Abstract

This paper reviews behavioural finance concepts including prospect theory, certainty effect, reflection effect, isolation effect, mental accounting, time preference and self-control, regret and disposition effect, cognitive dissonance, money illusion, availability heuristic, representative heuristic, overconfidence, anchoring and adjustment, ambiguity aversion, herd effects. It also discusses several factors that can help explain bubbles.

Keywords: prospect theory, mental accounting, overconfidence, anchoring, bubbles.

JEL classifications: G10, G40.
Behavioural Finance and Bubbles

1.1 Introduction

Standard finance is the body of knowledge build on the pillars of the arbitrage principles of Miller and Modigliani, the portfolio principles (capital-asset-pricing-model) of Markowitz, the arbitrage pricing theory of Sharpe, and the option-pricing theory of Black and Scholes. These approaches consider markets to be efficient and are highly analytical and normative. Humans simply are not capable of carrying out the dynamic optimization problems required by the tenets of classical finance theory. Instead they use rules of thumb (heuristic) to deal with a deluge of information. In contract to the Vulcan-kike logic of economic man, behavioural finance enlists well-documented psychological traits to replace the rationality assumption (Monitier, 2004).

1.1.1 The efficient market hypothesis

In the traditional framework where agents are rational and there are no frictions, a security’s price equals its “fundamental value”. This is the discounted sum of expected future cash flows, where in forming expectations, investors correctly process all available information, and where the discounted rate is consistent with a normatively acceptable preference specification. This hypothesis that actual prices reflect fundamental values is the Efficient Markets Hypothesis (EMH). In an efficient market, there is “no free lunch”: no investment strategy can earn excess risk-adjusted average returns, or average returns greater than are warranted for its risk (Barberis and Thaler, 2003). If the volatility of stock market prices is to be understood in terms of
the efficient markets hypothesis, then there should be evidence that true investment value changes through time sufficiently to justify the price changes. Three indicators change in true investment value of the aggregate stock market in the United States from 1871 to 1986 are considered: changes in dividends, in real interest rates, and in a direct measure of inter-temporal marginal rates of substitution (Shiller, 1987). Market efficiency survives the challenge from the literature on long-run return anomalies. Consistent with the market efficiency hypothesis that the anomalies are chance results, apparent overreaction to information is about as common as under-reaction, and post-event continuation of pre-event abnormal returns is about as frequent as post-event reversal. Most important, consistent with the market efficiency prediction that apparent anomalies can be due to methodology, most long-term return anomalies tend to disappear with reasonable changes in technique (Fama, 1998). Testing for market efficiency, however, is difficult. Dimson, Mussavian (2000) have documented a number of studies indicate anomalous behavior which appears, at first sight, to be inconsistent with market efficiency.

1.1.2 Behavioral finance

Behavioral finance\(^1\) is a new approach to financial markets that has emerged, at least in part, in response to the difficulties faced by the traditional paradigm. In broad terms, it argues that some financial phenomena can be better understood using models in which some agents are not fully rational. More specifically, it analyzes what happens when we relax one, or both, of the two tenets that underlie individual rationality (Barberis and Thaler, 2003). Behavioral finance helps explain why and how markets

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\(^1\) The useful website is available at [http://www.behaviouralfinance.net/](http://www.behaviouralfinance.net/)
might be inefficient (Sewell, 2007). Behavioral finance is the study of the influence of psychology on the behavior of financial practitioners and the subsequent effect on markets.

1.2 The Prospect Theory

A man could be judged irrational either because his preference are contradictory or because his desires and aversions do not reflect his pleasures and pains (Tversky and Kahneman, 1981). Prospect theory is a mathematically formulated alternative to the theory of expected utility maximization. Kahneman and Tversky\(^2\) (1979) lay out the original version of prospect theory\(^3\). Their paper presents a critique of expected utility theory as a descriptive model of decision making under risk, and develops an alternative model, called prospect theory. Choices among risky prospects exhibit several pervasive effects that are inconsistent with the basic tenets of utility theory. In particular, people underweight outcomes that are merely probable in comparison with outcomes that are obtained with certainty. This tendency, called the certainty effect, contributes to risk aversion in choices involving sure gains and to risk seeking in choices involving sure losses. In addition, people generally discard components that are shared by all prospects under consideration. This tendency, called the isolation effect, leads to inconsistent preferences when the same choice is presented in different forms. An alternative theory of choice is developed, in which value is assigned to gains and losses rather than to final assets and in which probabilities are replaced by

\(^2\) Prospect theory was developed by Daniel Kahneman, professor at Princeton University’s Department of Psychology, and Amo Tversky in 1979 as a psychologically realistic alternative to expected utility theory. In 2002 Daniel Kahneman shared the Nobel Prize in Economics but unfortunately Amos Tversky had died by that time and did not get his share of the fame.

\(^3\) Prospect theory is a theory that describes decisions between alternatives that involve risk, i.e. alternatives with uncertain outcomes, where the probabilities are known. The model is descriptive: it tries to model real-life choices, rather than optimal decision.
decision weights. The value function is normally concave for gains, commonly convex for losses, and is generally steeper for losses than for gains. Decision weights are generally lower than the corresponding probabilities, except in the range of low probabilities. Overweighting of low probabilities may contribute to the attractiveness of both insurance and gambling.

1.2.1 Certainty effect

We first show that people overweight outcomes that are considered certain, relative to outcomes which are merely probable – a phenomenon which we label the certainty effect. Choices are inconsistent with expected utility theory (Kahneman and Tversky, 1979, p.265). Kahneman and Tversky (1979) designed the following pair of choice problems. The number of respondents who answered each problem is denoted by N, and the percentage who chose each option is given in brackets.

<table>
<thead>
<tr>
<th>Problem 1:</th>
<th>Choose between</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: 2,500 with probability 0.33, 2,400 with probability 0.66, 0 with probability 0.01;</td>
<td></td>
</tr>
<tr>
<td>B: 2,400 with certainty.</td>
<td></td>
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<tr>
<td>N = 72</td>
<td>[18]</td>
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</table>

<table>
<thead>
<tr>
<th>Problem 2:</th>
<th>Choose between</th>
</tr>
</thead>
<tbody>
<tr>
<td>C: 2,500 with probability 0.33, 0 with probability 0.67;</td>
<td></td>
</tr>
<tr>
<td>D: 2,400 with probability 0.34, 0 with probability 0.66.</td>
<td></td>
</tr>
<tr>
<td>N = 72</td>
<td>[83]</td>
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The data show that 82 per cent of the subjects chose B in Problem 1, and 83 per cent of the subjects chose C in Problem 2. According to utility theory, with \( u(0) = 0 \), the first preference implies

\[
u(2,400) > 0.33u(2,500) + 0.66u(2,400) \text{ or } 0.34u(2,400) > 0.33u(2,500)
\]

while the second preference implies the reverse inequality. Note that Problem 2 is obtained from Problem 1 by eliminating a 0.66 chance of winning 2400 from both
prospects under consideration. Evidently, this change produces a greater reduction in desirability when it alters the character of the prospect from a sure gain to a probable one, than when both the original and the reduced prospects are uncertain.

“A man may act upon an estimate of the chance that his estimate of the event is a correct estimate. To be sure, after the decision is made he will be likely to sum all up in a certain degree of confidence that a certain outcome will be realized, and in practice may go farther and assume that the outcome itself is a certainty.” Frank Knight⁴ (1922)

1.2.2 Reflection effect

What happens when gains are replaced by losses? Risk aversion in the positive domain is replaced by risk seeking in the negative domain. Simple translation of outcome induces shift from risk aversion to risk seeking, i.e. accept risk instead of accepting a sure loss. Preferences between negative prospects violate expectation principle. Certainty increases the aversion to losses as well as the desirability of gains. Not true that certainty is generally desirable (Salmon, 2001). The previous section (1.2.1) discussed preferences between positive prospects, i.e., prospects that involve no losses. What happens when the signs of the outcomes are reversed so that gains are replaced by losses? The left-hand column of Table 1 displays two of the choice problems that were discussed in the previous section (1.2.1), and the right-hand column displays choice problems in which the signs of the outcomes are reversed. We use –x to denote the loss of x, and > to denote the prevalent preference, i.e., the choice

⁴ Online edition: [http://www.econlib.org/library/Knight/knRUP.html](http://www.econlib.org/library/Knight/knRUP.html)
made by the majority of subjects.

Table 1 Preferences between positive and negative prospects

<table>
<thead>
<tr>
<th>Positive prospects</th>
<th>Negative prospects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem 3: (4,000, 0.80) &lt; (3,000).</td>
<td>Problem 3’ (-4,000, 0.80) &gt; (-3,000).</td>
</tr>
<tr>
<td>N = 95 [20] [80]</td>
<td>N = 95 [92] [8]</td>
</tr>
<tr>
<td>Problem 4: (4,000, 0.20) &gt; (3,000, 0.25).</td>
<td>Problem 4’ (-4,000, 0.20) &lt; (-3,000, 0.25).</td>
</tr>
<tr>
<td>N = 95 [65] [35]</td>
<td>N = 95 [42] [58]</td>
</tr>
</tbody>
</table>

Source: Kahneman and Tversky (1979), p.268

The reflection effect implies the risk aversion in the positive domain is accompanied by risk seeking in the negative domain. In Problem 3’, for example, the majority of subjects were willing to accept a risk of 0.80 to lose 4,000, in preference to a sure loss of 3,000, although the gamble has a lower expected value.

Campbell (2003) investigate the use of downside risk, focusing on negative movements in stock markets for the assessment of risk, and see if the downside risk approach to asset allocation is able to provide some greater insight behind the puzzles in current finance theory over the tradition consumption based mean-variance approach. Using MSCI data for the G7 countries and US Government Bond returns they are able to express the risk-return trade-off in financial markets in an alternative way, shedding new light on the puzzle surrounding the size of the equity premium. He also found that contrary to mean-variance portfolio analysis investors concerned with downside risk tend to hold a larger proportion of their portfolio in domestic equities the more averse to risk they become.

1.2.3 Isolation effect

In order to simplify, people will often disregard components that the alternatives share and focus on the components that distinguish them. It may produce inconsistent preference since a pair of prospects can be decomposed into common and distinctive
components in more than one way and different decompositions can lead to different preferences. Different representations of the same probabilities induce different choices (Salmon, 2001). We refer to this phenomenon as the isolation effect. Kahneman and Tversky (1979) designed the following two-stage game (Problem 5). In first stage, there is a probability of 0.75 to end the game without winning anything, and a probability of 0.25 to move into the second stage. If you reach the second stage you have a choice between

\[(4,000, 0.80) \quad \text{and} \quad (3,000)\]

Your choice must be made before the game starts, i.e., before the outcome of the first stage is known. Note that in this game, one has a choice between $0.25 \times 0.80 = 0.20$ chance to win 4,000, and a $0.25 \times 1.0 = 0.25$ chance to win 3,000. Thus, in terms of final outcomes and probabilities one faces a choice between (4,000, 0.20) and (3,000, 0.25), as in Problem 4 above (see Table 1). However, the dominant preferences are different in the two problems. Of 141 subjects who answered Problem 5, 78 per cent chose the latter prospect, contrary to the modal preference in Problem 4. Evidently, people ignored the first stage of the game, whose outcomes are shared by both prospects, and considered Problem 5 as a choice between (3,000) and (4,000, 0.80), as in Problem 3 above.

1.3 Related Studies

Earlier in this section, we saw how prospect theory could explain why people made different choices in situation with identical financial wealth levels. This illustrates an important feature of the theory, namely that it can accommodate the effects of
problem description, or of framing. Framing refers to the way a problem is posed for the decision maker. In many actual choice contexts the decision maker also has flexibility in how to think about the problem.

1.3.1 Mental accounting

One important feature of mental accounting is narrow framing, which is the tendency to treat individual gambles separately from other portions of wealth. In other words, when offered a gamble, people often evaluate it as if it is the only gamble they face in the world, rather than merging it with pre-existing bets to see if the new bet is a worthwhile addition (Barberis and Thaler, 2003, p.1071). People sometimes separate decisions that should, in principle, be combined. For example, many people have a household budget for food, and a household budget for entertaining. At home, where the food budget is present, they will not eat lobster or shrimp because they are much more expensive than a fish casserole. But in a restaurant, they will order lobster and shrimp even though the cost is much higher than a simple fish in a restaurant. If they instead ate lobster and shrimp at home, and the simple fish in a restaurant, they could save money. But because they are thinking separately about restaurant meals and food at home, they choose to limit their food at home (Ritter, 2003). Another aspect of mental accounting relates to observations that people vary in their attitudes to risk between their mental accounts. Investors may be risk adverse in their downside protection accounts and risk seeking in their more speculative accounts. Framing wealth into separate mental accounts has the drawbacks noted by Markowitz, covariance between accounts are ignored and investment portfolios lie below the efficient frontier (Brabazon, 2000).
1.3.2 Time preference and self-control

The conventional representation of decisions over time has an additively separable utility function with exogenous, declining exponential weights. However, evidence from psychology suggests that discount rates change with circumstances. Deferring consumption involves self-control, and is therefore related to mood and feelings. There is evidence that discount rates are sometimes remarkably high, that gains are discounted more heavily than loss, that small magnitudes are discounted more heavily than large, that the framing of choice as a delay versus an advance has a large effect on decisions, that time preference differs greatly in different decision domains (e.g., money versus health), and that visceral influences such as pain or hunger affect inter-temporal choices (Hirshleifer, 2001). Barber and Odean (2008) propose an alternative model of decision making in which agents faced with many alternatives consider primarily those alternatives that have attention attracting qualities. Preferences come into play only after attention has limited the choice set. When alternatives are many and search costs high, attention may affect choice more profoundly than preferences do.

1.3.3 Regret and disposition effect

Regret is the pain we feel when we realize that we would be better off if we had not taken a certain action in the past. If the investor’s stock holdings fall in value, he may regret the specific decision he made to invest in stocks. Such feelings are naturally captured by defining utility directly over changes in the investors’ financial wealth or
in the value of his stock holdings. The possible fear of regret is a factor driving some investors’ behavior. This factor is most likely to dominate where investors are not confident of their information, or ability to process it, and where the possible detriment to their pride of a poor decision is considered too much to bear. This helps explain why studies have found that some investors faced with choosing between a popular or unpopular security may choose a popular security, because it would be easier to explain losses if everyone else bought the same security. Similarly, studies have shown that investors may use investment advisers as scapegoats thereby reducing their responsibility for poor investment decision. Institutional investors may also display this behavior when they seek to preserve their reputations (Wydeveld, 1999). The disposition effect is one implication of extending Kahneman and Tversky’s prospect theory to investments. Under prospect theory, when faced with choices involving simple two- and three- outcome lotteries, people behave as if maximizing an S-shaped value function. This value function is similar to a standard utility function except that it is defined on the basis of gains and losses rather than levels of wealth. The function is concave in the domain of gains and convex in the domain of losses. It is also steeper for losses than for gains, which implies that people are generally risk averse. Critical to this value function is the reference point from which gains and losses are measured. Usually, the status quo is taken as the reference point, but there are situations in which gains and losses are coded relative to an expectation or aspiration level that differs from the status quo. A person who has not made peace with his losses is likely to accept gambles that would be unacceptable to him otherwise (Kahneman and Tversky, 1979, pp.286-287). For example, suppose an investor purchases a stock that she believes to have an expected return high enough to justify its risk. If the stock appreciates and she continues to use the purchase price as a
reference point, the stock price will then be in a more concave, risk-averse part of the investor’s value function. The stock’s expected return may continue to justify its risk, but if the investor lowers her expectation for the stock’s return somewhat, she will be likely to sell the stock. If instead of appreciating, the stock declines, its price is in the convex, risk-seeking part of the value function. Here, the investor will continue to hold the stock even if its expected return falls lower than would have been necessary for her to justify its original purchase. Thus, the investor’s belief about expected return must fall farther to motivate the sale of a stock that has already declined rather than one that has appreciated. Similarly, suppose an investor holds two stocks. One is up, and the other is down. If he is facing a liquidity demand and has no new information about either stock, he is more likely to sell the stock that is up (Barber and Odean, 1999, p.42). Throughout this study, investor’s reference points are assumed to be their purchase prices. The price path also affects the level of reference point. For example, a homeowner who bought his home for $100,000 just before a real estate boom and had the home appraised for $200,000 after the boom may no longer feel he is “breaking even” if he sells his home for $100,000 plus commission (Barber and Odean, 1999, p.42).

Locke and Mann (2000) provided evidence that professional futures floor traders appear to be subject to disposition effect. These traders as a group hold losing trades longer on average than gains. Their evidence also indicates that relative aversion to loss realization is related to contemporaneous and future trader relative success. Though many factors can coordinate trading (e.g., tax-loss selling, rebalancing, changing risk preference, or superior information), Barber et al. (2003) argue their empirical results are primarily driven by three behavioral factors: the representativeness heuristic, limited attention, and the disposition. When buying,
similar beliefs about performance persistence in individual stocks may lead investors to buy the same stocks – a manifestation of the representativeness heuristic. Investors may also buy the same stocks simply because those stocks catch their attention. In contrast, when selling, the extrapolation of past performance and attention play a secondary role. Attention is less of an issue for selling, since most investors refrain from short selling and can easily give attention to the few stocks they own. If investors solely extrapolated past performance, they would sell losers. However they don’t. This is because, when selling, there is a powerful countervailing factor – the disposition effect – a desire to avoid the regret associated with the sale of a losing investment. Thus, investors sell winners rather than losers. Barber et al. (2006) analyze all trades made on the Taiwan Stock Exchange between 1995 and 1999 and provide strong evidence that, in aggregate and individually, investors have a disposition effect; that is, investors prefer to sell winners and hold losers. The disposition effect exists for both long and short position, for both men and women (to roughly the same degree), and tends to decline following periods of market appreciation.

1.3.4 Cognitive dissonance

Cognitive dissonance is the mental conflict that people experience when they are presented with evidence that their beliefs or assumptions are wrong; as such, cognitive dissonance might be classified as a sort of pain of regret, regret over mistaken beliefs. The theory of cognitive dissonance asserts that there is a tendency for people to take actions to reduce cognitive dissonance that would not normally be considered fully rational: the person may avoid the new information or develop
contorted arguments to maintain the beliefs or assumptions (Shiller, 2001b, 1313-1314). For example, new car purchasers selectively avoid reading, after the purchase is completed, advertisements for car models that they did not choose, and are attracted to advertisements for the car they chose.

1.3.5. Money illusion

It means the confusion between real and nominal values. The value of the stock market can be determined by discounted real cash flows at real rates, or nominal cash flows at nominal rate. At times of especially high or especially low inflation though, it is possible that some investors mistakenly discounted real cash flows at nominal rates. If inflation increases, so will the nominal discount rate. If investors then discount the same set of cash flows at this higher rate, they will push the value of stock market down. Of course, this calculation is incorrect: the same inflation which pushes up the discount rate should also push up future cash flows. On net, inflation should have little effect on market value. Such real vs. nominal confusion may therefore cause excessive variation in Price-Dividend (P/D) ratios and returns and seems particularly relevant to understanding the low market valuation during the high inflations years of the 1970s, as well as the high market valuations during the low inflation 1990s (Barberis and Thaler, 2003).

1.4 Other Related Studies

This section describes some psychological effects that are potentially relevant for securities markets, with hints at possible explanations based upon adaptiveness. The
general fact cognitive resource constraints force the use of heuristics to make decision. Hirshleifer (2001) called heuristic simplification (For cognitive resource constraints, read limited attention, processing power and memory.) A second source of bias arises indirectly from cognitive constraints. This is that natural selection probably did not design human minds solely to make good decisions.

1.4.1 Availability heuristic

Limited attention, memory, and processing capacities force a focus on subsets of available information. Unconscious associations also create focus. Selective triggering of association causes salience and availability effects. An information signal is salient if it has characteristics (e.g., differing from the background or from a past state) that are good at hooking our attention or at creating associations that facilitate recall. In the availability heuristic, items that are easier to recall are judged to be more common. This generally makes sense, since things that are more common are noticed or reported more often, making them easier to remember. Regular Web users can think of examples relating to the internet revolution which encouraged the market boom of the late 1990s (Hirshleifer, 2001).

1.4.2 Representative heuristic

The representative heuristic (Tversky and Kahneman ,1974) involves assessing the probability of a state of the world bases on the degree to which the evidence is perceived as similar to or typical of the state of the world. People’s perceptions of how ‘representative’ a piece of evidence is of a state of the world may match its
conditional probability poorly. For example, people tend to rely too heavily on small samples and rely too little on large samples, inadequately discount for the regression phenomenon, and discount inadequately for selection bias in the generation or reporting of evidence (Hirshleifer, 2001). Companies with very low P/E’s are thought to be temporarily “undervalued” because investors become excessively pessimistic after a series of bad earnings reports or other bad news. Once future earnings turn out to be better than the unreasonably gloomy forecasts, the price adjusts. Similarly, the equity of companies with high P/E’s is thought to be “overvalued,” before (predictably) falling in price (De Bondt and Thaler, 1985).

1.4.3 Overconfidence

The key behavioral factor and perhaps the most robust finding in the psychology of judgment needed to understand market anomalies is overconfidence. Overconfidence is sometimes reversed for very easy items. Overconfidence implies over-optimism about the individual’s ability to succeed in his endeavors. Such optimism has been found in a number of different settings. Men tend to be more overconfident than woman, though the size of difference depends on whether the task is perceived to be masculine or feminine (Hirshleifer, 2001). Economists have long asked whether investors who misperceive asset returns can survive in a competitive asset market such as a stock or a currency market. De Long et al. (1991) conclude that there is, in fact, a presumption that overconfident investors – even grossly overconfident investors – will tend to control a higher proportion of the wealth invested in securities markets as time passes. This presumption is based on the empirical observations that (a) most investors appears to be more risk averse than log utility, and (b) idiosyncratic
risk is large relative to systematic risk. Under these conditions, investors who are mistaken about the precision of their estimate of the returns expected from a particular stock will end up taking on more systematic risk. Taken as a group, these investors will exhibit faster rates of wealth accumulation than fully rational investors with risk aversion greater than given by log utility. Kyle and Wang (1997) showed that overconfidence may strictly dominate rationality since an overconfident trader may not only generate higher expected profit and utility than his rational opponent, but also higher than if he was also rational. This occurs because overconfidence acts like a commitment device in a standard Cournot duopoly. As a result, for some parameter values the Nash equilibrium of two-fund game is a Prisoner’s Dilemma in which both funds hire overconfident managers. Thus, overconfidence can persist and survive in the long run. Daniel et al. (1998) developed a theory based on investor overconfidence and on changes in confidence resulting from biased self-attribution of investment outcomes. The theory implies that investors will overreact to private information signals and under-react to public information signals. Odean (1998a) found that people are overconfident. His paper examines markets in which price-taking traders, a strategic-trading insider, and risk-averse market-makers are overconfident. Overconfidence increases expected trading volume, increases market depth, and decreases the expected utility of overconfident traders. Benos (1998) study an extreme form of posterior overconfidence where some risk neutral investors overestimate the precision of their private information. The participation of overconfident traders in the market leads to higher transaction volume, larger depth, more volatile and more information prices. An important anomaly in finance is the magnitude of volume in the market. The so-called “Groucho Marx” theorem states that people should not want to trade with people who would want to
trade with them, but the volume of stock market transactions is staggering (Camerer and Loewenstein, 2002). For example, Odean (1999) notes that the annual turnover rate of shares on the New York Stock exchange is greater than 75 percent, and the daily trading volume of foreign-exchange transactions in all currencies (including forwards, swaps, and spot transactions) is equal to about one-quarter of the total annual world trade and investment flow. Odean (1999) then presents data on individual trading behavior which suggests that extremely high volume may be driven, in part, by overconfidence on the part of investors.

Individual investors who hold common stocks directly pay a tremendous performance penalty for active trading. Of 66,465 households with accounts at a large discount broker during 1991 to 1996, those that trade most earn an annual return of 11.4 percent, while the market returns 17.9 percent. The average household earns an annual return of 16.4 percent, tilts its common stock investment toward high-beta, small, value stocks, and turn over 75 percent of its portfolio annually. Overconfidence can explain high trading levels and the resulting poor performance of individual investors (Barber and Odean, 2000a). Barber and Odean (2000b) report their analysis, using account data from a large discount brokerage firm, of the common stock investment performance of 166 investment clubs from February 1991 through January 1997. The average club tilted its common stock investment toward high-beta, small-cap growth stocks and turned over 65 percent of its portfolio annually. The average club lagged the performance of a broad-based market index and the performance of investors. Moreover, 60 percent of the clubs underperformed the index. Gervais and Odean (2001) develop a multi-period market model describing both the process by which traders learn about their ability and how a bias in this learning can create overconfident traders. A trader’s expected level of overconfidence increases in the
early stages of his career. Then, with more experience, he comes to better recognize his own ability. The patterns in trading volume, expected profits, price volatility, and expected prices resulting from this endogenous overconfidence are analyzed. Theoretical models predict that overconfident investors trade excessively. Barber and Odean (2001a) tested this prediction by partitioning investors on gender. Psychological research demonstrates that, in areas such as finance, men are more overconfident than women. Thus, theory predicts that men will trade more excessively than women. They document that men trade 45 percent more than women. Trading reduces men’s net return by 2.65 percentage points a year as opposed to 1.72 percentage points for women. People (especially males) seem to trade too aggressively, incurring higher transactions costs without higher return. In Taiwan, Barber et al. (2004b) found that the profitability of aggressive and passive trading by individuals offer some illumination. Virtually all trading losses by individuals can be traced to their aggressive trading. If entertainment is the sole explanation for individual investor trading losses, this result suggests individual investors find aggressive trading more entertaining than passive trading. If overconfidence is the sole explanation, this suggests individuals trade more aggressively when they are overconfident. Barber et al. (2004c) demonstrate that investors prefer to (1) repurchase stocks that they previously sold for a gain, (2) repurchase stocks that have lost value subsequent to a prior sale, and (3) purchase additional shares of stocks that have lost value subsequent to being purchased.

The existing overconfidence literature has focused on an individual’s propensity to incorrectly believe that she is better than others. Healy and Offenberg (2007) examined whether a similar phenomenon exists for social groups. Evidences from both the lab and the field show that confidence in one’s group parallels confidence in
oneself when choices are averaged over the entire sample. Underlying those average results are significant differences between the attitudes of men and women.

1.4.4 Anchoring and adjustment

In many situations, people make estimates by starting from an initial value that is adjusted to yield the final answer. The initial value, or starting point, may be suggested by the formulation of the problem, or it may be the result of a partial computation. In either case, adjustments are typically insufficient. That is, different starting points yield different estimates, which are biased toward the initial values. We call this phenomenon anchoring (Tversky and Kahneman, 1974). So, anchoring refers to the decision-making process where quantitative assessments are required and where these assessments may be influenced by suggestions. People have in their minds some reference points (anchors), for example of previous stock prices. When they get new information they adjust this past reference insufficiently (under-reaction) to new information acquired. Anchoring describes how individuals tend to focus on recent behavior and give less weight to longer time trends. Einhorn and Hogarth (1986) develop a model of how people assess uncertainty in ambiguous situations. The basic idea underlying the ambiguity model is that people use an anchoring-and–adjustment strategy in which an initial probability is used as the anchor (or starting point) and adjustments are made for ambiguity. The anchor probability can come from a variety of sources; it may be a probability that is salient in memory, the best guess of experts, or a probability that is otherwise available. Psychologists have documented that when people make quantitative estimates, they may be heavily influenced by previous values of the item. For example, it is not an accident that a used car salesman always
starts negotiating with a high price and then work down. The salesman is trying to get the consumer anchored on the high price so that when he offers a lower price, the consumer will estimate that lower price represents a good value. Anchoring can cause investors to under-react to new information (Fuller, 1998). Values in speculative markets, like stock market, are inherently ambiguous. It is hard to tell what the value of the Hang Seng Index should be. There is no agreed-upon economic theory that would provide an answer to this question. In the absence of any better information, past prices are likely to be important determinants of prices today. Therefore, the anchor is the most recently remembered prices.

1.4.5 Ambiguity aversion

People dislike ambiguity or situations where they are not sure what the probability distribution of a gamble is. This is potentially very relevant for finance, as investors are often uncertain about the distribution of a stock’s return. One of the more popular approaches is to suppose that faced with ambiguity, people entertain a range of possible probability distributions and act to maximize the minimum expected utility under any candidate distribution. If investors are concerned that their model of stock returns is misspecified, they will charge a substantially higher equity premium as compensation for the perceived ambiguity in the probability distribution. (Barberis and Thaler, 2003)

1.4.6 Herd effects

Patel et al. (1991) introduced two behavioral hypotheses to help explain financial
phenomena: Barn Door Closing for mutual fund purchases, and Herd Migration Behavior for debt-equity ratio. Barn door closing, in the horse protection sense, refers to undertaking behavior today that would have been profitable yesterday. Herd migration in finance occur when market conditions change, so that individual decision makers wish to alter their holdings substantially. Their transition is slowed because they seek protection by traveling with the herd. Herd behavior (i.e. people will do what others are doing rather than what is optimal given their own information) where behavior patterns are correlated across individuals – but could also due to correlated information arrival in independently acting investors. Herding closely linked to impact expectations, fickle changes without new information, bubbles, fads, frenzies. Herding does require a coordination mechanism. Either wide spread rule to coordinate based on some signal (e.g. price movement) or based on direct ability to observe other decision makers (observing investment trends) (Salmon, 2001, Part VI). Barber et al. (2003a) compared the investment decisions of groups (stock clubs) and individuals. Both individuals and clubs are more likely to purchase stocks that are associated with good reasons (e.g., a company that is featured on a list of most-admired companies). However, stock clubs favor such stocks more than individuals, despite the fact that such reasons do not improve performance. Barber et al. (2006) study the trade behavior of individual investors using the Trade and Quotes (TAQ) and Institute for the Study of Security Market (ISSM) transaction data over the period 1983 to 2001. They found that order imbalance based on TAQ/ISSM data indicates strong herding by individual investors. Individual investors predominantly buy (sell) the same stocks as each other contemporaneously. Further, they predominantly buy (sell) the same stock one week (month) as they did the previous week (month). Hon (2015b) found a significant correlation between the investment experience of
small investors and their average return of their bank stock investments firstly. Small investors are sophisticated and have more trading experience to have a lower disposition effect because they have a better understanding of the market, are more aware of such a tendency, and hence likely to correct it. Second, a significant correlation is found between the reason given by small investors for changing their current security holdings and the reason given for the sharp correction in the bank stock market. This finding suggests that herd behaviour occurred frequently among the small investors, and they tend to sell their stock during the sharp correction period. Third, they find a significant correlation between the opinion of small investors on whether the bank stock market would recover in the event of an economic downturn and the opinion of smaller investors on the bank stock market value today. This finding suggests that small investors have some reference points (i.e., anchors) in mind when small investors make their investments in the bank stock market. Finally, there is also a significant correlation between how small investors value information in a situation when they have to make a decision and their belief in the probability that the stock price index would continue to rise after three days of continuous increase. This finding provides empirical support for Kahneman and Tversky’s classic value function (i.e., prospect theory). Small investors tend to hold on to a position of loss in the hope that the stock prices will eventually recover. Prospect theory also predicts that small investors will be risk averse to gains, which means that they believe the stock price index will continue to increase in value, and hence they will sell their stock in a buoyant stock market. Hon’s paper (2013d) found that there was a change in the behaviour of small investors’ during and immediately after the buoyant stock market of January 2006 to October 2007 in Hong Kong. During the buoyant market, small investors were overconfident and bought stock. The small investors also
exhibited herd behaviour, and, once the sharp correction to the market began after
October 2007, they sold the stock. The small investors had in mind some reference
points (anchors), such as the stock purchase price. If a stock appreciates (e.g., during
the buoyant stock market) and the small investor continues to use purchase price as a
reference point, the stock price will be in a more concave, risk-averse part of the
investor’s value function. The stock’s expected return may continue to justify its risk,
but if the small investor lowers her expectation somewhat for the stock’s return, she
will likely sell the stock. On the other hand, if the stock declines (e.g., immediately
after the buoyant stock market), its price is the convex, risk seeking part of the value
function. Here the small investor will continue to hold the stock even if its expected
return falls lower than the level that would have been necessary to justify its original
purchase.

1.4.7 Ostrich effect

Karlsson et al. (2004) presented a decision theoretical model in which information
collection is linked to investor psychology. For a wide range of plausible parameter
values, the model predicts that investor should collect additional information
conditional on favorable news and avoid information following bad news. They called
this the ostrich effect. Empirical evidence from Scandinavian investors supports the
existence of the ostrich effect in financial markets.

1.4.8 Weekend effects

Weekend effects have been identified in the foreign-exchange and money markets as
well as in stock market returns. Significantly negative effects of weekends on stock
returns have been observed for Belgium, Canada, New Zealand, Switzerland, the
United Kingdom. And the United States, although the effect appears to be stronger in
the 1970’s than in earlier or later times. There already exist various explanations for
stock market behavior on weekends. For example, the regular weekend effect has
been attributed to payment and check-clearing settlement lags\(^5\). Kamstra et al. (2000)
believe that the importance of daylight saving\(^6\) time changes indicated in their paper
makes the issue something well worth sleeping on, and a matter that is as worthy of
further study as other explanations of the weekend anomaly.

1.5 Bubbles

1.5.1 Speculation

Speculation, in a financial context, is the assumption of the risk of loss, in return for
the uncertain possibility of a reward. Only if one may satisfy that a particular position
involves no risk may one say, strictly speaking, that such a position represents an
‘investment.’ Financial speculation involves the buying, holding, selling, and
shorting-selling of stocks, bonds, commodities, currencies, real estate, derivatives, or
any valuable financial instrument to profit from fluctuations in its price as opposed to
buying it for use or for income via methods such as dividends or interest. Speculation

\(^5\) With the five-business-day settlement through most of the period studied, and with one day for check
clearing, payments for Monday-Thursday stock purchases were settled after eight days, versus ten days
for Friday stock purchases. The jump in Friday prices by two-business-days’ interest explains a lower
return from Friday closing to Monday opening, albeit less than the observed effect.

\(^6\) Daylight saving implies the loss or gain of an hour twice a year, at 2.00 a.m. Sunday. In the United
States and Canada, until 1986, the spring time change always occurred on the last Sunday in April. As
of 1987, the spring time change takes place on the first Sunday in April. The fall time change has
always occurred on the last Sunday in October. There were no time changes during World War II or in
the year 1974; clocks were kept ahead in both periods to conserve energy.
represents one of four market roles in Western financial markets, distinct from hedging, long- or short-term investing, and arbitrage. Speculative purchasing can also create inflationary pressure, causing particular prices to increase above their true value (real value – adjusted for inflation) simply because the speculative purchasing artificially increases the demand. Speculative selling can also have the opposite effect, causing prices to artificially decrease below their true value in a similar fashion. In various situations, price rises due to speculative purchasing cause further speculative purchasing in the hope that the price will continue to rise. This creates a positive feedback loop in which prices rise dramatically above underlying value or worth of the items. This is known as an economic bubble. Such a period of increasing speculative purchasing is typically followed by one of speculative selling in which the price falls significantly, in extreme cases this may lead to crashes. Overall, the participation of speculators in financial markets tends to be accompanied by significant increase in short-term market volatility. This is not necessarily a bad thing, as heightened level of volatility implies that the market will be able to correct perceived mispricing more rapidly and more drastically. A great deal of evidence is presented that suggests that social movements, fashions, or fads are likely to be important or even the dominant cause of speculative asset price movements; but no single piece of evidence is unimpeachable (Shiller, 1984). A survey compared speculative behavior in two groups of institutional investors. The ‘experimental’ group held stocks that had shown extraordinary price increases over the preceding year that also had high price earnings ratios. The control group held randomly selected stocks (Shiller and Pound, 1986). Although the terms general investors and speculative investors are commonly used, it is important that they be clearly understood. General investors typically select reasonably conservative investment
vehicles, i.e., ones with either moderate or low volatility, and hold their investments for the mid- to long term. Although general investors select their investments with the hope of doing better than the market, their investment performance generally tracks market performance. Speculative investors, on the other hand, seek to achieve significantly higher yields on their investments. To achieve these higher yields, speculative investors employ three broad tactics. First, they choose investment vehicles with high volatility. A classic example is penny mining stocks. The higher volatility reflects greater price swings and increases the potential for profit. The second approach is trade more frequently. The time frame can vary from a few months to hours. For this reason, these investors typically refer to themselves as traders rather than investors. The reduced trading time frame produces greater opportunities to realize profits. The third approach is to borrow or leverage one’s investments, a tactic that further increases the potential for profit. Such tactics are associated with much higher risk than general investing. One the one hand, they greatly increase the potential for profit, and, on the other, they greatly increase the potential for losses (Govono et al. 2004). Barber et al. (2006) found that a great deal of current trading in Taiwan and the U.S. is speculative. There are two reasons for uninformed investors to trade speculatively: overconfidence and entertainment. The high levels of trading that they observe are a partial substitute for the entertainment associated with gambling. Hon (2012a) found that small investors were overconfident and bought more stock during the buoyant market in the Hong Kong stock market. Small investors also exhibited herd behaviour. Hon’s paper (2015d) he extend his paper to identify and analyse the important factors that capture the behaviour of small investors in the Hong Kong stock market, especially during the financial crisis. Exploratory factor analysis is employed to analyse the data, he found that monitor investments is the second
important factor and reference group is the most important factor.

1.5.2 The bubbles

The first study to report bubbles in experimental asset markets was published in 1988 by Vernon Smith, Gerry Suchanek and Arlington Williams. Bubbles feature large and rapid price increases which result in share price rising to unrealistically high levels. Bubbles typically begin with a justifiable rise in stock prices. The justification may be a technological advance or a general rise in prosperity. The rise in share prices, if substantial and prolonged, leads to members of the public believing that prices will continue to rise. People who do not normally invest begin to buy shares in the belief that prices will continue to rise. More and more people, typically those who have no knowledge of financial markets, buy shares. This pushes up prices even further. There is euphoria and manic buying. This causes further price rises. There is a self-fulfilling prophecy wherein the belief that prices will rise brings about the rise, since it leads to buying. People with no knowledge of investment often believe that if share prices have risen recently, those prices will continue to rise in the future (Redhead, 2003). A speculative bubble can be described as a situation in which temporarily high prices are sustained largely by investors’ enthusiasm rather than by consistent estimations of real value. The essence of a speculative bubble is a sort of feedback, from price increases to increased investor enthusiasm, to increased demand, and hence further price increases. According to the adaptive expectations version of the feedback theory, feedback takes place because past price increases generate expectations of further price increases. According to an alternative version, feedback occurs as a consequence of increased investor confidence in response to past price increases. A speculative
bubble is not indefinitely sustainable. Prices cannot go up forever and when price increases end, the increased demand that the price increases generated ends. A downward feedback may replace the upward feedback. Shiller’s (2000) paper presented evidence on two types of investor attitudes that change in important ways through time, with important consequences for speculative markets. The paper explored changes in bubble expectations and investor confidence among institutional investors in the U.S. stock market at six-month intervals for the period 1989 to 1998 and for individual investors at the start and end of this period.

1.5.3 Previous studies

Bubbles refer to asset prices that exceed an asset’s fundamental value because current owners believe that they can resell the asset at an even higher price in the future. There are four main strands of models that identify conditions under which bubbles can exist. The first class of models assumes that all investors have rational expectations and identical information. These models generate the testable implication that bubbles have to follow an explosive path. In the second category of models investors are asymmetrically informed and bubbles can emerge under more general conditions because their existence need not be commonly known. A third strand of models focuses on the interaction between rational and behavioral traders. Bubbles can persist in these models since limits to arbitrage prevent rational investors from eradicating the price impact of behavioral traders. In the final class of models, bubbles can emerge if investors hold heterogeneous beliefs, potentially due to psychological biases, and they agree to disagree about the fundamental value. Experiments are useful to isolate, distinguish and test the validity of different mechanisms that can lead
to or rule out bubbles (Abreu and Brunnermeier, 2002). West (1987) suggests that the set of parameters needed to calculate the expected present discounted value of a stream of dividend can be estimated in two ways. One may test for speculative bubbles, or fads, by testing whether the two estimates are the same. When the test is applied to some annual U.S. stock market data, the data usually reject the null hypothesis of no bubbles. The test is generally interesting, since it may be applied to a wide class of linear rational expectations models. The seeming tendency for self-fulfilling rumors about potential stock price fluctuations to result in actual stock price movements has long been noted by economists. In a famous passage Keynes, for example, described the stock market as a certain type of beauty contest: speculators devote their “intelligence to anticipating what average opinion expects average opinion to be”. In recent rational expectations work this possibility has been rigorously formalized, and the self-fulfilling rumors dubbed speculative bubbles. Craine (1993) suggest that the fundamental value of a stock is the sum of the expected discounted dividend sequence. Bubbles are deviations in the stock’s price from the fundamental value. Rational bubbles satisfy an equilibrium pricing restriction implying that agents expect them to grow fast enough to earn the expected rate of return. The explosive growth causes the stock’s price to diverge from its fundamental value. Whether the actual volatility of equity returns is due to time variation in the rational equity risk premium or to bubbles, fads and market inefficiencies is an open issue. Bubble tests require a well-specified model of equilibrium expected returns that has yet to be developed, and this makes inference about bubbles quite tenuous. Wu and Xiao (2004) propose an alternative approach to test such bubbles. The testing procedure is applied to market indexes in the U.S and Hong Kong. The proposed procedures provide useful complements to existing bubble tests. They collected
weekly price and dividend yield data for the Standard and Poor (S&P) 500 Index and the Hang Seng index (Hong Kong) from January 4, 1974 to September 18, 1998 (Friday close to Friday close). These markets experienced both crashes as well as relative stability over the sample period. If we define stock market crash as a drop in a major stock index 10% or more during a single day, then the U.S stock market has experienced only two crashes in the 20th Century, one in October 1929 and the other in October 1987. Over their sample period, the S&P 500 index, which consists of 500 large capitalization stocks on the New York Exchange, increased 10-fold from 100 to 1,020, with an average annual return of 9.5%. From August 1995 to September 1998, the index produced a 20% annual rate of return. The empirical results suggest that, after taking into account of the time varying growth and risk-premium, the evidence of a bubble in the US market is weak. The Hong Kong stock market had more than its share of ups and downs. The market crash in 1973 prompted the government to unify the territory’s four exchanges to form the Stock Exchange of Hong Kong (SEHK). Over their sample period, the Hang Seng Index increased 17-fold from 425 to 7,446, with an average annual return of 11.7%. It experienced crashes in October 1987, June 1989, November 1994 and October 1997. October 1997 crash was preceded by a climactic upward surge on the stock and property markets ahead of the transfer of sovereignty from Britain to China. It was associated with the Asian financial market crises that affected the entire Asia Pacific region. During this dramatic market downturn, the Hang Seng Index dropped from its peak of about 16,700 in August 1997 to about 7,400 in September 1998, a whopping 55% decline. In summary, the tests reject the null of no bubble for almost all (but one) cases, indicating the possibility of bubbles in the Hong Kong stock market. The empirical results suggest that, they find relatively strong evidence that Hong Kong market contained bubbles.
over the sample period. Chan and Woo (2008) employ a new test to detect the existence of stochastic explosive root bubbles. If a speculative bubble exists, the residual process from the regression of stock prices on dividends will not be stationary. The data series include the monthly aggregate stock price indices, dividend yields and price indices for the stock markets of Taiwan, Malaysia, Indonesia, the Philippines, Thailand and South Korea. The sample period span from March 1991 to October 2005 for all markets. The dividend series are estimated by multiplying the price indices by dividend yields. The stock price indices and dividends are deflated by the producer price index for Malaysia, and by the consumer price indices for the other markets. They find evidence of bubble in stock markets of Taiwan, Malaysia, Indonesia, the Philippines and Thailand, but no evidence of bubbles in South Korea over their sample period.

1.5.4 Factors underlying the bubble

There are several factors that can help explain bubbles.

1.5.4.1 Factors

The Internet

The Internet is changing how information is delivered to investors and the ways in which investors can act on that information. It has lowered both the fixed and marginal costs of producing financial services, thus enabling newer, smaller companies to challenge established providers of these services. On-line brokerage firms, such as E*Trade and Ameritrade, are among the most vivid and successful
financial advice, research tools, and financial information, have also emerged. These e-commerce firms are transforming the way traditional services are delivered and offering a vast assortment of new services. Investors in general and on-line investors in particular now make decisions in a very different environment than investors in the past. They have access to far more data. They often act without personal intermediaries. They can conduct extensive searches and comparisons on a wide variety of criteria. A critical- and largely unexplored-research question is how this different environment affects the decision-making of investors (Barber and Odean, 2001b). Barber and Odean (2002) analyze 1,607 investors who switched from phone-based to online trading during the 1990s. Those who switch to online trading perform well prior to going online, beating the market by more than 2% annually. After going online, they trade more actively, more speculatively, and less profitably than before - lagging the market by more than 3% annually. Reductions in market frictions (lower trading costs, improved execution speed, and greater ease of access) do not explain these findings. Overconfidence – augmented by self attribution bias and the illusions of knowledge and control – can explain the increase in trading and reduction in performance of online investors.

In Hong Kong, the contribution of online trading grew gradually over the years to 8.5% of retail investor trading in stocks in 2002/03. However, the proportion is not high compared to some overseas markets such as Korea and even Mainland China (Tsoi, 2004). By studying the impact of derivatives trading on portfolio returns and by examining whether individual investor performance is persistent, Bauer et al. (2007) provided new evidence on the investment performance and behavior of individual investors. They analyzed returns earned on stock, bond, and derivatives investments of more than 68,000 investors who trade at the largest Dutch online discount broker.
Their sample period ranges from January 2000 to March 2006, which covers both the burst of the Internet bubble and the subsequent recovery of financial markets. They found that the average investor earns negative gross and net alphas, mainly because substantial losses on derivatives investments. The underperformance of derivatives traders is due to bad market timing that results from overreaction to past stock market movements. They also found strong evidence of performance persistence among individual investors. Women are more successful investors than men and persistent winners hold larger accounts with lower turnover.

Derivatives

Hon’s paper (2013a) attempts to identify the ways that the Hong Kong companies in the Hang Seng Index Constituent Stocks manage their financial risk with derivatives. By analyzing the companies’ annual reports and financial reviews, it is found that 82.6% of these companies used derivatives in 2010. Specifically, 58.7% of them used swaps to hedge interest rate risk, and 54.3% of them used forward contracts to hedge foreign exchange risk. The results are largely consistent with the prediction that companies using derivatives to manage their financial risk.

By investing in stocks, bonds and other financial assets people have been able to build up a buffer in case of being dismissed. Firms have tilted their compensation packages to management away from fixed salaries toward participation and result-based compensations such as stock options. With such options management has an incentive to do everything possible to boost share prices. They have an incentive to maintain an appearance of corporate success and a corporation working its way toward an impressive future with increasing profits. It seemed as a strategy to boost the stock
value and to refine the company’s objectives and announcing that it was a part of the e-business society. Heath et al. (1999) investigate stock option exercise decisions by over 50,000 employee at seven corporations. Controlling for economic factors, psychological factors influence exercise. Consistent with psychological models of beliefs, employee exercise in response to stock price trends – exercise is positively related to stock returns during the preceding month and negatively related to returns over longer horizons. Consistent with psychological models of values that include reference points, employee exercise activity roughly doubles when the stock price exceeds the maximum price attained during the previous year. Options have no purchase price to serve as a reference point. Employees do not purchase options, they receive them at a strike price that is equal to the stock price on the date of the grant. Because employees can only exercise their options when the stock price exceeds the strike price, reference points, if they exist, will be dynamically determined by stock price movement after the grant.

CEO compensation has grown dramatically. Average CEO compensation as a multiple of average worker compensation rose from 45 in 1980, to 96 in 1990, and to an astounding 458 in 2000. A large portion of this compensation comes in the form of stock options. Economists fear that managers will behave more conservatively than is in the best interests of shareholders because managers’ careers are tied to the firm. Executive stock options mitigate this problem by rewarding managers when the firm’s share price goes up but not punishing them when it goes down. Such convex compensation contracts encourage managers to take risks. Gervais et al. (2003) argue that executives are likely to be overconfident and optimistic, and thus biased, when assessing projects and that many shareholders are under-diversified and do care about specific risk. Manager may further manipulate investor expectations by managing
earnings through discretionary accounting choices. Furthermore, research indicates that earnings manipulations can affect prices.

Derivatives are a new segment of secondary market operations in India. Ganesan et al. (2004) found that a buoyant and supporting cash market is a must for a robust derivative market. Hon’s paper (2015a) found that the majority of respondents who invest in their derivative investments during January 2013 to January 2014 in Hong Kong are relatively younger. More than 58.1% of the respondents who have tertiary education for their derivatives investments. Male preferred to invest in warrant than female, while female preferred to invest stock options than male. Hon’s paper (2015c) based on the survey results, he can derive the ascending order of importance of reference group, return performance and personal background (reference group is the least important and personal background is the most important) in the Hong Kong derivatives markets. The results of Hon’s paper (2013c) indicate that small investors mostly tend to trade Callable Bull / Bear Contacts (35% of total) and warrants (23% of total). Hon (2012b) identified five factors that capture the behaviour of small investors in derivatives markets in Hong Kong. The factors are personal background, reference group, return performance, risk tolerance, and cognitive style.

Feedback Models

The essence of a speculative bubble is the familiar feedback pattern – from price increases to increased investor enthusiasm to increased demand and, hence, to further price increase. The higher demand for the asset is generated by the public’s memory of high past returns and optimism the high returns generate for the future (Shiller, 2002).
When speculative prices go up, creating successes for some investors, this may attract public attention, promote word-of-mouth enthusiasm, and heighten expectations for further price increases. The talk attracts attention that justifies the price increases. This process in turn increases investor demand and thus generates another round of price increases. If the feedback is not interrupted, it may produce after many rounds a speculative “Bubble,” in which high expectations for further price increases support very high current prices. The high prices are ultimately not sustainable, since they are high only because of expectations of further price increases, and so the bubble eventually bursts, and prices come falling down. The feedback that propelled that bubble carries the seeds of its own destruction, and the end of the bubble may be unrelated to news stories about fundamentals. The same feedback may also produce a negative bubble, downward price movements propelling further downward price movements, promoting word-of-mouth pessimism, until the market reaches an unsustainably low level (Shiller, 2003).

Smart Money

The efficient markets theory, as it is commonly expressed, asserts that when irrational optimists buy a stock, smart money sells, and when irrational pessimists sell a stock, smart money buys, thereby eliminating the effect of the irrational traders on market price. From a theoretical point of view, it is far from clear that smart money has the power to drive market prices to fundamental values. For example, in one model with both feedback traders and smart money, the smart money tended to amplify, rather than diminish, the effect of feedback traders, by buying in ahead of the feedback traders in anticipation of price increases they will cause (Shiller, 2003). In addition to
search costs, investors might choose mutual funds with high expenses if high-expense funds provided better service than other funds. Braber et al. (2003b) believed that different levels of service are unlikely to explain their results since first-rate service and low expenses are not mutually exclusive. For example, Vanguard, which is well-known for its low-cost mutual fund offerings, has won numerous service awards.\textsuperscript{7} Barber and Odean (2003) concluded that either models of optimal asset location are incomplete or a substantial fraction of investors are misallocating their assets. Though tax considerations leave clear footprints in the data they analyze, many households could improve their after-tax performance by fully exploiting the tax avoidance strategies available on equities.

The Media

In an attempt to attract audiences, the news media try to present debate about issues on the public mind. This may mean creating debate on topics that would not otherwise consider worthy of such discussion. The resulting media event may convey the impression that there are experts on all sides of the issue, thereby suggesting a lack of expert agreement on the very issues about which people are most confused. Many news stories seem to have written under a deadline to produce something, anything, to go along with the numbers from the market. A typical news story of this type, after noting the remarkable bull market, focuses on very short-run statistics. It generally states which groups of stocks have risen more than others in recent months, even though there is no theoretical or empirical reason to think that their performance has

\textsuperscript{7} “Mutual funds” named Vanguard #1 in the “Best Service” category and as the favorite fund family overall, based on a 1999 survey of 2,000 subscribers. A November 2000 “SmartMoney” survey of 600 randomly selected readers named Vanguard as the “Best Fund family”. “Worth” designated Vanguard the winner in both the “Best Fund Family” and “Best Discount Broker” categories for service and performance, based on a 1999 survey of 4,000 readers.
caused the bull market. The news story may talk about the “usual” factors behind economic growth, such as the Internet boom, in lowing terms and with at least a hint of patriotic congratulation of US economic engine. The article then finishes with quotes from a few well-chosen “celebrity” sources, offering their outlook for the future. Sometimes the article is so completely devoid of genuine thought about the reasons for the bull market and the context for considering its outlook that it is hard to believe that the author was other than cynical in his or her approach (Shiller, 2001b). Media may well have an important role in directing this public attention toward markets, which may consequently result in abnormal market behavior. Stock market price increases generate news stories, which generate further stories about new-era theories that explain the price increases, which in turn, generate more news stories about the price increases (Shiller, 2002). In the United Kingdom, Diacon (2002) found that layman investors perceive higher risks in investing in financial services products than do their financial advisers (coupled with an inherent optimism about likely benefits) has substantial ramifications in the light of recent reports such as the ‘Sandler Review’ which may have the effect of encouraging consumers to deal direct with providers rather than via independent financial advisers. Dispensing with the services of financial advisers is likely to lead consumers to make more conservative investment choices: for example, by investing too little in equities and too much in fixed-income assets when saving retirement. As a result, consumers may find themselves with surprisingly inadequate levels of savings to meet future commitments such as a pension on retirement. In Hong Kong, this is an area that clearly requires attention, as is neatly illustrated in the SFC’s Retail Investor Survey. When asked what factors influenced fund investment decisions, 17.8 percent of survey respondents [who had invested in funds in the last two years] said they neither relied on offering
documents nor marketing materials. But perhaps more interesting, 44.8 percent of stock investors said they relied on the comments of celebrity analysts in making their investment decisions (Hong Kong Securities, 2004). Hon (2013b) studied the investment attitude and behavior of the small investors on derivatives markets in Hong Kong. He found that the most decisive factor that could influence small investor’s decision making was highly accessible and updated. 37.8% and 25.8% respectively respondents considered Internet and news/ magazines / newspaper were the decisive factors.

Emotions and sentiments

There are serious questions concerning whether the phenomenon on excess volatility exists in the first place and, if it did, whether abandonment of assumptions of rational expectations in favor of assumptions of mass psychology and fads as primary determinants of price changes is the best avenue for current research (Kleidon, 1986). Human behavior common to all human societies involves a tendency for an idle free-flowing exchange of idea and thoughts; we call this “conversation.” This flow of conversation serves to exchange a wide variety of information, and also to reinforce memories of pieces of information to be held in common by the group. There is a sense of conversation in the media, and many of same patterns continue in these media. The media appear to be somewhat less effective in transmitting information and opinions than ordinary interpersonal conversation. Perhaps, the media do not provide stimuli to all of the brain processes that evolved to make use of face-to-face conversation. Associated with conversation are a number of emotional responses to what is said, and an awareness of the emotional responses of others, responses that
presumably promote the exchange of information. Many of the failures of human judgment that fall under the rubric of “herd behavior” might be traced to the limitation imposed on human thought and memory by these patterns of communications (Shiller, 1995). Using common sense, one knows that the stock market could repeat the performance of recent years. That possibility seems quite real, just as real as the possibility of a major correction in the market. But the question is how the private investor feels when he fills out his choice of mutual funds for his retirement scheme? How this person feels depends on his experiences in investing? If one has been out of the market without participating in earning money that other investors may have done, one may be feeling a sharp pain of regret. Regret has been found by psychologists to be one of the strongest motivations to make a change in something. Envy is another dominant characteristic, to see other people having made more money in stock market than oneself has made from work is a painful experience, especially since it diminishes one’s ego. In case the other people were smarter, one feels like a fool, and even if they were not any smarter, just lucky, it may not feel any better. A common feeling in this situation is that if one can participate just one more year in rising stock market everything will be much better and mitigate the pain. One may also think that the potential loss will be much more diminishing to one’s ego than the failure to participate has already been. One may also realize that one takes the risk of entering the market just as it begins a downward turn. But the psychological cost of such a potential future loss may not be so much greater relative to the very real regret of having been out of the market in the past. Barberis et al. (1998) have presented a parsimonious model of investor sentiment, or of how investors form expectations of future earnings. The model they propose is motivated by a variety of psychological evidence, in making forecast, people pay too much attention to the strength of the
evidence they are presented with and too little attention to its statistical weight. Loewenstein et al. (2001) propose an alternative theoretical perspective, the risk-as-felling hypothesis that highlights the role of affect experienced at the moment of decision making. Drawing on research from clinical, physiological, and other subfield of psychology, they show that emotional reactions to risky situations often diverge from cognitive assessments of those risks. When such divergence occurs, emotional reactions often drive behavior. The risk-as-feelings hypothesis is shown to explain a wide range of phenomena that have resisted interpretation in cognitive-consequentialist terms.

If one participated in the market today for a while and ponders whether get out or not, he has a fundamentally different emotional frame of mind. This person feels satisfaction and probably pride in his past successes, and he will certainly feel wealthier. One may feel as gamblers do after they have “hit big time,” i.e. that one is gambling with the house money” and therefore has nothing to lose emotionally by wagering again. The concept of gambling with the house money is a theory about people’s risk preferences and is related to mental accounting. Investors will generally become more risk averse in case of prior losses and less risk averse in case of prior gain (Barberis and Thaler, 2003); they will also take greater risks as their profit grow. This provides support for the notion that successful traders are more likely to be overconfident. The emotional state of investors when they decide on their investment is no doubt one of the most important factors causing bull market. From the neuroscience literature Peterson (2008) demonstrated correlations between reward anticipation and the arousal of affect (feelings, emotions, moods, attitudes, and preferences). He briefly outlined an investment strategy for exploiting the event-related security price pattern described by the trading strategy, “buy on the
rumor and sell on the news.”

In the Chow’s paper (Chow et al., 2015) they conduct a survey to examine whether the theory developed in Lam, et al. (2010, 2012) and Guo, et al. (2015) holds empirically by studying the behavior of different types of Hong Kong small investors’ in their investment, especially during financial crisis. They found that determinants of the Hong Kong small investors’ investment decision have uniform views as to the ascending order of importance of time horizon, sentiment, risk tolerance. Time horizon is the least important factor and risk tolerance is the most important factor.

1.5.4.2 Conclusion

On Monday, October 19, 1987, the Dow Jones Industrial Average fell 508 points, a drop of 22.6% in one day. This crash was unprecedented in stock market history. Shiller (1987) sent out questionnaires at the time of the October 19, 1987 stock market crash to both individual and institutional investors inquiring about their behavior during the crash. The survey results show that: 1. no news story or rumor appearing on the 19th or over the preceding weekend was responsible for investor behavior, 2. investors’ importance rating of news appearing over the preceding week showed only a slight relation to decisions to buy or sell, 3. there was a great deal of investor talk and anxiety around October 19, much more than suggested by the volume of trade, 4. many investors thought that they could predict the market, 5. Both buyers and sellers generally thought that before the crash that the market was overvalued, 6. Most investors interpreted the crash as due to the psychology of other investors, 7. Many investors were influenced by technical analysis consideration, 8. Portfolio insurance is only a small part of predetermined stop-loss behavior, and 9.
Some investors changed their investment strategy before the crash. In a questionnaire survey, Shiller et al. (1988) asked Japanese institutional investors to recall what they thought and did during the worldwide stock market crash in October 1987. The results confirm that the drop in U.S. stock price was the primary factor on their minds, and other news stories in the United States dominated Japanese news stories. The results suggest that events in the United States were the proximate cause of the crash in Japan, but that the transmission mechanism of the crash was very similar in both countries.

Ma (2007) analyzed that bubbles burst on average at 55X trailing PE (see Table 2).

Table 2 Bubble burst on average 55X trailing PE

<table>
<thead>
<tr>
<th>Country</th>
<th>Index</th>
<th>Beginning</th>
<th>End</th>
<th>P/E ratio 6 months before bursting</th>
<th>P/E ratio in the month of bursting</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>S&amp;P 500</td>
<td>Aug-00</td>
<td>Sep-02</td>
<td>24.4</td>
<td>29.0</td>
</tr>
<tr>
<td>US</td>
<td>Nasdaq 100</td>
<td>Mar-00</td>
<td>Sep-02</td>
<td>41.0</td>
<td>51.0</td>
</tr>
<tr>
<td>JP</td>
<td>Nikkei 225</td>
<td>Jan-90</td>
<td>Jun-92</td>
<td>55.1</td>
<td>71.0</td>
</tr>
<tr>
<td>KR</td>
<td>KSE KOSPI</td>
<td>Oct-94</td>
<td>Dec-97</td>
<td>16.0</td>
<td>21.0</td>
</tr>
<tr>
<td>TW</td>
<td>TSE Index</td>
<td>Jan-90</td>
<td>Sep-90</td>
<td>50.0</td>
<td>68.9</td>
</tr>
<tr>
<td>HK</td>
<td>Hang Seng</td>
<td>Feb-73</td>
<td>Dec-74</td>
<td>29.7</td>
<td>88.4</td>
</tr>
<tr>
<td>HK</td>
<td>Hang Seng</td>
<td>Jul-97</td>
<td>Aug-98</td>
<td>17.1</td>
<td>19.2</td>
</tr>
<tr>
<td>HK</td>
<td>Red-chip</td>
<td>Aug-97</td>
<td>Aug-98</td>
<td>15.0</td>
<td>52.3</td>
</tr>
<tr>
<td>SG</td>
<td>SGX All shares</td>
<td>Jan-00</td>
<td>Oct-01</td>
<td>76.4</td>
<td>92.4</td>
</tr>
<tr>
<td>CN</td>
<td>Shanghai Composite</td>
<td>Jun-01</td>
<td>Jan-02</td>
<td>58.2</td>
<td>56.5</td>
</tr>
<tr>
<td><strong>average</strong></td>
<td></td>
<td></td>
<td></td>
<td>38.8</td>
<td><strong>55.0</strong></td>
</tr>
</tbody>
</table>

Source: Ma Jun 2007, ‘Structural issues behind China’s market dynamics,’ Deutsche Bank AG, Hong Kong Branch, Sept, p.36

The major market corrections occur at average trailing PE of 55 times. Ma and Lu (2008) analyzed that barring a recessionary scenario in the US, and expecting materialization of stronger-than-expected earnings performance, they think that the H share market should support a forward PE of 16-17x towards the end of 2008. The summer Olympic Games, to be held in Beijing in August 2008, is the single most important event for China since Hong Kong’s return to China sovereign rule in 1997. It offers the opportunity for China to showcase its growth achievements and national
pride in front of several billion viewers for almost an entire month. The government will do everything in its power to ensure that China is portrayed as a country of prosperity, dynamism, and social harmony. Ackert and Deaves (2010) asked three questions to the readers in their books. How much of the market decline has been fundamental and how much of it an overreaction? Why has volatility increased so dramatically? And will the higher levels of volatility persist over time? We cannot say with certainty that the recently observed levels of stock prices and volatility are irrational, but it certainly seems difficult to argue that it was a rational response to changing fundamentals. A very important lesson can be learned from this episode, however – financial markets are already capable of surprising us.
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