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Behavioral Finance

- And the Change of Investor Behavior during and After the Speculative Bubble At the End of the 1990s

Authors
Malena Johnsson
Henrik Lindblom
Peter Platan

Supervisor
Niclas Andrén

Abstract

The apparent high valuations in the aggregate market and the high price earnings ratios, experienced in the equity markets at the end of the 1990s, can be characterized as a so-called speculative bubble. The existence of such a phenomenon can in part be attributed to less-than-rational aspects of investor behavior and human judgment. The purpose of this thesis is to conduct a research on how private as well as institutional investors have changed their investment behavior as a consequence of the speculative bubble during the period from fall 1998 to March 2000. Our purpose is to establish what factors lie behind the speculative bubble and further investigate whether the investment objectives and factors influencing investment decision-making are different today than during the speculative bubble. Behavioral finance provides the fundamental theoretical framework for this thesis. The empirical research is based on a questionnaire directed towards active private investors in Sweden, more specifically members of the Aktiespararna Association, and institutional investors mainly resident in southern Sweden.

The results obtained suggest that the behavior of market participants during the speculative bubble was to some extent irrational and that the composition of investments has changed as a consequence of the speculative bubble. During the steep rise in value of the equity market, information from companies was the most important factor influencing investments among both private and institutional investors. However, it was considered as the least significant reason for the overvaluation of the market. When comparing the time period after the speculative bubble, information from companies gained importance for both groups of investors, especially institutional investors. This indicates an increase in the importance of fundamental data and valuations today than during the speculative bubble when intuition and other more vague valuation methods seemed to have influenced investments to a greater extent. Furthermore, the results indicate herd behavior as an important contributing factor to the overvaluation as well as the decline of the market. Both groups of investors also consider the forecasts of analysts as an important factor contributing to the overvaluation of the market but not as important when considering reasons for the market decline. The importance of analysts' forecasts to the overvaluation of the market suggests that analysts do share some blame for the IT bubble. The results show that the fall in market values after March 2000 was mainly due to earnings and profitability of companies, or a lack thereof. Overconfidence is another concept in behavioral finance that seems to have influenced investment decision-making strongly during the speculative bubble and may help explain the observed irrational behavior of investors. The fact that the market today is considered undervalued by a majority of investors may also imply the existence of overconfidence. This contradicts the efficient market hypothesis and implies that investors believe they can beat the market and overestimate their talents while underestimating the likelihood of bad outcomes.

This thesis supports, to some extent, the assumption that even though a majority of the investors during 1998 to 2000 seem to have realized the seriousness of the speculative bubble they nevertheless continued their investment activities knowing that the risk for a collapse was imminent. A more common understanding of factors underlying speculative bubbles and the way in which psychological factors affect our decision-making should help to avoid the occurrence of such phenomenon and enhance the efficiency of today's global financial markets.

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1 Introduction

The first chapter describes the background, problem and purpose of the thesis. Furthermore, the delimitation and definitions are presented, followed by an outline of the remainder of the thesis.

1.1 Background

During the past years the equity markets have been characterized by increasing volatility and fluctuations. The ever more integrated financial markets are increasingly exposed to macroeconomic shocks which affect markets on a global scale. From an investor's point of view, the vulnerability of markets has lead to increased uncertainty and unpredictability, as market conditions cannot always be judged with the help of standard financial measures and tools. Market participants have for a long time relied on the notion of efficient markets and rational investor behavior when making financial decisions. However, the idea of fully rational investors who always maximize their utility and demonstrate perfect self-control is becoming inadequate. During the recent years, examples of market inefficiency in the form of anomalies and irrational investor behavior have been observed more frequently.

The recent downturn in the US economy exemplifies a situation, which includes both unpredictability and irrational reactions. The US Federal Reserve Chairman Alan Greenspan (2001) described a similar market condition clearly in early 2001, amid the weakening of the U.S. economy by using the following words: "The unpredictable rending of confidence is one reason that recessions are so difficult to forecast. They may not just be changes in degree from a period of economic expansion but different processes endangered by fear. Our economic models never have been particularly successful in capturing a process driven in large part by non-rational behavior."

The apparent high valuations in the aggregate market and the high price earnings ratios, experienced in the equity markets at the end of the 1990's, can be characterized as a so-called speculative bubble. The existence of such a phenomenon can in part be attributed to less-than-rational aspects of investor behavior and human judgment. However, the notion that such irrational behavior exists is controversial. Shiller[1] (2000) points out that many of the experts, such as managers of university endowments who have at their exposure some of the finest scholars and university trustees drawn from the highest ranks of the business world, were actively involved in the market just before its peak in March 2000. Can these experts really be characterized as irrational or foolish? Nevertheless, that is what one apparently would have to do if one wishes to attribute the market behavior to human error.

Approaches based on perfect predictions, completely flexible prices, and complete knowledge of investment decisions of other players in the market, are increasingly unrealistic in today's global financial markets. Behavioral Finance is a new paradigm of finance theory, which seeks to understand and predict systematic financial market implications of psychological decision-making (Olsen, 1998). By understanding the human behavior and psychological mechanisms involved in financial decision-making, standard finance models may be improved to better reflect and explain the reality in today's evolving markets.

[1] Shiller, Robert: Stanley B. Resor Professor of Economics at Yale University. Author of the book *Irrational Exuberance*.

1.2 Problem Discussion

Within the time period of a few years, beginning in 1998, stock prices of IT-companies (Information Technology) experienced a phenomenal increase, which was followed by an equally abrupt downturn beginning in March 2000. The NASDAQ Composite Index rose by 170% during the period from the fall of 1998 to March 2000. By February 2001 the NASDAQ Index had lost half of its market value compared to its peak in March the previous year. The Stockholm Stock Exchange's All Share Index (SAX) experienced an increase of 118% during the corresponding period and by October 2001 its value had decreased by 43%. This speculative bubble has raised many interesting questions. Which factors and circumstances affected the behavior of private investors and institutional investors at the end of the 1990's when the IT stock hysteria was at its worst? How was it possible that the speculative bubble grew to such extreme dimensions? The majority of the market actors, seem to have realized the existence and seriousness of the speculative bubble but nevertheless continued their investment activities even though they were conscious that the risk for a collapse was imminent.

The fact that even the most prominent and well-educated institutional investors, as well as individual actors, were affected by the collapse of the speculative bubble demonstrates that something might well be fundamentally wrong in our current models of rational market behavior. Intuitively one can presume that the behavior between private and institutional investors could differ, but does it and to what extent? Can it be that private investors are following the behavior and recommendations of the institutional investors to such a degree that they are unable to discern the reality of the market situation or make own their conclusions? Do institutional market actors adjust their recommendations in order to accommodate the preferences of private investors? Have the serious consequences of the substantial realized losses, along with the breakdown of the speculative bubble, changed the behavior and views of market participants as well as the general public?

What causes speculative bubbles and to what extent does the irrational behavior of market participants contribute to this phenomenon? Is it possible to influence the factors that cause and lead to speculative bubbles in order to reduce the possibility for similar occurrences in the future? These are some of the many questions and problems forming the framework of this thesis.

1.3 Purpose

Our purpose is to describe and conduct a research on what factors, investing characteristics, and decision-making processes affected private and institutional investors during the speculative bubble and the following period of bear market beginning in March 2000. Which factors and reasons lie behind the enormous rise in the value of equity markets during the end of the 1990's? We also study how these factors and the behavior of investors have changed as a consequence of the speculative bubble.

1.4 Delimitation

We limit our research to concern *active* private and institutional investors in Sweden. By active, we mean investors that show an interest toward investing, which can be described as having knowledge of the financial markets above the average of a randomly chosen individual drawn from the Swedish population. Individuals belonging to the *Aktiespararna* Association are considered to be actively interested in investments and financial markets.

1.5 Definitions

Aktiespararna Sveriges Aktiesparares Riskförbund – the Swedish Shareholder's Association – is an independent organization working in the interests of private individuals who invest in stocks, mutual funds and other securities and derivatives. It was founded in 1965 as a reaction against a proposed perpetual tax on stock profits and has 120,000 members as of fall 2001.

Behavioral Finance A part of finance, which seeks to understand and predict systematic financial market implications of psychological decision processes. "Behavioral finance closely combines individual behavior and market phenomena and uses knowledge taken from both the psychological field and financial theory", (Fromlet, 2001).

Institutional investor An institutional investor in this thesis is considered to be a banker, analyst, dealer or similar professional who is active in the financial markets on a daily basis. Institutional investors are responsible for a large percentage of the overall traded volume and are less restricted in their investment activities than private investors are.

Private Investor A private investor is a person who invests his/her money on the stock market and manages this portfolio of shares. A private investor in this thesis is considered to be any person interested in the financial markets. The questionnaire conducted in this thesis was handed out to private investors belonging to the Aktiespararna Association.

Speculative Bubble A situation in which temporarily high prices are sustained largely by investors' enthusiasm rather than by consistent estimation of real value. The speculative bubble is limited to the bull market between the fall of 1998 and March 2000 when the market reached its peak. The time after March 2000 is regarded as a bear market. This period is also referred to as a bull market, the period after March 2000 is occasionally referred to as a bear market.

1.6 Outline

The structure of this thesis is as follows:

Chapter 2 Presents the general approach and method applied in this thesis. It also describes the working process and data sources used as well as criticism of the chosen sources.

Chapter 3 Consists of the principal theories underlying our research and the central concepts of behavioral finance related to this thesis.

Chapter 4 Presents the phenomenon of speculative bubbles and includes a description of some of the previous studies in the area. Factors and reasons underlying speculative bubbles are also discussed.

Chapter 5 Describes the empirical research conducted including the results obtained and a subsequent analysis of these results with statistical based comparisons.

Chapter 6 Provides a summarized conclusion and reflections over the thesis as a whole.

Relevant appendices are included at the very end, after the references, of the thesis.

2 Method

This chapter describes the overall approach of the thesis as well as the choice of method, data collection and criticism of the sources.

A method can be described as an instrument in solving problems and in arriving at new knowledge of the subject in question. Everything that contributes in achieving these goals is a part of the method. It is important that the method is consistent with the reality that is being researched. Furthermore, the achieved results should generate increased comprehension and understanding of the problem being examined (Holme and Solvang, 1996).

2.1 The General Approach

The general approach of a study is affected by the researcher's frame of reference, which refers to one's overall knowledge, norms and values (Wiedersheim-Paul and Eriksson, 1997). The approach of this study is based upon the frame of reference, which works as an individual scale. The applied theories and models themselves affect the individual scale of the research. Therefore, it is important that the researcher maintains an objective approach. To achieve objectivity we have studied a wide range of theories and literature in the field of our study. However, an entirely objective approach is difficult to achieve as a large part of the literature and scientific articles themselves contain interpretations and opinions that might possibly influence us.

According to Wiedersheim-Paul and Eriksson (1997) the scientific approach of a study can be described by two fundamental perspectives: rationalism and empiricism. The rationalistic perspective refers to a deductive method where the researcher bases the study on a theory, creates a hypothesis and subsequently reaches a logical conclusion through observations. On the other hand, the empirical perspective refers to an inductive method where general conclusions are based on empirical data. In contrast to the deductive method the research first takes an empirical point of view (data collection) and thereafter relates the findings to a theory. In our study we have chosen a deductive method as the research is based on a theoretical framework of finance with an emphasis on behavioral finance. We then test our empirical findings with the existing theories. However, a part of the theory that our study is based on, such as the prospect theory by Kahneman[2] and Tversky, is based on an inductive framework.

2.2 Choice of Method

A method can be either quantitative or qualitative. A *quantitative* method is formalized, structured and is characterized by selectivity as well as a distance from the source of information (Holme and Solvang, 1996). The approach centralizes on numerical observations and aims at generalizing a phenomenon through formalized analysis of chosen data where statistical indicators play a central role. On the other hand, a *qualitative* method is formalized to a lesser extent is directed at testing if the information is generally valid. The approach is

[2] Kahneman, Daniel: Eugene Higgins Professor of Psychology, Princeton University and Professor of Public Affairs, Woodrow Wilson School. Together with Amos Tversky (1937 – 1996; Professor of Psychology and Davis Brack Professor of Behavioral Sciences) he published the *Prospect Theory* which probably have had more impact than any other behavioral theory on economic research.

characterized by the use of verbal descriptions instead of purely numerical data and aims to create a common understanding of the subject being studied.

In order to achieve our purpose we have chosen to apply a quantitative as well as a qualitative method. The *quantitative* method refers to the survey we implement in the form of a questionnaire, which is directed at active private investors as well as institutional investors. The questionnaire was written with the help and inspiration from an article by Shiller and Pound (1986a). Through the survey we strive to determine how well the practical decision-making framework and behavior of investors in reality are consistent with the existing theories of finance. We also aim at defining factors, which may contribute to the existence of speculative bubbles. A *qualitative* method is implemented through our attempt to describe the reasons and existence of the speculative bubble during the end of the 1990's with the help of existing theories. We also aim to describe the basic concepts in behavioral finance in order to improve understanding of the subject.

2.3 Data Collection

Data for our study was primarily collected through a survey in form of a questionnaire as well as through research based on existing material concerning behavioral finance and speculative bubbles.

2.3.1 Primary Data

Primary data refers to data, which is collected for a specific purpose and which is required in order to complement secondary data (Wiedersheim-Paul and Eriksson, 1997). The primary data in this thesis consists of the survey in the form of a questionnaire directed at active private investors as well as institutional investors. The private investors are represented by the members attending the local meetings of the Aktiespararna Associations in Halmstad, Kristianstad, and Malmö, and Åkarp in December 2001. The associations were randomly chosen among all the member-meetings held in southern Sweden during December. We attended the meetings in person and explained the subject of our study. The questionnaire was handed out and answered voluntarily by those members who wished to participate during the meetings. We received approximately 160 answers from private investors, however; several questionnaires were omitted since too many questions had been left unanswered.

Institutions such as banks, mutual fund establishments and investment banks in the south of Sweden were chosen for the study and were contacted personally through email and telephone. The institutional investors are represented by employees at Aragon, Carnegie, Handelsbanken (Lund), Handelsbanken Trading (Malmö), Landesbank Kiel, Nordea Securities, Robur, and Sparbanken Finn (previously Matteus). The questionnaires were mailed out to the institutions. When completed, the questionnaires were picked up or sent to us by mail. Among all the questionnaires we sent out by mail and email, 47 institutional investors chose to participate. No institutional questionnaire had to be omitted.

The questionnaire consists of 21 questions concerning the fundamental factors affecting financial decision-making and questions referring to the behavior of investors during and after the speculative bubble. An example of the survey is included in Appendix 1.

The questionnaires were first processed with the help of Microsoft Excel to get an overview of the preliminary results. The analysis was divided into to parts. A regular analysis with

comparisons among questions, which were based on the same theory were grouped with each appropriate theory. This was done in order to be able to analyze and compare questions easier.

In the second part of the analysis we have compared questions from different theories. We have presented the eleven most interesting results of the fifteen comparisons in that were performed in chapter 5. The four left out comparisons are presented together with the first eleven in Appendix 2. The comparisons were carried out with the statistical method χ^2 (Chi square) according to the instructions in Körner (1996) and Rudberg (1993). Each χ^2 test resulted in a value; this value was compared with a critical value taken from a χ^2-distribution table (Körner, 2000). We used a 5% significance level with the respective number of degrees of freedom as this is the most often used significance level in elementary statistics. If the calculated value is less than the critical value, we cannot conclude that there is a difference between the compared questions and we accept the H_0 (null hypothesis). If the calculated value is greater than the critical value we conclude that there is a significant difference between the compared questions and we reject the H_0 and thus accept the H_1 (hypothesis one).

2.3.2 Secondary Data

Secondary data refers to the existing collected and summarized material of the subject in question. This data originates from sources such as databases, literature, journals and the Internet (Wiedersheim-Paul and Eriksson, 1997). The secondary data used in our research refers to the existing theories in finance, more specifically behavioral finance, such as articles in journals and literature on the subject as well as Internet data sources. The emphasis was on finding material on the relatively new area of behavioral finance and research on speculative bubbles.

Most of the literature and articles were found in the library of the School of Economics and Management in Lund and the University Library. Some literature was however ordered from other university libraries in Sweden and Finland and some articles were not available in the Nordic countries. By writing emails to Robert Shiller, Richard Thaler, and Meir Statman, we were able to receive the needed articles by attached files to emails or Xerox-copies by regular mail.

2.4 Criticism of the Sources

Both the primary and secondary sources of data may contain factors influencing the quality of the research. Furthermore, one must also consider the validity and reliability of the research in order to establish the overall quality of the study.

2.4.1 Criticism of Primary Data

The survey, which we conducted in the form of a questionnaire, is advantageous as the collected data is unique and contemporary in nature and the questions may be formulated to specifically correspond to the area being researched. However, the questionnaire is susceptible to the subjective opinions of the respondents. When asking about previous events extending farther into the past, investors' responses are exposed to their subjective ability to recollect specific past events. The respondents may also have changed their perception of past events according to the actual outcome of these events, particularly concerning questions regarding the time period during and after the speculative bubble. Therefore, the answers given by respondents can be biased toward what they think would have been the right course

of action if they were given the same choice today instead of reflecting the actual decision that would have been made in the past. This is called hindsight bias. In addition, institutional investors answering the same questions as private investors may be more familiar with the concept of speculative bubbles, which can lead to a better validity among answers from institutional investors concerning questions relating to the historical aspects of the speculative bubble.

The institutional investors made very few comments about the questionnaire and there seemed to be no confusion about what we asked or what we wanted to find out by the questions. Nordea thought the questions were too wide and needed to be more defined. A “big company” will probably not be the same to an institutional investor as it is to a private trader. The institutional investors handed back more complete questionnaires and they were more interested in receiving feedback from the thesis than the private investors.

In Kristianstad, many people commented that the questions were too difficult to answer and that people were unable to understand the questionnaire. In addition to this, several people chose not to participate in the survey. However, the questionnaires we received were properly filled out and gave the impression that people after all had understood the questions asked. Those who found the questions too difficult may simply have chosen not to hand in their questionnaires. People in Halmstad were very interested in participating in the survey and asked questions while filling out the questionnaire. Halmstad was however the association where we had to omit the most questionnaires since too many questions had been left out by the respondents. These questionnaires have not been used in the total statistical material. People in Malmö and Åkarp made few questions and the questionnaire seemed to pose no greater challenge to them.

Using a statistical test always involves some degree of uncertainty since a sample is taken out of a large population. Using a 5% significance level implies that we can with a certainty of 95% be sure of our result. We have tried to minimize the probability, or risk, of making type I and type II errors. A type I error is to reject a correct null hypothesis; a type II error is to accept an incorrect null hypothesis (Körner, 1996).

The probability to make an incorrect decision is denoted by α and β and can thus be defined as

$$\alpha = \Pr(\text{reject } H_0 | H_1 \text{ true})$$

$$\beta = \Pr(\text{accept } H_0 | H_1 \text{ false})$$

α is also called the significance level of the test.

2.4.2 Criticism of Secondary Data

The theories and literature written on behavioral finance are relatively new. It is currently an evolving branch of financial theory and thus subject to many interpretations and, to some extent, controversy within standard finance. We have endeavored to take an objective perspective on behavioral finance while describing and utilizing the existing theories in explaining the speculative bubble and the behavior of market participants. The majority of the secondary data is obtained from scientific sources and is contemporary in nature. Therefore we consider our secondary data to be highly pertinent.

2.4.3 Validity

A research has high validity if the study only contains what one wants to study and nothing else (Thurén, 1991). Validity refers to how well the data collection and data analysis of the research captures the reality being studied. Validity can be divided into three subgroups: construct-, internal- and external validity (Yin, 1994). First, construct validity refers to the data collection procedure, i.e. establishing correct operation measures for the concepts being studied. Our study concentrates on decision-making in financial markets where investors play a significant role and their decisions form the basis of the observed phenomena in financial markets. As our primary data collection was directed both toward private investors and institutional investors, both of which play a significant role in the functioning of financial markets, we consider our research to have high construct validity.

Internal validity refers to the process of establishing a casual relationship, whereby certain conditions are shown to lead to other conditions, as distinguished from spurious relationships (Yin, 1994). It also refers to the link between theory and the empirical research (Svenning, 1997). In our research we try to discover which behavioral factors can have led to the speculative bubble during 1998-2000. We consider the theories in behavioral finance, if not the only contributing theory, are valid in explaining our empirical findings. However, it is difficult to show that specific behavior among the investors observed would be the sole reason for the phenomenon we describe. There may just as well be other external and internal factors contributing to the speculative bubble which we have not taken into account.

External validity establishes the domain to which a study's findings can be generalized. It tests weather a study's findings can be generalized from a chosen sample to a more common theory (Yin, 1994). In our case external validity refers to the possibility of generalizing our findings among Swedish private investors and institutional investors to a more broadly defined population. We consider that our sample describes relatively well the decision-making behavior encountered among randomly picked private and institutional investors. Respondents of the questionnaire were chosen randomly and the sample of 197 investors was fairly high. However, a certain bias toward private investors may exist as respondents were chosen among members in Aktiespararna Association. Therefore, the results may reflect the fact that the respondents are more active in markets than an average individual and probably also possess above average knowledge of investing if compared to a purely randomly picked individual from the Swedish population.

2.4.4 Reliability

Reliability demonstrates that the operations of a study, such as the data collection procedures, can be repeated with the same outcome. The objective is to be sure that if a later researcher followed exactly the same procedures as described by an earlier researcher and conducted the same case study all over again; the later researcher should arrive at the same findings and conclusions (Yin, 1994). One prerequisite for a repeated case study is the need to document in detail the procedures in the relevant case. In our case we have utilized a quantitative method in the form of a questionnaire directed toward private and institutional investors. We consider that the same procedure is easily applicable to another similar sample of investors and should render the same results if directed toward the same sample group. Therefore, we believe the study fulfils the reliability criteria. However, the answers of the respondents are exposed to subjectivity and the prevailing general market climate in December 2001, particularly regarding the questions related to the speculative bubble. A certain amount of hindsight bias, as mentioned in section 2.4.1, may also distort the responses.

3 Theoretical Framework

This chapter presents the theories underlying our research. The chapter begins with a description of standard as well as behavioral finance, which often contradicts the modern financial theories. Subsequently different aspects and principles of behavioral finance, such as the prospect theory and heuristics are discussed.

3.1 Standard Finance

Standard finance is the body of knowledge built on the pillars of the arbitrage principles of Miller and Modigliani, the portfolio principles of Markowitz, the capital asset pricing theory of Sharpe, Lintner and Black and the option-pricing theory of Black, Scholes, and Merton (Statman, 1999). These approaches consider markets to be efficient and are highly analytical and normative.

Modern financial economic theory is based on the assumption that the representative market actor in the economy is rational in two ways: the market actor makes decisions according to the axioms of expected utility theory and makes unbiased forecasts about the future. According to the expected utility theory a person is risk averse and the utility function of a person is concave, i.e. the marginal utility of wealth decreases. Assets prices are set by rational investors and consequently rationality based market equilibrium is achieved. In this equilibrium securities are priced according to the efficient market hypothesis, which is illustrated in the next section.

3.1.1 The Efficient Market Hypothesis

According to the efficient market hypothesis, financial prices incorporate all available information and prices can be regarded as optimal estimates of true investment value at all times. The efficient market hypothesis is based on the notion that people behave rationally, maximize expected utility accurately and process all available information (Shiller, 1998). In other words, financial assets are always priced rationally, given what is publicly known. Stock prices approximately describe random walks through time: the price changes are unpredictable since they occur only in response to genuinely new information, which by the very fact that it is new, is unpredictable (Shiller, 2000). Due to the fact that all information is contained in stock prices it is impossible to make an above average profit and beat the market over time without taking excess risk.

3.1.2 Behavioral Finance

Behavioral finance is a new paradigm of finance, which seeks to supplement the standard theories of finance by introducing behavioral aspects to the decision-making process. Contrary to the Markowitz and Sharp approach, behavioral finance deals with individuals and ways of gathering and using information. Behavioral finance seeks to understand and predict systematic financial market implications of psychological decision processes. In addition, it focuses on the application of psychological and economic principles for the improvement of financial decision-making (Olsen, 1998).

Market efficiency, in the sense that market prices reflect fundamental market characteristics and that excess returns on the average are leveled out in the long run, has been challenged by behavioral finance. There have been a number of studies pointing to market anomalies that

cannot be explained with the help of standard financial theory, such as abnormal price movements in connection with IPOs, mergers, stock splits and spin-offs. Throughout the 1980s and 1990s statistical anomalies have continued to appear which suggests that the existing standard finance models are, if not wrong, probably incomplete. Investors have been shown not to react "logically" to new information but to be overconfident and to alter their choices when given superficial changes in the presentation of investment information (Olsen, 1998). During the past few years there has, for example, been a media interest in technology stocks. Most of the time, as we know in retrospect, there was a positive bias in media assessments, which might have lead investors in making incorrect investment decisions. These anomalies suggest that that the underlying principles of rational behavior underlying the efficient market hypothesis are not entirely correct and that we need to look, as well, at other models of human behavior, as have been studied in other social sciences (Shiller, 1998).

The following sections introduce some of the basic findings and principal theories within behavioral finance that often contradict the basic assumptions of standard financial theory.

3.2 The Prospect Theory

Prospect theory is a mathematically formulated alternative to the theory of expected utility maximization. The utility theory offers a representation of truly rational behavior under certainty. According to the expected utility theory investors are risk averse. Risk aversion is equivalent to the concavity of the utility function, i.e. the marginal utility of wealth decreases. Every additional unit of wealth is valued less than the previous equivalent increase in wealth. Despite the obvious attractiveness of this expected utility theory, it has long been known that the theory has systematically failed to predict human behavior, at least in certain circumstances. Kahneman and Tversky present in Prospect Theory (1979), the following experimental evidence to illustrate how investors systematically violate the utility theory;

When their subjects were asked to choose between a lottery offering a 25% chance of winning 3,000 and a lottery offering a 20% chance of winning 4,000, 65% of their subjects chose the later (20%; 4,000). On the contrary when the subjects were asked to choose between a 100% chance of winning 3,000 and an 80% chance of winning 4,000 80% chose the former (100%; 3,000). Expected utility theory predicts that they should not choose differently in these two cases since the second choice is the same as the first except that all probabilities are multiplied by the same constant. Therefore, according to the prospect theory, the individuals' preference for the first choice in the lottery, when it is certain in this example, illustrates what is called the "certainty effect", a preference for certain outcomes. People behave as if they regard extremely improbable events as impossible and extremely probable events as certain.

Another foundation of the prospect theory is the Kahneman and Tversky (1979) value function. The value function differs from the utility function in expected utility theory due to a reference point, which is determined by the subjective impression of individuals. According to the conventional expected utility theory, the utility function is concave *downward* for all levels of wealth. On the contrary, according to the value function the slope of the utility function is *upward* sloping for wealth levels under the reference point and downward sloping for wealth levels after the reference point. The reference point is determined by each individual as a point of comparison, e.g. a measure of a target level of wealth. For wealth levels under this reference point investors are risk seekers, i.e. they are prepared to make riskier bets in order to stay above their preferred target level of wealth. Whereas, for wealth levels above this reference point, the value function is downward sloping, in line with

conventional theories, and investors are risk averse. Kahneman and Tversky asserted that people are risk lovers for losses.

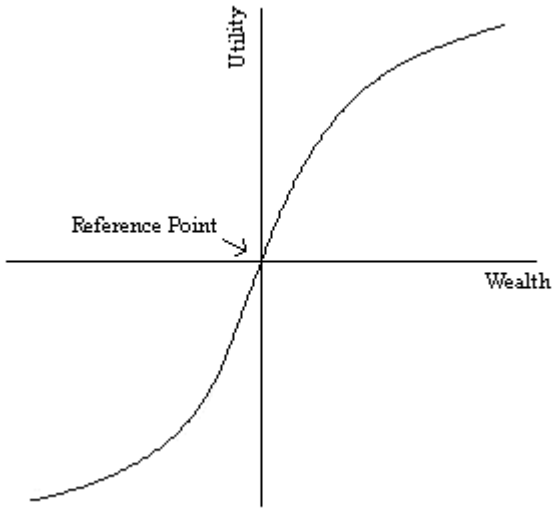

Figure 1. Kahneman & Tversky's Value Function

These two phenomena, the preference for certain outcomes and the preference for risk when faced with losses, discovered by Kahneman and Tversky, may explain some premises of investors' irrational behavior. Due to the fact that the reference point in the value function always moves with wealth to stay at the perceived current level of utility, investors will always behave in a risk adverse manner even when small amounts of wealth are in question. Subsequently, they will always prefer taking a risk when confronted with losses. This phenomenon, called loss aversion, is presented in the following section. Likewise, regret is an aspect of the prospect theory that can be traced to the value function theory.

3.2.1 Loss Aversion

Kahneman and Tversky sought to provide a theory that describes how decision-makers actually behave when confronted with choices under uncertainty. The value function shows the sharp asymmetry between the values that people put on gains and losses. This asymmetry is called loss aversion. Empirical tests indicate that losses are weighted about twice as heavily as gains – losing $1 is about twice as painful as the pleasure of gaining $1 (Kahneman and Tversky, 1991). This can also be expressed as the phenomena in which people will tend to gamble in losses, i.e. investors will tend to hold on to losing positions in the hope that prices will eventually recover. This is due to the fact that the utility function under the prospect theory is upward sloping for wealth levels under each individual's reference point. Prospect theory also predicts that investors will be risk averse in gains.

Samuelson (1963) illustrates an example of loss aversion. He asked a colleague whether he would accept a bet that paid him $200 with a probability of 0.5 and lost him $100 with a probability of 0.5. The colleague said he would not take the bet, but that we would take a hundred of them. With 100 such bets, his expected total winnings are $5,000 and he has virtually no chance of losing any money. The failure to accept several such bets when one consider them individually has been called "myopic loss aversion" by Benartzi and Thaler[3]

[3] Thaler, Richard; Professor of Behavioral Sciences at the University Chicago Graduate School of Business

(1995). Myopic loss aversion is the combination of a greater sensitivity to losses than to gains and a tendency to evaluate outcomes frequently. Investors' behavior is sometimes said to be myopic, short-sighted, in that it ignores everything that might happen after the end of the single-period horizon and therefore all investors plan for one identical holding period (Bodie et al., 2000). Two implications of myopic loss aversion are tested experimentally. First, investors who display myopic loss aversion will be more willing to accept risks if they evaluate their investments less often. Second, if all payoffs are increased enough to eliminate losses, investors will accept more risk. The myopic loss aversion explanation rests on two behavioral principles: loss aversion and mental accounting. Loss aversion refers to the fact that people tend to be more sensitive to decreases in their wealth than to increases. This is reflected in the prospect theory value function that has a kink at the origin (Thaler et al., 1997). Benartzi and Thaler argue that under estimated values for the "kink" in the Kahneman-Tversky value function, the equity premium puzzle of Mehra and Prescott (1985) can be resolved. The equity premium puzzle refers to the historical premiums received on equity which, from a historical perspective, are much too high compared to less riskier securities such as T-bills. The difference in return is too great to be explained solely by differences in risk characteristics.

Loss aversion can help to explain the tendency of investors to hold on to loss making stocks while selling winning stocks too early. Shefrin[4] and Statman[5] (1985) called this occurrence of "selling winners too early and riding losers too long" as the disposition effect. When investors view stocks on an individual basis, then risk aversion in gains will cause them to sell too quickly into rising stock prices, thereby depressing prices relative to fundamentals. This sets the stage for a further rise in price when stock prices return to fundamental values. Conversely, risk seeking in losses will cause investors to hold on too long when prices decline, thereby causing the prices of stocks with negative momentum to overstate fundamental values (Scott et al., 1999).

Loss aversion also implies that decision-making is sensitive to the description of the action choices i.e. to the way the alternatives are "framed" (Kahneman and Tversky, 1990). This role of frames or mental accounting, as it is also called, is presented in the following section.

3.2.2 Mental Accounting

Frames and mental accounting are a part of the prospect theory. It describes the tendency of people to place particular events into different mental accounts based on superficial attributes (Shiller, 1998). The main idea underlying mental accounting is that decision-makers tend to separate the different types of gambles they face into separate accounts, and then apply prospect theoretic decisions rules to each account by ignoring possible interaction between the accounts. Mental accounts can be isolated not only by content, but also in respect to time (Goldberg, von Nitsch, 2001)

Mental accounting can serve to explain why investors are likely to refrain from readjusting his or her reference point for a stock (Shefrin and Statman, 1985). When the stock is purchased, e.g. a stock of Ericsson, a new mental account for the particular stock is opened. The natural

[4] Shefrin, Hersh; Ph.D. from London School of Economics. Most recent publication: *Beyond Greed & Fear: Behavioral Finance & the Psychology that Drives Investors & Markets*, Harvard Business School Press, Cambridge.

[5] Statman, Meir: Glenn Klimek Professor of Finance at the Leavey School of Business, Santa Clara University. Ph.D. from Columbia University. His research focuses on Behavioral Finance. He attempts to understand how investors and managers make financial decisions and how these decisions are reflected in financial markets.

reference point, as in the Kahneman and Tversky valuation function described in section 3.2, is the asset purchase price. A running score is then kept on this account indicating gains or losses relative to the purchase price. When another stock is purchased, e.g. Nokia, another separate account is created. A normative frame recognizes that there is no substantive difference between the returns distributions of the two stocks, only a difference in names. However, a situation involving the sale of the Ericsson stock when it has decreased in price and using the proceeds to buy Nokia stock may be framed as closing the Ericsson account at a loss. It has been argued that decision-makers encounter considerable difficulty in closing a mental account at such a loss (Thaler and Johnson, 1985).

The role of frames is also illustrated in the dividend puzzle according to which private investors treat dividends separately from capital gains. In a world without taxes and transaction costs investors should be indifferent between a dividend dollar and a capital dollar. Moreover, in a world where dividends are taxed more heavily than capital gains, standard investors know that they are actually better off when companies refrain from paying dividends. So why do companies pay dividends? A dividend dollar is different from a capital dollar according to the prospect theory because the investor frames the dollars into two distinct mental accounts (Shefrin and Statman, 1984). Therefore, even though a stock paying out dividends might be decreasing in price an investor may be reluctant to sell the stock in fear of closing a mental account containing dividend income. Dividends can be thought of as a separate gain from the capital gain due to the rise in the stock price itself. Financing consumption out of dividends further avoids the anticipated regret of selling a stock that might later rise in value. Shefrin and Statman (1994) also argue that private investors think naturally in terms of having a “safe” part of their portfolio that is protected from downside risk and a risky part that is designed for getting rich.

Mental accounting can result in “good money being thrown after bad money” by a continuous operation of non-profitable ventures in the hope that recovery will somehow take place. It may also explain framing which is beneficial to investors with imperfect self-control – a phenomenon described in the following section.

3.2.3 Self-Control

Mental accounting and framing may also be used to mitigate self-control problems, for example, by setting up special accounts that are considered off-limits to spending urges (Thaler and Shefrin, 1981). Glick (1957) reports that the reluctance to realize losses constitutes a self-control problem; he describes professional traders who are very prone to let their losses “ride”. It is the control of losses that constitutes the essential problem. The traders’ problem was to exhibit sufficient self-control to close accounts at a loss even though they were clearly aware that riding losses was not rational. Self-control is also exhibited in the dividends puzzle, mentioned in the previous section. For example, old investors, especially retirees who finance their living expenditures from their portfolios, worry about spending their wealth too quickly, thereby outliving their assets. They fear a loss of self-control, where the urge for immediate gratification can lead them to overspend (Shefrin, 2000).

3.2.4 Regret

There is a human tendency to feel the pain of regret for having made errors, even small errors. It’s a feeling of ex post remorse about a decision that led to a bad outcome. If one wishes to avoid the pain of regret, one may alter one’s behavior in ways that would in some cases be irrational. Regret theory may help explain the fact that investors, as explained in the section

covering loss aversion, defer selling stocks that have gone down in value and accelerate the selling of stocks that have gone up in value (Shefrin and Statman, 1985). The theory may be interpreted as implying that investors avoid selling stocks that have gone down in order not to finalize the error they make and in that way avoid feeling regret. They sell stocks that have gone up in order not to feel the regret of failing to do so before the stock later fell. This behavior has been documented using volume of trade data by Ferris, Haugen and Makhija (1988) and Odean (1996).

Cognitive dissonance is the mental conflict that people experience when they are presented with evidence that their beliefs or assumptions are wrong. Cognitive dissonance may be classified as a sort of pain of regret, regret over mistaken beliefs. Festinger's theory (1957) asserts that there is a tendency for people to take actions to reduce cognitive dissonance that would not normally be considered as rational, such as avoiding new information or developing contorted arguments to maintain beliefs or assumptions. The theory of regret may attribute to the phenomenon of money flowing more rapidly into mutual funds or stocks that have performed well than flowing out of stocks or funds that have performed extremely poorly.

To avoid new information, contrary to the subjective beliefs of the individual or developing arguments to maintain own beliefs can also help explain the herd behavior and the "feedback phenomenon" experienced in connection with speculative bubbles.

3.3 Heuristics

The dictionary definition for heuristics refers to the process by which people find things out for themselves, usually by trial and error. Trial and error often leads people to develop "rules of thumb", but this process often leads to other errors (Shefrin, 2000). Heuristics can also be defined as the "use of experience and practical efforts to answer questions or to improve performance". Due to the fact that more and more information is spread faster and faster, life for decision-makers in financial markets has become more complicated. This implies increased use of heuristics which is often a mostly inevitable approach, but not always beneficiary (Fromlet[6], 2001).

Heuristics may help to explain why the market sometimes acts in an irrational manner, which is opposite to the model of perfectly informed markets. The interpretation of new information may require heuristic decision-making rules, which might later have to be reconsidered. The whole market can initially react in the wrong way.

Herd behavior is a form of heuristics where individuals are led to conform to the majority of individuals, present in the decision-making environment, by following their decisions. However, herd behavior, as with other heuristics, may lead people astray when they follow e.g. a general market trend. Herd behavior is described in the following section 3.3.1. In experimental settings people often tend to show excessive confidence about their own judgments. Overconfidence can also be traced to the "representativeness heuristic" (Kahneman and Tversky, 1974) a tendency for people to try to categorize events as typical or representative of a well-known class. In the stock market, for example, investors might classify some stocks as growth stocks based on a history of consistent earnings growth,

[6] Fromlet, Hubert: Senior Vice President and Chief Economist at Swedbank in Stockholm, Sweden. He is also professor of international economics at the Blekinge Institute of Technology. He received his Ph.D. from the University of Wurzburg, Germany.

ignoring the likelihood that there are very few companies that will keep growing. Overconfidence is therefore a component of heuristics and described more closely in section 3.3.2.

Finally, anchoring presented in section 3.3.3, refers to the decision-making process where quantitative assessments are required and where these assessments may be influenced by suggestions.

3.3.1 Herd Behavior

A fundamental observation about the human society is that people who communicate regularly with one another think similarly. It is important to understand the origins of this similar thinking, so that we can judge the plausibility of theories of speculative fluctuations that ascribe price changes to faulty thinking. Part of the reason people's judgments are similar at similar times is that they are reacting to the same information. The social influence has an immense power on individual judgment. When people are confronted with the judgment of a large group of people, they tend to change their "wrong" answers. They simply think that all the other people could not be wrong. They are reacting to the information that a large group of people had reached a judgment different from theirs. This is a rational behavior. In everyday living we have learned that when a large group of people is unanimous in its judgments they are certainly right (Shiller, 2000).

People are influenced by their social environment and they often feel pressure to conform. Fashion is a mild form of herd behavior while an example of the strong form is fads that constitute speculative bubbles and crashes. Herd behavior may be the most generally recognized observation on financial markets in a psychological context. Herd behavior can play a role in the generation of speculative bubbles as there is a tendency to observe "winners" very closely, particularly when good performance repeats itself a couple of times. It seems plausible to make a distinction between voluntary and enforced herd behavior. Many players on financial markets might think that a currency or equity is not correctly priced, but they refrain nevertheless from a contrary financial exposure. These people simply feel that it is not worthwhile to combat the herd. This is an example of enforced herd behavior. They follow the herd – not voluntarily, but to avoid being trampled and are therefore enforced into following the herd (Fromlet, 2001).

Even completely rational people can participate in herd behavior when they take into account the judgments of others, and even if they know that everyone else is behaving in a herdlike manner. The behavior, although individually rational, produces group behavior that is irrational and causes fluctuations in the market. The "noise trading" theory stems from the fact that investors with a short time horizon are influencing the stock prices more than the long-term investors are. Investors, with no access to inside information, irrationally act on noise as if it were information that would give them an edge (Thaler, 1993).

Another important variable to herding is the word of mouth. People generally trust friends, relatives and working colleagues more than they do the media. The conventional media, printed information, televisions, and radio have a profound capability for spreading ideas, but their ability to generate active behaviors is still limited Talking to other people and other kinds of interpersonal communication are among the most important social connections humans have. It is therefore likely that news about a buying opportunity will rapidly spread. In a study private investors were asked what first drew their attention to a company they recently had invested in. Only six percent of the respondents specified newspapers and

periodicals (Shiller and Pound, 1986b). Even if people read a lot, their attention and actions appear to be more stimulated by interpersonal communications.

The notion that the level of market prices reflects the outcome of private investors' aggregated assessments and consequently the true value of the market may be incorrect. People can instead be rationally choosing not to waste their time and effort in exercising their judgment about the market and thus choosing not to exert any independent impact on the market (Shiller, 2000). This can lead to herdlike behavior and act as a source of stock market over- or under pricing.

3.3.2 Overconfidence and Over & Underreaction

The key behavioral factor and perhaps the most robust finding in the psychology of judgment needed to understand market anomalies is overconfidence. People tend to exaggerate their talents and underestimate the likelihood of bad outcomes over which they have no control. The combination of overconfidence and optimism causes people to overestimate the reliability of their knowledge, underestimate risks and exaggerate their ability to control events, which leads to excessive trading volume and speculative bubbles. The greater confidence a person has in himself, the more risk there is of overconfidence. This applies, in particular, to areas where people are not well-informed – self-confidence usually bears no relation to their actual knowledge (Goldberg, von Nitsch, 2001). A surprising aspect is the relationship between overconfidence and competence. March and Shapira (1987) showed that managers overestimate the probability of success in particular when they think of themselves as experts.

De Bondt[7] and Thaler (1985) show that people tend to overreact to unexpected and dramatic news events. Consistent with the predictions of the overreaction hypothesis, portfolios of prior "losers" are found to outperform prior "winners". Overconfidence seems to be related to some deep-set of psychological phenomena. Ross (1987) argues that much overconfidence is related to a broader difficulty in making adequate allowance for the uncertainty in one's own viewpoints. Kahneman and Tversky (1974) show that people have a tendency to categorize events as typical or representative of a well-known class, and then, in making probability estimates to overstress the importance of such categorization disregarding evidence of the underlying probabilities. One consequence of this phenomenon is for people to see patterns in data that is truly random, to feel confident, for example, that a series which is in fact a random walk is not a random walk.

Price reactions to information are crucial for market behavior. Recent empirical research in finance (Barberis, et al., 1998) has uncovered two families of pervasive regularities: underreaction of stock prices to news such as earnings announcements, and overreaction of stock prices to a series of good or bad news. The underreaction evidence shows that over horizons of one to twelve months, security prices under react to news. As a consequence, news is incorporated only slowly into prices, which tend to exhibit positive autocorrelations over these horizons. A related way to make this point is to say that current good news has power in predicting positive returns in the future. The overreaction evidence shows that over longer horizons of three to five years, security prices overreact to consistent patterns of news pointing in the same direction. That is, securities that have had a long record of good news tend to become overpriced and have low average returns afterwards. The underreaction evidence in particular is consistent with conservatism. Conservatism refers to a phenomenon

[7] De Bondt, Werner: Ph.D. at University of Wisconsin at Madison. Frank Garner Professor of Investment Management.

according to which people mistrust new data and give too much weight to prior probabilities of events in a given situation. Edwards (1968) concluded that "it takes anywhere from two to five observations to do one observation's worth of work in inducing a subject to change his opinions." According to this principle people are slow to change their opinions. For this reason, it takes some time before investors begin to conclude that a trend, such as price increases in connection with a speculative bubble, will continue. Further, it is the over- and underreaction that is one of the causes of trends, momentums and fads.

Apparently, many investors feel that they do have speculative reasons to trade often, and apparently this must have to do with a tendency for each individual to have beliefs that he or she perceives better than others' beliefs (Shiller, 1998). It is as if most people think that they are above average. Shiller (1987) observed in a survey of the 1987 market crash, a surprisingly high confidence among investors in intuitive feelings about the direction the market would take after the crash. Therefore, overconfidence may help to explain possible general market overreactions as well as excess volatility and speculative asset prices. It may also explain why investment professionals hold actively managed portfolios with the intention of being able to choose winners and why pension funds hire active equity managers. High trading volumes and the pursuit of active investment strategies thus seem inconsistent with common knowledge of rationality.

3.3.3 Anchoring

Anchoring refers to the decision-making process where quantitative assessments are required and where these assessments may be influenced by suggestions. People have in their mind some reference points (anchors), for example of previous stock prices. When they get new information they adjust this past reference insufficiently (underreaction) to the new information acquired. Anchoring describes how individuals tend to focus on recent behavior and give less weight to longer time trends.

Values in speculative markets, like the stock market, are inherently ambiguous. It is hard to tell what the value of the Dow Jones Industrial Average should be. There is no agreed-upon economic theory that would provide an answer to this question. In the absence of any better information, past prices are likely to be important determinants of prices today. Therefore, the anchor is the most recently remembered price. The tendency of investors to use this anchor enforces the similarity of stock prices from one day to the next (Shiller, 2000). Other possible anchors are remembered historical prices, and the tendency of past prices to serve as anchors may explain the observed tendency for trends in individual stocks prices to be reversed. For individual stocks, price changes may tend to be anchored to the price changes of other stocks, and price-earnings ratios may be anchored to other firms' price-earnings levels. This kind of anchoring may explain why individual stock prices move together as much as they do, and thus why stock price indices are as volatile as they are – why the averaging across stocks that is inherent in the construction of the index does not more solidly dampen its volatility (Shiller, 1989). It may also explain why stocks of companies that are in different industries but are headquartered in the same country tend to have more similar price movements than stocks of companies that are in the same industry but are headquartered in different countries, contrary to one's expectation that the industry would define the fundamentals of the company better than the location of its headquarters (Griffin and Karolyi, 1998).

By extension from experimental results, such as Shiller (1984, 1990), it can be presumed that many economic phenomena are influenced by anchoring. Gruen and Gizycki (1993) used it to explain the widely observed anomaly that forward discounts do not properly explain

subsequent exchange rate movements. The anchoring phenomena would appear relevant to the “sticky prices” that are so talked about by macroeconomists. As long as past prices are taken as a suggestion of new prices, the new prices will tend to be close to past prices. The more ambiguous the value of a commodity, the more important a suggestion is and the more important anchoring is likely to be for price determination (Shiller, 1998).

4 Speculative Bubbles

We will in this chapter describe and explain some reasons to what caused but also what inflated the speculative bubble at the end of the 1990s. Some common psychological behavior characteristics and phenomena in the financial markets will also be dealt with.

A speculative bubble can be described as a situation in which temporarily high prices are sustained largely by investors' enthusiasm rather than by consistent estimations of real value. The essence of a speculative bubble is a sort of feedback, from price increases to increased investor enthusiasm, to increased demand, and hence further price increases. According to the adaptive expectations version of the feedback theory, feedback takes place because past price increases generate expectations of further price increases. According to an alternative version, feedback occurs as a consequence of increased investor confidence in response to past price increases. A speculative bubble is not indefinitely sustainable. Prices cannot go up forever and when price increases end, the increased demand that the price increases generated ends. A downward feedback may replace the upward feedback. (Shiller, 2001).

Financial speculative bubbles are prime examples of markets that do not always work perfectly. Despite strong evidence that the stock market is highly efficient, which means that one cannot earn abnormal profits by trading on publicly available information, there have been a number of studies documenting long-term historical anomalies in the stock market that seem to contradict the efficient market hypothesis.

4.1 The Speculative Bubble

During the past decade, information technology has emerged as an important factor affecting our society and everyday life. Subsequently it has become an essential part of the equity markets ever since the introduction of the very first company, America Online, in March 1992. In the following years, we have witnessed an increasing number of IPOs, including well-know US companies such as Yahoo, Amazon and E-bay as well as Swedish companies such as Net Insight, Teligent and HIQ. During 1998-2000 the amount of listed IT companies soared promoting an amazing rise in share values of these public companies. Between September 1998 and March 2000 the NASDAQ Composite index rose 170% and the Swedish All Share General SAX index rose by 118%. Over the same time the Dow Jones Industrial Average only rose by 39%. For some individual stocks the value increases were even higher. Yahoo! rose from its IPO price of $1.08 in April 1996 to $250 in January 1999 when it was valued at $133 billion – more than Ford and General Motors combined. In Sweden, companies like Net Insight were valued at 120 SEK per share in February 2000 and in November 2001 are priced at 4.85 SEK - a drop of 96% in value.

This dramatic rise in IT stocks between the fall of 1998 and March 2000 was followed by an equally dramatic decline starting in March 2000. The American IT stocks started to falter in March 2000 and the situation got worse in April as the downturn was spread to other global markets. The NASDAQ index alone dropped 16% in April 2000, whereupon the IT stocks have continued their slide and despite a few short rebounds they have not been able to move back to the overall price level in March 2000. In February 2001, the NASDAQ was below the level of 2200. In other words, the NASDAQ has lost half of its market value within one year. By September 2001 NASDAQ had lost 68% of its value and the SAX index had lost 48% of

its value compared to the February 2000 highs. The development of the markets is illustrated in the figure below.

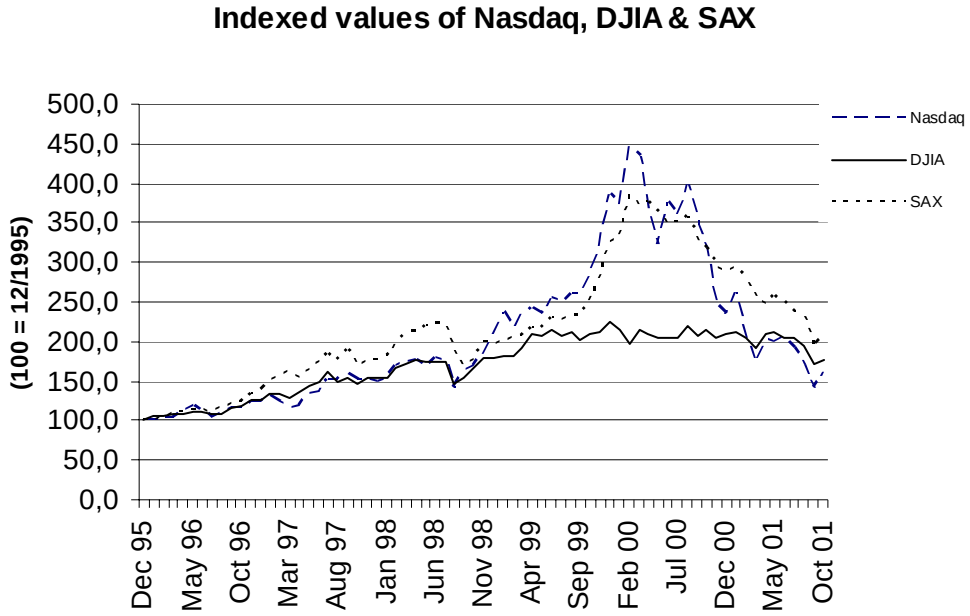

Figure 2: Indexed values of NASDAQ, the Dow Jones Industrial Average & Stockholm All Share Index between December 1995 and October 2001

It is difficult to justify the skyrocketing prices of IT stocks by any traditional valuation methods. The phenomenal increases in equity prices followed by and equally abrupt downturn can be described as a speculative bubble. Given the fact that the IT stocks dropped so much on what appears to be minor news, gives cause to suspect that the stock prices were not rationally priced before and after the burst of the speculative bubble in March 2000.

4.2 Previous Studies

A number of studies have been conducted in order to explain the speculative bubble. Liu and Song (2001) suggest that financial analysts as a whole were too optimistic regarding the IT stocks before the market crash in March 2000. They also suggest that earnings forecasts before the crash were less than rational and therefore the behavior of financial analysts is partly to blame in the formation of the speculative bubble. A study (Cooper et al., 2001) found for a sample of 95 very small firms, that changed their names to include dot.com or Internet, an average abnormal return of 74% for the ten days surrounding the announcement. They argued their evidence as being consistent with investor mania – investors seemed to be eager to be associated with the Internet at all costs. Hand (2000) shows that IT stock valuations were correlated with "supply and demand" variables such as short interest, the percentage of stock held by institutions, and the float, or number of shares outstanding not held by insiders. He interpreted his evidence as supporting the claim that IT stock pricing may not be fully rationally determined. Another study (McNichols et al., 1997) indicates that analysts tend to add firms they view favorably and drop firms they view unfavorably to their lists of followed companies. They interpret the evidence of self-selection by analysis as a partial explanation for the commonly observed phenomena that analysts' forecasts of earnings are generally and persistently overoptimistic.

According to a survey of professional analysts conducted by Thaler (1999), the median respondent estimated the intrinsic value of a portfolio of five IT stocks to be 50% of the market price. Thaler indicates that even though experts agree on the overvaluation of the market it is primarily the private investors holding the majority of the IT stocks who cause the "irrational equilibrium" in the market. The consensus on Wall Street may be that the stock market is 20-30% overvalued; yet prices can continue to increase because the investors who are willing to bet on a decline have too few dollars to prevail.

Shiller (1987) studied the investor behavior in connection with the October 1987 stock market crash. His survey shows, among others, that many investors thought they could predict the market and that both buyers and sellers thought the market was overvalued before the crash. Most investors also interpreted the crash as due to the psychology of other investors. Fama (1997) argues against recent evidence of market anomalies. He states that anomalies are chance results and that apparent overreaction of stock price information is about as common as underreaction which is consistent with the market efficiency hypothesis.

4.3 Factors Underlying the Speculative Bubble

There are several factors that can help explain speculative bubbles. Structural factors, such as technology and demography, lie outside the stock market itself, but nevertheless shape the market behavior. Cultural factors are factors that further reinforce the structure of speculative bubbles, such as the new economy phenomenon. Finally, psychological factors contribute in defining and explaining the speculative bubble. These three categories and the factors therein are illustrated below.

Structural Factors

- The Arrival of New Technology at a Time of Solid Earnings Growth
- Cultural Changes Favoring Business Success or the Appearance Thereof
- The Baby Boom and Its Perceived Effects on the Market
- An Expansion in Media Reporting of Business News
- Analyst's Increasingly Optimistic Forecasts
- The Growth of Mutual Funds & the Introduction of the Premiepensionsvalet
- The Decline of Inflation and the Effects of Money Illusion
- Expansion of the Volume of Trade: Brokers, Day Traders, and Twenty-Four Hour Trading
- The Rise of Gambling Opportunities

Cultural Factors

- The Media
- The New Economy
- Public Attention to the Market

Psychological factors

- Expectations and Emotions
- Personal Experience
- The Need to Control

The following three sections describe more closely each factor mentioned above, beginning with structural factors in section 4.3.1. Cultural factors are presented in section 4.3.2 and finally psychological factors in section 4.3.3.

4.3.1 Structural Factors

In the following, we will concentrate on nine factors that have had an effect on the market that is not warranted by rational analysis of economic fundamentals. We will however omit a number of factors that should rationally have an effect on the variation of the market, e.g. growth in earnings and the change in real interest rates.

The Arrival of New Technology at a Time of Solid Earnings Growth

Few people had ever used a cellular phone and even fewer had heard of the Internet and the World Wide Web in the mid 1990s. In the matter of just a few years these technologies have become common ubiquitous things to use, making us intimately conscious of the pace of technological change. Although the Internet businesses were not making any profits, people had a strong faith in that the young and inexperienced entrepreneurs would compete with the traditional businesses on equal terms. Earnings increased in the mid 1990s and they were attributed to the birth of the new era but in fact had little to do with the Internet. Instead the earnings growth was attributable by analysts to a continuation of the recovery from the economic turmoil and recession of the early 1990s, coupled with a weak the Swedish krona as well as cost cutting and dismissal of employees. It could not have been the Internet that caused the growth in profits; the booming IT companies were not making much of a profit yet.

The simultaneous occurrence of profit growth with the appearance of the new technologies led the minds of people to believe there was a connection between the two events. The lineage was especially strong with the advent of the new millennium – a time of much optimism and hopefulness of the future.

What matters for a stock market boom is not, however, the reality of the “IT revolution” but rather the public impressions that the revolution creates. Public reaction is influenced by the intuitive plausibility of Internet myth, and this plausibility is ultimately influenced by the ease with which examples or arguments come to mind. If we regularly spend time on the Internet, then this will come to mind very easily. Internet is, of course, an important technological innovation in its own right, as well as developments in other fields of science are, but we may question what impact the Internet and the communication revolution should have on the valuation of existing corporations. New technology will always have an impact on the market, but should it really raise the value of existing companies, given that those existing companies do not have a monopoly on the new technology?

Some simple economic growth models suggest that a sudden technological advance will have no effect on stock prices (Blanchard, 1989). The theoretical effect of a sudden technological advance might be to spur investment in new capital, which will compete away any extra profits that the technological advance might generate for existing capital.

Cultural Changes Favoring Business Success or the Appearance Thereof

The bull market has been followed by a rise in materialistic values. A survey in both 1975 and 1994 asked people what they valued in life (Bowman, 1996). In 1975, 38% picked “a lot of money”, whereas in 1994 63% picked this alternative.

Materialistic values do not by themselves have any logical bearing on the level of the stock market but it is reasonable to expect that people save for the future and an upcoming retirement. Stocks have long held out at least the possibility of amassing substantial and easily gained wealth. The notion that investing in stocks is a road to quick riches has a certain appeal to many people.

The release of many workers in the early 1990s probably led people to change how they view their lives. The experience of being discharged, or at least hearing about others being fired, have probably had an impact on how people look upon the dependence of the employer and a will to take the economic control of their lives. By investing in stocks, bonds and other financial assets people have been able to build up a buffer in case of being dismissed. Firms have tilted their compensation packages to management away from fixed salaries toward participation and result-based compensations such as stock options. With such options management has an incentive to do everything possibly to boost share prices. They have an incentive to maintain an appearance of corporate success and a corporation working its way toward an impressive future with increasing profits. It seemed as a strategy to boost the stock value in the late 1990s and to refine the company's objectives and announcing that it was a part of the e-business society.

The Baby Boom and Its Perceived Effects on the Market

In the years following World War II, there was a substantial increase in the birth rate, not only in Sweden but in many countries throughout Western Europe and the United States. Peacetime growth encouraged, those who had postponed families because of the depression and the war, to have children. Then, in the mid 1960s, the birth rate eventually declined and returned to a more normal level. The unusual decline was not unique and it did not occur because of starvation or war, but because of an endogenous decline in the birth rate (Cohen, 1998). Some factors contributing to the decline were advances in birth control and social changes that accepted the legality of contraception and abortion.

The baby boomers had by the end of last century reached the ages when they began saving for their retirements. Two theories suggest that the presence of a large number of middle-aged people ought to boost today's stock market. The first theory justifies the high price-earnings ratios we see today. This could be seen as a result of those baby boomer's competing against each other to buy stocks in order to save for their eventual retirement and bidding share prices up relative to the earnings they generate. The second theory indicates that it is spending on current goods and services that forces the share prices up through a generalized positive effect on the economy: high expenditures mean high profits for companies (Shiller, 2000).

These two theories are somewhat simplified. First, they neglect to consider *when* the baby boom should affect the stock market. The effect of the baby boom might already have been incorporated into stock prices by investors. The theories also neglect factors such as the emergence of new capitalist systems around the world and their demand. The theory suggests that the baby boom drives the market up due to baby boomer's demand for goods would imply that the market is highly valued because earnings are high; it would not explain the high price-earnings ratios.

If life-cycle savings patterns alone were to be the dominant force in the markets for savings, there would tend to be strong correlations in price behavior across alternative asset classes, and strong correlations over time between asset prices and demographics. This would imply

that when the most numerous generation feels the need to save, they would bid up all savings alternatives. The same would be true when this generation feels the need to decrease their savings; their selling would put a downward pressure on the prices. Studies performed in the United States show very little of such long-term correlation (Bakshi and Chen, 1994).

A possible explanation to this is that different generations have different attitudes toward risk. People who have no memory of harsh times such as the depression or World War II may be less conscious and aware of the risks associated with financial and political circumstances. There is some evidence that shared experiences in formative years leave a mark forever on a generation's attitudes (Inglehart, 1985). This provides undoubtedly some truth to these theories of the baby boom's effect on the stock market, but it may be the public's perceptions of the baby boom and its assumed effects that are most responsible for the surge in the market. Many believe that the baby boom represents an important source of strength for the market today, and this contributes to a feeling that there is good reason for the market to be highly valued. Many investors fail to appreciate just how common their thinking actually is and their perceptions fuel the continuing upward spiral in market valuations.

An Expansion in Media Reporting of Business News

The first business newspaper in Sweden was *Dagens Industri*, which started in 1976 and was followed by *Finanstidningen* founded in 1989. By the end of the 1990s the major newspapers had extended their coverage of the financial markets and a number of new web sites had emerged, for example *E24*, *Dagens Finans*, and *Bit*. In 1997, *TV8* emerged as the first Swedish financial television station, however; by this time cable viewers had long been able to watch American financial news on the CNN*fi*, CNBC and Bloomberg.

Not only the scope but also the nature of business reporting changed during the 1990s. Studies have shown that newspapers in the past twenty years have transformed their formerly staid business sections into enhanced "Money" sections with useful tips about personal investing. Articles about corporations that used to be written as if they were to interest only people involved in the financial industry or the corporations themselves are now written with a slant toward profit opportunities for private investors (Parker, 1998). This kind of media coverage leads to increased demand for securities, just as advertisements and commercials for other products make people more familiar with the products, remind them of the option to buy, and most importantly, encourage to actually purchasing the product. Given the media's heightened reporting it should not come as a surprise that the demand for securities increases just as it increases for any other marketed product after an intense campaign.

Investment fashions and fads and the resulting volatility of speculative assets prices appear to be related to the capriciousness of public attention (Shiller, 1984, 1987). Investor attention to investments categories seems to be affected by the alternating waves of public attention or inattention. Investor attention to the market seems to vary through time and major crashes in financial markets appear to be a phenomenon of attention, in which an inordinate amount of public interest is focused on markets (Shiller 1987). Therefore, media may well have an important role in directing this public attention toward markets, which may consequently result in abnormal market behavior.

Analyst's Increasingly Optimistic Forecasts

According to a study in Sweden, analysts at the big business banks gave strong buy recommendations in two out of three cases to companies, which the banks have underwritten

(Huldschiner, 2001). Not in a single case did the investment banks give sell-recommendation. Banks that have not been involved in the IPOs are less optimistic about the future of the companies. In one out of three cases the independent bank gave strong sell-recommendations. A study performed in the United States gave similar results; analysts' recommendations on 6,000 companies showed no more than 1% of the recommendations were sell-recommendations in late 1999 while 69.5 % were "buys" and 29.9 % were "holds". This is a stunning result compared with a study ten years earlier in which 9.1% of the recommendations were sell-recommendations (Shiller, 2000). The lack of objectivity can be explained in many ways, a bank may overrate its analyses in order to get more corporate finance orders since the bank may act as advisor in potentially profitable emissions by the companies in the future. Another reason may be that a sell-recommendation might incur the wrath of the company involved. Companies can retaliate by refusing to talk with analysts, whom they view as submitting negative reports, excluding them from information sessions and not offering them access to key executives as they prepare earnings forecasts. Another reason may be that firms underwriting securities employ a large number of the analysts, and these firms do not want their analysts to do anything that might jeopardize this lucrative side of business. Analysts affiliated with investment banks give significantly more favorable recommendations on firms for which their employer is the co- or lead underwriter than do unaffiliated analysts, even though their earnings forecasts are not usually stronger (Lin and McNichols, 1998).

These overly optimistic analyst recommendations and the evident undue influence of investment bank underwritings on analyst recommendations may contribute to abnormal market anomalies and speculative bubbles.

The Growth of Mutual Funds & the Introduction of the Premiepensionsvalet

The stock market boom coincided with a peculiar growth spurt in the mutual fund industry and a proliferation of advertising for mutual funds. The first mutual fund investing in stocks in Sweden was introduced in the 1950s by *Handelsbanken.* It was difficult to encourage people to invest money in the fund and by the early 1970s there was no more than 300 MSEK in those ten mutual funds that were offered by the market. The first large upswing in fund saving came in 1984 when the *allemansspar* was introduced. There were two options in the allemansspar, an interest-savings account (allemanssparkonto) or an equity-savings account in a mutual fund (allemansfond). There was an incentive to use this kind of saving since the yield was tax exempt until 1991. Dividends from allemansfonds were taxable by 20% tax until January 1 1997; this should be compared with a 30% tax on capital income. The popularity of the allemansfonds grew quickly and by 1986-87 8,400 MSEK had been invested in the funds; this amount had grown to 75,000 MSEK in 2000. The allemansfonds were the first big breakthrough for mutual funds in Sweden and people have since then learned to appreciate the advantages of diversifying the risks by investing in more than one security. In 1989, the opportunity to invest in foreign stocks became a reality. There were initially ten funds with a total capital of around 880 MSEK, five years later 6,600 MSEK had been invested in funds investing in foreign stocks. Today there are around 350 funds with roughly 50,000 MSEK invested (Fondex).

Part of the reason that equity mutual funds proliferated so rapidly is that they have been used in the premiepensionsvalet. Changes in the nature of employee pension plans have encouraged people to learn about and accept stocks and mutual funds as good sources for a growing capital. As people invest their money directly in mutual funds, they may develop a greater familiarity with the concept and they are thus more inclined to invest their non-

pension capital in mutual funds as well. If people's attention to the stock market is filtered through the lens of a pension plan it should intuitionally encourage longer-term investment thinking since the purpose of the premiepensionsvalet is to prepare for retirement, which for most employers is many years ahead. Encouraging longer-term thinking among investors is probably a good thing, however; as the number of mutual funds and available investment categories increases, banks and institutions offering mutual funds will probably create a further demand for stocks which in turn contributes to an even larger upswing in stock prices.

Another reason for the funds' explosive growth is that they have paid for a great deal of advertising. Mutual funds may encourage more naïve investors to participate in the market, by leading them to think that the experts managing the funds will steer them away from pitfalls. The proliferation of equity mutual funds has therefore focused public attention on the market, with the effect of encouraging speculative price movements in stock market aggregates, rather than in individual stocks. A study in the United States shows a relation between market performance and interest in mutual funds, inflows to mutual funds show an immediate reaction when the stock market goes up (Warther, 1995). The emerging popular concept that mutual fund investing is sound, convenient, and safe has now encouraged many investors who were once afraid of the market into participating, thereby giving an upward push in market values.

The level of knowledge and education among people and investors may also play an important role in the valuation of stocks. Thanks to mutual funds and media, investors have learned to hold for the long term and to see price declines as transitory – and as buying opportunities. Therefore investors may have learned that diversified portfolios of stocks are not risky, and that stocks are much more valuable as investments than they had formerly thought. As a result they are now willing to pay much more for stocks. Because of this increased demand for stocks, the stock market will perpetually remain at a higher level in the future. (Glassman, Hassett. 1999)

The Decline of Inflation and the Effects of Money Illusion

Money illusion is the failure to recognize the difference between nominal and real values, or the tendency to continue to attach some importance to nominal values even though real ones are recognized. This is common among most decision-makers, and remains persistent, even after substantial learning it is not entirely eliminated (Schwartz, 2000).

The Swedish economic outlook and inflation, as measured by the percentage change in the Consumer Price Index, has improved with the bull market during the 1990s. Why is inflation so bad? There are many reasons for this and one of them is that the public pays attention to high levels of inflation. Studies in the United States have shown that people widely believe that the inflation rate is a good measurement of the economic and social health of the nation (Shiller, 1997). High inflation is regarded as a sign of economic disarray, of a loss of basic values, and a disgrace to the nation. Low inflation is viewed as a sign of economic prosperity, social justice, and good government. Thus, it is not surprising that a lower inflation rate boosts public confidence and hence stock market valuation.

This view is not, however, satisfying as economic theory will explain. The stock market reacts irrationally to inflation because people do not fully understand the effect of inflation on interest rates (Modigliani and Cohn, 1979). When inflation is high – nominal interest rates are high because they have to compensate investors for the inflation that is eroding the value of their money. Modigliani and Cohn claim that the market tends to be depressed when nominal

rates are high even when real interest rates are low due to a of a sort of “money illusion”, or public confusion about the effects of a changing monetary standard. When there is inflation, the value of money changes, and therefore the measurement by which we estimate values changes as well. When people hear about a changing yardstick they become confused.

This misunderstanding among the public about inflation encourages high expectations for real returns. Most data on past stock market returns is reported in the media in nominal terms, without correction for inflation, and it is not surprising that the public might expect the same level of nominal returns in the future. The annual inflation in Sweden during the years 1996-2000 was on average 0.36%, the average annual inflation in 1986-1990 was 5.33% (SCB). Therefore, expecting the same nominal returns as we have seen in the stock market during the last decade is expecting a lot more in real terms.

The Expansion of the Volume of Trade

The turnover, number of shares times the value, for the Stockholm Stock Exchange has increased from 130,000 MSEK in 1991 to roughly 4,550,000 MSEK in 2000 (Stockholm Stock Exchange). This is a 3400% increase in no more than 10 years or an annual average equivalent of 42.3%.

The higher turnover rate may be due to an increased interest in the market as a result of other factors mentioned here but another important factor is the declining cost of making a trade. This may be a result of fiercer competition and the increase of discount brokers on the Internet but also technological changes play a part in the lowering of transaction costs. The advent of online discount brokers may have spawned a growing number of amateur investors who can “day trade”, that is, try to make profits by rapidly trading stocks using the same order execution systems used by professionals. The growth of the online trading, as well as the associated Internet-based information and communication services, may well encourage minute-by-minute attention to the market. After-hours trading on the stock exchange also has the potential to increase the level of attention paid to the market, as investors can track price changes in their living rooms during their spare time.

Economists Shlomo Benartzi and Richard Thaler have shown in experimental settings that there may be a negative relation between exposure to price quotes and the demand for stocks (Shlomo and Thaler, 1995). The two economists showed that the time pattern of attention to market prices can have important effects on the demand for stocks. If people are exposed to daily data on stock prices they express much less interest in investing in stocks than if they are shown only longer run returns. To keep an eye on day-to-day noise in stock prices obviously invokes more fear about the risk of investing in stocks. Institutional investors that encourage monitoring market prices more frequently may tend to depress the price level of the market (Shiller, 2000).

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Average Size of a Closed Contract	219	222	215	251	253	280	278	285	309	324
Average Daily Turnover	522	681	1,347	2,604	2,648	3,658	5,404	7,320	10,353	17,753
Stock Turnover (BN SEK)	130	171	339	659	665	918	1,346	1,830	2,609	4,456
Share Turnover (Millions)	1,163	2,146	4,944	6,650	5,981	8,431	9,021	11,915	14,690	27,901
Market Value (BN SEK)	558	552	892	976	1179	1688	2164	2413	3717	3583
Number of Closed Contracts (Thousands)	596	769	1,577	2,628	2,628	3,275	4,836	6,427	8,426	13,764
Turnover Velocity (%)	21	32	45	71	61	66	66	76	94	107

Source: Stockholm Stock Exchange

Table 1. Key Numbers from the Stockholm Stock Exchange 1991 - 2000

On the other hand, the increased frequency of reporting stock prices, caused by recent institutional and technological changes, may have the opposite effect to the observed by Thaler and Benartzi. In a non-experimental setting, where a supervisor does not control people's focus of attention, the increased frequency of price observations may tend to increase the demand for stocks by attracting investors to them.

The Rise of Gambling Opportunities

The number of available gambling institutions has increased during the last decade. Today, people can participate in gambling via television, the Internet, and different kinds of machines in restaurants and cafés - even in casinos run by the state. The increased frequency of actual gambling can have potentially important effects on our culture and on changed attitudes toward risk taking in other areas, such as investing in the stock market. Gambling suppresses natural inhibitions against taking risks and some of the gambling games, in particular the lotteries, superficially resemble financial markets. One deals with a computer, one receives a certificate, the lottery ticket, and after having established a habit of participating in such gambling, it would be a natural thing to move on to a more upscale form, speculation in securities.

A spillover from gambling to financial volatility may originate from gambling, and the institutions that promote it yield an inflated estimate of one's ultimate potential for good luck, a heightened interest in how one performs compared with others, and a new way to stimulate oneself out of a feeling of boredom or monotony (Shiller, 2000). Today we are constantly subjected to highly professional advertisements that try to foster such attitudes. In radio, television and on public billboards people are encouraged to choose mutual funds for their future retirement. These marketing efforts, and the experience of gambling or seeing others gamble, may well have the effect of also encouraging frivolous risk-taking behavior in the stock market.

4.3.2 Cultural Factors

This section will describe cultural factors, which further reinforce the structure of speculative bubbles, such as

- The Media
  - *Do Stock Prices Change on Days with Big Headlines?*
  - *Major Stock Price Changes on Days with No News*
- The New Economy
- Public Attention to the Market

The Media

The news media has during all times had a close relation to the expansion and consequences of speculative bubbles. Probably the most famous of all bubbles was the Dutch tulip mania in the 1630s in which newspapers played an important role for the propagation of the hysteria (Garber, 2000). Although the news media present themselves as unbiased observers they are an integrated part of the market events because they are interested in getting as many viewers and readers as possible. Significant market events generally occur only if there is similar thinking among large groups of people, and the news media are essential vehicles for the spreading of ideas. The media actually plays two roles; they set the stage for market moves but they also instigate the moves themselves (Shiller, 2000).

The news media are in constant competition to capture the public attention they need in order to survive. Survival for them requires finding and defining interesting news, focusing attention on the news that has potential and whenever possible, defining an ongoing story that encourages their audience to remain regular customers. The media actively shape public attention and categories of thought, and they create the environment within which the stock market events we see are played out. The news media are fundamental propagators of speculative price movements through their efforts to make news interesting to their audience. They sometimes strive to enhance such interest by attaching news stories to stock price movements that the public has already observed, thereby enhancing the salience of these movements and focusing greater attention to them. They may also remind the public of past market episodes, or of the likely trading strategies of others. Thus the media can some times foster stronger feedback from past price changes to further price changes. As a consequence the media can also foster another sequence of events.

These sequences of events are sometimes referred to as *news cascades*. It seems that news affecting the market are often delayed, news also seem to set off a motion of public attention. The attention may be targeted at images or stories, or to facts that may have already been known. They may have however; been ignored until a crucial piece of news becomes well known which in turn offsets a cascade of news reporting. These sequences of attention are called cascades, as one’s focus of attention leads to attention to another, and then another. (Shiller, 2000).

The news media are naturally attracted to financial markets because there is a perpetual flow of news in the form of daily price changes and company reports. There are other markets, such as real estate, that could work as a source for news but it does not however generate daily price movements and the volatility of the prices are not as great as it is in the stock market. The stock market also posses an image of quality and the public considers it the Big

Casino where the major players make their choices. The financial markets are also a place of excitement and thrilling challenges were fortunes are made and lost. The financial market possesses the nature of the rewarding loyal "gamblers", as people participate more frequently they learn more and they are more apt in making sounder decisions.

In their attempts to attract attention, the media try to present issues on the public mind. This may mean a debate on topics that experts would not otherwise consider deserving of such discussion. The resulting media event may convey the impression that there are experts on all sides of the issue, which suggests a lack of expert agreement on the very issues that people are most confused about.

There is no lack of journalists and analysts trying to answer our questions about the market today, however; there is a shortage of relevant facts or considered interpretations among these people. Many news stories seem to have been produced under the pressure of a deadline. Anything will do to go along with the numbers. A typical news story, after having noted the remarkable bull market is to focus on very short-term statistics, making comparisons with competitors and the story ends with a few of the "usual" factors behind growth.

Do Stock Prices Change on Days with Big Headlines?

What about real news then, what is the reaction to real unquestionable events? Is significant news followed by stock price changes? A study carried out by Victor Niederhoffer in the United States in 1971 sought to establish whether days with news of significant world events corresponds to days with big stock price movements. The study comprised of 432 headlines in the *New York Times* between 1950 and 1966. Some of these events were the Korean War, Russian troops threatening Hungary and Poland in 1956, the Suez crisis of 1956, the Cuban tensions in 1960 and 1962, and the assassination of President John F Kennedy in 1963. The study concluded that the S&P Composite Index over this period demonstrated substantial one-day increases (of more than 0.78%) on only 10% of the trading days and substantial one-day decreases (of more than 0.71%) on only 10% of the trading days. Of the 432 significant-world-event days, 78 (18%) showed big increases and 56 (13%) showed big decreases. Thus such days were only slightly more likely to show large price movements than other days (Niederhoffer, 1971). Niederhoffer claimed that the stories belonging to the headlines did not seem likely to have much impact on the fundamental value represented by the stock market. The media might have thought that what seemed to be big national news was not what was really important to the stock market. He speculated that news events that represent crises were more likely to influence the stock market. Niederhoffer found that during crises, defined as a time when five or more large headlines occurred within a seven day-period, 42% of the daily changes were "big", as compared with 20% for other, "normal" time periods. Thus the crisis periods were somewhat, but not dramatically, more likely to be accompanied by big changes in stock prices. Niederhoffer found eleven such crises, i.e. weeks, during the sixteen-year-time-period. Very few of the aggregate price movements in the stock market show any meaningful association with headlines.

Major Stock Price Changes on Days with No News

What about big price changes on days with no major breaking news? A study in 1989 compiled a list of the fifty largest American stock market movements, as measured by the S&P Index since World War II. Most of the so-called explanations do not correspond to any unusual news, and some of them could not even be considered serious news (Cutler et al., 1989). According to the Efficient Market Hypothesis, see section 3.1.1, stock prices respond

to news as soon as they occur, not when the media reports about them. This could then be an argument against the idea of finding breaking news on days of large stock price movements. Another reason may be that the confluence of many small events may cause a major change, although the events separately are too small to make any difference.

News stories occurring on days of big price swings that are cited as the causes for changes often cannot possibly account for the changes, or at least not for the full magnitude. Often the news stories concern a single firm, and when one considers how much of the total market value the stock of the firm represents, one can easily conclude that it is improbable that a single company should have such an impact on the total market. One can easily claim however; that the event is viewed by the market as a watershed event, indicating that many similar events may occur, which will affect firms in the same industry.

In a survey carried out in the United States in 1989, Shiller and Feltus asked 101 market professionals if they had heard about the leveraged buyout by UAL, the parent company of United Airlines. The question to the professionals was if they had heard about the buyout as an explanation of the market crash, or if the crash of the UAL was caused by the drop in the market. No more than 36% answered that they had heard about the news before the crash; 53% said they had heard about it afterward as an explanation for the drop; the remaining 11% were unsure when they had heard about it (Feltus, Shiller, 1989). It appears as if the news story may have tagged along after the crash, rather than directly caused it, and therefore it was not as prominent as the media accounts suggested. The second question concerned whether the sudden drop in UAL's stock price would reduce future takeovers, or if the news should be viewed as a focal point, in which investors were able to express their doubts about the market. Of the respondents, 30% chose the first alternative, 50% chose the second, and the rest were unsure. The market professionals seem to have reacted mostly to the news as an interpretation of the behavior of investors. It may be correct to say that the news event was *fundamental* to this stock market crash, in that it represented a "story" that enhanced the feedback from stock price drops to further stock price drops, thereby preserving the feedback effect for a longer period than would otherwise have been the case. Yet it was unlikely to have been its *cause*.

The New Economy

As with all major changes in the economy theories are born which try to explain and justify the new market conditions. One can discern a number of different arguments such as: macroeconomic variables e.g. lower inflation, increased globalization, falling interest rates, and ideology; organizational changes e.g. privatization, downsizing & restructuring and a move toward a service-economy rather than a traditional manufacturing-economy. Another factor worth mentioning is the boom in high-tech industries.

Most macroeconomists agree that a low inflation and economic stability are important factors for a strong market outlook. What the market shuns the most is uncertainty, i.e. risk, and with a high inflation prices tend to be less predictable.

A well-known theory during the boom of the 1960s was that if inflation goes up the stock market would also move up. The stock market would be a good hedge against inflation since investors would demand the same return no matter what the inflation was. During the boom of 1990s this idea was reversed, the common belief was that high inflation would push the market down instead of up. First of all, recent studies by economists had shown that the market does poorly during times of high outbursts of inflation and the market had eventually

accepted this newer knowledge. A second reason which seems equally probable is that people in the 1990s were reacting to the fact that the stock market had in recent years moved against inflation, rather than moved with it.

The end of the Cold War and decreased tensions among countries represented a break point for the economy. Suddenly people, goods and currencies could move more freely in a world, which was no longer dominated by military pacts. Unanticipated the opening economies faced competition from countries on the other side of the world, the competition forced both public and private managers to rethink how their companies were organized and whether the size of their labor force was optimal. An ascertained belief at the end of the 1990s was that the IT companies had forced the economy into a new era of higher productivity. This would allow the central banks to lower the interest rates and let the growth of the economy to accelerate to even higher levels without the risk of higher inflation. With the expected higher productivity wages were allowed to increase, or the reverse, the same output could be reached with less working-hours put into production. The effect was that more people could afford more services and more people were likely to provide the services demanded.

The new economy has often been quoted as an important factor in explaining the rapid price increases of stocks. The concept of a new economy implied unparalleled growth opportunities that could not be valued with the help of traditional fundamental pricing methods. The considerable price increases were to reflect the almost infinite growth opportunities and productivity increases offered by the new technological advances. This confidence in a new economic era may have acted as a justifiable ground for many investors to continue investing in the stock market despite the clear overvaluation of some stocks if valued by more fundamental analysis methods.

Public Attention to the Market

The level of public interest and attention to the market changes significantly over time, just as the public's interest jumps from one newsworthy topic to another. Interest in the stock market goes through fads in just the same way, depending on the quality of the story of the precipitating events. As can be seen by the numbers in the table, public attention and interest towards the market has increased during the entire 1990s as the value of the stock market went up.

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Associations	146	145	144	144	144	144	148	150	151	154
Members	76,800	67,500	78,500	100,000	102,000	106,000	117,000	124,300	132,000	141,500

Source: Aktiespararna

Table 2. Number of members and local associations of the Aktiespararna

Meir Statman and Steven Thorley have shown with the help of a statistical analysis that high returns in the stock market continue to promote high volume for many months afterward, and that while high volatility in market prices also promotes volume of trade, the effect of volatility on the volume of trade is more transient. Statman and Thorley draw the conclusion that this persistent effect of returns on volume is due to the impact of higher returns on investor confidence (Statman and Thorley, 1999). Even though an upward going market will "lift all boats", there is still a tendency for investors to interpret their investing success as confirmation of their abilities, and this reinforces their interest in trading stocks. This phenomenon is also linked to overconfidence described in section 3.3.2.

When people are successful in any area they will of course take new initiatives and develop their skills in hopes of achieving even greater success. Having acquired capabilities and interest they are likely to pay greater attention to the market for a longer period of time in order to see their investment skills "pay off".

4.3.3 Psychological Factors

This section will describe some of the psychological factors, which play an important role in the augmentation of the speculative bubble, such as

- Expectations and Emotions
- Personal Experience
- The Need to Control
  - *Forms of Control*
  - *Consequences of the Need for Control*

Expectations and Emotions

Economists are often modeling people as calculating, fully rational individuals who maximize their utility based on expected future prices and changes. As a matter of fact, the typical investor's actual decision about how much to allocate to the stock market overall, and into other asset classes such as bonds, real estate, or other categories, tends not to be based on careful calculations. Investors often do the opposite, i.e. they neither assemble forecasts for the returns of these different asset classes, nor weigh these against measured risks (Shiller 2000). An investor may easily come to the conclusion that it does not matter where he puts his savings. Most investors neither understand nor pay any attention to the complex econometric models economists use in their forecasts. And yet investors must make some decisions. What factors might then enter into one's mind when making a decision about how much to allocate into the stock market? The feeling of the stock market as "the only game in town", in some emotional sense, might play a pivotal role at this point in the decision-making.

Using common sense, one knows that the stock market *could* repeat the performance of recent years. That possibility seems quite real, just as real as the possibility of a major correction in the market. But the question is how the private investor feels when he fills out his choice of mutual funds for his retirement scheme? How this person feels depends on his experiences in investing. If one has been out of the market without participating in earning money that other investors may have done, one may be feeling a sharp pain of regret. Regret has been found by psychologists to be one of the strongest motivations to make a change in something (Loomes and Sugden, 1982). Envy is another dominant characteristic, to see other people having made more money in the stock market than oneself has made from work is a painful experience, especially since it diminishes one's ego. In case the other people where smarter, one feels like a fool, and even if they were not any smarter, just lucky, it may not feel any better. A common feeling in this situation is that if one can participate just one more year in the rising stock market everything will be much better and mitigate the pain. One may also think that the potential loss will be much more diminishing to one's ego than the failure to participate has already been. One may also realize that one takes the risk of entering the market just as it begins a downward turn. But the psychological cost of such a potential future loss may not be so much greater relative to the very real regret of having been out of the market in the past.

If one participated in the market today for a while and ponders whether get out or not, he has a fundamentally different emotional frame of mind. This person feels satisfaction and probably pride in his past successes, and he will certainly feel wealthier. One may feel as gamblers do after they have "hit big time", i.e. that one is "gambling with the house money" and therefore has nothing to loose emotionally by wagering again (Johnson and Thaler, 1990). The concept of gambling with the house money is a theory about people's risk preferences and is related to mental accounting described in section 3.2.2. Investors will generally become more risk averse in case of prior losses and less risk averse in case of prior gains; they will also take greater risks as their profits grow (Coval, 2001). This provides support for the notion that successful traders are more likely to be overconfident. The theory also involves a time variable; the more recently an asset is accumulated the more likely that asset is to be put at risk. This is due to the fact that new resources may not yet have been assimilated. The following is an example.

- *You go to a casino and put a quarter in a slot machine. You win $100. How is your gambling behavior affected? People are often more willing to gamble in this situation since it is a recent and an easily gained fortune.*
- *You are just about to go into a casino, when you see a newspaper. You own 100 shares of a stock and find out that it went up $1.00 that day. How is your gambling behavior affected? Most people's gambling behavior is unaffected by this news.*

In the first case, people feel as if they are gambling with the house's money. In the second case, it feels like their own money (Markman, 2001).

The emotional state of investors when they decide on their investment is no doubt one of the most important factors causing the bull market (Shiller, 2000). Although their emotional state may be in part a consequence of such factors as materialistic sentiment and individualism, it is also amplified by the psychological impact of the increasingly strong uptrend observed in the market.

In the following, several other psychological factors underlying speculative bubbles, such as personal experience and the need to control will be described.

Personal Experience

The first trade is often done with a vague feeling of what is right or wrong. The individual trader may have been consulting with some friends or a personal broker before making his first trade. The professional trader has probably studied the financial section of his newspaper before arriving at the office in the morning. Discussions with colleagues and trading friends complete the picture, which will help him form his opinion to make the first trade of the day. Completing the first transaction means that an idea on the part of the trader will become reality and give him an answer to the validity of his theory. Hope soon turns into pleasure if the price moves as expected. This may grow into elation and exuberance, depending on the temperament of the trader. The open position is soon cleared and a profit is hopefully created and realized.

Success breeds confidence. A small but reassuring back-up fund is now available for the next commitment. The trader usually spends less time and effort on gathering information during this second round, as he basically already knows what he wants (Goldberg, von Nitsch, 2001). The exchange of information with colleagues or friends merely serves to confirm his personal

opinion as regards price movements; it is not a critical discussion with other experts. On the contrary, others tend to come to him for advice, and therefore would normally not contradict him. The second trade is also successful, and the trader is very happy indeed. He is convinced he is in good form. Naturally, word of his success moves around; his colleagues and friends need to, and must, back winners, and his opinion is in great demand. Unfortunately, objective information and interpretation are no longer required, and the trader acts on gut feelings alone. It seems as if the trader, spoiled by success, now has a compulsive need to repeat the feeling of happiness and recognition as often as possible. Increased confidence leads him to increase the size of his positions, with commensurate greater profits, which he hopes to realize as quickly as possible. The successive emotional states of joy, hope, craving and euphoria, which can be seen in many successful market participants, distort their grasp of reality to a greater or lesser degree, depending on the intensity. Information in favor of the exposure is frequently perceived in an exaggerated form, while changes in the market that might prove harmful are hardly noticed.

The Need to Control

A strong desire to control is not the prerogative of an obsessive compulsive disorder. Few people like to be without power, exposed to the inconstancy of fate and the arbitrariness of others, helpless and without any opportunity to control things. The urge to control is particularly obvious in the financial markets, where winners and losers appear everyday. The trick here is to be one step ahead of the majority of the market participants, to use the movements of the markets through strategies, techniques and successful analyses and thus to become one of the winners.

The “locus of control” signifies the extent to which people anchor control in themselves (internal control) or perceive their fate to be manipulated by others or by blind forces (external control). According to this theory, successful people in particular have an internal locus of control, while “losers” often believe that they can do nothing to improve their situation. Their bad luck is blamed on others; life is against them and treats them badly (Goldberg, von Nitsch, 2001).

Forms of Control

There are different sorts of control. One is to exert control through influence. We assume that investors in the financial markets generally do not have any opportunity to influence prices and therefore cannot exert any control. In fact, there are only a very few people and institutions who control the markets through high-volume trading. Even stock exchange gurus can influence the market with their opinions only in the short term (Goldberg, von Nitsch, 2001). This is possible only in small markets, confirmed frequently and impressively by the recommendations of stock exchange gurus, even though the resulting prices are always quickly corrected. Even large injections of capital are frequently not sufficient to steer markets in the desired direction. Central banks in many countries have found this to their cost, when massive interventions have not been able to prevent the devaluation of a currency. The case of Nick Leeson is a good example, in which Nick Leeson discovered this himself when he brought the reputable Barings Bank to bankruptcy in 1995. In general, most market participants are probably aware that they cannot influence prices. Consequently, they are not under the impression that they can control the market in any form.

Another way of exercising control is through prediction. Individuals can take things into account and organize their actions in such a way that an event will turn out as favorably as

possible if events can be predicted to a certain degree (Thompson, 1981). An example is a manager of a stock exchange listed company who is aware of the turnover and profit his company makes. The manager can probably predict future prices for his company's share more or less correctly, based on his insider knowledge, and could enter into transactions based on this information, i.e. he would have total control over his capital. Apart from exceptional cases such as this, which would most probably have serious legal repercussions for the manager, most investors will not be able to predict future price developments. It is even more surprising that only very few investors know the limit of the extent to which prices can be predicted. An entire army of economic and technically oriented analysts are convinced they control the market on the basis of their own forecasts: predictions invoke the sense of being able to control the market and they believe that the more logically they have been compiled, the more probably they will come true. This phenomenon is called "control illusion", and is frequently seen in the stock market.

The decision-maker in a third variant of control is merely aware of the factors that govern a particular event, without having any influence on its occurrence or outcome in any way. This knowledge still enables him to judge his own situation, and therefore lessens the feeling of helplessness. He may even get the best out of the situation for his own purposes. Hedging one's risks, for example, only makes sense if the cause of the risk is known. This control variant applies to a wide spectrum of decision-making situations, which nevertheless differ in the extent to which the control (or control deficit) is experienced. A decision-maker considers a situation more or less controllable when he feels that he is fully informed and competent, so that he is confident he can reliably calculate the probability of an event occurring. An example would be the toss of a coin, where heads (a 50% probability) would mean a gain of 110 SEK and tails (a 50% probability) would result in a loss of 100 SEK. Everything for the decision is known, so the risk can be calculated exactly and therefore controlled. Situations characterized by full information and clearly indicated and reliable probabilities are not typical for the financial markets. The actor is usually aware that he only has partial information in relation to his possible investment, and he can estimate probabilities only vaguely, if at all. Investors may get into situations with high ambiguity, in particular, when they enter markets that are new to them.

The fourth and weak control variant occurs when an event is explained retrospectively, i.e. after it has occurred. The main purpose is to arrive at knowledge about future similar situations; based on the explanation of events that have already occurred (Thompson, 1981). Explaining an event primarily means to analyze its causes, and controlling the causes would enable one to control similar situations in the future. This variant plays a role in the financial markets insofar as knowing the cause and effect in the markets can be extremely useful for subsequent investments. For instance, a person who has just lost a lot of money in a stock market crash will swear to do his utmost so that future risks are known well in advance and losses are avoided. The investor will begin to look for explanations for the crash. The danger is that the investor will reach conclusions prematurely, which need not necessarily be correct, in order to meet his urgent need for control. He will, for instance, soon recognize that this crash occurred in October, just like a number of previous crashes. He will decide that next year he will sell his shares in September to avoid another disaster. The myth of October as a "crash month" is thus created. The investor may well overlook the fact that all October crashes occurred due to completely different reasons, which coincidentally occurred in October.

The fifth and weakest of control variants refers to the ability to play down possible negative results of one's actions. This type of control is used by individuals who very quickly forget a painful event, or who can consistently steer their thoughts toward its few positive aspects (Thompson, 1981). At the same time, they succeed in claiming that the blow of fate has been dealt to them in part of a higher-level plan: "Now I know why that happened and what I can do about it next time." Losses are therefore often played down as if they are the price to pay for learning. People tell themselves that they might have had to pay even more for this knowledge in a seminar, so they are still apprentices in it. Characteristic for this control variant is that it ultimately leads to greater satisfaction via a change in perception of, or even attitude to, a situation. Unfortunately, there is no change in the real circumstances.

Consequences of the Need for Control

The strategy to simply block out certain information in order to avoid cognitive dissonance (see section 3.2.4) is called "selective perception". Similarly, control illusion is said to help reduce the control deficit at least apparently; it therefore satisfies the need for control. People only imagine they are masters of the situation – in reality they usually do not control the situation by any means (Goldberg, von Nitsch, 2001). Selective decision-making describes the behavior whereby people in particular situations decide in a way such that dissonance is reduced. The sunk cost effect is an important example, according to which people try to move loss-making projects associated with dissonance into the profit zone by means of irrational decisions. The counterpart to the need for control consists of the phenomenon of loss of control, which similarly gives rise to irrational decision-making patterns, e.g. panic responses.

Control illusion can be traced back to aspects other than the desire to satisfy the need for control. Most people assume that the more control they have, the sooner they will be able to influence matters positively for themselves. This schema is easily reversed as part of the conditional probability fallacy. Once someone succeeds several times in a succession, he will be convinced that things are under his control. The phenomenon of control illusion can also be derived from attribution theory. An important part of this theory is the "self esteem serving attribution": if people succeed, then they believe this to be due solely to personal skills; if something goes wrong, then others, or adverse circumstances, are to blame. Market participants succeeding in the financial markets will take all the credit themselves. They will be under a strong illusion of control after a fairly long series of successes; they seem to succeed in everything. If they are not successful, then investors remind themselves that success on the stock market always depends on luck. That time they have been unlucky. Self esteem serving attribution therefore also contributes to the creation of control illusion.

The phenomenon of "learned carelessness" is linked closely to control illusion. With this phenomenon, an actor has had a series of successful investments and no longer knows what it feels like to lose. He is therefore prepared to run ever larger risks (Goldberg, von Nitsch, 2001). Nick Leeson, for instance, was so successful for a relatively long period that he was called the "man with the golden touch" by his colleagues in Singapore. He seemed to be able to produce large profits for the Barings Bank with hardly any effort. The results of his increasing carelessness, growing into foolishness and megalomania, are well-known. Availability also comes into the equation here, which ultimately states that the importance of events for the evaluation of a situation decreases as availability of these events decreases. The more time has passed since losses were made, or the less visible or noticeable a loss stored in the memory, the less risk plays a role in the evaluation of exposures and the greater and more risky the deals become. Learned carelessness therefore leads to the same consequences as control illusion.

5 Empirical Research & Analysis

In this chapter the questionnaire that was conducted is presented. The purpose of each question as well as the results obtained from both the private investors and institutional investors are described. The chapter also includes statistical analyses between certain questions.

The questionnaire, which is included in Appendix 1, was directed at institutional and private investors as described in chapter 2. Identical questions were presented for both groups of investors. 150 responses were received from private investors and 47 responses were received from institutional investors. The following sections will describe the profile of respondents as well as purpose of the questions together with the results obtained. This is followed by an analysis of each relevant group of questions with reference to the theoretical framework when applicable. The last part of the chapter also includes a statistical analysis and comparisons between certain questions. Tables with statistics for each question are provided in Appendix 3.

5.1 Profile of respondents

73% of the private investors and 87% of the institutional investors who responded to the questionnaire were men. 27% of the private investors and 13% of the institutional investors were women. Half of the private investors were over 65 years of age while 37% were in between the age of 51 to 65 years. 66% of the institutional investors were in between the age of 26 to 35 years and 23% were in between the age of 36 to 50 years.

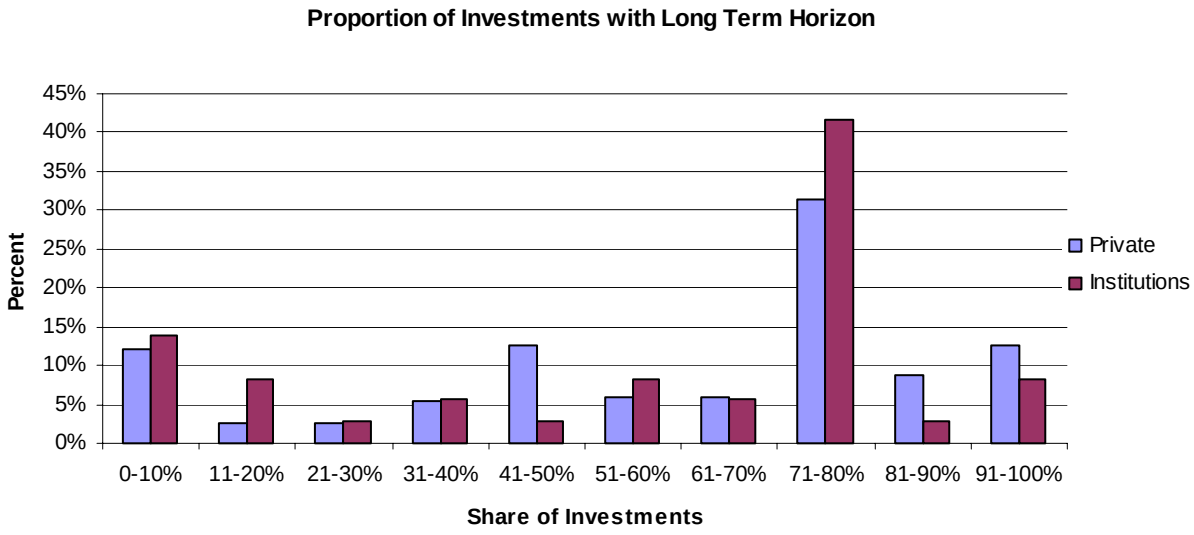

Figure 3

Concerning the respondents' investment horizon (question number one), the results obtained indicate that both private as well as institutional investors had nearly $^2/_3$ (63%) of investments within a long-term investment horizon covering a period over five years. Consequently, 37% of investments are placed with a short-term investment horizon under a year. More specifically, 31% of the private investors, and 42% of the institutional investors, indicated that a 71-80% share of their investments is placed with a long-term horizon. Furthermore, 24% of

both institutional and private investors indicate that an 11-20% share of their investments is placed with a short-term horizon.

These results indicate a preference for long-term investments, which can partly be regarded as a consequence of the speculative bubble from the fall of 1998 to March 2000, which was characterized by high-tech, speculative and short-term investment categories. The burst of the speculative bubble can have caused the current aversion towards these kinds of investments. The recent change in pension plans may have encouraged people to invest in more safe and long-term mutual funds as opposed to IT-companies. Institutional investors may also have changed their investment horizon compared to the time during the speculative bubble and the subsequent volatile market conditions and are now recommending long-term investments e.g. Premiepensionsvalet (see Chapter 4 Structural Factors). A more comprehensive result could be achieved by asking whether the investors have changed their distribution between long- and short-term horizons today compared to their investment horizon during the speculative bubble.

5.2 Behavioral characteristics

Change in Monitoring of Investments

In order to discern whether the investors have become more attentive and cautious as a consequence of the speculative bubble, a question concerning the monitoring of investments was asked (questions number two and three). A majority of the respondents, 55% of the private investors and 66% of the institutional investors, have not changed their behavior regarding the monitoring of their short-term investments. Similar results for the long-term investments were obtained as 56% of private investors and 83% of the institutional investors do not monitor their long-term investments more often today than during the speculative bubble.

This indicates that, among institutional investors during the period after the speculative bubble, there has been a slightly higher increase in the frequency of monitoring short-term investments (34%) than long-term investments (15%). Among private investors there seems to be no significant difference between the increase in frequency of monitoring long and short term investments even though private investors monitor both horizons more frequently now (41% and 42% respectively) than during the speculative bubble compared to institutional investors. This could be due to the fact that the respondents today invest for a longer time horizon than during the speculative bubble, e.g. for retirement, and for this reason try to avoid the more volatile short-term investments that often need more supervision. Another reason to the increased monitoring of investments may be the improved twenty-four hour accessibility to the markets through e.g. the Internet, and the extended opening hours. Moreover, the unpleasant experiences of the market decline after March 2000 can have made investors more cautious and careful today than during the speculative bubble.

Change in Investment Target Categories

To establish if investors have changed the investment objectives as a consequence of the speculative bubble, respondents were asked to choose the two most important alternatives describing their investments (questions number four and twelve). The respondents were asked to choose two alternatives indicating their investment target categories during the speculative bubble as well as after. The results indicate that 33% of the private investors invested mainly in Swedish companies and 26% in large sized companies during the speculative bubble.

Institutional investors, on the other hand, preferred big companies (24%) with the second most important investment alternative equally divided between investments in Swedish companies (19%) and companies with uncertain but higher expected returns (19%). Concerning the investments of private investors *after* the speculative bubble there were no significant differences as 31% continued to invest in Swedish companies and 28% in large sized companies. However, during the period after the speculative bubble the proportion of private investors investing in companies with uncertain but higher expected returns decreased from 13% to 6% while the proportion investing in companies with certain but lower expected returns increased from 18% to 25%. Private investors have decreased their share in the uncertain, higher return category in line with institutional investors. Institutional investors have further increased their share of investments in big sized companies, from 24% to 30%, and Swedish companies, from 19% to 27% after the speculative bubble. Private investors increased the share of investments in companies with certain but lower expected returns, 18% to 25%. Furthermore, the proportion of investments in companies with uncertain but higher expected returns dropped from 19% to 13% after the speculative bubble. The proportion of investments in small companies after the speculative bubble also dropped from 17% to 10%.

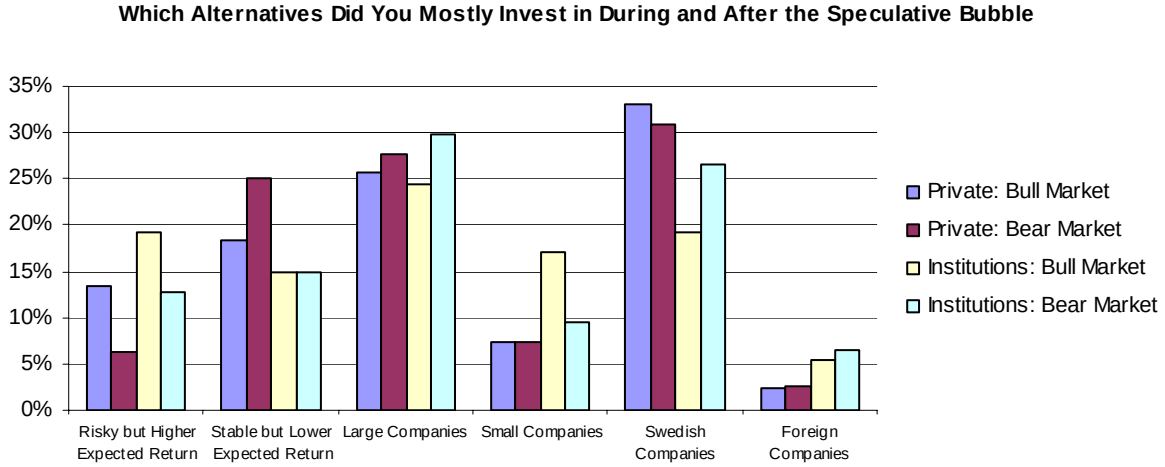

Figure 4

Big companies and Swedish companies still dominate as the most popular investment category, even after the market decline. This is in line with the evident move toward less risky investment categories such as companies with certain but lower expected returns and away from small companies and companies with uncertain returns. Mental accounting can influence the decision of investment categories as investors may separate between the natures of their investments therefore dividing investment into e.g. a "safe" category and a more risky category. Loss aversion may, as described in section 3.2.1, contribute in holding on to particular investments in these categories despite obvious losses experienced after the speculative bubble. The abnormally high payoffs on investments experienced during the speculative bubble can have encouraged higher risk taking and decreased investors' sensitivity towards losses. However, a clear distinction between what the respondents consider as less riskier, i.e. companies with more certain but lower expected returns, is fairly subjective and therefore a definite distinction between categories is difficult to make.

Change in Factors Important for Investments

Which factors do investors consider most important when making investment decisions? To establish if the factors have changed as a consequence of the speculative bubble the

respondents were asked to rate the importance of factors influencing investment decision-making (questions number seven and eight). 29% of the private investors and 45% of the institutional investors indicated information from companies as the most important factor considered when making investments during the speculative bubble. Furthermore, recommendations and forecasts from financial analysts played a significant part for as well private (23%) as institutional investors (21%). While institutional investors (13%) did not focus much attention on the general development of the market from a historical point of view and information from media, the results obtained from private investors (27%) witness a greater influence of these factors.

The most important factor when considering investments *today* continues to be information from companies with 33% of responses from private investors. As for institutional investors, information from companies has increased in importance from 45% during the bull market to 68% today. Today, intuition (9%) has diminished significantly in importance as influencing decision-making. Investments based on advice, recommendations and forecasts from other professional investors (13%) has also decreased in importance from 21% during the speculative bubble. 4% of the institutional investors indicate that information from colleagues is an important factor considering investment making today and has consequently increased in importance.

When comparing solely the distribution of answers from the private investors concerning the most important factor when making investments today and during the speculative bubble, it is evident that the overall performance of the market from a historical perspective has gained importance today with and increase from 14% to 18%. Subsequently, recommendations from investment professionals have lost importance with a decrease from 23% to 20% as well as information from newspapers/TV with a decrease from 13% to 9%.

When comparing exclusively the distribution of answers from institutional investors concerning the most important factor when making investments today and during the speculative bubble, it is clear that information from companies has increased its importance. During the speculative bubble, 45% of the institutional investors stated it as the most important factor while after the speculative bubble 68% indicated it as the most important factor. On the other hand, own intuition of the future market development has decreased in importance from 19% to 9%.

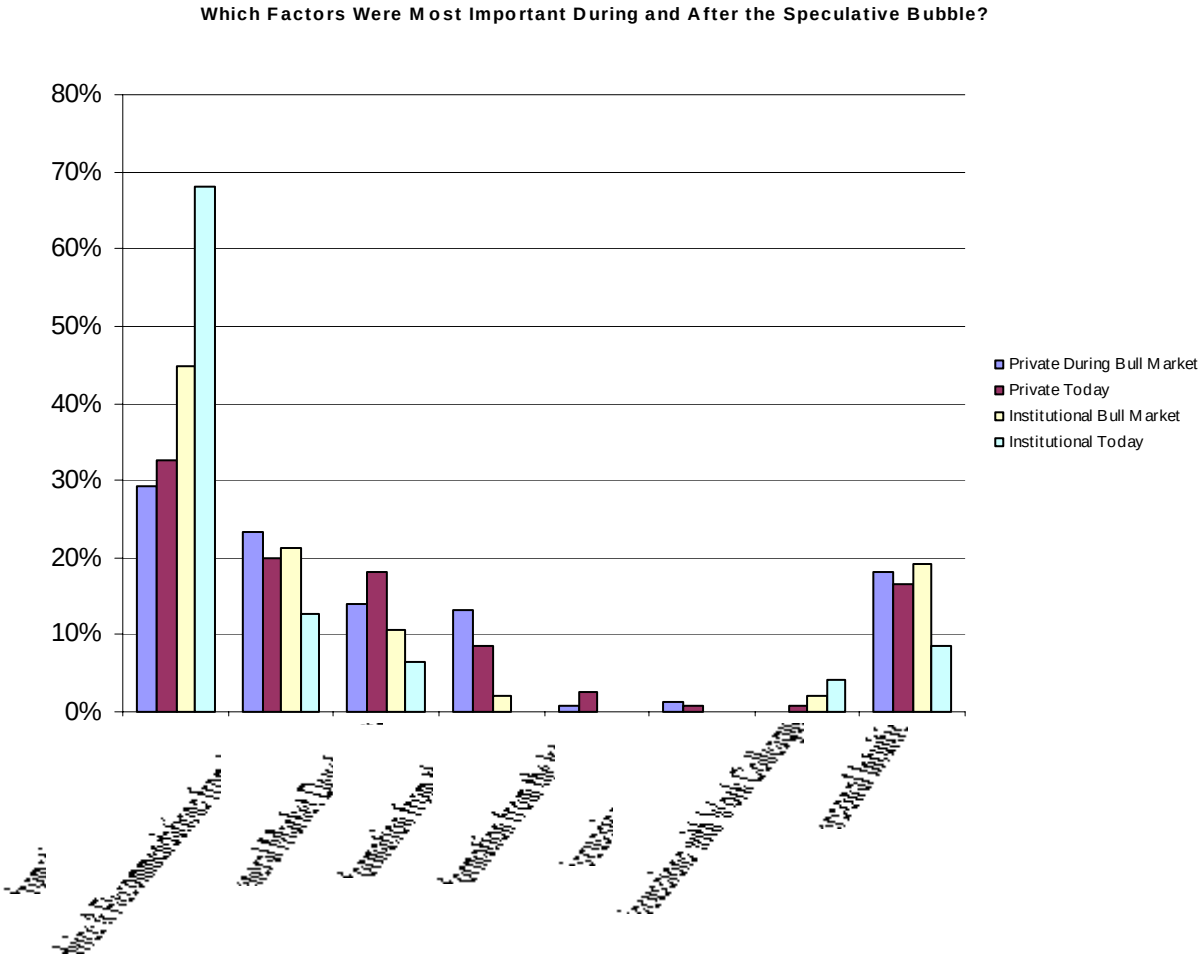

Figure 5

The most significant difference is derived from the fact that institutional investors consider information from companies to have an even greater importance today than during the speculative bubble. Likewise the importance of advice from other institutional investors and own intuition has decreased in importance, which seems to convey a higher attention towards clear facts and fundamentals valuations than just pure intuition as during the speculative bubble. Overall, a "gut feeling" and a general instinct of the future of the market seemed to have directed investors more during the speculative bubble than today. The intuition of both private and institutional investors did not pay as much importance as we thought it would during the speculative bubble. Professional opinion has also decreased in importance among private investors after the speculative bubble. This could be due to the overly optimistic earning forecasts before and during the speculative bubble that have created a decrease in confidence towards financial analysts. It seems like private investors rely more on information from the companies themselves today, even though advice from other professionals and the overall past performance of the market still play an important role. Furthermore, the reason for the diminished importance of the media could be due to less attention to articles covering the best purchase targets and strategies on how to invest.

Possible Reasons for the Overvaluation & the Decline of the Market

Why do rational investors want to invest in assets knowing that they are overvalued? What factors laid behind the speculative bubble experienced at the end of the 1990s' according to

private and institutional investors? Under the assumption that investors are rational, speculative bubbles like the one experienced should not exist. Questions number nine, ten and eleven attempt to shed light onto these circumstances. A clear majority of the respondents, 88% of the private investors and 96% of the institutional investors, considered the market to be overvalued during the period from the fall of 1998 to March 2000. Only 5% of the private investors and none of the institutional investors did not consider the market to be overvalued.

This result is consistent with Shiller's (1987) survey of the October 1987 market crash according to which 84% of institutional investors and 72% of private investors believed the market was overpriced just before the market crash. Shiller suggests that people did not actually realize how many others shared their own views that the market was overpriced and that apparently the view did not dissuade people from buying stocks nonetheless. This observed discrepancy might also be linked to cognitive dissonance, described in section 3.2.4. Even though investors were confronted with contradictory evidence suggesting that the consecutive price increases did not have any fundamental grounds, and the market was overvalued, they might have avoided new information or developed contorted arguments to maintain their own beliefs. Investors may therefore react to price movements themselves instead of specific market news or fundamental changes in forecasted earnings. Individuals tend to focus on recent behavior and give less weight to longer time trends as explained in section 3.3.3 on anchoring. The probabilities of recent price increases in connection with a speculative bubble are given too much weight. This can further have reinforced the herd behavior and feedback phenomenon.

To establish which factors investors considered most important in contributing to the overvaluation of the market, respondents were asked to name the most important factor. 28% of the private investors and 40% of the institutional investors consider herd behavior as the most important factor that contributed to the overvaluation of the market. 24% of the private investors believe that the overconfidence among investors was too strong and caused the remarkable increase in market value followed by overly optimistic forecasts of analysts with 23% of the responses. Regarding the institutional investors, 26% considered the forecasts of analysts as a cause to the overvaluation of the market with media also having a great influence (17%). However, institutional investors considered the overconfidence of investors to have a minor impact compared to the result obtained from the private investors.

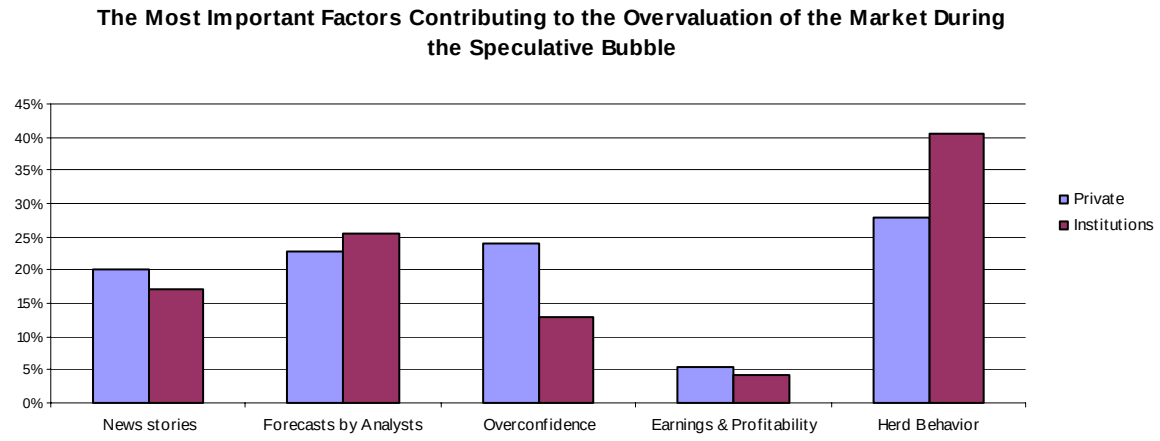

Figure 6

Referring to the most important factors contributing to the *decline* of the market starting from March 2000, the overconfidence among investors has changed to a loss of confidence among investors. 33% of the private investors and 60% of the institutional investors indicated that the earnings and profitability of companies, or the loss thereof, was the most important factor that contributed to the market decline. Further, according to institutional investors, the herd behavior (15%) as well as the media (13%) played a great part in the decline. Private investors put more emphasis on the importance of herd behavior (27%) and 21% of the respondents to the importance of media reporting.

When analyzing the answers between both private and institutional investors it is clear that the distribution of responses is fairly similar. For example, institutional investors consider earnings and profitability to be the most important factor contributing to the market decline (60%) while it is the least most important factor contributing to the overvaluation (4%). The corresponding figures are 33% and 5% for private investors. This is a fairly intuitive result since much of the rise in Internet companies' stock prices was not based upon fundamental valuations of earnings and profits during the speculative bubble. In addition, it reinforces the idea that investors were not actually making decisions based on purely fundamental principles but their action was based on other less rational factors. Subsequently, the fact that profit expectations and results were not realized as forecasted brought the market down. Furthermore, both groups consider forecasts from analyst as an important factor contributing to the overvaluation but the factor loses importance when considering the reasons for the market decline. As analyst forecasts are indicated to have a great impact to the overvaluation, it can be interpreted as if they do share some blame for the IT bubble. This interesting result suggests a clear consciousness among the institutional investors that they take on themselves some share of blame for contributing to the speculative bubble with their own recommendations. Apparently the financial analysts were overly optimistic with their less than rational earnings forecasts before the crash, which may have contribute to one of the greatest speculative bubble in stock market history. In addition, both groups indicated herd behavior as an important factor contributing both to the overvaluation as well as the decline of the market.

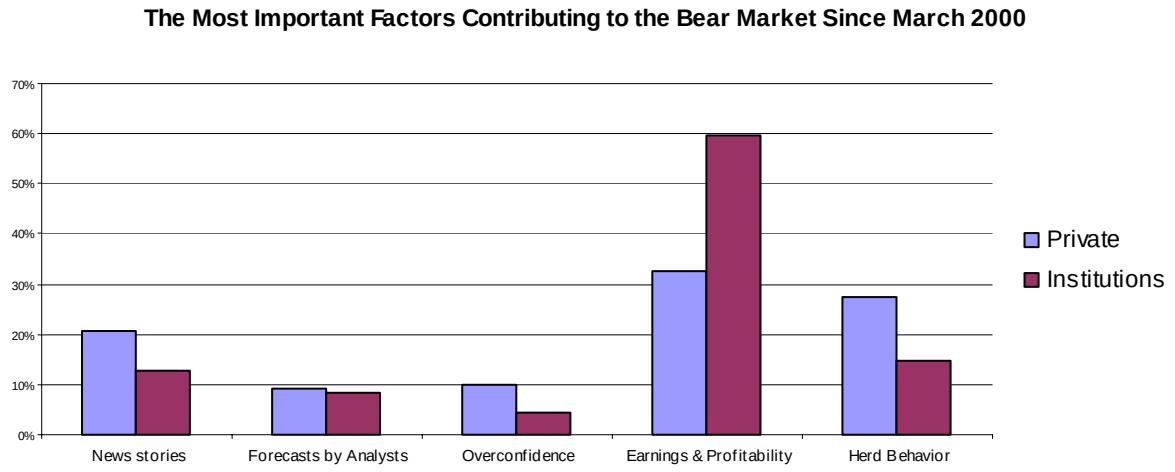

Figure 7

Opinions & Estimates on Current & Future Market Values

Do investors perceive the current value of the stock market to be overvalued, undervalued or fundamentally at a correct level (questions number nineteen and twenty). It is clear that the

market conditions during the first week of December 2001, when this questionnaire was conducted, have a significant effect on the respondents' answers. Half of the private investors consider the stock market to be undervalued by an average of 21%. 24% consider the market to be correctly priced and only 6% think that it is overvalued by an average of 17%. 38% of the institutional investors consider the stock market to be currently undervalued by an average of 25%. 32% suggest that the market is correctly priced and 23% consider the market to be overvalued by an average of 3%.

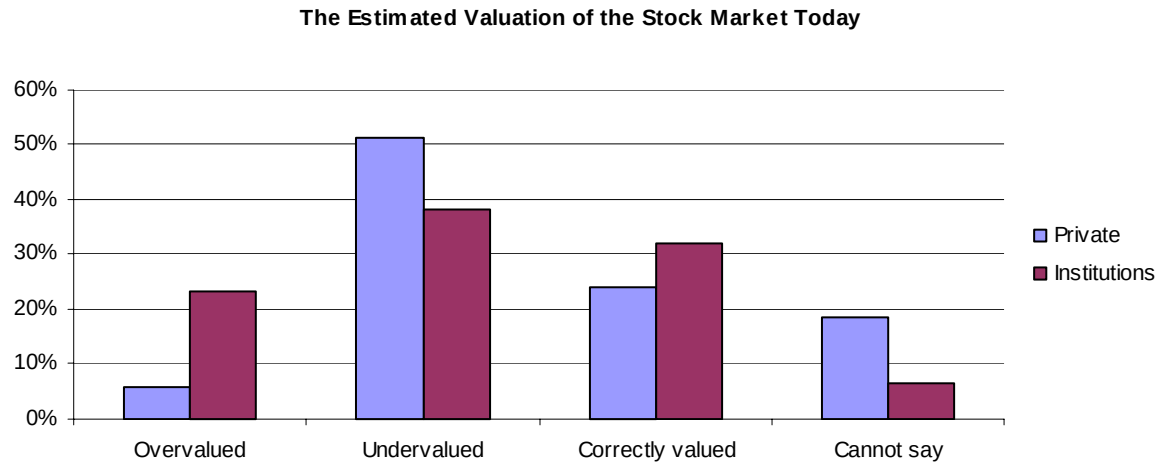

Figure 8

How do investors perceive the future development of the value of the Stockholm stock exchange's general index and to which extent does anchoring to a current market level affect the answers? Private investors indicate that the average value of the stock index six months from now would be 118.7 and institutional investors indicate a value of 113.8, if the current value of the index were 100.

Estimates on future market values are often based on current values – especially in the absence of any better price information. The anchor is the most recently remember price. Prices in the beginning of December 2001 seem to be considered as undervalued by the majority of the respondents which is reflected in the high future estimates on the stock market value. This can also be interpreted as evidence of overconfidence. Investors believe that the market is not correctly valued which contradicts the efficient market hypothesis. Despite the turbulent market during the past years, investors seem to have a great confidence in the market. The decline in market value since March 2000 has not gone unnoticed and investors seem to feel that current stock market values are far too low. The terrorist attack on September 11th 2001, which led to a further decline in stock prices followed by an equally large rebound some ten days later, can also play a role in convincing people of an expected upward trend in stock prices.

5.3 The Prospect Theory

Reasons for Bad Investments

What could be a possible reason for a less successful investment according to investors? Who do the investors blame for bad investments? This was explored in question number fourteen. 32% of the private investors consider incorrect recommendations or advice from analysts as the most important factor leading to a less successful investment. The second most important

factor is own errors with 30% of the answers. Furthermore, 27% blame a generally poor market performance for less successful investments. 2% gave other reasons for less successful investments such as “unpredictable events”, “a wrong turn in the business cycle” and “gambling”. The responses obtained from institutional investors indicate that 53%, compared to 30% of the private investors, consider own errors to be the main reason for a less successful investment. 15% of the institutional investors state incorrect recommendations or advice from other sources as a reason for a less successful investment and 13% indicate general poor market performance as the main reason for an unsuccessful investment. Only 11% indicate recommendations or advice from analysts as being the main reason. 9% point at other factors, such as “information from the company does not correspond with reality” and “the company is doing worse than I/the market/the company had expected”.

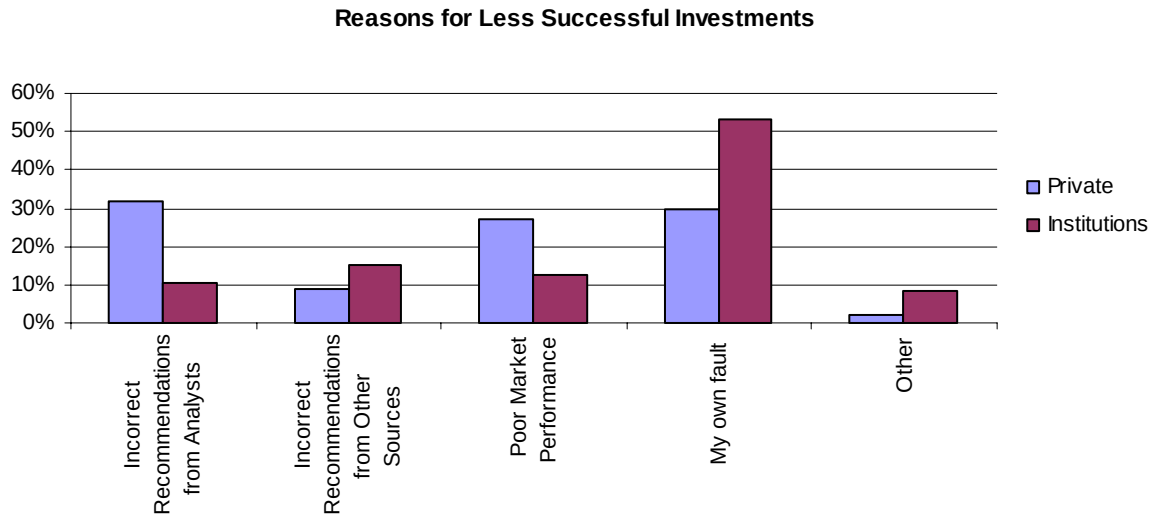

Figure 9

This is contrary to the survey conducted by Erlingsson and Björklund (2001), where 47% of the private investors considered own errors to be the most important factor and only 12% blamed analysts compared to the 30% and 32% respectively indicated in this survey. The current poor market conditions might explain the difference and the tendency to blame analysts for less successful investments. Market conditions were better when Erlingsson and Björklund performed their survey. Regret theory, as explained in section 3.2.4, may also help explain the results. Analyst recommendations and a general poor market performance were indicated among private investors as important factors for failed investments instead of own errors. The failure of investments brings with it the feeling of regret. Investors may try to avoid this regret by e.g. blaming investment advisors and recommendations from analysts or by avoiding the realization of losses. Nevertheless, a majority of the institutional investors admit own errors as the most important factor leading to a less successful investment. This is a sensible answer as some of the institutional investors themselves acted as analysts during the speculative bubble. Therefore, referring to own errors, among institutional respondents, may actually be equal to referring to analyst recommendations.

Susceptibility to Loss Aversion When Faced with Losses

What about the susceptibility to loss aversion among investors? Would investors prefer to gamble and possibly accumulate further losses when faced with a price decline of their stock instead of closing their position with a minor loss? This was researched with the help of

question number fifteen. 67% of the private investors chose to gamble and hold the stock in question for one more month in order to have the possibility to break-even, although they faced an equal risk to further increase their losses. 33% would sell the stock and realize a minor loss. 55% of the institutional investors express that they would choose to sell the stock now and realize a minor loss while 45% would choose to gamble and hold the stock in question for one more month in order to have the possibility to break-even.

The preference for the gamble proves that investors are risk lovers when confronted with losses in line with Kahneman and Tversky's value function theory. An investor will ride his/her losing stock as $^{2}/_{3}$ of the private investors and nearly half the institutional investors indicated. This reflects an asymmetry between the values that people put on gains and losses as explained in section 3.2.1. A combination of the prospect theory and herd behavior can explain some part of the speculative bubble. During the rapid increases in market values investors sold stocks that had gone up in value and consequently, encouraged by their success continued to buy more stocks, which lead to further price increases. Investors did not want to realize losses while at the same time putting high value on the easy gains being made. More and more people were attracted to the repeated good performance of stocks, which lead to a herd like behavior among investors, and acted as a source for the eventual overvaluation of the market. Weak self-control and an urge for immediate gratification can also be viewed as contributing factors in the irrational mass behavior of both institutional and private investors.

Another theory, which might help to explain the preference to gamble, is the theory of mental accounting and frames. A majority of the private investors chose to gamble, as the choice of a sure loss often feels naturally repellant. Investment decisions are often considered one at a time instead of adopting a broader frame and are guided by the attractiveness of the options immediately available. This narrow framing of alternatives can arise from the common practice of maintaining multiple mental accounts were different types of investments are categorized depending on the purpose and characteristics of the investment as explained in section 3.2.2. At least 67% of the private investors and 45% of the institutional investors seemed to be very attracted by the possibility for a gain when faced with a certain loss.

5.4 Heuristics

Investors' Ability to Forecast the Development of the Market

Another question aimed to determine if investors believed that they could forecast the future market development during the speculative bubble was question number five. The purpose was to establish if there was possibly a degree of overconfidence among investors during the period from the fall of 1998 to March 2000. 64% of the private investors and 38% of the institutional investors indicate that they did *not* think they could forecast the development of the market at some point of time during the speculative bubble. 26% of the private investors and 57% of the institutional investors believed that they could forecast the market while 10% of the private investors and 4% of the institutional investors were indecisive between the two choices.

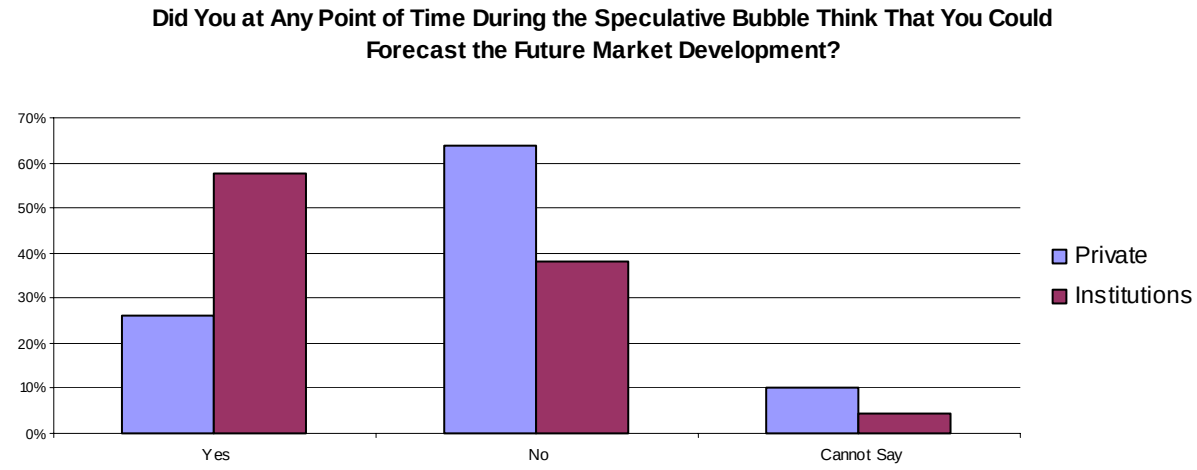

Figure 10

A majority of institutional investors thought they could forecast market development while only a minority of private investors though they could. Individuals have a tendency to have beliefs that they perceive as being better than others' beliefs. The results in this questionnaire are in line with Shiller's survey (1987) where 29% of the private investors thought that they could forecast the rebound of the market in connection with the October 1987 stock market crash. This can be partly explained by the overconfidence theory, according to which people tend to exaggerate their talents and underestimate the likelihood of bad outcomes as explained in section 3.3.2. Clearly, 57% of the institutional investors were influenced by a strong belief in their own skills. However, a smaller amount of the private investors seemed to be as confident in their own forecasting skills as the institutional investors.

The Influence of Announcement on Decisions

People tend to overreact to unexpected and dramatic news events. Market efficiency states that all public information is included in stock prices. But does the stock market overreact and does such a behavior affect stock prices? How did investors react to announcements and other information during the period of the speculative bubble? More specifically, the purpose of question number six is to find out if investors over- or under reacted to a certain amount of information pointing in the same direction. 57% of the private investors and 62% of the institutional investors made changes in their portfolio after several consequent news announcements pointing in the same direction. 37% of the private investors and 15% of the institutional investors were not concerned with news announcements from companies and only 5% of the private investors and 17% of the institutional inventors made changes in their portfolio after only one announcement.

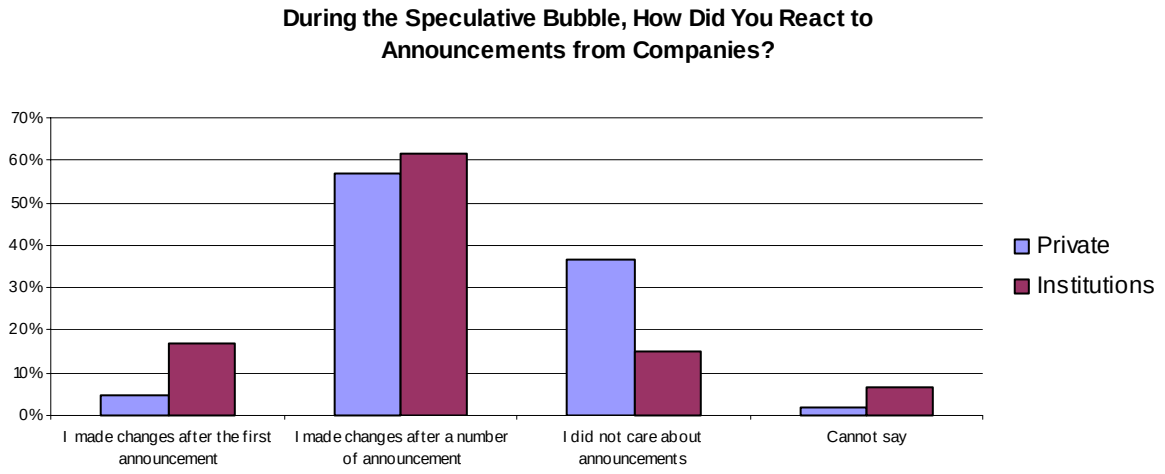

Figure 11

Investors seem to attach a disproportionate importance to short-run economic development, which can be regarded as violation of the weak-form market efficiency. Consistent patterns of news and information pointing in the same direction can lead to overreaction as explained in section 3.3.2. Securities that have a long record of good news tend to become overpriced and have low average returns afterward. The majority of both groups of investors indicated that they make changes in their portfolio after several consequent news announcements pointing in the same direction. People are susceptible to seeing patterns in information that is truly random. Investors overreact easily to consistent patterns of news, which can lead security prices to overreact and subsequently lead to speculative stock market bubbles.

Would the Market Rebound Today?

How would investors relate to a similar decline in the stock market today as was experienced after March 2000 and onward? Question number thirteen determines investors' current confidence level towards the market. Respondents were asked to choose between a scale from 1 to 5, where 1 represents strong confidence that the market would be back to its former level in a couple of years, if faced with a similar downturn, and 5 represents weak confidence that the market would be back to its former level in a couple of years. 53% of the private investors and 60% of the institutional investors responded on a level from 1 to 2, which indicates that a majority believes that the market will be back to its formal level in a few years if a similar downturn takes place today. Of these respondents, 13% of the private investors and 43% of the institutional investors express a strong confidence (chose level 1 = strongly agree) that the market would rebound back to its former level if a downturn would take place. 19% of the private investors and 15% of the institutional investors responded on a level from 4 to 5 indicating weak confidence that the market would rebound if faced with a similar downturn today.

The institutional investors share a stronger confidence towards the market than private investors. This can be due to the fact that private investors have probably been more affected by the losses realized in connection with the market decline in March 2000 than institutional investors.

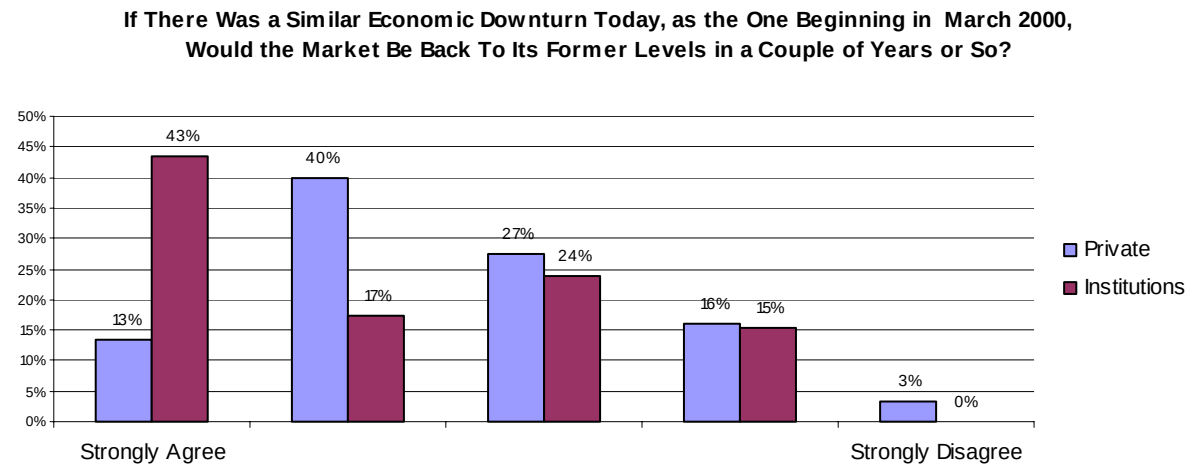

Figure 12

The magnitude of the decline in market values from March 2000 onward can act as a reason in itself for people to believe in a rebound if the market faced a similar downturn today. People are fairly confident and optimistic towards the development of the market. The historical market trends can also play a role in enhancing people's confidence as the stock market has historically always rebounded in the long-term from any momentary declines. These results are consistent with the answers received from questions number nineteen and twenty, which indicate that investors believe that the market is currently undervalued and that they expect stock prices to increase in the near future.

Investing in a Winner Stock

In a situation where a stock of a certain company has risen in value with 70% and even the future of the stock looks bright, 56% of private investors and 57% of the institutional investors consider the information to be insufficient for making an investment decision (question number sixteen). However, a higher proportion, 33% of the private investors and 32% of the institutional investors, consider the stock worth buying - than not buying.

People have a tendency to disregard base rate probabilities and make judgments solely in terms of observed similarities to familiar patterns. When stock prices increase, demand increases in line with enthusiasm which is followed by further price increases. Public memory of high past returns and optimism of those high returns generate enthusiasm towards the future. The results obtained imply that both groups of investors are more inclined to make a purchase based solely on recent favorable market performance instead of avoiding the investment altogether. This refers to the winner-loser and representativeness dilemma described in section 3.3.2. Investors may be prone to categorize events as typical or representative of a well known class which can lead them to believe that price increases would follow themselves and the stock in question is a "winner" stock. This can be enforced by herd behavior as investors feel compelled in following the winning stocks with the rest of the market and refrain from contrary financial exposure even though faced with contradictory information. This is true especially when good performance repeats itself. Even though the results indicate that a majority of the investors would decline from the investment in question altogether, there is still a significant amount investors how would make an investment based solely on favorable price movements.

Probability for Continued Changes in Value

How do investors perceive probabilities of repeated events and how do they react to a similar occurrence taking place repeatedly in the market? Questions number seventeen and eighteen refer to the anchoring of decisions to previous events when faced with uncertainty, and describe a situation where the index of a stock market has consequently decreased or increased for three days in a row. Respondents are asked their opinion on the probability of a similar development during the next day. The probability for a decrease or increase in the value of the index *should* be 50%. However, according to private investors the average probability for a similar *increase* was 31% and according to institutional investors 44%. Private investors indicate that the average probability for a similar *decrease* is 34% while the corresponding figure for the institutional investors is 46%. Both groups of investors seem to consider that the pattern of consecutive increases/decreases is likely to reverse itself. This is in conflict of standard probability calculus. However, institutional investors' responses are closer to the correct 50% probability than private investors' and institutional respondents' answers also contain a larger amount of fully correct answers, i.e. a 50-50 probability.

People have a tendency to categorize events, such as continuous price increases, as representative of a well-known class and subsequently overstress the probability of such categorization disregarding evidence of underlying probabilities. Therefore, patterns are easily thought to exist in data that is truly random and continuous price increases are categorized as improbable. This is consistent with the overconfidence hypothesis described in section 3.3.2. Conservatism can also help in explaining why people give too much weight to the prior probabilities of events in a given situation, as people are reluctant in changing their opinions.

Driving Skills of the Respondents

Question number twenty-one does not concern market conditions or financial decision-making. On the contrary, it is a control question intended to reveal the general validity of the received responses. The question ascertains whether respondents consider themselves to have under the average, average or over the average driving skills. Usually people's beliefs are biased in the direction of optimism where they tend to over exaggerate their skills towards positive end results. Therefore, the expected responses should indicate that a majority believe themselves to have over the average driving skills (Kahneman, Riepe, 1998). According to a survey conducted among American car drivers (University of Mannheim) 82% of the respondents thought that they belonged to the 30% share of the best drivers. This seems to hold true in this case as well. 56% of the private investors believe that they possess average driving skills while 39% consider themselves possessing above the average skills. Only 3% consider themselves to possess under the average driving skills. The results obtained from institutional investors express a higher level of confidence in driving skills. 66% of the institutional investors consider themselves to possess above the average driving skills. 28% consider themselves to possess average driving skills while 2% think that they possess below the average driving skills. It is obvious that institutional investors consider themselves better drivers than the private investors responding to the questionnaire.

5.5 Statistical Comparisons

5.5.1 Hypotheses

Our hypotheses are based upon the questions in the questionnaire. The questionnaire is included in Appendix 1. All questions, except one, are paired in two. Our H_0 is that there is no difference between the two questions in each pair. Our H_1 is that there is a difference between the two questions in the pair. The one question which is not compared with any other question has as its H_0 that there is not difference between the eight alternatives given; our H_1 is that there is a difference between the eight alternatives. Hence, the hypotheses are

H_0 : there is no difference between the two compared questions
H_1 : there is a difference between the two questions

5.5.2 Results & Analyses of Comparisons

We have a rationale with each of our comparisons. However, not all questions are connected to the theories; some of the questions posed have been asked with a more descriptive purpose and interest to collect data of a more practical nature.

The first comparison was carried out between questions four and eight. It is a general reflection of the composition and characteristics of investments. Mental accounting, as mentioned in section 3.2.2, can influence the decision of investment categories as investors may separate between the natures of their investments and dividing investment into e.g. a "safe" category and a more "risky" category. Loss aversion may contribute in holding on to particular investments in these categories. Was there a difference between the investment strategies and the most important sources of information when the respondents' made changes in their security holdings between the fall of 1998 and March 2000?

The critical value is 49.766 and our estimated value for the private investors is 31.521. We thus accept the H_0 and reject H_1, we cannot prove there is a difference. The estimated value for the institutional investors is 53.766. Here we can see that there is a significant difference and we reject H_0 and accept H_1. The comparison aims to see if we can establish a relationship between different investing behaviors concerning the choice of companies and sources of information. There is obviously a difference between private and institutional investors when it comes to investing strategies and the sources of information when changes were made in the holdings of stocks and other securities during the bull market from the fall of 1998 to March 2000.

Degrees of Freedom	35	
Critical Value	49.766	
	Private	Institutions
Estimated Value:	49.766	53.768
H_0	Accept	Reject
H_1	Reject	Accept

Table 3: Questions 4 - 8

The second comparison was between questions four and twelve. It is a general reflection of the composition and characteristics of investments. Opposite to the previous comparison, this is a plain comparison between how investors have separated investments in "safe" and a more

"risky" category over a period with utterly different circumstances regarding the market. It was done to find out if there is a difference between the investing strategies between the fall of 1998 and March 2000 and the investments the respondents have made since the bear market started in March 2000.

The critical value is 37.652 and our calculated value among the privates is 56.790. The corresponding value among the institutional investors is 42.964. We wanted to see if we were able to establish a connection between investment-strategy-behaviors during the bull market as well as the bear market. There is a significant difference between the investing strategies and the investments the respondents have made since the bear market began in March 2000. We accept H_1 and reject H_0 among both private investors as well as institutional investors. As can been seen from the diagram investing in Swedish stocks is far more important than in foreign stocks, especially among private investors. During the bull market 33% of the private investors preferred Swedish stocks compared to 2% preferring foreign stocks. The over-weight among Internet and high technology stocks that performed very well during the bull market and forced the Stockholm Stock Exchange up more than most other stock exchanges in the world may have been a reason for favoring Swedish stocks. As can be seen from the figure there is not much of a difference between the bull and the bear market among the institutional investors. This can be interpreted in more than one way; the positive interpretation is that they have long-term and well engineered investment plans which are not being affected either by a bull or bear market. The negative interpretation is that they are rigid and inflexible in their adoption of new market scenarios.

Degrees of Freedom	25	
Critical Value	37.652	
	Private	Institutions
Estimated Value:	56.790	42.964
H_0	Reject	Reject
H_1	Accept	Accept

Table 4: Questions 4 - 12

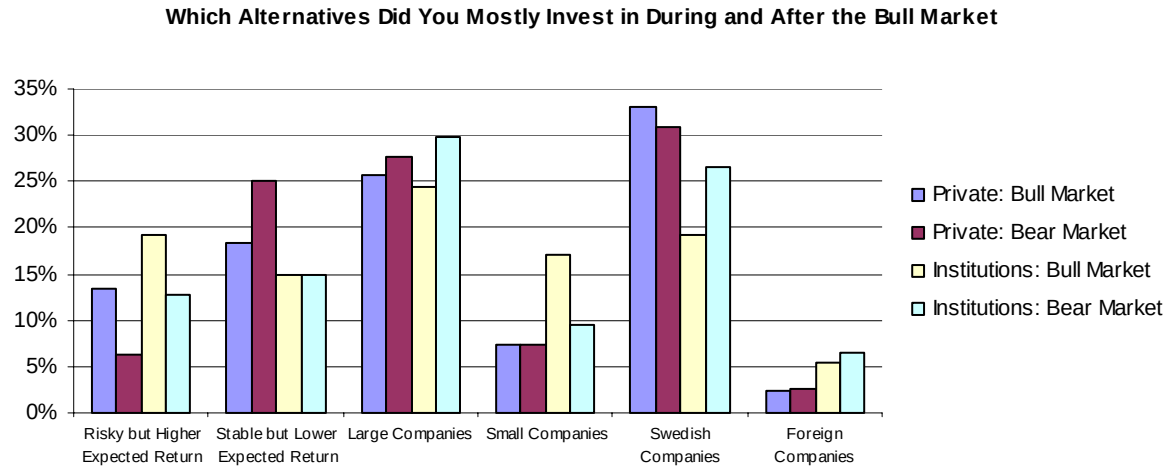

Figure 13: Questions 4 - 12

Our next comparison between questions five and nine was to analyze the relation between overconfidence, as described in 3.3.2, and cognitive dissonance as described in section 3.2.4. Is there a difference between the respondents' believed ability to predict the market and the

opinion of whether the market was overvalued or not between the fall of 1998 and March 2000?

Our critical value in this case is 9.488 and the estimated value among private investors is 8.020, the corresponding value among institutional investors is 37.533. Our value is less than the critical value for the private investors, which leads us to accept the H_0 and reject H_1; we cannot prove that there is a difference between the respondents' believed ability to predict the market and the opinion of whether the market was overvalued or not between the fall of 1998 and March 2000. The contrary applies to the institutional investors; we reject H_0 and accept H_1, there is a difference. As in the first comparison we have a difference between private and institutional investors concerning whether the respondents thought they were able to predict the market development and whether the market was overvalued during the corresponding phase. It is interesting to note that almost the same number of private investors as institutional investors thought the market was overvalued. One might think that professional analysts would have superior information and thus be able to realize that the market was inflated beyond what key figures could support. This seems not to have been the case. More than twice the number of institutional investors thought they were able to predict the market compared to private investors.

Degrees of Freedom	4	
Critical Value	9.488	
	Private	Institutions
Estimated Value:	8.020	37.533
H_0	Accept	Reject
H_1	Reject	Accept

Table 5: Questions 5 – 9

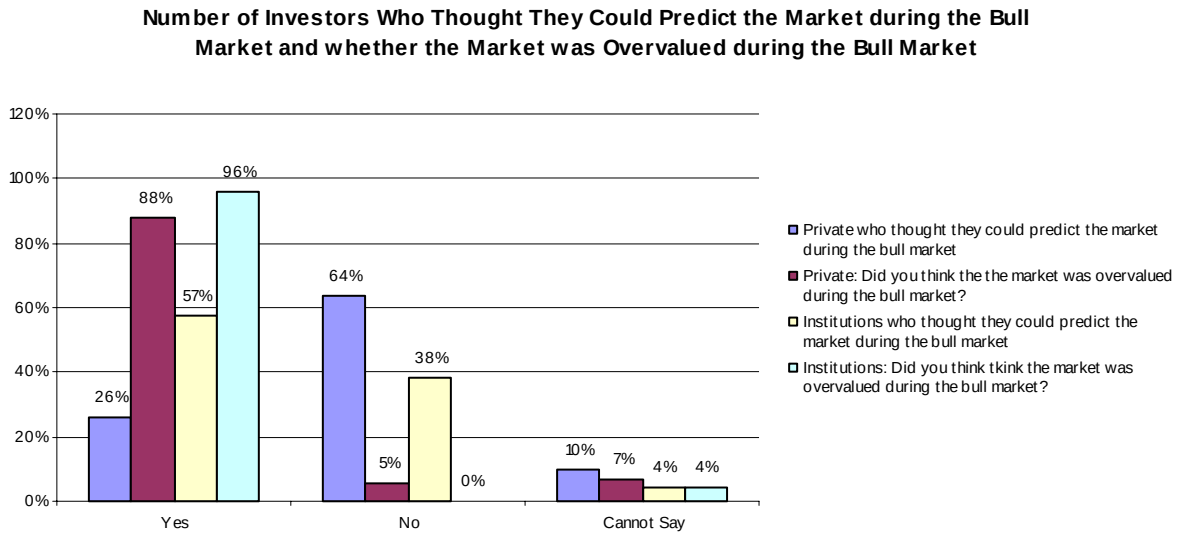

Figure 14: Questions 5 - 9

The intention with the comparison between questions five and twenty was to look for a connection between overconfidence and anchoring, as described in section 3.3.3. We examined the problem whether or not there is a difference between the respondents' believed ability to predict the market and the respondents' estimated value of the "generalindex" of the Stockholm Stock Exchange in six months.

The critical value is 12.592 and our estimated value is a stunning high 51.041 for the private investors and 15.871 for the institutional investors. There is a very significant difference between the predictability among the private investors and their guesses about the level of the generalindex in six months. The critical value with α of 0.05% is 24.103; this means we can detect a difference between the questions with a certainty of 99.5% and we reject the H_0 and accept H_1. All numbers and calculations have been checked several times but we have been unable to detect any miscalculation which would have lead to this remarkable value. We also have to reject the H_0 among the institutional investors, but just barely.

Degrees of Freedom	6	
Critical Value	12.592	
	Private	Institutions
Estimated Value:	51.041	15.871
H_0	Reject	Reject
H_1	Accept	Accept

Table 6: Questions 5 - 20

There seems to have been a large number of careful private investors, 85% of those who thought they could not predict the market are very cautious about what the index of the Stockholm Stock Exchange will be in six months. If this is due to cautiousness or mere lack of knowledge is hard to tell. The private investors who answered that they could not say if the market was overvalued during the bull market think the index will be between 21- 40% above the level today.

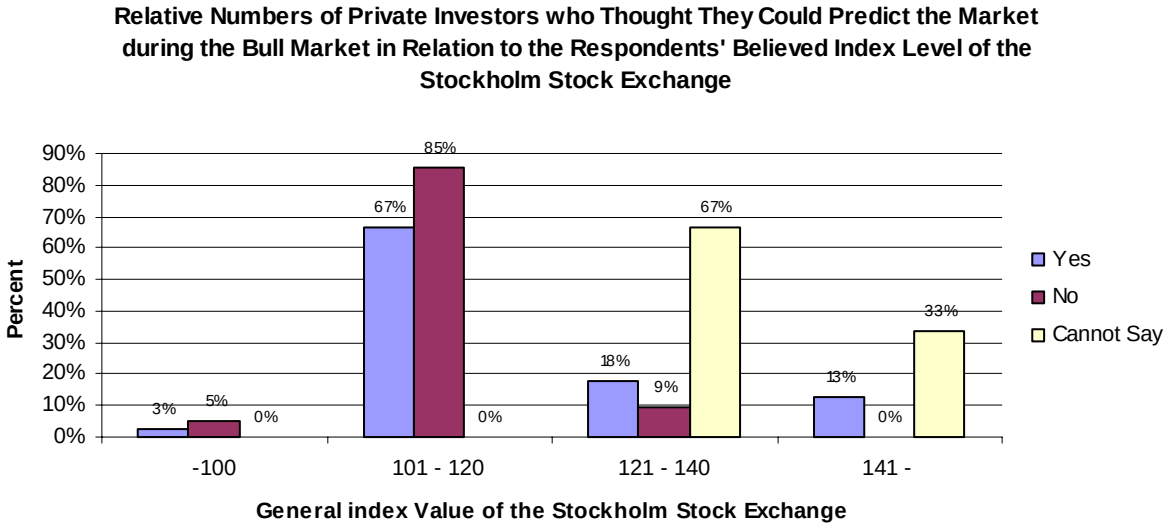

Figure 15: Questions 5 – 20, Private Investors

Another remarkable thing to note is that 50% of the institutional investors who could not say if they were able to predict the market during the bull market period think the index will be 41% above today's level in six months.

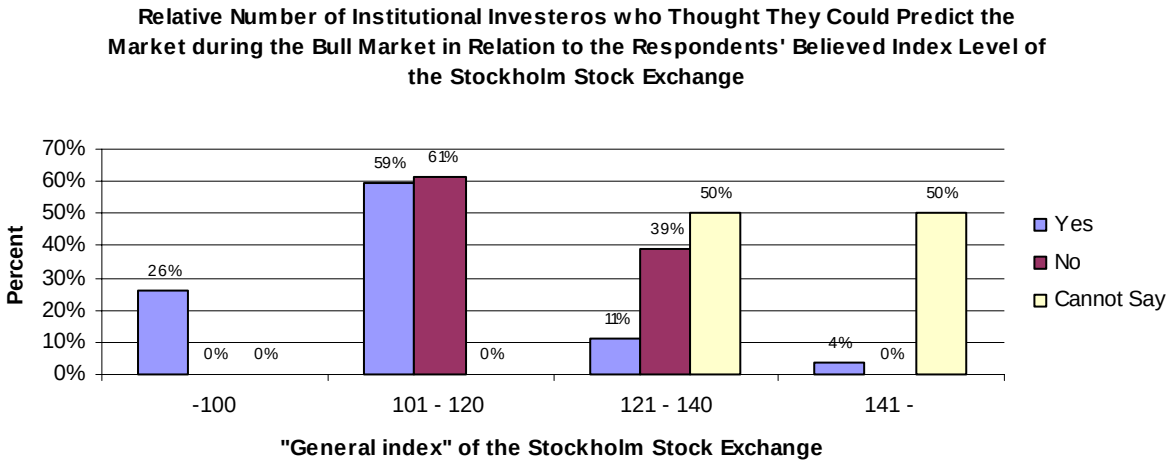

Figure 16: Questions 5 – 20, Institutional Investors

Next comparison was a comparison between questions seven and eleven. It is a more wide-ranging query concerning the composition and characteristics of investments and is based on a theory of herd behavior as a cause of both overvaluation and the decline of the market. Herd behavior has been dealt with in section 3.3.1. Is there perhaps a relation between respondents' reasons to make changes in their security holdings and the most important reasons for the bear market since March 2000?

The critical value is 9.488 and among the private investors the estimated value is 4.961, the corresponding value for the institutional investors is 4.961. We can from this bring to a close that we cannot prove a difference neither among the private investors nor the institutional investors; we hence accept H_0 and reject H_1. One might think that there would be a connection between how people make changes in their security-holdings today and those reasons they believe were important to the decline of the market after March 2000. If a respondent believes that the forecasts by analysts were important to the downturn, that respondent would plausibly focus on analysts' forecasts today in order to be well-informed about important news stories that may affect his security holdings. This seems however not to be the case since we could not establish a significant difference between the two questions.

Degrees of Freedom	4	
Critical Value	9.488	
	Private	Institutions
Estimated Value:	2.849	4.961
H_0	Accept	Reject
H_1	Accept	Reject

Table 7: Questions 7 -11

The analysis between questions seven and twelve refers to the features and constitution of the market and mental accounting which was described in section 3.2.2. The question whether there is a difference between the respondents' reasons to make changes in their security holdings today and the investments the respondents have made since the bear market started in March 2000 have been explored in this comparison.

The critical value is 49.766 and our calculated value among the private investors is 25.404. The institutional value is 41.148. We cannot see a significant difference in either group and we accept H_0 and reject H_1. There is obviously no relation between what information sources

investors focus on and what sort of companies they invest in. One may think that there would be a relation between how investors gather information and how they choose to invest their money. Swedish businesses give out large amounts of information that is easily available to any one living in Sweden and read Swedish whereas information from a foreign company is a bit more difficult to obtain.

Degrees of Freedom	35	
Critical Value	49.766	
	Private	Institutions
Estimated Value:	25.404	41.148
H_0	Accept	Accept
H_1	Reject	Reject

Table 8: Questions 7 - 12

To acquire some insight into question eight, we performed a test between the alternatives to see if there was any difference. The question refers to the most important factors when the respondents made changes in their security holdings during the bull market. There is a relation to the mental accounting theory behind the question. However; it is a more general examination of individual investment behavior during the hysteria of IT-stocks and other high-tech companies. How do people value sources of information when few companies could show any fundamental values as a justification of the stock prices?

The critical value is 18.307 and the value we estimated is equal to 26.025 among the private investors and 24.219 among the institutional investors. We are thus able to reject the H_0 and state that there is a difference between the information sources when private investors made changes in their holdings. H_1 is hence accepted, we can conclude that there is a difference. We cannot find any relation between what sorts of information sources investors choose to use when investing. It is plausible that people who use information from e.g. the Internet would prefer to collect information from other media also but this seems not to be the case.

Degrees of Freedom	10	
Critical Value	18.307	
	Private	Institutions
Estimated Value:	26.025	24.219
H_0	Reject	Reject
H_1	Accept	Accept

Table 9: Question 8

As shown by the figure, the dispersion of private investors is quite equal among five of the eight alternatives and only one alternative has zero percent. The institutional investors are somewhat more heterogenic, 45% have responded that information from the company is the most important alternative, advice from analysts and personal intuition come as second and third with 21 and 19% respectively. A somewhat surprising result may be that only 2% have answered *discussion with work colleagues*. We expected that the institutional investors would cooperate and inform one another more than they actually do. Neither *information from the Internet* nor *discussion with friends* were popular, both scored zero. To expect professional analysts to talk with friends about the financial markets is a bit farfetched but we would have expected some information gathering from the Internet.

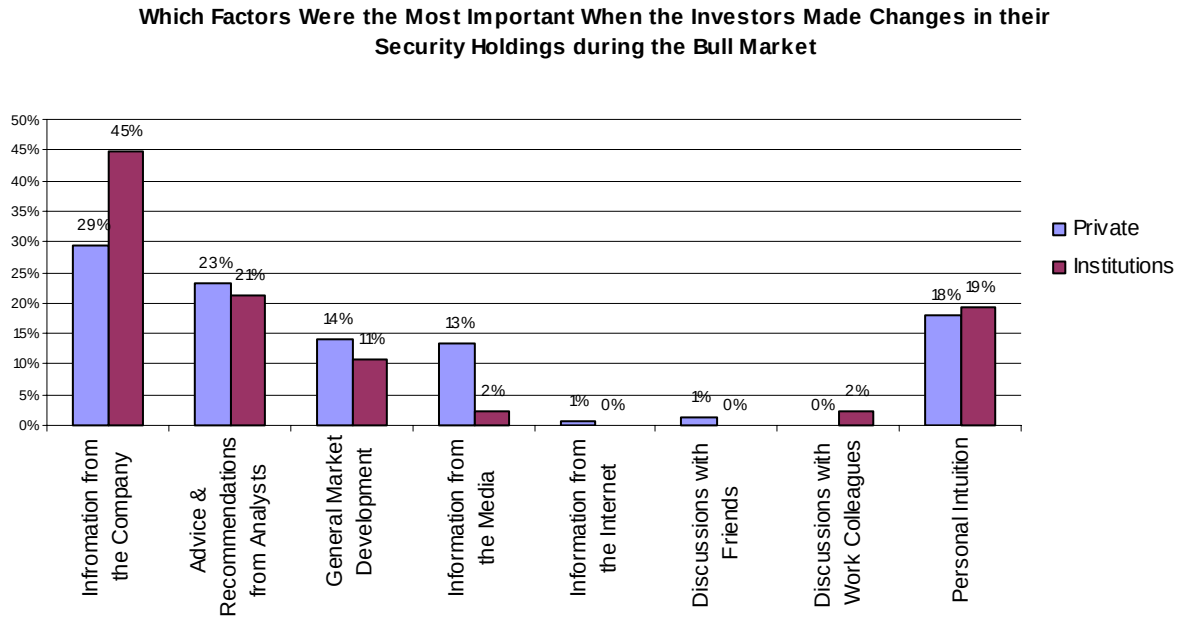

Figure 17: Question 8

The comparison between questions eight and ten was an exploration of mental accounting and cognitive dissonance. Individuals tend to focus on recent behavior and give less weight to longer time trends as explained in section 3.3.3 on anchoring. The probabilities of recent price increases in connection with a speculative bubble are given too much weight. This can further reinforce the herd behavior and feedback phenomenon. The comparison strives to find out if there is a difference between the most important sources of information for making changes in the respondents' security-holdings between the fall of 1998 and March 2000.

With a critical value of 9.488 and an estimated value of a low 1.388 among private investors, we can state that H_0 holds. The value for institutional investors is also surprising low, no more than 2.266. We reject H_1; the α-level would have to be very large if our estimation would even have the slightest chance of being significant for both private and institutional investors. We thought that there might have been a link between which sources of information people actually used and what sources they believed may have been the most important in inflating the speculative bubble. The Internet had been widely available and popular among many people and there were a number of Internet brokers and numerous web sites giving information on companies and financial related areas. Newspapers and tabloids gave "hot stock tips" almost on a daily basis and we expected that some of this would have affected people and the perceived reasons for the speculative bubble. To our surprise there is no such relationship.

Degrees of Freedom	4	
Critical Value	9.488	
	Private	Institutions
Estimated Value:	1.388	2.266
H_0	Accept	Accept
H_1	Reject	Reject

Table 10: Questions 8 -10

In the comparison between questions nine and nineteen we looked for a relation between cognitive dissonance and anchoring. Shiller suggests that people did not actually realize how many others shared their own views that the market was overpriced and that apparently the view did not dissuade people from buying stocks nonetheless. There is interest in knowing if there is any relationship between the respondents' opinion whether the market was overvalued or not between the fall of 1998 and March 2000, and the respondents' opinion on the market value today.

The critical value among the private investors is 12.592 and our estimated value is 6.221. Our value among the institutional investors is 1.600. We can thus accept H_0 and conclude that we have not traced any difference between the opinion about the market value during the bull market and the market value today. The H_1 is consequently rejected. What we were interested in with this comparison was whether it was possible to detect a correlation between people who thought that the market was overvalued during the bull market and what they think about the value of the market today. The relation is very insignificant, meaning there is no relation between people who thought the market was over/undervalued during the bull market and how they value the market today. This means that people who e.g. thought the market was overvalued during the bull market think the market is undervalued today. This seems reasonable to think and is supported by the chart. We can see that 52% of the private investors who thought the market was overvalued during the bull market regard the market undervalued today.

Degrees of Freedom	6	
Critical Value	12.592	
	Private	Institutions
Estimated Value:	6.221	1.600
H_0	Accept	Accept
H_1	Reject	Reject

Table 11: Questions 9 -1 9

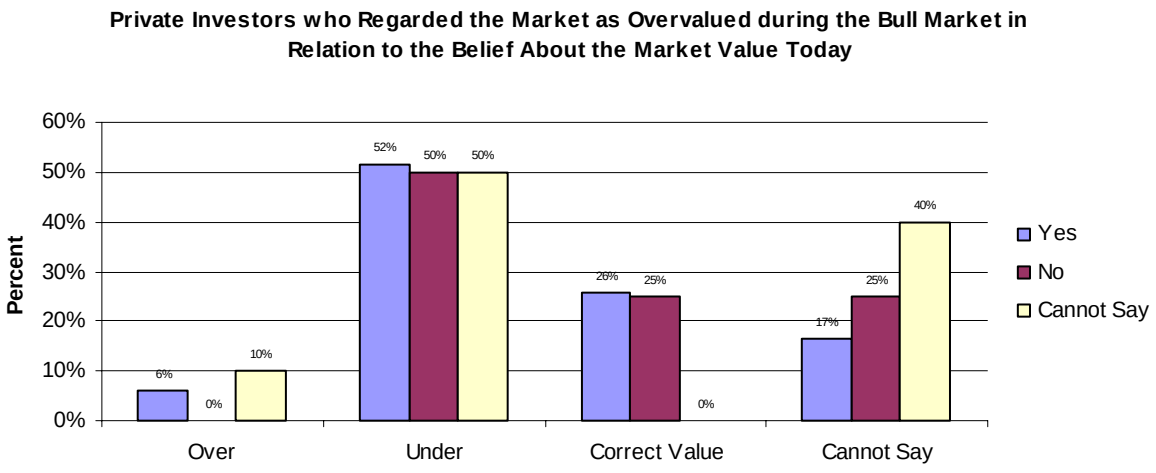

Figure 18: Questions 9 – 19, Private Investors

The dispersion among the private investors is more homogenous; there is a concentration around the alternative *undervalued*. Institutional investors give a totally different picture, as no single institutional investor has answered *no* to the question if the market during the bull market period was overvalued. Another strange thing to observe is that not a single investor

who answered *cannot say* about the market value today has answered *undervalued* during the bull market. It is evenly distributed among *overvalued* and *correct value*.

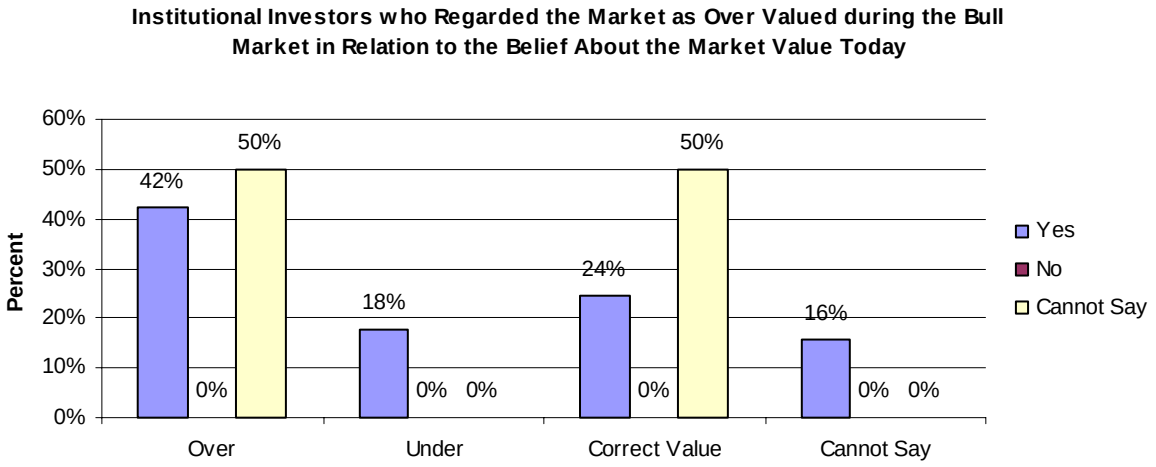

Figure 19: Questions 9 – 19, Institutional Investors

The intention of this comparison between questions thirteen and nineteen was to determine if there is a relation between confidence and optimism on one hand and anchoring on the other? Is there possibly a relation between the respondents' opinion whether the market will recover if there was a similar economic downturn as after March 2000 and the respondents' opinion on the market value today?

The critical value is 21.026 and our calculated value among the private investors is 11.780 and 16.524 among the institutional investors. We can conclude that there is no significant difference and we accordingly accept H_0 and reject H_1. It obviously does not matter what investors believe about the future of the market and what they think of the value today. A person who regards the market to be undervalued today may plausibly think that the market will recover in a few years to levels that prevailed during the speculative bubble but this seems not to be the case. The reason for us to think this is the mean reverse-hypothesis that predicts that the market will return to a historical average over time. The respondents seem not to agree with this hypothesis according to our questionnaire.

Degrees of Freedom	12	
Critical Value	21.026	
	Private	Institutions
Estimated Value:	11.780	16.524
H_0	Accept	Accept
H_1	Reject	Reject

Table 12: Questions 13 – 19

Among the private investors, 56% are very close to *strongly agree* that the market will recover if there was a similar economic downturn as the one beginning in March 2000 who also answered that the market is overvalued today. This seems to be somewhat paradoxical. Investors, who regard the market as overvalued today, when most experts say the market is undervalued, believe the market will recuperate if another economic decline occurs. To judge that the market will make progress in case of bad times implies confidence in the market but to regard the market as overvalued seems to be more due to lack of knowledge about the market value today.

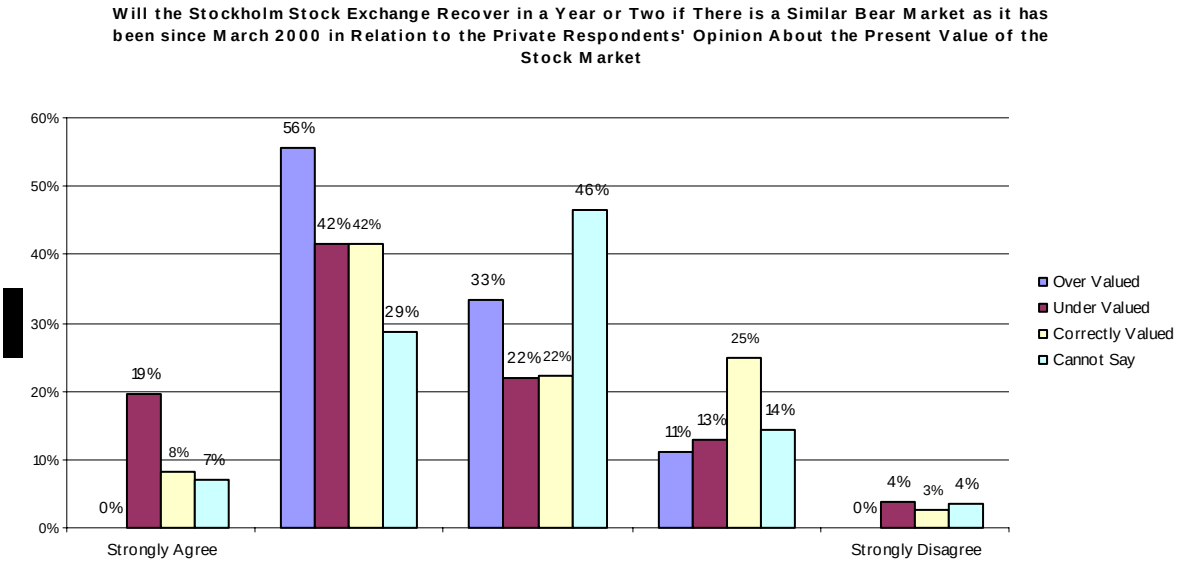

Figure 20: Questions 13 – 19, Private Investors

Also according to this comparison, the private investors seem to have been more heterogenic than the institutional investors. This seems reasonable; the private investors represent all sorts of people having the slightest interest in the financial markets whereas the institutional investors are professionals. Private investors will probably pick up a few news stories now and then and base their views on these irregular pieces of information. The institutional investors can make a better judgment since they have a steady and abundant flow of information. It is interesting to note that 100% of those who answered *cannot say* if the market is overvalued today have also been very cautious in their opinion whether the market will improve within a few years in case there was another market decline.

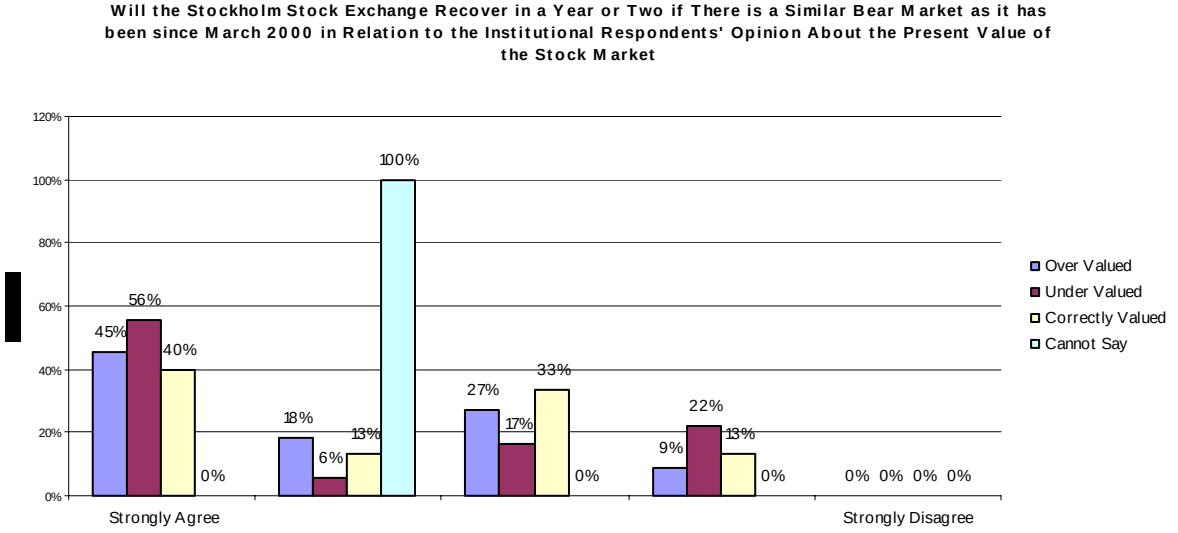

Figure 21: Questions 13 – 19: Institutional Investors

The comparison between questions sixteen and seventeen was an investigation of Daniel Kahneman and Amos Tversky's classic value function described in section 3.2, and framing, explained in section 3.2.2, compared with anchoring and herd behavior. It aims to examine the relationship between how the respondents value the information in a situation when a

decision has to be made given certain information and the respondents' believed probability that the generalindex of the Stockholm Stock Exchange will continue to rise after three days of continuous increase.

The critical value is 15.507 and the found value among the private investors is 4.681 and 24.835 among the institutional investors. We can hence accept the H_0 and reject H_1, there is no significant difference among the private investors. The contrary applies among the institutional investors, we find that there is a significant difference and we reject H_0 and accept H_1.

Degrees of Freedom	8	
Critical Value	15.507	
	Private	Institutions
Estimated Value:	4.681	24.835
H_0	Accept	Reject
H_1	Reject	Accept

Table 13: Questions 16 - 17

We wanted to find out how investors value information from different areas. As can be seen from the diagram 56% of the investors who answer that the stock is not worth buying, given the information in question 16, believe the probability that the stock market will continue to go up, if it has gone up three consecutive days, is between 0-20%. This may imply that these investors have inferior knowledge in statistics and probability knowledge. No matter how many days the stock exchange has increased in value, the probability that it will go up, or down the next day is 50-50. Patterns are easily thought to exist in data that is truly random and continuous price increases are categorized as improbable. This is consistent with the overconfidence hypothesis described in section 3.3.2. Conservatism can also help in explaining why people give too much weight to the prior probabilities of events in a given situation, as people are reluctant in changing their opinions.

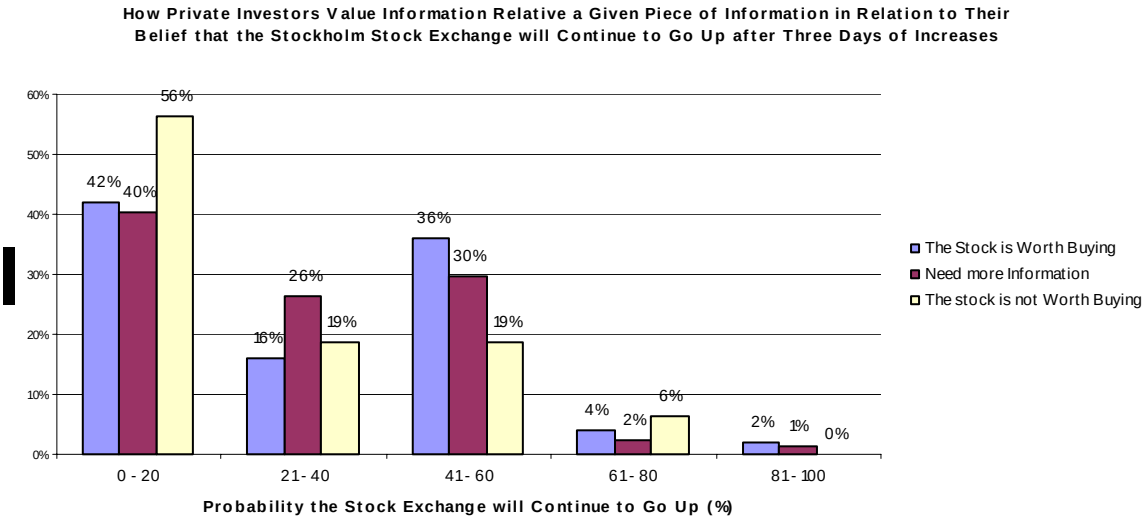

Figure 22: Questions 16 – 17, Private Investors

As we have seen before, the institutional investors are more heterogenic as a group. As shown in the figure, among the institutional investors no one has responded that the probability of the

market going up is between 61-100%. However, among the investors who responded that the information given about the stock is not worth buying, a surprising 80% of the private investors claim the probability is 80% that the stock market will continue to go up.

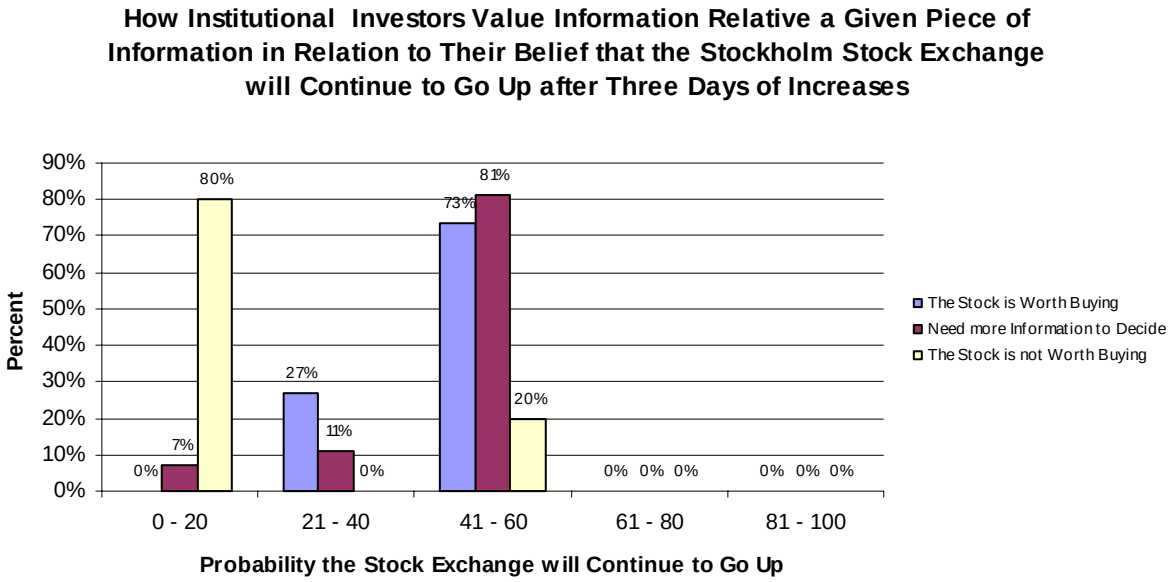

Figure 23: Questions 16 – 17, Institutional Investors

6 Conclusions

This chapter recapitulates the major concepts of this thesis and summarizes the analysis and results obtained.

The purpose of this thesis was to conduct a research on factors and decision-making processes that affect the investments of private and institutional investors. More specifically, the objective was to study which reasons lay behind the enormous rise in the value of the equity market during the end of the 1990s. Behavioral finance, which is a new paradigm of finance seeking to supplement the standard financial theories by introducing behavioral aspects to the decision-making process, provided the theoretical basis for the research. In addition to behavioral factors, possible structural and cultural factors underlying the speculative bubble were introduced and further developed.

Market participants have for a long time relied on the notion of efficient markets and rational investor behavior when making financial decisions. However, the idea of fully rational investors always maximizing their utility and demonstrating perfect self-control is becoming inadequate as examples of market inefficiency in the form of anomalies and irrational investor behavior have been observed more frequently during the past decades. The results obtained from the questionnaire carried out suggest that the behavior of market participants during the speculative bubble was indeed to some extent irrational when considered from a standard finance point of view and that the composition of investments have changed as a consequence of the speculative bubble. The results also shed light into the possible reasons underlying the speculative bubble.

The investment horizon of the respondents indicates that a majority of investors have an investment horizon covering a period over five years. Investments made during the speculative bubble where often made with much shorter target periods and therefore the current emphasis on long-term investments may well be a sign of aversion towards similar short-term profit opportunities as experienced during the speculative bubble. Furthermore, the slight increase in the monitoring of investments may also indicate a more cautious attitude towards investing today.

The composition of investments has changed slightly after the speculative bubble. Both private investors and institutional investors have clearly decreased their share of investments in companies characterized by uncertain but higher expected returns. This category includes the stocks of IT-companies, which experienced the highest increases in value during the speculative bubble and therefore the results enhance the picture of a move towards safer investment categories. The abnormally high returns experienced during the speculative bubble may have encouraged higher risk taking and the decline in the market after March 2000 has reversed this tendency. The change in investment strategies was also conformed in the statistical analysis which indicates a significant difference between the investment strategies and the investments the respondents have made since the bear market began in March 2000. However, the statistical analysis was not able to prove that there is a relation between what information sources investors focus on and what sort of companies they invest in. Furthermore, the decreased importance of own intuition and information from the media when making investment decisions suggests an emphasis on a more fundamental perspective towards the market today and not just a reliance on analyst recommendations or other more or less vague valuation methods as seems to have been the case during the speculative bubble. This is particularly evident among institutional investors where the importance of information from companies has significantly increased.

A definite majority of the private investors and institutional investors who responded to the questionnaire considered the market to be overvalued during the period from the fall of 1998 to March 2000. Even though the responses were collected following the period of the speculative bubble itself, after which the reality of the phenomenon became clear to everybody, it nonetheless gives a clear picture of the investors' comprehension on the existence of the speculative bubble. In addition, the statistical analysis carried out suggests that institutional investors thought they could clearly predict the development of the market even though they were at the same time highly conscious of the overvaluation of the market during the speculative bubble. One might think that professional analysts would have been better informed and thus be able to realize that the market was inflated beyond what key figures could support. However, more than twice the number of institutional investors thought they were able to predict the market compared to private investors.

When examining the reasons contributing to the speculative bubble the results were more scattered. Herd behavior was considered as a major contributing factor, especially among institutional investors, while private investors also consider overconfidence and forecasts of analysts to be almost as important. An interesting aspect is the fact that institutional investors consider forecasts of analysts to be an as important contributing factor as private investors do, which suggests that even the institutional investors themselves acknowledge that they might be partly to blame for the overvalued market. The behavioral aspects underlying these views are numerous. Cognitive dissonance can have been a decisive factor as investors may have reacted to the price increases themselves indifferent to the contradictory evidence of the IT-companies nearly non-existing profits and the fundamental values underlying the unrealistic stock prices. Anchoring may have also affected the decision-making process causing the overweighing of favorable probabilities and enforcing the picture of a market with a small chance of making any losses. This can have further reinforced herd behavior and the feedback phenomenon. The earnings and profitability of companies was considered as the least important factor contributing to the overvaluation. This reinforces the suspicion that investors' decision-making was based more on obscured expectations, leading to irrational investment behavior, than on realistic fundamental valuations. In any case, it is clear that markets were not functioning purely according to theories on efficient markets and that fundamental valuation principles were set aside by a majority of the investors during the speculative bubble. Furthermore, the decline of the market after the speculative bubble was mainly blamed on the earnings and profitability of companies, especially among institutional investors, which indicates a clear consciousness of the fundamental significance of concrete earnings and not just overly high expectations such as was the case with the majority of the IT-companies with soaring stock prices during the speculative bubble.

The prospect theory and heuristics may further help in explaining other psychological factors affecting the investment decision-making process and how these processes can lead to speculative bubbles. Prospect theory offers an alternative to the theory of expected utility maximization according to which investors are risk averse at all levels of wealth. On the contrary, the prospect theory asserts that people are risk lovers for losses and risk averse only for levels of wealth above a certain reference point. The answers received seem to conform the at least a certain portion of investors seem to prefer to gamble with a possibility for a gain when faced with a certain loss. This was especially true among private investors. Weak self control, loss aversion and framing may further help in explaining the overvaluation of the market as investors were encouraged by short-term successes, repeated good performance and an urge for immediate gratification.

Heuristics, a process by which people find things out for themselves usually by trial and error, may help to explain why the market sometimes acts in an irrational manner, which is opposite to the model of perfectly informed markets. Overconfidence during the speculative bubble seems to have been strong especially among institutional investors. This suggests that institutional investors' decision-making was influenced by a strong belief in their own skills which can have lead to the underestimating of the likelihood of bad outcomes during the speculative bubble. Consistent patterns of information such as news pointing in the same direction or a consecutive stock price increases can lead to overreaction among investors. How investors interpret information is an important question to investigate. Given a certain piece of information the investors were asked about the probability that a stock will go up tomorrow. No matter what the information contained, the probability is 50%. The direction during the last few days does not effect the direction of the stock tomorrow. The answers received suggest that investors do react to consecutive news announcements pointing in the same direction from companies. A majority of the private investors and almost half of the institutional investors also consider a stock worth buying solely based on recent high stock price increases and a positive future outlook. People are susceptible to seeing patterns in information that is truly random while disregarding base rate probabilities. The answers received, referring to the probability of a repeated market event, suggest that not all investors are conscious about basic probability calculus and its implications on investment decisions as according to standard finance. This was especially evident among the private investors. The consecutive increases in stock prices during the period from the fall of 1998 to March 2000 may have contributed to an overly optimistic enthusiasm among investors, which led security prices to overreact. People believed they were following "winner" stocks blinded by the seemingly easy profits and they refrained from contrary financial exposure even though faced with contradictory information. This phenomenon was further enforced by herd behavior, which respondents themselves admit as an important contributing factor to the overvaluation of the market. The saying that people see what they want to see may in this case very well hold true and lead to heuristic and irrational decision-making as was experienced during the late 1990's.

A comparison of the investors' believed ability to predict the market and the respondents' estimated value of future market levels also exhibited an interesting result. Investors who claimed that they were not able to predict the market during the speculative bubble also give more cautious estimates of future market values. However, a large proportion of private investors who could not say if they were able to predict the market gave higher estimates of future market values than investors who were able to ascertain their skills during the speculative bubble. Another remarkable thing to note is that half of the institutional investors who could not say if they were or were not able to predict the market nonetheless estimated very high future values for the market. This suggests that investors who were indecisive of their abilities during the speculative bubble now forecast high future market values.

The responses received concerning the current and future valuation of the stock market as well as the ability of the market to recover if faced by a similar downturn indicate that confidence in the stock market is currently fairly high. Half of the private investors and more than a third of the institutional investors consider the market to be undervalued as of the beginning of December 2001 by approximately 21-25%. The value of the Stockholm Stock Exchange's General Index is estimated at approximately 114 – 119 six months from now (December 2001) if the current value of the index were 100. Investors who thought the market was overvalued during the speculative bubble think that the market is currently undervalued

which is an intuitive result and also conformed through the statistical analysis. This consensus of a future increase in market values is also reflected in the confidence shown towards the market if it was to face a similar downturn today as in March 2000. Even though the market decline after the burst of the speculative bubble in March 2000 was steep, it has not eroded the respondent's confidence in the stock market's ability to recover from downturns. However, the statistical analysis on whether there is a relation between investors' opinions on the market's ability to recover, if there was a similar economic downturn as it was after March 2000, and the investors' opinion on the market value today is somewhat contradictory. There seems to be no correlation between the perceived ability of the market to recover and the current valuation of the market.

The speculative bubble experienced during the fall of 1998 and March 2000 exemplified a situation, which includes both unpredictability and irrational reactions. However, the notion that such irrational behavior exists is controversial in standard finance even though behavioral finance and other contemporary theories are beginning to discover evidence, which may help understand such market anomalies. Approaches based on perfect predictions, completely flexible prices, and complete knowledge of investment decisions of other players in the market, are increasingly unrealistic in today's global financial markets.

This thesis supports, to an extent, the assumption that even though a majority of the investors during 1998 to 2000 seem to have realized the seriousness of the speculative bubble they nevertheless continued their investment activities knowing that the risk for a collapse was imminent. This in itself can be characterized as less than rational behavior. There seems to have been no significant behavioral differences between private and institutional investors, despite a minor indication of overconfidence among institutional investors, as both groups have made similar changes in their investment characteristics and act principally according to the same set of physiological motives. The prospect theory and heuristics help to understand some of the possible factors underlying the phenomenon of a speculative bubble, even though they can not alone give exhaustive answers to all the matters surrounding this market anomaly. However, a more common understanding of these factors and the way in which psychological factors affect our decision-making should help to avoid the occurrence of such speculative bubbles and enhance the efficiency of today's global financial market. Despite the inevitable losses realized among both private and institutional investors, as a consequence of the burst of the speculative bubble, confidence toward the market in the end of 2001 seems fairly high. From a long-term historical perspective investing in the equity market has been profitable and the understanding of the behavioral factors affecting this market can help to better understand its periodic unpredictability.

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Appendix 1

Questionnaire

We are three students from Lund University in Sweden and we are writing our Master Thesis in Finance. Our research deals with the factors affecting private investors', as well as institutional investors', financial decision-making. More specifically, we are researching how the speculative market bubble during the fall of 1998 and March 2000 has affected investment behavior. With the speculative market bubble we mean the significant increase in equity prices from the fall of 1998 up to March 2000. We are also researching how market participants have changed their market behavior after the decline in the market during the period from March 2000 up until today.

This questionnaire consists of 21 questions and should take about 10-15 minutes to answer. In each question choose the alternative that best reflects your own opinion or experiences. Your answers will greatly help in contributing to the research on financial decision-making. All answers will be handled anonymously and confidentially.

Gender:

1. Man
2. Woman

Please choose your relevant age group:

1. Under 25 years
2. 26-35 years
3. 36-50 years
4. 51-65 years
5. Over 65 years

1) How are your investments distributed between short-term and long-term investment horizons:

   1. Proportion of investments with long-term (> 5 yr.) investment horizon _____ %
   2. Proportion of investments with short-term (< 1 yr.) investment horizon _____ %

2) Do you monitor your investments with a *short-term* investment horizon more often today compared with the period before the market decline in March 2000. Choose one alternative:

   1. Yes
   2. No
   3. Cannot say

3) Do you monitor your investments with a *long-term* investment horizon more often today compared with the period before the market decline in March 2000. Choose one alternative:

   1. Yes
   2. No
   3. Cannot say

4) Choose the two alternatives that best describe your investment strategies during the period from the fall of 1998 up to the market decline in March 2000.

   1. I invested mostly in companies with uncertain, but higher excepted returns
   2. I invested mostly in companies with stable, but lower expected returns
   3. I invested mostly in large size companies
   4. I invested mostly in small size companies
   5. I invested mostly in domestic companies
   6. I invested mostly in foreign companies

5) During the increases in equity prices from the fall of 1998 up to March 2000, did you at any point in time think that you could forecast the future market development?

   1. Yes
   2. No
   3. Cannot say

6) During the increases in equity prices from the fall of 1998 to March 2000, how did you react to announcements and other information from companies?

   1. I made changes in my portfolio after the *first* news announcements
   2. I made changes in my portfolio after *a number* of consequent news announcements that pointed into the same direction
   3. I was not concerned about news announcements
   4. I cannot say

7) When making investment decisions *today*, which of the following factors do you consider most important when making investments?

   ____ Information from the company as a basis for a fundamental analysis.
   ____ Recommendations, advice and forecasts from professional investors.
   ____ The overall past performance of the market seen from a historical perspective.
   ____ Information from newspapers/TV.
   ____ Information from the Internet.
   ____ Discussion with personal friends.
   ____ Information from colleagues at work.
   ____ Own intuition of future performance.

8) When you made investment decisions *during* the period from the fall of 1998 to March 2000, which of the following factors did you consider most important when making investments?

   ____ Information from the company as a basis for a fundamental analysis.
   ____ Recommendations, advice and forecasts from professional investors.
   ____ The overall past performance of the market seen from a historical perspective.
   ____ Information from newspapers/TV.
   ____ Information from the Internet.
   ____ Discussion with personal friends.
   ____ Information from colleagues at work.
   ____ Own intuition of future performance.

9) In your opinion, was the stock market overvalued at any point of time during the period from the fall of 1998 to March 2000?

   1. Yes
   2. No
   3. Cannot say

10) If yes, what do you think was the most important contributing factor to the *overvaluation* of the market during the period from the fall of 1998 to March 2000?

   ___ The news stories in the media.
   ___ The forecasts of analysts.
   ___ Over confidence among investors in the stock market.
   ___ Earnings and profitability of the listed companies.
   ___ Herd behavior, i.e. private investors following the majority.

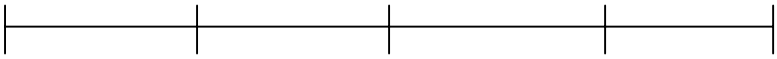
11) What do you think was the most important contributing factor to the *decline* in the market from March 2000 up until today?

___ The news stories in the media.
___ The forecasts of analysts.
___ Loss of confidence among investors in the stock market.
___ Earnings and profitability of the listed companies.
___ Herd behavior, i.e. private investors following the majority.

12) Choose two alternatives that best describe the investments you have been making since the market decline in March 2000 up until today:

1. I invest mostly in companies with uncertain, but higher excepted returns
2. I invest mostly in companies with stable, but lower expected returns
3. I invest mostly in large size companies
4. I invest mostly in small size companies
5. I invest mostly in domestic companies
6. I invest mostly in foreign companies

13) If there was a similar significant downturn in the market today as there was during the spring, summer and the fall of the year 2000, the market will surely be back up to its former levels in a couple of years or so? Circle a number from the line below.



Strongly agree **Strongly disagree**

14) According to you, what is generally the reason for *your* less successful investments?

1. Incorrect recommendations or advice from broker/analyst/banker etc.
2. Incorrect recommendations or advice from other sources
3. The market has, in general, performed poorly
4. Own errors
5. Other_____
   _____

15) You are faced with the following situation: A stock that you bought one month ago for $50 is selling today at $40. One month from now the stock price will have either increased in price by $10 (i.e. price one month from now will be $50) or decreased in price by $10 (i.e. price one month from now will be $30). Both possibilities are equally likely; fifty-fifty chance. Choose from the following:

1. Sell the stock now, thereby realizing a $10 loss.
2. Hold the stock for one more month, given 50-50 odds between losing an additional $10 or breaking even.

16) Assume the following situation: during the two recent years, the stock price of a certain company has risen with 70% and even the future for the stock looks bright. How do you value this information?

1. The stock is worth buying
2. The information is not sufficient enough for buying the stock
3. The stock is not worth buying

17) If the Stockholm Stock Exchange's general index has *increased* consecutively during the past three days what is the probability that it will *increase* in value during tomorrow as well ?

_____ %

18) If the Stockholm Stock Exchange's general index has *decreased* consecutively during the past three days what is the probability that it will *decrease* in value during tomorrow as well ?

_____ %

19) If you look at the stock market today, in your opinion, it is (choose one alternative):

1. Overvalued by _____ %
2. Undervalued by _____ %
3. Valued at a fundamentally correct level.
4. Cannot say.

20) If the value of the Stockholm Stock Exchanges general index was 100 today, what do you think the value of the index will be in 6 months ?

I think the value of the general index will be _____

21) Finally, in your own opinion, how good of a driver are you?

1. Under average
2. Average
3. Above average
4. I do not have a drives license

WE APPRECIATE YOUR HELP ! THANK YOU !

Appendix 2

In this appendix we present all 15 statistical comparisons. Eleven of them have already been presented in Chapter 5. Four of them were performed but the results were not interesting enough to be presented and analyzed in Chapter 5. However, we present the remaining four comparisons here for the completeness of the statistical research.

Questions 2-19

Degrees of Freedom	6	
Critical Value	12.595	
	Private	Institutions
Estimated Value:	4.353	2.806
H_0	Accept	Accept
H_1	Reject	Reject

Questions 3-19

Degrees of Freedom	6	
Critical Value	12.595	
	Private	Institutions
Estimated Value:	6.286	2.696
H_0	Accept	Accept
H_1	Reject	Reject

Questions 4-8

Degrees of Freedom	35	
Critical Value	49.766	
	Private	Institutions
Estimated Value:	49.766	53.768
H_0	Accept	Reject
H_1	Reject	Accept

Questions 4-12

Degrees of Freedom	25	
Critical Value	37.652	
	Private	Institutions
Estimated Value:	56.790	42.964
H_0	Reject	Reject
H_1	Accept	Accept

Questions 5-9

Degrees of Freedom	4	
Critical Value	9.488	
	Private	Institutions
Estimated Value:	8.020	37.533
H_0	Accept	Reject
H_1	Reject	Accept

Questions 5-20

Degrees of Freedom	6	
Critical Value	12.592	
	Private	Institutions
Estimated Value:	51.041	15.871
H_0	Reject	Reject
H_1	Accept	Accept

Questions 7-11

Degrees of Freedom	4	
Critical Value	9.488	
	Private	Institutions
Estimated Value:	2.849	4.961
H_0	Accept	Reject
H_1	Accept	Reject

Questions 7-12

Degrees of Freedom	35	
Critical Value	49.766	
	Private	Institutions
Estimated Value:	25.404	41.148
H_0	Accept	Accept
H_1	Reject	Reject

Question 8

Degrees of Freedom	10	
Critical Value	18.307	
	Private	Institutions
Estimated Value:	26.025	24.219
H_0	Reject	Reject
H_1	Accept	Accept

Questions 8-10

Degrees of Freedom	4	
Critical Value	9.488	
	Private	Institutions
Estimated Value:	1.388	2.266
H_0	Accept	Accept
H_1	Reject	Reject

Questions 9-13

Degrees of Freedom	8	
Critical Value	15.507	
	Private	Institutions
Estimated Value:	1.185	3.789
H_0	Accept	Accept
H_1	Reject	Reject

Questions 9-19

Degrees of Freedom	6	
Critical Value	12.592	
	Private	Institutions
Estimated Value:	6.221	1.600
H_0	Accept	Accept
H_1	Reject	Reject

Questions 13-19

Degrees of Freedom	12	
Critical Value	21.026	
	Private	Institutions
Estimated Value:	11.780	16.524
H_0	Accept	Accept
H_1	Reject	Reject

Questions 13-20

Degrees of Freedom	12	
Critical Value	21.026	
	Private	Institutions
Estimated Value:	4.915	15.433
H_0	Accept	Accept
H_1	Reject	Reject

Questions 16-17

Degrees of Freedom	8	
Critical Value	15.507	
	Private	Institutions
Estimated Value:	4.681	24.835
H_0	Accept	Reject
H_1	Reject	Accept

Appendix 3

Private Investors

Sex	Number	Percentage
Male	41	87%
Female	6	13%
Total	47	100%

Age	Number	Percentage
1	2	4%
2	31	66%
3	11	23%
4	3	6%
5	0	0%
Total	47	100%

Question 1	
Average long-term	63%
Average short-term	37%
Total	100%

Question 2		Number	Percentage
1.	Yes	62	41%
2.	No	83	55%
3.	Cannot say	5	3%
Total		150	100%

Long	Number	Cumulative	Percentage
0-10%	18	18	12%
11-20%	4	22	3%
21-30%	4	26	3%
31-40%	8	34	5%
41-50%	19	53	13%
51-60%	9	62	6%
61-70%	9	71	6%
71-80%	47	118	31%
81-90%	13	131	9%
91-100%	19	150	13%
Total	150		100%

Short	Number	Cumulative	Percentage
0-10%	31	31	21%
11-20%	36	67	24%
21-30%	19	86	13%
31-40%	11	97	7%
41-50%	19	116	13%
51-60%	7	123	5%
61-70%	4	127	3%
71-80%	2	129	1%
81-90%	9	138	6%
91-100%	12	150	8%
Total	150		100%

Question 3		Number	Percentage
1.	Yes	63	42%
2.	No	84	56%
3.	Cannot say	3	2%
Total		150	100%

Question 4	Number	Percentage
1.	40	13%
2.	55	18%
3.	77	26%
4.	22	7%
5.	99	33%
6.	7	2%
Total	300	100%

Question 5		Number	Percentage
1.	Yes	39	26%
2.	No	96	64%
3.	Cannot say	15	10%
Total		150	100%

Question 6	Number	Percentage
1.	7	5%
2.	85	57%
3.	55	37%
4.	3	2%
Total	150	100%

Question 7	Number	Percentage
1.	49	33%
2.	30	20%
3.	27	18%
4.	13	9%
5.	4	3%
6.	1	1%
7.	1	1%
8.	25	17%
Total	150	100%

Question 8	Number	Percentage
1.	44	29%
2.	35	23%
3.	21	14%
4.	20	13%
5.	1	1%
6.	2	1%
7.	0	0%
8.	27	18%
Total	150	100%

Question 9		Number	Percentage
1.	Yes	132	88%
2.	No	8	5%
3.	Cannot say	10	7%
Total		150	100%

Question 10	Number	Percentage
1.	30	20%
2.	34	23%
3.	36	24%
4.	8	5%
5.	42	28%
Total	150	100%

Question 11	Number	Percentage
1.	31	21%
2.	14	9%
3.	15	10%
4.	49	33%
5.	41	27%
Total	150	100%

Question 12	Number	Percentage
1.	19	6%
2.	75	25%
3.	83	28%
4.	22	7%
5.	93	31%
6.	8	3%
Total	300	100%

Question 13	Number	Percentage
1.	20	13%
2.	60	40%
3.	41	27%
4.	24	16%
5.	5	3%
Total	150	100%

Question 14	Number	Percentage
1.	49	33%
2.	101	67%
Total	150	100%

Question 15	Number	Percentage
1.	48	32%
2.	13	9%
3.	41	27%
4.	45	30%
5.	3	2%
Total	150	100%

Question 16	Number	Percentage
1.	50	33%
2.	84	56%
3.	16	11%
Total	150	100%

Question 17	
Average increase	31%

Question 18	
Average decrease	34%

Question 19, part 1	
Average overvalued	17%
Average undervalued	21%

Question 19, part 2	Number	Percentage
1.	9	6%
2.	77	51%
3.	36	24%
4.	28	19%
Total	150	100%

Question 20	
Average Generalindex	118,7

Question 21	Number	Percentage
1.	4	3%
2.	84	56%
3.	59	39%
4.	3	2%
Total	150	100%

Institutional Investors

Sex	Number	Percentage
Male	41	87%
Female	6	13%
Total	47	100%

Age	Number	Percentage
1	2	4%
2	31	66%
3	11	23%
4	3	6%
5	0	0%
Total	47	100%

Question 1	
Average long-term	63%
Average short-term	37%
Total	100%

Question 2		Number	Percentage
1.	Yes	16	34%
2.	No	31	66%
3.	Cannot Say	0	0%
Total		47	100%

Long	Number	Cumulative	Percentage
0-10%	6	6	14%
11-20%	4	10	8%
21-30%	2	12	3%
31-40%	3	15	6%
41-50%	2	17	3%
51-60%	4	21	8%
61-70%	3	24	6%
71-80%	17	41	42%
81-90%	2	43	3%
91-100%	4	47	8%
Total	47		100%

Short	Number	Cumulative	Percentage
0-10%	8	8	19%
11-20%	10	18	24%
21-30%	9	27	22%
31-40%	2	29	3%
41-50%	2	31	3%
51-60%	3	34	5%
61-70%	2	36	3%
71-80%	6	42	14%
81-90%	3	45	5%
91-100%	2	47	3%
Total	47		100%

Question 3		Number	Percentage
1.	Yes	7	15%
2.	No	39	83%
3.	Cannot say	1	2%
Total		47	100%

Question 4	Number	Percentage
1.	18	19%
2.	14	15%
3.	23	24%
4.	16	17%
5.	18	19%
6.	5	5%
Total	94	100%

Question 5		Number	Percentage
1.	Yes	27	57%
2.	No	18	38%
3.	Cannot Say	2	4%
Total		47	100%

Question 6	Number	Percentage
1.	8	17%
2.	29	62%
3.	7	15%
4.	3	6%
Total	47	100%

Question 7	Number	Percentage
1.	32	68%
2.	6	13%
3.	3	6%
4.	0	0%
5.	0	0%
6.	0	0%
7.	2	4%
8.	4	9%
Total	47	100%

Question 8	Number	Percentage
1.	21	45%
2.	10	21%
3.	5	11%
4.	1	2%
5.	0	0%
6.	0	0%
7.	1	2%
8.	9	19%
Total	47	100%

Question 9		Number	Percentage
1.	Yes	45	96%
2.	No	0	0%
3.	Cannot say	2	4%
Total		47	100%

Question 10	Number	Percentage
1.	8	17%
2.	12	26%
3.	6	13%
4.	2	4%
5.	19	40%
Total	47	100%

Question 11	Number	Percentage
1.	6	13%
2.	4	9%
3.	2	4%
4.	28	60%
5.	7	15%
Total	47	100%

Question 12	Number	Percentage
1.	12	13%
2.	14	15%
3.	28	30%
4.	9	10%
5.	25	27%
6.	6	6%
Total	94	100%

Question 13	Number	Percentage
1.	21	43%
2.	8	17%
3.	11	24%
4.	7	15%
5.	0	0%
Total	47	100%

Question 14	Number	Percentage
1.	5	11%
2.	7	15%
3.	6	13%
4.	25	53%
5.	4	9%
Total	47	100%

Question 15	Number	Percentage
1.	26	55%
2.	21	45%
Total	47	100%

Question 16	Number	Percentage
1.	15	32%
2.	27	57%
3.	5	11%
Total	47	100%

Question 17	
Average increase	44%

Question 18	
Average decrease	46%

Question 19, part 1	
Average overvalued	3%
Average undervalued	25%

Question 19, part 2	Number	Percentage
1.	11	23%
2.	18	38%
3.	15	32%
4.	3	6%
Total	47	100%

Question 20	
Average Generalindex	113,78

Question 21	Number	Percentage
1.	1	2%
2.	13	28%
3.	31	66%
4.	2	4%
Total	47	100%