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Behavioral Finance

Investors' Rationality

Bachelor Thesis within Finance

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Abstract

Purpose: The purpose of this thesis is to examine if professional investors are indicating tendencies of irrational behavior when exposed to certain psychological dilemmas related to the financial world.

Background: A new field within financial theory emerged in the 1980s; one which did not build on fundamental cornerstones but from the world of psychology, called Behavioral Finance. The theories within Behavioral Finance also offered a new perspective when explaining market movements. The market is determined by people who can not always be considered rational in their investment decisions, especially not during times of financial distress (Shefrin, 2000). Behavioral finance is, in essence, trying to explain and increase understanding of the reasoning patterns of market participants, including the emotional processes involved and the degree to which they influence the decision-making process (Ricciardi & Simon, 2002). This thesis takes the perspective to investigate the psychological impact on investors in the financial world.

Method: For this thesis a quantitative method has been used and a survey has been conducted. Methodology about measuring the behavioral impact on decision making is discussed, which form the basis of the empirical data collection.

Conclusion: It was found that there are indeed tendencies that indicate that professional investors are prone to fall for seemingly straightforward psychological dilemmas. These are interesting findings as they confirm that, within the target group, the level of irrationality linked to psychological dilemmas is common. It was found that Anchoring and Gambler's fallacy both indicated strong biases, compared to overconfidence that indicated low tendencies.

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1 Introduction

This section introduces the reader to the background of the concept Behavioral Finance. In addition, the problem discussion, research questions, purpose and approach of this thesis are presented.

1.1 Background

The financial world was shaken to its foundation during some highly turbulent weeks in autumn 2008. The aftermath of the Subprime Crisis that originated from the highly over speculated US housing market spread across the world like a plague. Major banks and financial institutions around the world saw their balance sheets drastically diminishing, if not completely wiped out. Governments stepped in with enormous capital rescue plans, and former gigantic investment institutions were bought, merged with competitors, or, in some cases, went under. Even nations, such as Iceland, were on the verge of total financial collapse. This incredibly hard striking and fast moving crises obviously resulted in considerable drops at all major stock markets. That the markets react negatively to problems like these are in itself not very extraordinary. However, what was remarkable were the extreme fluctuations that occurred, many which only could be compared to some historical dark data. Over-day-drops of several percentages were again and again recorded. The Russian stock exchange, for example, completely closed numerous times. How could these drastic fluctuations occur? Fundamentals can only explain this question to a certain extent. There must be something else at play, a force with enough penetrating power to turn the financial world upside down.

The drastic fluctuation just discussed makes one wonder: How efficient is the Efficient Market Hypothesis? Throughout history, theoretical and empirical evidence explaining market movements have been almost entirely influenced by the Capital Asset Pricing Model (CAPM) and the Efficient Market Hypothesis (EMH) (Leicester Business School). The standard equilibrium models of asset pricing (CAPM) assume investors only care about asset risks if they affect marginal utility of consumption and incorporate publicly available information to forecast stock returns as accurately as possible (EMH) (Camerer, C. F., & Loewenstein, G., 2002). The occasional errors of these models were shoved away and blamed on anomalies. But as time passed on, the number of anomalies increased and so did their impact on the markets fluctuations (Phung, 2008). All of a sudden there was the January effect, the Weekend effect, the Small Firm effect and the Holiday effect – to mention a few. As more and more anomalies were recorded, scholars began wondering whether the traditional finance theories were incapable of explaining what determines security prices (Shefrin, 2000).

A new field within financial theory emerged in the 1980s; one which did not build on fundamental cornerstones but instead from the world of psychology, called Behavioral Finance. The theories within Behavioral Finance take a different approach when explaining market movements. After all, the market is determined by people, and people can not always be considered rational in all their investment decisions, especially not during times of financial distress (Shefrin, 2000). Financial distress puts professional investors under pressure. As Mark Douglas describes the investor's dilemma: "Entering a trade will involve all your beliefs about opportunity in relation to risk, missing out, needing a sure thing, and not being wrong. Exiting a trade will involve all your beliefs about loss, greed, failure, and control.

Considering the unlimited potential for profits, entering the market will be much easier, because exiting will require you to confront your beliefs about greed, loss, and failure in relationship to the constant temptation of the possibility for unlimited profits” (Douglas, 2005).

In essence, Behavioral Finance attempts to explain and increase understanding of the reasoning patterns of market participants, including the emotional processes involved and the degree to which they influence the decision-making process (Ricciardi & Simon, 2002).

Gradually, Behavioral Finance has become a widely adopted and acknowledged field within finance, advocated by many – at least on the theoretical level (Leicester Business School). This is not to say that the EMH and CAPM theories are disregarded, or for that matter should be. A sound coexistence is recommended. To what extent this general coexistence is implemented, personal experience must judge. As demonstrated in the financial crises that occurred during the autumn of 2008, one could see unprecedented movements. These movements can, as already discussed, only to some extent be explained by fundamentals. During that period, market psychology was instead, to a great degree, setting the standard of the market. It is a time like that the theories from Behavioral Finance can help us explain and understand the highly irrational behavioral patterns of the investor who dictates the market.

1.2 Problem discussion

The financial world is influenced by much more than fundamentals. For example company profits. Today, this is the common understanding of most scholars and professional investors (Leicester Business School). Yet, we see behavioral patterns that indicate very irrational investment decisions. Obviously, these are very interesting circumstances, which make one ask the fairly straightforward question: Why is it so? Perhaps the old saying “easier said than done” can give some guidance. Understanding, for example Herd Behavior and Loss Aversion, two theories of significance within Behavioral Finance, can appear easy at first glance but prove much harder to actually master when times call for it (Kahneman & Tversky, 1974). This is not remarkable in it self. For instance, all investors who have contemplated to sell off a security with a loss can testify that the feeling is not rewarding, even though the outlook for that specific security might be doomed. To trace behavior like this to the average investor would, however, not create headline news.

But how is it in the sphere of the professional investors, those who many of us trust to make good judgments with our invested capital? To what extent can tendencies of irrationality be traced to them? One could expect that they should be better prepared to deal with psychological influences, partly their own, but also those streaming from the market participants. It is this statement that will be examined further.

1.3 Research questions

The problem discussion led us to the following research questions:

- Are professional investors indicating tendencies of irrational behavior when exposed to certain, financially related, psychological dilemmas?
- If so, to what extent does this irrationality exist?
- Is it possible to distinguish specific psychological dilemmas that are especially significant?

1.4 Purpose

This thesis will examine if professional investors indicate tendencies of irrational behavior when exposed to certain psychological dilemmas related to the financial world.

1.5 Approach

A quantitative approach has been used in order to answer the purpose of this thesis. This approach fits well when examining if certain psychological behaviors are present among professional investors. Generalizations will be made, and, due to this fact, a quantitative approach is preferable. We will demonstrate potential tendencies of irrational behavior, not dig deep for specific underlying reasons. This action rules out the possibility of using a qualitative approach.

Furthermore, it is important to consider that Behavioral Finance is by no means a question of right or wrong. This is necessary when taking into account its close relation to the field of human psychology. Is there a universal rule that applies to how humans behave in certain situations? With this idea in mind, trying to locate or distinguish new behavioral patterns in the financial world is an almost impossible undertaking, thus we have decided to focus on a more general picture, as psychology is, and will remain a highly interesting yet somewhat difficult field of science, especially when related to the financial field.

Regarding theoretical delimitations it is important to consider that behavioral Finance is a vast field of science with numerous theoretical approaches of varying size and relevance. To focus on a few selected parts was vital to be able to complete this thesis. As the main purpose is to research certain psychological dilemmas, the selection process was done by distinguishing parts of key relevance, applicability and feasibility. This was done through selective reading of numerous scientific papers and literature by prominent researchers within the specific field. Eight main theoretical themes, all indicating their own psychological behavior, were chosen. The selection of these specific eight was based on their distinct reoccurrence in the readings. They are all presented in detail in the theoretical framework.

2 Theoretical framework

This chapter presents the relevant theories selected to fulfill the purpose of this thesis.

“Perhaps the most important contribution of Behavioral Finance on the theory side is the careful investigation of the role of markets in aggregating a variety of behaviors” (Thaler, 1999, p.243).

Modern financial theory is based on the assumption that the “representative agent” in the economy is rational in two ways: The representative agent makes decisions according to the expected utility theory and makes unbiased forecasts about the future. An extreme version of this theory assumes that every agent behaves in accordance with these assumptions. Most economists recognize this extreme version as unrealistic; they concede that many of their relatives and friends are hopeless decision makers. Still, defenders of the traditional model argue that it is not a problem for some agents in the economy to make suboptimal decisions as long as the “marginal investor,” the investor who is making the specific investment decision at hand, is rational (Thaler, 1999).

However, the simple truth is that we make mistakes when we come to decisions. Hirschleifer argues “Psychologists have spent years documenting and cataloguing the types of errors to which we are prone. The main results are surprisingly universal across cultures and countries. Most of these mistakes can be traced to four common causes; self deception, heuristic simplification, emotion, and social interaction”.

2.1 Anchoring

The concept of anchoring can be explained by the tendency to attach or "anchor" our thoughts to a reference point - even though it may have no logical relevance to the decision at hand. (Phung, 2008)

What this definition implies can be illustrated by an experiment conducted in the paper “Judgment under uncertainty” by Kahneman and Tversky (1974). In this experiment, respondents were asked the question - how many percentages of the UN members’ are accounted by African countries? The respondents were to give their answers first after spinning a wheel with the possible outcome of 1 through 100. Kahneman and Tversky (1974) found the somewhat random anchoring behavior that the number which the wheel landed on had an effect on the respondents estimate. For example, when the wheel landed on 10, the average estimate given by the subjects was 25%, whereas when the wheel landed on 60, the average estimate was 45%. This behavior illustrates how mental anchoring can have an effect on how people evaluate certain decisions, even though, as this experiment indicates, the number had absolutely no correlation at all to the question.

Similar tendencies as those discussed in the previous example can also be traced to the financial world. For example, some investors tend to believe that stocks which have fallen considerably over a short period now can be bought at a discount. This misperception is due to that the investor has mentally anchored a high price for that specific stock, a type of base price acting as a reference point. Disregarding the reason for that stock’s evident drop, the anchored higher price is mentally considered its “rightful” price. The stock is therefore believed to bounce back over a certain time period. (Phung, 2008)

Anchoring behavior can also be linked to De Bondt's and Thaler's concept of the winner loser effect. Bondt and Thaler (1985) argues that investors who rely on representativeness heuristic become overly pessimistic about past losers and overly optimistic about past winners, and this type of bias causes prices to deviate from fundamental value. Especially past losers come to be undervalued and past winners come to be overvalued. However, this mispricing is not permanent; over time the mispricing has a tendency to correct itself. At that point, the losers will outperform the general market, while winners will underperform.

Yet another issue, discussed by Shefrin (2000), regarding anchoring, deals with the concepts of conservatism and adjustment problems. Some analysts do not adjust their earnings prediction properly in response to new information presented in earnings announcements; they conservatively trust and focus too much on their initial forecasts.

2.2 Confirmation bias

Economists have assumed that financial actors are rational optimizers. This assumption has often been defended by the argument that, by repeated experience of market transactions, agents will learn to optimize. The question is if this way of confirming one's decisions is rationally sustainable? (Jones & Sugden).

When searching for information to confirm one's beliefs people tend to follow their original thoughts on a subject and let that form the research. This behavior is referred to as confirmation bias or positive bias. (Jones & Sugden).

Jones & Sugden further stated that "if positive confirmation bias is a fundamental property of the processes of inference and learning used by human beings, then we might expect it to impact on the decisions that economic agents make in relation to the acquisition of information. As a result, there might be systematic biases in economic learning; for example, an agent who repeatedly faces the same set of options might retain the false belief that a particular option was optimal, even after long exposure to evidence which, rationally interpreted, would indicate the contrary" (Jones & Sugden, p. 50)

One might wonder if this way of collecting data or information contributes to irrational decisions. Jones & Sugden found related limitation of previous investigation on the subject of positive confirmation that these investigations did not reveal what use individuals make of information after they had gathered it.

"Existing evidence from selection tasks suggests that individuals seek certain kinds of information which, in the framework of a theory of rationality, is valueless. The implications of such behavior for an economic theory of learning depend crucially on whether irrelevant information is simply ignored in subsequent decision-making or is treated as if it were relevant. The use to which irrelevant information is put also has implications for individuals' ability to learn by experience that such information is not worth collecting" (Jones & Sugden, p. 60)

It seems that positive confirmation bias is a manifestation of a pattern of reasoning which, although producing sub-optimal decisions, is internally consistent. Findings suggest that positive confirmation bias may have a subconscious anchoring to experience, at the same time it seems that individuals can learn the value of looking for potentially disconfirming evidence (Jones & Sugden).

2.3 Hindsight bias

The recollection of confidence is systematically restored after feedback about previous event has been received, known as hindsight bias (Hertwig, Gigerenzer & Hoffrage, 1997).

Fischhoff's original explanation for Hindsight bias was that new information is immediately incorporated with what is already known about the event. "The purpose of this integration is to create a coherent whole out of all relevant knowledge" (Fischhoff, 1977) cited in (Mazursky & Ofir, 1996, p. 237) This tends to occur in situations where a person believes that some past event was predictable and completely obvious, whereas, the event could not have been logically predicted. Many events seem obvious in hindsight. Hindsight bias can be interpreted as our natural need to find order by creating explanations that allow us to believe that events are predictable.

It is important to note that hindsight bias does not refer to all retrospective increases in the probabilities assigned to events. The hindsight bias is a projection of new knowledge into the past accompanied by a denial that the outcome information has influenced judgment. Thus, subjects who learn of an outcome in a hindsight experiment typically claim that they "would have known it all along" Fischhoff, 1975 cited in (Hawkins & Hastie, 1990)

2.4 Gambler's Fallacy

In an article presented in Psychological Bulletin (1971), Tversky & Kahneman describes the heart of gambler's fallacy as a misconception of the fairness of the laws of chance. When tossing a coin with a fair chance between head or tail, most people think the probability of getting a tail increases after a run of five heads in a row. This is a common but completely false perception. The chance of getting a head in an individual toss of a coin has always the probability of 50%. People tend to think that every segment of the random sequence must reflect the true proportion. The fairness of the coin makes the gambler feel that a head will cancel out a tail. To think that a random process is self-correcting is wrong. Consider another example: The mean IQ of the population of eight graders in a city is known to be 100. You have selected a random sample of 50 children for a study of educational achievements. The first child tested in your sample has an IQ of 150. What do you expect the mean IQ to be for the whole sample? Most people think the correct answer is still an IQ of 100. They believe that errors cancel each other out, thus they think that the boys' unusual high IQ should be disregarded and cancelled out. But this is not true; it is impossible to implement what you know from a large population and apply it to a smaller sub sample. To make a correct assumption you should recalculate your answer. Doing this should change your expectation of the samples mean IQ to be 101 $((1*150+49*100)/50)$. (Tversky & Kahneman, 1971) To make an assumption based on a large sample and apply it to a small sample as in the IQ example above is referred to a concept called the "law of small numbers". Tversky & Kahneman further explain this with a simple experiment of how an outcome changes when the sample size decreases. Suppose you have run an experiment of 20 people, and have obtained a result that confirms your theory significantly. You now run the same test but your sample size is only 10 people. What do you think the probability is that the same test will give a result as significant as for the first group? If your answer would be around probability 85% you would belong to a majority of the respondents. Only a minority, 9 out of 84 respondents thought the probability would be between 40-60% which would be a much more appropriate

answer. Once again the respondents are fooled and transfer data from a large sample and apply it to a small sample.

Rabin (2002) describes the gambler's fallacy from a fund manager's perspective in the Quarterly Journal of Economics. Consider that a fund manager has a 50% chance of investing successful over a one year period. If a person believes that a head will cancel out a tail in a toss with a fair coin, he will also think that a fund manager that has a 50% chance of investing successful in one year will have less than 50% chance of investing successfully next year. Equally he will think that an investor that is successful two years in a row is unusually good. This leads to that a person who believes in the law of small numbers over exaggerates the information presented to him.

Another example of gambler's fallacy that is evident in finance is when one tries to predict when a recession is going to occur. In 1988, Robert Citron former treasurer of Orange County, forecasted a recession during the summer. He did this because according to him the economic expansion had been two years longer than normal. His forecast turned out to be incorrect, the predicted recession struck two years later. Citron was biased by the law of small numbers and his prediction of a recession were of similar state of confidence as assuming a tail would turn up after a strike of five heads in a row with a fair coin (Shefrin, 2000).

2.5 Herd Behavior

To mimic others decisions and ignoring substantive private information is called herd behavior. Herd behavior has not evolved from the financial world. The phenomena can be traced in everyday life but is nonetheless sometimes very evident, and troublesome, in the world of finance.

Below is a classical example of herd behavior published by Abhijit (1992). Most of us have been in a situation where we have to choose between two restaurants that are both more or less unknown to us. Consider now a situation where there is a population of 100 people who are all facing such a choice. There are two restaurants, A and B, which are next to each other, and it is known that the prior probabilities are 51 percent for restaurant A being the better and 49 percent for restaurant B being better. People arrive at the restaurant in sequence, observe the choices made by the people before them, and decide on one or the other of the restaurants. Apart from knowing the prior probabilities, each of these people also got a signal which says either that A is better or that B is better. It is also assumed that each person's signal is of the same quality. Suppose that of the 100 people, 99 have received signals that B is better but the one person whose signal favors A gets to choose first. Clearly, the first person will go to A. The second person will now know that the first person had a signal that favored A, while her own signal favors B. Since the signals are of equal quality, they effectively cancel out, and the rational choice is to go by the prior probabilities and go to A.

The second person thus chooses A regardless of her signal. Her choice therefore provides no new information to the next person in line: the third person's situation is thus exactly the same as that of the second person, and she should make the same choice and so on. Everyone ends up at restaurant A even if, given the aggregate information, it is practically certain that B is better.

To see what went wrong, notice that if instead the second person had been someone who always followed her own signal, the third person would have known that the second person's signal had favored B. The third person would then have chosen B, and so would have everybody else. The second person's decision to ignore her own information and join the herd

therefore inflicts a negative externality on the rest of the population. If she had used her own information, her decision would have provided information to the rest of the population, which would have encouraged them to use their own information as well. As it is, they all join the herd.

In classical economic theory investment decisions reflect rational expectations, decisions are made using all available information in an efficient manner. In contrast to classical economic theory there are psychological aspects of the financial market. Financial investors are affected and driven by psychological factors. Even though investors might be able to process information and form their own decisions they are affected by external factors, such as supervisors, colleagues, and markets. (Scharfstein & Stein, 1995)

“...It is the long-term investor, he who most promotes the public interest, who will in practice come in for most criticism, wherever investment funds are managed by committees or boards or banks. For it is in the essence of his behavior that he should be eccentric, unconventional, and rash in the eyes of average opinion. If he is successful that will only confirm the general belief in his rashness; and if in the short-run he is unsuccessful, which is very likely, he will not receive much mercy. Worldly wisdom teaches that it is better for reputation to fail conventionally than to succeed unconventionally.” (Scharfstein & Stein, p.465, 1995)

Investors apply to “herd behavior” because they are concerned of what others think of their investment decisions (Scharfstein & Stein, 1995). There are several examples where herd behavior has had big implications, every major bull market wear signs of them. The IT-boom in the late 1990’s is a classic example. During this time, the general feeling among investors was that the price levels on the stock market were too high. Yet almost everyone wanted to stay in the market, since they were afraid of missing the ride. When the bubble burst it was too late, investor’s success was turned to failure and large amounts of their savings were totally wiped out.

2.6 Overconfidence

There is a thin line between being confident and overconfident. Shefrin (2000) illustrates this statement by an example of average people’s overconfidence when it comes to driving. A research group was asked regarding their driving ability. Between 65 and 80 percent of the people who answer the question rated themselves above average. Naturally, we all want to be above average, but only half of us can be!

The financial world also holds its share of overconfident behavior. In a study conducted by researcher James Montier (2006), he found that 74% of the 300 professional fund managers who completed his survey believed that they had delivered above-average job performance. Of the remaining 26% surveyed, the majority considered themselves as average. Astoundingly, almost 100% of the survey group believed that their job performance was average or better. Once again we encounter the same dilemma as with the drivers. Clearly, only 50% of the sample can be above average. This example is giving good indications of the level of overconfidence and irrationality that exists among professional investors.

A common trait among investors is a general overconfidence of their own ability when it comes to picking stocks, and to decide when to enter or exit a position. These tendencies were researched by Oden. T, (2002) *Volume, Volatility, Price, and Profit When All Traders Are Above Average*. Odean found that traders that conducted the most trades tended, on average, to receive significantly lower yields than the market. Furthermore, psychologists have deter-

mined that overconfidence causes people to overestimate their knowledge, underestimate risks, and exaggerate their ability to control events. Specific security selection is a highly difficult undertaking. Interestingly this type of activity is precisely the task at which people exhibit the greatest overconfidence. (Nofsinger 2001).

Shefrin continues the discussion regarding overconfidence by claiming that there are two main implications of investor overconfidence. Firstly, investors take bad bets because they fail to realize that they are at an informational disadvantage. Secondly, investors tend to trade more actively than what can be considered sound. This type of behavior leads to excessive trading volume. Furthermore, investors have a tendency to formulate their forecasts by naively projecting trends that they have studied in various charts. The problem with overconfidence becomes even more profound when investors overvalue their own ability to predict self thought of trends accurately.

Behavior like this can also be considered in the context of the fairly common and dangerous behavior of self confirming. Many investors focus on evidence that confirms their views, for example their predictions for a certain stock, while neglecting information that is of a contradictory nature. Shefrin (2000)

Investors can take simple steps to reduce the effect of overconfidence, including counterfactual thinking (i.e., imaging scenarios where current assumptions might not hold), formally recording how past decisions were made at the time of the decision (versus trying to recall how that decision was made from memory), and using actuarial decision aids that decompose decisions into core components. Shepherd & Zacharakis (2001)

2.7 Cognitive Reflection Task

Cognitive Reflection Task is simply the interaction between the spontaneous- and the logical thinking process. The spontaneous process “System 1” does not require or consume much attention. It is the answer that first spring to mind when presented with a problem. “System 2” requires a deliberate effort to use and is slow but logical (Shane, 2005).

Shane 2005 explains the CRT process. “Recognizing that the face of the person entering the classroom belongs to your math teacher – it occurs instantly and effortlessly and is unaffected by intellect, alertness, motivation or the difficulty of the math problem being attempted at the time. Conversely, finding the square root out of 19163 to two decimal places without a calculator involves System 2 ” (Shane, 2005).

Even though the diversity of phenomena related to higher cognitive availability, few have attempted to understand its influence on judgment and decision making. Studies on the previous mentioned theories in this thesis such as Anchoring rarely make any reference to the possible effects of cognitive abilities or traits. Research within these fields are more focused on the average effect, thus individual differences are regarded as another source of “unexplained” variance (Shane, 2005).

2.8 Prospect Theory

Prospect theory is based on two major parts, loss aversion and mental accounting. Loss aversion refers to that individuals are more sensitive to losses compared to gains. Empirical studies have shown that a loss has about twice the negative impact compared to a gain. A person who would have gained \$100 and then lost \$50 so that his net gain would be \$50 would feel less “happy” compared with a person who would just have gained \$50 (Benartzi & Thaler, 1995).

Daniel Kahneman and Amos Tversky were the pioneers within prospect theory and they studied how people reacted to a prospect of a loss. Here is one of their examples:

Suppose you can choose between the following choices.

- A. a sure loss of \$7500
- B. take 75% chance of losing \$10000 or
take 25% chance of losing nothing

The outcomes are both \$7500 [$0.75 \times 10000 = 7500$] but most people would choose the sure \$7500 because they hate to lose. This phenomenon is called loss aversion (Shefrin 2000)

The magnitude of loss aversion can be shown in the graph.

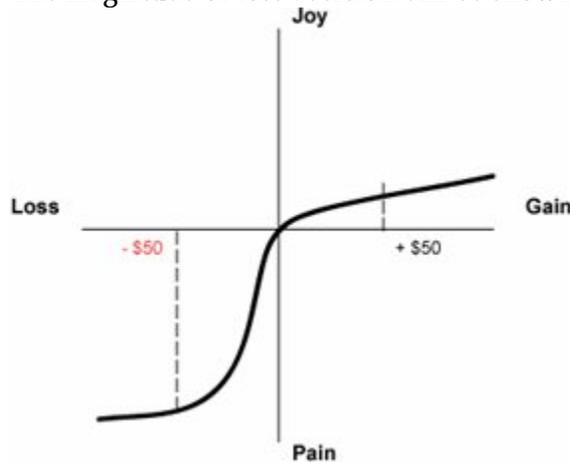


Figure 1 - Loss Aversion diagram, Investopedia (2008)

Loss aversion has consequences, people hold on to losers too long and sells winners too soon. Leroy Gross describes the difficulties investors face. “Many clients, however, will not sell anything at a loss. They do not want to give up the hope of making money on particular investment, or perhaps they want to get even before they get out. “The “getevenitis” disease has probably wrought more destruction on investments portfolios than anything else...” (Shefrin, 2000, p. 150).

Thaler (1999) defines mental accounting as following: “mental accounting is the set of cognitive operations used by individuals and households to organize, evaluate, and keep track of financial activities” (Thaler, 1999, p.183). This result in a tendency for people to separate their money into separate accounts based on a variety of subjective reasons. Individuals tend

to assign different functions to each asset group, which has an often irrational and negative effect on their consumption decisions and other behaviors.

Mental accounting refers to the codes people use when evaluating an investment decision. The theories of mental accounting can be used for stockbrokers. Instead of telling a client to sell an asset they say “transfer your assets”. By using these magic words the stockbroker makes the client move money from one mental account to another, rather than closing an already existing mental account. The client never has to feel that he is selling at a loss, instead he is just transferring money from one mental account to another (Shefrin, 2000).

Further Thaler emphasize that the primary reason for studying mental accounting is to enhance our understanding of the psychology of choice. In general, understanding mental accounting processes helps us understand choices because mental accounting rules are not neutral. Thaler continues by arguing “An accounting system is a way of aggregating and summarizing large amounts of data to facilitate good decision making. In an ideal world the accounting system would accomplish this task in such a way that the decision maker would make the same choice when presented with only the accounting data as he had access to all the relevant data. This is what Thaler means by ‘Neutral’. Achieving this goal is generally impossible, because something must be sacrificed in order to reduce the information the decision maker has to look at. Thus neither organizational nor mental accounting will achieve neutrality” (Thaler, 1999, p. 243).

Loss aversion and mental accounting often coexist. Samuelson illustrated this with an example in Benartzi & Thaler, (1995). Samuelson asked a friend if he would be willing to accept a bet. The friend had a 50% chance of winning \$200 and a 50% chance of losing 100\$. The friend turned down the offer since he felt that a loss of \$100 would hurt more than an eventual gain of \$200. He was clearly loss averse. But the friend said that he would be willing to accept 100 bets of equal character. The friend had a mental account where he could not stand to just take one bet. But 100 bets would be accepted as long as he did not have to watch any individual bet. In the long run even the friend understood that the odds were in his favor (Benartzi & Thaler, 1995). By this example Samuelson draws the parallel that when decision-makers are loss averse they are more willing to accept risk if they evaluate their performance infrequently.

The following example illustrates the problem of loss aversion and mental accounting for an investor. Suppose an investor is equally loss averse as in the example mentioned above. The investor can choose between a risky asset with an expected payoff of 7% a year with a standard deviation of 20% and a risk free sure payoff of 1%. The choice for the investor is dependent upon what time horizon the investor has. With a longer time horizon, the more interesting is the risky asset. With a short time horizon, the sure 1% payoff would be the best pick. With this in mind two factors plays a major role for an investor’s decision making, loss aversion and time horizon (Benartzi & Thaler, 1995).

3 Method

The next chapter accounts for data collection, chosen target group, sample size and general survey theory. Furthermore, the design and selection process of the questionnaire questions will be discussed. In addition, the final sections will touch upon generalization, reliability, and validity.

3.1 Data collection

To establish a good understanding of the field of Behavioral Finance an extensive data collection process has been undertaken. This approach was crucial so the most suitable theoretical parts could be studied more in-depth.

The sources of this data have been drawn from primarily the University of Jönköping's library and its database. Google scholar has also been an important tool as much of the literature that exists is of a scientific paper character. Lastly, some old theses have been studied mostly for structural reasons.

3.2 The target group

The target group has been referred to as professional investors, one that makes investment decisions on behalf of someone else (i.e. gives financial advice or manages others' investments). This group was selected in order to have a specified population that is clearly defined.

The questionnaire was answered by Swedish fund managers, financial analysts and private bankers. The reason for choosing this target group is because they are considered most relevant as they are, as the definition states, responsible for others' assets and therefore have more at stake than a private investor. Also, the fact that they trade as a profession is of importance, as this would imply that they should be more resistant to psychological dilemmas.

3.3 Sample size

Through the central limit theorem the sample data drawn from populations not normally distributed can be analyzed by using normal distribution, because the sample means are normally distributed for sample sizes of $n \geq 30$, (Arjomand, L. 2002). This implies that some generalization, from the target group to the population, can be done for this thesis since our sample size consisted of 37 responses.

The target group was rather difficult to record due to professional investors' tight time schedules, and also because of the fact that the questionnaire was sent out during the midst of a financial crisis.

It is difficult for us to estimate the level of none response as the questionnaire was sent as a hyperlink with the possibility to forward. However, it was possible to record the ratio of "started and completed" questionnaires. The "completed" ratio was 80%.

3.4 Survey theory

Collecting primary data for academic research is mainly done in three different ways; Experiments, surveys and observations (Burns & Bush, 2000). These three methods are all legitimate for data collection but differ in design and function. When performing experiments and observations the attributes are often known, as for a survey the idea often begins with a desire to know or measure the unknown attributes of a population (Czaja & Blair, 1996). Questionnaires can therefore be used for descriptive research, using attitude and opinion questionnaires to identify and describe the variability in different phenomenon (Saunders, M., Lewis, P. and Thornhill, A. 2007).

3.4.1 Survey advantages

The main advantage of using a survey is, according to Saunders et. al, (2007) that it allows the researcher to collect large amounts of data, from a considerable population, to a very affordable price. A survey can due to this fact, yield a very wide and sizable coverage of the researched field. To use a standardized questionnaire will also allow easy comparison between the different subjects. It should also if conducted in the correct manner, give the researcher more control over the development of the research process.

The multiple category closed-ended question offer several response options to choose from. These types of questions facilitate both the questioning and the data collection process. The dichotomous closed-ended questions have only two response options, e.g. “yes” or “no” (Burns & Bush, 2000).

A scale-response question is composed by a scale to measure the characteristics of one specific field that is being studied, where each level is described and labeled. One example of a scale-response form is the Likert scale, where respondents are asked to indicate their level of agreement and disagreement for each series of statements. These types of scale-response questions stresses the intensity of the respondents feelings, since the respondents are asked to what extent they agree or disagree with each statement (Burns & Bush, 2000).

These structures of questions have been chosen for this thesis as they contribute to a good variety for the questionnaire. More important is also the fact that the questions varies in what they are indicating, hence one type of structure can not be used. An appropriate mix reflecting the individual type of question has been chosen.

3.4.2 Survey disadvantages

According to Saunders et al, (2007) the most significant problem with using a survey is the possibility that one is using it for the wrong reasons. Questionnaires are usually not particularly good for explanatory or research that requires large number of open-ended questions. It is, as mentioned, more efficient when standardized questions are used that can be assumed to be interpreted in the same manner by all respondents. Denscombe (1998) strengthens this assumption by saying that questionnaires often appear impersonal. This is due to the fact that it rarely occur any direct contact between the researcher and the respondent and that the respondents often receives no notification that a survey is incoming. Saunders et al. (2007) emphasize that it is preferable to contact the respondents prior to the delivery of the questioner, but also after its arrival to increase the likelihood of an answer.

These are common problems but also possible to counter. The impersonality issues are especially difficult to handle when it comes to questionnaires. We did our best by calling most of our respondents to present our thesis and stress the importance of their cooperation. We also made sure to properly introduce the topic in the e-mail for them who did not hear from us personally.

The width and coverage of a survey can also be its most significant flaw. Using a survey of large proportion will evidently result in that the possibility of receiving detailed information will be lost. Precision and honesty from the respondents can vary considerably. Yet another problem with surveys are that the compilation and testing phase of a high-quality questionnaire is time demanding. In addition, regardless of how well the survey is compiled, the problem of non-response will always be present (Denscombe, 1998).

Befring (1994) suggests that the concept of motivation factors is essential when conducting a survey. Short and precise questions with clear and unambiguous answers are highly preferable. The amount of questions should also be limited; to keep the questions relevant is a key concept. One should also bear in mind that controversial topics could make the respondents feel uncertain; in those cases it is very important to secure anonymity.

Motivational factors were of key relevance. Even if the topic of Behavioral Finance could not have been more relevant during the time of writing, it was also a time of great stress and uncertainty for the target group. To receive answers from professional investors would be difficult. To motivate our respondents the questionnaire had to be easy assessable. In order for the questionnaire to be completely online based, an online service provider was used. An introductory mail was sent with a brief presentation of ourselves and the topic in general, the respondents were after that directed to the survey. To assure that the respondents fitted into our target group, work title and employer was asked, apart from that was total anonymity used. On completion, the respondents were once again redirected, this time to an online document where a brief description of the logic, and answers, to all of the questions were presented. We assume this approach made the respondents more cooperative and acceptable to forward the survey to colleagues.

3.4.3 Questionnaire design

The main purpose of the designed questionnaire was to distinguish general tendencies that are related to the chosen theories. We want to examine how professional investors react to psychological dilemmas presented to them. This was done by presenting a set of problems to our respondents, all linked to the chosen theories, which are structured in a way that certain behaviors can be traced to the answers given. The nature of the questions were both direct and indirect. What this implied was that some were asked straight up giving direct answers, while others were asked indirectly, with for example scale estimates. This approach was important since we were studying psychological tendencies. We could for example not ask the question. –“Do you feel that you are influenced by herd behavior?” Even if this would be the case, a No would almost always be the answer as a professional investor knows what he should answer. Instead we needed to move around the problem, asking questions that indicated the behavior.

Yet another problem was present. It was difficult to receive relevant answers regarding questions that are too obvious for professional investors due to their expertise on the subject. One can assume they know what to answer regarding a certain dilemma when it is financially related, however, this does not in any way guarantee that they would actually act that way when a similar real life occurrence takes place. We countered this problem by asking questions that are related to the behavior at large, not specifically to the field at which our target group is experts. We wanted to lead them away from the obvious answer that they know by heart but still perhaps fall under.

3.4.4 Questionnaire questions

The process of designing a survey is usually time consuming since the questions needs to pass several criteria in order for the questions to be able to generate relevant and honest data. The process of finding suitable question for the specific research area is highly important since unanswered or misunderstandings of questions can jeopardize the entire analysis. Self-administered questionnaire needs questions to be clearly formulated so that the research group interprets it similarly (Saunders et. al, 2007).

A majority of the questions in the questionnaire were selected from surveys and literature. We found that preceding surveys within this field were based on a sample of 15 to 30 standardized questions, all composed by well known scholars within the field of Behavioral Finance. For this thesis James Montier's paper, *Behaving Badly*, acted as a framework for the structure of the questionnaire.

Some of the questions that we encountered during the data collection suited our research questions well and was therefore, after a selection process where the most relevant question applicable was drawn, selected to serve as survey questions in this thesis. Examples of literature are Hersh Shefrin's *Beyond Greed and Fear* and Kahneman's and Tversky's *Choices Values and Frames*, both considered prominent work within the field of Behavioral Finance.

Some questions were modified to fit with the target group and to make the questionnaire more "current", hence more interesting. The final questionnaire contained 19 survey questions where each one represents a theoretical part within Behavioral Finance. The questionnaire questions are mainly category questions so each respondent's answer can fit only one category. Such questions are particularly useful if one need to collect data about behavior and attributes.

3.4.5 Pilot group

To minimize the risk of unclear questions and apparent but overlooked issues, the questionnaire was before finalized sent to a pilot group. The pilot group consisted of ten students, selected at random, at the International Business School in Jönköping. The main purpose of this pilot group was not to test the relevancy of the questions but to detect structural errors. Also, as the questionnaire was internet based it was crucial to test that everything would work as intended.

3.5 Generalizability

Vogt (1993) describes generalizability as; “the extent to which you can come to conclusions about one thing (often a population) based on the information about another (often a sample)” (cited in Collins and Hussey, 2003).

To raise the level of generalizability the sampling technique is crucial to avoid the many biases connected to it. It has been argued by numerous researchers that the only adequate sampling technique to use to be able to generalize for a population is random sampling. For this thesis, convenience sampling has been used. This type of sampling has some degree of randomness attached to it. However, it is not the same as random sampling as the respondents was selected after certain prerequisites and also due to accessibility.

Because we used convenience sampling, and due to the limited sample size obtained, we can not generalize about the population from our survey responses, we can only make generalizations based on our theoretical framework and indications of irrational behavior from our target group. Consequently, the results presented should be considered as an estimate and not as the truth. As Ruane (2006) argues; it is important to remember that research does not describe the truth but instead gives an estimate on what the reality looks like. Biases will always be present.

3.6 Survey biases

3.6.1 Validity

For survey research, the problem of generalizability is associated to the issue of validity. (Ruane, 2006). Even though a pilot study was undertaken, we can not ignore the possibility that the respondents might have interpreted the questionnaire questions differently than we intended. This lowers the extent of validity in the findings, causing a decrease in the level of generalizability.

3.6.2 Non-response

In order to deal with the problem of non-response the respondents' answers was individually examined. If it was apparent that the respondent ignored to answer realistically, or misunderstood the question, the answer was deducted so it would not jeopardize the outcome of the questionnaire.

3.6.3 Translation bias

The majority of the questions used in the questionnaire have been created by English researchers, the importance of avoiding translation bias was therefore crucial. The questions were translated and then tested on the pilot group. Both the English and Swedish version was tested to distinguish possible flaws. The pilot group did not show any differences regarding the interpretation of the questions.

3.7 Questionnaire

See appendices 1 and 2 for the final version of the Swedish and English questionnaire and appendix 3 for the answers provided for the respondents.

3.7.1 Empirical findings

The empirical findings are listed in appendix 4. Each result is presented by the corresponding numerical appearance of the question. The empirical findings are also included in the analysis section.

4 Analysis and Empirical finding

The analysis section has been structured in a manner that allows the reader to in a coherent way see how various parts of the questionnaire is linked to our chosen theories. For the readers' convenience we have included the survey result in the analyses.

The structure of the analysis is as follows: Firstly the related theory, secondly the question and its result, lastly the analysis. Through analyzing the answers we can distinguish tendencies of irrational behavioral patterns within our target group. Once again it is important to consider that some of the questions hold no correct or incorrect answer, nevertheless the answers provided indicate tendencies related to psychological dilemmas.

For each question a corresponding explanation can be found in appendix 3

4.1 Rationality

Question 1 was placed at the beginning of the questionnaire as it involves the key element that this entire thesis want to shed light on, namely the level of rational reasoning, alternatively the level of irrationality among our target group. What the question examines is how far the respondent is taking his rational reasoning when exposed to the problem.

Question 1

You are now going to play a game against the others sitting in this room. The game is simply this. Pick a number between 0 and 100. The winner of the game will be the person who guesses the number closest to two thirds of the average number picked. Your guess is:...?

Survey result:

Response average: 28

Analysis

As the explanation states in appendix 3, the correct answer to the question is zero. Zero is the mathematically correct answer and the answer one get if one takes the rational reasoning to the fullest, it would however not resulted in winning the game proposed in the question and can therefore be argued to be incorrect. The winning guess is however irrelevant.

The response average was 28 which must be considered fairly high, too high according to us. 28 indicates that most of the respondents took their reasoning beyond the first two obvious steps, them being $\frac{2}{3}$ of $66 = 44$, followed by $\frac{2}{3}$ of $44 =$ which yields almost exactly 28. But what made them stop here? -If I made it this far what stops my colleagues from making the exact same guess? This can never be known for certain but it can be assumed that the individual respondent thought that their colleagues would not go further down in their guesses. Does this indicate a lack of confidence towards the reasoning pattern of the colleagues, or simply a lack of reasoning from the respondent's side? This question can not be given a good answer due to the qualitative approach that we have chosen. That the average ended up remarkably high is however clear. Still, in defense of the target group a few "zero" answers were recorded.

The behavior described can be a problem for an investor. Assume that an investor invests in an according to him miss priced asset. His forecast for the future tells him that the miss pricing will even out. But his assumptions rely upon that everyone else is rational and see the miss pricing as well. If they do not, the miss pricing will continue and the investor's investment will turn out unprofitable. It is important to consider that far from all actors in the market are rational investors.

4.2 Anchoring

Question 2

Imagine 100 book bags, each of which contains 1,000 poker chips. Forty-five bags contain 700 black chips and 300 red chips. The other 55 bags contain 300 black chips and 700 red chips. You cannot see inside any of the bags. One of the bags is selected at random by means of a coin toss. Consider the following two questions about the selected book bag

- 1) What probability would you assign to the event that the selected bag contains predominantly black chips?
- 2) Now imagine that 12 chips are drawn, with replacement, from the selected bag. These twelve draws produce 8 blacks and 4 reds. Would you use the new information about the drawing of chips to revise your probability that the selected bag contains predominantly black chips? If so, what new probability would you assign?

Survey results:

Response average part 1: 48%

Response average part 2: 60%

Analysis

The answer to the first question is quite obvious and not surprisingly did the average end up just above the correct answer which is 45%. The interesting part of this question is however the second part where many of the respondents did not adjust their answer from the first question sufficiently. The average answer to the second question was a 60% probability estimate while the correct answer is a 96% probability that the bag contains predominately black chips. Many of the respondents did not change their estimate at all, some are scattered around 60% while only a few ended up above 90%.

The anchoring behavior in this example is evident. The initial answer to question one indicates that the respondent does not alter his answer sufficiently when confronted with the second question. He is unconsciously anchored to his first estimate and therefore gives a much too low second estimate. It might also be that he is responding too conservatively to the new information presented in part 2.

Problems like these can be recorded in the financial world in how professional investors react to earnings announcements. They do not adjust their earnings estimates enough to reflect the new information. Consequently, positive earnings surprises tend to be followed by more positive earnings surprises, and negative surprises by more negative surprises. (Shefrin, 2000)

4.3 Anchoring and Representativeness bias

Question 3

A health survey was conducted in a sample of adult males in New Jersey, of all ages and occupations. Please give your best estimates of the following values:

- What percentage of the men surveyed have had one or more heart attacks?
- What percentage of the men surveyed are both over 55 and have had one or more heart attacks?

Survey results:

Average response part 1: 6%

Average response part 2: 19%

Analysis

The fact that the respondents' average turned out to be 6% in the part 1 and 19% in part 2 is quite remarkable. This indicates that the respondents show clear tendencies of representativeness. The problem with this question is that the respondent lets the heuristic take control over the reasoning. People are linking a higher rate of heart attacks to older people and should rightfully do so when examining the entire population. However, this knowledge makes the respondent not consider the question in the correct manner. They anchor their rooted knowledge and let this judge the outcome of the estimate. When considering the problem with an open mind it becomes quite obvious that it is impossible that part 2 would yield a higher percentage than part 1. The percentage of men having had a heart attack and are over 55 can never be higher than the percentage of the men who have had a heart attack. Consider that it is one sample, something that is clearly stated in the question, still ignored by many.

Letting the narrative of the description cloud one's judgment is dangerous and can lead to significant errors related to the financial world. Consider a high yielding and popular industry, such as internet related companies at the end of the 90's. Did the mere fact that a company belonged to this segment make it a good investment? Not at all.

Also, too easily misjudging a problem, or information, just because how it is presented can cause major mishaps. Our target group show clear tendencies of this behavior, something that is worth mentioning.

4.4 Confirmation bias

Question 7

A set of four cards are presented to you, each with either a number or a letter. On the other side of the card there is a number and on the other side is a letter. The cards have the following signs [B] [4] [F] [7]

Then you get the information that a card with letter B on one side has number 4 on the opposite side. Which card or cards do you need to flip to confirm this statement?

Survey results:

B	82.9%
4	62.9%
F	5.7%
7	14.3%

Analysis

Searching for confirmation is something that everyone can relate to. Every day we try to convince or negotiate for our needs and during that process humans use arguments that go in line with those needs. This is something that reflects our behavior when it comes to decision making. Question 7 is a great proof of this biased behavior. To confirm the statement that B should have a 4 on the opposite side one should first turn the B card to make sure that it has a 4 on the other side. Choosing card B confirms or disconfirms the statement.

The question is then which card to choose to make the statement even more confident. Most people turned the card with a 4 which is incorrect since the question states that B should have a 4, not the other way around. Thus turning the card with a 4 will not tell you anything. By turning the card with a 7 you can prove the statement to be correct as well, as long as B is not showing on the other side.

According to the results a substantial confirmation bias was recorded among the respondents. The respondents were asked to choose which cards that needed to be turned in order to confirm the statement. With a percentage majority of B and 4 chosen, we can confirm that this heuristic bias to be true among investors.

One can argue that this behavior is more a pattern of reasoning and directly linked to experience rather than an active research process. Investors can learn the value of looking for potentially disconfirming evidence in order to find evidential information.

Question 8

You are about to invest in a specific stock but are still uncertain about whether or not to go along with the purchase. Who are you most likely to discuss your investment plan with?

- A) A co-worker and good friend that you know from previous experience has similar investment preferences as you.
- B) A co-worker that you know from previous experience has different investment preferences than you.

Survey results:

Response percentage part A: 34%

Response percentage part B: 66%

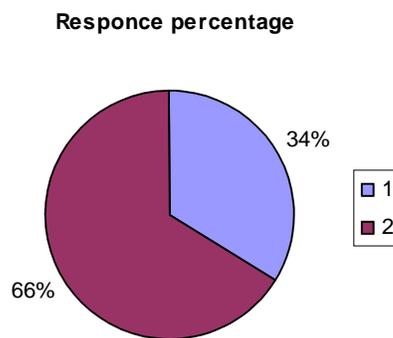


Figure 2 - Survey result question 8

Analysis

That the second alternative has the higher percentage average is a good start, we consider however that this figure should have been even higher. Still 1/3 says that they would prefer discussing their investment with someone that they know have similar preferences. Obviously we can not rule out that this would necessarily be completely incorrect. Nevertheless, in general, this behavior would only confirm an already decided opinion and yield no new input or point of view. Investors' tend to do this as it makes them feel better about an uncertain undertaking. It is much more rewarding to hear that someone agrees with you than to hear the opposite, especially when you are uncertain about something, for example a new investment. However, to discuss an investment plan with someone that you know usually disagrees with you might very well ad new input and shed new light on possible problems that might alter the way you consider the investment. If one wants to limit the possibility that important information have been overlooked, it is better to check with one's counterpart.

4.5 Hindsight bias

Question 9

Rewind the time 1,5 years, would you say that the financial crisis and the recession that we are now experiencing was expected? Give your estimate on a scale from 1-10 where 10 is “completely convinced” and 1 “completely surprised”

Survey results:

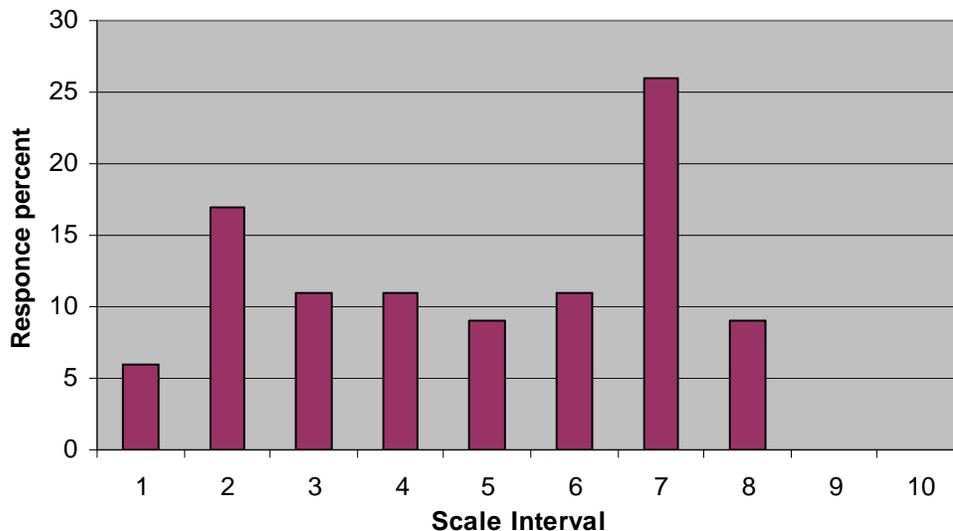


Figure 3 - Survey result question 9

Analysis

To analyze an occurrence in hindsight is a common human trait. Things that have taken place tend to appear obvious to us when we think back on them. With this question we wanted to examine the level of hindsight bias that our target group indicates.

Even if there were signals that the sub mortgage problems that originated from the US housing market could cause global financial hardships, with the result in hand, for people to claim that they anticipated a crisis of the magnitude that struck the world during the autumn of 2008 would be remarkable. There might have been signals but for the overall average to say that they anticipated it would indicate typical tendencies of hindsight bias. If most new, why did not more investors react?

Our target group did in our opinion quite well on this question. For example, there were no respondents marking a 10 or 9 and the majority of the respondents ended up below 5. Yet, 25% claim that they, indicated by the scale interval, were quite confident that the financial crisis was awaited. This is an interesting figure. We can obviously never prove to what extent they actually were right or wrong but for so many to say they were quite certain is interesting.

Hindsight bias is a problem that can be related to the financial world various situations. A common situation in which hindsight bias is especially present is when investors see tenden-

cies in the market based on old statistics or performances. There are undoubtedly indications that can give some guidance but the future is always uncertain.

4.6 Gambler's fallacy

Question 12

A student has a GPA during the first year of high school of 18p, the overall average for high school students is 15,5 on a scale from 10-20. What would you expect that student's final grade to be when he graduates?

- Below average
- Above average
- No preference.

Survey result:

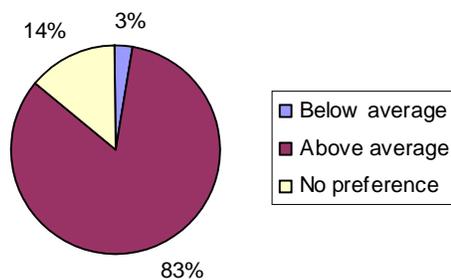


Figure 4 - Survey result question 12

Analysis

The result from question 12 clearly shows that the target group is affected by gambler's fallacy and the law of small numbers. Amazingly 83% of the respondents believe the student's final grade would be "above average". At a first glance this might seem natural, but can one really draw conclusions from one individual student's past grades? No, one can not. To make an assumption about a larger group, let's say 100 students with above average grades from first year in high school and assume that they would graduate from high school with "above average" grades would be more justified.

Investors often make assumptions that normally would only be valid for a large sample, and then implement it for a much smaller sample. A classic example is to make a prediction when a bear market will turn to a bull market. Everyone knows that the financial market is cyclical, but to predict the cycles from year to year is impossible, although assumptions when the market is going to turn up is written in newspapers every other day.

Question 10

If a fair coin is tossed five times and each time the coin lands on heads. If you had to bet 5000kr on the next toss, what would you choose?

Survey results:

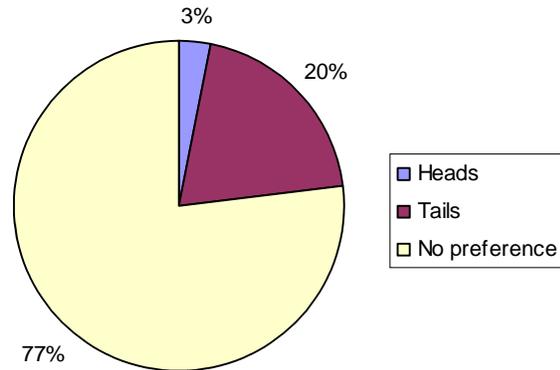


Figure 5 Survey result question 10

Analysis

When a coin is tossed with a fair chance of head or tail, some people tend to believe that the probability for a tail increases each time the coin lands on heads. People think that every segment of a random sequence must reflect the true proportion, which in this case is 50/50. For a large sample size this is true due to the “law of large numbers” where an increase in sample size brings the average closer to the mean. Gambler’s fallacy exists because people think that the “law of large numbers” applies for the “law of small numbers”. For small numbers the average cannot be related to the expected outcome. (Tversky & Kahneman, 1971)

As we can see from our findings the respondents’ are well aware or at least understand the fundamental concept of the “law of small numbers”. The respondents who answer tails (20%) are probably distracted by the outcome of the first five tosses and believe that a higher chance of winning is obtained through the choice of tail, which might seem to be more likely to occur through the “law of large numbers”. From this question we can convincingly say that the majority (77.1%) indicate rational behavior. When a random sequence appears on the financial stock market such as stock movements, one might think that there must be a reflecting sequence in the opposite direction over a period of time. This belief is probably more common among investors than what the survey indicates. Bear in mind that this was an easy and straight forward question, still 20% got it wrong. Investing rationally is not as obvious.

4.7 Herd behavior

Question 13

This question is based on the hypothesis of Company X which is a highly interesting investment but you do not have enough adequate information to be sure of this investment. Suddenly a large number of your colleagues decide to go through with the investment of Company X. How does this sudden movement from your colleague's affect you in your decision?

Survey results:

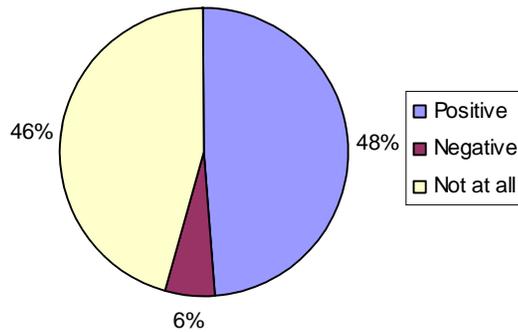


Figure 6 - Survey result question 13

Question 15

Now imagine that you have bought stocks of Company X. Suddenly a large number of you colleagues decide to sell the stocks and does so accordingly. How does this affect your attitude towards the same stock?

Survey results:

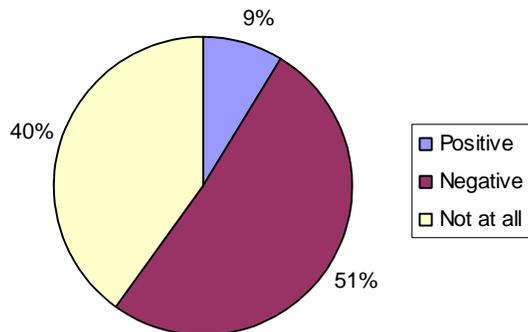


Figure 7 - Survey results question 15

Analysis

Ignoring substantive private information and instead rely on others information or actions is called herd behavior. Herd behavior has not evolved from the financial world; it is nevertheless a very common behavioral bias that can be traced among actors in the financial markets. According to the theories behind herd behavior investors are not rational, even though they are able to process relevant and efficient information. The major obstacles to rationalization are external factors such as supervisors, colleagues and markets. Keynes stated earlier that investors apply to herd behavior because they are concerned with what others think of their investment decisions.

According to our survey the respondents show to some extent indication of herd behavioral activity since approximately 50% of the respondents in both question 13 and 15 would be affected of the actions of colleagues.

The seemingly low tendencies of herd behavior in these two questions favor our respondents. However, we are not convinced that the questions are completely representative. The questions are quite obvious in their nature and we assume that the professional investors know all to well that they should not be influenced by herd behavior, anyway not when asked. We can not prove this statement but it should be considered when analyzing the question.

4.8 Overconfidence

Question 11

Are you a better driver compared to the average?

Survey result:

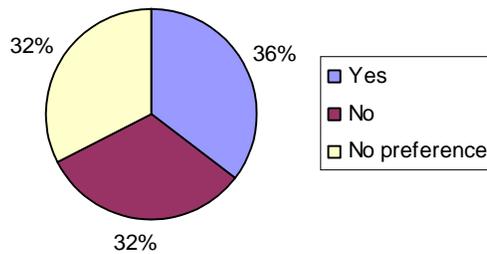


Figure 8 - Survey results question 11

Question 17

Are you above average at your job?

Survey result:

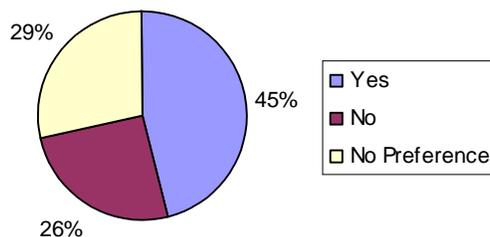


Figure 9 - Survey results question 17

Analysis

When a question about driving skills was asked to drivers in the US, between 65 and 80 percent of the respondents rated themselves above average. Furthermore, Montier(2006) found that 74% of the 300 professional fund managers who completed his survey believed that they had delivered above-average job performance. With this in mind it is remarkable but perhaps not surprising to see that Swedish professional investors are so humble and do not show signs of strong overconfidence. For a professional investor to be overconfident is dangerous and can be a big contributor for making bad investment decisions. We think that Swedish people in general can be more humble and not willing to point out themselves as better than others. Yet, the results can also be influenced by the current financial crisis and

recession. It is not farfetched to draw parallels between financial hardships and a lack of confidence, especially for our target group.

4.9 Cognitive Reflection Task

Question 14

It takes 5 machines 5 minutes to produce 5 widgets, how long does it take for 100 machines to make 100 widgets?

Survey result:

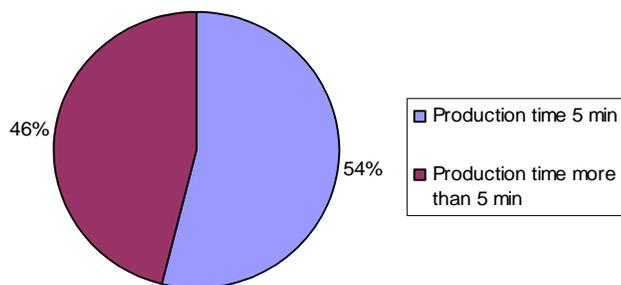


Figure 10 - Survey results question 14

Question 16

A bat and a ball together cost 110kr. The bat costs 100kr more than the ball. How much does the ball cost?

Survey result:

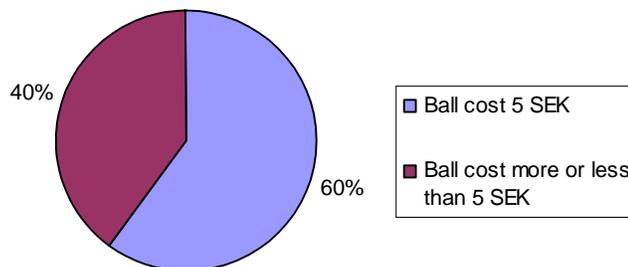


Figure 11 - Survey results question 16

Analysis

The two questions examine the respondents' Cognitive Reflection. A person's mind is divided between two systems, the first system reacting more spontaneously to a task while the other system works more logical. The interaction between the two indicates whether a person tends to make more spontaneous and emotional decision, which oftentimes is irrational, or logical and well-reasoned decisions. Judging from the survey questions the respondents show to some degree more of a logical reasoning when solving the problems; approximately 60%. Since logical reasoning is highly important in a financial environment where oftentimes personal and spontaneous reactions lead to bad investments, we consider the result of the questions to be somewhat low. Still, 1/3 of the respondents show distinct indication to a more spontaneous reasoning.

There can be many factors that affected the respondents' answers which we need to take into consideration when evaluating these questions, for example time constraint and stress. These are however attributes that should be fairly common to our respondents due to their line of work and hence not cause any major difficulties.

4.10 Prospect Theory & Mental Accounting

Question 4

Problem 1: You have just won \$30. Now choose between:

- A) 50% chance to gain \$9 and a 50% chance to lose \$9
- B) No further gain or loss

Problem 2: You have just lost \$30. Now choose between:

- A) 50% chance to gain \$9 and a 50% chance to lose \$9
- B) No further gain or loss.

Problem 3: You have just lost \$30. Now choose between:

- A) 33% chance to gain \$30 and a 67% chance to gain nothing
- B) sure \$10

Survey results:

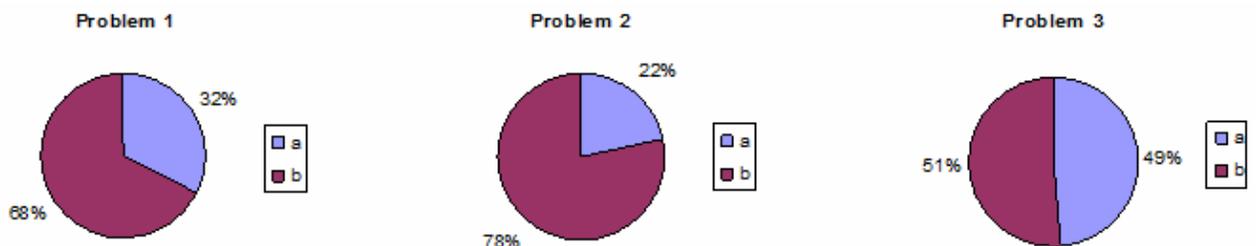


Figure 12 - Survey result question 4

Question 5

Imagine that you face the following pair of concurrent decisions. First examine both sets of choices, then indicate the option you prefer for each.

First decision: Choose

A. a sure gain of \$2,400, or

B. a 25 percent chance to gain \$10,000 and a 75 percent chance to gain nothing

Second decision: Choose

C. a sure loss of \$7,500, or

D. a 75 percent chance to lose \$10,000 and a 25 percent chance to lose nothing

Survey results:

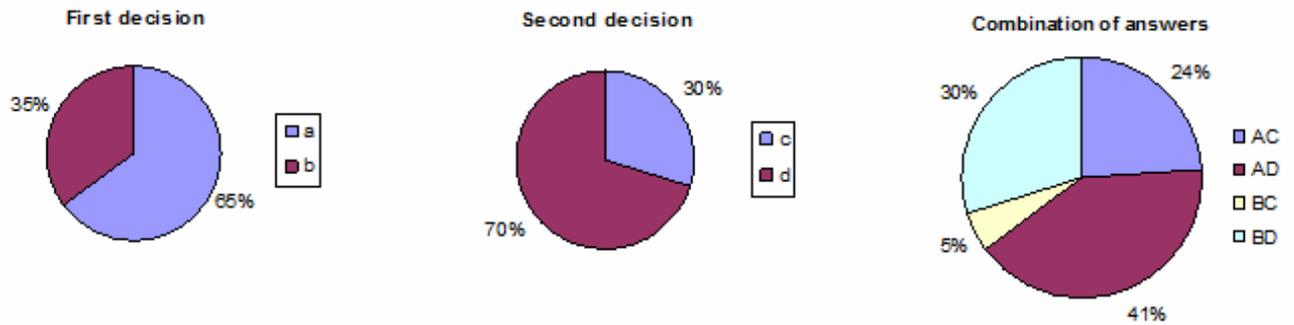


Figure 13 - Survey result question 5

Question 6

Problem 1: Imagine that you have decided to see a play and paid the admission price of 500 SEK. As you enter the theater you discover that you have lost the ticket. The ticket can not be recovered.

-Would you pay 500 SEK for another ticket?

Problem 2: Imagine that you have decided to see a play where admission is 500 SEK. As you enter the theater you discover that you have lost a 500 SEK bill on your way over.

-Would you still pay to see the play?

Survey result:

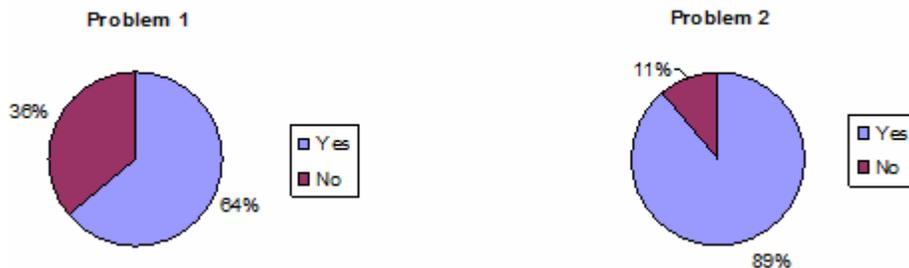


Figure 14 - Survey result question 6

Question 18

On the toss of a fair coin, if you lose you have to pay me 1000 SEK. What is the minimum you need to win to make the bet attractive?

Survey result:

Response average: 2436 SEK

Analysis

In question 4 the respondents had to make a decision regarding three problems. We found that the respondents were more willing to accept a gamble when they had just won \$30 compared to when they had lost \$30. In problem 1, 32% of the respondents were willing to accept a new gamble compared to 22% in problem 2. The answers to question 4 gives us evidence that investors are not neutral. To be neutral, a person should be equally willing to accept a gamble, no matter if he has just lost or gained money. In reality this indicates that investors are more willing to invest in a riskier asset when they have done a previous successful investment. They put the gained assets into a different mental account compared to when they have lost money. To separate money into different accounts make investors separate their willingness towards risk for certain assets. In the end this increases the total risk of, for example, a portfolio.

Professional investors will always have different preference towards risk, this is shown in problem 3 in question 5. The respondents were almost indifferent between taking a gamble to recover, and taking a sure gain. We assumed that more respondents would choose a sure gain, as the related theory had indicated this. The reason for this somewhat surprising tendency can have various explanations. It might be so that the stake was too low to put the respondents under pressure. It might also be that our response group has a higher preference towards risk in general. However, this is nothing that other related questions indicated.

In question 5 we wanted to see if the respondents could see the interplay between two concurrent decisions. The results showed that they could not. The underlying theory in question 5 is mental accounting and loss aversion. Loss aversion states that people hate to lose. To lose something has a 2.5 times higher negative impact compared to the joy of winning, this has been theoretically proven. It is therefore not surprising to see that the respondents strongly prefer A (65%) in decision 1 and D (75%) in decision 2. More interesting is why they do not prefer the combination B and C (5%) which has a combined higher total outcome.

Combination A,D yields a 25% chance of winning \$2400 and a 75% chance of losing 7600\$. Combination B,C will yield a 25% chance of winning \$2500 and a 75% chance of losing \$7500.

The results clearly show that the respondents see the concurrent decisions as separated and not as a combination of the two. They put each decision into separated mental accounts and treat them thereafter. This behavior might limit professional investors to see the whole picture and conduct good investments. For example, some investors do not see how different assets in a portfolio are related to each other. To have a diversified portfolio with a sound balance between the different assets are important to reduce risk. An investor must have the ability to see how a change in one asset influences the total portfolio. To separate the assets

into different mental accounts leads to that the investor unconsciously increases total portfolio risk.

Mental accounting was put on its very edge in question 6. Do professional investors really put money into different accounts as mentioned earlier? Would they be willing to buy a ticket for a play when they as in problem 1 already had bought it, or as in problem 2 had lost 500 SEK, the same amount as the ticket price? The respondents' answers indicate that professional investors do put money into different accounts. In problem 1, 64% were willing to buy a new ticket whereas in problem 2, 89% were willing to buy a new ticket. The difference shows that when money has been "attached" to a mental account, professional investors are less willing to buy a new ticket. In contrast, when they lose the same amount as the ticket price, and the money has not been attached to a mental account, more are willing to buy a new ticket. To draw conclusions from this behavior straight into the financial world can not be fully justified, but it definitely indicates behavior that are all but rational.

We assumed an even bigger difference between the willingness to buy a new ticket in problem 1 and 2. When the question was asked to a group of student the difference was much higher. Probably the professional investor is more invulnerable for capital losses of this size.

In question 18 we wanted to see how loss averse professional investors are. The answer justified our assumptions as the average response turned out to be 2436 SEK. Previous studies have shown that people are 2 -2.5 times more risk averse than risk taking. Our response group has a risk aversion ratio of 2.44. It is hard to make generalizations from question 18, but our target group showed strong risk aversion. One complication of being strongly risk adverse is that because of the "hate" to lose investors tend to hold on to loser to long and sell winners too soon.

4.11 Conclusive analysis

In order for the reader to get a structured overview of the entire analysis a simple and intuitive table is presented below (Table 1). The table presents what we have come to conclude when taking all answers from all questions into consideration. The rating takes its standpoint from the individual analysis.

Table 1 - Tendency of irrational behavior

	Low tendency of irrational behavior	Medium tendency of irrational behavior	Strong tendency of irrational behavior
Anchoring			X
Confirmation bias		X	
Hindsight bias		X	
Gambler's fallacy			X
Herd behavior		X	
Overconfidence	X		
Cognitive reflection task		X	
Prospect theory		X	

With this table it becomes evident that irrational behavior does exist and even so, according to us, are in some regards quite extensive. This conclusion can be set in comparison with the respondents' own perceptions. Question 19 distinguishes this difference. Considering the answers that we have received from the other questions, what is our final conclusion of our target group's ability to handle psychological dilemmas in comparison to their own belief?

Question 19

Behavioral finance is a fast growing field within financial theories that has become more and more accepted during the last decade. How would you grade your knowledge of Behavioral finance on a scale between 1-10 where 10 is Very good and 1 is Poor.

Survey results:

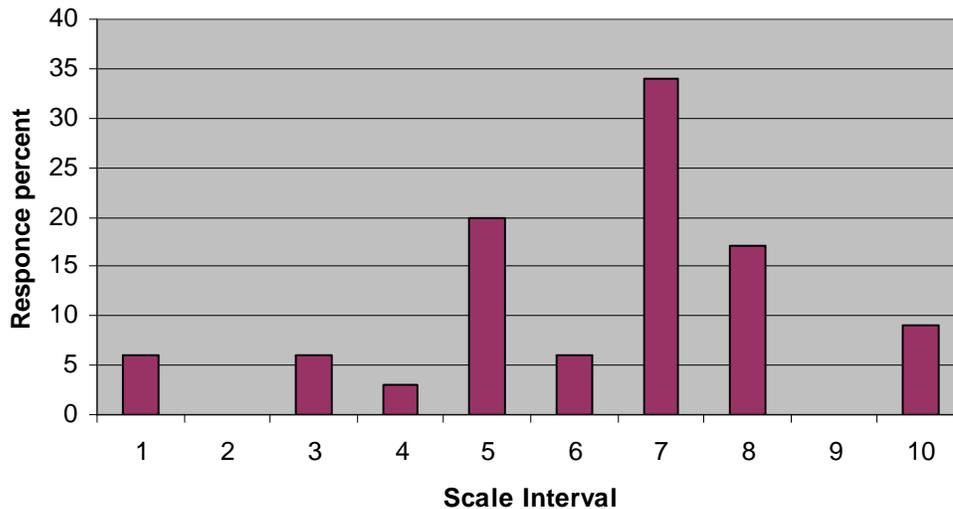


Figure 15 - Survey result question 19

Analysis

Considering the overall analysis of the results we have come to the conclusion that the general knowledge and understanding of the concepts within Behavioral Finance are rather low within our target group. Not surprisingly, the survey results from question 19 displays that the respondents judge themselves differently. Only a minority judge themselves to be under five, i.e. indicating a modest attitude towards their own knowledge which we consider would be an answer more in line with what we have come to conclude from the overall impression. The most common answer is 7, and almost 25% believe they are an 8 or over, i.e. feeling confident about their own knowledge about Behavioral Finance and the various dilemmas it describes. Either the respondents have too great confidence regarding their own knowledge level, or alternatively that the concepts within Behavioral Finance are easy to understand in theory but are hard to live up to in practice. Nonetheless, professional investors are prone to act irrational when exposed to certain psychological dilemmas that can be troublesome in the investment decision.

4.11.1 Final remarks

The purpose of the questionnaire was in no way to trick our fool the respondents, or for that matter deem them better or worse investors depending on their individual answers. We want to shed light on the fact that behavioral biases occur and how easy it may be to fall into cognitive pitfalls. We would also like to emphasize the fact that some questions were put in situations different from what financial investors are usually familiar with. The reason for this is

that we wanted to take the target group out of their secure environment so that they would not rely on common habits.

5 Conclusion

The purpose of this thesis was to examine if professional investors were indicating tendencies of irrational behavior when exposed to certain psychological dilemmas related to the financial world. Furthermore, we wanted to examine if it was possible to establish viable conclusions that indicated irrationality and if some psychological dilemmas were more significant than others.

It was found that there are indeed tendencies which indicate that professional investors are prone to fall for seemingly straightforward psychological dilemmas. In many of the questions presented to the respondents, the overall average was in distinct deviation from what the correct answer holds. Some questions can not by their nature give a “correct” answer, nevertheless does the answer provided indicate a more or less rational behavior; as it turned out it often pointed more towards irrationality. These are interesting findings as they confirm that, within the target group, the level of irrationality linked to psychological dilemmas is common.

The extent to which irrationality exists is obviously capricious and can therefore not be given any rightful numerical value. This was however not the purpose. An estimate build on the overall opinion was what determined the outcome of the question. The conclusive analysis showed that a majority of the respondents indicated a behavior that can be considered irrational. Taking this into consideration, the extent of irrationality among our respondents can be considered fairly high.

Regarding the question if some psychological dilemmas were more significant than others it was found that Anchoring and Gambler’s fallacy both indicated strong biases. This conclusion was established in accordance with the results that eventuated from the questionnaire. In both cases were the tendencies clear. On the other side of the spectrum we found Overconfidence. The respondents did not, according to us, indicate overconfident behavior. This finding was considered quite remarkable as previous related research had indicated strong tendencies of overconfidence for similar target groups. Obviously we would hope that this result would be completely significant but we assume that the current financial crisis might have had an impact on the respondents’ self-confidence, especially in regards to their line of work.

5.1 Reflection and further studies

Behavioral Finance is a highly interesting field of science and we recommend all with an interest to continue where we left off. However, it should be considered that it is not an easy field to grasp and research.

A suggestion for further studies is to conduct a similar study but to try to increase the sample size. With this thesis one problem has been to determine to what degree we could generalize our research data to a larger population. To deal with this problem we see two possible

research approaches, either to increase the sample size or delimit the research to a more specific problem.

Another interesting approach would be to do a study where a comparison between our results is set in contrast with how private investors would reply. Are educated professional investors more rational compared to private investors?

Considering the complexity of Behavioral Finance, another recommendation would be to conduct a qualitative study. This would yield the possibility to go more in depth and examine the underlying factors of the dilemmas that Behavioral Finance discuss. Such a study could add more information to the question – Why professional investors behave irrational.

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7 Appendices

7.1 Appendix 1 – Swedish questionnaire

Fråga 1

Föreställ dig att du deltar i en tävling med ytterligare 99 deltagare. Ni blir samtliga ombedda att välja en siffra mellan 0 och 100. Vinnaren av tävlingen är den person som väljer siffran som är $2/3$ av deltagarnas medeltal. Vad är din gissning?

(Är gruppens medeltal t.ex 60 vinner deltagaren vars individuella gissning är 40)

Fråga 2

Föreställ dig 100 stycken påsar med vardera 1000 marker. 45 påsar innehåller vardera 700 svarta marker och 300 röda marker. De övriga 55 påsarna innehåller vardera 300 svarta och 700 röda marker. Du ges inte chansen att titta i påsarna. Reflektera över de två frågorna och ge din bästa uppskattning.

- a) Med vilken sannolikhet skulle du uppskatta chansen att den första påsen du tar innehåller fler svarta marker än röda?
- b) Föreställ dig nu att 12 marker slumpmässigt dras ur påsen. Dessa 12 marker utgörs av 8 svarta och 4 röda. Skulle du med denna information ändra din uppskattning i fråga a. Om så är fallet, med vilken sannolikhet skulle du nu uppskatta att du har dragit en påse med övervägande svarta marker?

Fråga 3

En hälso-studie utfördes på vuxna män i olika åldrar och levnadsstandard i Göteborg. Ge din bästa uppskattning till följande frågor.

- a) Vilken procentuell andel av de svarande har haft en eller flera hjärtattacker?
- b) Vilken procentuell andel av de svarande var både över 55 år och har haft en eller flera hjärtattacker?

Fråga 4.1

Föreställ dig att du precis har lyckats vinna 500kr. Du ställs nu inför två alternativ.

Välj ett av två alternativ:

- a) Du har 50% chans att vinna ytterligare 150kr och 50% chans att förlora 150kr.
- b) Stanna vid din vinst på 500kr.

Fråga 4.2

Föreställ dig att du precis har förlorat 500kr.

Du ställs nu inför två alternativ:

- a) Du har 50% chans att vinna 150kr och 50% chans att förlora 150kr.
- b) Stanna vid din förlust på 500kr.

Fråga 4.3

Föreställ dig att du precis har förlorat 500kr. Du ställs nu inför två alternativ.

- a) Du har 33% chans att vinna 500kr och 67% chans att inte vinna något.
- b) En säker vinst på 150kr.

Fråga 5

Du står inför följande samverkande beslut. Ange vilka svar du föredrar efter att ha studerat de båda fallen nedan.

- a) En säker vinst på \$2400.
- b) 25% chans att vinna \$10.000 och 75% chans att inte vinna något.

- c) En säker förlust på \$7500.
- d) 75% chans att förlora \$10.000 och 25% chans att inte förlora något.

Fråga 6.1

Föreställ dig att du skall se en pjäs och betalat biljetten via internet några dagar tidigare. Priset på biljetten är 500kr som du vid ett tidigare tillfälle hämtat ut. När du väl kommer fram till entrén upptäcker du att biljetten av någon anledning är borttappad.

Skulle du betala 500kr i entrén för en ny biljett?

- a) Ja.
- b) Nej.

Fråga 6.2

Du har bestämt dig för att se samma pjäs som i föregående fråga men tänkte betala vid entrén samma kväll. Framme vid entrén upptäcker du att du har tappat en 500kronors skulda. Skulle du fortfarande betala för en ny biljett?

- a) Ja.
- b) Nej.

Fråga 7

Föreställ dig att det framför dig ligger fyra stycken kort. På ena sidan av kortet finns en bokstav och på andra sidan kortet finns ett nummer. Jag påstår att ett kort med bokstaven B har siffran 4 på andra sidan.

[B] [4] [F] [7]

Vilket eller vilka kort måste du vända på för att vara säker på att mitt påstående är sant?

Fråga 8

Du står inför ett beslut om att investera i en aktie men tvekar på grund av olika omständigheter.

Vem skulle du vända dig till för råd om ditt beslut?

- a) En kollega som du känner väl och som du vet har liknade investerings preferenser som dig själv.
- b) En kollega som du känner väl och som du vet har liknade investerings preferenser som dig själv.

Fråga 9

Spola tillbaka tiden ett och ett halvt år, anser du att den rådande finanskrisen och lågkonjunkturen som vi nu upplever var väntad?

Uppge ditt svar från 1 till 10.

Fråga 10

Ett mynt har singlar fem gånger, varje gång har det landat på krona. Om du var tvungen och satsa 5000kr på nästa resultat, vad skulle du välja?

- a) Krona.
- b) Klave.
- c) Ingen preferens.

Fråga 11

Är du en bättre bilförare än genomsnittet?

- a) Ja.
- b) Nej.
- c) Ingen preferens.

Fråga 12

En student har ett genomsnittsbetyg under första året på gymnasiet på 18p, genomsnittet för gymnasieelever i allmänhet är på 15,5 på en skala mellan 10-20. Vad skulle du uppskatta elevens avgångsbetyg i år tre att vara?

- a) Under genomsnitt.
- b) Över genomsnitt.
- c) Ingen preferens.

Fråga 13

AB X är ett företag vars aktie du har bristfällig information om. Därför tvekar du om huruvida den är värd att köpa. Plötsligt köper flera av dina kollegor och konkurrenter aktien. Hur påverkar detta din attityd till AB X?

- a) Positivt.
- b) Negativt.
- c) Ingen preferens.

Fråga 14

Om det tar 5 maskiner 5 minuter att tillverka 5 produkter, hur lång tid tar det då för 100 maskiner att tillverka 100 produkter?

Fråga 15

AB X är ett företag vars aktie finns i din portfölj men som du överväger att sälja. Plötsligt säljer flera av dina kollegor och konkurrenter aktien. Hur påverkar detta din attityd till aktien?

- a) Positivt.
- b) Negativt.
- c) Ingen preferens.

Fråga 16

Ett racket och en boll kostar tillsammans 110kr. Racketen kostar 100 kr mer än bollen. Hur mycket kostar bollen?

Fråga 17

Anser du dig bättre än genomsnittet på det du jobbar med?

- a) Ja
- b) Nej
- c) Ingen preferens

Fråga 18

Tänk dig att vi singlar slant, där chansen att vinna eller förlora är lika stor. Vid förlust förlorar du din insats på 1000kr. Hur mycket måste jag erbjuda dig i insats för att du ska acceptera spelet?

Fråga 19

Behavioral Finance är ett starkt växande koncept inom finansvärlden som har blivit mer och mer accepterat, samt diskuterat, under det senaste årtiondet.

Hur skulle du uppskatta din kunskap, på en skala mellan 1-10 där 1 är Dålig och 10 är Mycket God om marknadens psykologiska effekter?

7.2 Appendix 2 – English questionnaire

Question 1

You are now going to play a game against 99 other participants. The winner of the game will be the person who guesses the number closest to two thirds of the average number picked. What is your guess?

Question 2

Imagine 100 book bags, each of which contains 1,000 poker chips. Forty-five bags contain 700 black chips and 300 red chips. The other 55 bags contain 300 black chips and 700 red chips. You cannot see inside any of the bags. One of the bags is selected at random by means of a coin toss. Consider the following two questions about the selected book bag.

- a) What probability would you assign to the event that the selected bag contains predominantly black chips?
- b) Now imagine that 12 chips are drawn, with replacement, from the selected bag. These twelve draws produce 8 blacks and 4 reds. Would you use the new information about the drawing of chips to revise your probability that the selected bag contains predominantly black chips? If so, what new probability would you assign?

Question 3

A health survey was conducted in a sample of adult males in New Jersey, of all ages and occupations. Please give your best estimates of the following values:

- a) What percentage of the men surveyed have had one or more heart attacks?
- b) What percentage of the men surveyed are both over 55 and have had one or more heart attacks?

Question 4.1

Problem 1: You have just won \$30. Now choose between:
A 50% chance to gain \$9 and a 50% chance to lose \$9.
No further gain or loss.

Question 4.2

Problem 2: You have just lost \$30. Now choose between:
A 50% chance to gain \$9 and a 50% chance to lose \$9.
No further gain or loss.

Question 4.3

Problem 3: You have just lost 30\$. Now choose between:

A 33% chance to gain 30\$ and a 67% chance to gain nothing.

A sure 10\$.

Question 5

Imagine that you face the following pair of concurrent decisions. First examine both sets of choices, then indicate the option you prefer for each.

First decision: Choose between

a) A sure gain of \$2,400.

b) A 25 percent chance to gain \$10,000 and a 75 percent chance to gain nothing.

Second decision: Choose between

c) A sure loss of \$7,500.

d) A 75 percent chance to lose \$10,000 and a 25 percent chance to lose nothing.

Question 6.1

Imagine that you have decided to see a play and paid the admission price of 500 sek. As you enter the theater you discover that you have lost the ticket. The ticket can not be recovered.

-Would you pay 500 sek for another ticket?

a) Yes.

b) No.

Question 6.2

Imagine that you have decided to see a play where admission is 500 sek. As you enter the theater you discover that you have lost a 500 bill on your way over.

-Would you still pay to see the play?

a) Yes.

b) No

Question 7

Imagine these are four playing cards laid out in front of you. Each one has a letter on one side and a number on the other. If a card has an E, it should have a 4. Which cards do you need to turn over in order to see if I am telling the truth?

[B] [4] [F] [7]

Question 8

You are about to invest in a specific stock but are still uncertain about whether or not to go along with the purchase. Who are you most likely to discuss your investment plan with?

- A co-worker and good friend that you know from previous experience has similar investment preferences as you.

- A co-worker that you know from previous experience has different investment preferences than you.

Question 9

Imagine 1.5 years ago, would you say that the financial crisis and the recession that we are now experiencing was expected? Give your estimate on a scale from 1 to 10 where 10 is “strongly convinced” and 1 “not at all convinced”.

Question 10

Suppose an unbiased coin is flipped five times, and each time the coin lands on heads. If you had to bet \$1000 on the next toss, what side would you choose?

- a) Head.
- b) Tail.
- c) No preference.

Question 11

Are you a better driver than average?

- a) Yes.
- b) No.
- c) No preference.

Question 12

A student has a GPA during the first year of high school of 18p, the overall average for high school students is 15,5 on a scale from 10-20. What would you expect that student's final grade be when he graduates?

- a) Below average.
- b) Above average.
- c) No preference.

Question 13

You have poor knowledge about Company X's stock and are therefore uncertain whether to invest or not. Suddenly, many of you co-workers and competitors buy the stock. How does this affect your attitude towards X?

- a) Positive.
- b) Negative.
- c) No preference.

Question 14

If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?

Question 15

You hold stocks in company Y but are contemplating to sell, suddenly many of your co-workers and competitors sell. How does this affect your attitude toward Y?

- a) Positive.
- b) Negative.
- c) No preference.

Question 16

A bat and a ball together cost \$1.10. The bat costs \$1.00 more than the ball. How much does the ball cost?

Question 17

Are you above average at your job?

- a) Yes.
- b) No.
- c) No preference.

Question 18

Imagine flipping a fair coin where the chance of winning or losing is equal 50/50. If you lose you have to give away your bet of 1000\$. What is the minimum bet that one has to bet against you to make the bet attractive to you?

Question 19

Behavioral finance is a fast growing field with financial theories that has become more and more accepted during the last decade. How would you grade your knowledge of Behavioral finance on a scale between 1-10 where 10 is Very good and 1 is Poor.

7.3 Appendix 3 – underlying theory for the questionnaire

Question 1

The game itself should be a simple one under the standard assumptions of economics i.e. rationality and common knowledge. The game can be solved by a process known as “iterated dominance”. A dominated strategy is one that yields a lower payoff than another, regardless of what other players are doing. Since all players want to choose $2/3$ of the average, there is theoretically only one equilibrium answer to this question which is zero. If a participant is totally rational he or she should add the assumption of everyone else being rational and therefore should the most rational answer be zero.

Question 2

The answer to the first question is quite obvious (45% probability). The interesting part of this question is however the second part where oftentimes the respondents do not adjust their answer from the first question sufficiently. The correct answer to the second question is a 96% probability that the bag contains predominately black chips. The estimate for the second question is often anchored to the first estimate resulting in a much too low answer for the last part.

Question 3

Judging things how they appear and not how statistically likely they are is another common heuristic (representativeness). People tend to separate the two questions which often end up in a conjunction fallacy.

Question 4.1, 4.2, 4.3, 6.1, 6.2

These questions investigate how prior outcomes affect risky choices. People tend to distinguish money that they have gained from a win from other money that has been earned through labor. This is what is called mental accounting, where people mentally separate money into different pockets which is then also spent differently. This is why, when losing, less risk is acceptable and when winning, a more risky decision is acceptable.

Question 5

The way people respond to this question tells us a lot about their approach to making decision. The two decision problems together constitute a concurrent “package.” But most people do not see this “package” and therefore does not choose the most profitable answer; they separate the choices into mental accounts.

Question 7,8

Questions 7 and 8 represent the Confirmatory bias theory where one seeks information to confirm his view instead of discussing possible logical alternatives, partiality that prevents objective consideration of an issue. Important to notice is that this biased behavior is common since the confirmation of one’s beliefs or view increases one’s personal ego.

Question 9

Hindsight bias describes the tendency to see something that occurred in the past as being obvious and totally predictable. The recollection of confidence after feedback tends to make people believe that some past events were predictable which is highly irrational. People who learn of an outcome in a hindsight event typically claim that they “would have known it all along”.

Question 10, 12

This question represents the Gambler’s fallacy theory. The outcome of an individual toss of a fair coin has the probability of 50% for either outcome. After a run of five heads in a row people tend to think the probability of getting a tail increases which is a completely false perception. There is a general tendency to think that every segment of the random sequence must reflect the true proportion. To think that a random process is self-correcting, that a head will cancel out a tail, is wrong.

Question 11, 17

A simple way to investigate overconfidence among the respondents is to ask if they are better than average on something that they all have in common. Previous studies show that respondents believe that their job performance is above average (30%) or better (70%) which is not possible. This gives a good indication of the level of overconfidence and irrationality that exists among professional investors.

Question 13, 15

These questions indicate possible herd behavior. The questions can easily be overanalyzed but one should in general not try to be too influenced by other actors on the market. After all, analyzing an investment solely on how other actors act give not assurance that this is the right call.

Question 14, 16

These questions or tasks investigate the cognitive reflection among the respondents, the interaction between the spontaneous- and the logical thinking process. People often tend to show impulsive behavior to an appeared obvious question, instead of thinking logical.

Question 18

This question simply states how risk averse people are. Previous studies have shown that the ratio of a win to a loss is approximately 1 to 2.5. In order to accept a bet when tossing a fair coin the counter bet should be 2.5.

Question 19

Our questionnaire finishes off with a question on the respondents estimation of their own knowledge within Behavioral Finance. The answer can be set in comparison to how they have performed on the other questions.

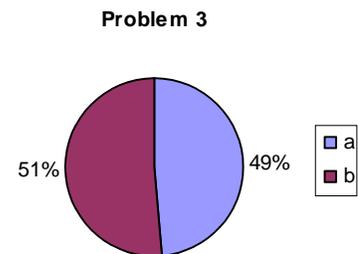
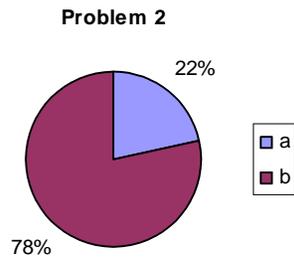
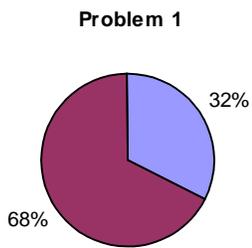
7.4 Appendix 4 – Survey results

Survey results question 1:
Response average: 28

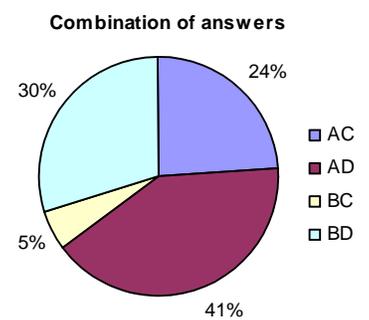
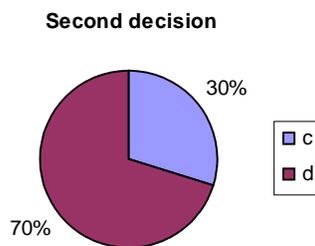
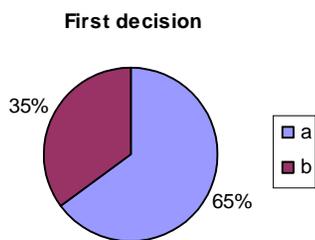
Survey results question 2:
Response average part 1: 48%
Response average part 2: 60%

Survey results question 3:
Average response part 1: 6%
Average response part 2: 19%

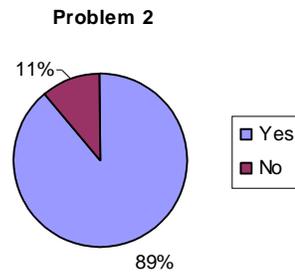
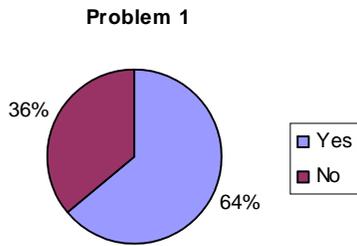
Survey result question 4:



Survey result question 5:



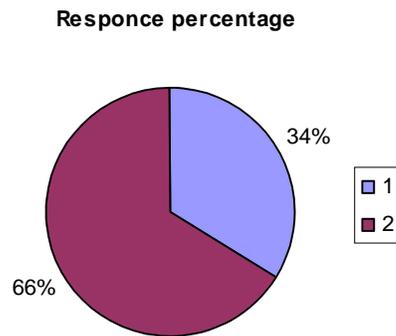
Survey result question 6:



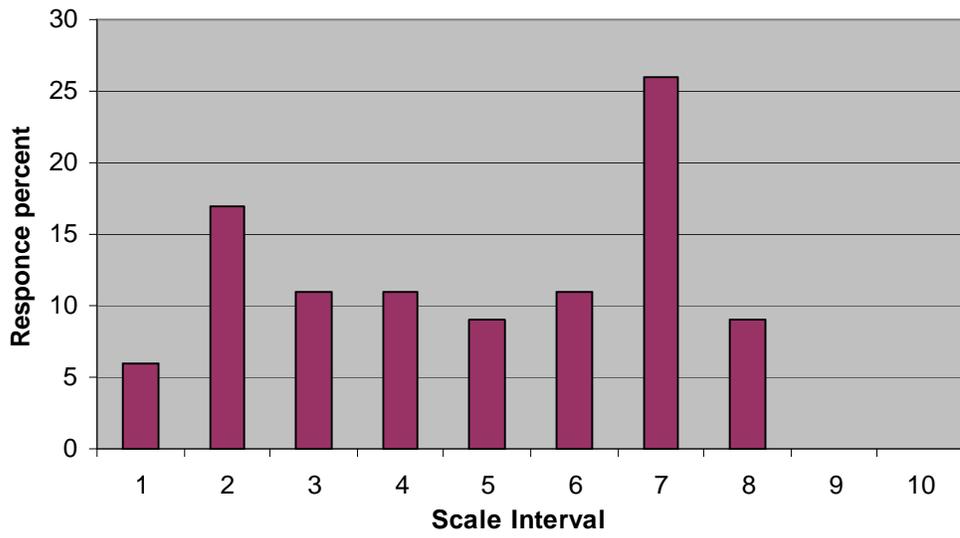
Survey question 7:

[B]	82.9%
[4]	62.9%
[F]	5.7%
[7]	14.3%

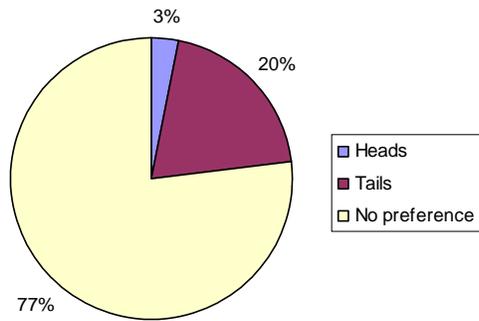
Survey result question 8:



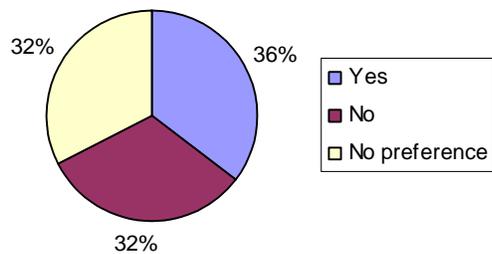
Survey result question 9:



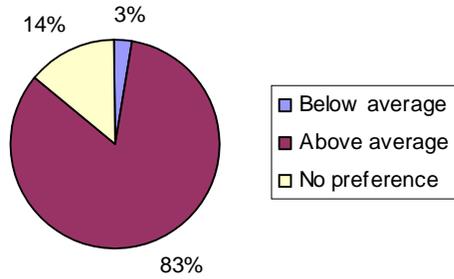
Survey result question 10:



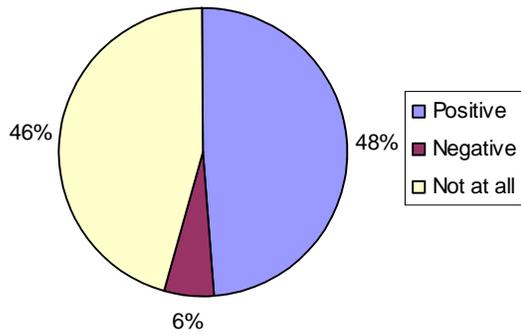
Survey result question 11:



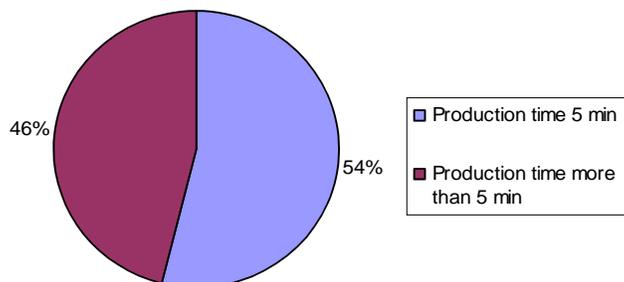
Survey result question 12:



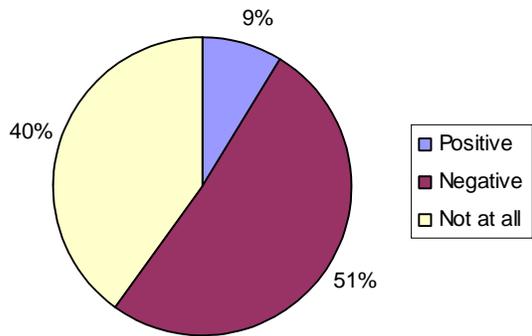
Survey result question 13:



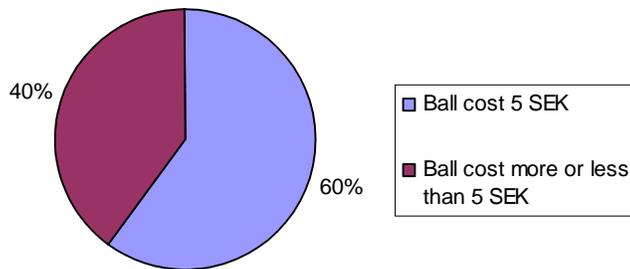
Survey result question 14:



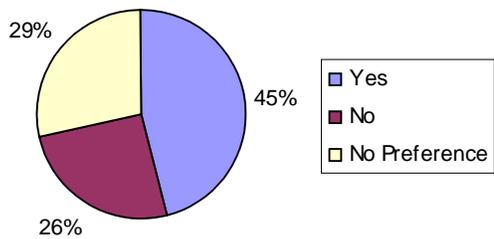
Survey result question 15:



Survey result question 16:



Survey result question 17:



Survey result question 18:
Response average: 2436 SEK

Survey result question 19:

