

## **Chapter 3**

### **Methodology**

#### **3.1. Introduction**

The literature review in the preceding chapter established that people did not always make rational choices when presented with finance-related decisions. The primary motivation behind this study was to gain a better understanding of the cognitive and emotional influences behind the seemingly reckless actions of investment professionals who could have, and in some instances had, put the viability of their employers and integrity of the marketplace at risk. The underlying assumption was that investment professionals were better trained, had more investing experience, and had greater access to financial information and investment technologies. Coupled with a fiduciary duty to act in the interest of their employers and/or clients at all times, investment professionals were expected to be more rational in their judgement and dealings.

The discussions in this chapter consist of four main sections. The first section was a review of the conceptual framework on the role of learning in decision-making, to be followed by a discussion on the research approach (a mixed methods approach) and the issues behind this technique. The last two sections would be a review of the steps taken in the collection of the quantitative and qualitative data for this study.

#### **3.2. Conceptual Framework**

Any research on the topic of decision-making under uncertainty would call for an understanding of cognitive psychology, i.e. an examination of how people thought, how

they learnt, and how they acted when making a choice. Kahneman (2003) described a two-system approach to the decision-making process. The mental process in system 1 was reflexive and was fast, effortless, associative and often governed by emotions. System 2, on the other hand, was reflective and was slower, effortful and deliberately controlled. The conceptual framework behind the current study would be based on this two-system mental process.

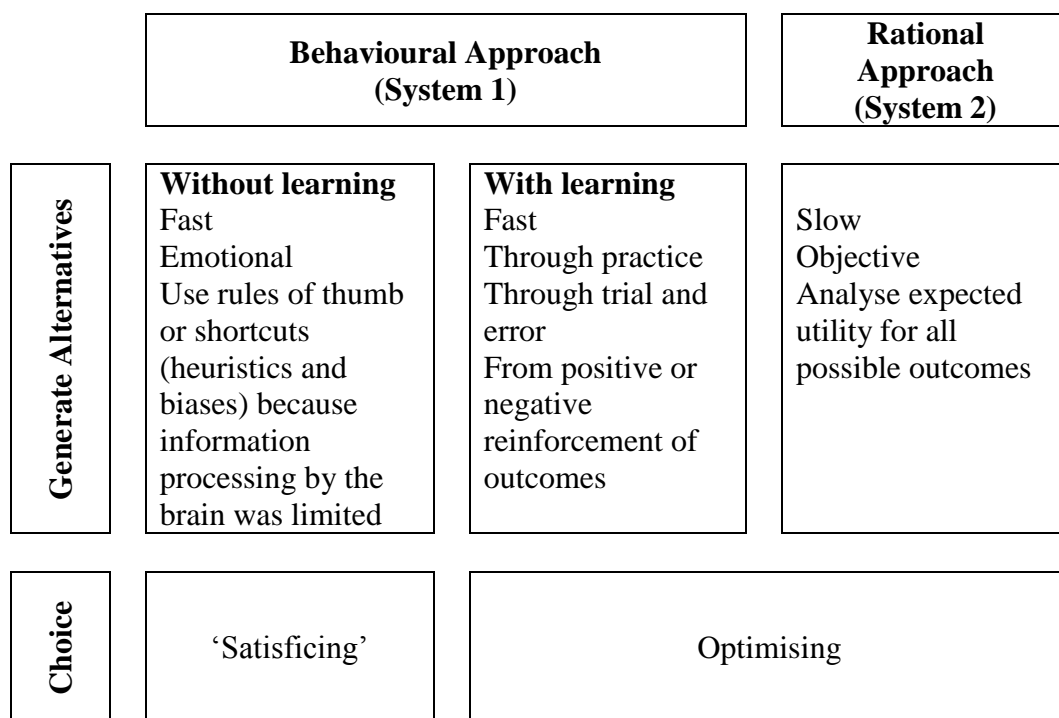
The key assumption behind most economic models of choice was that people were rational agents. In other words, people when required to make a decision would have all information regarding the different choices they faced, could determine the outcomes associated with each of these choices, could rank these outcomes and would chose the outcome associated with the highest utility. System 2 corresponded roughly to this mental process, where choice was optimised.

In reality, people are not entirely rational agents. Due to limited access to information, limited processing capacity of the brain and limited time available, the mental process when making choices would use short-cuts in the form of heuristics or 'rules of thumb'. Hence, people would not seek the best possible solution to problems but would rather accept choices that were 'good enough' for their purposes; which at times could be sub-optimal. Simon (1955) coined the term 'satisficing' to describe this decision-making behaviour in his theory of bounded rationality. System 1 corresponded roughly to this mental process.

However, Simon was of the view that this satisficing behaviour could be optimised. According to Kahneman, improving one's skills through prolonged practice would increase the accessibility of useful responses and thus speed up the evaluation process.

Kahneman (2003) gave the example of a master chess player who through years of practice developed the ability to play multiple games at the same time and win without slowing down, as performing intuitively. Lo (2004) in his adaptive markets hypothesis reinforced this notion that optimising behaviour could result from learning through trial and error, from experiences, and by receiving positive or negative reinforcement from outcomes. Over time people would develop best guesses as to what might be optimal.

The conceptual framework is summarised in Figure 3.1.



**Figure 3.1**

**Conceptual Framework**

Studies by Nicolosi, Peng and Zhu (2009), Glaser and Weber (2007) and List (2003) supported the notion that investors did learn from their investing experience. In support of these findings, Loomes, Starmer and Sugden (2003) proposed three hypotheses on how investors learnt from experience.

- i. The refining hypothesis stated that individuals refined their decision-making ability through repetition, feedback and incentives. Repetition enabled subjects to become more familiar with decision tasks and the objects of choice; feedback enabled subjects to experience the consequences of particular choices; and incentives provided a general motivation to attend to tasks carefully.
- ii. The market discipline hypothesis stated that individuals adjusted their behaviour to correct errors if and only if those errors had proved costly.
- iii. The shaping hypothesis stated that in repeated market environments, there was a tendency for individuals to adjust their bids towards the price observed in the previous market period.

In a similar vein, the strategy selection learning theory proposed by Rieskamp and Otto (2006) assumed that individuals would have formed subjective expectations for the choices available to them and would select the choice that best matched their expectations. These expectations would be updated on the basis of subsequent experiences. The learning assumption was supported in four experiments conducted by the authors where the participants were found to have substantially improved their inferences through feedback.

Further evidence of this two-system mental process could be found in the field of neurosciences; where research findings revealed that the human brain possessed two systems that processed information (Montier, 2007; Camerer, Loewenstein & Prelec, 2005; Weber, 2003). These two systems operated in parallel and were controlled by different parts of the brain. The system located in the region of the neo-cortex enabled information to be processed in a rule-based and analytical manner. The second system, located in the region of the brain stem worked on similarity and associations, and was strongly influenced by affective reactions like fear. While the two systems operated in parallel, people with more formal education and expertise tended to favour outputs from their rule-based analytic system, whereas the less experienced layperson tended to depend more on outputs from their associative and affective system.

### **3.3. Research Approach**

Much of the research on economic decision-making behaviour under uncertainty had been conducted by way of experiments, usually within a classroom environment, using decision games or questionnaires consisting of decision scenarios to collect data. The subjects of such experiments were typically university students, although more recent studies used subjects who were involved in the financial services industry (refer to Table 3.3). The main criticism of this approach was that hypothetical settings might not reflect real consequences, thereby raising questions regarding the validity and reliability of the research findings and the corresponding conclusions.

Alternatively, some researchers adopted the approach of analysing actual trading data of individuals to study the effect of behavioural biases on financial decision-making (Frino, Grant & Johnstone, 2008; Kumar & Lim, 2008; Coval & Shumway, 2005;

Garvey & Murphy, 2004). While such analyses had shed some light on the loss aversion tendencies of traders and investors, it would be challenging to use this data to examine certain behaviours, for example the framing effect, anchoring effect, status quo effect, etc. Moreover, in some jurisdictions like Malaysia, secrecy provisions in the securities laws would make access to individual investment data a problem for researchers.

In this study, the researcher opted for a mixed methods research approach. According to Creswell (2003), the earliest researchers to use multiple methods to study the validity of psychological traits were Campbell and Fiske (1959). The focus of this study, which was to examine the decision-making traits of investors, had some similarities with the study conducted by Campbell and Fiske. A mixed methods approach would also address some of the limitations associated with conclusions drawn from the analysis of data collected purely from self-reports. The statistical analysis in the quantitative approach would be augmented by case study analysis of observed behaviour in the qualitative approach.

### **3.3.1. Mixed Methods Research**

Mixed methods research is an alternative research approach that complements the traditional qualitative and quantitative research techniques. According to Creswell (2003) the collection of diverse types of data would be better applied in cases where addressing the research problem would involve the need to explore context and outcomes and to explain meanings and trends in both narrative and numerical formats.

In order to better understand this research approach, two definitions of mixed methods research are provided below; one by Creswell and Plano Clark (2007) which is more

comprehensive, and the other by Johnson and Onwuegbuzie (2004) which is more concise.

“Mixed methods research is a research design with philosophical assumptions as well as methods of inquiry. As a methodology, it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative approaches in many phases in the research process. As a method, it focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies. Its central premise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than either approach alone.”

(Creswell & Plano Clark, 2007, p. 5)

“Mixed methods research is formally defined here as the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study.”

(Johnson & Onwuegbuzie, 2004, p. 17)

### **3.3.1.1. Quantitative Approach**

A cross-sectional study was selected for the quantitative approach. Cross-sectional studies where subjects were measured once during a short data collection period were best suited for studies aimed at examining relationships between variables (Kumar, 2005). Longitudinal studies, on the other hand, involved taking at least two measures

over an extended time period. Longitudinal studies allowed researchers to measure change and to establish cause-effect relationships. This associative and not causal element is an inherent problem and weakness of cross-sectional studies. However, Babbie (2010) noted that some researchers would still attempt to draw conclusions of causal processes that occur over time from the findings of cross-sectional studies.

The research objectives outlined in Chapter 1 drew attention to the role of experience in financial decision-making behaviour, and where two of the key areas to be examined were:

- i. the similarities and differences in finance-related decision-making behaviour between investment professionals and retail investors; and
- ii. the relationship between demographic and socio-economic characteristics of the subjects and behavioural biases that were predicted by prospect theory.

In other words, the statistical analysis would be aimed at examining the relationship between the criterion variables (decision-making behaviour) and predictor variables (demographic and socio-economic characteristics). Therefore, a cross-sectional approach would be appropriate for this study.

Most cross-sectional studies were conducted through surveys, where the use of questionnaires had become a widely accepted data collection tool in social science research. Questionnaires had the ability to not only gather personal details and chronological data but also to solicit an individual's views on perception, preference and choice, which could serve as inputs for studies on behaviour (LeBaron, Gail & Susan, 1989). Compared to observing the actual behaviour of individuals over a period of time, surveys had a wider reach, took less time to complete and under certain circumstances, were more cost effective.



Primary data for this study was collected using both on-line and printed questionnaires. The questionnaire consisted of a variety of finance-related decision scenarios aimed at simulating actual decision-making behaviour under similar circumstances. One of the techniques used by social and behavioural scientists to study human attitudes, behaviour, feelings or thoughts was self-reporting. However, researchers had been cautioned when analysing or interpreting self-report measures because the responses from individuals could be inaccurate or unreliable (Schwarz & Oyserman, 2001; Schwarz, 1999). Two reasons had been cited for this phenomenon. Individuals who gave inaccurate responses either did so unintentionally due to lapses in memory, or intentionally in order to present oneself in a socially acceptable manner.

The researcher was aware of the problems associated with the use of questionnaires in a survey, for example reaching the target population, obtaining an acceptable sample size, and gathering valid and reliable data. The discussion in Section 3.4 would focus on the issues of questionnaire design, sampling technique and conduct of the survey to address these issues.

It had been suggested in the literature on survey techniques that subjects who were interested in the topic of the research and were willing to participate would very likely be motivated to respond truthfully. Furthermore, if the questions were well-worded and not too difficult to understand, and the questionnaire did not take too long to complete, the response rate would be higher (Olsen & St. George, 2004).

### 3.3.1.2. Qualitative Approach

The case study methodology had been recognised as a strategic tool by researchers who were looking for a more in-depth understanding of a phenomenon or behaviour. Robert Yin defined the case study research method in two parts as follows:

- “1. A case study is an empirical inquiry that
  - investigates a contemporary phenomenon within its real-life context, especially when
  - the boundaries between phenomenon and context are not clearly evident.
2. The case study inquiry
  - copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result
  - relies on multiples sources of evidence, with data needing to converge in a triangulating fashion, and as another result
  - benefits from the prior development of theoretical propositions to guide data collection and analysis.”

(Yin, 1994, p. 13)

Supporters of this research approach argued that the case study inquiry which produced detailed accounts of the phenomenon or behaviour in a real-life setting and from multiple viewpoints, would provide a better understanding of the complexities and relationships of the issue under study. Such perspectives of the research problem might not be captured through experimental or survey research (Zainal, 2007). Critics, on the other hand, highlighted weaknesses in establishing reliability or generality of findings

due to a single or small number of cases. Another concern was the lack of rigour in the methodology which might allow one-sided evidence or biased views to shape the direction of the results or conclusions (Zainal, 2007; Tellis, 1997; Yin, 1994).

In response to the issues raised, Yin (1994) provided researchers with guidelines for the design, conduct, analysis and write-up of case studies that would satisfy the methodological rigour required for quantitative research; i.e. describing, understanding and explaining. Yin opined that the logic for the selection of cases should be the ability to replicate the findings rather than randomness of the sample. Furthermore, the generalisation of results, whether from a single case or multiple cases, should be to theory and not to the population. Hence replication of the findings from multiple case studies would increase confidence in the strength of the theory.

The distinctive characteristics and descriptive analysis of case study research made it a useful investigative tool when used in combination with the statistical analysis of the survey data. For the qualitative approach in this study, the researcher chose a multiple-case design, where five case studies would be selected for the purpose of comparison and generalisation.

### **3.3.2. Hypothetical Bias**

A common technique among researchers in the study of human behaviour, including decision-making behaviour, was the use of hypothetical situations in games or written formats. Subjects were presented with hypothetical scenarios and were then asked to make a decision based on the given scenarios. The legitimacy of this research methodology hinged on whether people 'do what they say they would do'. This

discrepancy between intentions and actions was termed hypothetical bias. One explanation for the hypothetical bias was that people would make different decisions under hypothetical situations where no consequences were suffered as opposed to decisions where the consequences would be real (Wiseman & Levin, 1996).

There were also counter arguments on the influence of the hypothetical bias in behavioural research. Kuhberger, Schulte-Mecklenbeck and Perner (2002) posed the question whether one could investigate people's decisions in real life by asking them to form an image of what they would do if they were in a particular real life situation. They argued that the process of decision-making was in fact hypothetical; that the process essentially involved anticipating potential outcomes and evaluating them, and where at the time of the decision, none of these outcomes were real. This process would be the same for both real and hypothetical decisions. Hence, the authors concluded that real and hypothetical decisions would result in similar choices.

Most of the studies carried out to seek evidence of the hypothetical bias were based on the willingness of subjects to pay for goods or services not transacted in the market place<sup>15</sup>. The findings from these studies were mixed; where the subjects either overstated or understated the economic valuation of the good, or where there was little or no difference between hypothetical and actual values. Some suggestions from these studies to reduce the hypothetical bias were the use of a choice-based stated preference valuation format (Murphy et al., 2005), realism in the survey design (Cummings & Taylor, 1998), and 'cheap talk', which was a script to inform the subjects about the bias in order for them to self-correct for it (Murphy, Stevens & Weatherhead, 2005; Brown, Ajzen & Hrubes, 2003).

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<sup>15</sup> Examples of such goods or services were public services related to environmental preservation, health care, road safety etc. Some of the studies also looked at the validity of opinion polls.

Outside of academia, financial advisors had been known to use questionnaires to measure the risk tolerance<sup>16</sup> of investors. Questionnaires which were designed to comply with psychometric standards consisted of questions relating to attitudes, values, preferences, emotions or behaviour in situations that involved risk. From the choices that ranged from riskless to risky, investors would be assigned a final score that corresponded to one of five investment risk tolerance categories, i.e. very conservative, conservative, moderate, aggressive and very aggressive<sup>17</sup>. Subedar (2007) in his thesis confirmed that standardised psychometrically validated risk tolerance questionnaires were effective in providing objective and unbiased assessments of investors' risk tolerance.

Overall, there seemed to be much support for the position that a decision made under hypothetical circumstances would be a reasonable reflection of the decision that would be made in the same context with real consequences. Nonetheless, efforts were still taken in the questionnaire design to minimise the influence of the hypothetical bias, if any.

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<sup>16</sup> Risk tolerance was defined as the amount and type of risk an investor would be willing to take to achieve his/her investment goal. As an example, securities that had volatile returns like small-cap stocks or derivatives would typically not be suitable investments for investors who were categorised as very conservative.

The assessment of an investor's tolerance level for risk is a regulatory requirement under the 'know your client' rule in almost all capital markets around the world. This assessment should be carried out before any financial advice or sale of an investment product could be made to an investor. This requirement ensured that the investor would not be sold investment products that were unsuitable based on the investor's risk profile.

<sup>17</sup> Refer to Appendix 3.1 for a description of the five commonly used risk tolerance categories.

### **3.4. Design of Questionnaire and Conduct of Survey**

One of the most frequently used data collection tool, both for academic research and commercial purposes, was the survey questionnaire. Some of the advantages of self-administered questionnaires cited were:

- cheaper to conduct compared to telephone or face-to-face interviews, especially when the survey involved a large sample population and/or had a wide geographical coverage; and
- for questionnaires with closed-ended question formats:
  - easy and quick to answer;
  - less intrusive in that participants could respond in their own time;
  - pre-determined choices could promote consistency in terms of understanding the questions and responses; and
  - data collected would be easier to code and analyse.

However, self-administered questionnaires often run the risk that the questions could be misinterpreted, and as there was no avenue to provide any form of clarification, the responses might be inaccurate and hence distort the findings of the study. This highlighted the importance of good questionnaire design, particularly with respect to the wording of questions for clarity and desired interpretation. The other disadvantage was that recipients could ignore the questionnaire and if there was no follow-up in the form of reminders, could result in a low response rate.

Validity and reliability are essential for a good questionnaire (Field, 2005). Validity refers to how well the concept or construct of the study is being measured, and reliability refers to the ability to produce the same results under the same conditions.

The questions for this study consisted of decision scenarios that were similar to those used in prospect theory experiments. Most of the choices given were dichotomous in nature, where one choice represented a rational decision and the other an irrational or emotional decision. One test of the validity and reliability of the questionnaire would be whether the results obtained were consistent with the findings from existing research in prospect theory.

In the design of the questionnaire, the researcher paid particular attention to research findings on increasing response rates and encouraging truthful answers. Roszkowski and Bean (1990) conducted a postal survey of 8,534 subjects to study the effects of questionnaire length on response rate and response bias. Their findings showed that questionnaires with fewer questions had higher response and completion rates than longer questionnaires. This finding was confirmed by Edwards et al. (2002) in a review of 292 randomised controlled trials of any method to influence response to mail surveys. The other relevant findings of the review were that response rates increased when incentives were offered for completing and returning the questionnaire, when the questions were of interest to the participants, and when the questionnaires were from universities rather than commercial sources.

Anonymity or assurance of confidentiality and the effect on response characteristics like response rate, item omission and quality of item responses, was another concern in survey data collection. Anonymity requires that the identity of respondents not be known to anyone; and confidentiality requires that the responses not be disclosed without the respondents' expressed permission. The results from studies on the effects of anonymity or confidentiality on response rates were mixed, where most reported that there was little evidence that anonymity or confidentiality had any effect on survey

response rates (Yeager, 1998). Nonetheless, good survey research practices recommended that researchers should take measures that would assure respondents that their identities and responses would be kept confidential.

It was suggested by Doyle (2001) that mail surveys should include a brief introduction of the study in order to deliver three messages important for increasing the response rate:

- i. a promise of confidentiality of responses;
- ii. an explanation of why the success of the study depended on the respondents' full participation; and
- iii. an estimation of the time to complete the questionnaire.

In the introduction before the questionnaire proper for this study (shown below), the researcher had attempted to include the suggestions by Doyle, aimed at minimising survey response biases.

Dear Sir/Madam

I am a student from Universiti Malaya and am writing my doctoral thesis in economics. My research topic deals with factors affecting the financial decision-making behaviour of private investors, as well as institutional or professional investors.

The questionnaire consists of 13 questions that ask you to assume or imagine that you are in a certain situation. The objective of each question is to gain a picture of what you would do in such circumstances regardless of whether you have ever been in them or ever likely to be in them. For each question please answer or chose the best option given based on the information given. There is no right or wrong answer. The success of my doctoral research is highly dependent upon your honest response to each question.

The data gathered would be used only for the purpose of my doctoral thesis, and would be kept confidential. Your anonymity is assured.

The questionnaire should take about 10-15 minutes to complete. Please email the completed questionnaire to [survey.chak@gmail.com](mailto:survey.chak@gmail.com), and I will send you a brief that would explain some aspects of investor psychology behind each question.



While there was no offer of monetary incentives or gifts, respondents were promised an explanation of the investor psychology behind each of the choices for each decision scenario, upon receipt of a completed questionnaire. (Refer to Appendix 3.2 for a copy of this explanation.) This allowed the respondents to do a self-assessment, i.e. to determine whether they were rational or irrational investors. As the selection criteria for the target population were people who had some knowledge and/or experience in investments, it was assumed that providing respondents with insights to “why smart people make big money mistakes” would be of interest to them. This was similar to the motivation that attracted people to take personality or intelligence tests; i.e. an opportunity to learn something about themselves.

#### **3.4.1. Criterion Variables**

Prospect theory had been widely accepted by researchers in behavioural studies as a descriptive framework on how people made decisions in situations that involved uncertainty, like financial decisions. Unfortunately, prospect theory could not provide an explanation for all the behavioural biases that influenced financial decision-making. The more commonly observed behaviours associated with prospect theory were conduct that resulted from the anchoring, loss aversion, mental accounting and status quo biases.

Anchoring was the tendency to rely on certain pieces of information, regardless of their relevance. Loss aversion was the tendency to avoid losses rather than to acquire gains because the pain from a loss was greater than the pleasure from a gain of the same quantum. Mental accounting was the tendency to group assets into different categories where the gains and losses in each category were treated separately and at times

differently. Status quo was the tendency to choose inaction as the best course of action going forward. These four biases formed the basis for the measurement of the criterion variable.

The questionnaire consisted of 13 finance-related scenarios, where each scenario had response choices which represented a rational decision and an irrational decision. Only the questions on the endowment effect were presented in an open-ended format. The hypothetical scenarios and response choices presented were adapted from experiments conducted in research on prospect theory. Each bias under study was represented by more than one question, the exception being behaviour like the disposition effect and endowment effect which straddled two biases (refer to Table 3.1). This was done to test for consistency in the responses.

**Table 3.1**  
**Criterion Variables**

<b>Mental Accounting Bias</b>	<b>Loss Aversion Bias</b>	<b>Status Quo Bias</b>	<b>Anchoring Bias</b>
Q3 (house money effect) Q6 & Q7	Q1, Q2, (framing effect) Q4 (snakebite effect) Q5 (breakeven effect)	Q12	Q8, Q13
Q9 (disposition effect)			
	Q10 & Q11 (endowment effect)		

One disadvantage of the closed-ended question format was that it did not allow respondents to express a decision which was different from the pre-determined choices, and hence would not capture data that the researcher might have failed to anticipate. An open-ended question format would definitely yield more varied responses but would be

problematic to code for subsequent statistical analysis due to the difficulty in identifying common responses from the data collected.

The researcher was of the view that allowing for free expression of responses with an open-ended format for this study might not serve to improve the results. Respondents in the survey were asked to choose the response choice that best represented the decision they would make if they found themselves in the same situation as the presented scenarios. Evidence from literature on the effect of the hypothetical bias in behavioural studies showed that people 'do what they say they would do'. The choice of either a rational or irrational response would be a reasonable indication of the tendency of the respondent to be influenced by the bias under study.

#### **3.4.1.1. Coding the Decision Scenarios**

The criterion variables were measures for decision-making behaviour, where rational decisions were coded as zero (0) and irrational decisions were coded as one (1). The rationale behind the coding for each decision scenario would be discussed in this section, where the term 'irrational individual' was used to refer to a person whose response choices were influenced by cognitive biases.

*Question 1*

Suppose you have RM20,000. When presented with the following options, which would you choose?

- (a) A 100% chance to win RM5,000
- (b) A 50% chance to win RM10,000 and a 50% chance to win nothing

*Question 2*

Now, suppose you have RM30,000. When presented with the following options, which would you choose?

- (a) A 100% chance to lose RM5,000
- (b) A 50% chance to lose RM10,000 and a 50% chance to lose nothing

Questions 1 and 2 were based on experiments in loss aversion cited in Kahneman and Tversky's (1979) paper on prospect theory. The results from the experiments conducted showed that an irrational individual would choose (a) for question 1 and (b) for question 2.

Irrational individuals would view the two scenarios as separate and different, where the decision taken would be based on the gains and losses of each scenario independently. In question 1, an individual's predisposition to avoid a loss implied a preference for a sure gain to a gamble of the same expected value. However, in question 2, when faced with a sure loss, the chance to lose nothing induced a preference for the gamble.

On the other hand, the rational individual would treat the two decision scenarios as identical, i.e. when viewed in terms of state of wealth. The individual who would not take a gamble and choose (a) for both questions would end up with RM25,000. The individual who would take a gamble and choose (b) for both questions would end up with RM20,000 or RM30,000 with equal probabilities. Hence, a rational individual who was more concerned about the final state of wealth would either chose a sure thing or gamble instead of flipping preferences.

*Question 3*

You have just won RM1,000. Now choose between:

- (a) A 50% chance to gain RM200 and a 50% chance to lose RM200
- (b) No further gain or loss

*Question 4*

You have just lost RM1,000. Now choose between:

- (a) A 50% chance to gain RM200 and a 50% chance to lose RM200
- (b) No further gain or loss

*Question 5*

You have just lost RM1,000. Now choose between:

- (a) A 30% chance to gain RM1,000 and a 70% chance to gain nothing.
- (b) A sure gain of RM300.

Questions 3 to 5 were based on experiments conducted by Thaler and Johnson (1990) on how loss aversion in decision-making would be influenced by prior outcomes. The findings from Thaler and Johnson's research suggested that an irrational individual would choose (a) for question 3, (b) for question 4 and (a) for question 5.

In question 3, a prior gain could stimulate risk-seeking in a person. The gain would be put into a separate mental account and would not be viewed the same as one's own money. The individual would then have different risk preferences for the money in each account, i.e. own money account and gains account. This was known as the house money effect where individuals were prone to take on more risk after experiencing a gain.

In questions 4 and 5, prior losses would not stimulate risk-seeking unless the gamble offered a chance to breakeven. The pain experienced from an initial loss would discourage an individual from accepting a gamble that might incur a further loss and hence more pain. This was often known as the snakebite effect. However, an

opportunity to get back to the original reference or breakeven point could change an individual's risk-seeking behaviour. In other words, when prior losses were present, gambles that offered the prospect of recouping losses would be treated differently from gambles that did not. This was known as the breakeven effect.

A rational individual should not be affected by a prior outcome, where gains or losses experienced the past would not form part of the decision-making process. Prior outcomes of investments were sunk, were irrelevant, and should not overly influence an individual in making the next investment decision.

*Question 6*

You have bought a ticket to a play that you have waited for a long time to see. At the theatre you realise that you have lost your ticket, which cost RM150. Do you spend another RM150 to see the play?

- (a) Yes
- (b) No

*Question 7*

You are going to a play that you have waited for a long time to see, but you have not bought your ticket, which costs RM150. At the theatre you realise that you have lost RM150 in cash. If you still have enough money, do you buy a ticket to see the play?

- (a) Yes
- (b) No

Questions 6 and 7 had been cited as examples of mental accounting (Kahneman & Tversky, 1984). Research findings suggested that an irrational individual would chose (b) for question 6 and (a) for question 7.

It should be noted that both scenarios offered the same outcome, i.e. total out-of-pocket cost of RM300 for a product valued at RM150. The difference in response was attributed to the organisation of an individual's mental accounts; where one account

would be the experience of seeing the play and the other account would be cash. The cost of the ticket represented the experience of seeing the play and buying a second ticket would increase the cost for that experience which an irrational individual might find unacceptable. However, the loss of cash would not be posted to the account of seeing the play. The irrational individual would view the scenario in question 7 as two independent mental accounts, RM150 in lost cash and the RM150 for a ticket, which would be more acceptable.

*Question 8*

Investor A owns 100 shares of a stock, which he paid RM10 per share. Investor B also owns 100 shares of the same stock for which he paid RM20 per share. The value of the stock was RM16 per share yesterday, and today it dropped to RM14 per share. Who in your view is more upset?

- (a) Investor A
- (b) Investor B

This example was used by Kahneman and Riepe (1998) to explain the behaviour of investors who often used the purchase price as a reference point. An irrational individual would choose (b) as he/she would rationalise that investor A would treat the bad news as a reduction in a gain, while investor B would see the same news as an increased loss. The value function in prospect theory was steeper in the area for losses than for gains. Hence the RM2 drop in stock price and the feeling of pain would be more significant for investor B (overall loss of RM6) than for investor A (loss of RM2).

*Question 9*

You invested RM200,000 in stocks A and B where you paid:

- RM8 per share for stock A; and
- RM15 per share for stock B.

After 1 year, your initial investment increased in value to RM230,000 where the value of:

- stock A increased to RM15 per share; and
- stock B decreased to RM10 per share.

You have no information to evaluate the future performance of either stock and both are equally susceptible to changes in the economic outlook. If you need to pay for an expense of RM30,000 from your investment portfolio, how would you choose to pay for that expense?

- (a) Sell RM30,000 of stock A
- (b) Sell RM21,000 of stock A and RM9,000 of stock B
- (c) Sell RM9,000 of stock A and RM21,000 of stock B
- (d) Sell RM30,000 of stock B

Question 9 was an illustration of the disposition effect, which was the tendency of individuals to sell stocks whose value had increased, while keeping stocks that had dropped in value (Shefrin & Statman, 1985). An irrational individual would choose (a). According to prospect theory, an individual would feel the pain from a loss more strongly than the pleasure from an equal gain. Selling a stock at a loss would make the loss 'final' along with an admission that the decision to invest in that particular stock was a mistake. Alternatively, realising a gain would give rise to feelings of pleasure and pride.

In addition to loss aversion, the feeling of regret had been identified as relevant in the decision to realise gains or losses (Muermann & Volkman Wise, 2006; O'Curry Fogel & Berry, 2006). Studies had shown that the feeling of regret from an act of commission was greater than from an act of omission. This meant that the feeling of regret would be greater if the stock which was sold at a loss subsequently gained in value, than if the



stock was held on with further loss in value. Hence, loss aversion and regret explained why individuals held on to their paper losses until their investment at least broke-even.

*Question 10*

Your family has a 5-acre parcel of land in a rural area. This parcel of land has been in your family for four generations. You are contacted by a real estate agent who wants to know if you are interested in selling the whole 5 acres for RM200,000 or any significant portion of the parcel for RM40,000 per acre. The agent tells you that this is the current market price.

What would be the lowest price you would accept to sell the land?

RM \_\_\_\_\_ per acre

*Question 11*

You have RM200,000 and is thinking about owning some rural property. A real estate agent contacts you to say there is a 5-acre parcel of land in a rural area available for sale, and that the current market price is around RM40,000 per acre.

What would be the highest price you would offer to buy the land?

RM \_\_\_\_\_ per acre

Questions 10 and 11 taken together, was an example of the endowment effect. Thaler (1980) described this behaviour as the tendency of individuals to place a higher value on objects they owned relative to objects they did not own.

An irrational response would be one where the value given for question 10 would be higher the value given for question 11. Once an individual owned something, the idea of giving up the object became a potential loss which would evoke the feeling of pain. Therefore, when setting the sale price, the individual would likely overvalue the item in order to compensate for this perceived loss. In addition to loss aversion, the endowment effect was also linked to the status quo bias. In this case, the preference to do nothing or to maintain one's current position could be overcome by setting a higher selling price. The rational individual would quote the same value for the land in both questions 10 and 11.

*Question 12*

You have an investment portfolio that consists of small-cap stocks of moderate risk. You recently inherited an investment portfolio that consists of stocks that are of low risk. What would you do with your newly inherited portfolio of stocks?

- (a) Do nothing
- (b) Sell the stocks in the portfolio to buy stocks of your choice

Question 12 was adapted from experiments to test for the status quo effect by Samuelson and Zeckhauser (1988). An irrational individual who chose (a) would be exhibiting behaviour consistent with the status quo bias. This was the tendency to do nothing and to keep the investments received rather than to exchange it for other types of investments. An individual when faced with many investment choices could find the task of making a decision daunting. As a result, these individuals would choose to avoid making a decision and do nothing.

*Question 13*

You have been trying to sell your semi-detached house. Your asking price is RM500,000 and have rejected offers of RM450,000. After a 6-month period, you receive a new offer of RM430,000 for your house. The real estate agent tells you that this is now the market price.

- (a) Accept the offer
- (b) Reject the offer

Question 13 was adapted from an example in Pompian (2006) on the anchoring bias. An irrational individual would choose (b). The reference points of value would be the original asking price of RM500,000 and the last offer price of RM450,000. The anchoring bias would hinder an individual from incorporating updated information when making a decision, which in this case would be the market price. In this example, the fact that the housing market could be softening was not be taken into consideration when choosing the option to reject the offer.

### 3.4.2. Predictor Variables

The predictor variables were demographic and socio-economic characteristics of the respondents that were relevant to concept of ‘experience’. The Webster’s Encyclopedic Unabridged Dictionary of the English Language (1989) defined ‘experience’ as:

- The process or fact of personally observing, encountering, or undergoing something.
- The observing, encountering, or undergoing of things generally as they occur in the course of time.
- Knowledge or practical wisdom gained from what one has observed, encountered, or undergone.
- The totality of the cognitions given by perceptions; all that is perceived, understood, and remembered.

The choice of predictor variables would revolve around this definition.

Table 3.2 is a listing of the predictor variables in the questionnaire along with its relevance to the concept of experience. Coincidentally, these same variables were used by financial advisors as heuristic predictors of the financial risk tolerance of investors (Subedar, 2007). While the use of demographic and socio-economic indicators to assess financial risk tolerance might still be in practice, the use of psychometric questionnaires where the outputs were more objective and consistent had become the gold standard.

**Table 3.2****Predictor Variables**

<b>Predictor Variable</b>	<b>Rationale for Choice of Variable as a Proxy for ‘Experience’</b>	<b>Commonly Held Beliefs Pertaining to Financial Risk Tolerance</b>
Age	Older people, over their lifetime, would have more opportunities to learn about financial matters, sometimes from trial and error	Younger investors were more risk tolerant as they had a longer investment horizon and the capacity to recover from losses
Gender	Men who were usually the head of the household would normally be responsible for and thereby more experienced in investment matters	Men were more risk tolerant
Education Level	Higher levels of education would enhance ability to understand financial matters	Individuals with higher levels of education were more risk tolerant
Ethnicity	Not applicable	Cultural differences might have an effect on risk tolerance
Household Income	Higher income levels would translate to more disposable income to engage in investing activities	Individuals with higher income levels were more risk tolerant
Type of Investor	Investment professionals would naturally have more investing experience than non-investment professionals	Individuals with more knowledge of finance or investment were more risk tolerant
Years of Investing Experience	Self-explanatory	
Estimated Net Worth or Size of Portfolio	Greater wealth would mean the individual would have a larger portfolio of investment assets, and hence more investing experience	Individuals with greater wealth were more risk tolerant as they had the financial capacity to incur uncertain returns over a sustained period of time

Most of the predictor variables were presented with a closed-ended list of responses for the respondents to choose from, except for ‘age’ and ‘years of investing experience’ which were open-ended. For the closed-ended questions, care was taken to ensure that the list of responses would be comprehensive enough to capture the required personal data from the respondents.

For the variable ‘investor type’, investment professionals were defined as people who on a professional basis were engaged in investments in financial assets and/or evaluation of financial assets for the purpose of investment. Respondents who were dealers/traders, remisiers, fund managers, investment advisers and financial analysts would fall under the definition of investment professionals. This list was provided to ensure that respondents whose line of work involved dealing in financial matters, like accountants, financial executives etc., would not classify themselves as investment professionals by mistake. Non-investment professionals were individuals who invested for their own account rather than on behalf of a third party.

For personal data which were sensitive in nature like ‘income’ and ‘net worth’, broad categories of responses were offered. For example, the categories for total monthly household income were <RM5,000, RM5,000 – RM9,999, RM10,000 – RM19,999, RM20,000 – RM29,999, and  $\geq$ RM30,000. Respondents who were usually not comfortable to disclose specific numbers for such personal data might be more willing to choose a broad category.

### **3.4.3. Pre-testing**

Another recommended practice in survey research was to run a pilot test of the questionnaire before the main survey, a procedure known as pre-testing. The process involved administering the questionnaire to a small group of people from the target population in order to obtain feedback on the design of the questionnaire; for example whether the respondents understood what was required from the wording of the scenarios and response choices, whether there were any questions (including questions

on personal information) that the respondents might deem sensitive and were not willing to provide a response, and what could be done to interest people to participate in the survey. The pre-test also provided an estimation of the time needed to complete the questionnaire.

The pre-test for this study was conducted on a group of 20 persons<sup>18</sup> that had the following characteristics:

- professional and retail investors;
- male and female respondents;
- representation from the Bumiputra, Chinese and Indian communities; and
- investing experience ranging from less than one year to more than 10 years.

The researcher was present at the pre-test session to respond to any queries on the decision scenarios and to receive comments on how to improve the decision scenarios to make them more realistic and relevant.

From the analysis of the results of the pre-test session, the researcher made the following changes to the pre-test questionnaire:

- developed new decision scenarios to replace those scenarios where the results from the pre-test were not consistent with the behaviour described by prospect theory; and
- revised some of the monetary or reference values in the decision scenarios to make them more realistic and applicable.

The questionnaire for the main survey is attached as Appendix 3.3. A second pre-test was not carried out on the final draft of the questionnaire.

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<sup>18</sup> It was assumed that the pre-test sample size of 20 was appropriate as it was comparable with the sample sizes of some behavioural finance experiments, for example, Vicek and Wang (2007) used 59 undergraduate students and Brown (1995) used 43 undergraduate students.

#### **3.4.4. Sampling Design**

In social science research, collecting data from every individual in the population under study would usually not be possible. Instead, data would be collected from a subset of individuals who fulfilled the requirements of the study, a process known as sampling. The critical elements in a good survey were (1) a well-worded questionnaire; and (2) assurance that the right population was being sampled. The former was discussed above, while the latter would be looked at in the discussions that follow.

There were two general approaches to sampling: random sampling and non-random sampling. In random sampling, all subjects in the population had the same opportunity of being included in the sample. The data collected could then be analysed and used to make inferences about the entire population. Techniques used to select a random sample were simple random sampling, stratified random sampling, cluster sampling, and multistage sampling.

In contrast, with non-random sampling, subjects were usually selected based on availability or the researcher's judgement of the subject's representativeness. Hence, there could be a proportion of the population that might not be sampled, and as a result the sample might or might not accurately represent the entire population. The more commonly used techniques to select a non-random sample were convenience sampling, quota sampling, judgemental sampling, and snowball sampling.

The researcher decided to adopt a non-random sampling approach, using snowball sampling, as the means to collect primary quantitative data for this study. While most

survey research guidelines recommended the use of random sampling, the researcher was of the view that was neither practical nor necessary to use probability sampling for the following reasons:

- i. There was no official statistics or information with regard to the sampling frame. The target population was people with experience in investing activities or had knowledge of finance and investment matters.
- ii. The aim of the study was to examine a particular trait within the target population, i.e. financial decision-making behaviour.
- iii. It was not the primary concern of the study to generalise the findings to the entire population.
- iv. Binomial logistic regression would be the main method used for data analysis. This statistical technique made no assumptions about the distribution of the sample population.

Furthermore, one advantage of non-random sampling was that it was relatively easy to conduct and was cost effective.

Snowball sampling was chosen over the other non-random sampling techniques for the following reasons:

- i. The purposive nature of the snowball sampling technique in identifying the initial and subsequent sets of respondents would ensure that the right individuals in the target population would be sampled. It had the ability to specifically reach the target population compared to other sampling methods.
- ii. The referral feature of the snowball sampling technique could act as a form of 'peer pressure' to get people to participate in the study.

This sampling technique was also compatible with the data collection strategy of distributing the questionnaire via the internet.



### **3.4.5. Survey Strategy**

Data collection was carried out via a dual mode strategy; where the questionnaires were distributed through email and by hand. This two-pronged approach was adopted to increase coverage of the target population as not everyone in the target population would have access to the internet.

The first set of relevant respondents who received the questionnaire by email were selected from individuals who worked in financial institutions like commercial and investment banks, insurance companies, fund management companies, stock broking companies, financial advisory companies, rating agencies and regulatory bodies. These individuals were requested to respond to the questionnaire and/or forward it to their colleagues, clientele and acquaintances who might be interested to participate in the survey. In order to keep the transmission process going, the researcher would request individuals who returned the completed questionnaire to recruit other individuals. This non-random sampling approach was known as exponential non-discriminative snowball sampling. It was assumed that the likelihood of duplicates in the responses would be low because the specific nature of the survey questionnaire would trigger recognition in individuals who had already responded.

It was assumed that investment professionals as defined would be a small subset of the target population. The strategy to go for financial institutions first was to obtain enough responses from this subgroup in order to run meaningful correlation and regression analyses on the sample. The initial requests were also targeted at the more senior members of the financial institutions as subsequent referrals from this group of

individuals would be more persuasive in soliciting participation from their staff and colleagues.

Printed questionnaires were also given to individuals who were not in the researcher's email list. These individuals were also given extra copies of the questionnaire to be passed on to other people in a bid to increase the sample size. Most of the responses from the printed questionnaires came from groups of graduate management trainees in a local banking group. These groups of individuals were targeted to provide some variance in the sample with respect to age and years of investing experience. Not all the management trainees were fresh graduates, and due to the fact that they had been selected to work in a financial institution, they would have had some prior knowledge and exposure to financial and investment matters regardless of their investment experience.

The survey period which was approximately eight weeks ended when no responses were received, either by email or by hand, within a two-week period. A total of 284 responses were received, out of which 56 came from the printed questionnaires. Comments from some of the respondents via email revealed that they appreciated the feedback on their responses to the scenarios in the questionnaire in the form of Appendix 3.2. Unlike other surveys that these respondents had participated in where no feedback was given, in this survey, they learnt something about the psychology behind investing decisions.

This could have been a contributing factor in building participation during the sampling period, and was consistent with the finding by Edwards et al. (2002) that response rates increased when incentives were offered for completing and returning the questionnaire.

Surveys which did not incorporate some form of human interaction like face-to-face or telephone interviews, would typically experience low response rates as the received questionnaires could be ignored or thrown aside.

While assurance of confidentiality of responses was given in the introduction to the questionnaire, the channel used for data collection also provided some form of anonymity. Respondents who did not wish to reveal their identities could return the questionnaire using unidentifiable email addresses. There was also nothing in the printed questionnaires to identify it with the respondent. This could have played a part in the relatively low rate of 'missing' data for each item in the questionnaire, i.e. around 1% of the sample. Only the variables 'total monthly household income', 'years of investing experience' and 'estimated net worth' recorded missing data of 12 (4.2%), 15 (5.3%) and 22 (7.7%) respectively. The higher rate of missing data for the variable 'estimated net worth' could have been that the respondents were unsure of the meaning of net worth. A brief definition should have been provided in the questionnaire.

#### **3.4.6. Sample Size**

Another important consideration in conducting a survey would be determination of the sample size. According to Lenth (2001) a sample that was too small might not have enough data points to produce useful findings, while a sample that was too large would be a waste on the resources allocated in carrying out the survey. In general, an appropriate size would be one that should be large enough to show some variability in the attributes being measured.

Literature on sampling techniques proposed several methods to determine an appropriate sample size. Some of these methods include sampling the entire population if it was small enough, use the same sample size of similar studies, use published tables and apply formulas to calculate the sample size. For this study, it would not be feasible to conduct a census on the target population, and published tables and formulas were not applicable for non-random samples. However the sample size for this study, which was 284 respondents, was comparable with other studies in behavioural finance as shown in Table 3.3.

**Table 3.3**  
**Experiments in Behavioural Finance**

<b>Year</b>	<b>Author</b>	<b>Study</b>	<b>Sample Size</b>
<i>Responding to hypothetical scenarios</i>			
2007	Markus Glaser, Martin Weber	Why inexperienced investors do not learn: They do not know their past portfolio performance	215 online broker investors
2006	Lukas Menkhoff, Ulrich Schmidt, Torsten Brozynski	The impact of experience on risk taking, overconfidence, and herding of fund managers: Complementary survey evidence	117 German fund managers
2005	Masashi Toshino, Megumi Suto	Cognitive biases of Japanese Institutional Investors: Consistency with Behavioral Finance	488 respondents from 48 financial institutions
2003	E. Asgeir Juliusson	Effects of gain and loss frame on escalation	80 undergraduates at Goteborg University
1988	William Samuelson, Richard Zeckhauser	Status quo bias in decision making	486 students at Boston University School of Management & Kennedy School of Government at Harvard University

**Table 3.3, continued****Experiments in Behavioural Finance**

<b>Year</b>	<b>Author</b>	<b>Study</b>	<b>Sample Size</b>
<i>Playing decision games</i>			
2007	Martin Vicek, Mei Wang	The disposition effect in the lab	59 students from University of Zurich and Swiss Federal Institute of Technology Zurich
2005	Martin Weber, Heiko Zuchel	How do prior outcomes affect risk attitude? Comparing escalation of commitment and the house-money effect	133 undergraduate students majoring in economics or business administration
2003	Maria L. Loureiro, Wendy J. Umberger, Susan Hine	Testing the initial endowment effect in experimental auctions	85 undergraduate students
1998	Martin Weber, Colin F. Camerer	The disposition effect in securities trading: an experimental analysis	29 engineering students from Aachen University 35 business & 39 economic graduate students from University of Kiel
1995	Paul M. Brown	Learning from experience, reference points, and decision costs	43 undergraduates at the University of Massachusetts

**3.5. Selection of Case Studies**

The hypothesis behind this study was that experience could play a role in tempering the influence of behavioural biases in decision-making, which in this case would be finance-related decisions. Investment professionals by virtue of their employment, knowledge, and accessibility to financial information and analytical tools should be more objective and rational in their choice of a strategy for their financial transactions. Yet, incidences where investment professionals intentionally hid unauthorised trading positions from their respective institutions, which subsequently turned into huge losses

continued to surface. For example, in February 2008, the actions of Jérôme Kerviel, an employee of Société Générale, managed to grip the attention of the global financial community when he was alleged to have been responsible for a net loss of €4.9 billion, which was by far the largest trading loss by an individual at that point in time.

One recognised weakness of the cross-sectional quantitative approach was that conclusions of cause-effect relationships could be open to question. The correlation and regression analysis conducted on the survey data would, at best, serve to provide a static view of the interactions between the behavioural biases under study and the selected demographic and socio-economic variables. On the other hand, the investigative element in case study research, where the analysis would be based on the facts and circumstances surrounding an actual event, would complement the statistical findings and provide a better understanding of the behavioural and cognitive motivations behind the irrational and destructive actions of a few individuals in the financial services industry. The analysis of the selected case studies would be two-fold, i.e. to identify:

- i. common trends or characteristics in the rogue trading<sup>19</sup> cases; and
- ii. behavioural biases and emotional influences behind the conduct of the rogue traders.

The focus of the selected case studies, therefore, would be individuals who engaged in unauthorised trading or investment activities on behalf of financial institutions, and whose actions had resulted in massive losses to their respective institutions. It would, however, not include incidences of managerial misjudgement like Enron and

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<sup>19</sup> The Oxford Pocket Dictionary of Current English (2006) defined a rogue trader as a securities trader who attempts to hide tremendous losses suffered on speculative trading.

WorldCom or fraudulent activities like the Ponzi scheme<sup>20</sup> operated by Bernard Madoff. This would be consistent with the definition of investment professionals in Section 3.4.2 so that the findings from the case studies would be able to augment the findings from the survey.

Five case studies were selected for this study and the criteria for selection were as follows:

- High-profile financial scandals which were widely reported in the media. Such cases would be information rich, with observations reported from various perspectives.
- Where possible, from different locations in the global financial community. Results that could be replicated under different regulatory regimes and state of development of the capital markets would lend credibility to the accuracy, validity and reliability of the conclusions of the study, even though Yin (1994) emphasised that multiple-case studies should follow a replication and not a sampling logic.

The data for the selected case studies would be solely from secondary sources like media reports, research studies and authorised accounts initiated by the relevant regulatory agency or board of directors of the affected financial institution. Where there were authorised reports, these would form the basis for the analysis of the case with contributions from other media reports as supplementary information. It was assumed that the description of the case from authorised reports would be more objective and where the official findings would not be biased in any manner. Collection from primary

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<sup>20</sup>The US Securities and Exchange Commission described a Ponzi scheme as a fraudulent investment operation where investors would be promised high returns for their capital. The payment of these purported returns would come from money contributed by new investors. Such schemes tend to collapse when it becomes difficult to recruit new investors or when a large number of investors decide to exit from the scheme.

sources was not applicable as there was no financial scandal that fall within the scope of this study in Malaysia.

### **3.6. Summary**

The methodology adopted for this study was that of a mixed methods approach, where quantitative data was collected from a survey questionnaire and qualitative data collected from case studies of rogue trading incidences. In the design and conduct of the data collection process, care was taken by the researcher to ensure that, wherever possible, issues on the accuracy and reliability of the quantitative and qualitative datasets would be addressed. Greater care was taken in the implementation of the survey as the data was from primary sources and the researcher was aware of the importance of getting it right the first time.

Creswell and Plano Clark (2007) proposed three ways of mixing the datasets in the analysis:

- i. merging or converging the quantitative and qualitative datasets;
- ii. connecting the two datasets where the findings from one dataset would build on the other; and
- iii. embedding one dataset within the other.

The researcher chose approach (ii), where the discussion in the Chapter 4 would be on the findings from the survey data based on statistical analysis using chi square tests and binomial logistic regression. The findings from the statistical analysis would then be 'mixed' with the results from the examination of the case studies in Chapter 5 in order to form a more complete understanding of the research problem, i.e. the decision-making behaviour of investment professionals under risk and uncertainty.