Chapter – II

Survey of Literature

2.1. Introduction:

Efficient Market Hypothesis reached its height of dominance at around 1970, the time "rational expectations revolution was in its first blush of enthusiasm". Recently economists began to accept anomalies as counter examples that could not be permanently ignored and developments in the field of psychology have identified promising directions for a new theory. Models of human behaviour, especially the theories of human behaviour from psychology, sociology, anthropology etc. have helped motivate much recent empirical research on behaviour of financial markets. While behavioral economics appeared as a relatively new field of study, most of its ideas are not new; indeed, they return to the roots of neoclassical economics after a century-long detour. Beginning at around 1980s academic research once again started to be dominated by the application of socio – psychological and cultural factors in financial decision making. Behavioural finance has been started to be identified as a promising direction with better explanatory power in order to supplement the missing link of the existing robust theory of market behaviour. Currently no unified theory of behavioural finance exists. So far, most emphasis in the literature has been on identifying behavioural decision making attributes that are likely to have systematic effects on financial market behaviour. The review presented below is a synthesis of major empirical findings confirming systematic departures from the predictions of rationality driven theories of market efficiency.

2.2. Definition of Behavioural Finance:

The major emphasis of Behavioural finance is to replace the behavioually incomplete theory of finance now often referred to as standard or modern finance. It is a part of science, in that it starts from fundamental axioms and asks whether a theory built on these axioms can explain behaviour in the financial market place. Contrary to some assertions, this new paradigm does not try to define "rational" behaviour or label decision making as biased or faulty. Rather, it seeks to understand and predict systematic financial market implications of psychological decision processes (Olsen 1998). The main focus is on the application of psychological and economic principles for the improvement of financial decision making. Especially, behavioural finance theorists have identified a number of potential psychological decision attributes with overarching potential axiomatic status. These mainly include the following:

1. Decision maker's preferences tend to be multifaceted, open to change, and often formed only during the decision process itself.

2. Decision makers appear to be adaptive, in the sense that the nature of the decision and the environment in which the decision is made contribute to their selection of a decision process or technique.

3. Decision makers seek satisfactory rather than optimal solution.

Basically behavioural finance increases the explanatory power of economics by providing it with more realistic psychological foundations. Such an approach from a broader social science perspective including psychology and sociology is appearing as the most fertile ground of research. Its findings often stand in sharp contradiction to much of the efficient market hypothesis.

The field of behavioural finance is far too vast and it is impossible to cite every known work. Therefore, some subjective choices are to be made to mention scholarly works .In the forth coming survey, our major emphasis would be on

presenting socio psychological biases highly influenced in the in the heterogeneous market framework.Especially we will present the theories that have been widely acknowledged in explaining self fulfilling prophesies in asset price dynamics in speculative markets.

2.3. Theories of Behavioural Finance:

(a) Prospect Theory[2]:

Prospect theory is perhaps the most influential findings so far in the development of Behavioural finance literature(Kahneman and Tversky 1979, Tversky and Kahneman,1992). It is a mathematically-formulated alternative to the theory of expected utility maximization, an alternative that is supposed to capture decision making more realistically under uncertainty.

The points of departure from the expected utility maximization are cited below:

(1) Certainty Effect and Weighting Function:

According to the Prospect Theory, individuals are represented as maximizing a weighted sum of "utilities," although the weights are not the same as probabilities and the "utilities" are determined by what they call a "value function" rather than a utility function. The weights are, according to Kahneman and Tversky (1979) determined by a function of true probabilities which gives zero weight to extremely low probabilities and a weight of one to extremely high probabilities. That is, people behave as if they regard extremely improbable events as impossible and extremely probable events as certain. However, events that are just very improbable (not extremely improbable) are given too much weight; people behave as if they exaggerate the probability. Events that are very probable (not extremely probable) are given too little weight; people behave as if they underestimate the probability. What constitutes an extremely low (rather than very low) probability or an extremely high (rather than very high) probability is determined by individuals' subjective impression and prospect theory is not precise about this. Between the very low and very high probabilities, the weighting function (weights as a function of true probabilities) has a slope of less than one (see figure 2.1).

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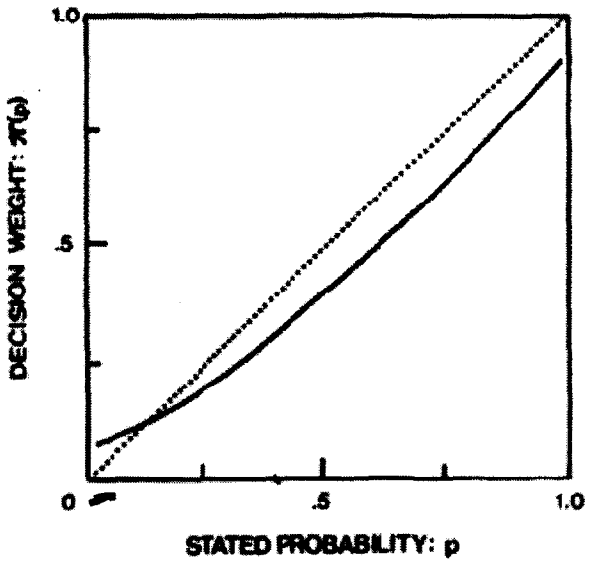
[2] The Theory has been incorporated from the Cowels Foundation Paper No.1025, titled "Human Behaviour and the Efficiency of the Financial System" by Robert J. Shiller in 2001, available at Cowels Foundation For Research In Economics, Yale University.

Figure: 2.1

(Weighting Function)



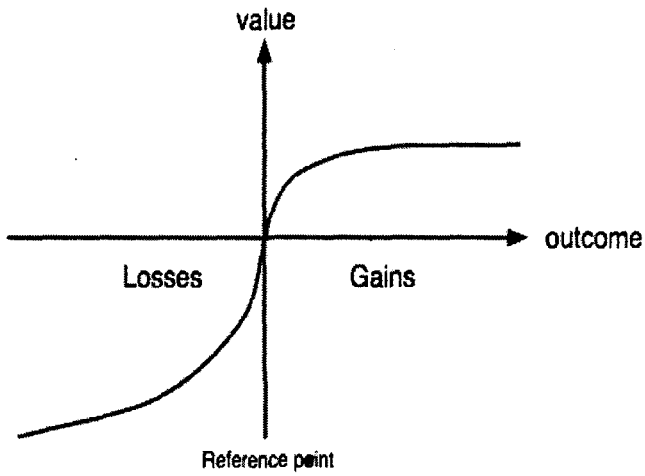
(Source : Kahneman.D and Tversky.A,1979,Prospect Theory : An Analysis of Decision under Risk,Econometrica, Vol .47,No.02,(March 1979),263-292)

If we modify expected utility function by substituting the Kahneman and Tversky weights for the probabilities in expected utility theory, it might help explain a number of puzzling phenomena in observed human behavior toward risk. For a familiar example, such a modification could explain the apparent public enthusiasm for high-prize lotteries, even though the probability of winning is so low that expected payout of the lottery is not high (Shiller 2002). It could also explain such phenomenon as the observed tendency for overpaying for airline flight insurance that has coverage only during the flight (Eisner and Strotz (1961,Shiller 2001).

(2)Value Function:

We now turn to another foundation of prospect theory, the Kahneman and Tversky (1979) value function (see figure :2.2).

Figure:2.2



(Source : Kahneman.D and Tversky.A,1979,Prospect Theory : An Analysis of Decision under Risk,Econometrica, Vol .47,No.02,(March 1979),263-292)

The value function differs from the utility function in expected utility theory in a very critical respect: the function (of wealth or payout) has a kink in it at a point, the "reference point," the location of which is determined by the subjective impressions of the individual. The reference point is the individual's point of comparison, the "status quo" against which alternative scenarios are contrasted. Taking value as a function of wealth, the Kahneman-Tversky (1979) value function is upward sloping everywhere, but with an abrupt decline in slope at the reference point, that is, that may be today's wealth or whatever measure of wealth that is psychologically important to the subject. For wealth levels above the reference point, the value function is concave downward, just as are conventional utility functions. At the reference point, the value function may be regarded, from the fact that its slope changes abruptly there, as infinitely concave downward. For wealth levels below the reference point, Kahneman and Tversky found evidence that the value function is concave upward, not downward. Thus people behave as risk lovers for losses.

Prospect theory does not nail down accurately what determines the location of the reference point. The experimental evidence has not produced any systematic patterns of behavior in this respect that can be codified in a general

theory. However, the reference point is thought to be determined by some point of comparison that the subject finds convenient, something readily visible or suggested by the wording of a question. This discontinuity in the value function has another implication. In making choices between risky outcomes, kink is always relevant, no matter how small the amounts at stake are. The reference point always moves with wealth to stay at the perceived current level of wealth or the current point of reference.

(b)Loss aversion:

Another important dimension of the kink or discontinuity in the value function is the psychology that "losses loom larger than corresponding gains". Abrupt changes in the slope of value function indicate the tendency for people to strongly prefer avoiding losses than acquiring gains. Some studies suggest that losses are as much as twice as psychologically powerful as gains (Kahneman and Tversky 1979)". "The central assumption of the theory is that losses and disadvantages have greater impact on preferences than gains and advantages (Tversky and Kahneman 1992).Moreover the concave shape of the value function in the domain of losses in terms of reference point indicates people to be risk lover to avoid mental penalty associated with given amount of losses.

This tendency of loss aversion under the reference dependent decision making has been extensively studied in a wide range of literatures. The term *"equity premium puzzle,"* coined by Mehra and Prescott (1985), is widely used to refer to the puzzlingly high historical average returns of stocks relative to bonds (Siegel,1994). Benartzi and Thaler(1995) show that if people use a one-year horizon to evaluate investments in the stock market, then the high equity premium is explained by *myopic loss aversion.* Moreover, prospect theory does not suggest that in this case riskless real interest rates need be particularly high. Thus, if we accept prospect theory and that people frame stock market returns as short-term, the equity premium puzzle is solved (Siegel and Thaler ,1997).The failures to accept many bets when one considers them individually has been called as myopic loss aversion by Benartzi and Thaler (1995). They

demonstrated the issue nicely.In their experiment when subjects are asked to allocate their defined contribution of pension plans between stocks and fixed incomes, their responses differed sharply depending on how historical returns were presented to them. If they were shown thirty individual 'one-year' returns, their median allocation to stocks was 40%, but if they were shown 30-year return their median allocation to stocks was 90%(Thaler, Tversky, Kahneman and Schwartz ,1997).

While Benartzi and Thaler's (1996) hypothesis is viewed by many as a plausible explanation of the equity premium puzzle, there are few direct empirical tests about it. The work that has followed their paper has instead focused on formalizing their original argument (see, Barberis, Huang, and Santos 2001, Andries 2012, Pagel 2012). There is, however, some evidence for the related idea that loss aversion and narrow framing can explain the *non-participation puzzle*: the fact that, historically, most households did not participate in the stock market. Dimmock and Kouwenberg (2010), for example, find that survey-based measures of loss aversion predict stock market participation in a cross-section of households.

Another set of application of Prospect Theory aims at understanding how people trade financial assets over time. One target of interest is the *'disposition effect'*,which is nothing but buying the losers and selling the winners. This empirical findings of Odean 1998; Frazzini 2006 state that both individual investors and mutual fund managers have a greater propensity to sell stocks that have risen in value since purchase, rather than stocks that have fallen in value . This behavior is puzzling because, over the horizon that these investors trade, stock returns exhibit *"momentum"*: stocks that have recently done well continue to outperform, on average, while those that have done poorly continue to lag. Interistingly, investors concentrate their selling stocks with poor past performance—but they do the opposite. This apparent unwillingness to sell stocks at a loss relative to purchase price has an important counterpart in the real estate market (Genesove and Mayer 2001,Shefrin and Statman 1985). The intuition is that, if a stock (or a piece of real estate) performs poorly, this brings its owner into the loss region of the value function, where, because of the

convexity, the owner becomes risk-seeking. As a result, this investor holds on to the stock (or the real estate) in the hope of breaking even later on. A number of recent papers have tried to formalize this intuition but that task turns out to be harder than expected. In particular, some researchers have argued that, for the argument to work, the value function needs to be much more convex over losses than the experimental evidence suggests issue still continues to be a hot topic to debate (Barberis and Xiong 2009). Meanwhile, some authors have argued that the disposition effect in both the stock market and the real estate market can be better understood as a consequence of *"realization utility,"* the idea that people derive utility directly from selling an asset at a gain relative to purchase price -- and disutility from selling at a loss -- perhaps because they think that selling assets at a gain relative to purchase price is a good recipe for long term wealth accumulation or conversely, that selling assets at a loss relative to purchase price is a poor recipe for wealth accumulation. If the time discount rate is sufficiently positive, even linear realization utility can generate a strong disposition effect, as well as other empirically-observed trading patterns (Barberis and Xiong ,2012) . While this explanation for the disposition effect differs from that based on the convexity of the prospect theory value function, it is ultimately still rooted in prospect theory, in that it relies on the investor deriving utility from gains and losses rather than from absolute wealth levels.

(c)Bounded Rationality[3]:

It is the idea that in decision-making, rationality of individuals is limited by the information they have, the cognitive limitations of their minds, and the finite amount of time they have to make a decision. It was proposed by Herbert A.Simon in 1955 as an alternative basis for the mathematical modeling of decision making, as used in economics, political science and related disciplines. It complements rationality as optimization, which views decision-making as a fully rational process of finding an optimal choice given the information

[3] See "A Behavioral Model of Rational Choice" by Herbert A. Simon , The Quarterly Journal of Economics, Vol. 69, No. 1. (Feb., 1955), pp. 99-118

available. Another way to look at bounded rationality is that, because decision-makers lack the ability and resources to arrive at the optimal solution, they instead apply their rationality only after having greatly simplified the choices available. Thus the decision-maker is a satisfier one, seeking a satisfactory solution rather than the optimal one. This concept of bounds on rationality has been successfully applied in wide ranges of literature as a root cause for imposing limits on arbitrage operation generating adaptive behaviour and bubble grows (see Broke and Hommes 1997,1998, Goundersdorfer 2001, Woodford 2000, Munier 2010)

(d) Regret Theory:

There is a human tendency to feel the pain of regret at having made errors, even small errors, not putting such errors into a larger perspective. One kicks oneself at having done something foolish. If one wishes to avoid the pain of regret, one may alter one's behaviour in ways that would in some cases be irrational unless account is taken of the pain of regret. For the purpose of investment decisions regret theory may play role by deferring selling stocks that has gone down in value and accelerate the selling of stocks that have gone up in value (Shefrin and Statman 1985, Ferris , Haugen and Makhija 1988. Odean 1998).

(e) Cognitive Dissonance:

It is a mental conflict that people experience when they are presented with evidences that their beliefs or assumptions are wrong .It may be termed as pain of mistaken belief.In order to reduce cognitive dissonance people are found to avoid new information and develop contorted arguments to maintain the statusquo (Festinger 1957, Erlich, Guttman , Schopenback and Mills 1957).Cognitive dissonance may restrict the arbitrage operation whereby investors in loosing funds have been found unwilling to confront the evidences that they made a bad decision.(Goetzmann and Peles 1997).

(f) Anchoring:

In making quantitative assessments people tend be influenced by suggestions i.e. the anchors. This tendency restricts people to form unbiased expectations purely on the basis of available information and sometimes

influence them to predict in many situations where there is no information. Two types of psychological anchors have been identified in the literature ,so far, in the context of speculative prediction. Firstly, the quantitative anchors which gives indication for the appropriate level of market. Secondly , there are moral anchors which operate by determining the strength of the reason that compels people to buy stocks , a reason that they must weigh against their other uses for the wealth they already have (or could have) invested in the market. With quantitative anchors, people are weighing numbers against prices when they decide whether stocks are priced right. In the absence of any better information where people has to come up with an estimate, decisions are found to be influenced by whatever available anchor at hand (Tversky and Kahneman ,1979).For example , past prices(or asking prices or prices of similar objects or other simple comparisons) are likely to be important determinant of today's price (Northcraft and Neale 1987). With moral anchors, people compare the intuitive or emotional strength of argument for investing in the market against their wealth and their perceived need for money to spend now. Here market is tied down by people's comparisons of the intuitive force of stories and reasons to hold their investment against their perceived need to consume the wealth that these investment represent.

(g) Overconfidence:

People often tend to show excessive confidence about their judgment (Fischof,Slovic,Lichtenstein, 1977).It is a broader difficulty with "situational construal", a difficulty in making adequate allowance for the uncertainty in one's own view of the broad situation. Obviously people do learn substantially in circumstances when the consequences of their errors are repeatedly presented to them but still there seems to be a common bias towards overconfidence (Ross 1987).Overconfidence may lead to the overreaction and biased self attribution on the part of decision makers. These phenomenon can be found in the literature of excess volatility of speculative prices (Shiller 1979,1981 a,Le Roy and Porter 1981).Psychologists have long wondered why it is that people seem to be overconfident. One theory has been that, in evaluating the soundness of their conclusions, people tend to evaluate the probability that they are right on only the

last step of their reasoning, forgetting how many other elements of their reasoning could be wrong (Shiller'2005).Another theory is that people make probability judgments by looking for similarities to other known observations , and they forget that there are many other possible observations with which they could compare.(Shiller,2005).

(h)Heuristic Simplifications:

1) Attention /Memory/ Ease of Processing Effects:

Limited attention, memory and processing capacities force a focus on subsets of available information.Uncocious associations also create selective focus.In many studies, priming subjects with (possibly irrelevant) verbal information triggers associations that influence judgements.

i. *Salience or availability effects:*

An information signal is salient if it has characteristics that are good at hooking our attention or at creating associations that facilitate recall. Items that are easy to recall are judged to be more common as they are noticed or reported more often making them easier to remember.Moreover people underweight the probabilities of contingencies that are not explicitly available for considerations. Availability heuristics has been posited as a prominent cause of "*negativity bias*[4]" in stock and future market returns (Akhtar, Faff ,Oliver,and Subrahmanyam,2012).The affect of salience or availability biases has also been studied widely in explaining decision making in consumer goods market (see Busse, Lacetera, Pope ,Jorge Silva-Risso, Justin R. Sydnor,2013)

ii. Representativeness Heuristics:

[4] An asymmetric reaction of US stock and futures market returns to the preliminary announcement of the monthly consumer sentiment index provided by Thomson Reuters/University of Michigan(see Shumi Akhtar,Robert Faff Barry Oliver,*Avanidhar Subrahmanyam)

People tend to make judgements in uncertain situations by looking for familiar patterns and assuming that future patterns will resemble past ones, often without sufficient consideration of the reasons for the patterns or the probability of the pattern repeating itself.(Tversky and kahneman 1991, Boussaidi, 2013;Luo,2012).

iii. Magical thinking:

It is the innermost thoughts that decision makers do not have to explain or justify to others.People have occasional feelings that certain actions will make them lucky even if they know logically that the actions cannot have an effect on their fortunes(Shiller 2005).

2) **Narrow framing/ mental accounting/ reference effects:**

(i)*Mental Accounting:*

It is a kind of narrow framing that involves keeping track of gains and losses related to decisions in separate mental accounts and to reexamine each account only intermittently when action relevant. This economic concept was established in the financial literature by economist Richard Thaler (2008), which contends that individuals divide their current and future assets into separate, non-transferable portions. The theory purports that individuals assign different levels of utility to each asset group, which affects their consumption decisions and other behaviors. The importance of this theory is illustrated in its application towards the economic behavior of individuals, and thus entire populations and markets. Rather than rationally viewing every dollar as identical, mental accounting helps explain why many investors designate some of their dollars as "safety" capital which they invest in low-risk investments, while at the same time treating their "risk capital" quite differently. play an important role in determining how people evaluate risky gambles.Experimental studies on behavioural finance suggests that ,an important feature of mental accounting is narrow framing,the idea that people do sometimes appears to derive utility from narrowly defined gains and losses.If one of an investor's many stock performs poorly, the investor may experience a

sense of regret over the specific past decision to buy that stock.In other words,individual stock gains or losses can be carriers of utility in their own right. Moreover ,narrow framing i.e. the tendency to focus on narrowly defined gains and losses with Loss aversion have been found to play an important role indetermining how people evaluate risky gambles (Berberis and Huang 2001).

(ii) House money effect:

A greater willingness to gamble with money that is recently own.The unpleasantness of a loss of recently own money may be diluted by aggregating it with earlier gains (Ackert and Deaves 2009).

(iii) Wishful thinking:

Wishful thinking is the formation of beliefs and making decisions according to what might be pleasing to imagine instead of by appealing to evidence, rationality, or reality. It is a product of resolving conflicts between belief and desire. Studies have consistently shown that holding all else equal, subjects will predict positive outcomes to be more likely than negative outcomes (Szyszka , 2013).

3) Updating of belief:

(i) Conservatism:

Under appropriate circumstances individuals do not change their beliefs as much as would a rational Bayesian in the face of new evidence.The more useful the evidence , the greater the shortfall between actual updating and rational updating (Szyszka , 2013).

(ii) *Statusquo bias :*

The status quo bias is a cognitive bias for the status quo; in other words, people tend to be biased towards doing nothing or maintaining their current or previous decision(Thaler et. al(1992) defines the bias as preference

for the current state that biases the economist against both buying and selling his wine.'Thaler et.al (1992).'One implication of loss aversion is that individuals have a strong tendency to remain at the status quo, because the disadvantages of leaving it loom larger than the advantages. (Kahneman et al.,1991).' Gal (2006). The status quo bias is a part of a more general issue known as ' loss aversion.'

(i)Theories of Social Learning:

Traditionally financial economists have borrowed more from individual psychology than from social psychology in explaining behaviour of speculative prices, its volume and related corporate actions. In the traditional framework, all trades are expected to take place as an outcome of independent analysis whereby "walrasian auctioneer" with their simultaneous execution of a large number of trades, tend to produce optimal outcomes and set prices correctly. As a challenge to this basic proposition of modern financial economics ,during the past decades, herding behaviour has received much attention from both academic researchers and practitioners. It has appeared as an alternative explanation of the way the investment choices are made by investors. Basically the literature recalls for a once prominent view of financial markets—as driven by "animal spirits," (Keynes 1935) where investors behave like imitative lemmings. While the rational actor approach has largely driven this view from mainstream research in financial economics, it is far from gone. Both influential market participants and financial economists reportedly still believe that imitative behavior is widespread in financial markets (Devenow and Welch, 1996). This has led some researchers to assert that market participants engage in non-rational herd behavior (e.g. Kirman, 1993, Shleifer and Summers, 1990). Herd mentality and herd behavior have been prevalent descriptors for human behavior since people began to form tribes, migrate in groups, and perform cooperative marketing and agricultural functions. The idea of a "group mind" or "mob behavior" was first put forward by 19th-century French social psychologists Gustave Le Bon in 1947. Herd behavior in human societies has also been studied by Wilfred Trotter (1914), whose book Herd Instincts in Peace and War is a

classic in the field of social psychology. Sociologist and Economist Thorstein Veblen's Theory (1953) of the Leisure Class illustrates how individuals imitate other group members of higher social status in their consumer behavior.

Intuitively, an individual can be said to be in herding if she would have made an investment without knowing other investors' decisions, but does not make that investment when she finds that others have decided not to do so. Alternatively, she herds when knowledge that others are investing, changes her decision from not investing to making the investment. However for an investor to imitate others, she must be aware of and be influenced by others' actions. Basically, herding is a form of convergent social behaviour that can be broadly defined as the alignment of the thoughts or behaviours of individuals in a group (herd) through local interaction and without centralized coordination. It is an influential and well-documented feature of human behaviour in a number of domains, particularly in economics and finance [Sornette, D. et al. (2009), Shiller, R.J. (2000), Shiller, R.J. (2002)]. Although the current economic turmoil has revealed the depth of herding among financial institutions and individual investors [Shiller, R.J. (2008)] .This concept also has much broader relevance beyond the economic arena. Examples of phenomena that have been described as involving herd behaviour are diverse and varied, ranging from stock market bubbles and financial speculation to zealotry (e.g. the 2002 Gujarat mob violence (Kumar, M., 2007), political choice (Battaglini, M., 2005).Whereas the concepts behind herd mentality and herd behaviour have a rich history, the methods, techniques and approaches currently used to elucidate them are relatively recent. The process has also been investigated in social psychology and terms such as Fad, Fashion, Mass Hysteria, Bandwagon Effect, Groupthink and Herd Instinct have entered common parlance.

Literatures from behavioural finance have identified several reasons for an investor to be influenced in reversing a planned decision after observing the others. So far the theories of herding behavior are available in the financial literature, the key mechanisms underlying the behaviour are multifaceted. Let us start with the rationality driven theories of herd behaviour.

(j) Rationality driven theories of Herd Behavior:

These models on rational herding behavior concentrates on how utility maximizing investors not being influenced by their independent judgements, swayed away by the decisions of others and ultimately, true information about fundamental value fails to be disseminated and evaluated (see Banerjee 1992,Bickachandani , Hershleifier and Welch 1992, Avery and Zemsky 1998, Bickachandani and Sharma, 2001, Bulow and Klemperer ,1994, Caplin and Leahy 1993, Chamley and Gale 1992 etc.). Several potential reasons have been documented in favour of rational herding models and chief of them includes imperfect information, concern for reputation, and compensation structures. Let us discuss all these type of herding model in brief.

(1)Information-Based Herding and Cascades:

The central theme in this approach is herding by imperfect information. This approach is based on some structural assumptions about the information content of individual investor below:

(i) Individuals face similar investment decisions under uncertainty and have private (but imperfect) information about the correct course of action.

(ii) An investor's private information is the conclusions of her own research effort.

(iii) All information relevant to the investment is public but there is uncertainty about the quality of this information. An individual's assessment of the quality of publicly available information is only privately known to her.

(iv) Investors are not participating in the market simultaneously but they decide sequentially whether to invest in a particular stock or market.

Under such structural conditions individuals can observe only each other's actions but not the private information or signals that each player receives.

Each individual has some view about the appropriate course of action but inferences about a player's private information can only be derived from looking at his actions. Even if individuals communicate their private information to each other, the idea that "actions speak louder than words" provides justification for this assumption. In this context even a completely rational people can participate in herd behaviour when they take into account the judgments of others , even if they know that everyone else is behaving in a herd like manner. The behaviour , although individually rational, produces a group behaviour that is , in a well defined sense , irrational. This herdlike behaviour is said to arise from an information cascade. Once a cascade starts, an individual's action does not reflect her private information. Consequently, the private information of subsequent investors is never included in the pool of public knowledge. In the context of capital market decisions, another dimension is added to the underlying uncertainty of the basic model.It assumed that, there are two types of investors depending upon the quality of information they posses viz. H and L (see Avery and Zemsky ,1998) . Type H investors have very accurate information about the appropriate course of action and type L have very noisy information. Further, it is assumed that the proportion of the two types of investors in the population is not common knowledge among market participants (Avery and Zemsky ,1998). In particular, this proportion is not known to the market-makers. Hence, although at any point of time the price in the stock market reflects all public information, the price does not reveal the private information of all previous investors. A clustering of identical decisions may arise naturally in a well informed market (one in which most of the investors are of type H) because most of the investors have the same (very informative) private signal realization. Further, a clustering of identical decisions is also natural in a poorly informed market (one in which most of the investors are of type L). Because of herding by type L investors who mistakenly believe that most of the other investors are of type H. Thus, informationally inefficient herd behavior may occur and can lead to price bubbles and mispricing when the

accuracy (or lack thereof) of the information with market participants is not common knowledge. Traders may mimic the behavior of an initial group of investors in the erroneous belief that this group knows something. Thus, when the uncertainty is only about the value of the underlying investment, the stock market price is may be informationally efficient and herd behavior may not occur. But, when there is an additional dimension to the uncertainty, namely uncertainty about the accuracy of the information possessed by market participants, a one-dimensional stock price is no longer efficient and herd behavior can arise, even when investors are rational (Avery and Zemsky ,1998,Bikhachandani and Sharma 2001).Here people might be choosing rationally not to , as they see it, waste their time and effort in exercising their judgments, about the market, and thus choosing not to exert any independent impact on the market. It has been found in the literature that, an individual is in an "invest cascade" ("reject cascade") if and only if the number of predecessors who invest is greater (less) than the number of predecessors who do not invest by two or more (Bickachandani and Sharma, 2001, Andrea Devenow, Ivo Welch,1996, Bikhchandani, Hirshleifer, and Welch (1992).

(2).Reputation-Based Herding

Scharfstein and Stein (1990), Trueman (1994), Zweibel (1995), Prendergast and Stole (1996) provide another theory of herding based on the reputational concerns of fund managers or analysts. Reputation or, more broadly, career concerns arise because of uncertainty about the ability or skill of a particular manager. The basic idea is that if an investment manager and her employer are uncertain of the manager's ability to pick the right stocks, conformity with other investment professionals preserves the fog—that is, the uncertainty regarding the ability of the manager to manage the portfolio. This benefits the manager and if other investment professionals are in a similar situation then herding occurs.

Consider the decisions of two investment managers, I_1 and I_2, faced with an identical investment opportunity. Each manager I_i, $i = 1,2$, may be of high ability or low ability, and their type or ability level is chosen independently. A high ability manager receives informative signals about the return from an

investment, whereas a low ability manager's signal is pure noise. Neither the manager I_i nor her employer E_i knows whether the manager I_i is of low or high ability. Each manager and employer has an identical prior belief about the manager's type. This belief is updated after the decisions of the two managers and the return from the investment are observed.

If both managers are of high ability then they observe the same signal realization (good or bad) from an informative signal distribution (but neither manager observes the other's signal realization). If both managers are of low ability then they observe independent draws of a signal (either Good or Bad) from a distribution that is pure noise. If one manager is of high ability and the other of low ability, then they observe independent draws from the informative signal distribution and the noisy signal distribution respectively. The informative and noisy signal distributions are such that the ex ante probability of observing good signal is the same with either distribution. Thus, after observing her signal realization a manager does not update her prior beliefs about her own type.

I_1 makes her investment decisions first and then I_2 does so. I_1's decision is based only on her signal realization (which may either be informative or pure noise—I_1 does not know which it is). I_2's decision is based on her own signal realization and on I_1's decision. In the final period, the investments pay off and the two investors are rewarded based on an ex post assessment of their abilities.

This game has a herding equilibrium in which I_1 follows her own signal and I_2 imitates I_1 regardless of her own (I_2's) signal. The intuition behind this result is that since I_2 is uncertain about her own ability, she dare not take a decision contrary to I_1's decision and risk being considered dumb (in case her conflicting decision turns out to be incorrect). Thus, it is better for I_2 to imitate I_1 even if her own information tells her otherwise. If the common decision turns out to be incorrect it will be attributed to an unlucky draw of the same signal realization from an informative distribution, thus increasing the posterior beliefs of her employer that I_2 is of high ability. I_1 is happy to go

along with this arrangement as she too is unsure of her own abilities—I_2's imitation also provides I_1 with cover.

If there are several managers deciding in sequence, everyone imitates the decision of the first manager. Eventually there will be a preponderance of Good signals (Bad signals) if the investment is profitable (unprofitable). However, this private information will not be revealed because all subsequent managers, without regard to their information, imitate the first manager's decision. Thus, the herding is inefficient. Moreover, it is idiosyncratic because it is predicated on the first individual's signal realization and fragile since the herd behavior is based on very little information. Many of the implications of this theory are similar to that of informational herding with rigid prices.As in the papers by Banerjee (1992) and Bikhchandani, Hirshleifer, and Welch (1992), here too it is assumed that the investment opportunity is available to all individuals at the same price.

(3)Compensation-Based Herding:

If an investment manager's (i.e., an agent's) compensation depends on how her performance compares with that of other similar professionals, then this distorts the agent's incentives and she ends up with an inefficient portfolio (see Brennan (1993) and Roll (1992)). It may also lead to herd behavior.

Maug and Naik (1996) consider a risk-averse investor (the agent) whose compensation increases with her own performance and decreases in the performance of a benchmark (which may be the performance of a separate group of investors or the return of an appropriate index). Both the agent and her benchmark have imperfect private information about stock returns. The benchmark investor makes her investment decisions first and the agent chooses her portfolio after observing the benchmark's actions. Then, as argued in the section on information-based herding above, the agent has an incentive to imitate the benchmark in that her optimal investment portfolio moves closer to the benchmark's portfolio after the agent observes the benchmark's actions. Furthermore, the compensation scheme provides an additional reason to imitate the benchmark. The fact that her compensation decreases if she underperforms the benchmark causes the agent to skew her investments even more towards the benchmark's portfolio than if she were trading on her own account only.

It is optimal for the principal (the employer of the agent) to write such a relative performance contract when there is moral hazard or adverse selection. Any other efficient contract (i.e., any contract that maximizes a weighted sum of the principal's and the agent's utility) will also link the agent's compensation to the benchmark's performance. Thus herding may be constrained efficient (the constraints being imposed by moral hazard or adverse selection). However, the compensation scheme selected by an employer would seek to maximize the employer's profits rather than society's welfare.

Apart from the above, various other socio psychological causes have been identified in the literature generating convergence in opinion. Theories of social interactions, person to person and media contagion of ideas, factors of interpersonal communications etc. have been found to have profound influence in formation of herd like behaviour in speculative markets.

(K) Information Communication and Word of Mouth:

The human mind is the product of evolution almost entirely in the absence of any printed word, e mail, internet, or any other artificial means of communication. Human society has been able to conquer almost all habitats of this planet primarily because of its own innate information processing ability. A fundamental component of this information processing ability is the effective communication of important facts from one person to another. This superior ability to communicate knowledge has been made possible over past millions of year by evolutionary changes in human brain that have optimized the channel of communication and created an emotional drive to communicate effectively. It is because of this emotional drive that most people's favorite activity is conversation. The incessant exchange of information has become a fundamental characteristic of human species. The information that tends to flow most rapidly is the kind that would have helped society in centuries past in its everyday living: information about such things as food sources, dangers, or other member of the society. By analogy, in modern society there is likely to be rapidly spreading conversation about a buying opportunity for a hot stock, or about immediate threats to personal wealth, or about story of the people who run a company. These topics resemble the kind of things our ancestors have talked about since time immemorial. But conversation seems to flow less well about abstract topics, such as mathematics of finance, or statistics about asset returns or optimal level of savings for retirements (Shiller, 2005).The conventional media – print media, television, and radio- have a profound capability for spreading ideas, but their ability to generate active behaviour is still limited. Interpersonal and interactive communications, particularly face to face or word of mouth communications still have the most powerful behaviour (Shiller and Pound ,1986, Shiller ,2000).Word of mouth communication can proceed with great speed and across disparate social groups. The channels of human communication that we know today seem to favor the interpersonal face – to – face and word – of- mouth communication that developed over millions of years of evolution , during times when such communication was virtually the only form of interpersonal communication. The patterns of communication hard-wired into our

brains rely on there being another person;s voice , another person's facial expressions, another person's emotions, and an associated environment of trust, loyalty, and cooperation. Because these elements are missing from the written or electronic word, people find it somewhat more difficult to react to these sources of information. They cannot give these other sources the same emotional weight, nor can they remember or use information from these other sources of information. The word of mouth transmission of ideas does not have to infect the entire nation to affect national prices in stock market. Moreover, word of mouth may function to amplify public reaction to news events or to media accounts of such events. Thus the likelihood of any event affecting market prices is enhanced if there is a good, vivid, tellable story about the event. The influence of conversation on trading may arise from individual's overconfidence about their ability to distinguish pertinent information from noise or propaganda. Process of belief formation has also been found to be leading towards "availability cascades" wherein an expressed perception is perceived to be more plausible as a consequence of its increased availability in public discourse. Moreover conversation pools information surprisingly poorly. Groups of people tend to talk much more about information signals that they already share than individual specific signals (Stasser, Taylor and Hanna 1989).As a result groups sometimes fail to detect patterns that are discernable by combining individual specific signals (Stasser and Titus 1985).Environmental pressures such as crowding and unusual circumstances cause group members to experience 'cognitive overload' and rigid thinking (Argote,Turner and Fichman 1988).When communicating information , people tend to sharpen and level i.e. emphasize what they construe to be the main point and deemphasize qualifying details that might confuse this point. This is necessary for clarity given cognitive constraints (Allport and Postman, 1947) , but tends to cause listener beliefs to move to extremes.

Direct interpersonal communication, coupled with media reporting with limited attention bias, anxiety and distress of being seeing as foolish before the others, reputational concern, perceived authority of others etc. (Asch 1956, Milgram1974 , Bond and Smith 1996) at individual level have found to be the critical determinant in contagion of public opinion. People tend to pay much more attention to ideas or facts that are reinforced by conversation, rituals or symbols (Shiller 1999). In consequence

culture becomes an important determinant of behaviour and expression of ideas can be self – reinforcing.

In sum, it is observed that the herd behaviour is the prominent one amongst the psychological attributes to explain the formation of beliefs and decisions .In fact, almost all the recent suggestions of the scholars researching in the field of behavioural finance grossly converges to explain the behaviour of the investors either in the framework of herd behaviour or structurally heterogeneous group of market players that observe almost the prescriptions of bounded rationality. In the next chapter, it is our humble attempt to describe and form model on the attributes that are prominently prescribed and attested by the scholars to explain the stock market upheavals.

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