

Henry Montgomery

The Financial Crisis – Lessons for Europe from Psychology

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Preface

The US-led financial crisis led to the worst global economic recession since World War II. In the aftermath, a vast amount of analysis of the causes and consequences of the financial crisis has been carried out by economists, with the usual emphasis on greed and lack of trust. The politicians, for their part, have executed a sizable number of reforms at an extremely rapid pace, mainly focusing on regulation and supervision.

This research report takes this analysis one step further by examining the psychological explanations for the financial crisis. This report explores the cognitive bias behind the decisions made by economic professionals and lay people in the financial markets, and shows how psychological knowledge can lay the groundwork for reforms designed to safeguard sound economic development in the future. Instead of using regulation and control, the author wants to improve the quality of economic decision-making by suggesting a number of steps. Among them, an increased financial education, transparency of financial products and reformed economic forecasting will be mentioned.

This research report is part of a research programme regarding the long-term effects of the economic crisis, encompassing a number of studies reflecting various aspects of the crisis. With this report, we are very pleased to present the very first SIEPS publication within the field of psychology. By issuing the report, SIEPS is striving to provide further insight into the functions of the financial markets and to make a contribution to both the academic and popular debate on how to prevent financial crises in the future.

Stockholm, February 2011
Jörgen Hettne
Acting Director

SIEPS carries out multidisciplinary research in current European affairs. As an independent governmental agency, we connect academic analysis and policy-making at Swedish and European levels.

About the author

Henry Montgomery is Professor of Cognitive Psychology at Stockholm University. His research interests include cognitive processes and structures in decision-making and judgment both in single individuals and in interaction between individuals and groups. He has participated in several multidisciplinary projects in these areas involving economists, philosophers, political scientists and medical doctors. His recent research includes studies in collaboration with economists on cognitive determinants of attitudes towards free trade in goods and services with low-wage countries (see Calmfors et al, Sieps report 2009:6). He has developed an educational programme in economic psychology at Stockholm University which is to be continued at Södertörn University, Sweden.

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Executive summary

This report discusses how psychology can shed light on the recent global financial crisis. The aim is to show how psychological knowledge can lay the groundwork for reforms (rather than commenting on specific reforms) that could mitigate future financial crises in the EU area.

Academic psychology has accumulated evidence for the existence of two modes of cognitive function. There is an *intuitive mode* (System 1), in which people make judgments and decisions quickly and automatically, and an *analytic mode* (System 2), which is deliberate and slower. Both systems may appear rational or irrational depending on the context in which they operate and also depending on how rationality and irrationality are defined. This means that it is possible to distinguish between four modes of cognitive function by combining System 1 and 2, respectively, with rationality or irrationality, or more precisely with an adaptive or maladaptive mode of cognitive function.

Adaptive intuitive (System 1) mode of cognitive function. System 1 thinking sometimes has good contact with reality in two different types of contexts. On the one hand, by having access to many thousands of patterns stored in long-term memory, System 1 thinking can quickly and automatically recognize and evaluate different objects. The ability to do so is an important ingredient in true expertise, including in the financial market. On the other hand, by using fast and frugal rules, laypersons may have an advantage over experts in utilizing the most important dimensions in the environment for making quick and relatively accurate judgments.

Maladaptive intuitive (System 1) mode of cognitive function. System 1 is associated with a local here-and-now oriented mode of thinking, where everything that is outside the focus of attention is less real in some sense. This is true both for risk judgments and for how we evaluate and integrate information (prospect theory). In addition, System 1 may fool people – all of us, independent of our level of expertise – into seeing meaning where there is no meaning. We become “fooled by randomness”, as nicely expressed by the economist Nassim Taleb. These biases lead to overconfidence and are strengthened by a general confirmation bias. As a result, people, again including both professionals and laypersons, did not

see the long-term dangers of the developments before the financial crisis and were seduced by the prospect of short-term gains. At the same time, there was probably a mismatch between commercial financial institutions and their clients with respect to the prevalence of certain cognitive biases, a mismatch that was exploited by the former and fuelled the imbalances that finally led to the outburst of the crisis.

Adaptive analytic (System 2) mode of cognitive function. The cognitive biases that contributed to the crisis could not have been removed simply by making people aware of them, although there exist some simple de-biasing techniques that may be useful. To remove the biases more thoroughly it is necessary to build up a new culture, one that favours System 2 thinking. In such a culture individual differences in cognitive styles should be recognized.

Maladaptive analytic (System 2) mode of cognitive function. Maladaptive System 2 thinking boils down to an excessively heartless and more or less immoral kind of rational thinking, which obviously occurred to a certain degree – including a few spectacular cases – during the financial crisis.

The driving force of the financial crisis was factors that operate on a collective level. Before the crisis occurred, there was a relatively long period with an increasing number of actors running in parallel, a development that inflated the financial bubble. Typically such a development is described as herding behaviour. However, herding behaviour alone cannot explain the development of the crisis. It cannot explain the remarkable synchronization of behaviours of different groups of people that, as a result of a lack of competition between different views, led to a shared but misguided reality that involved seeing private homes as money machines and viewing CDO bonds as profitable financial instruments in which the risks had been balanced out in a sophisticated way. The growth of the financial bubble accelerated as a result of an increasing prevalence of ‘groupthink’, which emerges as a result of social identifications uniting parties that earlier had opposing interests, the emergence of salient norms and low self-efficacy. Groupthink resulted in the suppression of dissent, group polarization (implying that groups take greater risks than individuals), and self-censorship, which in turn resulted in an illusion of consensus.

The explosive bursting of the financial bubble was elicited by a rapid destruction of trust all over the world, not least in Europe. The parallel course of diverse actors was replaced by antagonism. A more critical attitude (in line with System 2) took over shaping a “moment of truth”, which created a possibility for taking measures against future crises. Distrust can be allayed and trust recovered by persons talking to each other, which indeed occurred after the crisis, to a large extent involving politicians within and between countries.

The different phases of the financial crisis can be seen as illustrating three different types of relationships between the individual and the collective level: The superbiased hyperindividual, where individual biases are added up on a collective level (the inflating of the financial bubble), the scattered collective (the bursting of the financial bubble), and the well balanced collective (the goal in attempts to restore the economy after the crisis). The present paper, I wish to emphasize, gives a cognitive account of the financial crisis rather than a non-cognitive account based on emotions and herding behaviour alone, where the importance of shared reality is neglected.

The financial crisis has also been regarded as a crisis for economic forecasting. I have used forecasting data from Oxford Economics to find possible cognitive explanations of the failure to predict the crisis in Europe as well as in the USA. It appears that the forecasting failure was due to a general inability to predict more than one year ahead.

This report concludes that future crises could be counteracted by stimulating a positive spiral in which people develop their own thoughts, feelings and behaviour by influencing and being influenced by the economic environment. This goal cannot be attained by regulation alone. The following policy measures are recommended: (1) Governments and governmentally controlled companies as well as public sector organizations should provide a good example of appropriate economic conduct in their own behaviour. (2) Economic forecasts should be delimited and replaced by more openness to “black swans”, which implies taking seriously that the real economy in fundamental aspects is intrinsically unpredictable. (3) Innovative research in behavioural and financial economics should be stimulated. Several European countries provide sources for collecting

valuable field data. (4) Measures should be taken to increase people's understanding of financial matters and the private economy, including better awareness of risks for being susceptible to biases in their economic decisions. (5) A development should be stimulated that increases the transparency of financial products. Regulation may not be the primary road in such a development. Ideally, transparency should become an important factor in the competition between banks and financial companies. An example from a recent EU directive concerning rules for transparent information about investment products is critically discussed.

Finally, a utopian view is given of the economic life in a fictive country that has developed in line with the five recommendations described above.

1 Introduction

In the autumn of 2008 the most dramatic worldwide economic crisis since the great depression of the 1930s broke out in full strength. At the present moment, there exists a widely shared understanding of the processes that built up the crisis, how it exploded, how governments all over the world fought against the crisis, and, finally, how a more or less fragile recovery has taken place. This story of the crisis is mainly an economic one. In particular it is a story of financial crisis. It is a story of an economy that was increasingly dependent on illusory money based on borrowing rather than on the production of goods and services (the real economy), of the economic imbalances that this kind of economy caused, and of the increasingly complex financial savings products that helped to keep this economy going until the bubble burst. One writer has described the crisis as a perfect storm (Norberg, 2009), where a unique combination of economic factors led to a fast and dramatic chain of events that rapidly spread around the world.

The goal of the present report is to go beyond the economic level in an attempt to find a deeper understanding of the financial crisis. More specifically, I aim to investigate how psychology can shed light on the financial crisis. To what extent is it possible to explain the crisis in terms of general psychological factors that also apply to other social worlds outside the economic world? In the present paper, I will attempt to answer this question, with some focus on the European scene.

Other scholars have already attempted to find psychological explanations for the crisis (e.g., Barberis, 2009; Gärling et al., 2010; Kahneman and Taleb, 2009). In these explanations, the focus has been on the shortcomings and limitations of the human mind. This is also an important ingredient of the account offered in this paper. However, my aim is broader than those I have found in the relevant literature. In this paper, my ambition has been to offer a coherent account of how people's minds work on both an individual and a collective level, in crises as well as in successful adaptation to the environment, and from this to shed light on why and how the crisis developed. In addition, the paper includes a case study in which forecasts of the European and American economy before and during the

crisis are analysed in terms of the psychological framework given in this paper. The paper ends with a number of conclusions of how psychology can be used to counteract future economic crises, especially in Europe.

In the wake of the financial crisis, a plethora of reform proposals and regulations have been presented within the EU community. The number of reforms that have been decided since the crisis broke out is larger than the total number of reforms since the euro cooperation started in 1999 (Atkins and Ward, 2009). To a large extent these reforms concern regulation and control. The aim of this report is not to comment on specific regulations, but rather to show how psychological knowledge can lay the groundwork for reforms, particularly within the EU, that facilitate people (economic professionals as well as lay persons) to understand how they should act to safeguard sound economic development in the future.

How then does psychology come into the picture? All the economic events that are part of the story of the financial crisis are founded on human behaviour. It is people who invest, speculate, borrow, and lend, who buy and sell. Economic behaviour is a psychological microcosm, to which all fields of psychology could be applied. As in people's worlds in general, people who act in the economic world understand the world around them in line with general psychological principles (cognitive psychology), they are driven by certain motives and emotions (motivational and emotion psychology), they cooperate or compete with each other, and trust or distrust each other (social psychology). Individual differences in these respects are also important inasmuch as people who are active in the financial world may hold particular values and attitudes (Sjöberg and Engelberg, 2009).

The present paper illustrates the advances made in the field of behavioural economics, and the closely related field of behavioural finance. In these fields psychological theories are used to interpret and predict economic behaviour in general, and behaviour in financial markets more specifically. Since the 1960s, models from cognitive psychology have played a large role in this area. An important milestone was the prospect theory, which was formulated by the psychologists Daniel Kahneman and Amos Tversky (1979). This theory led to the award of a Nobel Prize to Daniel Kahneman in 2002. (Tversky met an untimely death in 1996.) Prospect theory, which

will be described in some detail in this paper, explains why people are not rational utility maximizers, as is assumed in classic economic theory (rational choice theory). In recent decades behavioural economics and related fields have incorporated theories from motivational and social psychology. Today both psychologists and economists work in the field. Behavioural and financial economics represent a true symbiosis between economics and psychology. Prominent economists in this field include such well known names as George Akerlof (Nobel Prize in 2001), Robert Shiller, Richard Thaler, and George Loewenstein, as well as researchers in behavioural game theory, such as Ernst Fehr and Werner Güth. The psychologists are primarily active in research on judgment and decision making, and include well known figures such as Max Bazerman, Daniel Kahneman, and Paul Slovic. In this paper I will also discuss research in cognitive and social psychology that does not seem to have been counted as behavioural economics, but is still clearly relevant for the field.

An underlying assumption in this paper is that it is fruitful to view people's behaviour (psychology) and the world in which the behaviour takes place (here the financial world) as one coherent system (cf. Magnusson, 2001). Especially, the efficiency of people's behaviour must be understood in relation to how the surrounding world functions. Efficiency results from a successful match between behaviour and the structure of the world in which the behaviour takes place. A behaviour that is efficient in one type of world may be inefficient in another. Just imagine how a person in prehistoric times would succeed in our society if he or she interpreted the world and behaved in it as he or she is accustomed to behave. This does not mean, however, that people today are freed from their "evolutionary legacy". On the contrary, in some respects, today's humans are exactly the same as they were 10,000 years ago. We belong to the same species, with the same bodies and the same brains. Meanwhile, however, the surrounding world has changed dramatically. A tremendously complex man-made world has evolved, a world where every one of us participates and affects the situation of people all over the world. This new world is largely an economic one. As a result of globalization, people's economic behaviour (buying, selling, saving, investing, borrowing, lending) in one region of the world has worldwide economic consequences. Do people act efficiently in this complex world? It is easy to find evidence for a positive answer to this question. In many respects the modern economic

world would be a paradise for the prehistoric person. Thus, in this man-made world, people typically seem to interact with the surrounding world in an efficient way. However, when an economic bubble bursts, people wake up and experience a clear mismatch between their expectations and what is actually happening. The world has not functioned as expected. To understand this mismatch it is necessary to analyse how people's minds work in relation to how the economic and financial world actually works.

2 A two-systems view of how the human mind works – two types of adaption and maladaption to economic realities

Cognitive psychology is concerned with the interface between the mind and the surrounding world. People have experiences and general ideas which they use in order to adapt to constraints and possibilities in the external world. We have already noted how the external world has become more and more complex over thousands of years of human history, with a dramatic acceleration in recent years. At the same time, people can extend their minds with enormously complex tools, such as computers and internet-based technologies, and by using increasingly more sophisticated scientific theories. How is it possible that the brain seems to master this perpetually increasing complexity? Are there really limits to the human brain's capacity to do so? Let me start with the first question.

The human brain is the result of an evolutionary process that started many millions of years ago. It is capable of taking care of huge amounts of information. It consists of approximately 20 billion neocortical neurons. Each of these neurons is connected to an average of 7,000 other neurons (Drachman, 2005). Thus, roughly speaking, the human brain can store something like 100 terabytes of information, which corresponds to the storage capacity of perhaps 100 times the capacity of the hard disk memory of an ordinary laptop computer. This means that the human brain has a large capacity for storing vast amounts of practical and theoretical knowledge, which may seem to be sufficient for handling the amounts of information that people face in our society.

However, the human brain is not a computer. It is part of an organism in flux, integrated with a body that acts and interacts with the surrounding world, which in turn consists of other acting and interacting human beings. Through verbal and other types of communication the seven billion human beings on earth form a super-organism, which many sciences try to understand. One of these sciences is economics.

In this world each human being tries to understand what is going on and uses his or her understanding as a basis for deciding what to do. Sometimes it is necessary to understand and evaluate a situation quickly and automatically in order to interact efficiently with a dynamic environment. Sometimes there is more time for reflection and analysis, which in turn could be used for improving one's capacity for efficient acting. Academic psychology has accumulated evidence for the existence of two modes of cognitive function which correspond to these two types of cognitive modes. There is an *intuitive mode* in which people make judgments and decisions quickly and automatically, and an *analytic mode*, which is deliberate and slower. Kahneman (2003) calls these modes System 1 (intuition) and System 2 (reason). Other researchers make a similar distinction between an experiential mode (Epstein, 1994, 2003; Slovic et al., 2002) and a rational (Epstein 1994, 2003) or analytic (Slovic et al., 2002) mode.

As a rule, Systems 1 and 2 cooperate very effectively with each other. However, the balance between the modes is delicate and is always dependent on the current situation within and around the acting individual. Sometimes, quick and intuitively based action is needed, for example, in an auction. However, in order to work well it is necessary that the intuition is based on relevant knowledge that has been acquired initially through System 2. Moreover, when using System 1 the individual should be prepared for the possibility of using System 2, for example, if something unexpected happens that calls for a deliberate analysis (e.g., that something may be wrong in a business deal).

Behavioural economics and finance have largely been concerned with the functioning of System 1. Classic economics, with its idea of the rational economic actor, seems to be in line with the analytical or rational information processes associated with System 2. In this way, behavioural economics can offer a new perspective on economic behaviour by investigating the role of System 1 thinking in economic behaviour. Typically, it is then assumed that System 1, although an indispensable component in cognitive functioning, can lead to maladaptive biases in judgment and decision making. A massive amount of research within this tradition has generated a long list of behavioural phenomena that are at odds with economic rationality. Later, I will discuss these phenomena in some detail and also their relevance for the recent financial crisis.

Some scholars have pointed out that both systems may appear rational or irrational depending on the context in which they operate and also depending on how rationality and irrationality are defined (e.g., Kahneman and Klein, 2009; Slovic et al., 2002, 2004). This means that it is possible to distinguish between four modes of cognitive function by combining System 1 and 2, respectively, with rationality or irrationality, or more precisely with an adaptive or maladaptive mode of cognitive function. Let us see what this means.

2.1 Adaptive intuitive (System 1) mode of cognitive function

Only a small portion of the knowledge that is stored in our brains is consciously handled at a given moment of time. The remaining information is stored in what psychologists call the long-term memory. Here all our personal memories (episodic memory), our knowledge about the world in general (semantic memory) and the basis for various motor skills (motor memory) are stored. The semantic memory is primarily used for pattern recognition. Humans can recognize and categorize a very large number of different stimulus patterns, for example, the many thousands of words in one's native language, or the thousands of different human faces that a typical adult person can recognize. Research shows that people can store up to 50,000 patterns within a given domain (Hirsch, 1987). A literate person has about 50,000 words in his or her vocabulary. Similarly, a chess champion has access to 50,000 pre-stored positional patterns. It can be speculated that an experienced real estate broker or stock analyst has stored a similar number of patterns in their long-term memories. To build up this vocabulary of pre-stored patterns and the ability to use them takes much time. As a consequence, it takes many years and daily hours of deliberate training to build up the knowledge and proficiency needed to become an outstanding performing expert in many areas such as mathematics, music and chess (Ericsson, Roaring and Nandagopal, 2007).

Acquired expertise in a domain is largely a question of being able to recognize many patterns. A top-class chess player only needs to look quickly at a chess position produced by a less skilled chess player in order to decide which move to make (Simon and Chase, 1973). He or she does not need to make a conscious System 2 analysis of the chess position, but can instead recognize given chess positions as corresponding

to a specific pattern that is already stored in his or her long-term memory and associated with making a particular chess move. This would be an example of the type of intuitive or automatic judgments that correspond to System 1. In the same way a used car dealer or a stock analyst can recognize many stimulus patterns and immediately make a judgment that is associated with the recognized pattern. In certain areas, pattern recognition expertise is very efficient. For example, experienced judges of livestock can base their judgments on stimulus patterns that take eleven dimensions into account and, consequently, produce highly reliable and valid judgments (Phelps and Shanteau, 1978). Shanteau (1992) reviewed evidence showing a high degree of reliability and validity for expert judgments from astronomers, test pilots, soil judges, chess masters, physicists, mathematicians, accountants, grain inspectors, photograph interpreters, and insurance analysts. In many of these areas, perhaps all of them, the expertise is possible because of the expert's access to a large number of patterns that match different stimulus patterns in the external world. To a large extent this is probably true in the financial world where savings products, financial reports, business ideas etc. are sorted into many categories that are quickly recognized by the expert. The ability to store and recognize many patterns may be one of the explanations why certain professionals in the financial sector, such as accountants and insurance analysts, have been found to be highly skilled. In line with this finding, there is evidence that highly specialized stock investors perform better than chance, although only slightly better, as compared with other groups of investors (Ericsson, Anderson and Cokely, 2005).

This access to a very large number of patterns within one's area of expertise may explain why economic experts can exhibit a seemingly impressive ability to analyse economic events *after* they have occurred. Among the perhaps 50,000 pre-stored patterns, there may exist at least one that fits quite well with what actually has happened. This ability reinforces an impression of true expertise. However, access to many pre-stored patterns does not necessarily entail a corresponding ability to predict future economic events. We will return to this later.

More recent research indicates that the pattern-matching mechanism may guide decision making via affectively loaded images, or, to use a more popular expression, through gut feeling (Slovic et al., 2002). To account

for how this process works, the neurologist Antonio Damasio (1994) has offered the *somatic marker* hypothesis. Somatic markers stand for bodily grounded affects that are linked to images that are evoked in a decision situation. The affects may be positive or negative and have their links to specific images that have been acquired through lifetime learning. When a possible future outcome is linked to a negative image, it signals alarm, implying that the outcome should be avoided. If the image is positive, it transmits an incentive to act in support of the outcome. The somatic marker hypothesis explains experiences like “I would not buy a used car from this man” or “I simply feel that he or she can be trusted”. According to Damasio’s research (Bechara and Damasio, 2005; Damasio, 1994) somatic markers are indispensable behavioural guides that prevent people from exposing themselves to disastrous outcomes.

A paradoxical and debated finding in research on expertise is that sometimes it may be better to know less than to know more. The reason is that simple heuristic rules, which do not require much knowledge, sometimes yield more valid predictions than do more complex rules. This is particularly true for the so-called *recognition heuristic* (Goldstein and Gigerenzer, 2002). A person with little knowledge may use the fact that he or she recognizes a limited number of objects as a cue for evaluating the objects. In the stock market this would imply buying stocks that one *recognizes*, such as stocks in companies well known in one’s own country (Gigerenzer et al, 1999; for studies questioning the validity of this heuristic, see Andersson and Rakow, 2007; Boyd, 2001). This heuristic may be successful because recognized objects tend to function better than non-recognized objects. For example, well-known companies may be more reliable simply because they have proved to be reliable and successful for a long time and, as a result, have become well known.

Another simple heuristic which could be used by non-experts easily and be surprisingly effective is to prefer an object that deviates from other objects in the most important attribute that differentiates the particular object from other objects. This is called the *take the best rule* (Gigerenzer and Goldstein, 1996). For example, consider the choice of a CEO for a big company. Let us say that one and only one candidate has an outstanding performance history. In that case, it may be wise to select this candidate and neglect other factors that may favour other candidates, such as sociability,

charisma, age, social background etc. A financially more relevant example is the use of systematic stock investment strategies that are based on the idea of using just one feature, such as the P/E ratio or momentum, as a basis for decisions for choosing stocks to sell or buy. There is evidence that such strategies outperform a comparable stock index (Anderson and Brooks, 2006; Jegadeesh and Titman, 1993, 2001; Karlsson et al., 2007).

The decision rules discussed above are examples of so-called fast and frugal decision rules. They are easy to apply and hence fast, they use a limited amount of information and hence frugal, and they are sometimes very effective. The reason for their effectiveness is that they exploit relevant information and ignore information that is misleading. The fast and frugal rules may be associated primarily with System 1 thinking, since they could be used automatically with a minimum of conscious thinking.

Although some fast and frugal rules could also be used by experts, they imply that expertise is no guarantee of being smarter than others. In contrast to fast and frugal rules, expertise involves the danger of over-utilizing knowledge to see meaning where in fact there is no meaning. Unwarranted trust in expertise among actors in the financial market may be one cause of the recent financial crisis, a theme that will be further discussed later in this report.

Thus, System 1 thinking is sometimes veridical for two different reasons. On the one hand, by having access to many thousands of patterns stored in long-term memory, System 1 thinking can quickly and automatically recognize and evaluate different objects. The ability to do so is an important ingredient in true expertise, including in the financial market. On the other hand, by using fast and frugal rules lay persons may have an advantage over experts in utilizing the most important dimensions in the environment for making quick and relatively accurate judgments.

System 1 implies a rationality that can be defined in terms of the degree of matching between mind and reality. We have seen that this matching can be successful. However, System 1 can also lead to systematic differences between mind and reality. This issue is discussed in the following section. We will examine how these inconsistencies may explain economic imbalances such as the recent financial crisis.

Summing up implications for the financial crisis. A lesson from the financial crisis is that expertise in financial matters is no guarantee of better economic decisions. Financial expertise may even lead to developments that have negative consequences, as is exemplified by the sophisticated but “toxic” investment products that contributed heavily to the crisis. Knowledge about how System 1 thinking works facilitates distinguishing true expertise from alleged expertise. Experts are good at pattern recognition, which is probably true also for financial experts and other professional economic actors. However, experts may also recognize patterns that simply do not exist or lack validity, which in turn may give an advantage to the lay person’s more simple-minded but perhaps less biased judgments. Better knowledge of the good and bad sides of expertise as well as having limited knowledge might have mitigated the development of the crisis.

2.2 Maladaptive intuitive (System 1) mode of cognitive function

We have already discussed how System 1 thinking is associated with using simple heuristics for making inferences about the external world. More recently, researchers have shown how simple rules can work surprisingly well. Decades ago, Tversky and Kahneman (1974) discussed a number of heuristics that people use for making judgments under conditions of uncertainty. They pointed out that these heuristics could serve adaptive functions, but also that they are associated with systematic errors in how different types of information are evaluated (see Kahneman (2003) for a more recent discussion of this issue). That is, people tend to overreact to certain types of information and underreact to other types, and since System 1 largely functions unconsciously, people do not realize that they are making these errors. This is also true for professionals and experts in the economic and financial world, as will be illustrated below (for a more detailed account of cognitive biases with a focus on the stock market, see Wärneryd, 2001). In the following I will first discuss the three classic heuristics with their associated biases that were described by Tversky and Kahneman (1974). After this a number of additional cognitive biases will be discussed and related to the financial crisis.

Availability. When people judge the probability that an event will occur, they are guided by the psychological availability of examples of this

event. That is, the easier it is for a person to think of examples of an event, the more probable the person thinks it is that this event will occur again in some form. This is often a sensible heuristic. For example, if you can easily think of many persons who have recently had the flu, it is reasonable to expect that you yourself will get the flu. The availability heuristics works well when the psychological availability corresponds to an objectively existing relationship to facts in the external world. In the flu contagion example, there exists such a relationship. The ease of finding examples of infected people is normally related to the actual probability that a given person will be infected.

However, sometimes availability does not match the corresponding objective probability. This is because availability is sometimes affected by factors that are unrelated or even negatively related to the actual probability. When dramatic or vivid events occur close in time and space to the present situation, people are very open to the possibility that something similar will happen again, even if the objective probability for this is small. As I write these lines (Sunday, 9 May 2010), stock prices have fallen dramatically in the last week. On Friday night (7 May), when the stock exchange closed, I feared that the stock market fall would continue and felt inclined to sell some of my shares. Now, when some time has passed, I feel more optimistic, although the information from the stock exchange market is the same and the problems that led to the stock market fall are also the same. It is just that time has passed. In the same vein, immediately after the sinking of MS *Estonia* in September 1994, the numbers of passengers on ferry routes that were close to the route of MS *Estonia* in the Baltic Sea decreased dramatically, but the numbers returned to normal after some time (Sandström, 2004). Probably, the possibility of a new catastrophe was particularly available to prospective passengers on these routes immediately after the disaster, and less so on routes that were further away. In fact, however, the objective probability of a new catastrophe on nearby routes should have been lower just after the sinking of MS *Estonia* because of all the extra security measures that were taken on these routes after the event.

The availability bias may operate together with a tendency to be over-optimistic about the future, for example, with respect to investment decisions (Moore et al., 1999). Thus, when times are good, availability

and optimism work in the same direction, whereas when times are bad the two biases may cancel each other out. A recent study by Lee, O'Brien and Sivamakrishnan (2008) showed that forecasts made by financial analysts exhibited exactly this pattern. It was found that the current state was overweighted in growth forecasts, which lead to overoptimistic forecasts in good times and more accurate forecasts when the economy was in a relatively poor state.

A striking property of the stock market is that dramatic shifts up and down occur which seem difficult to explain from a rational point of view. However, as a rule, after the shifts have occurred it is often obvious what caused the shifts. It is easy to see how certain news will immediately affect stock prices (cf. deBondt, 2008). It could be new unemployment statistics, unexpectedly positive or negative reports for a specific company, or as had happened recently when writing this report, news showing Greeks demonstrating against cut backs decided by their government. The stock market reactions themselves become good or bad news that amplify the effects of the original news. Obviously, these news reports are simultaneously *available* to many of those who trade in the stock market, and it seems that the availability, once it is there, affects the stock prices too strongly. Although the available events as a rule are economically relevant, they strongly influence the prices of shares that have little connection with the events that have occurred. For example, during the four days when the Greek crisis culminated, the share prices of the Swedish Internet bank Avanza, which has little connection with Greek problems as far as I know, plummeted by 19 % (to be compared with a drop of 11 % in the OMXSPI index for the Swedish stock market). In the following three days the price of Avanza shares by and large returned to the level it had before the drop. The overweighting of easily available evidence implies what economists call overreaction. The opposite phenomenon is underreaction, neglecting relevant information that is less available. There is evidence that overreaction on financial markets tends to be preceded by periods of underreaction (Schleifer, 2000). That is, up to a certain point investors tend to neglect news pointing in the same direction that accumulates over time, until the impact of the accumulated news becomes so strong that the market “explodes” in an overreaction. This has been shown in statistical analyses of how security prices react to news that accumulates over time (Barberis, Shleifer and Vishny, 1998). In other words, “out of sight out of

mind” may also be true on the financial market during certain periods. For example, the economic problems in Greece built up over many years, but apparently this had little effect on the European stock markets until the “explosion” occurred on 4–7 May 2010. To some extent this development was hidden by distorted economic statistics, but the underlying problems in Greece were nevertheless widely known, as is evidenced by several warnings issued by the European Commission long before the crisis erupted (Pouskari, 2010).

It seems reasonable to conclude that the availability bias contributed heavily to the recent financial crisis. The crisis was the result of developments that took place over many years. These problems were well known and debated in the media, but the fact that the economy developed well year after year seems to have drawn more attention than the warnings issued by many economists. Thus, the “here and now” looked fine. Steadily growing stock prices indicate that people’s confidence in the economy was unbroken all over the world until late 2007, when stock prices (see., e.g., the Dow Jones index) started to go down, and then they plummeted downwards in September 2008 when Lehman Brothers collapsed. The deep dip in stock prices, which reached its bottom in early 2009, was followed by a year of gradually increasing stock prices, especially on American and European stock markets. Again, we may have an example of an underreaction that was followed by an overreaction (the dip in 2008-2009). Obviously, the strong reactions to the collapse of Lehman Brothers, as well as to some other dramatic events, aggravated the crisis by invoking a crisis of trust on the financial markets.

Anchoring and adjustment. In many situations people make estimates by starting from an initial value that is adjusted until a final answer is obtained. This is often a very reasonable heuristic. If I want to judge the height of the towers of the cathedral in Uppsala, I may start with a height that I know, say the height of the City Hall of Stockholm, which is 106 m. Then I adjust this height upwards a little since it appears to me that the towers of Uppsala cathedral are higher than the tower of Stockholm City Hall (the correct answer is 119 m).

However, there is evidence that people tend to make too small adjustments of the anchor, which entails that this heuristic will result in biased

judgments. For example, if asked to make an intuitive estimate of the product of $1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8$, most people will give an answer that is too low. The median estimate is 512 (Tversky and Kahneman, 1974), but the correct answer is 40,320. This is because people start by computing the first products and then make an intuitive adjustment upwards that is insufficient. This example becomes still more convincing if we ask people to estimate the product of the same series stated in the reverse direction, i. e., $8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$. In this case the answer will be higher (median = 2250) as a result of the higher value of the anchor (presumably 8×7), but it is still clearly lower than the correct answer.

In an economic context, insufficient adjustments to an anchor may be found when people estimate the long-term results of exponential growth functions, such as inflation, interest on loans, or economic growth. Research has shown that people grossly underestimate the correct answer in such tasks (Keren, 1983).

Insufficient adjustment may perhaps also explain why the fees of mutual funds have been found to play a minor role in people's fund preferences (Hvalgren, 2009), despite the fact that seemingly small variations in annual fees may lead to dramatic differences in the total fees paid over time. In general, it seems that people underestimate how much money it costs over time to make many financial transactions. This may be especially true for men. It has been found that men tend to be less successful than women simply because men are more active in the financial market and as a result lose more money on transaction costs (Barber and Odean, 2001). Perhaps if people, more than they do now, calculated costs and gains in the long run, they would become more careful to avoid activities that lead to economic bubbles. Perhaps all of us – ordinary people, professional actors in the economic world, politicians – would gain by thinking of financial transactions the way many of us think of climate effects. In this area, we have an intuitive understanding that a creeping development can lead to disastrous consequences in the long run.

One of Tversky and Kahneman's (1974) examples of insufficient adjustment is biases involved in the evaluation of conjunctive and disjunctive events. These two types of events are mirror images of each other. As an example of conjunctive events, consider the building of a

house within a certain time. To attain this end, a number of requirements must be fulfilled (e.g., raising sufficient money, suitable weather, building materials must be delivered in time etc.). To assess the probability of the house being finished in time, one may start with one of the events (the anchor) and then adjust the probability downwards when considering the probability of the other events (including unforeseen events). Typically, these adjustments are insufficient, which results in over-optimism with respect to the probability of finishing in time. Conjunctive events could always be reframed as disjunctive events, and vice versa. A disjunctive framing of the building example would be to estimate the probability that at least one of the requirements will *not* be fulfilled, which will be the same as estimating the probability that it will *not* be finished in time. Again the estimator will start with one of the events (anchor) and judge the probability that this event will not occur (presumably a low probability) and then adjust the probability upwards as other events are considered. And again the adjustments will be insufficient, which will result in an underestimation of the probability that the house will not be finished in time.

The conjunctive/disjunctive bias is obviously relevant for understanding why people in general (including economic experts) were so unprepared when the economic crisis became a financial storm. In retrospect, we can see that one event (the explosion of the subprime loans) had a decisive impact on the crisis, but it was not equally easy to see beforehand that exactly this consequence of the financial problems that worried people during 2007 and 2008 would play such a decisive role (see Section 4 below). Presumably, there are many possible bubbles in modern economies that could burst for several reasons. Beforehand it is not easy to know which bubble will burst for which reason. Thus, even if the *a priori* probability of one particular scenario leading to a crisis is low, there may be a high probability that *any* of a number of possible scenarios (of which many probably are not known) will be realized. However, the disjunctive/conjunctive bias results in underestimations of the probability that a crisis will occur as a result of any of many possible scenarios.

A possible example of the conjunctive/disjunctive bias may be found in a recent article in *Dagens Nyheter*, the leading morning newspaper in Sweden (*Dagens Nyheter*, 16 April 2010). The article was written in

response to worries about a growing housing price bubble in Sweden. In the article two economists argued against these worries by using the following argument (Borg and Pousette, 2010):

Summing up, we think there is convincing evidence that the price level of the housing market is well in line with the economic, political and social factors that can be assumed to influence it. It is never the case that one can completely rule out the possibility of a fall in prices. If the Swedish Bank increases the interest rates much more than expected, the prices will be pressed down. The same is true if the interest deduction is abolished or if the real estate tax is dramatically increased. But none of these measures seem likely at the present moment.

The authors seem to have taken for granted that if the probability is low for each event (including other unmentioned events), then the probability that any of the events will occur is also low, which seems to be a clear example of a possible disjunctive bias.

Another consequence of using the anchoring and adjustment heuristic is that the anchors selected may be totally irrelevant for the estimates, such as a number generated by a roulette wheel (Tversky and Kahneman, 1974). Just the fact that a number is at hand invites using it as an anchor for numerical estimates. I would like to argue that such a bias exists in economic forecasts. What the forecasters seem to do when making a new forecast is to *adjust* their most recent forecast upwards or downwards (see Section 4 below). A Google search on the words “adjust” and “forecast” gave 12 million hits. To legitimate using the previous forecast as an anchor it is necessary that this forecast is reasonably valid and unbiased. However, as already has been noted (Lee et al., 2008) and as also will be illustrated in a later section, this may be far from the truth. Add to this that adjustments tend to be insufficient. Hence the result of using an anchor and adjustment strategy is that biases in forecasts accumulate over time, especially for long-term forecasts where feedback comes after a long time.

Why not simply calculate a new forecast without basing it on the previous forecast? Why not avoid being disturbed if the new forecast deviates markedly from the previous forecasts even if not so much has happened since the last forecast? Perhaps more can be gained than lost by starting from scratch with fresh eyes every time a new forecast is made.

Representativeness. This heuristic is relevant when people assess the probability that a certain object A belongs to a certain class B, or that an event A originates from process B. According to Tversky and Kahneman (1974), in assessing such probabilities people “typically rely on the representativeness heuristic, in which probabilities are evaluated by the degree to which A is representative of B, that is, by the degree to which A resembles B” (p. 1124). Again this is a reasonable heuristic. For example, if I am looking for Swedes at an international conference I may look for people (A) whose appearance represents my idea of how a typical Swede looks (B). This might work well, but the heuristic may lead to misconceived probabilities if one does not take *a priori* probabilities into account, i.e., the probability that A belongs to B before I know anything about how similar A is to B. In the conference example, this probability would be the probability that a given person is a Swede if I have no idea of what Swedes look like, which would then simply be the proportion of Swedes out of all conference attendees. A bias associated with the representativeness heuristic is that people pay too little attention to the *a priori* probability. Representativeness takes over too much. To return again to the conference example, if the *a priori* probability that a person is a Swede is very low, say 0.001, then the probability that a person who looks Swedish in fact is a Swede will still be quite low. But I may forget this fact when I approach a Swedish-looking person, thinking, “He looks so Swedish that he must be a Swede”. Conversely, if a large majority of the persons at the conference are Swedes, then persons who do not look very Swedish will probably be Swedish even if I do not judge them to be.

The representativeness heuristic will be particularly biased if the *a priori* probability is zero or very close to zero. This is the case when people search for regularities in patterns that actually are completely random. It appears that humans have difficulty in understanding randomness. We are unable to generate truly random patterns (Falk and Konov, 1997). We see meaningful patterns everywhere, even where randomness is the rule. For example, we see patterns in the positions of the stars. We see the little bear, the great bear, the big dipper, but of course there are no bears or dippers in the sky. The hundreds of thousands of patterns that we have stored in our brains seem have a pervasive influence on our perception. They make it possible for us to see meaningfulness more than is correct – and so we do. This is usually good for our adaptation to the external world, but when we

see and believe in patterns that actually are not there, our skill in seeing meaningful patterns could be maladaptive.

An obvious example of pattern recognition in a random environment is the patterns that people see in stock price movements. It is well established in economics that stock price movements are unpredictable. This is referred to as following “a random walk”. Thus, today’s price movements do not predict tomorrow’s price movements (Maikiel, 1996). There seem to exist minor exceptions from this general rule, since especially momentum strategies (extrapolation of downward or downtrend trends) may be moderately successful in predicting stock prices for certain time intervals (Jegadeesh and Titman, 1993, 2001; Karlsson et al., 2007). But the rule is randomness, as is shown by zero or close to zero auto-correlations between successive price levels on the stock market (Barberis et al., 1998) and by the fact that the more people trade in the stock market the more they lose, because of higher transaction costs (Barber, Lee, Liu, and Odean, 2009).

However, observers of stock price movements do not see random patterns. They see meaningful patterns like a steady rise, reaching the bottom, being on a plateau etc. Thus, the observed patterns are seen as representative of meaningful categories (Maxwell, 2008). In addition, observers tend to experience stock price movements in terms of agency categories. Thus, the movements may be seen as living agents that want to reach a goal (e.g. “stock prices are rushing upwards”) or as dead objects that move in line with physical laws (e.g., “stock prices are falling like a stone”). Stock analysts’ writings are full of these metaphors. These metaphors are then used for making predictions. For example, when an agent metaphor is used observers find it more likely that the observed trend will continue (to reach the agent’s goal) as compared with when an object metaphor is used (Morris et al., 2007).

It may be speculated that, if people fully understood the role of randomness in financial markets, they would act in a way that would diminish the outbreak of a crisis like the one that occurred recently. They would trade less because each transaction costs money and it is very uncertain that it will lead to better investments. When taking risks they should know what they are doing (e.g., by having the metaphor of a roulette wheel in mind), which probably would lead to an overall reduction in their risk taking. As

a rule, they should think prospectively rather than reacting to historical patterns. They should be very sceptical towards financial advisers since as a rule these persons do not know more about future monetary gains or losses than anyone else does. Presumably, all these behaviours would lead to more stable developments on the financial market, which possibly would decrease the risk that explosive bubbles will emerge.

Other heuristics and biases. A number of additional judgmental heuristics and biases have been identified in the literature. Most of them can be related to the heuristics and biases discussed so far.

The *affect heuristic* (Slovic et al., 2002, 2004) is based on the observation that affect frequently dominates people's experiences of the world. Stimuli evoke positive or negative affects in our minds before we make a more detailed cognitive analysis. Thus, affect comes first (Zajonc, 2001). The affect heuristic implies that evaluative judgments of a given object are guided by an immediate positive or negative affective reaction to the object as a whole. A positive affect will make positive aspects (e.g. benefits) of the objects to come in the foreground, whereas a negative affect will strengthen negative aspects (e.g. risks). Affects could be evoked automatically by associations to an affect "pool" in the evaluator's mind. This pool consists of images that are tagged or marked to varying degrees with an affect. Affect could also result from sheer familiarity with an object. As a rule, people like familiar objects more than unfamiliar ones (Zajonc, 2001). This phenomenon may be associated with the *endowment* effect (Kahneman et al., 1990; Knetsch, 1989), which implies that people require a higher price for objects that they own than the price for which they bought the objects. In the financial market this would lead to a reluctance to sell financial assets once they have been acquired, which could also be referred to as a *status quo* bias.

The affect heuristic is often very useful. As already discussed, affective reactions may be associated with gut feelings that are often indispensable guides for our actions (Damasio, 1994). However, as exemplified above, the affect heuristic may lead to biased perception and to behaviours that stand in the way of an efficient market (the endowment effect and the status quo bias).

The *hindsight bias* (Fischhoff, 1975) corresponds to a tendency to exaggerate the likelihood that one knew in advance that a particular event would occur. We may talk of an “I knew it all along” bias. This bias may be seen as a variant of the availability bias. What actually occurred is more available in one’s mind than what did not occur and, hence, it will be close at hand to believe that one knew all along that the event would occur.

The hindsight bias is an obstacle to learning from one’s mistakes. If, after having failed to predict an event, people nevertheless think that they made a correct prediction, they will never realize what went wrong in their failure to predict the event. If an investor, after having lost money on an investment, erroneously thinks, “I knew it all along, but I failed to do something about it”, the door will be open for repeating the mistake that led to the economic loss.

Another bias that may also be related to the availability bias is *hyperbolic discounting* (Loewenstein and Thaler, 1989), which implies that preferences are time inconsistent. This bias concerns how the evaluation of an object or a quantity (e.g., a certain sum of money) is dependent on how soon the evaluated object or quantity will be at hand. As a rule it is better to receive 1000 SEK now than 1000 SEK in one year’s time. How much does the value decrease as it becomes more distant in time? Classic economics prescribes that the decrease in evaluation should follow an exponential function, which means that the value of the object will decrease by a constant percentage per time unit. However, both humans and animals have in common that the value is experienced to decrease in line with a hyperbolic function, which means that it decreases faster than prescribed in the near future and then levels out. Thus receiving something now or very soon instead of waiting some time is worth more than it would be according to an exponential function. This has the following paradoxical consequence. Which would you prefer – to buy a mobile phone now, for say 300 €, or wait another month to get a discount, say 10 % off the price? Most people would probably prefer to pay a little bit more and get the mobile phone now. Now let us change the question. Which would you prefer – to buy a mobile phone one year hence for 300 € or wait another month and get the same discount as in the previous case? Now many more people would prefer to wait another month instead of choosing the earlier

option as they did in the former case. Such a *preference reversal* is clearly a bias since it is at odds with the assumption of exponential discounting which is posited by economic theory.

Hyperbolic discounting reinforces the appetite for getting fast benefits even if the long-term risks are very great. The future problems are far away until suddenly one is there. Obviously, this is a mechanism that feeds financial bubbles.

Confirmation bias is a tendency for people to search for evidence confirming what they think is true and to neglect disconfirmatory evidence (Bazerman and Moore, 2009, p. 41). Confirmation bias makes it easier to act forcefully on one's beliefs. The price to be paid, however, is that people miss opportunities to abandon a faulty hypothesis, which of course may have serious consequences if it guides their actions.

Confirmation bias is facilitated by and overlaps with the affect heuristic. As we have seen, when this heuristic is at work, aspects that support the overall evaluation of an object come to the foreground and non-supporting aspects fade into the background. In this way, the evaluator makes a head start in confirmation bias in support of the initial positive or negative evaluation of the object. At the same time, the affect heuristic could give the evaluator a strong feeling that he or she is on the right track, which makes it natural to defend rather than criticize one's initial hypothesis.

History is full of examples of disastrous decisions where decision makers looked away from disconfirmatory evidence, such as the USA's decision to launch invade the Bay of Pigs invasion in Cuba in 1961 (Janis, 1982), or NASA's decision to launch the *Challenger* space shuttle despite many warning signs (Vaughan, 1996). Norberg (2009) describes how US banks disregarded the risk of trading with subprime bonds at the same time as leading economists clearly spoke out about this danger.

Janis and Mann (1977) distinguished between two ways of coping with an escalating crisis (like the financial crisis). One very common reaction is defensive avoidance, which can be seen as a strong form of confirmation bias, where the individual avoids looking at disconfirming evidence and makes incomplete appraisals of given information. Defensive avoidance

occurs when the individual does not consider it realistic to find a better solution. If the individual has a hope of doing so, another more adaptive way of coping with a crisis may be used – vigilance, which involves thorough search and appraisal. Lack of hope of really solving a problem, as opposed to having such hope, seems to be an important factor for whether biased evaluations occur or not. We will return to this issue in Section 3.2.

Overconfidence implies that people are too confident that they have correct beliefs. For example, if a person says that he or she is absolutely certain about something, i.e., that the probability is 1.00 that he or she is correct, the true probability may be 0.80, and if the person says his or her confidence is 0.80 the true probability may be 0.65. Results in line with these examples have been obtained in numerous studies where participants have been asked to rate the probability that they have given the correct answer to more or less difficult questions. By calculating the proportion of correct answers for each rated probability, it is possible to obtain an estimate of over- or underconfidence by comparing these proportions with the rated probabilities. The typical finding is overconfidence, since the rated probabilities are higher than the actual proportion of correct answers. There has been debate about the overall validity of these results (Gigerenzer, Hoffrage and Kleinbölting, 1991; Juslin, 1994). However, in the financial market overconfidence seems to be a real phenomenon. In a study by Törngren and Montgomery (2004), stock market professionals were asked to estimate their ability to pick the best performing stock of two options. They estimated that the probability that they have picked the better performing stock was around 0.65. The actual proportion of correct predictions was 0.40, that is, worse than chance. Lay persons who were given the same task were less confident, although still overconfident. For them, the proportion of correct predictions was 0.50, i.e., equal to chance.

Overconfidence follows naturally from the confirmation bias, which leads to unwarranted confidence. Overconfidence also follows from all the other heuristics discussed above, since all of them lead to erroneous beliefs.

In the next subsection we will discuss a theory that provides an understanding of various biases in decision making under risk. The theory is another of Kahneman and Tversky's contributions to behavioural finance – prospect theory.

Prospect theory. A core assumption in classic microeconomics is that choices maximize utility. The idea is that people make economic choices that overall will lead to maximization of the utility associated with the chosen commodities. This idea is challenged in Kahneman and Tversky's (1979) prospect theory, which purports to come closer to people's actual economic behaviour than is true for utility maximization. The theory describes how people make choices under risk, which makes the theory very relevant for financial decision making. In utility maximization it is assumed that people base their decision on the utility of *final states* (e.g. how much money I will have as a result of my decision, independently of whether I have lost or gained money). By contrast, prospect theory assumes that people's choices are guided by potential *losses* or *gains in relation to a reference point* (e.g., how much money I lose or gain, in relation to what I have). Hence, utility maximization is based on absolute values, whereas prospect theory is based on relative values.

The reference point in prospect theory could vary across situations and persons. For example, it could correspond to current wealth, aspired wealth, a maximal or a minimal value or a normal value on a given attribute. In financial contexts the reference point could be a financial index like OMX. Thus, according to prospect theory, a given quantity (e.g., a certain sum of money) could be evaluated very differently depending on the reference point. As an example, consider a person's stock portfolio which increases by 10 % during a period in which OMX index increased by 20 %. This could be evaluated positively if the reference point is the value of the portfolio at the beginning of the year, but evaluated negatively if the reference point is the rise of the OMX index. By contrast, in utility maximization the utility of a given quantity will be the same independently of reference points.

The reference point not only influences whether a certain quantity will be evaluated positively or negatively. As in utility maximization theory, it is assumed that subjective value is non-linearly related to objective value (e.g., in terms of monetary values). In prospect theory it is assumed that the function relating subjective value to objective value (the value function) is concave for gains and convex for losses. Thus, the value function will have an S-shaped form, the inflexion point of which corresponds to the reference point (see Figure 1). This implies that people will tend to be risk avoiding for gains and risk seeking for losses. Thus, most people would

prefer a certain but smaller gain to an uncertain but greater gain, with the same expected values. For example, one would prefer to have 10,000 SEK for sure than 11,000 with a probability of 0.91. Conversely, people would prefer to lose 11,000 SEK with a probability of 0.91 to losing 10,000 SEK for sure. This means that, depending on the reference point, people could choose differently between the same options. If the options are seen as gains, one would be less willing to make a risky choice as compared with when the same options are seen as losses.

An additional property of the value function is that losses loom larger than gains, implying that the loss part of the value function has a steeper slope than is true for the gain part (see Figure 1). Experiments have shown that losses weigh about twice as much as gains (Kahneman and Tversky, 1992). For example, the subjective size of a loss of 1000 SEK is the same as the subjective size of a gain of 2000 SEK. The fact that losses loom larger than gains may explain why people require an extra premium for taking risks. That is, an extra premium is necessary for compensating for the heavy weight of losses that are associated with a risky alternative.

The form of the value function may explain the *disposition effect*, which is an anomaly that has been discovered in behavioural finance (Shefrin and Staman, 1985). The disposition effect implies that investors tend to sell winning assets too soon while keeping losing assets too long. When an asset has increased in value it is tempting to sell it in order to realize the gain (risk avoidance for gains). Conversely, when the asset has decreased in value the investor will be reluctant to realize the loss (risk seeking for losses), especially since losses loom larger than gains (Weber and Camerer, 1998). It is often pointed out that the rational investor should only think forwards and disregard sunk costs. The disposition effect implies that *buyers* actually think forwards (since they have not experienced any previous losses or gains of the bought asset) more than *sellers* do (who have experienced gains or losses in relation to previous prices of the shares that they sell or consider selling) (Svedsäter et al., 2009). From a rational point of view this is an anomaly. In an efficient market both buyers and sellers should think forwards. Presumably, the disposition effect may contribute to the explosion of financial bubbles since it reinforces a bear market when many investors sell simultaneously at a late stage of the down period.

Prospect theory also assumes that the probabilities of losses or gains are weighed differently depending on the size of the objective probability. Very small probabilities are overweighted when combined with the subjective value of a given quantity. They are simply a possibility, although small. This may explain why people buy tickets in a lottery where a very large sum of money may be won with an extremely low probability: “Why not, it could be me who will win the money”. It could explain why premium bonds are attractive despite a low level of expected interest. On the other hand, moderate probabilities are underweighted, which means that people are fairly insensitive to differences between moderately sized probabilities. This fact can be utilized by insurance companies when deciding the price of certain insurances. That is, they do not need to increase or decrease prices strictly in relation to the probability that the insurance will fall out, which offers the possibility of earning money at the expense of the insured. Finally, absolute certainty carries a much higher weight than close to absolute certainty. This explains why a chance to win and the absolute certainty of not losing (more than a given amount) could be an attractive argument in the sale of certain financial products such as equity bonds. This means in turn that these products could be sold with high subscription fees and, hence, be very profitable to the seller.

As exemplified above, prospect theory may explain why people pay high fees for certain savings products and for certain insurances, fees that are very profitable to the seller. Prospect theory implies that there could be a gap between commercial financial institutions and their clients. In relation to their clients the commercial institutions are utility maximizers. They are interested in earning a maximum of money in the long run across a large number of customers. The clients think and behave more in line with prospect theory, implying that they are willing to pay extra money for products that are attractive in terms of prospect theory, but at the same time less profitable in the long run than other options. This implies immense possibilities to earn money for the financial institutions at the expense of their clients. Of course, it is reasonable for clients to pay some money for the security associated with certain financial products. However, the question is whether clients are aware of how much money they lose in the long run even with seemingly low fees (see “anchoring and adjustment” above).

The gap between how ordinary people and commercial financial institutions perceive savings products may have been one driving force behind the recent financial crisis. The gap could inspire financial agencies to construct increasingly sophisticated products that appear attractive to the consumers and at the same are profitable to the sellers. This development inspires both sellers and buyers to believe that money is for free. The sellers have strong motives for conveying this message and the buyers are happy to accept it. At the same time, the possibility of earning great money may also delude financial institutions to take unwarranted risks or to disregard risks, as they did when giving subprime loans.

Prospect theory could also shed light on another aspect of the financial crisis, namely the bonus culture that prospered before the crisis broke out (and still exists to some extent). This is not to say that bonuses are bad, but prospect theory may explain why economic compensation, including bonuses and fixed salaries, may reach unreasonable heights. The basic assumption in prospect theory is that people evaluate options in terms of gains or losses in relation to a reference point. What is the reference point for CEOs or bankers when they evaluate their economic compensation? Is it the salaries of ordinary people? No. It is what other CEOs or bankers earn. This creates a zero-sum game where competition for the highest compensation feeds an ever-increasing level of compensation until the bubble bursts. Greed is not the best word for describing this process – a perverted race is a better way to describe it.

Summing up implications for the financial crisis. How could people – professionals and lay persons alike – make all the misjudgments they did during the development of the financial crisis? Above, I have shown that cognitive biases associated with System 1 may be an important part of the answer to the question. System 1 is associated with a local here-and-now oriented mode of thinking, where everything that is outside the focus of attention is less real in some sense. This is true both for risk judgments and how we evaluate and integrate information (prospect theory). In addition, System 1 thinking may fool people – all of us – to see meaning where there is no meaning, we become “fooled by randomness”, as nicely expressed by Taleb (2005). These biases lead to overconfidence and are strengthened by a general confirmation bias. As a result, people, again both professionals and lay persons, did not see the long-term dangers and

were seduced by the prospect of short-term gains. At the same time, there was probably a mismatch between commercial financial institutions and their clients with respect to the prevalence of certain cognitive biases, a mismatch that was exploited by the former and fuelled the imbalances that finally led to the crisis.

2.3 Adaptive analytic (System 2) mode of cognitive function

Can the biases and limitations discussed above be overcome? A rather large number of studies have focused on this issue (although it is much smaller than the voluminous research on cognitive biases, see Lilienfeld, Ammirati, and Landfield (2009)). A recurring finding in this research is that cognitive biases indeed can be mitigated (“debiased”) by replacing System 1 with a kind of System 2 thinking that counteracts the System 1 cognitive mode. This is a kind of thinking where one is open to several alternatives and seriously considers these alternatives in an attempt to find the objective truth. Various labels have been used for this mode of thinking, such as accuracy motivation (Chaiken, Wood, and Eagly, 1996), openness to experience (Costa and McCrae, 1985), or vigilance (Janis and Mann, 1977). It has been found that such thinking may be fairly independent of expertise (Tetlock, 2005; cf. also Tversky and Kahneman, 1974), but moderately correlated with intelligence as it is measured traditionally by intelligence tests (Stanovich and West, 2000).

One line of research has tested the possibility of reducing System 1 biases by stimulating System 2 thinking. Typically, participants have been given tasks that stimulate them to be many-sided rather than one-sided in their thinking. In a pioneering study, Koriati, Fischhoff and Lichtenstein (1976) found that by listing contradictory reasons against the chosen answer participants could increase the appropriateness of their confidence. Variants of this experiment have been carried out repeatedly, yielding similar results with respect to the possibilities of reducing overconfidence or confirmation bias (Lilienfeld et al., 2009). Another debiasing technique found to be efficient for reducing confirmation bias among clinicians was simply to delay the decision or to encourage decision makers to slow down and reflect on their decisions (Parnley, 2006; Sprengler et al., 1995). Thus, it seems that by using quite simple means it is possible to reduce cognitive biases, particularly overconfidence and confirmation bias. However, an

important caveat is that debiasing does not seem to work when people are strongly involved in an issue. On the contrary, in such cases providing participants with information that speaks against their own opinion has been shown to increase biases and polarization of attitudes between parties (Lord et al., 1979). Presumably, this is because the confirmation bias here leads to distorted conclusions regarding evidence that runs counter to one's views.

Simple instruction to avoid biases has been found to have small effects (Willingham, 2007). Montgomery and Adelbratt (1982) found that choices about lottery gambling did not change after educating people about the advantages of maximizing expected value. The same study also showed that giving information about actual expected values did not change choices. However, when asked to consider that they should repeat a choice many times, participants became expected value maximizers. In general, it appears that successful debiasing requires that people are given tasks that start System 2 thinking. For this to work in the long run, it is necessary that people learn to use such strategies spontaneously without being instructed to do so. However, studies of long-term effects of debiasing interventions seem to be lacking.

How should debiasing be done in order to avoid faulty financial judgment and decision making? The techniques discussed above may be useful for reducing confirmation bias and overconfidence also in financial contexts. However, it should be born in mind that the biases discussed above follow naturally from how our minds function in a very basic sense. In order for us to replace System 1 with System 2 thinking in economic and financial contexts, it may be necessary to change the *contents* in our thinking about these economic and financial matters, and here general debiasing techniques probably are not sufficiently efficient. We must take seriously that the future is as real, when it becomes the present, as the present is now. We must understand that the world may change much more than we are prepared for. We must understand that economic events by their nature are random in certain fundamental respects. We must learn to resist the overwhelming propensity to see patterns in randomness. We must learn to calculate what the outcome of different choice options will be in the long run, rather than being guided by local gains or losses in relation to more or less arbitrary reference points. Somewhat paradoxically, this apparent

need for rethinking is true for lay persons and economic professionals alike. It may be asserted that even educated economists could benefit by learning and taking seriously how psychology meets economics.

There are reasons to believe that the prevalence of cognitive biases, including narrow thinking confined to local issues in present time, are heavily domain dependent. As we have seen, this kind of thinking is common in economic contexts and perhaps also in the political world. In contrast, consider how people think about environmental issues. For some decades, people at large have been deeply concerned with environmental issues that concern the Earth as a whole and have implications for future generations. People also act in line with these concerns. We try to minimize polluting nature, we buy environmentally friendly products, we sort household waste etc. Still, this is quite a new phenomenon. Terms like environmentally friendly, sustainability, green issues etc. represent a new way of thinking. In business life, too, environmental thinking as well as socially responsible thinking has gained a foothold, and stands for a long-term orientation apart from immediate profit (Gärling et al., 2010). Thus, it may be possible to rethink in economic life in a manner analogous to what has happened in the environmental domain. We will return to this issue later.

Another line of research on the distinction between System 1 and System 2 thinking concerns individual differences in people's mode of cognition. Of particular relevance for the present paper is Tetlock's (2005) study of forecasts made by 284 experts in different social science areas (including international relations, economics, national security and arms control). The respondents were asked to predict various future events within and outside their own area of expertise. The forecasted events included the outcomes of political elections, economic performance measures, and outcomes of international conflicts. In general, the forecasters were slightly more accurate than chance. In addition, the accuracy of forecasts made in the forecaster's own field and in other fields did not differ significantly. Nor were there any clear differences between respondents with different political ideologies. What is of special interest in the present context is that the forecasting ability differed clearly between two groups of respondents, called "foxes" and "hedgehogs", who were identified by means of self-report questionnaires. This distinction was taken from the philosopher and

historian of ideas, Isiah Berlin (1953), who wrote: “The fox knows many things but the hedgehog knows one thing”. Tetlock states that hedgehogs try to expand the big thing they believe to cover new cases, which implies risks for a confirmation bias. By contrast, foxes have a self-critical, point-counterpoint style of thinking, which prevents them from building up excessive enthusiasm for their predictions. The lack of self-criticism and the one-sidedness in hedgehogs’ thinking style may be associated with System 1, implying that the opposite thinking style of foxes belongs to System 2.

As the reader may have guessed, foxes tended to be more accurate in their forecasts than was true for hedgehogs. They had also a more realistic idea about their forecasting accuracy than was the case for hedgehogs. Tetlock concludes that *how* one thinks matters more for success in forecasting than *what* one thinks.

Do Tetlock’s (2005) findings mean that that we should only listen to foxes when consulting forecasters? The answer is no. Foxes are wrong more often than hedgehogs, but they tend to make more extreme predictions and sometimes reality is on their side. The hedgehog could be a stubborn but bold whistleblower and may have good arguments on his or her side. So it may be worthwhile to listen to the hedgehogs’ arguments, especially when their forecasts concern events with very serious consequences. Those who repeatedly warned about the subprime loans, like Nassim Taleb (Taleb and Martin, 2007) and Peter Schiff (Task, 2008), may have been hedgehogs. They had one big idea and they had a very strong conviction of being right, and in fact they were right. Winston Churchill – a hedgehog, I think – was wrong many times, but he was right once in seeing early the threat from Nazi Germany. Because of this he contributed to laying the groundwork for the final victory over the Nazis in World War II.

Two general conclusions can be drawn from Tetlock’s (2005) research. First, thinking style is important (besides expert knowledge and political orientation) for the accuracy of forecasts and, second, different thinking styles have different advantages and disadvantages. Thus, a culture that has room for both hedgehogs and foxes may provide an optimal preparedness for future risks and possibilities. Common to both hedgehogs and foxes is that they are fairly independent of others in their thinking. By contrast,

in the recent financial crisis, dependence on others' thinking, or rather dependence on what one thinks others are thinking, was the rule. This will be discussed in some detail later.

Summing up implications for the financial crisis. The cognitive biases that contributed to the crisis could not have been removed simply by making people aware of them, although there exist some simple debiasing techniques that may be useful. To remove the biases more thoroughly it is necessary to build up a new culture that favours System 2 thinking. In such a culture individual differences in cognitive styles (e.g., in terms of hedgehogs and foxes) should be recognized.

2.4 Maladaptive analytic (System 2) mode of cognitive function

Can System 2 thinking be maladaptive? Can conscious, open-minded and analytic thinking go wrong in the long run? To understand why the answer may be positive we need to consider adaptive System 1 thinking. System 1 is built on intuition and affect. We have seen that intuition and affect are indispensable components in successful adaptation among humans and also among other living organisms. Damasio (1994) exemplified how damage to the brain's emotional centre (System 1) could lead to disastrous consequences even when reasoning ability (System 2) remains intact. People with such brain damage suffer great impairment in their day-to-day decision making and social interaction.

Reasonably, the deficiencies shown in people's judgments and decision making in the recent financial crisis cannot be explained primarily in terms of brain damage. In addition, the behaviour of financial actors in the recent crisis did not seem to suffer from the kind of lack of decision-making ability that Damasio observed in his brain-damaged patients. On the contrary, some actors apparently were very decisive and consistent in their actions at the same time as they were aware of the risks, and used this awareness to acquire huge amounts of money (Lewis, 2010). But there may still be room for referring to a System 1 deficient rationality. It is tempting to describe some financial actors in terms that depict them as rational (System 2) but heartless individuals (lack of System 1), who act destructively in relation to the society at large. It could be a picture of a special type of people with almost monstrous personal qualities. In this

vein, the Swedish Minister of Finance recently called actors in the financial market a “pack of wolves” that profit from the weak economies in Europe (Todanicia.com, 2010). Thus, in these descriptions, maladaptiveness appears in the shape of blatant egoism at the expense of other people, a sort of psychopathic maladaptiveness.

However, it is possible to paint another picture of the “pack of wolves” in the financial market. Apparently, at least some of those who have earned large sums of money in the recent and earlier financial crises were extremely smart and clear-sighted (System 2) and decisive persons (Lewis, 2010). But are these persons also more ruthless and “psychopathic” than other people, or do they simply use their capability in the same way as any person would do if he or she had this rare capability? The latter possibility assumes that a person with normal System 1 thinking could behave as a “wolf” given that the situation at hand gives them opportunities for such behaviour. Perhaps both possibilities have some degree of truth. On the one hand, there is anecdotal evidence about an overrepresentation of psychiatric deficiencies among the actors in the recent financial crisis (Lewis, 2010). We also know that criminal activities that may be associated with psychopathy have played an important role in many financial crises – think of names such as Ivar Kreuger and Bernard Madoff. On the other hand, some of those who are known for having gained large sums of money from this and earlier financial crises, such as Nassim Taleb or George Soros, now use their fortunes for improving the world and few people would regard them as psychopaths, rather the contrary. In any case, it is very easy and very tempting to explain the crisis in terms of the behaviour of a limited group of deviant persons. In the next section, I will apply another perspective on the (lack of) rationality of the financial market in a crisis situation by leaving the individual level and going to a collective level in my analysis.

Summing up implications for the financial crisis. As I have described maladaptive System 2 thinking it boils down to a heartless and more or less immoral kind of rational thinking, which obviously existed to a certain degree – including a few spectacular cases – during the financial crisis.

3 The collective level – eliciting factors in the development of the financial crisis

So far I have listed a number of psychological factors that *facilitated* the recent financial crisis. It remains to discuss whether psychology can shed light on the circumstances that *elicited* the crisis. Why did the crisis break out with such an enormous force? And why did the world economy by and large recover relatively quickly (although the recovery may be fragile)? To answer these questions, we need to consider the fact that the crisis is a collective phenomenon. At the end, it comprised the whole world and included billions of people. The crisis built up as a result of interconnections between all these people. The enormous force of the crisis as well as of the recovery can be understood from the fact that all these billions of people have a huge impact on the economy when their behaviours are combined in certain ways. Let us see how.

A key concept in economic science is equilibrium, which implies that a number of factors balance each other. The aspiration to earn money by selling a product is balanced by the fact there are buyers who want to use their money to buy the product. By contrast, large parts of social psychology concern lack of balance, either in terms of collisions between interests (conflicts) or in terms of lack of counterbalancing factors when many people move in the same direction. The development of the financial crisis can be described in terms of both types of imbalances.

First, there was a relatively long period with an increasing number of actors running in parallel, a development that inflated the financial bubble. The interesting thing is that so many different groups of people all moved in the same direction (cf. Norberg, 2009). Politicians in the USA made it possible for people with low incomes to take up cheap home loans (or more precisely, loans that were cheap initially). People happily took up these loans. Banks earned money by creating a bond market for these loans wherein the bonds (denoted as Collateralized Debt Obligations, CDO) became increasingly complicated and “toxic”. Investment banks were transformed into “shadow banks” by lending money based on this

market without having the same securities as ordinary banks (Krugman, 2009). Investors earned money by selling the CDO bonds. Some banks were rewarded by the state in proportion to how many loans they succeeded in granting. Rating institutions gave high credit ratings to these banks. For a long time, financial analysts failed to perceive the risks associated with the toxic CDO bonds. After some time, people in other countries became involved in this escalating process as buyers or sellers of the toxic bonds.

Thereafter, when the crisis exploded, the parallel running was replaced by antagonism and lack of trust between different groups of actors, between lenders and borrowers, between different banks, between states and banks, between lay persons and financial experts and, in a later stage, between different states. Finally, an economic recovery occurred, although it is still unclear whether the recovery is stable.

I will now analyse the different stages of the crisis in the light of theories and concepts from social psychology.

3.1 Building up the financial crisis – herding and shared reality

There are a number of concepts and theories in social psychology that shed light on the increasingly parallel running that characterized the building up of the financial crisis. *Social pressure* implies that the behaviour of others exerts a pressure on the individual to behave in the same way, if this is seen as relevant. Thus, if I observe a person behave in a certain way, for instance, running in order to catch a train, I will feel pressured to behave in the same way provided that I want to catch the same train. Classic experiments in social psychology have shown that the pressure exerted from other people's behaviour can be so strong that people will conform to others' behaviour even when the behaviour is absurd, especially when the others form a sufficiently large group (say, at least three persons) behaving in a uniform way (Asch, 1955; Tanford and Penrod, 1984; see Bond and Smith, 1996). Thus, in this sense humans are like sheep, although there are some cultural differences in the sensitivity to social pressure, with the French being less sensitive than many other nationalities (Bond and Smith, 1996). In behavioural finance, the tendency to follow other people's behaviour, for example, with respect to investments, is called *herding behaviour* (Sias, 2004). A recent study, which basically mimicked

Asch's classic experiment in a stock investment situation, showed that people follow a majority herd (other investors' predictions of future stock prices) even when the herd members made obviously wrong predictions (Andersson et al., 2009).

It may be conjectured that herding behaviour was an important ingredient in the recent financial crisis, especially when it started to develop. The first decisive step in this development was the launching of the cheap home loans, the so-called subprime loans. When some people with low incomes took these loans, this may have elicited herding behaviour, where more people with low incomes took more of these loans simply because others did it. Herding behaviour probably played a role in all phases of the developing crisis, since a multitude of actors were involved who acted in parallel with each other on the financial market or in the housing market or in financial politics. However, herding behaviour alone cannot explain the development of the crisis. It cannot explain the remarkable synchronization of behaviours of different groups of people. Here imitation was not the critical factor, but different behaviours that were based on the same understanding of the environment, an understanding that involved the idea of seeing private homes as money machines, and the idea of the "toxic" bonds as profitable financial instruments, where risks had been balanced out in a sophisticated way. Obviously, these ideas, that were shared by so many people from different camps, fuelled the development of the crisis. This brings us to another concept from social psychology, the concept of *shared reality*.

The origin of the notion of shared reality is another classic experiment from social psychology, viz. Sherif's (1935) study of the so-called autokinetic effect. This effect occurs when people look at a stationary light in a dark room. After a while, individual observers do not see the light as stationary but as moving about. How the movement is seen will vary between different persons who simultaneously observe the same light. One person may see the light as moving vertically, another one may see it as moving horizontally, and so on. Thus, individually, different persons see different movements, but as soon as they tell each other what they are seeing, they will rapidly converge to seeing the same movement. A shared reality has been established. Different groups may arrive at different common perceptions of the apparently moving light, but within the group they will see the same movement, thus having their own particular shared reality.

As can be seen from Sherif's classic study and many subsequent studies (for a review, see Echterhoff, Higgins and Levine, 2009) a shared reality can be assumed to have a subjective component, which is erroneously perceived as corresponding to objective facts by those who live in the same shared reality. This subjective component presumably is present in all realities that are shared within groups to which people belong, such as family, work community, nation or region, political organization, and church. It is part of the human condition to share interpretations of the external world with group members and believe in these interpretations more than could be justified from an impartial analysis.

However, in a well functioning society different groups with different shared realities balance each other in such a way that the net result is a more balanced and accurate view of the surrounding world. Similarly, in well functioning markets, sellers' and buyers' realities converge in market prices that are economically sounder than would be the case if sellers or buyers could dictate the prices. However, this balancing mechanism is put aside when financial bubbles grow because sellers and buyers participate in largely the same one-sided shared reality, a reality where fundamental values are neglected and future value rise is in focus. A spiral is built up, where past rises in value fuel expectations of future value rise, which in turn more and more weakens the contact with fundamental economic facts. In the recent financial crisis, the spiral was accelerated by the introduction of smart financial products that promised security without bothering about economic fundamentals. Add to this the fact that respected rating institutions, such as Moody's and Standard and Poors, were tempted and sometimes pressured to make unduly positive evaluations of the new financial products (Norberg, 2009).

In a recent book, Lewis (2010) describes how a few financial traders earned enormous fortunes by seeing through this doomsday machine. These traders took seriously the risk that the bubble would burst when borrowers could not afford to pay the increased interest charges that were contracted in their housing loans. In addition, one of these traders had the idea to make *in situ* inspections of relevant housing properties to check whether these properties were properly evaluated. What the traders understood from using common sense and their own eyes convinced them that a financial disaster was close at hand, independently of the sophisticated construction

of the “toxic” housing bonds. Based on this insight, some traders arranged bets against the subprime mortgages going bad, an outcome that turned out to be true and resulted in enormous monetary gains to those who invested in this outcome of the bet.

3.2 Accelerating the growth of the financial bubble – groupthink

So far we have pointed out how a shared reality can drift far away from objective reality, when appropriate checks and balances are wiped out, as was the case in the recent financial crisis. It is important to note that this drift occurs within a group of people, such as actors in a financial market. This brings us to the concept of *groupthink* (Janis, 1972), which has been defined “as a type of thought within a deeply cohesive in-group whose members try to minimize conflict and reach consensus without critically testing, analyzing, and evaluating ideas” (Wikipedia, 2010). Groupthink theory describes mechanisms that, in the absence of external checks and balances, lead to severely biased shared realities among group members.

In a modified version of the original groupthink theory, Baron (2006), with support from a large body of research, relaxes the requirement that groupthink is elicited in deeply cohesive groups. In this modified theory there are a number of antecedent conditions that lead to groupthink. First, the individuals in question experience a *social identification* with a collective of which they are members themselves. When the social identification emerges across groups that should balance each other the results may be disastrous. This occurred in the recent financial crisis when staff from financial rating institutions and traders seem to have felt a common social identification as negotiators of credit ratings (cf. Norberg, 2009). Such inappropriate alliances may be a stronger facilitator of deficient groupthink than cohesiveness in naturally formed groups, which was thought to be an important factor in the original groupthink theory.

The second antecedent condition pointed out by Baron (2006) is the existence of *salient norms*, which implies that “group interaction and discussion must produce or reveal an emerging or dominant group norm”. This can be seen as corresponding to the shared reality which by tradition exists in relevant groups. That is, the building up of a shared reality with respect to a specific target, like subprime mortgage bonds, requires

that the group members from the start share certain norms and thought patterns. It seems safe to say that the financial world is homogenous in its norms and thought patterns, as shown, for example, in common norms for evaluating successful performance (monetary success rather than, say, being outstanding in making ethical investments, or in the fact that stock markets react uniformly to news).

The third antecedent condition is *low self-efficacy*, which means that group members generally lack confidence in their ability to reach a satisfactory resolution of the conundrum facing them. In the recent financial crisis the ever more complex subprime mortgage bonds doubtless made buyers and sellers feel that they lacked competence to assess the value of these financial products. An exception was the few actors who simply abstained from trying to understand these products and instead used their common sense.

I will now turn to the symptoms of groupthink. All symptoms have in common that they help to build up a heavily biased view of the external reality. One symptom is *suppression of dissent*. Baron (2006) listed a number of studies documenting that group members who express divergent options are initially subject to social pressure, then ignored and finally punished for their lack of loyalty to salient group norms. Norberg (2009) and Lewis (2010) give many examples of how, in the period before the outbreak of the financial crisis, “whistle blowers” were ignored or suppressed (cf. also the web dialogue between Peter Schiff and the economist Art Laffer (Task, 2008)). If these dissenters had been taken more seriously, perhaps the crisis would not have occurred. A second symptom is *group polarization*, which stands for a situation where decisions taken by groups are more extreme, for example, with respect to risk taking (Myers and Arenson, 1972), than is true for decisions taken by individual members of the group. Group polarization is one of the most well documented phenomena in social psychology (for a review, see Myers and Lamm, 1976). One underlying mechanism is that arguments favouring an emerging decision and going against the alternative decision tend to predominate increasingly the closer the group comes to its decision. This can be seen as a kind of a group-level confirmation bias. This bias may be common in the financial world since many important financial decisions result from group discussions at different levels, from the market floors

to the boards of banks and financial companies. Group polarization is facilitated by *self-censorship*, which means that group members who do not agree with the majority do not express these views openly in group discussions. As a result of all the mentioned mechanisms, an *illusion of consensus* will emerge, where divergent options are kept within the individual. We will see next how the revelation of the false consensus played an important role when the financial bubble burst.

3.3 Bursting of the financial bubble – destruction of trust

The bursting of the financial bubble that had grown in the USA in recent years was a veritable economic explosion. It has an exact date – on 15 September 2008, the largest bankruptcy in US history was a fact. People all over the world watched on television as harried employees of Lehman Brothers, one of America's biggest and oldest banks, carried away their belongings from the sinking bank.

It is true that the bursting of the bubble was preceded by many warning signs and that it was preceded by period more than a year of increasing worries that things were going wrong in the US economy. From an all-time high value on 9 October 2007, the Dow Jones index started a journey downwards and had decreased by 19 % on 14 September 2008. However, this was just the beginning. On 15 September, the Dow Jones fell by 5 % and on 27 February 2009 it had decreased by 50 % since the October 2007 peak. It was the biggest decline of US stock prices since the great depression in the early 1930s. This was paralleled by other dramatic events. In the weeks and months following the crash of Lehman Brothers, the Wall Street investment banks ceased to exist in their traditional form, partly as a result of the fact that the US government spent enormous sums of money to rescue the faltering credit market. After some months, one-third of the US credit market was gone (Gelinas, 2009). At the same time the crisis spread rapidly to the rest of the world.

Modern capitalism rests on a precious foundation – trust. Lenders must trust that borrowers will repay them. Investors must trust that their investments are reasonably well taken care of. A contract signatory must trust other signatories to live up to their undertakings. Without trust an economic system built on capitalist principles cannot work. Trust has a strong psychological component. Trust works because one *believes* – rightly or

not – that people, and the world in general, will behave as expected. Trust is closely related to shared reality. Participants in a shared reality trust that they share a common perception of this reality (Echterhoff et al., 2009). The more the shared reality drifts away from objective reality, the greater is the risk that a dramatic event, such as the Lehman Brothers crash, will wake up participants and that trust will evaporate.

The decline of financial activities during the recent crisis can be interpreted as following from a destruction of trust. Corsetti et al. (2010) collected data on how trust changed during the crisis. Their findings are striking. Annually collected survey data in the USA indicate that in 2005 30 % of the US population had great confidence in banks and financial institutions. At the end of 2008 and beginning of 2009, this measure had decreased to a tiny 6 %. Moreover, after the crisis, respondents trusted banks as much as they trusted a random citizen, and they trusted mutual funds and the stock market much less. This is in sharp contrast to the higher trust people had in banks and financial institutions compared with their trust in unknown people before the crisis.

Trust is a miracle. Game theorists have shown that trust is irrational in situations where people have a choice between cooperation (trust) and defection (distrust), since defection is the rational choice (Rapoport and Chammah, 1965). Still, the parties gain in the long run if they conjointly choose to cooperate. Thus it is not remarkable that trust breaks down, as it did in the recent financial crisis. What is remarkable is that trust works at all. This is why it is important to preserve trust when it exists. Trust can never be taken for granted. At the same time it is important to guard against trust that is founded on false premises, as indeed occurred in the recent financial crisis. Just remember the revelation of perhaps the greatest fraud in economic history in December 2008: Bernard Madoff's swindling of \$ 65 billion from people all over the world through his investment fund. Another example of falsely based trust is the unjustified high credit ratings made by respectable credit rating institutions.

To understand why trust works so often – whether justified or not – it may be noted that unquestioned trust and belief seems to come before distrust and disbelief in our understanding of the world. Supported by empirical data, Gilbert (1991) asserted that belief has epistemic priority

inasmuch as, at an initial stage, understanding an idea is inseparable from believing in it. In a later stage we can doubt our initial belief, but believing and trusting is the unquestioned point of departure for our understanding. Disbelief and distrust are the more or less painful exceptions. This is why our interaction with the surrounding world usually goes on smoothly and automatically (in line with System 1). We simply take for granted that the interaction will work and it does. However, when this smooth interaction is broken, a qualitative shift occurs in our thinking. A critical and more conscious attitude (in line with System 2) takes over, as we start to distrust or disbelieve what we have earlier taken for granted (Packer, 1985). Such “moments of truth” should be taken care of meticulously since they provide a possibility for taking measures against future crises. Hence now is the time for learning from the recent financial crisis.

The fragility of trust may shed light on why distrust – for example, shown in decreased credit giving – spread so rapidly all over the world when the recent financial crisis culminated. The bankruptcy of Lehman Brothers, Bernard Madoff’s fraud, and other dramatic events that were known almost simultaneously all over the world, created a universal feeling of awakening, which in turn resulted in decreased trust in financial institutions and actors.

3.4 Recovery from crisis – talk, talk, talk

How can trust be restored? Humans have access to a remarkable tool for building up trust – talking to each other. Research on economic games has shown that allowing verbal communication between the players has strong effects on their willingness to co-operate (Dawes and Messick, 2000; Orbell et al., 1988). In the same vein, many studies have shown that contact between members of different groups leads to more positive intergroup relations (Crisp and Turner, 2009).

To talk is to act (Habermas, 1986). By talking it is more possible to take other people’s perspective, which in turn promotes cooperation (Galinsky, Ku and Wang, 2005). Perspective taking is an act that signals preparedness to take in other people’s points of view. As a consequence, perspective taking is a precursor for building up a new shared reality. Other acts expressed by talking are: promising, taking responsibility, escaping responsibility, attacking, defending oneself, dominating, subduing etc. It

seems difficult to find any intentional act that could not be expressed in verbal communication. This implies that talking is important for building up any type of relationship – cooperation, but also antagonism and distrust. Thus talking *per se* is not enough for promoting cooperation. It must be the right kind of talking, where perspective taking is an important component.

The culmination of the recent financial crisis immediately led to massive amounts of talking in order to restore the economy. As observed from the media, politicians played decisive roles in all this talking. There were international meetings of politicians and civil servants from different countries, there were national meetings in which politicians from different parties negotiated, and there were also meetings between politicians and representatives of banks and other financial companies. They were great days for politicians all over the world. There were high expectations from the public that politicians would agree on powerful measures for restoring the economy. Now, in 2010, politicians from different countries compete to show their voters how successful they were in handling the financial crisis.

Globalization has created a world where a narrow national or institutional perspective is outmoded. It is necessary to take other countries' and other institutions' perspectives in order to work for the common good. Today (August 2010) all EU-countries need to take the economic problems of Greece, Spain, and Portugal seriously, since these problems also imply problems for the other EU countries. At the same time it is impossible to force countries with problematic economies to take appropriate measures. The way out is cooperation between all EU countries based on mutual perspective taking, and this requires talking, talking, and talking.

So far the “talking to each other” by and large seems to have been successful. The world economy has recovered as a result of the massive economic stimulus that politicians jointly decided to deliver as a result of prolonged negotiations. It is beyond the scope of this paper to judge whether this has been a good thing in the long run.

3.5 Combining the individual and collective level

The building blocks of the collective level are individuals and relations

between them. It may then be asked: How does the collective level operate in relation to individuals' mode of operation? The financial crisis and its aftermath illustrate three alternative answers to the question.

The superbiased hyperindividual. The idea here is that the biases in individuals are added to each other on the collective level. The result is a collective that is more biased, and hence performs worse, than would be true if the individuals operated alone. This will happen if individuals are biased in the same direction and reinforce each other in these biases. Obviously, this is what happened when the financial crisis developed. For example, individuals' biased perception of gains that could be derived from certain savings products was added to superbiased reactions on the collective level. The collective acted as a superbiased hyperindividual.

The scattered collective. In other cases, individuals act independently of each other in order to satisfy their personal needs and aspirations. The result may then be that individuals maximize their own gains, at least in a short-term perspective, but at the same time they cause losses on the collective level. A prototypical example is bank runs. In general this is what happens when mutual trust collapses, as is true when a financial bubble bursts. Here individuals are not necessarily biased. On the contrary, they may act rationally from their own perspective, which is true if they increase their savings in bad economic times. Nevertheless, the result on the collective level could be negative, which happens when saving increases during economic recessions. The collective is scattered into a multitude of self-serving individuals.

The well balanced collective. A third possibility is that individual biases balance each other out or are upheaved on the collective level. This is what happens in a well functioning market. My more or less biased needs and aspirations are balanced out by your more or less biased needs and aspirations. In addition, when individuals, institutions and/or countries meet to solve mutual problems, as happened in the aftermath of the recent financial crisis, the result may be a common, less biased perception of the problems at hand. Also, there may be positive long-term consequences when collective problem solving leads to structural changes in the economic system.

3.6 Common to all alternative modes of functioning – primacy of cognition

When the economy is in a poor state, people search for psychological explanations. People in general, as well as professional economists, expect that psychology can account for the irrational side of humans. Economists think thus because their models assume that humans are rational, so when the economy works rationally psychological explanations of economic behaviour are out of place. The coupling between psychology and bad economy in people's mind is confirmed by Google statistics. A search for "economy", "bad" and "psychology" together gives 13.4 million hits, whereas "economy", "good" and "psychology" gives 5.92 million hits. On the other hand, if the key word "psychology" is taken away, "economy", "good" gives 136 million hits and "economy", "bad" gives 81 million hits.

To a great extent, the present paper has adopted this view of how psychology can shed light on economic behaviour. However, it has also been stressed that there is a psychology of well functioning, well adapted economic behaviour both at the individual and the collective level. It has also been pointed out that adaptive and maladaptive behaviour may be two sides of the same coin. The adaptive side works when the structure of the economic world is in balance with the psychological world, for example, when the patterns stored in our brains match actually existing worlds out there, and when the psychologically shared reality matches actual reality. Conversely, when these matches do not exist, the maladaptive side of the coin is at work. At the same time, it has also been pointed out that maladaptive phases of the economy can lead to structural changes which can exploit the adaptive side of the coin.

By and large, the present paper has given a cognitive account of the financial crisis. The focus has been on maladaptation and adaptation in people's understanding of the economic world. By contrast, popular psychology often explains maladaptive economic behaviour by three noncognitive words; greed, fear, and herding (259,000 hits in Google for these words in general, with "herd" as an alternative to "herding", and 171,000 hits for "economy", "greed", "fear", "herd" or "herding"). None of these words refer to cognition but motivation, emotions and behaviour. In the present paper, we have not focused on greed and fear as explanations of the development of the financial crisis and we have pointed out that

herding is related to the more cognition-laden concept of shared reality. The classic statement by the economist John Maynard Keynes (1935, p. 384) goes in the same direction: “It is ideas, not vested interests, which are dangerous for good or evil”.

Greed and fear are fundamental human phenomena, but do they explain whether economic behaviour is adaptive or maladaptive? Both these phenomena can be connected with adaptation or maladaptation (especially from an individual perspective) depending on whether the greed or fear is based on unbiased or biased interpretations of the surrounding world, i.e., on cognition. In this way cognition comes before greed and fear as an explanation of adaptive or maladaptive economic behaviour.

In the next section a concrete example is given of what may be regarded as maladaptive cognition in relation to the development of the financial crisis.

4 A case study of cognitive limitations – biases in forecasts of economic growth

The recent financial crisis has also been regarded as a crisis for economic forecasting. In the summer of 2008 a group of consensus economists in the USA forecasted a GDP increase of 2 % for the final quarter of 2008. The Federal Reserve made similar forecasts (Coy, 2009). In reality, GDP decreased by 6.3 %, representing perhaps the greatest forecasting error in modern times. Obviously, if it had been possible to forecast the crisis, at least to some extent, it would have been possible to do more to stop it than actually was done. Thus, the failure of economic forecasts may be regarded as one component in the financial crisis. In this section I will analyse the nature of this failure. How can it be described in more detail and is it possible to find cognitive biases that caused it?

The data for the analysis are GDP forecasts made by Oxford Economics, published monthly in the journal *Economic Outlook*, during the period January 2007–May 2010. For the purpose of the present paper, it is interesting that Oxford Economics is a European forecasting institute and that it consistently publishes forecasts for many countries and regions, including the USA and Europe (Eurozone). Oxford Economics is a British forecasting institute, proud of having outperformed other global forecasters during the recent financial crisis (Oxford Economics, 2010). The forecasters explain their relative success by two factors. First, they update their forecasts monthly, and even more frequently, when necessary. Second, they base their forecasts on a model – the Global Economic Model, which they describe as the world’s most integrated macro model – to analyse the impact of economic and financial scenarios. At the same time they supplement their model with purely statistical models in order to combine “sensible forecasts with well-founded analysis” (Oxford Economics, 2005, p. 2). Also in order to use the model effectively it is necessary to make subjective estimates of various economic policy decisions that are used as input to the model. Finally, the presentation of the forecast gives room for subjective interpretations, as will be shown below. Thus, it appears that the forecasters to an important degree use

their own judgment, which may make them susceptible to cognitive biases. Add to this that the model itself may be biased by disregarding factors that contribute to economic changes, such as a model for how trust can be destroyed.

We consider first the accuracy of the forecasts as they came closer to the actual outcome. Figure 2 shows monthly forecasts for the USA and Europe (Eurozone) of the GDP for 2009 (denoted as the target year) – the year when the GDP reached a bottom level. Each curve starts in January 2007 when there still were three years left until the end of the target year and ends a few months after the end of the target year. (Note that the GDP calculations may be adjusted in retrospect.) The forecasts are also given in Table 1. The following pattern can be observed. During 2007 and until March 2008 the forecasts were quite stable and predicted a fairly normal GDP growth of around 3 % for the USA and 2 % for Europe. In April the forecasts started to drop slowly, and as late as September 2008 the GDP growth was expected to be 1.7% for the USA and 0.9% for Europe. After the Lehman Brothers crash the forecasts started a rapid movement downwards, but it still took some months before they reached a bottom level of -3.6 % for the USA (March 2009) and -4.8 % for Europe (July 2009). Finally, as the actual outcome became increasingly better known, the forecasts started to be less negative and settled on a level that was 0.5–1.0 % above the bottom level. These patterns can be interpreted in terms of an availability bias, i.e., a tendency to be too close to the present situation when forecasting the future.

Figure 3 shows the corresponding curves for the target year 2010, where we still do not know the actual outcome. Here it is interesting to note that the curves to a large extent have the same shape across the months as the curves for the *preceding* year (i.e., the target year 2009, see Figure 2). They are fairly flat and express positive expectations until September 2008 and then there is a rapid movement downwards and then up again in the middle of 2009 (although more up than in the curves for 2009, see Figure 2). Thus, long-term predictions appear to be based on simultaneously made forecasts for the year before, which are adjusted slightly downwards when the forecasts are positive and upwards when the forecasts are negative. This appears to be an illustration of the use of the anchoring-and-adjustment heuristic.

The failure to predict the GDP dip in 2009 may be explained in two ways. One possibility is that the forecasters were more biased than usual when they made forecasts for 2009. The other possibility is that their ability was unchanged and that the omission for 2009 was due to the fact that the events in 2009 were exceptional. Figures 4 and 5 present data that could be used to distinguish between these two possibilities. The figures show GDP forecasts for the USA and Europe made by Oxford Economics for the target years 2001–2011 made on four occasions: (a) zero years ahead (the actual outcome as it was known at the end of the target year), (b) half a year, (c) one year, and (d) one and a half years before the end of the target year. The following patterns can be observed. The forecasts made one and half years ahead changed very little and seem to have practically no connection with the actual ups and downs in the economy. There were three turning points in the economy in the 2001–2010 period (see lines for zero years ahead in Figures 4 and 5): a bottom value in 2001 for the USA and 2003 for Europe (the aftermath of the IT dot-com boom), a top value in 2004 for the USA and 2006–2007 in Europe, and finally the big dip in 2009 in both areas. It can be seen that the one-and-a-half-year ahead forecasts missed all three turning points for each of the two regions. On the other hand, there is a tendency for these forecasts to predict a turning point one year *after* the actual turning point, presumably because the forecasters were influenced by the turning point that was correctly predicted in the short-term forecasts that were made simultaneously. Thus, we see again how long-term forecasts are anchored in short-term forecasts made simultaneously rather than in the actual outcome. The one-year ahead forecasts are clearly more accurate, but still miss the 2001 turning points and the 2003 turning point in Europe. The half-year ahead forecasts are close to the zero-year ahead forecasts.

Another interesting observation in Figures 4 and 5 is that long-term forecasts (one and a half years ahead) are consistently on quite a high level (around 3 % for the USA and around 2 % for Europe) or higher than most forecasts and equal to the remaining forecasts, including the zero years ahead forecast, with one exception. No bad times exist in the world of long-term forecasts, a clear example of an optimism bias.

It can be concluded that forecasts made more than one year before the end of the target year were practically useless. The information they give

reflects the short-term forecasts being made simultaneously rather than the actual outcome. Thus, there was nothing special in the long-term forecasts made for 2009. These forecasts were as blind as they had been earlier. The window to the future seems to encompass no more than one year.

Recent research on GDP forecasts for Sweden during 2001–2008 made by the Swedish Ministry of Finance and by the Swedish National Institute of Economic Research confirms the validity of the pattern of results displayed above (Finanspolitiska rådet, 2010). When the prediction horizon exceeds one year, the accuracy of the forecasts is on the same level as or even worse than the forecasts produced by a simple mechanical formula. I have not found any other studies of GDP forecasts where the time horizon has been varied in such a way that comparisons can be made with the present findings. However, in line with the present findings it has been found that forecasts made approximately one year ahead of the outcome have a limited ability to predict turning points in GDP growth (Heileman and Stekler, 2010; Oller and Barot, 2001).

To obtain an idea of the reasoning behind the monthly forecasts for the current year and the following year, Table 1 gives the headlines presented by *Economic Outlook* for each of the 41 successive sets of forecasts from January 2007 until May 2010. It can be seen that in early 2007 there are no clouds in the sky. However, as early as March 2007, the forecasters have noted turbulence on the financial markets although it is dismissed as not threatening world growth – yet. The financial troubles reoccur in several of the successive headlines for 2007 (June, August, September, October, and November). In synchrony, the US forecasts for 2008 become gradually less positive (going from 3.3 % in January to 2.5 % in November, but with a jump downwards to 1.8 % in December). The slow adjustments may be interpreted as the use of the anchoring-and-adjustment heuristic. The forecasts for 2009 move downwards at a still slower pace. The European forecasts are unchanged during all of 2007. Thus, in 2007 the financial turbulence seems to be regarded as an American problem. Moreover, although the forecasters worry about the financial turbulence they do not seem have an idea of the impending financial disaster.

The headline for January 2008 is “US – no recession, thanks to Fed”. Several of the headlines for the following months deal with counter-

measures against the growing economic crisis (February, March, April, September, October). At same time the US forecasts for 2009 go down steadily until September 2009, when they plummeted until the bottom was reached in March 2009. The headlines in this period deal with the dramatic events that are happening at the time when the forecasts are made: massive counter-measures, bailouts, how the crisis spreads globally. The headline of April 2008 reads: "First signs of light at the end of the tunnel". Almost all monthly headlines after this until May 2010 concern the recovery of the economy in more or less optimistic tones. One has the feeling of being a car passenger on a bumpy road going to better times (see headline of December 2009). Again, the headlines seem to be reactions to the most recent signals. It is interesting to note the metaphorical language: the economy is sometimes described as a living entity ("distress mounts", "policy makers struggle", "green shoots", "is there life beyond...", "consumers stay cautious", cf. Sheldon et al., 2007). This metaphorical language is indicative of the representativeness heuristic. The metaphors give ideas about the immediate future of GDP. Another trace of the representativeness heuristic is words that signal that the economy is in a certain phase of the business cycle ("the slide towards recession", "light at the end of the tunnel", "recovery may prove slow", "recovery starts to get under way"). Thus, the forecasters seem to have an idea of regular ups and downs in the economy (which may be true to some extent) and they may base their forecasts on how the most recent information fits into this cyclical pattern.

It can be noted that one year ahead forecasts for the USA and Europe shadow the more imminent forecasts in each of the regions, implying the signs of a more rapid recovery in 2009 in the USA than in Europe, corresponding to more optimistic forecasts also for the following year (2010 and 211, respectively). It will be interesting to see how the economy in each of the two regions will actually turn out.

To summarize, the three classic judgmental heuristics and biases suggested by Tversky and Kahneman (1974) shed light on how the forecasts were made and justified. Apparently, they are not only heuristics but also biases. They explain how the most recent evidence is overgeneralized into the future (availability), how the long-term forecasts are based too much on short-term forecasts (anchoring) and how preconceived ideas about

business cycles and the economy as a living entity underlie the forecasts (representativeness). In line with this, the forecasts were practically useless for long-term predictions during the crisis, as well as earlier, and yet they continue to be used.

Perhaps a greater awareness of biases in economic forecasts made in connection with the recent financial crisis could have facilitated economists and people in general being more prepared for surprises. One of the points considered in the following and final section of this paper is the implications of this observation for possibilities of counteracting future economic and financial crises in Europe, and the world in general.

5 Conclusions: What does psychology say about possibilities of counteracting future economic crises?

The message of this paper has been that the recent financial crisis, as well as the economy in general, can be understood from a psychological perspective which complements the perspective provided by economics. Four themes may be discerned. First, economic behaviour, including behaviour in an economic crisis, is susceptible to a number of cognitive biases. Second, people have cognitive resources (often one side of a coin, with biases on the other side) that may be used to overcome cognitive biases. Third, economic behaviour is not only individual behaviour, but it also takes place at a collective level. This is perhaps particularly relevant when a financial bubble develops. Fourth, the psychological perspective is valid for everyone – laypersons and professionals alike – but with variations in how it is applicable.

Another theme in this paper has been that psychology and economics should be understood as a coherent whole. Depending on how the economy works, people's behaviour will be more or less well adapted. At the same time, the economic system can develop as a result of changes in how people think, feel, and behave.

This multifaceted and dynamic view of economic behaviour speaks against using regulation as the main tool for counteracting future crises. Instead, it is necessary to find means for stimulating a positive spiral in which people develop their own thoughts, feelings and behaviour by influencing and being influenced by the economic environment. This positive spiral would involve the development of a greater realism and understanding of financial matters, not only among lay persons, since professionals are also susceptible to cognitive biases. The spiral would also involve the development of a well balanced economic system, where trust and openness go hand in hand to optimize co-operation and peaceful competition and minimize the risk of a crisis of trust resulting from fraud and exploitation. These goals cannot be attained by regulation alone,

although some economic regulation may be useful to prevent counteracting future crises, especially if it can stimulate positive spirals.

With this theoretical background and also with a background in more specific findings presented in the present paper, I will now outline a number of points that could be included in a policy for counteracting future economic crises. These ideas are thought to be particularly relevant for the European scene, with its combination of well developed democracy and a fairly strong public sector in many countries. Sweden is a prototypical example of such a country.

The first recommendation is that governments and governmentally controlled companies as well as public sector organizations provide good examples of appropriate economic conduct in their own behaviour. In this way these agencies could serve as positive role models for normatively appropriate behaviour. For example, the exaggerated use of bonuses, which was one of the ingredients of the recent financial crisis, could be counteracted if the public sector and public companies take the lead with respect to a sensible usage of bonuses. This is the ambition in Sweden presently, and is clearly in line with the message of the present paper. Another example is to influence the lending policy of banks in ways that discourage financial bubbles by starting to change the policy in state-controlled banks, like SBAB in Sweden.

The second recommendation is to delimit the role of economic forecasts in economic politics. This paper, as well as earlier research, has shown that GDP forecasts that look more than approximately one year ahead are virtually useless. Relying on these forecasts may stimulate one-sidedness and overconfidence when forming an economic policy and may definitely hinder preparedness for future economic crises. Probably, there exists room for improvement of economic forecasts, for example, by trying deliberately to counteract cognitive biases in them. On the other hand, there are good reasons to believe that the real economy in fundamental aspects is intrinsically unpredictable. Convincing evidence for this assertion has been presented by Taleb (2007) in his “black swan” theory. This theory asserts that hard-to-predict events have a disproportionate role in the economy as well as in human development in general.

As I see it, the present form of point estimate forecasts of economic growth (for more than a year ahead) should be replaced by another way of thinking about the future, where there is more room for genuine uncertainty, by being open to the possibility that almost anything could happen. This would imply searching for robust economic policies that could withstand threats of different kinds, including threats where psychological aspects play a large role. This would also imply involving lay persons and people with different reasoning styles (e.g., like hedgehogs and foxes) in economic planning and forecasting.

The third recommendation is to take measures that stimulate innovative research in behavioural and financial economics. Although the yield of the research in this area has been ground-breaking, the volume of research is still quite small. In particular, there are few field studies on how actors in the financial market think, feel, and behave. In addition, there are few experimental studies where professionals in the financial and business world participate as subjects. Data tends to come either from college students who serve as participants in experimental studies or from register data on financial transactions. I think that Europe, and in particular Sweden, has a competitive advantage in relation to the USA with respect to the possibilities of developing behavioural research that comes closer to actual decision making among people who are active in finance and business. In several European countries the trust in government and official institutions, like universities, seems to be greater than in the USA (Berggren, 2000; Blind, 2006). To the extent that this is true for the business world, there are interesting research possibilities for researchers in behavioural and financial economic economics.

The fourth recommendation is to take various measures that increase people's understanding of financial matters and private economy, including better awareness of the risk of being susceptible to biases in their economic decisions. The greater the gap between the financial knowledge of professionals and laypersons, the greater is the risk that laypersons will be exploited or at least feel that they are exploited, for instance, when losing money on their investments. Conversely, if people are more informed in financial matters, they will be able to make decisions that are anchored in their own values and goals, which in turn will create a better balance between financial companies and their clients. There seems to be

a great need for education in this area. In a country like Sweden, millions of people are shareholders, in specific stocks or in mutual funds, or even invest in sophisticated savings products like hedge funds. In addition they make decisions about how their pensions should be invested, they borrow large sums of money for housing, they use various kinds of credit to pay for their consumption and so on. Still people's knowledge seems to be limited in financial matters (Hedesström, Svedsäter and Gärling, 2009). Possible concrete measures to increase people's level of financial knowledge include introducing private economy as an important school subject and using the media to educate people in this area, where public-sector media like certain television and radio channels could take the lead. The more this subject is officially recognized as important in this way, the more people may try themselves to learn about it in their own interest.

The fifth recommendation is to stimulate a development that increases the transparency of financial products. Difficulties of seeing through sophisticated investment products appear to have contributed to the recent financial crisis. In line with the general message of this paper, I do not think that regulation is the primary route for increasing transparency in the financial market. The ideal is for transparency to become an important factor in the competition between banks and financial companies. This is to say that people will require openness and easily understood information about investment products when choosing between them. To help promote such a development, the media could again play an important role, with public sector media in the lead. Consumer organizations may also participate in this development with some monetary and moral support from the government. Still another possibility is that governmental institutions like the Swedish Financial Supervisory Authority (*Finansinspektionen*), either directly or indirectly through consumer organizations, builds up easily available databases and computerized tools for evaluating and understanding savings products. The result of such endeavours could be a positive spiral where banks and financial companies compete in helping customers to make informed decisions, which in turn educates the customers to be still more informed.

In the aftermath of the financial crisis, the importance of increased transparency of financial products has been stressed by the European Commission. Recently, an EU directive was issued (2009/65/EG) that

proposed various types of information that should be given to buyers of financial products, such as a seven-point rating of the risk level of a product based on volatility of past performance (Committee of European Securities Regulators, 2010). I see it as a problematic issue to decide what information that really increases transparency should look like. For example, a risk score could lull people into a false sense of security and in this way counteract transparency. Remember the high ratings that rating institutions gave to the “toxic” CDO bonds. Past low volatility is no guarantee of future low volatility (Mergner and Bulla, 2008), for example, when “black swan” events occur in a particular market (Taleb, 2007, 2009). I think that real transparency is not only tied to how an investment product is presented (although this is important), but also to an ability to see through the apparently attractive surface of a product or, vice versa, to see possibilities in the negative framing of an investment product. This includes an awareness of how cognitive biases affect the evaluation of an investment product and also a feeling of the importance of unknown “black swan” risks. It is up to every investor to cultivate this ability. Exactly as ordinary people can judge the competence of a football team, or the value of a house, or the status of one’s own health (often better than the doctor does), it should also be possible to learn how to evaluate the risks and possibilities associated with investment products. More lucid presentations of investment products could be helpful, but cannot replace personal competence in evaluating the product.

I would like to conclude this paper by outlining a vision of economic life in the fictional country of Utopia. Imagine that Utopia is a medium-size northern European country like Sweden in the year 2020. In the year 2011, when the present paper was published in Utopia, a growing number of people became interested in behavioural economics. These included persons with responsible positions in the public and private sectors of the economy, respectively. Thanks to these people’s commitment, a development started that changed economic life in Utopia. In 2020 one of the most popular topics of conversation among people is economic issues and their relation to private investments. People discuss the pros and cons of different investment possibilities and the future prospects of different companies and branches of the economy. They talk about their strategies for minimizing bias and maximizing realism and objectivity in their economic decisions. They discuss how to handle the problem of “black swans”. They

also discuss the goals of investing money, goals besides maximizing profit such as security, moral responsibility and time horizons. They do not talk about how much money they possess or have won or lost, but about how they dispose of their economic resources. They are not only engaged in their own economic decisions, but also in economic decisions made by companies and politicians. Some people participate in focus groups that public and private institutions and companies have organized in order to gain ideas about how to meet citizens' and customers' values and goals in their economic decisions.

The economy flourishes in Utopia. Regulation is minimal. The economy works well thanks to strong behavioural norms, a mutual trust between different groups of actors, and a widely shared genuine interest in economic problems. Equity funds all over the world use Utopia as a test market. Saving money has developed to an art, where different styles and philosophies compete with each other. The result is a diversified financial market with a good balance between institutions and ordinary people and with respect to the potential of coping with good and less good economic times (which may come). Some foreigners think that Utopians are boring in their exaggerated interest in the economy. The Utopians themselves, at least some of them, cannot understand why the economy should not be just as interesting as sports, music, the weather and other things that make life interesting for many people.

Sammanfattning

Denna rapport handlar om hur psykologisk kunskap kan belysa finanskrisen. Syftet är att visa hur psykologiska insikter kan ligga till grund för reformer som skulle kunna mildra framtida finansiella kriser inom EU-området (snarare än att syftet är att kommentera specifika reformer).

Psykologisk forskning har funnit att människors kognition fungerar på två olika sätt. Det finns en intuitiv funktion (System 1) där människor gör bedömningar och fattar beslut snabbt och automatiskt, och en analytisk funktion (System 2) som är medveten och långsammare. Båda systemen kan vara rationella eller irrationella, beroende på i vilket sammanhang de verkar och även beroende på hur rationalitet och irrationalitet definieras. Detta innebär att det är möjligt att skilja mellan fyra typer av kognitiva funktioner genom att kombinera System 1 respektive System 2 med rationalitet eller irrationalitet, eller mer exakt med en adaptiv eller icke-adaptiv kognitiv funktion.

Adaptiv intuitiv (System 1) kognitiv funktion. System 1 har ibland god kontakt med verkligheten och detta i två olika sammanhang. Å ena sidan, genom att ha tillgång till många tusentals mönster som har lagrats i långtidsminnet kan System 1 snabbt och automatiskt känna igen och värdera olika företeelser. Förmågan att göra detta är en viktig beståndsdel i verklig expertkunskap, även på den finansiella marknaden. Å andra sidan, med hjälp av snabba och enkla regler kan lekmän vara bättre än experter på att utnyttja de viktigaste dimensionerna i till exempel en finansiell produkt för att göra snabba och relativt korrekta bedömningar.

Icke-adaptiv intuitiv (System 1) kognitiv funktion. System 1 kännetecknas av ett lokalt här-och-nu-orienterat sätt att tänka, där allt som är utanför fokus är mindre verkligt i någon mening. Detta gäller för såväl riskbedömningar som hur vi utvärderar och integrerar information (prospektteori). Dessutom kan System 1 lura människor – oss alla, vare sig vi är experter eller lekmän - att se mening där det inte finns någon mening, till exempel i slumpmässiga ekonomiska skeenden. Dessa felbedömningar (bias) leder till överkonfidens och förstärks av ett allmänt konfirmeringsbias, vilket i finanskrisens förspel resulterade i att varken professionella ekonomiska aktörer eller lekmän kunde

inse de långsiktiga riskerna med utvecklingen på finansmarknaden, samtidigt som de blev förförda av möjligheten till stora kortsiktiga vinster. Lägg till detta att det troligen rådde en obalans mellan å ena sidan banker och andra finansiella företag, och å andra sidan deras kunder när det gäller förekomsten av vissa kognitiva bias. En misspassning som utnyttjades av den förra parten och gav näring åt de obalanser som till slut ledde till att den finansiella krisen byggdes upp och utlöstes.

Adaptiv analytisk (System 2) kognitiv funktion. De kognitiva bias som bidrog till krisen hade inte kunnat elimineras genom att människor hade gjorts medvetna om dem, även om det finns några enkla ”debiasing”-tekniker som kan vara användbara. För att effektivt motverka kognitiva bias är det nödvändigt att bygga upp en ny kultur som gynnar System 2-tänkande. I en sådan kultur bör individuella skillnader i kognitiva stilar erkännas.

Icke-adaptiv analytisk (System 2) kognitiv funktion. Icke-adaptivt System 2-tänkande innebär ett mer eller mindre omoraliskt slags rationellt tänkande - rationalitet utan hjärta - som uppenbarligen var för handen under den finansiella krisen, inklusive ett par spektakulära fall.

Drivkraften i den finansiella krisen kom från faktorer som verkade på en kollektiv nivå. Innan krisen bröt ut, gick ett ökande antal aktörer åt samma håll, en utveckling som byggde upp den finansiella bubblan. En sådan utveckling karaktäriseras som flockbeteende. Men flockbeteende kan inte ensamt förklara utvecklingen av krisen. Det kan inte förklara den anmärkningsvärda synkronisering av beteenden hos olika grupper av människor som skedde under åren före finanskrisen. Detta var ett resultat av bristande konkurrens mellan olika synsätt och ledde till en verklighetsbild som innebar att många USA-medborgare uppfattade den egna bostaden som en sedelpress och de svårgenomskådliga CDO-obligationerna som lönsamma finansiella instrument, där risker hade vägts samman på ett sofistikerat sätt. Tillväxten av den finansiella bubblan accelererade som ett resultat av en ökad utbredning av ett grupp-tänkande där människor ömsesidigt förstärker en förenklad bild av verkligheten. Detta tänkande är en följd av att sociala identifikationer binder samman parter som tidigare har haft motstridiga intressen, framväxandet av nya sociala normer samt en låg tilltro till den egna förmågan (att t. ex. bedöma de komplicerade CDO-obligationerna). Grupp-tänkandet ledde till ett undertryckande av obeqväma röster (exempelvis ekonomer som varnade för

vart utvecklingen var på väg), en polarisering mellan olika grupper (vilket visar att grupper är beredda att ta större risker än individer) och en självcensur som i sin tur gav en illusion av samstämmighet.

Ett snabbt raserande av förtroendet över hela världen - inte minst i Europa - fick den finansiella bubblan att explodera och de olika aktörernas gemensamma marschriktning förbyttes i antagonism. En mer kritisk hållning (i linje med System 2) tog över och ledde till ett "sanningens ögonblick", vilket skapade en möjlighet att vidta åtgärder mot framtida kriser. Misstro kan dämpas och förtroende återskapas genom att människor talar med varandra. Så skedde också efter krisen, och det handlade inte minst om samtal mellan såväl politiker i de enskilda länderna som kontakter länderna emellan.

Finanskrisens olika faser kan beskrivas som tre skilda typer av relationer mellan individen och den kollektiva nivån: den endimensionella hyperindividen (uppbyggnaden av den finansiella bubblan), det uppsplittrande kollektivet (finansbubblans bristande) och det välbalanserade kollektivet (målet att försöka återställa ekonomin efter krisen).

I denna rapport ges, det vill jag understryka, en kognitiv beskrivning av den finansiella krisen snarare än en icke-kognitiv enbart baserad på känslor och flockbeteende, och där man försummar att ta upp betydelsen av den upplevda gemensamma verkligheten.

Den finansiella krisen har också setts som en kris för ekonomiska prognoser. Jag har använt mig av prognoser från Oxford Economics för att finna möjliga kognitiva förklaringar till misslyckandet med att förutsäga krisen i såväl Europa som i USA. Rapporten ger stöd för uppfattningen att prognosmakarnas misstag berodde på oförmågan att göra prognoser som sträcker sig längre i tiden än ett år.

En slutsats i rapporten är att framtida kriser kan motverkas genom att man stimulerar en process där människor får utveckla sina egna tankar, känslor och beteenden i ett växelspel mellan ekonomiska aktörer och den omgivande ekonomiska miljön. Detta mål kan inte uppnås enbart genom regleringar utan måste ske med hjälp av olika parter aktiva medverkan. Följande åtgärder rekommenderas för att underlätta en sådan utveckling: (1) Såväl regeringar och statligt kontrollerade företag som organisationer inom den offentliga

sektorn bör föregå med gott exempel när det gäller det egna agerandet på det ekonomiska området. (2) Ekonomiska prognoser bör begränsas och ersättas med ökad öppenhet för s.k. ”svarta svanar” (oförutsebara händelser), vilket innebär att man på allvar måste beakta att vissa grundläggande aspekter i den reala ekonomin till sin natur är oförutsägbara. (3) Nyskapande forskning inom beteende- och finansiell ekonomi bör stimuleras. Flera europeiska länder erbjuder goda möjligheter till insamling av användbara fältdata. (4) Åtgärder bör vidtas för att öka människors förståelse av såväl finansiella frågor i allmänhet som marknadsekonomi, inbegripet en ökad medvetenhet om riskerna för felbedömningar när det gäller de egna ekonomiska besluten. (5) En utveckling som ökar insynen i och transparensen hos finansiella produkter bör uppmuntras, men reglering är nog inte det bästa medlet att åstadkomma det. Helst bör transparens bli en viktig faktor i konkurrensen mellan banker och finansbolag, och i rapporten behandlas också ett nytt EU-direktiv om regler för mer transparent information om investeringsprodukter.

Slutligen ges i rapporten en utopisk vision av det ekonomiska tillståndet i ett fiktivt land som har utvecklats i linje med de fem rekommendationer som beskrivs ovan.

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Table 1. Overview of monthly forecasts (January 2007–March 2010) of GDP one and two years ahead in the USA and the Euro zone.

Date of forecast	Headline in Economic Outlooks	US08	US09	Eu08	Eu09
Jan 07	Positive start to 2007	3.3	3.4	2.2	2.0
Feb 07	US soft landing is on track	3.0	3.2	2.1	2.0
Mar 07	Turbulence on financial markets doesn't threaten world growth – yet	3.1	3.1	2.2	2.0
Apr 07	Global economy set for a good year ... despite slower growth in the US ... as Europe steps up...	3.0	3.1	2.1	2.0
May 07	China offsets US slowdown	3.1	3.2	2.3	2.0
Jun 07	Improved outlook raises interest rate expectations, causing stockmarket jitters	3.1	3.2	2.3	2.1
Jul 07	Continued strong growth prospects leaves policymakers troubled by inflation	3.1	3.1	2.4	2.1
Aug 07	Financial jitters – how long a shadow will they cast?	2.8	3.1	2.4	2.1
Sep 07	Financial market turbulence to impede growth	2.5	3.0	2.3	2.1
Oct 07	Is the damage to the real economy from the credit crunch contained?	2.5	2.8	2.2	2.1
Nov 07	The credit crunch returns, and growth fears intensify	2.5	2.9	2.1	2.1
Dec 07	The US leads forecast downgrades	1.8	2.6	2.0	2.1
Jan 08	US – no recession, thanks to the Fed	1.8	2.7	2.0	2.1
Feb 08	Weaker activity spurs policy makers into action	1.8	3.3	1.7	2.0
Mar 08	A fall in employment to keep the Fed busy	1.7	3.3	1.7	2.0
Apr 08	Payrolls point to near term growth risks – but extra stimulus to prompt recovery	1.5	2.5	1.8	1.8
May 08	Are commodity prices now a bigger threat than the credit crunch?	1.5	2.5	1.6	1.8
Jun 08	Growth outlook darkens as inflation fears mount	1.6	2.0	1.7	1.4
Jul 08	Consumer squeeze compounds financial stress	1.6	1.7	1.5	1.2
Aug 08	Growth concerns shift to Europe	1.7	1.7	1.3	0.9
Sep 08	Will the bailout of Freddie and Fannie halt the slide towards recession?	1.8	1.5	1.3	0.8
Oct 08	Governments step in as global recession looms	1.5	0.4	1.1	0.1
Nov 08	As global recession becomes a reality, stimulus efforts to redouble	1.3	-0.4	1.0	-0.5
Dec 08	Global economy facing worst year since 1945	1.3	-1.9	0.9	-1.8

		US09	US10	Eu09	Eu10
Jan 09	Distress mounts as deleveraging spreads to the corporate sector	-2.0	2.9	-2.1	0.8
Feb 09	Policymakers struggle to head off growing risk of deflation	-2.1	2.9	-2.6	0.6
Mar 09	Massive corporate deleveraging exacerbates the global downturn	-3.6	1.5	-3.2	0.4
Apr 09	First signs of light at the end of the tunnel	-3.4	1.6	-3.8	-0.3
May 09	Recovery still some way off, despite 'green shoots'	-3.1	1.2	-4.0	-0.1
Jun 09	Is there life beyond the stock cycle?	-3.0	1.2	-4.7	-0.1
Jul 09	The recession eases... .. but recovery may prove slow... .. as consumers stay cautious...	-2.8	1.7	-4.8	-0.1
Aug 09	Too soon to think of 'exit strategies'	-2.8	1.9	-4.5	0.2
Sep 09	Recovery starts to get under way – but at what pace?	-2.7	2.3	-4.0	0.5
Oct 09	Global economy past its trough... .. but still reasons for caution...	-2.5	2.5	-4.0	0.6
Nov 09	Asset markets divided over recovery prospects	-2.5	2.4	-3.9	0.8
Dec 09	Good news from the labour market – but still a bumpy path ahead	-2.5	2.6	-4.0	1.1
		US10	US11	Eu10	Eu11
Jan 10	World economy growing again... ..with emergers leading the way... ..but the US also picking up	3.2	3.0	1.1	1.5
Feb 10	Uncertainty persists as concern about sovereign risk rises	3.3	3.2	1.0	1.6
Mar 10	Will the G7 economies be left behind in 2010?	2.3	3.1	0.5	1.6
April 10	How robust is the global recovery?	3.2	3.3	0.9	1.6
May 10	Bond market crisis holds back Eurozone, but growth elsewhere strong	3.5	3.8	0.7	1.3

Figure 1. The value function in prospect theory.

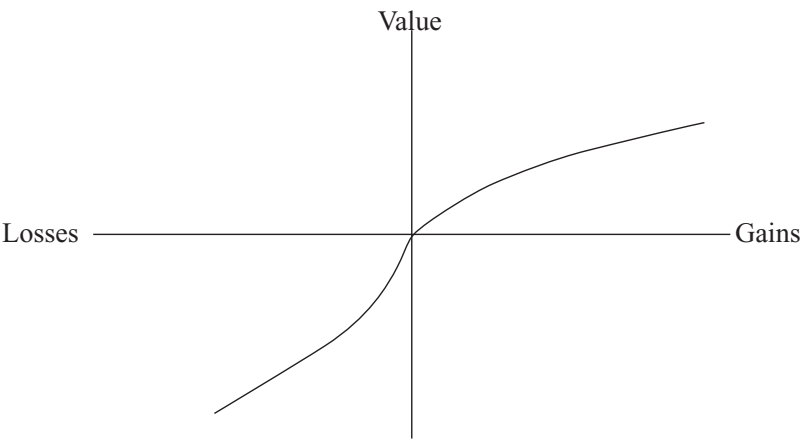


Figure 2. Forecasts of GDP for 2009 in USA (US09) and in the Euro-zone (EU09) made in successive months from January 2007 until May 2010.

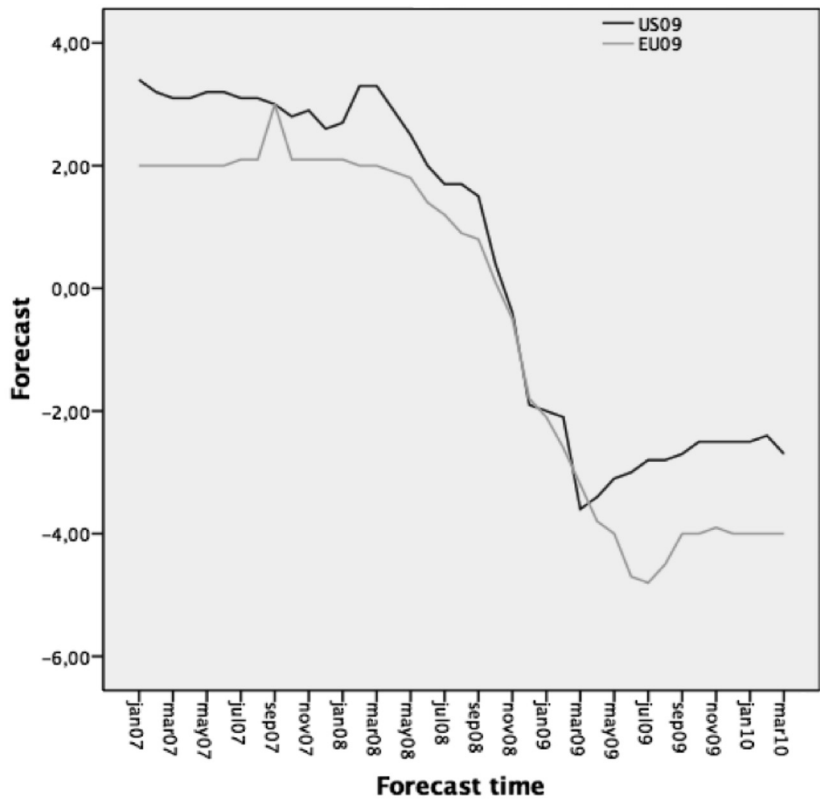


Figure 3. Forecasts of GDP for 2010 in USA (US10) and in the Eurozone (EU10) made in successive months from January 2007 to May 2010.

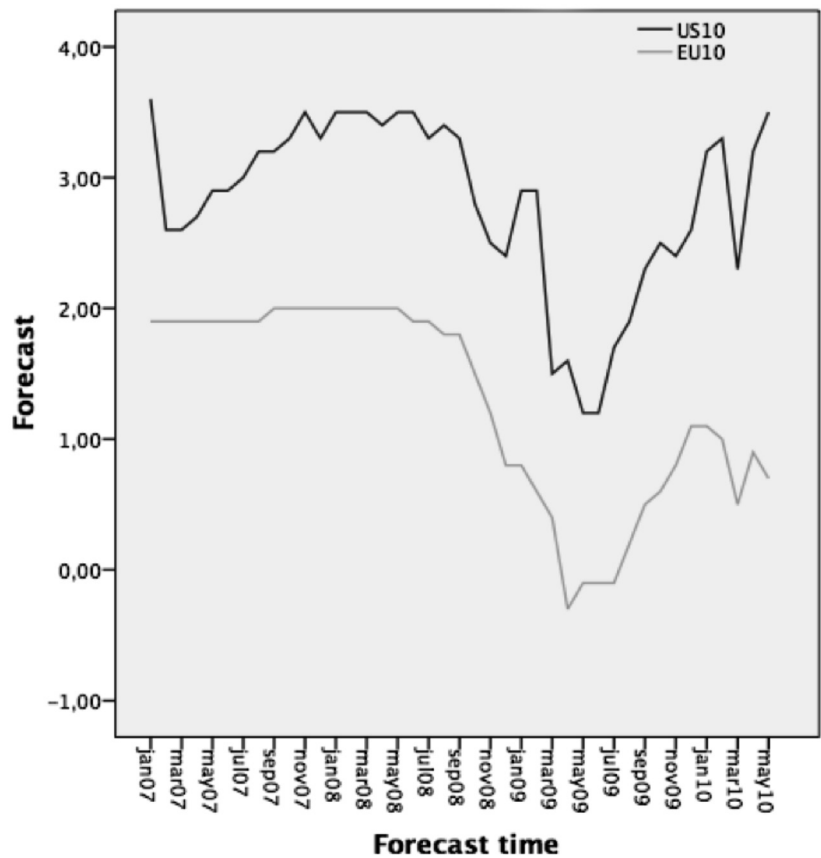


Figure 4. GDP forecasts for USA for target years 2001–2011 made on four occasions: [a] zero years ahead (= the actual outcome as it was known at the end of the target year), [b] half a year, [c] one year, and [d] one and a half years before the end of the target year.

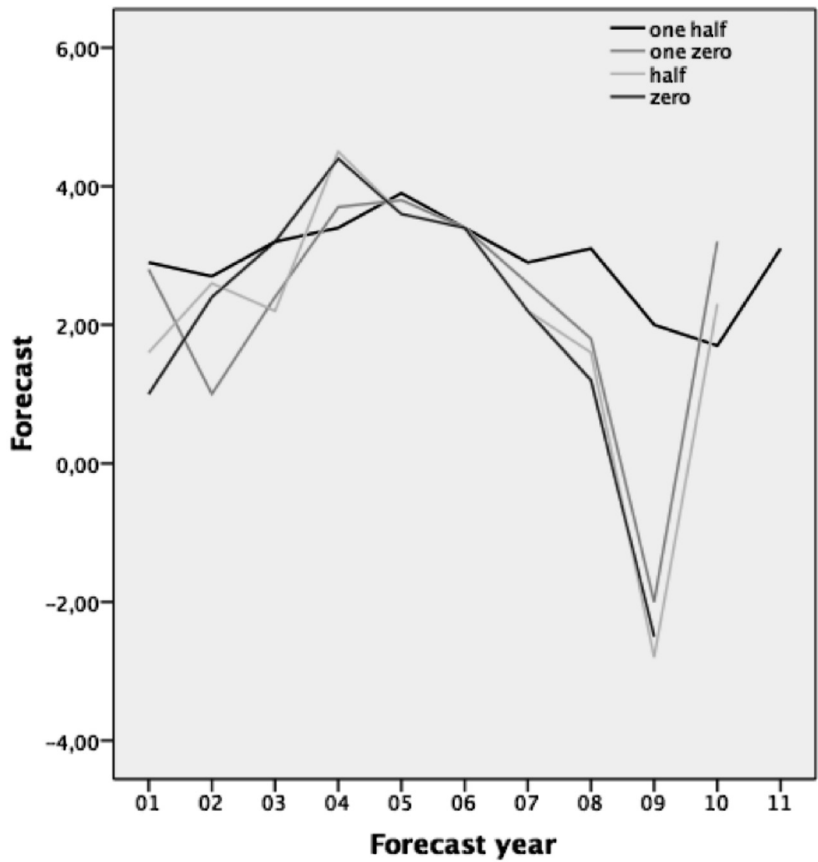
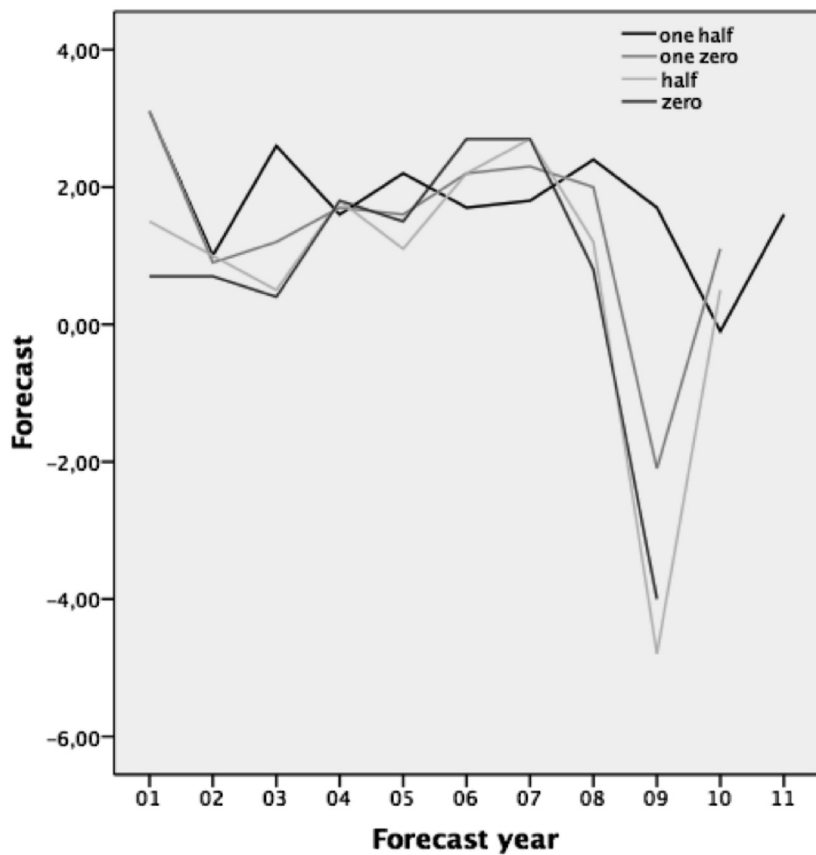


Figure 5. GDP forecasts for the Eurozone for target years 2001–2011 made on four occasions: [a] zero years ahead (= the actual outcome as it was known at the end of the target year), [b] half a year, [c] one year, and [d] one and a half years before the end of the target year.



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