Informational and emotional shock faced by investors when exposed to any new information faced due to cognitive informational inefficiency, mental frame and heuristics.

Investment decision of investors is based on the investors perceived information after the news pass through screening filter, heuristics filter and tailor made filter.

This filters will change as individual may differ based on internal factors like bias, emotion and background and investment period and external factors like differences in states of the economy and market.

3. DISCUSSION

In this paper, we have developed the general investor's decision making conceptual model with reference to news as an element and reviewed the various studies carried out on individual investor's reaction to news and cognitive decision making process of an individual investor and its linkages to behavioral theories.

Assumptions:

1. There is a relationship between stock price and new information.

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2. There is a relationship between market and decision making of investors.

3. There is relationship between the news influences on investor's reaction and their investment decision, which is attributed due to heuristics and bias.

4. Investor's cognitive inefficiency, mental frame and heuristics are responsible for slow market response to new information

It is very evident that after a release of a news item like print media, electronic media, journals, blogs, stock updates, investment sites, etc. are accessed by investors. The news acts as a stimuli the investor encodes, decodes, reacts and after evaluating the investors makes his decisions based on how strong is the influence of news released. Sometimes it impacts only a particular stock or sector, which has recently telecasted in the news demonstrates explicitly the cause and effect relationship of news on investor's behavior and stock prices. In the diagram given in Figure 1, we have the first filter grounded on the filter models theory of attention on exposure to news or information. We assume that investors react based on the information content and information influence on one's portfolio or decision. If the information received has a great impact on the investors, they overreact and underreact if it has less applicability or impact on their current situation. This leads to selective attention at times and inattention if we undermine or ignore the information being aired or received. This limited investor attention causes underreaction. After the first stage of information filtering process based on the information content and weightage, the second filter refers to heuristics, bias filter and customized filter which is used by investors due to cognitive inefficiency and limited resources of time and knowledge to process loads of information by cognitive and emotional processing, thus attributing the heuristics filter as the reason for investor's behavioral reaction and biased decisions made.

Now after all the filtering process, it changes the gathered data to perceived information. Then later the perceived information derived from various sources after penetration is the basis upon which the investors make their tailored made filters like decisions according to each investor's financial objectives, investment strategies, proficiency and personal background.

Thus, the market behavior is influenced by how an investor perceives the given market information, how the individual investor reacts and makes decisions under uncertain situations according to their knowledge, psychology and sentiments, which affects the stock market performance.

Influence of different type of news on individual investor's decision making in stock markets and its linking effect on behavioral theories and biases is displayed as given in Table 2. The macro news during different stages of economic cycle investors are prone to loss aversion, disposition effect and risk aversion in expectation of price increase during boom period and underreact to bad news due to anchoring effect and its impact stays for a greater period of time compared to good news, which shows the impact of prospect theory on investors. Before and after announcement, investors are prone to anchoring bias. Eminent firms are more prone to representative bias compared to value and growth stocks.

Market news always have an upper hand compared to corporate news as investors are prone to recency, availability and representativeness bias. Investors underreact to recent news when the news received is conflictory to their assumption and further creates cognitive dissonance in minds of investors. Conversely, if compatible with their views, it creates confirmation bias and representativeness due to lack of processing loads of information. Both the confirmation bias with representative bias leads to overconfidence. Herding bias is also reflected when majority go for profit booking during bullish trend followed by bearish trend due to mass selling.

Corporate news make investors underreact to initial public offerings, earnings announcement, quarterly statements and repurchase of growth stocks due to the reference point being set in their mind due to anchoring bias effect, overreact to analyst opinion, dividend omission, earnings, value stocks and goodwill write offs due to availability and representative bias. During announcements,

investors face availability bias, anchoring bias as it gives them a rough framework, cognitive dissonance happens when information seems to be opposite to investor's goals, and at times can lead to status quo bias, which would make the investors indecisive and stressful.

Emotional and informational shock caused in response to sudden unexpected news increases investors' attention during emotional and informational shock of unforeseen/unexpected news or announcements. Investors experience when they are in dilemma to make investment they use confirmation bias as to gather news, which ascertain their decision moves and thus reduce uncertainty or become risk and loss averse and reduce their positions.

Affect will also play a role in increasing investors' attention capacity only to positive news in good mood and only pessimistic news during bad moods. Even experts are prone to representative bias and confirmation bias as their analysis is based on recent indices movement, which ignites their representative and confirmation bias to validate their opinion.

CONCLUSION

Each type of news, be it market, company specific, corporate, political or economic news, each of it contributes a ripple in the minds of the investor in prediction of future, which is uncertain and he makes decision with constraint of time and uncertainty.

Stock market fluctuates in tune with all macroeconomic, market and company news. Individual investor's reaction are also in tune with the above. Investors either show sluggishness or responsiveness to any information as they are faced with cognitive inefficiency and take heuristics and biases as their last resort leading to errors and irrational decision making.

The results reveal that based on the information content and information influence, the investors give selective attention span only to those information that affects their portfolio or goal. Further, due to the emotional, informational shock combined with cognitive informational inefficiency, investors opt for simpler methods and thus prone to biased decisions. Decision of investors depends on perceived information, which is comprehended after all screening processes. Though the information released and external factors being common for all the reaction, decision, behavioral bias internal and external factors being varied for each individual, there arise differences.

We can conclude that investor's decision making depends on degree of information penetration through various filters, degree of impact of information content and information, influence on investment goals and strategies, specific internal factors like heuristics, bias, feelings, sentiments, financial proficiency and background, which need to use customized filters as it varies from individual to individual and depends on generic external factors of economic state of boom/recession and market conditions of investors prevailing at that given circumstances.

What's new? There are exceptional cases still to be resolved and need to be answered by linkages to behavioral theories. Price reversal based on price are beneficial to investors both to gain and to avoid loss and, but once it happens, the investor is incapable of realizing it well before time as the investor fails to distinguish between a false one and the pullback situation that normally occurs in the market. The truth is once they recognize it becomes too late for recovery. Japanese studies have examined using alpha momentum and found that there is a need to attribute the momentum in return and reversal behavior to behavioral theories. The reason was they invest for a long time period and are highly sensitive to market sentiments is the answer for the above circumstances (Yilmaz, 2016). Thus this conceptual model helps to understand the impact of news causes for the response, decision and the reason for those varied and divergent investors behavior.

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Macroeconomic and market news and factors are uncontrollable factors, but company specific news is controllable to a certain extent. This can be used by managers, monetary and fiscal policy holders to make best use of the opportunity by framing policies and announcing of events tailor made according to the existing market and economic conditions to alleviate the stress and burden of individuals. This model can be further researched in the second filter regarding technology and how better analytic tools help in overcoming the biases and minimize the irrational decisions made by the investors with the help of predictive analytic tools such as Cabot research, which uses psychometric profiling to predict the future behavioral patterns and sheds light to sentimental analytics and expert analysis.

As in finance everyone wants to make rational decisions and want to roughly estimate the future happenings. So predictive analytics will give a great support, which helps to track for patterns and will be helpful to forecast the future. This study we can extend and it also applies to fund managers, insurance and other institutional investors. With robust advancement in technology, we can take leverage of analytic tools like predictive analytics, which process the information, analyze, predict and even identify the behavioral pattern and sentiments of the investors. The interdisciplinary filed of finance, informatics and computer science can solve certain issues and also debias the human element related bias and errors.

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APPENDIX A

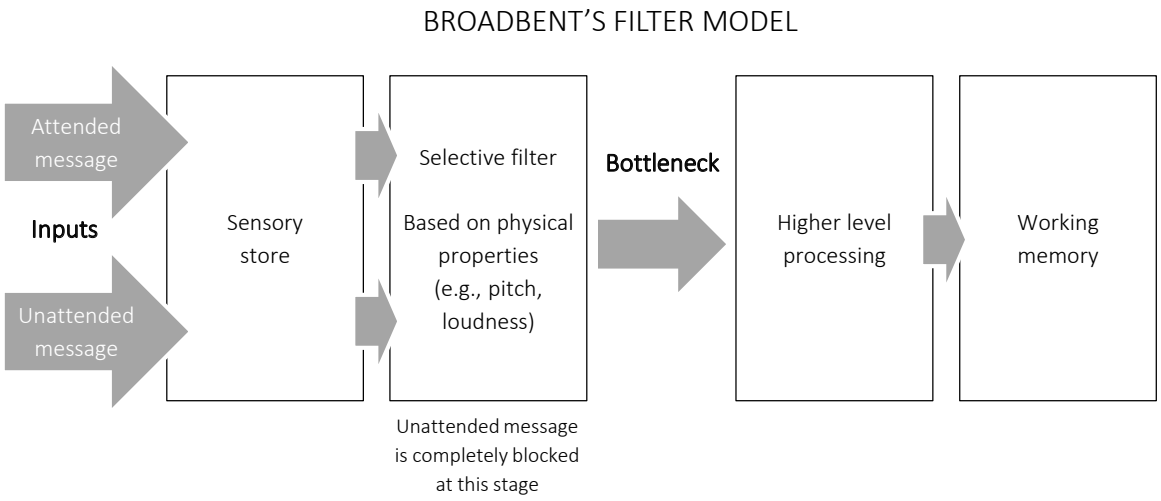

Figure A1. Broadbent's filter model

Table A1. Empirical literature and tools used on investors reaction to news in various markets

Year and author	Title	Purpose	Tools	Results
Doukas and Li (2009), Review of Behavioral finance	Asymmetric Asset Price Reaction to News and Arbitrage Risk	Studies the price adjustment of value and highly demanded stock prices to news (July 1963 – May 2005)	Regression, GARCH – M, CAR	Value stocks price adjustments at a slower rate than growth stocks
Cox, Dayanandan, and Donker (2016)	Relationship between voluntary disclosures and the economic cycle	Investors reaction to unfavorable news during economic cycle of 445 firms (1995–2009)	Abnormal average Return, Cumulative abnormal average return, Multivariate regression model test	The stock price reacts immediately to unfavorable news during boom compared to recession time period, Less negative stock return reaction after the announcement compared to non-announcement of news
Kliger and Kudryavtsev (2014), Quantitative finance	Out of the blue: mood maintenance hypothesis and seasonal effects on investors reaction to news	Study reaction and role of investors mood of analyst recommendations and revisions in context with daylight and SAD NYSE (2001–2006) of 1373 firms	Descriptive test, F test, Chi square test, AAR	Negative returns are more during downgrades during day increase than day decrease. Positive abnormal returns during upgrades are more in day Increase due to shallow thinking

Table A1 (cont.). Empirical literature and tools used on investors reaction to news in various markets

Year and author	Title	Purpose	Tools	Results
Huang (2004), Managerial Finance	China Stock Price Reactions to Financial, Announcements: Evidence from Segmented, Markets	Stock price reaction to financial announcement (2002)	T test for ER, CAR,	Foreign investors overreact to bad news than good news and shares traded in foreign currency receive information pretty sooner than domestic currency due to variations in their accounting standards
Collett and Dedman (2010), Journal of Applied Accounting Research	Large share price movements, the disclosure of news and corporate governance	Relationship between company specific announcements, its price movements and corporate governance	Kruskal Wallis test, univariate and multivariate analysis and robust test (June 2002 – Sep 2004) of 1785 abnormal returns of 91 firms	Independent boards, CEO playing two roles, bigger firms, have a high rate on revealing the news compared to badly performing firms
Elisabete (2011), Managerial Finance	Investor sentiment and the market reaction to dividend news: European evidence	Investors sentiment to dividend in UK, Portugal and France	ISENT and ESI Index, Regression, Descriptive, Pooled OLS (ISENT index 1995–2002, ESI index 1989–2002)	UK markets react positively and shows high ISENT to increase and low ISENT and less sensitive to decrease in dividends. Small and new firms in France have higher impact than normal dividend announcements
Azuma, Okada, and Hamuro (2014), International Review of Finance	Is No News Good News? The Streaming News Effect on Investor Behavior Surrounding Analyst, Stock Revision Announcement	Effect of media on stock markets	CAR of 6353 and 5795 events covered and uncovered by media, respectively	Media covered stocks shows weak post drift
Khatua and Pradhan (2014), Vikalpa	Indication of Overreaction with or without Stock Specific Public, Announcements in Indian Stock market	Study overreaction to both specified and unspecified events	Descriptive statistics, multiple Regression, OLS	India is highly affected by overreaction, stock overreact to specific events than unspecified (good). Underreact specified events and overreact to unspecified events (bad)
Ljungqvist, Nanda, and Singh (2006), UMI ProQuest	Essays on the Stock Market's Reaction to Macroeconomic News	Reaction of stock market to macro news	Correlation, MS-VAR,EGARCH, Sensitivity analysis	Large firms react intensely to macroeconomic news than value and growth stocks
Rosen (2006), Journal of Business	Merger Momentum and Investor Sentiment: The Stock Market Reaction to Merger Announcements	Impact of merger announcement on market factors	Regression CAAR, Robustness, BHAR (1982–2001)	Markets react positive to best selling stocks and negative for low performing stocks
Giglio and Shue (2014), Review of Financial Studies	No News Is News: Do Markets Underreact to Nothing?	Even no news in case of merger is significant behavior reactions	Regression, Parametric and non parametric (5,000 mergers, 1970–2000)	Underreaction to no news
Kerl, Schürg, and Walter (2014), Swiss Society of Financial Research	The impact of Financial Times Deutschland news on stock prices: post-announcement drifts and inattention of investors	Effect of news on stock prices and investors' attention	Regression, Parametric and non parametric (5,000 mergers 1970–2000)	Underreaction to no news and markets incorporate it a little later
Kadiyala and Rau (2004), Journal of Business	Investor Reaction to Corporate Event Announcements: Underreaction or Overreaction	Effect of corporate announcements	Descriptive, robustness test, cross sectional regression rather than OLS (Jan 1980 – Dec 1994)	Investors underreact to short-term than long-run abnormal returns
Manickam (2009), Banking and Finance Letters	Stock Market Reaction to Quarterly Earnings Announcement – a Study on Indian Information Technology Industry	Reaction of quarterly earnings on stock prices and investors reaction with specific IT sector to find the EMH in India	CAAR, AAR and price of companies and CNIXT Index of 20 IT companies of Dec 2008	No effect on IT industry as the Indian stock market was efficient
Wetterlind (2005), Journal of Human Resource Costing & Accounting	Stock market reactions to financial information	Reaction of stock prices to financial announcements	Computer based content analysis 1991–1996	Positive correlation to financial information
Lillo et al. (2015), Quantitative Finance	How news affects the trading behavior of different categories of investors in a financial market	Bootstrap analysis, regression, VAR, descriptive	Descriptive, VAR, correlation Thomson news articles, 2003–2008	Trading investors of various segments with news and volatility

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