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CORVINUS UNIVERSITY OF BUDAPEST

The behavioural motives of the optimistic EPS forecasting error

Analysing Hungarian and Austrian companies' EPS forecasts

Ph.D. dissertation

Erika Jáki

Budapest, 2012

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Department of Enterprise Finances

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CORVINUS UNIVERSITY OF BUDAPEST

MANAGEMENT AND BUSINESS ADMINISTRATION DOCTORAL
SCHOOL

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Foreword

"IN 2008, a massive earthquake reduced the financial world to rubble. Standing in the smoke and ash, Alan Greenspan, the former chairman of the U.S. Federal Reserve once hailed as "the greatest banker who ever lived," confessed to Congress that he was "shocked" that the markets did not operate according to his lifelong expectations. He had "made a mistake in presuming that the self-interest of organizations, specifically banks and others, was such that they were best capable of protecting their own shareholders." We're painfully blinking awake to the falsity of standard economic theory – that human beings are capable of always making rational decisions and that markets and institutions, in the aggregate, are healthily self-regulating. If assumptions about the way things are supposed to work have failed us in the hyperrational world of Wall Street, what damage have they done in other institutions and organizations that are also made up of fallible, less-than logical people? And where do corporate managers, schooled in rational assumptions but whorun messy, oft en unpredictable businesses, go from here?" (Ariely, 2009, Page 78-79)

Introduction

> *„Even though we recognize that people make a large number of forecasts in business, we know relatively little about the behaviour of the judgmental forecaster and the biases that are typically present."*
> *(Lawrence és O'Connor, 1995, Page 443)*

Theoretical economics has undergone great changes in recent decades. Instead of earlier closed-thinking systems we can now more and more often encounter scientific methods and results of other disciplines in economics and finance research. The appearance of interdisciplinarity is most striking in the relationship of finance and psychology (Komáromi, 2003a).

In my research I organise the findings of four disciplines into a coherent system. These are:

1. *Corporate finance*, to which the topic of EPS[1] forecasting is related.
2. *Decision-Sciences*, which itself is of a multidisciplinary nature and closely connected to psychology, as many uncertainty factors must be weighed in EPS forecasting. Seldom is it possible to judge probabilities objectively; rather, it tends to take the form of subjective estimates (Zoltayné, 2005).
3. In interpreting psychological phenomena in EPS forecasting I also rely on the empirical findings and ordering principles of *behavioural finance*.
4. Further, I have used the conclusions and research results of *cognitive psychology*.

The theme of my thesis is financial planning, with a focus on systemising the key behavioural causes of systematic optimism so far identified and proven as characteristic of the EPS forecasting error. A number of publications have been devoted to the subject

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[1] EPS = earnings per share

including the systemisation of interactions between certain behavioural factors; however, there are often multiple terms used to denote the same mechanism and comparing the findings of several studies allows exploring the mechanism of different behavioural factors relative to each other. Specialised literature uses several terms to describe optimism characterising financial planning, such as overplanning, optimistic targets, or systematic optimism in financial planning etc. I also use these concepts in my thesis but they all mean that the forecasted result exceeds the actual figure.

The phenomenon of overplanning has been studied from a number of aspects. There have been structural studies leading to the conclusion that costs tend to be underplanned to a lesser extent than revenues are overplanned, i.e. it is in the case of overforecasting sales revenues that overplanning justifies systematically optimistic forecasted results. Another aspect of study is to look at what motivates especially the analyst making the EPS forecast to project a higher EPS value. A third important area of focus is the psychological factors at play in the process of forecasting. It is these research findings that the thesis presents and systemises. This systemisation may not necessarily be true in other disciplines; the correlation of cognitive thinking elements is explicitly characteristic of financial planning

When it comes to financial forecasting it is important to distinguish cases where the financial planner has a decision-making role from those where he does not. It is the managers that have decision-making powers, typically in cases of mergers and acquisitions (M&A), new investments or even drawing up annual plans. The thesis does not examine forecasting errors in making annual corporate plans as target figures are dictated by top executives or the parent company. In addition, there are other incentives that come into play in annual planning as the level of bonuses is linked to the gap between plan vs. actual; clearly, therefore, there is a drive towards setting lower targets.

Thus, I make a clear distinction between two important cases in financial planning, one being where managers make a financial plan for considering a critical decision from a financial aspect and seek maximum accuracy. The other is when corporate analysts make (*inter alia* EPS) forecasts about a company on the stock exchange but have no influence on implementing the plan. The identified cognitive thinking factors are generally true of both cases.

I have taken the research idea from Kahneman and Lovallo's (2003) article "Delusion of Success", which is the most comprehensive publication on the subject. It lists several cognitive thinking mechanisms that may explain the phenomenon of overplanning observed in financial forecasting but fails to explore the decision-making process or which points in that process those mechanisms affect. Many publications have come to light on individual elements of cognitive thinking and the findings of each make a contribution to understanding cognitive thinking involved in financial planning and the decision-making process.

I have divided the dissertation into three chapter.

Chapter One gives an overview of the conceptual framework necessary for processing this subject, including:

1. An introduction to the criteria of rational decision-making and to decision-making models;
2. Normative and descriptive schools of decision sciences. These present two different approaches to examining decision-making;
3. A brief overview of notions used by descriptive decision theory (with a focus on the phenomenon of overplanning);
4. The definition of EPS;

Chapter Two of the thesis will discuss financial overplanning (a form of which is the typically optimistic EPS forecast) and especially the underlying psychological causes as well as summarising and categorising existing research findings. The psychological causes of overplanning can be grouped into three main categories of impact:

1. overconfidence and overoptimism
2. illusion of knowledge
3. illusion of control.
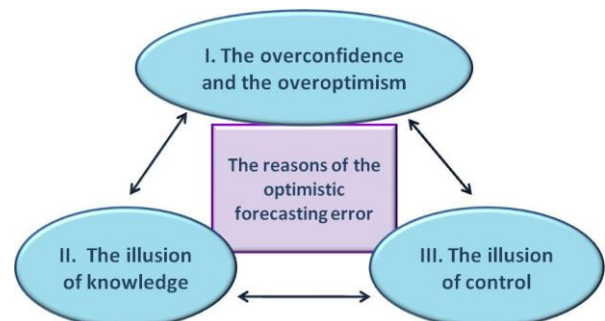
Figure 1.: The theoretical structure of the paper

Most studies point foremost to **overconfidence and overoptimism** as the underlying psychological cause.In addition to defining the two concepts, I also discuss how and why overconfidence develops. An interesting question is why we think that failures will diminish our belief in our own capabilities or our optimism about the future. Even so, why is it that failures do not actually diminish our self-confidence and optimism? Understanding our psychological immune system provides the answer to these questions! Naturally, the reader may feel compelled to ask the question "Is that supposed to mean that having an optimistic outlook is wrong?" Optimism has many benefits and is very important in everyday life, which I will cover in detail at the end of the chapter

The articles provide proof for the formation of the **illusion of knowledge** along some particular causes but only introduce the interaction of them partly and only in relation to a few mechanisms. No comprehensive systemisation of results achieved so far has taken place to date. In respect of the illusion of knowledge, Kahnemann's work must be highlighted. Several of his publications and studies are considered as milestones in understanding the formation of the illusion of knowledge.

For an understanding of the formation of the illusion of knowledge I have taken as a basis the mechanism of information processing, in particular its first step: the perception of information. The reason for the formation of the illusion of knowledge is that the subject does not attach appropriate weights to new pieces information in considering them. He attaches too much weight to information confirming his opinion and too little weight to what disconfirms it. I examine the formation of the illusion of knowledge along the anchoring bias. The anchoring bias explains the inadequate weighting of information, as a result of an anchor (which is a value already known or presented for the variable in question) strongly influences the estimation of the final value. The formation of the *anchor* itself and its characteristics has been studied from countless aspects. The anchor can be numerical or non-numerical, relevant or irrelevant, and can be derived from an external source of information or a memory conjured up internally. Further, it has been proven that prior expectations, stereotypes and previous experience function as anchors. Thinking in stereotypes is a non-numerical internal anchor, which draws attention to the role of the representativeness heuristic. The representativeness heuristic explains the role of EPS values in recent years and the

effect of managers' strategic concepts. The anchoring role of managerial strategy talks is pointed out by the inadequacy of the subjective judgement of conjunctive and disjunctive events. It was proven as part of the anchoring bias. Earlier experience and opinions that belong to an internal anchor are linked to the availability heuristic.

Financial planning and EPS forecasting have an effect on the analyst's or planner's sense of usefulness. In the course of time, the planner feels like possessing all the accompanying benefits of the EPS forecast (bonus, good relationship with the managers) or of the business (profits) and start to feel attached to the forecasted value. Mental accounting, one of the most seminal behavioural theories linked to the reference point of the value function presented in Kahneman and Tversky's (1979) Prospect theory[2] helps understand the cognitive process of anchor fixation.

The other part of the anchoring effect, *inadequate adjustment*, has also been widely studied. There have been several studies all coming to the same conclusion and proving the effect of the confirmation bias and bounded rationality. They also refer to the confirmation bias as motivated reasoning or confirmation evidence. Each study has proven that information concordant with the anchor is given greater weights when taken into account.

In accordance with the foregoing, the thesis discusses the formation of the illusion of knowledge along the anchoring bias in three stages:

A. anchor formation
B. anchor fixation
C. inadequate adjustment.

At the end of the Part I, I will present those techniques the use of which can mitigate the effect of biases in the formation of the illusion of knowledge.

In closing Chapter II, I will cover the *illusion of control*, which is closely linked to the formation of the illusion of knowledge and also overconfidence. The three psychological effects reinforce each other – as the illusion of knowledge increases so does the financial planner's illusion of control and self-confidence in relation to the given task. Thus the person with higher self-confidence will quickly develop the illusion

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[2] Kahneman was awarded the Nobel Prize for his Prospect theory.

of knowledge and control. In addition, whoever believes that they are able to control events will be more liable to overlook bits of information that otherwise warrant caution.

Chapter III of the thesis is devoted to the **empirical study** of the structure and direction of the error in EPS forecasting (as a form of financial planning) made for Hungarian companies listed on the stock exchange. For comparison, I included in the study the Austrian counterparts of the Hungarian companies. The study is innovative in terms of both its temporal and geographical scope. The research was conducted with a focus on altogether 7 companies of 3 industries in 2 countries on the basis of EPS forecasts of 53 financial analyst companies. The sample is exhaustive in respect of the EPS forecasts in the given period and for the given companies. The research conclusions are valid within these limitations. I look at two periods, one being the 5 years preceding the crisis (2003-2007), the other being the 17.09.2008-2010 period following the bankruptcy of Lehman Brothers.

Methodologically, I assembled the EPSerr formula using the methodology of earlier studies and conducted a descriptive statistical analysis for it. In order to verify several hypotheses I determined different variables; I studied their effect on the average EPSerr using the ANOVA test and examined the variance of scatter with the Levene test. Since DeBondt and Thaler's (1990) article, regression analysis has been a favoured technique in the study of EPS forecasts. I repeated in the research several earlier regression analyses and also assembled a new, modified formula myself.

The **central focus of the study** is the weighting of information and making a distinction between positive and negative information, i.e. the empirical examination of the confirmation bias as one of the cause of the formation of the illusion of knowledge. I grouped my hypotheses into three categories:

1. First, I studied whether we could capture systematic optimism in the two periods. Surprisingly, as opposed to earlier studies, in the period 2003-2007 pessimistic forecasts were made for 5 of the 7 companies under review. The reason being the underweighting of positive news. 2003-2007 was a period of positive news in the oil industry and the banking sector, which allowed me to investigate the weighting of positive news in a real environment.

2. I took a particularly close look at the effect of the ***global financial crisis*** on the EPSerr*,* which increased uncertainty and was regarded as decisively negative information. Based on earlier research conclusions, both increased the optimism of the EPSerr, which I examined by comparing the two periods. I analysed the two variables in DeBondt and Thaler's regression analysis – forecasted ΔEPS and actual ΔEPS – using descriptive statistical methods whereby I was able to separate the effect of the crisis as negative news and as an uncertainty factor. The crisis as negative news was underweighted, which squares with earlier research findings, but in the uncertain environment forecasts became pessimistic again.

3. Finally, a favoured method of weighting information in studies is the examination of the effect of EPS change in the previous year (hereinafter: ΔEPS_{t-1}) on the forecasted ΔEPS (FC). In both periods under review, I divided ΔEPS_{t-1} values into 5 identical parts along percentiles. The study draws attention to the distinction of extreme positive and negative news from *"credible"* positive and still *"underratable"* negative news. Extreme[3] negative news is overrated, i.e. analysts set EPS forecast values too low, whereas extreme positive news is ignored.

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[3] The thesis does not cover the definition of extreme news. It is important to note, though, that how a bit of news is accepted and weighed depends to a great degree on the decision-maker's personality, knowledge and expectations. Accordingly, a piece of news in itself cannot be safely considered extreme. In all cases, it is necessary to factor in the information environment and the decision-maker's personality.

1 Chapter Literature review and conceptual framework

Economic theories assume that decision-makers make rational decisions. Their basic criterion is to be perfectly informed, which is a goal decision-makers earnestly seek to achieve.[4] Systematic optimism observed in financial planning can be traced back to the imperfection of information processing. From a behavioural aspect, the underlying causes lie in certain cognitive thinking patterns. Before exploring cognitive reasons I will first define the concepts I use in the thesis, in particular

- the concept of rationality and
- related schools of thought in decision theory the definition of EPS and the method of forecasting
- overplanning and its synonymous equivalents.

I will present previous study conclusions in respect of the EPSerr. By the end of Chapter I the reader will be familiar with those cognitive thinking patterns and concepts which will be discussed in detail in Chapter II of the thesis.

1.1 Rationality and rational behaviour

> *"Rationality is usually referred to as THE criterion of good decisions" (Zoltayné, 2005, Page 167)*

Rationality as such has different definitions. One can distinguish formal rationality, Max Weber's concept of purposive-rationality and value-oriented rationality. Closely connected to the latter two concepts are those of substantive and procedural rationality. From the aspect of my theme, economic rationality and Herbert A. Simon's concept of bounded rationality are particularly relevant.

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[4] Identifying investment alternatives requires the investigation of a number of environmental segments, an overview of which is given by Jáki (2004a).

Rationality concepts can be assigned to two decision-theory schools of thought, namely normative and descriptive decision-theory. Let us see the difference between the two schools of thought.

1.1.1 Normative decision-theory

Normative decision-theory is basically linked to the concepts of *purposive* and *formal rationality*, and proposes solutions to the question of *"how one should decide"* (Zoltayné, Könczey, Szántó, Wimmer, 2008). Theories belonging to this school of thought focus on the process of decision-making, offer methodological solutions and present the elements of decision-making. They examine the end-point of the decision, i.e. whether the decision made is optimal from the aspect of the final goal (Zoltayné, 2005). Normative models began to be developed from the 1950s; the best-known of them is what is considered to be an ordering model, namely *Bayes'* SEU[5] (Subjective Expected Utility) model, or the maximisation of expected utility.

Based on the SEU model's assumptions the decision-maker (Simon, 1983):

1. knows all possible options of action,
2. knows for sure the outcomes and consequences of each variant of action, and
3. is certain to be able to determine the order of preference of the outcomes.

The first two points assume being perfectly informed, while the third one presupposes a clear system of preferences.

According to the theory of **formal rationality**, the decision-maker selects actions that best suit their goals and the decision-making process is consistent with their preferences. The analysis is determined by the assessment of the consequences of each optional action. Each alternative serves the achievement of the goal. Closely linked to

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[5] SEU $= \prod_{(i)}*U_{(i)}$, where: $\prod_{(i)}$ signifies the probability of the outcome of an event and $U_{(i)}$ denotes the subjective utility of that event.

The SEU is based on the assumption that the decision-maker is capable of anticipating the subjective utility of the outcome of every single event (there are also several theories for defining the concept of utility), and he is able to evaluate the probability of the occurrence of each event subjectively. Subjective Expected Utility is defined from the product of the two which he seeks to maximise. (Herbert, 1983, és Zoltayné, 2005)

formal rationality is *substantive rationality*, which examines whether the *outcome* of the decision-making process meets expectations and whether the selected mode of action is acceptable in the light of its result (Zoltayné, 2005). Thus, a decision will be substantive-rational if, under the given circumstances, the decision-maker achieves their goal by way of the selected option to act, regardless of the means used in reaching that end[6]. By contrast, *procedural rationality* focusses on the *procedures* applied in selecting an action in the process of decision-making, i.e. it also takes into consideration how the decision-maker can cope with analysing the given decision-making situation and factors in people's cognitive capabilities and limitations (Zoltayné, 2005).

The concept of formal rationality is closely related to Max Weber's concept of **purposive-rationality** along with that of value-oriented rationality.

„*A person acts **purposive-rationally** if they direct their action according to the ends, means and consequences while rationally weighs the means against the ends and the ends against the consequences and finally the different ends against each other.*" (Zoltayné, 2005, Page 121).

A person acts **in line with value-oriented rationality** if their action is directed by a sense of duty, dignity, beauty or a religious tenet, homage or any other *"cause"* without considering the consequences (Zoltayné, 2005). As Weber explains, value-oriented rationality always seems irrational from the aspect of purposive-rationality.

Economics has also taken over the concepts of rationality and defined the criterion of **economic rationality** whereby the decision-maker always seeks to achieve the most preferred state, which is the maximisation of something (often their own wealth). Even though everybody endeavours to maximise their own sense of usefulness or their own benefit, in the case of investment decisions investors' individual consumer preferences can be ignored[7]; consequently, from an investment decision aspect a good or rational

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[6] In many cases a substantive-rational decision is not in accordance with value-oriented rationality (see above) when the behaviour transgresses moral norms but the decision-maker achieves their goal. (This is referred to as a case of *"the end justifying the means"*.)

[7] In his work published in 1930, Irving Fisher explained that in a perfect market „the capital investment decision has nothing to do with the individual's preferences for current versus future consumption"" (Brealey, Myers, 1998, Page 22). That is, shareholders' current personal consumer preferences do not

decision will be one that maximises the value of the company. The model of economic rationality describes the decision-making process as a choice between bets with financial implications. It assumes that managers' decisions in weighing their chances are consistent with Bayes' model and that they acknowledge uncontrollable risks as anticipated gains will offset anticipated losses arising from the risks undertaken (Kahneman, Lovallo, 1993). Accordingly, managers look upon risks as challenges to overcome with their capabilities and choices in order to achieve the set goal. Although they do not deny the role of misfortune they think of themselves as smart and prudent agents able to control events and people rather than being gamblers (March, Shapira, 1987).

In the light of the above concepts we can see that even the criterion of rational decision is not unambiguous. The rationality of a decision can be judged by the procedure or the outcome of the decision. We have become familiar with three concepts in respect of the process of rational decision-making: formal rationality, purposive-rationality and procedural rationality. With regard to the outcome of a decision, the concepts of value-oriented rationality and substantive rationality have been introduced. It can happen that the same decision is rational from one aspect (helping the poor is in accordance with value-oriented rationality but irrational from another (helping the poor is not rational from the perspective of economic rationality as it does not increase the value of the company).

1.1.2 Descriptive decision-theory

The other school of thought of decision-theory is the **descriptive** approach, which concentrates on perceptions and emotional processes at play in the decision-making process. The focus is on *"how one decides"* rather than *"how one must decide"*[8]. It regards decision-making as a cognitive process (Zoltayné, 2005). It is not normative models that the descriptive theories challenge but the underlying conditions of the SEU, namely to be perfectly informed and the clear set of preferences. As opposed to

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influence capital investment decisions. Extravagant or frugal, they are equally interested in maximising the value of the company, i.e the price of its shares.

[8] For empirical research results on leaders' decision-making see Zoltayné, Wimmer (2009)

normative theories, descriptive theories do not normally give a description of the entire decision-making process; rather, they explore the actual functioning of human thinking and judgement formation in its sub-processes. The discipline of descriptive decision-theory is closely connected to cognitive psychology.

Herbert A. Simon's (1983) concept of **bounded rationality** belongs to the school of thought of descriptive decision-theory. Bounded rationality takes into account that a person's information processing capacity is limited and so they are not perfectly informed during the decision-making process; therefore, decision-making is surrounded by uncertainty in respect of both probabilities and utility[9].

1.1.2.1   Behavioural sciences

Since the 1990s, many behavioural disciplines have come into existence that analyse a given discipline in a field of science from a behavioural aspect and give cognitive thinking explanations. From the perspective of this theme, three disciplines are of particular relevance: behavioral economics, behavioral finance and behavioral corporate finance.

These areas cannot be clearly separated. I put the phenomenon of overplanning experienced in financial forecasting under behavioral corporate finance as it is about corporate financial planning and managers' or analysts' decisions. Behavioral finance looks into investors' decision-making mechanisms and thus the use of EPS forecasts rather than their preparation. In what follows I will briefly present each field. Many works have devoted to delineating these disciplines but I have not yet come across definitions of either of them.

The most comprehensive field is that of **behavioral economics.** Kahneman (2003) considers Thaler's (1980) article entitled "Toward a Positive Theory of Consumer Choice" as the "founding article" of behavioural economics. However, Adam Smith's "invisible hand" theory or his less known book, "The Theory of Moral Sentiments", also belong here. In the second half of the 20th century several seminal publications gave impetus to the development of behavioural economics. Herbert A. Simon's (1983) book titled "Bounded Rationality" and Kahneman and Tversky's

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[9] Bounded rationality will be discussed later.

publication on "Judgment under uncertainty: Heuristics and biases" of 1974 together with their article on the Prospect Theory published in 1979 had a major influence.

An area related to descriptive decision-theory is that of **behavioral finance (BF),** which is connected to the theory of market efficiency. Fama's article of 1970 is considered a milestone with its summary of existing research findings and distinction of the weak, semi-strong and strong forms of market efficiency.

> *"Behavioural finance, i.e. the application of the results of economic psychology is a new discipline in the field of corporate finance. The beginnings are linked to DeBondt and Thaler's (1985) article on overreaction, but its real development started in the 1990s. Behavioural finance evolved from the works of Kahneman and Tversky; their Prospect Theory* (1979) *shook the foundations of conventional finances together with the picture of rational investors. To date, the experiments of Kahneman and Tversky have remained the most important point of departure for behavioural research."* (András Márk Molnár, 2007, Page 19)

Market actors trusted the efficiency of markets and investors' rationality in financial decisions for a long time. In the 1990s, as a result of market anomalies they questioned both market efficiency and investor rationality. As an explanation of these anomalies they applied the conclusions of cognitive psychology, from which behavioural science has grown over the past two decades. Behavioral finance is concerned with the investor and their information-seeking and processing methods, together with cognitive thinking factors influencing their decision-making. DeBondt and Thaler's article issued in 1990 is considered as the beginning of behavioral finance[10] (for its review see Nofsinger, 2007).

After decision-theory and behavioural findings were applied to investor and securities trader decisions, they also started to be used in the area of corporate finance,

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[10] In the Hungarian context, György Komáromi conducted studies in this field. Between 2000 and 2006, he wrote a number of publications. In his doctoral paper of 2007, András Márk Molnár deals with the same subject.

which led to the emergence of **behavioral corporate finance (BCF**[11]**)**. These two disciplines, BF and BCF, cannot be sharply separated from each other. A favours area of research of BCF is overplanning, which is the theme of my doctoral paper.

1.1.2.2   The concepts of cognitive thinking

The descriptive school of thought of decision science uses the conclusions of cognitive psychology to explain decision-making that deviates from rationality. The most important groups of cognitive thinking patterns are as follows:

The first is what is known as *"bias"*, meaning *inclination* or *distortion.* From the aspect of the theme, highly important are optimism bias, self-attribution bias and desirability bias or hindsight bias, which will be covered in detail below.

The second is *illusions*. The most relevant to theme are the illusion of knowledge and the illusion of control.

The third one is *heuristics*, which are simple rules of thumb, or decision-making patterns, that are used to estimate probabilities in a particularly **uncertain** situation. Kahneman and Tversky (1974) approached the concept of heuristics as follows: When the information to be processed grows beyond the individual's cognitive capabilities[12], they will rely on a limited number of heuristic principles in making decisions, i.e. *estimating probabilities and forecasting values will be reduced to simpler processes of making judgements*. Heuristics are generally useful. However, sometimes they can lead to serious and systematic errors. By using them we reduce the amount of information to be used and simplify the perception process. However, heuristics do not necessarily help in finding the optimum solution. In sum, heuristics are *unconscious routine* procedures that are particularly used *in an uncertain situation to estimate probabilities*. Among heuristics, the most important are judgemental heuristics introduced by Kahneman and Tversky (1974), including anchoring, representativity and availability heuristics.

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[11] My articles written in 2008 also relate to the discipline of BCF. These are: Rationality and investment evaluation (Jáki, 2008a); A decision-theory approach to investment (Jáki, 2008b).

[12] The human brain can manage 5 to 9 bits of information at the same time, while in the course of financial planning far more information must be handled concurrently.

Further, we can encounter the phenomenon of ***error***. In my paper, I will discuss in detail the attribution error.

1.1.3   Summary

Through the concepts of rationality belonging to the normative school of thought of decision science we got to its descriptive school of thought , which in turn led to behavioural sciences. In closing the chapter, I briefly presented concepts connected to cognitive thinking, which are covered in different articles on the subject and also in this paper. Articles on the causes of overplanning observed in financial forecasting accept the fact that analysts do not think along rational decision-making models and that Bayes' criteria of rational decision-making are not met.

1.2   The definition of EPS forecasting

EPS stands for earnings per share (net earnings / number of outstanding shares). It is a popular indicator reflecting and comparing shareholding companies' income generation capacity. It helps investors to judge a company's profitability and ability to reach its targets.

EPS[13] forecasts always refer to a particular year and may even be made on a daily basis. One can distinguish between individual forecasts, i.e. those made by one analyst, and the average of forecasts for a particular company in respect of a given period, which is called *"consensus"* EPS forecast. EPS forecasts are often used to project a shareholding company's future performance. Managers and analyst also make EPS forecasts for particular shareholding companies for one year, two years or three years ahead. It is adjusted several times in the light of available information.

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[13] For a detailed description of EPS see Virág, Fiath (2010).

1.2.1 Sources of information and methods for making EPS forecasts

Several techniques can be used to make EPS forecasts; their accuracy has been covered in a number of comparative studies (for details see Brown, 1993). Initially, EPS forecasts were made by way of *analysing time series properties of earnings*; later, time series analyses were supplemented with non-earnings type of financial indicators. A great number of researchers have studied the accuracy of EPS forecasts made by analysts and the extent and direction of the forecasting error. After considering public and private information, analysts prepare judgmental EPS forecasts.

A number of different models have been worked out to support EPS forecasting based on **time-series** analyses. The first and most famous one is Box-Jenkins' ARIMA[14] time-series model for quarterly earnings. This was followed by the Griffin-Watts model and the Brown-Rozeff model[15]. The annual values arrived at by means of these models on the basis of cumulating forecasted quarterly earnings provided 15% to 21% more accurate forecasts than when only data from the preceding year were used (Brown, 1993). Later, non-income type of indicators were integrated into the models such as yield calculated from share prices and the book value and other data gained from financial statements, which allowed making more accurate forecasts than before (Value Line). At the same time, EPS forecasts showing analysts' earnings expectations are more accurate than time-series models. Importantly, it is to be noted that time-series models do not factor in structural changes available at a given point in time that influence a company's income-generating capacity. The analyst incorporates this information in the EPS forecast and thereby – especially at times of transparent price-relevant income shocks – makes more accurate forecasts. The analyst has access to various kinds of information that time-series ignore. Such information includes managers' forecasts published after time-series analyses, macro-economic and industry data, as well as private information received from managers. However, no scientific evidence has been found to date that would reveal which information makes analysts' forecasts more accurate.

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[14] The ARIMA models assume an internal stochastic coherence among time-series data which exist permanently, can be shown, and will presumably remain present in the future.
[15] For a detailed description of the models see Brown (1993).

The accuracy of consensus values calculated as the average of individual forecasts was also examined in order to improve the accuracy of EPS forecasts. Using the data of Zacks Investment Research, Brown (1991) pointed out that an average calculated from the most timely three composite values was more accurate than the consensus forecast. The most timely three forecasts were:

1. the modus of available EPS forecasts

2. the average of the three most frequent forecasts

3. the average of the past 30 days' forecasts.

This method takes into account the latest and most frequent forecasts and thus filters out those which are dated or outliers.

Several studies[16] have confirmed that analysts do not use all public information available from either financial statements or share price changes. The fact that analysts process information ineffectively and overreact to positive news while underreacting to negative news has made the influence of cognitive effects on analysts' EPS forecasts a fascinating area of research.

1.2.2   Analysts: sell-side, buy-side

Sell-side or broker EPS analysts typically work for brokerages and make their analyses public. It is usually these brokerages or the company's investment bank partner that market the company's shares. Since EPS analysts are paid a commission from the revenues generated from selling the company's shares, they have an interest in making favourable EPS forecasts. That is because it is easier to encourage customers to buy with a favourable EPS forecast than to sell with an unfavourable one. In addition, as the given shareholding company's investment banker it has to assure the company's management that their strategic plans are realistic, which are of course optimistic (see Annex 1).

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[16] Lys and Sohn (1990) and Abardanell (1991) used the data of Zacks Inv. Res. prepared a Value Line analysis. They studied whether forecasts made 1 week earlier represented information found in available financial statements. Only one or two analyses took into account their values.

Buy-side analysts are employees of analyst banks, insurers or pension funds. Their analyses are used internally by portfolio managers. One of the reasons for overly optimistic forecasts may be their drive to maintain good relationships with managers so they continue to receive information from them in the future. Another possible explanation is that making optimistic forecasts is not intentional; in this case, systematic optimism can be explained by behavioural causes.

1.2.3   The importance of EPS forecasts

The EPS value is a critical factor in judging companies listed on the stock exchange since it is a simple indicator of a company's profitability as well as playing a key role, together with the P/E ratio, in determining its value. EPS forecasts are crucial in evaluating a company's equity (Beckers; et al.; 2004; Clayman, Schwartz 1994). EPS forecasts' greatest significance lies in shaping stock portfolios.

Several studies have provided evidence for a strong link between EPS forecasts and share price changes. According to academic research, positive EPS forecasts are accompanied by rising share prices in the short term, while lower projections cause a "reflex" reaction which sends stock prices down (Clayman, Schwartz, 1994; Zacks, 1979, Burgstahler, Eames, 2006).

Research over the past decade has taken the general optimism of EPS forecasts as a given; therefore, the most recent studies have focussed on exploring its underlying causative factors. If the market regards EPS forecasts rational and statistically optimal, then their systematic optimism will have a profound impact on the pricing of shares.

1.2.4   Summary

EPS forecasts can be made in a variety of ways and on the basis of different bits of information. Time-series analyses project the anticipated value based on historical revenue changes. They were later complemented by non-earnings type of indicators to improve their accuracy (Value Line). However, the most accurate projections are made by EPS analysts, who also incorporate private information received from managers and public information available at that given time. In order to maximise accuracy,

companies providing financial data compute the average of EPS forecasts, i.e. the consensus forecast. Brown (1993) pointed out that removing the most current and outlying values from the average of EPS forecasts resulted in an even more accurate forecast. EPS analysts can be distinguished by the purpose of their analyses. Sell-side analysts, who have an interest in stimulating the sale of shares, are motivated to prepare more favourable EPS forecasts. With buy-side analysts, no such motivation should be assumed.

EPS forecasts have an effect on share prices, and hence the value of the company; therefore the EPSerr is an important area of research for stock market actors. A number of studies have looked into the extent and direction of the EPSerr. I will discuss the most seminal of them in the next chapter.

1.3 Overplanning: definition, empirical evidence and causes described in specialised literature

> *The overoptimism of financial plans is significant both economically and statistically. ! (Darrough, Russell, 2002; Duru, Reeb, 2002)*

We talk about overoptimism in respect of financial plans when forecasted data systematically deviate from actual values in the positive direction, i.e. sales revenues are overplanned while costs are underplanned (Lovallo, et al., 2007 and Kahneman and Lovallo, 2003, Haw Jung, Ruland, 1994, Duru, Reeb, 2002)[17]. The error in financial planning is studied relative to profitability. In the case of companies listed on the stock exchange studies focus on EPS forecasts.

EPS forecasts have been a subject of study since the early 1980s. One of the early analyses was Zacks' (1979) research. He wanted to examine the effect of EPS forecasts

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[17] Sedor (2002) measured optimism by the extent of increase compared to baseline data. In his case it was not possible to make a plan versus actual comparison as he carried out laboratory research. With this approach, however, he arrived at measurable data and the study was suitable to examine and measure psychological effects.

on share prices. To his surprise he found that EPS forecasts were systematically optimistic. Later, the phenomenon was referred to as **systematic forecasting error** by Beckers, Steliaros and Thomson (2004). Nearing the turn of the millennium publications did not only discuss the forecasting error but also their underlying causes connected to cognitive thinking patterns. These publications now described the phenomenon as "**overplanning", "overoptimism"** or "**systematic optimism"**, terms that I use myself in the thesis.[18]

Later, many studies were made in the field of EPS forecasting aiming to explore the degree, patterns and causes of the forecasting error. Around the turn of the millennium a number of behaviourist explanations were published shedding light on the causes of this phenomenon.

1.3.1   The empirical evidence of overplanning

No matter how detailed a business plan is it is usually optimistic. In addition, the more detailed it is, the more it tends to be characterised by optimism. The reason is simple: Any complex project is exposed to countless problems ranging from technical errors through price changes to bad weather; also, the majority of problems are beyond imagination making us unable to factor in each and every eventuality during planning (Lovallo, Kahneman, 2003).

Our everyday life is interspersed with the phenomenon of overplanning. We miscalculate the amount of work we can do at the weekend or the time it takes to make a dress, do the cleaning or fix a malfunctioning appliance etc. An area most typically affected is house construction where both the time and cost of construction/refurbishment are underplanned.

In financial planning, the time required for execution and, closely related to it, the cost factor are typically underplanned while sales revenues are overplanned. As a consequence, results fall short of the plan. Before discussing related empirical evidence,

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[18] Clayman, Schwartz (1994) called this phenomenon the "overestimation bias", whereby EPS forecasts consistently exceed subsequent actual values but this description would not appear in further publications.

let us take a brief look at the different categories of financial plans, which is critically important from the aspect of the theme.

In the field of financial planning[19] a distinction must be made between a case when planners (**internal analysts**) have an inside view of the company's opportunities and also have their own personal motivations. In the case of building a plant, starting up a new company or acquisition, all of which go with large *capital outlays*, managers and other leaders are considered as internal analysts who are attached to the company.

Normal annual corporate plans should be treated differently as in the course of annual planning other motivations should also be factored in, given that bonus payments are linked to the gap between planned and actual performance; clearly, therefore, lower target values are set. Accordingly – and in line with publications I present in this paper – the thesis does not deal with normal annual planning.

Another case is when it is **external analysts** who make forecasts about the company's performance. It is more typically companies listed on the stock exchange that *EPS forecasts* are made about by external analysts, who can be regarded more or less independent of the company.
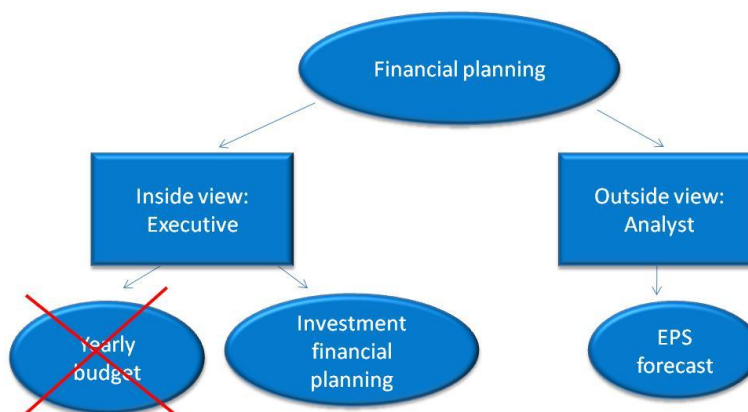
Figure 2. Categories of financial planning

In what follows I will discuss EPS forecasts and financial plans made for capital outlays. In both cases, the optimism of financial plans can be traced back to the mechanism of information processing. I will present empirical research findings related to the error in financial planning separately for capital outlays and EPS analyses.

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[19] For an overview of financial planning methodologies see Virág (1992) and Jáki (2004b).

1.3.1.1   Overplanning in capital outlays

Opportunities to study financial plans drawn up for capital outlays are far more limited than those to study EPS forecasts. The reason is that plan data are normally confidential. Typically, it is consultancy firms that are able to compile smaller or larger databases but those are inaccessible to researchers. Accordingly, there are only a few publications that deal with errors in financial planning for capital outlays. Kahneman and Lovallo's (2003) article reveals cognitive *(exploratory thinking-related)* causes affecting financial overplanning giving the following empirical introduction:

- Most large capital outlays are recovered with a delay or overrun the budget.

- 70% of new plants in North-America close down in the first ten years of the operation.

- 75% of M&A will never pay off or the shareholders of the acquiring company lose more than those of the acquired firm.

- 80% of venture capital investments fail before reaching the targeted market share.

- In the case of large corporations twice as much is spent on building a new plant as planned; furthermore, one year after commissioning:

  - half of plants run at 75% and

  - a quarter of them at less than 50% of their capacity;

  - in most cases their performance remains below their capacity and the investment will never be recovered.

The publications of Lovallo, who as a McKinsey employee was able to track financial plans for acquisitions both in the design phase and in the light of actual data, are exceptional. The McKinsey & Company study (Lovallo, Viguerie, Uhlaner, Horn, 2007) revealed that half of acquiring firms paid more for the company than its actual value. In an acquisition, the company's value depends on the CF the acquirer can generate in the future with the companies' assets, i.e. the company's value and thus the purchase price is determined on the basis of forecasted future revenues and costs.

Sometimes researchers infer the overoptimism of financial plans from statistical data, such as the number of plant closures or company dissolutions. Dunne, Roberts

and Samuelson's (1988) empirical research has shown that most newly started businesses fail in the first few years of operation; 61.5% are dissolved within 5 years, 79.6% within 10 years and small businesses cease to operate within 4 years on average.

1.3.1.2 Overplanning in EPS forecasts

A favoured method of examining the phenomenon of overplanning is the analysis of the EPS forecasting error. Several forecasts are made by the same analyst for a company during the year; in addition, forecasts are made by several analysts for the same company, which thus makes it possible to assemble a homogenous database from the aspect of financial plans; also, these data are public.

With the study of EPS forecasts, initially the extent and form of the error and later its causes were also investigated. Research focussed on the degree and structure of the EPS forecasting error for the United States (Zacks, 1979, DeBondt, Thaler, 1990, Dreman, Berry, 1995, Clayman, Schwartz, 1994) and Europe (Capstaff, Paudyal, Rees, 2001, Beckers, Steliaros, Thomson, 2004). The most seminal empirical studies are as follows:

Zacks

Zacks (1979) studied the EPS consensus forecasts of 260 companies of the S&P 500 index to see how the degree of the projected versus actual variance influenced share prices. Prices in those portfolios in which the actual growth of companies was higher than projected rose at a higher-than-average rate compared to benchmark data. Wherever the forecasted EPS value exceeded the actual value the extent of growth of the portfolio remained below the market growth. The point of the research was to prove market effectiveness, i.e. the fact that information – EPS forecasts – is incorporated in the price. An interesting finding of the research from the aspect of this paper is that EPS forecasts were overall exaggerated and optimistic.

DeBondt and Thaler

DeBondt and Thaler (1990)[20] looked at securities analysts' 1-year or 2-year EPS forecasts and concluded that they were optimistic and exaggerated. They found greater optimism in the case of 2-year outlook horizons than for 1-year outlooks.

Using regression analysis was considered a milestone in behaviourist studies of overplanning and was taken over by subsequent publications.

Clayman and Schwartz

Clayman and Schwartz's (1994) study focussed on monthly and annual EPS forecasts of 399 companies between 1982 and 1992[21]. They demonstrated that EPS forecasts for the next year were higher than actually realised values and that forecast optimism, i.e. the variance between projected and actual values, declined as the year-end approached. This conclusion (i.e. that as the time horizon shortens so decreases the EPSerr) accords with the findings of Sedor (2002) and DeBondt et al. (1990), who observed that optimism grows with longer time horizons, i.e. the further ahead forecasts were made the greater the projected versus actual variance was and that forecasted values were usually better than actual figures. On an annual basis, one month before the end of the year they still found overplanning by 11.9%. The greatest degree of overplanning was discovered with firms that ultimately realised negative earnings in the given period. That finding coincides with Sedor's (2002) conclusion that earlier years' profitability influences analysts in making financial forecasts, i.e. they fail to make adequate corrections. Another interesting area of research is whether projection accuracy is linked to the number of forecasts underlying the EPS consensus forecast. Clayman and Schwartz (1994) did not find any correlation between the number of forecasts and projection accuracy.

Capstaff, Paudyal and Rees

Capstaff, Paudyal and Rees (2001) looked into overoptimism in EPS forecasts in 9 Western-European countries including Belgium, France, Germany, Ireland, Italy, the

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[20] EPS forecasts were analysed between 1976 and 1984 using IBES International's database; the forecasts were made for institutional investors and the factual data were provided by COMPUSTAT. Companies involved in the study had been profitable in the preceding 3 years and closed the financial year in December. EPS values were available for 10 years back and in both databases.

[21] The database was provided by Zacks Investment Research.

Netherlands, Spain and Sweden. They assumed that making projections was made more difficult in cases where EPS forecasts were more volatile in respect of time and the company[22]. In the study they compared 500,000 EPS forecasts for the period 1987-1994. EPS forecasts were characterised by a +16.9% forecasting error on average[23]. The greatest degree of systematic error was found in the case of Spain, France and Italy, while the most accurate forecasts were made in the UK, Ireland and the Netherlands. The reason was, as they concluded, that the correlation between forecasts and share prices was the strongest in these three countries. Overall, the study drew conclusions in accordance with those of American studies.

Beckers, Steliaros and Thomson

Beckers, Steliaros and Thomson (2004) studied the accuracy of EPS forecasts made by European analysts with a special focus on the "sheep" effect, i.e. the extent to which analysts took into account the EPS consensus forecast of the preceding period in predicting the next EPS values.

They conducted the above research mostly in America; two studies were made for Western-European countries between 1970 and 1995.

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[22] Data were provided by Institutional Brokers Estimate System for the study.

[23] Projections 20 months before and 3 months after the end of the year were analysed.

1.3.2 Possible causes of overplanning – a literature overview

> *"The conclusion we reach from our examination of analysts' forecasts id that they are decidedly human. The same pattern of overreaction found in the predictions of naive undergraduates is replicated in the predictions of stock market professionals. ...The fact that the same pattern is observed in economists' forecasts of changes in exchange rates and macroeconomic variables adds force to the conclusion that generalized overreaction can pervade even the most professional of predictions....The proper inference from this, we think, is to take seriously the behavioural explanations of anomalous financial market outcomes"* *(DeBondt, Thaler, 1990, 57. old.)*

The reasons for financial overplanning have been examined from different aspects, including the *planning fallacy*, i.e. which factors' evaluation led to overplanning; *incentives* encouraging analysts or managers to overstate the strengths of a project or company; and finally *cognitive thinking patterns*, the subject of my dissertation.

Studies scrutinising the **planning fallacy** element in overplanning mostly refer to capital outlays. These studies seek to pinpoint that specific determinant which has led to overplanning. *Planning fallacy* occurs when the implementation time and cost of a project – personal or business – are underestimated. It is a general phenomenon that investment projects meet with unforeseen difficulties from the outset and run behind schedule. By the end of completion, both timeframes and budgets are overshot as decision-makers have underestimated risks and overestimated the probability of positive outcomes (Kahneman, Lovallo, 2003). The underestimation of time requirements also affects our everyday life: We tend to miscalculate the amount of work to be done or the deadline for finishing a dissertation. In their empirical study, Buhler, Griffin and Ross (1994) proved that people allowed less time for accomplishing their personal projects

than what they actually took. It is a common occurrence that people fail to reckon with circumstances that may hinder the completion of work. We may think that experience improves the accuracy of our predictions over time but that is not the case. """ (Buehler, Griffin, Ross, 1994,[24]

In sum, the evaluation of overoptimism in financial planning has revealed that sales revenues are overplanned whereas the time and budget for implementation are underplanned. The greatest uncertainty has been found with sales revenues, investment costs and the time needed for completion. There is much less uncertainty in sizing up operational costs.

As to *incentives* causing the optimistic error of EPS forecasts and corporate financial plans, the most relevant conclusions are as follows:

1. EPS analysts seek to **keep good contact with company managers** so that they continue to support forecasts with information (Lim, 2001, Brown 1993, Francis, Philbrick, 1993, Libby, Hunton, Tan, Seybert, 2008; Ke, Yu, 2006; Cotter, Tuna, Wysocki, 2006). Understandably enough, a manager will not keep contact with an analyst who has made unfavourable forecasts about the company as analyses influence the company's capital market value, to which managers' compensation is linked. (Lim, 2001). A favourable EPS forecast confirms management's positive earnings expectations (Eames et al., 2002). This is contradicted by Jorge and Rees's (2000) research. By interviewing managers in Spain they proved that management provided not less but actually more information to those analysts who had made unfavourable EPS forecasts in an effort to improve the forecasts. In addition, as they point out, optimistic EPS forecasts cause a negative earnings surprise, which again is not favourable for management (Eames, Glover, 2003). Managers try to create a positive earnings surprise by both revising EPS forecasts downwards and manipulating actual earnings to make them look better (Burgstahler, Eames, 2006). All this is in contradiction with the optimism of EPS forecasts since that would cause a negative surprise to investors. It must be

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[24] For an answer to how cognitive thinking causing this phenomenon works see the section "Rose-coloured glasses".

noted that managerial ideas can be factored in with long-term forecasts. A positive EPS estimate for 2 or 3 years ahead may in fact increase share prices. The accuracy of forecasts is compared with the last preceding value and thus the downward correction to an appropriate degree of the last value is sufficient to cause a positive surprise.

2. By way of positive prognoses, analysts aim to **boost securities trading** (Kim, Lustgarten, 1998; Brown 1993). As has been written above, sell-side analysts have an interest in stimulating trading. Several studies have provided evidence that the downward revision of EPS forecasts is followed by share prices. It often presents itself as a reflex-like process in the market (Clayman, Schwartz, 1994). There have been a good number of studies (Hunton, 1997, Jacob, Rock, Weber. 2008) offering proof that the investment banking sector easier to sustain with positive forecasts.

In their research, Affleck-Graves, Davis and Mendenhall (1990) found more optimism with sell-side or broker analysts than buy-side analysts. That led them to conclude that *the optimism was not intentional* and that positive EPS forecasts were prepared even without incentives. Eames, Glover and Kennedy (2002) explicitly focussed on broker analysts' EPS forecasts. Their EPS forecasts driven by ask offers were consistently pessimistic, a phenomenon they described as "motivated reasoning" or, introducing a new concept, "objectivity illusion". By contrast, their EPS forecasts supporting bid offers were optimistic, which was a conscious trade-boosting act.

3. With capital outlays, Kahneman and Tversky (2003) identified **corporate pressure** as a driver of optimism. All companies have scarce resources in term of both time and money that they can expend on projects. Therefore, both individuals and sites keenly compete for scarce resources for their own proposals[25]. As forecasts are the only weapon to rely on in this struggle, financial planners are pushed to overstate the positives in making projections. That has two adverse implications. One is that it predestines the overoptimism of forecasts, which will distort all further analyses concerning the project. The other lies in the increased probability for the

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[25] For in-company competition in detail see Hámori, Szabó, Hurta and Tóth (2007b).

investment project selected for implementation to be most overly optimistic and thus to cause disappointment.

4. Other **corporate practices** also stimulate optimistic planning. Senior executives like to emphasise the importance of setting overstretched targets, which have the beneficial effect of increased motivation; however, the downside is that site managers plan for unrealistically optimistic outcomes[26]. Organisations openly crack down on pessimism which is seen as a sign of disloyalty. Bad news messengers are often expelled, avoided and ignored by others. If pessimistic views are suppressed and optimistic ones are rewarded then the company's capacity for critical judgement will be reduced. The group will mutually reinforce optimistic partiality and thus an unrealistic vision of the future (Kahneman, Tversky 2003).

Many studies have been conducted to determine the ***cognitive thinking-related*** causes of overplanning. Research has identified the following most frequent reasons, which will be covered in detail in Chapter II of the paper:

1. The primary cause is *overconfidence* (Camerer, Lovallo, 1999; Kahneman, Lovallo, 2003; Lovallo, Viguerie, Uhlaner, Horn, 2007, Nofsinger, 2007), to which the following factors are related, as has been shown by research:

   a. *Illusion of knowledge* (Nofsinger, 2007), as a result of which the decision-maker believes their information to be accurate and correctly interpreted. This belief is reinforced by:

      • *Confirmation bias* (Camerer, Lovallo, 1999, Lovallo, Viguerie, Uhlaner, Horn, 2007, Krizan and Windschitl 2007), whereby the decision-maker accepts, and attaches greater weights to, those bits of information which confirm their preliminary expectations;

      • *Information-structuring* (Sedor 2002); the analyst considers the success of the strategy to be of greater value based on information received as part of a scenario than if the same information was received in bullet points. This approach coincides with the

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[26] For the development of competitive behaviour among companies in the Hungarian context see Hámori, Szabó, Derecskei, Hurta and Tóth (2007a).

evaluation of the probability of *conjunctive and disjunctive* events discussed by Kahneman and Tversky (1974) as part of anchoring heuristic, which will be covered below.

    b. *Attribution error* (Kahneman, Lovallo, 2003); people ascribe positive events to their own influence while negative events to external factors, regardless of what happened in actual fact.

    c. *Illusion of control* (Krizan és Windschitl 2007, Nofsinger, 2007; Kahneman, Lovallo, 2003); a phenomenon whereby we believe that we can control uncontrollable events such as the weather or economic trends etc. Managers are sometimes in actual denial of the role of luck in respect of the proposed outcomes of projects.

2. *Anchoring effect or anchoring heuristic* (Kahneman, Lovallo, 2003); the decision-maker is guided by an initial value or parameter called an "anchor" in making decisions. To that is linked the phenomenon of "inadequate adjustment", when the subject is unable to detach themselves from the anchor value to a sufficient degree in making the final decision.

3. *Desirability bias* (Krizan és Windschitl 2007) increases the weight attached to the subjective probability of a desired event caused by its repeated visualisation. It is closely related to the illusion of control.

4. *Absence of control*; it increases propensity toward optimism (Armor et al. 2002).

The above cognitive thinking elements will presented in detail Part II of the paper.

1.3.2.1   Uncertainty

Uncertainty is a core factor in setting heuristics in motion. A number studies have looked at the impact of growing uncertainty on planning fallacy. Early research (Irwin, 1953, Marks 1951) provided proof that when success was indeed a matter of good luck (heads or tails, or 50%-50%) then the anticipation of success was the greatest. However, as the objective probability of success dropped so did inclination to optimism. Ackert and Athanassakos, (1997) came to exactly the same conclusion, i.e. the greater the *uncertainty*, the greater the optimism.

Duru and Reeb (2002) also drew similar conclusions; the wider in a company's international trade (revenues and expenditures) is, the more optimistic financial plans are made. Wide-ranging international trading operations make forecasting more complicated. A reason for that is that analysts know better their home countries than other countries and thus the judgement of other countries' macro-environment – politics, culture and the firm's competitive environment – adds to uncertainty (Ashbaugh, Pincus, 2001) and language barriers increase information asymmetry between analysts and managers.

Similarly, greater EPS forecasting optimism was discovered with those companies whose historical share prices showed greater scatter (Ackert, Athanassakos, 1997). In their research, Haw, Jung and Ruland (1994) found evidence that optimism rose after fusions. In addition to that, the forecasting error also grew with the gearing ratio and diversification. The extent of optimism usually returned to the pre-fusion level after four years

Ali, et al. (1992) and Klein (1990) has found that *optimism after a loss-making year is greater* than after a profitable year since uncertainty is also greater. Sedor (2002) calls this phenomenon *asymmetrical optimism* as profit-making years are overrated while the results of loss-making years are underrated.

Yet another uncertainty factor is the time horizon; *as it increases so does optimism* (De Bondt, Thaler 1990, Kadous et al. 2006).

1.3.3 Summary

The accuracy of financial plans preceding capital outlays and of EPS forecasts is critically important. Since 1979, the accuracy and direction of planning has been the subject of research, especially in the United States. studied .

Since 1995, many similar studies have been conducted for Western-European companies listed on the stock exchange, each proving the systematic optimism of planning fallacy. Later, a number of other studies also focussed on determining the causes of overplanning found in the case of financial plans. I have divided publications into three groups; the first group examined the phenomenon of overplanning from the

structural aspect, the second from an incentives perspective and the third in terms of cognitive thinking factors. From the aspect of the structure of planning fallacy, it has been discovered that the degree of error is the greatest in estimating the investment cost; the time needed for completion; and sales revenues, and is biased in the optimistic direction. From an incentives point of view, specialised literature points out analysts' motivations to boost trading and foster good relationships with managers in the case of EPS forecasts, and corporate pressure in the case of capital outlays as the key incentives for overplanning.

Studies scrutinising cognitive thinking have shown a number of reasons. Many sought to identify and prove specific cognitive patterns. The most comprehensive publication on cognitive mechanisms is Kahneman and Lovallo's 2003 article. *Overconfidence* or, used synonymously, overoptimism has been identified as the most important reason. Strictly speaking, however, overconfidence and overoptimism are not synonymous as they are characterised by different thinking patterns. With the progress of my research I felt it increasingly important to define these concepts, which has led to a highly interesting discovery. I have also received an answer to why self-confidence and optimism do not falter despite failure and what heuristics underlie this phenomenon.

The second most frequently revealed cognitive thinking pattern is the *illusion of knowledge*, which is directly or indirectly covered by many studies. It must be noted that to have a better understanding of how the illusion of knowledge is formed I have also made use of the conclusions of articles not explicitly addressing planning fallacy. The third most frequent causative factor is the *illusion of control*, closely linked to the above two. Critically important is the effect of uncertainty, which practically brings heuristics into play.

2 Chapter Presenting and structuring the behavioural causes of overplanning

In 2. Chapter of my paper I will systemise and present the interconnectedness of psychological causes underlying financial planning optimism (Jáki, 2009), as well as pointing out at which stage of the budgeting process each plays a decisive role. In respect of financial planning, the mechanisms responsible for overplanning can be grouped around three main effects (Nofsinger, 2007), which I will discuss in Chapter II in the following structure:

1. overconfidence and overoptimism,
2. illusion of knowledge, and
3. illusion of control.

In addition to the concepts outlined in 1. Chapter, I will present different heuristics that are directly or indirectly connected to the phenomenon of overplanning[27].

The psychological causes of overplanning

Figure 3. Key psychological causes of overplanning

Research conclusions agree that it is **overconfidence** that most often underlie optimistic financial plans. As a consequence, company executives overrate their own managerial capabilities while analysts do so about their own information-processing and analytical abilities as well as strongly trusting their intuitions. The other frequently highlighted reason is **overoptimism**, a term used synonymously with overconfidence. As a corollary of overoptimism, people overestimate the probability of the occurrence of positive future events and underrate that of the occurrence of negative events. Therefore, in the course of corporate planning managers feel success as more likely and failure as less likely as an outcome. Similarly, analysts also expect their analyses to be proven right and thus overweight the likelihood of positive events and underweight that of negative events.

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[27] In some cases their existence has been proven in other disciplines and their operational mechanisms have been revealed; they can be easily interpreted in the context of financial planning, too.

Processing and interpreting information plays a critical role in financial planning. Economic theories assume a state of being perfectly informed. We are inundated with information in every field but are unable to cope with perceiving, processing, systemising and storing it all. Our cognitive thinking relies on many simplifying mechanisms that help us find orientation in the midst of all that information flow, systemise it and thus make decisions. Unfortunately, heuristics do not necessarily lead to optimum decisions, *"only"* acceptable ones. What is acceptable depends on the decision-maker's judgement. As a result, those bits of information will carry a greater weight in decision-making which suit the analyst's judgement and expectations. We presume the decision to be adequate; to rest on sound deliberation and wide-ranging information-processing; and, hence, to be right. Literature refers to this state as the **illusion of knowledge;** the mechanisms contributing to its formation will be presented in a systemised manner.

The third element of the model is the **illusion of control,** which is closely linked to overoptimism and emerges in parallel to the formation of the illusion of knowledge, overwhelming the decision-maker. Accordingly, this part is devoted to how the illusion of knowledge is connected to the other two concepts.

2.1   The rose-coloured glasses

> *"The most difficult thing to come to terms with is that you are not smarter than the average!" (Daniel Kahneman)*

The past 20 years witnessed the appearance of a great many explanations of overplanning observed in budgeting. For a large part, these explanations pointed to decision-makers' overconfidence and overoptimism about the future as the reason but without delving into details; instead, they sought to present and prove the consequent behaviour, such as the illusion of knowledge, the illusion of control or the attribution error, etc.

In specialised literature, authors normally do not draw a distinction between overoptimism and overconfidence; however, the two concepts do not refer to the same phenomenon. The definition and detailed presentation of the concepts will also give a picture of their role in financial overplanning.

We might think that failures reduce overconfidence and optimism about the future. In this chapter we will find an answer to why people insist on this idea and how through cognitive thinking mechanisms our psychological immune system protects our self-image and **optimism about the future**.
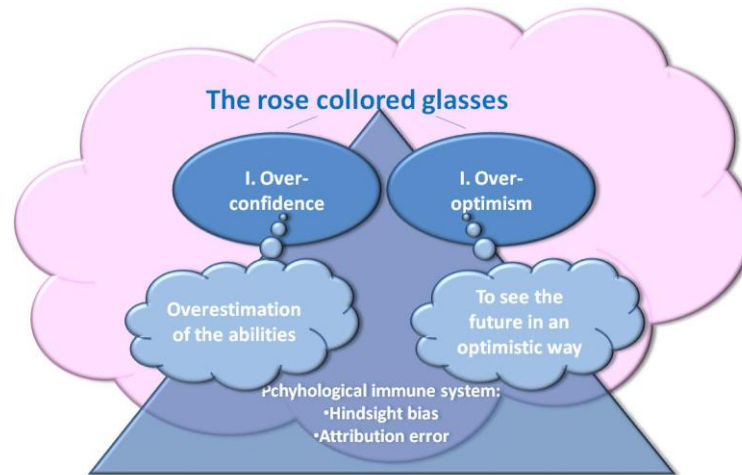
Figure 4. Reasons for the rose-coloured glasses

2.1.1   Overconfidence

Overconfidence means that we tend to overestimate our positive capabilities and underestimate our negative ones. Psychological studies have shown evidence that most people **overestimate their relative abilities** believing to have above-average mental and physical capabilities and are unduly optimistic about their own future (Weinstein, 1980). When people rate any of their positive abilities within a reference group they usually believe them to be above-average, whereas only half the group could rate above-average if symmetrical distribution is assumed (Kahneman and Lovallo 2003)[28].

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[28] One of the best known studies is as follows: The study participants were asked the question *"How good a driver do you consider yourself compared to the average?"* In the study conducted at a US university 82% of students felt that they were above-average drivers (Nofsinger, 2007; Barberis and Thaler, 2001; Svenson, 1981). In another study, also among students, it was observed that students had expected better grades after an exam than what they finally got. The further away the assessment was from the exam the higher students rated their own performance. In yet another study among university students 70% believed their abilities to be better than their fellow students' and only 2% rated themselves below-average. In team work, 60% thought to be among the top 10% while 25% rated themselves among the top 1% (Armor et al., 2002). Interestingly enough, great self-confidence does not subside over time but grows as demonstrated by another study. At a US university 94% of professors believed to do above-average work compared to their colleagues. (Dunning, Meyerowitz, Holzberg, 2002).

In respect of financial planning, such positive personal abilities include organisational skills and managerial and planning abilities etc.[29]. Larwood and Whittaker (1977) conducted a study among management students on how they assessed their own managerial abilities in the fields of marketing, resource logistics and sales. The students rated their own managerial capabilities above-average compared to their course mates. They thought their decisions could help a company succeed. Several studies have demonstrated that the foundation of later failed businesses was itself a misguided decision right at the outset. The reason was entrepreneurs' overconfidence leading them to believe they would bring success to the business (Dunne, Roberts, Samuelson 1988; Richard Roll, 1986; March, Shapira, 1987). In consequence of overconfidence, managers set forecasted values higher since they believe to be able to overcome difficulties.

In the case of EPS analysts overconfidence presents itself in their undue faith in their own private information and hence disregard of those bits of information which disconfirm that conviction (Easterwood, Nutt, 1999). They attach too much importance to events that confirm their belief (Daniel, Hirshleifer, Subrahmanyam, 1998).

2.1.1.1 Abilities

The **definition of abilities** is not always clear. We distinguish between easy-to-define and hard-to-define abilities depending on how easy the criteria of *competence* and *excellence* are to determine. People define, or attach criteria of competence and excellence to, hard-to-interpret abilities in a way to get a favourable self-rating, i.e. whatever they consider themselves to be outstanding in will be the criterion of competence or excellence[30].

For instance, the criterion of a good company executive can be "task-orientation", whereby they organise work processes well and pay attention to detail, or "people-orientation", i.e. they care about employees' needs and resolve conflicts. In their study,

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[29] For an overview of the most important managerial skills and abilities see Zoltayné (2008 and 2010).

[30] Dunning, Meyerowitz and Holzberg, (2002) explain this phenomenon with the *availability heuristic*. When our own or others' positive abilities have to be rated, that criterion will come to our mind first against which we can rate ourselves outstanding. Meanwhile, in respect of others the criterion of the same positive ability will be those negative traits based on which we do not consider others to be outstanding in that given ability.

Dunning, Meyerowitz and Holzberg (2002) observed greater self-confidence in respect of hard-to-define abilities than in the case of easy-to-define ones. Self-confidence about hard-to-define abilities decreased when criteria were assigned to them (two or four – for a description of the study see Annex 2). In the case of EPS analysts, such abilities include information-seeking and evaluation along with filtering and appropriately weighting information.

Experimental economics has found evidence that overconfidence leads to miscalculated market entry decisions. Camerer and Lovallo (1999) used the methods of experimental economics to model market entry decisions and demonstrated how the overrating of personal abilities produced misguided market entry decisions (for details see Annex 2).

2.1.2 Overoptimism

> *The present and the future are working out well. The present is better than the past, and the future will be even better – especially for me. (Taylor, 2003)*

Krizan and Windschitl (2007) defined **overoptimism** as people's tendency to rate the likelihood of desirable events higher than what it actually is while underrating the probability of non-desirable events. Hundreds of empirical studies have presented proof that people in general believe to be part of positive events (long and healthy life; successful career; fulfilling marriage etc.) with greater likelihood than of negative events (falling victim to robbery; car accident; severe health problems etc.) (Griffin, Tversky, 1992; Weinstein, 1980 and 1998). It was observed among second-year MBA students how they overestimated the number of job offers, the amount of their initial pay that they would get after graduation and also how quickly they would get their first job offer (cited by Armor et al. 2002). In a laboratory study of Armor et al. (2002), 85%-90% of the subjects thought to have a better future than the average future of the group. All that points out how the majority of people overrate their future prospects.

Overoptimism is of critical importance in respect of budgeting as managers, just like their competitors, also have overly optimistic expectations about the company's future:

1. In their research, Cooper, Woo and Dunkelbert (1988) found that entrepreneurs overrated the chances of success of their businesses even though they clearly saw the likelihood of failure in the case of those types of businesses.

2. Studying the optimistic outlook, Griffin and Tversky (1992) discovered that it was not caused by the judgement of the business as a whole but by the subjective judgement of the likelihood of particular events.

3. Overoptimism is particularly dangerous in the case of M&A when sales revenues and cost reductions generated by synergies must be forecasted. Typically, the extent of error is greater with revenues than with expenditures (Lovallo, et al., 2007), i.e. positive future events such as an increase in sales volumes and economies of scale are overrated.

We would think that an exact knowledge of objective probabilities should dampen optimism about future events. Contrary evidence has been found in health care. In a study, attention was drawn to the importance of a healthy lifestyle in preventing heart disease. After presenting a healthy lifestyle the subjects were asked how likely they thought they would ever suffer from heart disease based on their current lifestyle. The study scrutinised whether awareness of the exact criteria of a healthy lifestyle would decrease unrealistic expectations about the future, i.e. whether the subjects would consider the occurrence of heart disease more likely when realising that they were not doing everything in their current lifestyle to prevent it. In another study the aim was to make the participants select reference persons whose lifestyle, i.e. doing exercise and a healthy diet, exposed them to a particular disease to a lesser extent. In both cases, it was observed that neither awareness of objective probabilities nor the formation of a new reference group led to diminishing optimism about the future, i.e. study participants did not rate higher the likelihood of the occurrence of the disease in their own cases (Weinstein, Klein, 1995).

Corporate executives think in a similar way about the likelihood of the company ending up in financial difficulties or failure (or, by analogy of the health care research, falling ill). Managers give similar reactions to the historical likelihood values of risk factors. Their awareness of objective probabilities does not do much in the way of changing their subjective judgement of them. In addition, they select reference or benchmark companies that they assume to be less responsibly coordinated or have taken more risks, or they ascribe failure to force majeure.

In summary, everybody looks upon the future optimistically and no fact, likelihood or statistics can shake that belief. Efforts to make subjects select reference groups or benchmark data against which they would judge their own possibilities less optimistically have also proven to fail.

2.1.3 Why do we believe that failures will diminish optimism or self-confidence?

In many cases the launch of a new business, a merger or acquisition, or the construction of a new plant is based on overly optimistic financial plans and ultimately leads to grave financial consequences. The systematic optimism of EPS forecasts could also warn analysts to exercise caution. The question arises: **Why do such failures not inspire caution in managers, decision-makers and EPS analysts? Why are they not more careful in making the next plan?**

We naturally expect failures to breed caution and dampen undue optimism. We usually think that failures cause greater and longer-lasting emotional trauma than what actually the case is.

Expectations in respect of the intensity of trauma or pleasure are referred to as *impact bias* in English-language specialised literature. The idea is that the degree of neither pleasure nor trauma meets expectations. For example, winning a cash prize does not give as much pleasure as expected but, fortunately, nor is trauma as intense as we imagined. *Impact bias* has one very important practical application, namely motivation, which the authors call **motivated distortion**. It drives us to achieve a goal in the case of positive events and spurs us to avoid terrifying emotional consequences when it comes to negative ones. After negative events it comes as a relief that the intensity of the sustained negative impact is more endurable than anticipated, while with positive events the desired sense of happiness is also less powerful. This motivation also plays an important role in implementing financial plans. Decision-makers make every effort to achieve their set targets. In the context of financial planning, motivating factors include the prospect of advancement, a high bonus or recognition and, as negative consequences, demotion, dismissal or a widely published scandal etc. All these factors

militate towards improved performance, which is a critical consequence of the *impact bias*.

The overestimation of the duration of emotional trauma is referred to as *durability bias*. In short, we believe happiness/sadness caused by a positive/negative event to last longer than it does in reality. In practice, the received wisdom that whoever e.g. wins the jackpot in the lottery or the Nobel Prize will be a happy person *in everyday life*, i.e. we also expect to see them as a happy and content person years later as a result of that event. Equally, weeks, months or even years after negative events (being quit by one's lover; divorce; losing one's job; undergoing financial turmoil; losing a significant other etc.) we tend to think of a person as someone who must be very sad (Gilbert, Pinel, Wilson, Blumberg, Wheatley, 1998). We think in a similar fashion when believing that the experience of failure in the wake of a bad business decision inspires caution or at least acts as a deterrent. After all, bad financial decisions have caused great losses to the company and may even have had personal consequences (layoffs, unpaid bonus etc.). That is what generates the belief that the fallout from bad financial decisions induces caution in decision-makers **in the long run**. *Durability bias* has been traced back to multiple reasons that cause us to believe that the emotional impact of a particular event will persist in the long term (Gilbert et al., 1998). These reasons are as follows:

1. **Misconstrual**: It is hard to judge a person's reaction to an event *unless we have ever experienced a similar occurrence* ourselves[31]. Circumstances greatly influence the emotional impact associated with an event. Few people have any experience in managing a company or making high-volume financial decisions; thus, it is an unknown event for many people. Just as in the case of other fiascos, circumstances can reduce the sense of failure in financial planning. There is a difference between starting up a company of the founder's own free will and inheriting and finding it a liability before sending into bankruptcy. There can have been many events that caused the decision-maker to "drift into" a situation

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[31] Losing one's eyesight is a cruel thing and therefore we normally believe that those who become blind at any point in their lives must be very sad. When we imagine the situation we do not consider how many forms and ways there can be for someone to lose their vision and how differently that occurrence can be interpreted in the light of circumstances. The loss of vision can occur from one day to the next or after protracted medical treatment but it can also be linked to a heroic act, e.g. if a person rescued a little child from a burning house (Gilbert et al., 1998).

where they embarked on a business or project, and many events can also be found that excuse them from responsibility.

2. **Inaccurate theories:** In the case of misconstrual, as discussed above, the person does not have a similar experience but there are certain events that they think *they know a little about*. It is a common belief that *"Money makes you happy"*. After winning in the lottery we expect the winner to remain pleased for a long time or simply that rich people are happy. Everybody has made or will sooner or later make bad decisions with financial implications. Overplanning entails grave financial consequences whereby we assume that the decision-maker undergoes a profound emotional ordeal since we relate it to our own experience of an emotional impact caused by the loss of a smaller amount of money. By financial overplanning we mean that a *person*, e.g. a corporate executive, can be held and does feel responsible for failure and is now brooding over how it came to pass[32]. In fact, however, a number of people were involved in the decision and, as we will see, many rationalisations and excuses can be found.

3. **Undercorrection**: Trauma or pleasure feels the most intense at the first moment. As time goes by the emotional impact begins to subside. Studies conducted in many disciplines have shown evidence that we expect the period of high emotional intensity to last longer than what it actually does as the initial ordeal leaves a profound impact. Initial high-intensity trauma is believed to explain the *durability bias*.

4. **Focalism:** In visualising an event we exclude other accompanying circumstances that also have an impact on our emotional state, while over time there are many other events that also affect our mood. This phenomenon is also known as *focusing illusion*. The greatest success in financial planning is when the company gains (in-company, bank, or State etc.) financial resources, which initially engenders euphoria and satisfaction. However, joy over success immediately begins to dwindle as the details of implementing the project and related problems have to be dealt with and responsibility for project delivery looms large. External observers ignore these circumstances and expect the general feeling of pleasure over access to resources to result in an overall good

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[32] For an overview of players and roles in corporate decision-making see Zoltayné (1999).

mood. Equivalently, those losing a funding opportunity are thought to grieve over the event for a long time whereas they probably focus on new tasks – their psychological immune system has come into play…

It is clear from the above that an external observer expects financial decision-makers to fall into an emotional crisis after a failed financial investment and due to the *durability bias* perceives it to last longer. Contrary to expectations, though, the decision-maker's optimism will not diminish radically when faced by a new assignment or financial plan. An explanation of which is to be found in the operation of the psychological immune system.

2.1.4 Psychological immune system: Why do optimism and self-confidence not decrease?

Overoptimism/overconfidence in task performance usually presents itself in the statement that *"I am the kind of person who can reach that target"* (Armor, Taylor, 2002), i.e. it is about an individual's faith in their own abilities (overconfidence). When the set goals are not achieved the individual will come into conflict with their own self-image: *"Perhaps I am not a good strategist, manager, financial expert after all?"* This is cognitive dissonance, which they must dissolve.

The concept of **cognitive dissonance** was introduced by Leon Festinger in 1957. He postulated that if a new bit of information or experience is inconsistent with our earlier knowledge or ideas, i.e. we discover a contradiction between our thoughts and beliefs and the world we experience we will feel dissonance or internal tension. To protect self-confidence and optimism, cognitive mechanisms come into play confirming our earlier beliefs and the correctness of our decision. These processes dissolve cognitive dissonance and bring experienced events into alignment with our self-image and beliefs.

A current example of cognitive dissonance is how behavioural finance is limited in gaining ground by the existence of well-established and unshakeable models based on normative techniques. In the light of the global crisis of 2008, these models have been called into question as they do not seem to represent reality adequately. The acceptance of behavioural approaches besides what has so far been a well-functioning science

would be a kind of admission of the inadequacy of normative models. Challenging the models, i.e. misguided assumptions, that have been applied to date would be tantamount to questioning competence in our Western culture, which is why, quite understandably, there is resistance to the spreading of this new science.[33] The ensuing cognitive dissonance has been dissolved by the following argument: *Even though existing models are less than perfect they still provide a satisfactory representation of the real world.* That explanation has been used to deal with cognitive dissonance (Olsen 2009).

The **psychological immune system** *in general* keeps us relatively satisfied with ourselves. Psychologists have intensively researched into the process of emotional healing and come up with many results (Gilbert et al., 1998). An important finding in respect of the psychological immune system is that it only works well if no one watches it. When attempts were made to scrutinise it with subjects i.e. they were asked to tell about their thoughts and feelings it simply stopped working. Another important characteristic is that we are not aware of it. It is critical that this function of our subconscious remains hidden as those subjects who were aware of it were disappointed at how slowly it worked[34].

As a result of the functioning of the psychological immune system (Gilbert et al., 1998) people usually:

- mention their successes and overlook their difficulties,
- celebrate their triumphs and forgive their mistakes,
- exaggerate their successes and explain away their blunders.

The psychological immune system is connected to *durability bias*, i.e. the overestimation of the length of emotional ordeal, in that it dissolves cognitive dissonance experienced by the decision-maker in the wake of a bad decision. As we will see, corporate executives and financial decision-makers have a multitude of potential excuses and external circumstances to blame ensuring that the psychological immune

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[33] It has been my experience in the Hungarian context that there is openness toward behavioural disciplines on the part of professors and researchers of BCE and the Universities of Szeged and Pécs alike.

[34] An everyday example of the functioning of the psychological immune system is the statement frequently made after divorce that *"I never really loved her/him anyway"* or *"we were never really happy"* etc.

system works well. As a result of the psychological immune system, they shift responsibility to somebody else or explain their mistake with an unforeseen event.

Research has shown evidence that after mistaken forecasts people make impartial judgements about both the result achieved and their initial expectations and plans. Consequently, they find rationalisations, explanations or excuses for why they failed to achieve the set goals, or rather, why the goals failed to be achieved (Armor, Taylor, 2002).

Festinger (2000) believes that there are three ways to overcome cognitive dissonance, which, however, do not exclude each other:

1. Changing **beliefs, opinions or behaviours** underlying cognitive dissonance.

2. Reducing the importance attached to or even completely forgetting thoughts/events causing dissonance.

A project's success is normally not possible to judge objectively[35]; the information asymmetry[36] between managers, owners and creditors has an important role to play here. In evaluation, those project features are highlighted in respect of which it can be considered successful. On the other hand, characteristics based on which the project outcomes could be evaluated negatively are ignored or played down. In evaluating the variance between planned and actual values the figures cannot be changed any more, but *original expectations can be re-evaluated* when the variance is explained (citing an increase in market share, marketing campaigns, reorganisation) or have different recollections as to belief in the success of the project *("I always thought so")*. Another defensive technique is to *re-evaluate the initial situation* in the light of which the results achieved are regarded as success, or *find a new reference group*, which leads to re-evaluating the achieved results. All these mechanisms result from the effect of *hindsight bias,* which I will present later.

3. Obtaining **new knowledge** that supports our existing ideas and thus overshadows dissonance. In such a case insufficient knowledge influencing the foundation of our earlier decisions and information about the project is relied on. Similarly to the previous point, dissonance can be mitigated by

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[35] Different indicators give an evaluation of a company or its value. For details see Aranyossy (2010).

[36] There are countless indicators against which a business can be evaluated. For an overview see Virág, Becker, Turner and Varsányi (2005).

identifying a new reference group; re-evaluating underweighted information; or finding force majeure events.

Hindsight bias and the *attribution error* can also be linked to Leon Festinger's third point. Failure is explained by unforeseen external factors rather than the lack of adequate abilities; it is unanticipated circumstances that are to blame for failure to meet expectations, while success is attributed to abilities.

Below I present the functioning of hindsight bias and the attribution error, which are key components of the psychological immune system.

2.1.4.1   Hindsight bias

Hindsight bias is a cognitive process whereby a person, in possession of information after an event, feels that they would have also known the best solution at the moment of decision, i.e. would have weighted information correctly. This bias basically appears when a negative event takes place. A well-known phenomenon in everyday life is when after a soccer game football fans explain the right or winning strategy not letting each other get a word in edgewise and are convinced that they would have done the right thing had they been in the place of the coach/players. Nor is it different in financial decision-making. When a project fails warning signs are clearly visible in hindsight which the decision-maker overlooked in planning. (I will show why it was overlooked in presenting the illusion of knowledge.)

It has been observed with people inclined toward overconfidence that they **positively evaluate their performance even if it fell short of their earlier expectations**. Often they recall their **initial expectations** as if the latter were consistent with the performance achieved, i.e. they were less optimistic or exaggerated. Cooper and Artz (1995) conducted such studies on financial businesses. Three years after inception owners positively evaluated their successes even though they fell short of expectations. Most surprisingly, their satisfaction remained the same even when the achieved successes were measured objectively. It has been concluded from several studies that those who are the most optimistic in their expectations are the ones who judge their own performance the most favourably, regardless of how they have met their initial expectations. Often this is a consequence of the fact that when forecasts are underachieved it is the expectations that are called into question rather than adversely judging the actual performance. That is in part understandable, as in possession of new

information – especially when it comes to judging uncertain events – it appears in the light of actual events that they were more predictable than it was the case in reality. In the field of financial planning, currently it presents itself as an obvious explanation that no one ever thought the crisis of 2008 would occur, or as is the case now, that it would be so protracted. Hindsight bias leads people to think subsequently, in the light of facts, that more accurate forecasts should have been made and how come these obvious signs went overlooked.

Another way to positively evaluate the achieved results is to **change the perception of initial conditions**. A study among students revealed that after an ineffective course students claimed that their skills that were supposed to be enhanced by that course had been weaker before the course than what they had thought they were at the time. That was their way to confirm the usefulness of the course in order to avoid feeling it actually had been a waste of time and money. In the case of financial undertakings we can observe a similar phenomenon whereby after an ill-fated marketing campaign the corporate leader thinks that the firm's image must nonetheless have improved among customers, or he explains a failed investment project with the company's increased opportunities and thus the project can ultimately be considered a success. Naturally, these explanations can be true, or in many cases self-fulfilling, but are hard to measure.

Yet another solution is to **compare the achieved performance with underperforming projects** and thereby prove that the results reached are better than those of the other projects[37]. Unless such projects are identified in the environment then how the situation could be worse will be imagined[38]. At financial undertakings, when plans are underachieved a source of pleasure will also be found in having at least making some profit or just very little loss, or that they did not go bankrupt, unlike some competitors. In the event of schedule overruns a sense of satisfaction is found in the fact

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[37] Studies on cancer patients showed that they typically compared their condition to patients who were at a more advanced stage of cancer and so they were pleased to feel better than those other patients (Wood, Taylor and Lichtman 1983).

[38] For example, if someone's accommodation is significantly worse than expected on a package tour bought from a travel agency the person will be happy that they at least have somewhere to stay and the travel agency did not go going bankrupt.

that the delay was only 1 year as opposed to other companies that were e.g. 3 years behind schedule.

In sum, as result of hindsight bias, people

- re-evaluate and lower their earlier expectations
- change the evaluation of the starting situation itself and lower its level to make growth look bigger
- look for a benchmark or reference (a similar project or company) for evaluating the achieved results against which they can be considered better.

2.1.4.2   Attribution error

The source and driver of overconfidence is the natural propensity of human beings for overrating our own abilities and, as a consequence, misconstruing the causes of certain events (Kahneman, Lovallo, 2003). The most typical form of attribution bias is that people ascribe positive events to their own influence while putting down negative events to external factors. Many times the *"shock"* of realising that our expectations were not met triggers a process whereby more realistic expectations are set, which helps identify events that made initial expectations unrealistic (Kahneman Miller, 1986)[39].

When explaining delays in performing everyday tasks, study participants typically cited external factors. However, an objective look at events revealed that poor time management was much more likely the reason, yet the subjects blamed external circumstances. In another study the focus was on the subjects' own role in reaching the set goals, regardless of whether or not the task was accomplished. It was found that they explained success with their own abilities and failure with external factors (Buehler, Griffin and Ross, 2002).

> *" One study of letters to shareholders in annual reports, for example, found that executives tend to attribute favourable outcomes to factors under their control, such as their corporate strategy or their R&D programs. Unfavourable outcomes, by contrast, were more likely to be attributed to uncontrollable external factors such es weather or inflation." (Kahneman, Lovallo, 2003, p59)*

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[39] exclusion rationalisation

A typical form of the *attribution error* in financial planning is when corporate executives ascribe positive outcomes to their own hard-to-measure personal abilities such as organisational skills, managerial abilities or strategic skills whose effect is also difficult to measure, as is the effectiveness of corporate strategy, R&D or marketing. These success factors can be linked to abilities in respect of which the decision-maker is overconfident. By contrast, negative events are blamed on external factors such as the weather, inflation, competitors' unforeseen moves or the current economic situation characterised by global recession etc. This phenomenon has been proven by studying the annual reports of companies listed on the stock exchange.

2.1.5   Putting optimism in its place

One of the negative implications of overoptimism is no doubt the fact that people underrate real threats and in a sense consider themselves invulnerable. All that adds to the propensity to take risks, which also induces dangerous behaviour in everyday life (Armor et al., 2002). There is plenty of empirical evidence that optimism increases the willingness to take risks in business life as well, which leads to poor investment decisions resulting in overshot schedules and budgets or lower than forecasted market shares, which is manifested in lower sales and loss-making operations. It has to be emphasised, though, that optimism does have its place in everyday and business life, too.

Optimism generates more enthusiasm than does realism, let alone pessimism. It gives an impetus when we are faced by a difficult situation or challenging goals. However, a balance must be struck between optimism and realism. Aggressive goals motivate the team and increase the chance of success but efforts must be made to reduce optimism when forecasts are made to support management's capital layout decisions. Decision-makers should have a realistic approach while managers should be optimistic. An optimistic corporate executive (CFO or CEO) can pose a serious threat to the company while the lack of optimism in an R&D manager would undermine the soaring flights of imagination. Brilliant resourcefulness is crucial at the sales department. In fact, project implementers should not see realistic analyses as they may dampen enthusiasm. Objective forecasts help find the smartest ends and the right means to them. Once a company has committed itself to an investment, the constant scrutiny for pitfalls

in achieving success will certainly do morale and performance no good. The right amount of optimism will enable the company to get across hurdles it faces in the process of implementation (Kahneman et al., 2003).

Studies have shown evidence that positive expectations significantly improve performance. Besides, those who set positive goals outperform those who do not. In a study the time it took to complete a task was examined. The subjects set the deadline, which was of course sufficiently optimistic, and failed to accomplish the task by that deadline but finished earlier than those who had not set a deadline at all (Armor et al. 2002). The authors concluded that optimism or overconfidence brings people closer to their goals than if they were not overly optimistic. Optimism, even if exaggerated, is critically important in the case of tasks that demand perseverance. Overall, overconfident people set motivating goals and achieve higher performance.

Executing a project is a task requiring particular perseverance whereby project implementers are faced by many difficulties and pitfalls. All that confirms Kahneman et al's (2003) conclusion: Optimism is necessary during implementation but when a decision has to be made to embark on a project, efforts must be made to reduce optimism.

Overall, most researchers agree that optimism must be curbed in making forecasts, the first step of which is to determine its most important causes and understand its sources and how they were formed.

2.1.6 Summary

The most frequently mentioned reason for overplanning observed in financial forecasting is the overconfidence and overoptimism of the decision-maker. Based on a more thorough look at these concepts, overconfidence can be defined as the overrating of abilities while overoptimism as the overly positive subjective judgement of the likelihood of future events.

It would be expected that after a failure analysts' or managers' self-confidence will decrease and the degree of overplanning will be reduced when the next decision is made, but experience suggests the opposite. We have received an explanation of why we believe that a manager who has undergone failure will be more cautious in the future and why that is not the case in reality. Although pleasure caused by happiness is greater

initially, its intensity falls short of our expectations, which is referred to as *impact bias*. Its duration is also much shorter than anticipated, which phenomenon is known as *durability bias*. Completely analogous to that is sorrow caused by failure both in intensity and duration, which again fall short of the predicted degree of intensity and duration. Both effects have their great advantage in their *motivating power* (motivated distortion), i.e. the obtainment of the desired feeling of pleasure or the avoidance of shock caused by imagined failure, which spurs the individual to better performance.

As a consequence of one's experience of failure, the individual comes into conflict with their self-image and belief in their own abilities. This is known as cognitive dissonance, which is remedied by the psychological immune system. Two related heuristics have been introduced: hindsight bias and the attribution error. Hindsight bias helps re-evaluate expectations or the starting conditions or find a new reference group, compared to which the performance achieved is *"not that bad after all"*. The attribution error is committed when we ascribe positive outcomes to our own abilities while blaming failures on external circumstances. An interesting discovery of research has been that the psychological immune system only works when we are not aware of it, which makes its study highly difficult.

2.2 Illusion of knowledge in financial planning
- following Kahneman -

At the end of the day, systematic optimism in financial planning can be traced back to irrational decisions observed in information processing. (Easterwood, Nutt, 1999)

"Following Kahneman": Kahneman's seminal articles co-authored by Tversky and Lovallo have given the greatest impetus to understanding cognitive processes underlying the development of the illusion of knowledge (Kahneman and Tversky 1974 and 1979; Kahneman and Lovallo 1999 and 2003), together with appreciative critiques of those writings as well as articles providing deeper analyses of certain of their findings or confirming them with empirical studies. Kahneman and Tversky's articles on judgemental heuristics (1974) and on prospect theory (1979) lay the foundations of decision-theory and are pivotal to understanding the development of the illusion of knowledge.

The psychological causes of overplanning
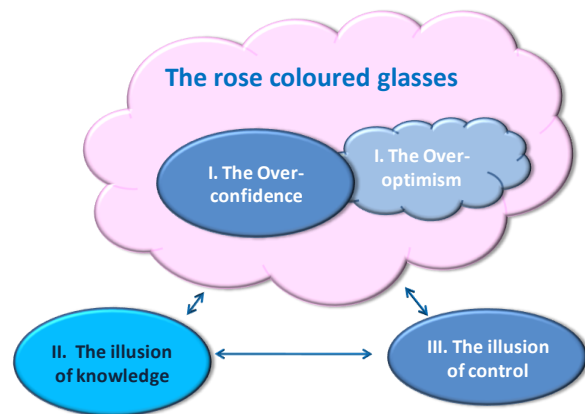
Figure 5. The key psychological causes of overplanning: Illusion of knowledge

The other reason for overplanning lies in the illusion of knowledge; I will discuss the most important factors of its formation in this chapter (Jáki, 2010). Both Nofsinger (2007) and Kahneman and Lovallo (2003) have identified the illusion of knowledge as the consequence of overconfidence.

The normative theory assumes a state of being **perfectly informed** in respect of both outcomes and probabilities and that the decision-maker is able to consistently

assign preferences to outcomes. In perfect market conditions no costs are incurred by obtaining and processing information, which is an indispensable condition of normative theory models. It is not only the time requirement and cost of obtaining information that prevent people from reaching the state of being perfectly informed but also their own cognitive limitations.

Illusion of knowledge is used to describe a situation when we believe that as the amount of information grows we will be able to make better and more accurate decisions with regard to future consequences, which is *apparently not a deplorable thing* in itself[40]. Consequently, we have the feeling that our information is (Kahneman and Lovallo, 2003):

> a.   accurate, and
>
> b.   correctly interpreted.

However, due to heuristics influencing the *seeking and processing of information*, this *(apparently) not deplorable* attitude (can) lead to overly optimistic forecasts.

Understanding the business model in **financial planning and EPS forecasting** and mapping value drivers require taking in, systemising and processing a vast amount of information. Exploring value drivers demands the processing of further information; the amount of information exceeds the processing capacity of the human brain[41] (Kahneman and Lovallo, 1993).

If analysts behaved rationally they would integrate all available information in their forecasts impartially. This has been the subject of many studies (see Brown, 1993). Easterwood and Nutt (1999) have proven that analysts **underreact to negative information,** i.e. fail to adjust their forecasts sufficiently downwards while **overreact to positive information**, i.e. adjust them excessively in the positive direction, which is inconsistent with rational behaviour. These two effects in combination lead to systematically optimistic EPS forecasts. According to Capstaff et al. (2001), EPS analysts are reluctant to make bad projections because of personal motivations, and that is why optimism is greater in periods when results are relatively weaker. In addition, the

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[40] For the discussion of knowledge management see Zoltayné (2002)

[41] The possibility of unlimited outcomes is incomprehensible to the human brain. Miller (1981) was the first to observe that our short-term memory was able to store 7+/-2 bits of information.

authors also acknowledge that insufficiently weighted information can also provide an explanation, so besides personal motivations cognitive factors should also be considered.

It has to be considered in an actual decision-making process that when processing information analysts seek to make decisions as quickly as possible, i.e. with a minimum expenditure of time. Time is the scarcest resource in the process of information search; therefore, mental shortcuts are often used in decision-making with the help of heuristics. The use of heuristics often leads us to believe that we have gained some knowledge that we do not actually have, or to deem a faulty conclusion as correct. These kinds of time savings in the world of finance in turn result in optimistic forecasts, as a consequence of which EPS analysts may encourage investors to make investments or buy shares that will ultimately cause losses (Moisland, 2000).

Overall, finding information is a costly and time-consuming process. Analysts weight information differently in part because of their personal motivations, in part due to their unconscious cognitive patterns. In what follows I will focus on these cognitive mechanisms.

2.2.1 Anchoring heuristic as the main ordering principle of the development of the illusion of knowledge

Anchoring heuristic causes people to accept one reference point in a decision-making situation and adjust their subsequent proposed solutions to it, even though that reference point is unsuitable for solving the problem (for studies proving the anchoring effect see Annex 3).

Anchors can take countless forms. They may be seemingly harmless such as a person's inadvertent remark or a newspaper article, but they can also be harmful prejudices, such as stereotypes. They are often linked to past events or e.g. trends projected by the statistical office[42].

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[42] In a bargaining situation, it is considered a great tactic to anchor the other party's thoughts e.g. when the price of a service has to be set. The customer's thinking is often bounded by the original offer and will pay much more for the service than what they would otherwise need to.

The anchoring effect is usually studied in two stages (Kahneman, Tversky, 1974):

(1) Anchoring describes a phenomenon whereby based on different reference points various estimates are given for the same value in the decision-making process, during which the final value is approached from the initial anchor (Kahneman and Tversky, 1974).

(2*) Insufficient adjustment refers to a phenomenon whereby the decision-maker is guided by an initial value or parameter in the decision-making process known as the anchor and cannot sufficiently depart from it when making the final decision.* The anchor can be a recalled memory, an experience or a data provided by another person.

In the case of financial plans we cannot overlook the fact that earlier plans become increasingly fixed over time due to the effect of cognitive mechanisms. This is what I call anchor fixation.

I discuss the process leading to the illusion of knowledge along the anchoring bias. I have divided the process into three stages as follows:

    A. anchor formation

    B. anchor fixation

    C. insufficient adjustment.

At each stage I will present the key cognitive mechanisms. Several publications have already addressed these effects proving their role in financial planning and decision-making. I have put together my model on their basis. Many publications have systemised interactions between some cognitive patterns, which I also present and use. The novelty of this theory section lies in its comprehensive systemisation of the mechanisms determining the development of the illusion of knowledge. It is a summary of previous research findings, which – to the best of my knowledge – has not been done before.

2.2.2   Anchor formation

In everyday life a multitude of information gets into our brain, of which we only perceive those few bits which we deem important. This is called selective perception, a kind of filtering mechanism.

In financial planning, attention[43] is influenced by selective perception. From the aspect of information gathering, our **initial expectations** are of critical importance among influencing factors[44] at play in making the final decision.

The formation of initial expectations is affected by early experience, previous or existing information and available historical data about the company or a similar undertaking, or perhaps the industry. After considering available information, the decision-maker prepares a forecast (Webby, O'Connor, 1996). In respect of a particular product, market or even macro-economic situation several different analyses are available that can even contradict each other. The decision-maker has to choose which analysis to give priority, or a greater weight, i.e. which of them to accept[45].

In the current chapter, I first introduce the anchor itself, followed by the factors leading to the formation of the anchor. First I cover the representativeness heuristic followed by the judgement of conjunctive and disjunctive events and finally the availability bias.

2.2.2.1   The anchor

The anchor has been examined according to different categorisations. A distinction can be made between **numerical** and **non-numerical anchors**. As a non-numerical anchor, usually stereotyped thinking (see representativeness heuristic) has been studied. A prosperous company is normally associated with a prestigious building

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[43] For an overview of the subject of atteniton see the work of Hámori (2006).

[44] Selective perception is influenced by the following factors: (1) we seek information consciously, (2) the information carrier attracts attention, (3) information is consistent with intitial expectations, (4) information confirms stereotypes and patterns.

[45] In personal interviews related to EPS forecasts, Sedor (2002) observed that based on historical data analysts already had a preliminary idea about the EPS. However, in the light of managers' strategic vision of the future they re-evaluated that preliminary value.

as company seat or with a charismatic leader etc. Much research has typically looked into anchoring to numerical values, as it is clear from the foregoing.

Another grouping is also possible, namely **informative** and **non-informative** anchors can be distinguished[46] (Chapman and Johnson, 2002). For example, an **informative** anchor is the length of the river Tisa used to estimate the length of the Danube. When we look for informative anchors, the problem of anchoring must be approached as an information search-related problem. In respect of EPS forecasting we clearly deal with looking for informative anchors.

We can distinguish between anchors according to the source of its formation, i.e. as provided or self-generated anchors (Mussweiler; Englich, 2005). A **provided anchor**[47] for EPS analysts can be EPS forecasts received from managers, while a **self-generated anchor**[48] is produced from the person's previous knowledge and experience. In the case of EPS analysts, preceding years' EPS values or growth trends can function as self-generated anchors.

It should be added that anchoring leads to bad or misguided decisions if the initial value, i.e. the **information is no longer relevant** (Kopelman and Davis, 2004). In the case of EPS forecasts, a favoured point of reference is historical data, which of course make relevant information but information referring to the future may be more important while mental anchors formed in this way may interfere with its processing.

In financial planning, two important characteristics must be highlighted concerning anchor formation on the basis of Chapman and Johnson's (2002) article on anchoring categorisation:

1. Decision makers seek **informative anchors**, which is to be interpreted as an information search-related problem.

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[46] In Kahneman and Tversky's (1974) examples, a **non-informative** anchor was when the number of physicists in Manhattan had to be estimated based on the last four digits of one's social security number or the number produced by the lucky wheel, to which the study subjects were attached in defining the target value, as was proven by empirical research.

[47] Provided anchor: "Think of the last four digits of your social security number then estimate the number of physicists living in Manhattan."

[48] What is the freezing point of alcohol? Self-generated anchor: 0 degrees for water.

2. **Not exclusively numerical anchoring** effects should be expected. The subjective judgement of the likelihood of future outcomes is also influenced by a number of non-numerical values.

2.2.2.1.1 Provided and self-generated anchors

Epley and Gilovich (2001) have scrutinised the effect of provided and self-generated anchors. We adjust self-generated values or anchors[49] better as we know that they are only approximations of the desired value, whereas we assume the provided anchor to be accurate. Let us suppose that a provided anchor is a value given by an external expert, even if it is overly optimistic, but we take it seriously at least for a moment. By contrast, we know about the self-generated anchor that it is only a reference value. In their studies estimates have to be given for the freezing point of vodka. A self-generated anchor is the freezing point of water, i.e. 0 degrees. However, that piece of information does not have an effect that would make us seek related confirming information. However, if an external expert gives a value for the freezing point of alcohol, then – even if it may be wrong – subjects will take it seriously and be anchored to that value. Epley and Gilovich (2001) have demonstrated that people use self-generated anchors consciously. Asked how they got to the decision the study subjects told about what reference values they had used and how they adjusted it to come to the final decision (*When was Washington elected President? Columbus discovered America in 1492, so it had to be sometime later.*) By contrast, when they started from a value given by an external expert, they did not mention it as a reference value in describing the decision-making process (*What is the average length of a whale if any whale is 69 feet long?*)[50].

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[49] Availability bias helps understand what the self-generated value will be. This heuristic explains what memory or experience the decision-maker recalls first to which they will remain anchored later.

[50] In budgeting, the strongest and **predominant provided anchor** is the **preliminary plan** made about the project, which is assumed to be based on market research and financial analyses (Kahneman and Lovallo, 2003). Lovallo et al. (2007) reveal that during due diligence before M&A decisions, decision-makers try to issue a letter of intent (LOI) that will give a push to the business. All this is done long before they get actual data about the target company. This LOI will then be the provided anchor in making detailed plans.

A non-numerical anchor is an **image or opinion** formed about an industry or company. Komáromi (2003a) points out that the processing characteristics of news and information are linked the anchoring effect.

"News newly released about a share will not change radically our image already formed about that share. It has been anchored to the earlier image from which we cannot detach ourselves completely, so the price will not move sufficiently as an effect of the news. The adaptation of the news takes place gradually, i.e. a certain time has to pass before the share price appropriately reacts to the given news. {...} A special case of anchoring is conservatism, whereby a change in our opinion stems from our character and makes itself felt in every field." (Komáromi, 2003a)

2.2.2.1.2   The strength and intensity of the anchor

The strength and intensity of the anchor has also been the subject of much research, in the case of both informative and non-informative anchors. Studies have been conducted on the effect of concentration on the anchor; the relevance of the anchor value; the effect of extreme values; or the strength of unconscious anchors, etc., the results of which are presented below:

A.) **Awareness of the anchor**. The anchor must be **conspicuous** for the anchoring effect to form or intensify (Chapman, Johnson, 2002). In Kahneman et al.'s (1974) experiment it was the comparison (a higher or lower value than the target value, i.e. *Are there more or fewer physicists than the last four digits of your social security number in Manhattan?*) that drew the study subjects' attention to the anchor. Wilson et al. (1996) directed subjects' attention to the anchor by getting them to write down the numerical anchor on several pages. Many studies have shown evidence that the anchoring effect will come into play even if the subject's attention is not directed to the anchor. In Mussweiler and Englich's (2005) study, a value flashed on the computer screen ten times in a minute without the subject becoming aware of even though seeing it[51], and then the number thus flashed was proven to have an anchoring effect.

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[51] The subjects were watching the display for one minute while thinking about a question about the price of a car or, in another case, the average temperature in Germany, which were the target values, and meanwhile a number intended for an anchor flashed ten times but was not sensed by the subjects.

B.) Simonson and Drolet (2004) studied the **compatibility of informative anchors**. The intensity of anchoring or attachment depends on how compatible the anchor is with the original question. In case of compatibility a key criterion is that the anchor and the target value should be on the same scale (currency unit, ranking) and the direction of the correlation should be identical (company ranking and company profitability are counter-directional). Strack and Mussweiler (1997) went even further. Not only the scale (meter) must be identical but the anchor must refer to the same underlying dimension, such as width or height. In their study, the participants had to estimate the height and width of the Brandenburg Gate. The same anchor was provided for both the height and, in the opposite way, for the width. It was observed that where a height anchor was given for estimating the height it was stronger than when it was given as a width anchor. In other words, the more relevant a bit of information as an anchor is for a specific decision, the stronger the anchoring effect will be. After studying from multiple aspects the role of compatibility, Slovic, Griffin and Tversky (2002) concluded that compatibility plays a key role in how strong a piece of information as an anchor proves to be. It should be added that the decision-maker focusses on the aspect from which the anchor is compatible rather than on why it should not be a good reference value, i.e. the aspect from which it is different. With regard to anchor compatibility, the decision-maker seeks confirming information.

C.) It should be highlighted that extreme values also qualify as anchors. An anchor is considered **extreme** if it represents an unlikely value for the value in question. In their experiment, Mussweiler and Strack (1997) asked when Einstein had been to the United States for the first time. The two values (1215 and 1992), however extreme they were, proved to be anchors. Epley and Gilovich (2001) also revealed in their study that the closer the anticipated estimated value was to the reference value the sooner the decision-making process ended.

D.) We normally do not know that our decision has been influenced by an initial value, i.e. **we are unaware of the anchoring effect**. Experiments drawing the subjects' attention to the anchoring effect were unsuccessful as the anchoring effect did not diminish (Wilson et al. 1996). Accordingly, incentives rewarding accuracy also remained ineffective (Wilson et al. 1996, Slovic, Griffin and Tversky, 2002). As result

of empirical research Chapman and Johnson (2002) drew the conclusion that **incentives do not** or only negligibly **reduce the anchoring effect**.

E.) The intensity of the anchor is influenced by the **illusion of validity,** i.e. the extent to which the decision-maker finds the result good. Faith in the accuracy of forecasts primarily depends on the degree of representativeness, i.e. on how good the decision-maker feels the fit between the selected result and input data (to what extent an individual's personality fits the stereotype linked to a particular occupation[52]). In such cases we do not or hardly take into account factors that limit the accuracy of the forecast. For example, in the case of occupations we ignore the number of persons engaged in a certain occupation in a given society[53], i.e. the *a posteriori* probability, as we are anchored to input data, i.e. personality traits. We are strongly inclined to trust redundant information, and thus the increasing amount of redundant information among input data reduces forecasting accuracy. This unfounded trust, which is created by a good fit between the forecasted outcome and the input information, was called the **illusion of validity** by Kahneman and Tversky (1974).

F.) Another interesting observation is that **the decision-maker more easily adjusts in the positive direction** (costs downwards and revenues upwards) **than in the negative direction** from the anchor value. This phenomenon can be explained well with mental accounting, i.e. the hypothetical value function of the prospect theory (see anchor fixation); further, overreaction to positive information and underreaction to negative information also belong here (Easterwood and Nutt, 1999).

G.) The sequence of information plays a key role in information processing. Every bit of information can function as a potential anchor but its intensity is determined by the sequence in which the analyst or decision-maker receives information. Studies on auditors have shown that the explanation of unforeseen revenue fluctuations is more influenced by information received first than information received later. This is effect is referred to as *"belief perseverance"* by researchers. In their experience, the weighting of information was affected by what information the study subject was exposed to first.

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[52] *"Steve is very shy and withdrawn, invariably helpful, but with little interest in people, or in the world of reality. A meek and tidy soul, he has a need for order and structure, and a passion for detail."* Based of this description Steve's occupation must be defined (Kahneman and Tversky, 1974).

[53] See the examples of Steve and Mary in the section on representativeness heuristic.

Another interesting observation was that the anchor strengthened, or the information was assigned an even greater weight, as soon as it was put in writing. In the auditors' case, when they already wrote down the possible cause of unforeseen revenue change they became much more strongly anchored to it (Koonce, 1992). Accordingly, in making EPS forecasts which bit of information analysts process first and whether they have already written down their projections is of pivotal importance.

> *"In summary, anchoring effects are common when the anchor has received sufficient attention. This effect occurs even for extreme anchors and even when respondents are unaware of the effect, have been warned to avoid the effect, or are motivated to be accurate. Anchors are most influential if they are relevant to the target judgement; that is, if they are expressed on the response scale and represent the same underlying dimension, thus comprising a potential answer to the target question." (Chapman and Johnson, 2002, p. 126.)*

2.2.2.2 Cognitive mechanisms playing a role in anchor formation

As we have seen, first impressions and stereotypes play a key role in the formation of initial expectations as a *non-numerical anchor*, which points to the representativeness heuristic. In the case of *self-generated anchor* formation we saw the critical role of early experience and first information, the effect of which is explained by the availability heuristic. The judgement of conjunctive and disjunctive events as part of the anchoring bias has also been the subject of study (Kahneman and Tversky, 1974).

The three cognitive thinking mechanisms listed below have an important role to play in financial overplanning:

1. Representativeness heuristic, about which it has been demonstrated (Kahneman and Tversky, 1974) that loss-making years are underweighted as opposed to managers' ideas and profit-making years are overrated in forecasts concerning the future.
2. The subjective judgement of the probability of disjunctive and conjunctive events provides a further explanation of what effect managers' strategic plans have on analysts. Kahneman and Tversky (1974) has shown and proven its role as part the anchoring heuristic in financial forecasting.

3. Availability heuristic draws attention to the misjudgement of subjective probabilities. The decision-maker is anchored to this subjective opinion in planning (Kadeus et al., 2006).
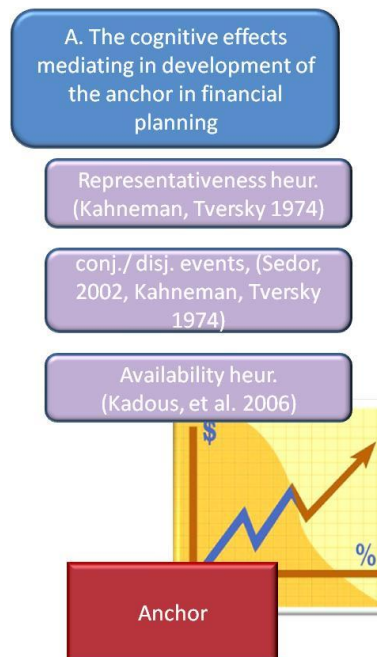
Figure 6. Factors influencing anchor formation

These effects help understand how an initial, preliminary opinion develops in the early phase in information gathering about the final outcome of financial planning.

2.2.2.2.1 Representativeness heuristic

> *„I believe in all of my beliefs, but I believe that some of my beliefs are false." (Griffin, Tversky, 1992, p. 248)*

In making EPS forecasts what the analyst thinks of the company, its leader or the industry itself is critically important. These ideas are heavily influenced by the analyst's **stereotypes.**

Before delving into the details of representativeness heuristic let us take a look at what is meant by stereotype, as the representativeness heuristic is closely related to it and shows well the effect of stereotypes. In addition, it also explains how redundant information affects initial expectations and what influences the intensity of attachment to the initial opinion formed in this manner.

According to the Dictionary of Foreign Words, a **stereotype** is a superficial generalising opinion. It is worth examining this word etymologically: " *'Stereotype'* is composed of the Greek words *'stereos'* meaning 'hard' or 'rigid' and *'typos'* meaning 'type', 'model' or 'pattern'." By definition: *"Stereotypes are extremely simplified and widespread observations about the members of a community. They can be positive, negative or even neutral. Their common feature is resistance to experience and ignorance of individual differences."* Stereotypes are not necessarily based on experience. We distinguish between their two groups: strong and weak stereotypes. The difference between them was that strong stereotypes are absolutely immune to any kind of information. Generally speaking, all stereotypes are largely independent of facts and information. The relationship between facts and stereotypes is the exact opposite of what we would expect. It is not facts that influence mental ideas; rather, we compare all new information with an idea typical of some stereotype. If the information is consistent with the stereotype we will accept it; if it contradicts it we will reject it.

From the aspect of obtaining information related to **financial planning**, the role of *stereotypes and patterns* is crucially important. In financial planning, they appear in the form of expectations and prejudices with regard to persons and businesses. In this respect, what matters is how well the given corporate executive fits the *good manager* stereotype, or how well a company or industry fits into the *good investment* category. In the case of foreign analysts, what they generally think of a given country or economy is also important. In such cases the opinion of a prestigious analyst company or recognised expert is also given greater weights in making forecasts.

Representativeness heuristic occurs when the decision-maker judges probabilities based on the extent to which thing 'A' represents thing 'B', i.e. how similar 'A' is to 'B' (Kahneman and Tversky, 1974). Kahneman and Tversky's two famous experiments show evidence of the representativeness heuristic through the examples of Steve[54] and Mary[55]. Our preliminary expectations are significantly

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[54] *"Steve is very shy and withdrawn, invariably helpful, but with little interest in people, or in the world of reality. A meek and tidy soul, he has a need for order and structure, and a passion for detail."*

After this description people must determine Steve's occupation or order occupations (farmer, salesman, airline pilot, or librarian etc.) by probability. Representativeness, i.e. the stereotype based on the similarity of Steve's personality to particular occupations is not influenced by the base-rate frequency of

influenced by the representativeness heuristic as people choose the outcome (occupation in Steve's case) which is the most representative of the input (Steve's personality). Input is information based on which we make a decision, i.e. select that result from the options that we believe to be correct. Representativeness can lead to serious mistakes since it is not influenced by many of the factors that affect the likelihood of a particular event (Steve's personality traits suggesting he was a librarian versus the number of librarians in America).

In evaluating information, analysts take into account the *authenticity* of information and how typical or *representative* it is (Kahneman and Tversky, 1973a). The *more representative* a piece of information is of a given problem, the greater weight analysts attach to it. However, weighting is also influenced by their opinion of the *authenticity* of information. **Studies have demonstrated that people lay more emphasis on representativeness than on authenticity when deciding on weighting information. All this is instrumental in the development of the illusion of knowledge especially in the case of decisions made under uncertainty.** Below I present a few examples proving that representativeness matters more in the weighting of information than does the authenticity of information.

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occupations. That occupation which is the most frequent should be selected as the most probable. However, the probability of Steve's occupation is judged on the basis of how similar Steve's personality is to the stereotype attached to each occupation. Most people assessed that Steve was a librarian (Tversky and Kahneman, 1974), whereas in America there are many more farmers than librarians in the population, so Steve was much more likely to be a farmer than a librarian.

[55] Mary is a talented, independent 31-year old woman with a philosophy degree, who is sensitive to social injustice and frequently participates in anti-nuclear demonstrations. What occupations and activities is she interested in? Please, order the following by probability: a) Mary is an elementary school teacher, b) Mary works in a bookstore, c) Mary is involved in the feminist movement, d) Mary is a social worker dealing with mentally disabled people, e) Mary is a member of the League of Women Voters, f) Mary is a bank teller, g) Mary is an insurance agent, h) Mary is a bank teller and a feminist. 85% of the study subjects deemed it more probable that *Mary was a bank teller and a feminist* than she was a *bank teller*.

2.2.2.2.2   *A posteriori probabilities vs. representativeness*

Representative information overwrites objective probability values. This phenomenon is easy to understand through the examples of Steve and Mary. In Steve's example it is a fact that there are many more farmers in America than librarians. This is an a posteriori probability and therefore it is much more likely that he is a farmer rather than a librarian. However, this fact does not influence Steve's representativeness, i.e. similarity to the librarian stereotype. Under the effect of the representativeness heuristic, the study subjects selected librarian as Steve's occupation, ignoring the distribution of the population in respect of individual occupations. In Mary's example, based on the figure below − where 'bank teller' is marked with a blue oval and 'feminist' with a 'purple' one − it can easily be understood that there is a greater probability for someone to be a *bank teller (blue set) or a feminist (purple set)* than a *bank teller and a feminist (intersection of the two sets)*.
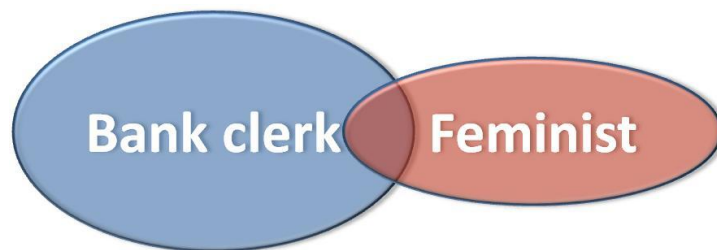
Figure 7. Representation of the set of bank tellers and feminists in Mary's case for Kahneman and Tversky's (1974) study

Kahneman and Tversky (1974) described this phenomenon as insensitivity to a posteriori probabilities.

The representativeness heuristic plays an immensely important role in the judgement of a company's performance. If a manager *"looks like"* a successful manager then he is put in the *"successful manager box"*. Factual data − the given manager's business management history and experience − will change an opinion formed in this way only slowly and with difficulty. Griffin and Tversky's study (1992) has also confirmed this finding. In judging the probability of an uncertain event (a company's success), analysts relied on their impression formed on the basis of information (representativeness heuristic); this is what influences information processing and leads to the development of the illusion of knowledge.

Kahneman and Tversky's (1974) research has generated important findings from an EPS forecasting perspective. In their study, the subjects had to predict the future profile of a business based on its description. In the light of the description, the subjects determined the company's profitability, i.e. if the description was favourable, profits were favourable, too, and if it was mediocre, they were predicted to be mediocre. In the case of such intuitive[56] projections, people do not or hardly take into account the degree to which it is possible to forecast a company's profit on the basis of the given data, i.e. they decide partly based on *redundant information*. The more similar the description is to the image of a successful company, the higher profits will be projected. If on the basis of information it is not possible to make a profit forecast then the industry figure (average profit) should be given for every company. However, influenced by the representativeness heuristic, the subjects also took into consideration information which was redundant from the aspect of the company's operation.

2.2.2.2.2.1 The incorrect interpretation of the return to average, or overreaction to profitable years

Return to average is a well-known phenomenon which can be observed in everyday life when tracking performance changes. People often do not reckon with return to average performance even in cases where it inevitably happens (see athletes' performance). In addition, when they recognise the occurrence of the return to average they often invent a convincing explanation of why it happened[57] (Kahneman, 1973). Return to average is hard to accept since it is in contrast with the conviction that results must represent inputs to a maximum extent, i.e. despite the investment of the same amount of energy outstanding performance is not repeated but returns to an average, sustainable level of performance growth.

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[56] *'Judgmental'* is the term used in English-language specialised literature to describe forecasts based on analysts' intuition.

[57] An experienced instructor leading a flight exercise deemed that compliments received after a smooth landing would be followed by a worse landing, while criticism received after a mediocre landing would be followed by a better landing. Therefore, it was decided that compliments adversely influenced learning, i.e. punishment was more effective than reward, whereas students had only returned to average performance.

As a consequence of the representativeness heuristic, based on the information obtained analysts form an acceptable picture of reality. They feel they make well-founded, good decisions and if with some luck their prognoses prove to be right their self-confidence will grow further. They will become increasingly self-confident and ignore those bits of information that should make them reconsider or perhaps change their decision.

This phenomenon is also found in the sciences of behavioural finance. A good company and a good investment are often mixed up in investment decisions. A good company generates steady revenues and has good sales opportunities and good management. However, a good investment is the one that yields a higher profit than other similar corporate stocks. Those companies are good investments which are underrated. Few companies are able to keep up the same results in the future as in recent years but their popularity pushes up their price, i.e. investors overreact to previous years' performance (see the studies of Nofsinger, 2007; Lakonishok, Shleifer and Vishny, 1997, 1994, 1992, 1991). That is exactly why good companies are not always good investments, but investors believe that the earlier good performance will continue in the future and ignore any information that is contrary to that belief. Earlier underperforming companies may not necessarily yield poor results in the future, but that is the expectation their share prices reflect (Nofsinger, 2007).

In respect of EPS forecasting, we encounter this phenomenon when recent years' substantial EPS growth is also projected by managers for the coming years. They overlook the fact that that growth has been above average[58] and cannot be sustained in the long-run[59].

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[58] Because of managers' attribution error the role of luck is ignored; they put down above-average performance to their own abilities (see overconfidence) and believe that event will also work out favourably in the future (see overoptimism).

[59] Easterwood and Nutt (1999) interpreted this phenomenon as overreaction to positive news.

2.2.2.2.2.2 The effect of managers' strategic ideas, or the underrating of loss-making years

Das, Levine and Sivaramakrishnan (1998) have found empirical evidence that the less predictable revenues are based on public information, i.e. the greater the uncertainty is, the more optimistic financial forecasts will be. In such cases, analysts try to obtain as much information as possible – obviously from their managers. When analysts listen to managers' future ideas the effect of the **representativeness heuristic** will be decisive. The manager's goal is to convince the analyst about the company's bright future. Company share prices will increase in response to favourable EPS forecasts. As a result of the representativeness heuristic, the analyst believes that the manager will bring success to the company and does not attribute the previous years' unfavourable performance to the manager's fault.

Sedor (2002, then with his co-authors Kadous, et al. 2006) conducted laboratory studies to investigate how study subjects modified their forecasts in response to managers' strategic plans and found evidence for the effect of the representativeness heuristic. The study participants received financial data about a company retrospectively for three years, during which the firm generated negative earnings, together with a description of the company and its products. After that, they were asked to make EPS forecasts for the company for two years ahead. Then they listened to management's future vision, and next they made a modified forecast. The average EPS forecast was $0.23. After the managers' presentation of future plans the average rose to $0.30.

2.2.2.2.3 *Evaluating conjunctive and disjunctive events*

As we have seen, managers' strategic plans have a strong impact on analysts and hence on EPS forecasts. Another cognitive mechanism is also at play in this context, namely the subjective judgement of conjunctive and disjunctive[60] events (Kahneman and Tversky, 1974). Conjunction is a chain-like structure, while disjunction is characterised by a funnel-like structure. People overestimate the subjective probability of conjunctively structured events and underestimate that of disjunctive events (for evidence see Annex 4).

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[60] Kahneman and Tversky (1974) discussed the effect of conjunctive and disjunctive events as part of the anchoring heuristic.

Kahneman and Tversky already pointed out in 1974 that strategic plans related to a business had **conjunctive** characteristics:

„Biases in the evaluation of compound event are particularly significant in the context of planning. The successful completion of an undertaking, such es the development of a new product, typically has a conjunctive character. for the undertaking to succeed, each of a series of event must occur. Even when each of these event is very likely, the overall probability of success can be quit low of the number of events is large. The general tendency to overestimate the probability of conjunctive event leads to unwarranted optimism in the evaluation of the likelihood that a plan will succeed or that a project will be completed on time" (Kahneman, Tversky, 1974, 1129.old.)

Corporate analysts already have an idea of the anticipated EPS based on historical data. However, they re-evaluate this preliminary value in the light of managers' future strategic vision. Sedor (2002) conducted personal interviews and studying EPS forecasts found that study subjects attached a greater value to the success of strategic plans based on information received as a narrative scenario (scenario condition) than if they received the same information in an unstructured list (list condition). This phenomenon was explained by the availability heuristic. However, we should notice that when information is transferred to the analyst in scenario condition it will be a conjunctive, i.e. chain-like series of events[61]. By contrast, the same information presented as in a list condition rather than as an interlocking series of events will be construed as disjunctive events whereby the probability of each event will have to be judged separately.

„Disjunctive structures are typically encountered in the evaluation of risks. ... Because of anchoring, people will tend to underestimate the probabilities of failure in complex systems". (Kahneman, Tversky, 1974, p. 1129).

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[61] Real-option decision trees also represent a conjunctive series of events through which the relationship between subjective probabilities and those calculated with a decision tree can also be tested. It should be added that the decision-maker also judges probabilities subjectively at each fork on the decision tree.

We underrate events that in themselves – as disjunctive events – may cause difficulties in the company's operation, i.e. interrupt the chain of events. As we have seen with overoptimism, we like to believe that bad luck avoids us.

It is easy to see that success requires the confluence of many fortunate outcomes (see Jáki, 2004a), while bad luck can hit at isolated points. If a customer does not pay or returns the goods due to quality issues, it can cause liquidity problems for the company. If a supplier delivers goods of inferior quality, which causes delays in production, the company may lose a customer. These events in and of themselves can be enough to cause a business to fail.

The convergence of the two studies is shown in the figure below:
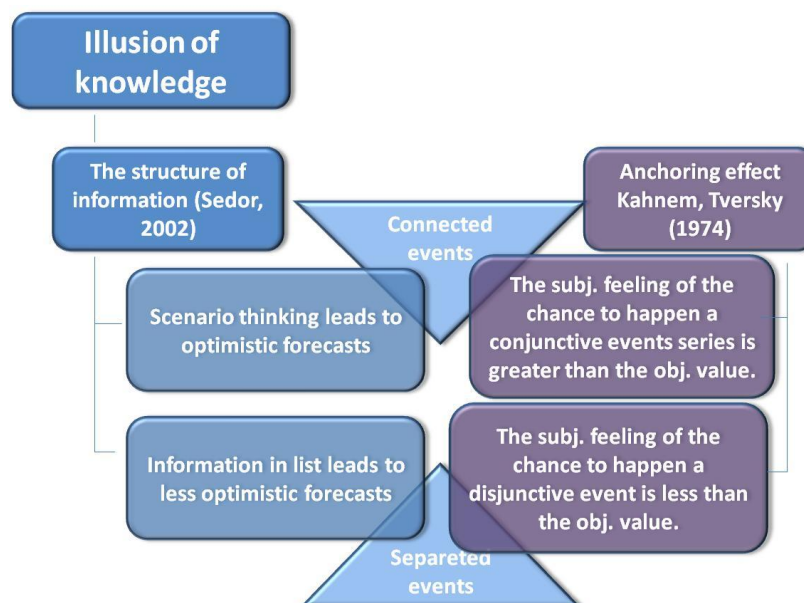
Figure 8. The causes of overplanning – Parallels between the theories of Sedor (2002) and Kahneman and Tversky (1974)

2.2.2.2.4   *Availability heuristic*

According to Epley and Gilovich (2001), the self-generated anchor can be understood with the help of the availability heuristic. This heuristic explains what memories or experiences are the first to be recalled by decision-makers to which they will later be anchored. As a result of the **availability heuristic**, we believe there is a probability for events that can be recalled more easily to occur more frequently.

> *„There are situations in which people assess the frequency of a class or the probability of an event by the ease with which instances or occurrences can be brought to mind." (Kahneman, Tversky, 1974, p. 1124)*

Obviously, *more frequent* things can be recalled more easily than those that occur more rarely; however, there are situations when this relationship is reversed by human judgement and greater frequency is attributed to phenomena that for some reason can be **conjured up more easily** (Kahneman and Tversky, 1974*)*. Under the effect of the availability heuristic, subjective probability judgements often significantly differ from objective values. According to Schwarz (1998), the availability heuristic is particularly dangerous when the individual believes that they are well-informed in a given field and so considers informative the ease or difficulty with which they can recall information. The author placed great emphasis on making a clear distinction between *"what comes first"* to one's mind and *"how easily it comes"* to one's mind.

Easier recallability can have many reasons that are not related to the probability of the occurrence of the event. These include the following:

▪ *Recent* events are easier to recall compared to events that occurred in the distant past. If someone hears more frequently about a risk factor or for some reason the media pays more attention to it (e.g. exchange rate risk), the person will devote closer attention to it immediately and try to protect the company from that risk (e.g. by forward deals against exchange rate risk).

▪ We can also recall *interesting or unusual* events more easily. For instance, the sight of a burning house is more easily retained in the memory as opposed to reading about it in the newspaper or seeing it on television (Zoltayné, 2005). The terrorist attacks of 9/11 have led to the revaluation of the security status of the US. Previously we had believed that America was watching war events from a distance; it has since taken serious steps to prevent terrorist acts and a result now everybody is obliged to *"suffer"* airport security systems. In the economy, one does not have to look hard for unusual occurrences. Up until September 2008, the fall of Lehman Brothers, bank failures had been thought inconceivable. We thought the State would bail it out. After the government defaults in Argentina and Iceland, the prospect of default also loomed large in Hungary, whereas previously such news had been considered a joke.

- *Imaginability bias.* Sometimes estimates must be given for the frequency of events examples of which are not stored in the memory but can be produced according to a certain rule. Frequency or probability is assessed based on its imaginability. Imaginability plays an important role judging probabilities in real situations.

> „... one may evaluate the probabilitiy that a given business venture will fail by imagining various difficulties it could encounter." *(Kahneman, Tversky, 1974, p. 1124)*

A risk involved in a business can be greatly underestimated if it is difficult to imagine some possible threats (e.g. a friend from university as co-owner escapes to the Republic of South Africa with the borrowed money) or if they do not come to our mind.

In an interesting study, subjects were encouraged to find counter-explanations militating against the desired outcome. Optimism only dwindled when the subjects easily found such information since they then attached to it a greater probability of occurrence. This was explained by the availability heuristic (Sedor, 2002; Kadeus, et al., 2006).

In the case of conjunctive/disjunctive events, the authors (Kadous, et al. 2006) also explained the effect of the scenario-based information with the availability heuristic. They thought that when at conferences, in news releases or on other communication channels managers spoke about how they would improve the company's performance in the future they gave a detailed scenario of how they would implement their plans. Due to the scenario condition, the analyst recalls more easily how the future plan will improve the company's performance, which will strengthen the subjective judgement of the probability of success.

In overall terms, the availability heuristic is also a causative factor of the increase in optimism along conjunctive and disjunctive processes.

2.2.2.2.5   Summary

Anchor formation plays a key role in the development of the illusion of knowledge. Studies on the anchor have demonstrated that it can be numerical or non-numerical and informative or non-informative and can also be distinguished as provided versus self-generated.

The non-numerical anchor has drawn attention to stereotypical thinking, i.e. the importance of the representativeness heuristic as a way of anchor formation. In this chapter those experiments have been presented which provided evidence for the effect of the representativeness heuristic, with special regard to EPS forecasts. As we have seen, managerial plans greatly influence analysts resulting in a positive picture of the manager and the company which, due to the representativeness heuristic, has a significant effect on the EPS forecast. We have covered the judgement of conjunctive and disjunctive events, which was proven by Kahneman et al. (1974) as part of the anchoring heuristic. Also, future strategic plans also push EPS in the positive direction due to the availability heuristic, as information presented in a scenario is easier to remember later in preparing EPS forecasts than if the analyst was given the same information in bullet points.

In summary, mostly on the basis of early research findings, I have focussed on three cognitive mechanisms: representativeness heuristic; the judgement of conjunctive and disjunctive events as a manifestation of the anchoring effect; and availability heuristic. All three explain how managers' strategic plans move the judgement of future corporate performance, i.e. analysts' EPS forecasts, in the positive direction.

2.2.2.3 Anchor fixation, or why do we remain attached to initial expectations?

Positive expectations in financial planning "burn into" the planner, as it were, especially when they have a responsibility as well as personal motivations in implementing the plan. Analysts are not involved in corporate decision-making; they are only outside observers and their motivations are linked to trade-boosting and related bonus payments. Further, we cannot exclude the possibility that in the course of analyses attachment develops between the analyst and corporate executives, especially in the case of domestic companies.

A framework to all this is provided by the reference point of prospect theory's (Kahneman and Tversky, 1979, Hámori, 2003b) value function, which can be matched with initial expectations, i.e. the anchor. Cognitive mechanisms resulting in anchor fixation can be understood through factors affecting the evaluation of the reference point.

Before delving into details, let me first briefly present prospect theory and its evaluation phase.

Prospect theory *"models decisions made under uncertainty as an alternative to the expected utility hypothesis"* (Hámori and Komáromi, 2005, p. 831). *"An essential feature of prospect theory is that it is not the final states that carry values but changes in assets or wealth"* (Csontos, 1998, p. 97)

Prospect theory breaks down the process of choice into two phases: initial or *editing* phase, when the individual seeks to represent decision alternatives in more simple terms, and *evaluation* phase, when the decision-maker maximises their sense of utility along the value function. The zero-point of the value function is the reference point. The decision-maker evaluates change in their sense of utility compared to that point. The reference point is determined by the past and current context, which is the state in which the decision-maker currently *feels* themselves. Very importantly, the reference point marks not the actual but the perceived or felt state. That is what determines whether the new state is evaluated by the decision-maker as a gain or loss. The value judgement depends on the value of differences or changes rather than absolute values. In the case of hard-to-measure qualities this is even more so than in the

case of judging changes in light, sound or temperature. With financial plans, such hard-to-measure qualities include prestige, success, or efficiency.

In the event of gain, the value function is concave showing risk-aversive behaviour, similarly to Markowitz's utility function. In the event of loss, it is convex, i.e. indicative of risk-seeking behaviour. Its important characteristic is that it is steeper in case of losses, and the function is the steepest at the reference point. In general it can be said that the value of 2 units of loss is equivalent to the utility value of 1 unit of gain.
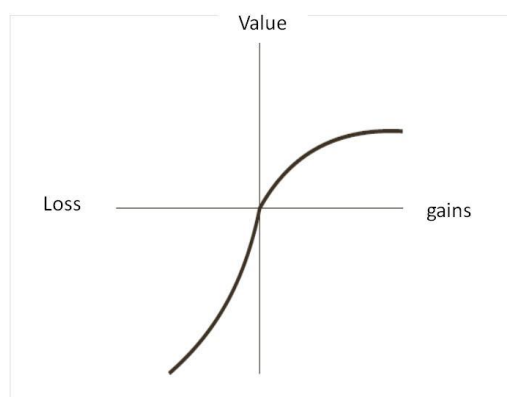
Figure 9. The hypothetical value function of prospect theory

Many studies associate the anchoring effect with the reference point of prospect theory (Kahneman and Tversky, 1979). In the field of financial planning, the decision-maker evaluates not only the effect on the judgement and outcome of the project but also the change in their own position in the event of project success/failure. Therefore, the reference point can be considered relevant to this field for the understanding of the emergence of the anchoring effect[62].

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[62] It should be mentioned, though, that not all researchers agree with this point. Chapman and Johnson (2002) do not think that the two phenomena – anchoring heuristic and prospect theory's reference point – are comparable, as the anchoring is a starting point and is linked to attention, whereas the reference point is an evaluation related to a perception or utility function. The other critical observation they make is that anchoring is linked to information-processing while the reference point is connected to the process of discussing preferences and evaluating the utility of opposite events. Chapman and Johnson (2002) are probably right in general terms, but in the case of financial planning information-processing as a process cannot be separated from the decision-maker's judgement of the value of their own utility or the gains associated with a project. The decision-maker has to evaluate the succes of a given project based on each and every bit of information. Accordingly, in the case of financial planning, the value function is closely connected to the anchoring heuristic.

It should be noted that it is not necessarily success that *directly* increases the decision-maker's sense of utility but its *indirect* consequences such as recognition, promotion and, in the case of positive EPS forecasts, perceivable growth in demand, bonus payment and good relationships with managers. It is the desire to achieve all this that causes the EPS forecast as anchor to become fixed. Expectations should be corrected downwards in response to negative information, which would be perceived by the analyst or planner as a loss, i.e. a negative move away from the reference point. The more often they think about expected consequences, the more those will be fixed and "posted" by way of mental accounting as success and integrated into their reference point.

There are a number of mechanisms contributing to the fixation of the reference point; the most decisive is a cognitive mechanism known as mental accounting, which I discuss in the current chapter.

A. Development of the anchor

B. Fixation of the anchor
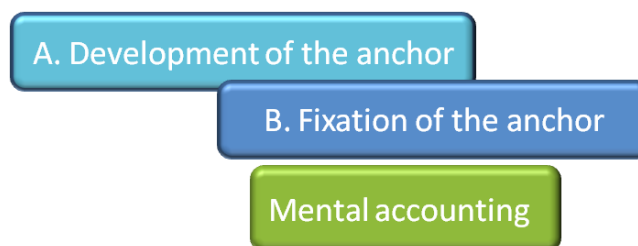
Mental accounting

Figure 10. Factors affecting anchor fixation

2.2.2.3.1 *Mental accounting*

As a result of *mental accounting*, the analyst relates to the desired outcome as an actually realised value[63].

A case in point is a well-known phenomenon in corporate finance whereby in a near-bankruptcy situation the company management embarks on investments whose

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[63] Mental accounting can be well captured in contest shows where the participants increase their gain with every good answer but can lose it all with a single bad answer. As the amount of the prize grows they will answer with increasing caution as they have already "posted" the potential reward, while they were much more daring at the first question (Moisland, 2000). This example sheds light on the mechanism that comes into play in the person working out a project or business plan. As planning progresses, mentally they have already completed the project and enjoy its benefits. Moisland (2000) lists a range of various behavioural patterns arising from mental accounting and Nofsinger (2007) also illustrates it with many examples from behavioural finance.

anticipated value (NPV) will reduce the company's value, but a little chance has still been left for turning the company around. The prestige of the management will not be further damaged by the occurrence of the bankruptcy, it has already been "posted", but if the investment succeeds they can gain a lot of recognition. This phenomenon is very well explained by prospect theory's value function. The reference point is bankruptcy or complete loss, from which a bad project will no longer change the situation of the management either financially or from a prestige aspect, while a successful investment can make them profitable.

Another example taken from corporate finance is that of sunk costs, which should not be taken into account for future investment decisions. Nevertheless, people routinely consider non-recoverable past expenditures when making decisions about the future. They invest even more into an already bad financial undertaking since so much money, time and energy has been expended on it that they hope that extra cash input may turn it around (the reference point is the success of the business), and project failure would be regarded as a loss. This phenomenon is known as the **sunk-cost** effect, which has two dimensions: *scale*, i.e. the amount of input cash, energy and time, and *timing* (Arkes and Blumer, 1985)[64]. The more cash, energy, time and effort has been invested in a given project or its preparation, the greater sense of loss will be experienced by the subject if the project fails to yield expected results. From the aspect of timing, losses will be easier to accept as time passes.

Closely related to that is another effect of mental accounting, whereby the decision-maker tries to bring expenditures and ensuing profits as close as possible in time. According to behavioural finance, they open a new file for every financial investment where expenditures are posted and do not consider the relationship between investments, i.e. do not diversify. Rather than looking at the overall situation they focus

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[64]An example mentioned to illustrate this point is that of a family that has bought tickets for a baseball game for $40 but there is a huge snowstorm on the day of the game, which would significantly spoil the entertainment. When is it more probable that the family goes to see the game: if they have purchased the ticket, or if they have received them as a gift? Clearly, if the tickets have been purchased by them, they will be much more willing to expose themselves to bad weather than if they have got the tickets as a gift. That is an example of the aspect of scale. Another question is: When is it more probable that they go: if they bought the tickets yesterday or a year ago? This illustrates the point about timing. If they bought the tickets a year ago then the pain of spending $40 is already a thing of the past.

on its parts separately. As a consequence, he sells profitable shares more quickly and keeps on storing loss-making ones. Here another psychological mechanism is at play called "regret theory", whereby the decision-maker would not like to realise the loss and thus acknowledge that they have made a bad investment decision (Nofsinger, 2007).

In working out a project, the decision-maker already feels the project accomplished and "mentally has posted" success. Their personal sense of utility will not be changed by the implementation of the project, while they would experience its failure as a loss[65].

2.2.2.3.2   *Summary*

I discussed factors influencing anchor development in the preceding chapter, where initial expectations appeared as a synonymous concept. The current chapter has dealt with cognitive mechanisms that play a role in the fixation of initial expectations. The most decisive effect is mental accounting, which is a theory linked to the reference point of the value function in Kahneman and Tversky's (1979) prospect theory. The intermediary step in the anchoring effect, namely the fixation of the anchor, can be understood by way of theories linked to the reference point. I have presented the reason for the insufficient weighting of positive and negative information in the case of financial planning and EPS forecasting along the reference point of the value function. The modification of forecasted values can also change the forecaster's sense of utility. Positive news can add to their personal sense of utility (higher bonus, better job prospects, increased trading volume in the case of EPS forecasts), while negative news can decrease it. Therefore, it is easy to see that they refrain from considering the effect of negative information and are more willing to integrate the effect of positive news into forecasts.

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[65] In financial planning, we judge the performance of a business unit in a similar way. If the given subsidary performs well, we "post" it as success. If performance drops in the next year and falls short of anticipated results but still remains profitable, then that business unit is not considered successful but as one that failed to achieve the plan. Management experiences it as a failure as it has fallen short of expectations and their sense of utility has moved from the reference point in the negative direction.
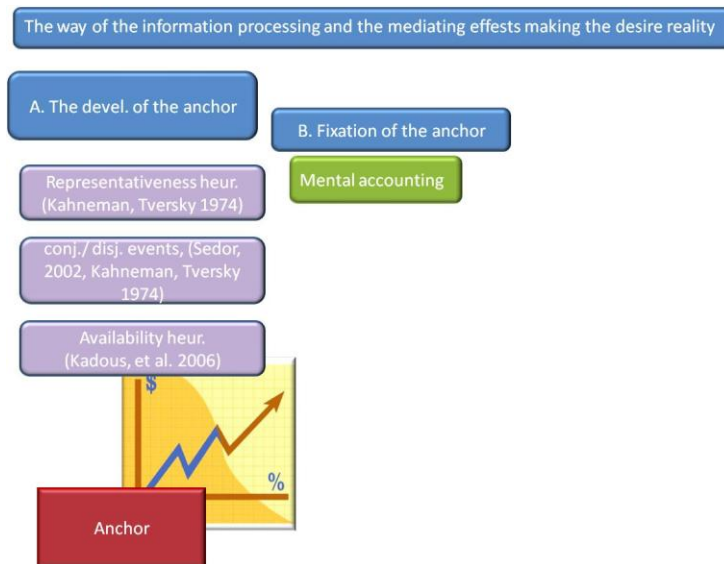
Figure 11. Factors affecting the formation and fixation of the anchor

I have presented the impact of mental accounting on financial decision-making through several examples, including the sunk-cost effect and unrealistic investment decisions made in near-bankruptcy situations. We have also received an explanation of how financial planning is pushed in the optimistic direction by the decision-maker's mental "posting" of project benefits and how he tries to make the project appear in a positive light.

In presenting the first two steps of the development of the illusion of knowledge (anchor formation and anchor fixation) we have seen what cognitive mechanisms influence the decision-maker in developing their own initial expectations and how the anchor becomes fixed by way of mental accounting.

2.2.3   Insufficient adjustment

The last step in the development of the illusion of knowledge is insufficient adjustment. Insufficient adjustment explains why during information-processing the decision-maker is unable to detach from the anchor and give appropriate weights to contradictory (negative) information.

*Specialised literature uses the term "**insufficient adjustment**" to refer to a phenomenon whereby a reference value is in significant correlation with the estimated value, suggesting the existence of an anchor to which the*

> *decision-maker is attached and which approximates the final estimate by way of numerous adjustment processes, at least when the anchoring effect is examined in the case of numerical values. (Chapman, Johnson, 2002)*

It has been nearly 30 years that the *anchoring–and-adjusted heuristic* has been a subject of study. Many interesting findings and plenty of evidence have been provided proving that the phenomenon of anchoring is part of cognitive thinking.

Several explanations of insufficient adjustment exist; for an overview of them see Chapman and Johnson (2002). In the field of financial planning, insufficient adjustment should be approached as lack of information, i.e. a resource problem. Of the identified cognitive thinking-related causes, those are the most relevant which evaluate the process of insufficient adjustment as an **information search process**. From that aspect, we can distinguish between two approaches:

a. The decision-maker evaluates the ***anchor as guidance*** in processing information.

b. Insufficient adjustment is explained by the ***exhausting process of information search***.

In financial planning an important characteristic of insufficient adjustment is uncertainty around the target value. In this case it is a problem of information search and the **anchor is evaluated as guidance serving to reduce uncertainty**. We move away from the anchor to approach an acceptable target value. As a result, if the anchor is higher than the target value the final estimate will be optimistic, and if lower, the final value will be pessimistic.

The other explanation of insufficient adjustment has to do with the **highly exhausting** nature of the information search process, i.e. it takes a lot of time and other resources to obtain and process information of the right quantity and quality. That is why the adjustment process finishes too early and particular bits of information are given too much weight. An equivalent explanation has been provided by Strack and Mussweiser (1997), who explain insufficient adjustment with the effort to minimise the energy expended on information gathering.

Closely linked to these explanations are ***bounded rationality*** theory and ***conformation bias***, which give a detailed explanation of why the decision-maker

finishes information-processing too early and why information that would be necessary for sufficient adjustment, i.e. for modifying initial expectations to the right extent, is not given appropriate weight.

Figure 12. The causes of insufficient adjustment

2.2.3.1 Bounded rationality

Bounded rationality theory belongs to the descriptive approach to decision theory and points to the limitations of information-processing in the actual decision-making process.

Bounded rationality takes into account the human being's limited information-processing capacity and state of being less than perfectly informed in decision-making. Accordingly, people seek to concentrate their attention on a single point in order to avoid scatter-mindedness, which presents itself whenever they try to gather and systemise information beyond their cognitive capacities (Simon, 1983). They collect information on an industry or a business segment for EPS forecasting and focus on a part or value driver of a company rather than the entire operation.

The decision-maker handles **alternatives sequentially**, i.e. seeks information systematically with a focus on the problem at hand. At first they look at obvious solutions and continue the search only if none of these meet their expectations. The search process is influenced by the decision-maker's personality, experience, education,

hopes, worldview and aspirational level[66] (Zoltayné, 2005). If they easily find confirmatory information that fulfils their expectations they will stop searching, while if the information fails to confirm their expectations they will continue to search for the appropriate information.

A further conclusion of bounded rationality is that in seeking information the decision-maker wants to find a good solution rather than the best solution, i.e. they **seek satisfaction**. What the decision-maker considers a good solution depends on their aspirational level, which keeps changing during the decision-making process. If a good solution takes too long to find the aspirational level will fall, while if the decision-maker finds it too soon their aspirational level will rise (Simon, 1983). From this it follows that information confirming expectations will be overweighted. If they find contradictory information it will modify initial expectations, but that bit of information is assigned a greater weight which confirms the decision-maker's further expectations the most.

According to Kahneman and Jacowitz (1995), the adjustment process lasts until the subject deems that the estimated value has reached the lower or upper limit of the probability range that contains the right value. Since the *adjustment process stops at the first such value*, the adjustment will be insufficient.

Schwarz (1995) puts it this way (p. 89): in relation to a known event *"although they have not yet recalled all relevant information from their memory, the individual ceases the search process when they think they have enough information to make a decision with a sufficient sense of security"*

Chapman and Johnson (2002) explained insufficient adjustment with the exhausting nature of the adjustment process, as a result of which information serving as the anchor receives an unduly large weight and that is what causes the insufficiency of adjustment. In his words *"too much confidence is placed in the information obtained"* (illusion of knowledge).

The effect of bounded rationality has been proven by many researchers but not linked to the theory expounded by Herbert Simon (1983). Bounded rationality goes a long way in explaining the phenomenon of insufficient adjustment when there is great uncertainty and a wide range of information is available to the decision-maker.

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[66] The level which the decision-maker deems "good enough" (Zoltayné, 2005).

The other major heuristic explaining insufficient adjustment is confirmation bias.

2.2.3.2   Confirmation bias

A heuristic most frequently associated with the anchoring effect is **confirmation bias** (Chapman, Johnson, 2002), which drives the decision-maker only to seek information that confirms the solution dictated by their expectations. They try to find confirmatory information, which they believe to be true and ignore in making their decision any information that is contrary to their expectations (Zoltayné, 2005). To put it in everyday words: *"People will hear what they want to hear" (Moisland, 2000)*. According to Strack and Mussweiser (1997), people use a complete mental model that seeks *confirmatory information* selectively. Confirmation bias significantly contributes to increasing decision-makers' optimism about the future since in the information search process they feel increasingly certain of success based on information confirming their expectations.

In what follows three effects will be introduced. One of them is closely connected to confirmation bias, namely:

1. Desirability bias (Krizan and Windschitl, 2007).

The other two heuristics' effects are the same as that of confirmation bias but the authors used different terms to describe the identified phenomenon:

2. Motivated reasoning (Eames, Glover and Kennedy, 2002).

3. Confirmation evidence (Chapman, Johnson, 2002).
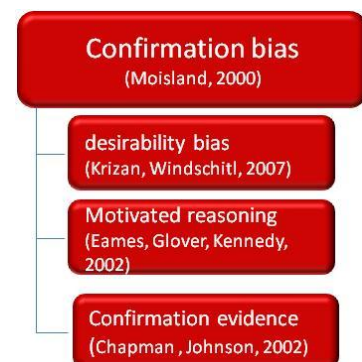
Figure 13. Concepts related to or identical with the confirmation bias

According to Krizan and Windschitl (2007), the desire for the occurrence of an event, i.e. the **desirability bias** triggers cognitive processes that lead to optimistic plan values in financial planning. The desire for the particular event generates optimistic expectations in estimating probabilities. It pushes the probability of events needed for

success towards the desirable value, i.e. positive events are overrated and the probability of negative events is underrated.

The authors have explored psychological effects mediating between desirability bias and optimism. One of such intermediaries is confirmation bias, as a result of which information or evidence confirming the achievement of the desired outcome will be taken into account, while contrary information and evidence will be disregarded. As a result of repetition, optimism about the occurrence of the desired event grows, i.e. the probability of the outcome is felt increasingly certain[67].
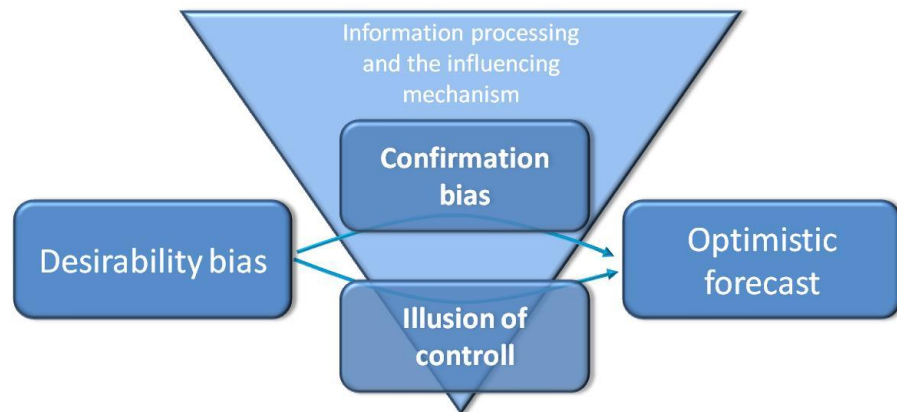
Figure 14. The causes of overplanning: Desirability bias and mediating cognitive elements, Based on Krizan and Windschitl (2007)

The analyst can make proposals to sell, buy or hold securities, which is preceded by thorough analysis. **Motivated reasoning** means that the individual seeks to draw a favourable conclusion by way of rational deliberation. In doing so, they will search for relevant information that logically supports the desired conclusion. The *analyst* is not aware that information-processing is biased by their drive to reach the *desired conclusion* and that they would get another conclusion if they had different expectations during information-processing (Eames, Glover, Kennedy, 2002).

Chapman and Johnson (2002) have researched into mechanisms underlying anchoring and by describing **confirmation evidence** they actually point to confirmation bias as follows:

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[67] This cognitive process is known as mental accounting, which is linked to prospect theory.

1. As a first step, available information is collected from the decision-maker's environment and memory. The anchor thus formed determines what information they will take into consideration later.

2. Secondly, having collected the information, the decision-maker formulates their final decision but at this point already attaches priority to confirmatory information. It may happen that the anchor itself also appears as information if it is a relevant piece of information.

3. Lastly, the final value is determined.

In overall terms, bias towards confirmation evidence influences not only the content of information the decision-maker collects but also the fact that in making the decision they will attach too much weight to information confirming their ideas and play down those bits of information that are contrary to their opinion (Chapman, et al. 2002).

Further research findings have shed light on the fact that the cause of insufficient adjustment has to do with the effect of confirmation bias:

1. In the case of earnings forecasts, decision-makers underreact to negative news referring to earnings, i.e. it seems that analysts do not believe unfavourable news. (Klein, 1990).

2. Managers notice every tiny bit of information about market improvement while they consider negative signs accidental. Moisland (2000) held confirmation bias responsible for the fact that employees in America prefer to buy shares of their own companies often for the reason that most of their colleagues do the same (confirmatory information).

3. Moisland (2000) also attributes customer's disregard of downside risks and focus on growth potential when purchasing securities to confirmation bias. Since investors seek confirmatory information to strengthen their belief that they have made the right decision, they overreact to positive news while underrating or assigning weak weights to negative information.

4. Markovics (2006) makes an interesting point concluding that decision-makers often seek opinions from consultants only to confirm their own position. They have a tendency to attach greater weights to expert opinions supporting their

own opinion than to those which warn them to be cautious or are completely contrary to their own ideas.

Based on all this, the analyst feels that they make the right decisions and have processed and weighted information appropriately. If luck is also on their side, then their optimism grows further and they will be increasingly confident to overlook those pieces of information that would make them reconsider or perhaps change their decisions.

That is where we find an explanation of hindsight bias (see the section on the *Psychological immune system*). In hindsight it is possible to see which analysis was correct but it is very difficult to predict in advance. Critics believe – as a result of hindsight bias – that they would have given priority to the right analysis. However, as we have seen, at the moment the decision is made it is confirmatory information that receives the greater weight due to confirmation bias.

2.2.3.3   Summary

The *anchoring–and-adjusted heuristic* has been the subject of study for decades. In this chapter, two cognitive mechanisms have been discussed in detail to explain insufficient adjustment: bounded rationality and confirmation bias. Bounded rationality points out the minimisation of energy expended on information gathering.

Several independent studies have shown evidence for the important role of confirmation bias in the anchoring effect. Confirmation bias sheds light on how from the flow of information decision-makers accept and assign greater weights to news and data consistent with their expectations. Studies on the effect of positive and negative news on EPS forecasts have been conducted to prove this. In some cases, research refers to confirmation bias as motivated reasoning or confirmation evidence. The desirability bias is an intermediary mechanism which is close to mental accounting and drives to decision-makers to seek confirmatory information.

2.2.4 Fight against cognitive mechanisms

Lovallo, Viguerie, Uhlaner and Horn (2007) explain the phenomenon of overplanning with human cognitive bias and suggest that decision-makers should first **become familiar with and understand the above listed cognitive biases** and their functioning and identify their role at specific decision points. Moisland (2000) believes that financial consultants who are aware of, and are able to identify, bad decisions resulting from biases are more effective in helping their clients to achieve their goals.

Several studies have demonstrated that the degree of overplanning will decrease if the analyst or planner is aware that the forecast accuracy will be tested later in the process or **when feedback can be expected with regard to the forecast**. In addition, it has been observed that planning fallacy can even grow into pessimism. Accordingly, the degree of overplanning will increase if the decision-maker thinks that planning fallacy will have no consequences, i.e. no feedback will follow in the event of a variance between planned and actual values (Armor et al., 2002; Epley and Gilovich, 2006).

In the case of capital outlays, Kahneman and Lovallo (2003) distinguish two planning techniques: the inside view and the outside view. The outside view determines the business success of a given financial undertaking against the values of reference groups, thus ignoring the above mentioned cognitive mechanisms altogether, while the inside view examines the details of projects. When the inside view is applied the illusion of knowledge is developed along the process described above. I will introduce techniques to avoid the illusion of knowledge according to the differentiation described above.

2.2.4.1 The inside and the outside view

> *„Every game is unique and this is one is no different from the rest." (Buehler, Griffin, Ross, 2002, p. 255.)*

To overcome the anchoring bias, Kahneman and Lovallo (2003) suggest the adoption of the **outside view,** which can help avoid all the cognitive effects listed above. The outside view is also known as *reference-class forecasting*. This technique

ignores project details and does not try to examine factors influencing the project; instead, it summarises the outcomes of similar projects laying out a rough distribution of the reference class. Decision-makers provide more realistic probabilities when they evaluate a similar undertaking than when evaluating their own business (Griffin and Tversky, 1992). When making the comparison there is no need to calculate exact figures, only the reference project has to be evaluated according to some performance categories such as good, bad, or average (Lovallo et al., 2007; and Kahneman and Lovallo, 2003). The project at hand has to be compared to these results and then probability of success should thus be determined. The resulting forecast is much more accurate than the one made using the inside view technique.

When applying the outside view, data can be derived from both our own and others' experience. Former personal experience with corporate projects is not considered relevant to the given project since its implications – given that projects mostly fall short of targets – would unfavourably influence the judgement of the new project. Planners refer to the many unique characteristics of the new project to prove why earlier experience is irrelevant to it (*"this time it is different"*). Data from other unknown projects are not welcomed either as planners do not know what actually happened during the implementation of those projects (Buehler, Griffin, and Ross, 2002). Those, however, who are not directly involved in a project tend to adopt the outside view as they find it difficult to visualise the implementation process.. They are more willing to rely on similar past performance as a basis (Buehler, Griffin, and Ross, 2002).

The outside view is most useful when the company is about to launch a completely new project with no previous track record (entry into a new market, application of a new technology, or start-up of a new business unit), as in such cases optimism can be particularly strong. Ironically, that is when corporate pressure is also the strongest. Managers think that unless plan prudently enough and apply the inside view they will neglect their duties. Facts are facts, though: the outside view produces much more realistic and accurate forecasts (Kahneman and Lovallo, 1993; 2003).

When **the inside view** is adopted during planning, the analyst will take each step needed for the implementation of the project. They consider the tasks, the timing, the locations and the methods. They also think about some pitfalls that may hinder the

implementation as well as how to manage them. All the details of a complex and long project cannot be foreseen, however. The outcomes of many uncertain events must be weighed. When applying a scenario-based approach, the decision-maker tries to imagine a probable outcome of the future; however, future outcomes can take so many forms that the probability of any scenario is negligible among all the possible scenarios. In general, it can be said that **the least favourable outcome is the most probable** as things can go wrong in so many ways (Kahneman and Lovallo, 1993; Buehler, Griffin, and Ross, 2002). A given scenario may not model actual pitfalls, while other scenarios reckon with too few unfavourable events. A basic problem of the inner view is that decision-makers focus too much on internal information and the company's capabilities, while information related to the external environment remains underrated (Kahneman, 1993). Analyses prepared by internal analysts contain more planning fallacy than those compiled by market analysts as external viewers, which can be traced back to the applied methods of processing and evaluating information (Darrough and Russel, 2002).

Giving preference to the inside view approach involves a kind of moral obligation. The decision-maker thinks that applying this approach is a serious attempt to understand the project as a complex whole, while the outside view approach degrades it as just a rough analogue of superficially similar examples (Kahneman and Lovallo, 2003). People tend to prefer the inside view when forecasting project implementation thus emphasising the unique nature of the project. An interesting finding is that the more detailed the forecast is the more optimistic it will become (Buehler, Griffin and Ross, 2002)[68].

Accordingly, **the adoption of the outside view is often rejected** and a typical explanation of this is that a forecast by nature focuses on the future rather than on the past, and thus data from former projects are not relevant.

When both approaches were adopted to determine the values of a project it was found that the outside view produced a better forecast than the inside view (Kahneman and Lovallo, 2003). *Capital market analysts* have been observed to produce much more optimistic market data when deriving them from aggregated company forecasts than from macroeconomic data. Darrough and Russel (2002) called this approach the

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[68] Remember that scenario-based thinking increases actual performance, as it has been shown before, even if it falls short of an overoptimistic forecast.

bottom-up and top-down technique. The authors believed that the company analyst, being in close relationship with the company, adopts the inside view approach, namely he focuses on the company's competences and opportunities. The bottom-up technique summarises company data thus produced and calculates the market value. The market analyst employs the outside view and concentrates more on macroeconomic data using them as a point of departure (top-down technique) to define company data. Both techniques in their study generated optimistic results; however, more significant overplanning was measured based on the bottom-up method than when the top-down technique was used in forecasting. The fact that the inside view is always coupled with incentives resulting from personal and business relations should not be overlooked.

2.2.4.2　Techniques against the development of the illusion of knowledge

If budgeting is done applying the inside view, one must/can fight against the development of the illusion of knowledge at each step of the process. The first step for the decision-maker identified by Lovallo, Viguerie, Uhlaner and Horn, (2007) as well as by Moisland (2000) is **to understand the process** whereby the illusion of knowledge is developed. A high level of self-control and self-observation is needed for the decision-maker to be able to not only focus on the task itself, namely financial planning, but also concentrate on observing the working of their own mind and decision-making mechanisms. Awareness of heuristics alone can result in improved decision-making and understanding the way others think in financial planning.

The next step is for decision-maker to use **defensive techniques** to prevent heuristics at each step. It will be shown that it is not always necessary to recognise the operation of a heuristic, such as in the case of anchor formation, but it is advisable to guide the decision-maker toward more open thinking. In other cases, the key to the solution is the recognition of the heuristic and the reconsideration of the decision. In what follows I will return to the three stages already discussed in the paper, namely

    A. anchor formation,
    B. anchor fixation, and
    C. insufficient adjustment.

2.2.4.2.1   Fight against anchor formation

Representativeness bias, i.e. thinking in stereotypes, plays the most important role in anchor formation. Further, the subjective judgement of both conjunctive and disjunctive events and availability heuristic have an important role to play in the subjective judgement of probabilities.

When the financial planner adopts the inside view, they generally consider a rather optimistic probable scenario of project implementation. If the budgeting is made by an external expert it is still the **managers** who outline their **strategic ideas** which tend to be more optimistic as well. Thinking in scenarios is a typical example of a series of conjunctive events. A decision-maker can be jerked out of such scenario-thinking by *making a list of assumptions* and re-evaluating the probability of each event (Kadous et al., 2006).

To improve the **planning of the required time** for the project, Buehler, Griffin and Ross (2002) advised to outline several pessimistic scenarios for project scheduling. It is interesting to note that scenario-based thinking is believed by the authors to help in reducing optimism as in such cases one has to go over a chain of events. The time needed for the implementation can be more accurately defined since the decision-maker does not look at the project as a whole but considers it as an activity consisting of sub-events. All this may seem to contradict the statements above; however, there we examined the subjective probability of events and not the time needed for particular sub-events.

When there is an external analyst, the positive impression made by the manager or the company raises the optimism of the forecast due to the representativeness heuristic. The financial planner can think that "*this kind of manager usually makes good decisions and is in control of the events and so he will bring success to the company*". In such cases it is useful to briefly think over whether there are any events which might spoil the management's plans.

In his study on auditors, Koonce (1992) revealed that those auditors who looked for counter-explanations against the management's future plans found the future capacity growth of the company less probable than those who did not think about events hindering their realisation. Heimen (1990) found that auditors who gave five counter-

explanations provided lower probability values than those who listed only two. His study implies that the larger the number of counter-explanations, the greater the reduction in forecast optimism will be. However, research conducted by Kadous, Krische and Sedor (2006) has revealed the limitations of this assumption. They showed that listing two counter-explanations resulted in a significant decrease in the influence of the representativeness heuristic. In their study, following the manager's presentation a group of participants was requested to list two counter-explanations while another group had to list ten reasons why the strategic ideas could fail. They also had a control group. In the control group the anticipated EPS value grew after the manager's presentation, while in the group listing two counter-explanations not only did it not increase but it actually decreased, which was a significant difference. The most interesting result of the research was that participants who had to think of ten counter-explanations made not lower but higher EPS forecasts than those who listed only two, i.e. their forecasts became even more optimistic. The explanation of this phenomenon lies in the limitations of cognitive thinking. The human brain can process and make sense of two events but ten events are beyond that number of variables which it can cope with.

The authors held the availability heuristic responsible. They assumed that if someone had difficulties finding counter-explanations then their optimism would be reduced as they thought the occurrence of easily imaginable events to be highly probable, whereas if it was difficult to list such events they thought them to be less probable and thus forecasting optimism did not diminish. In the first study, the participants were instructed to list the counter-explanations of success themselves. In the second one they did not have to list counter-explanations but were given a list compiled during the earlier examination. One group was given a list with a few events, the other with numerous events. They observed that the list containing a few events reduced optimism while the list with many events did not. I think that the explanation lies in imaginability. Many events which might jeopardise a business are difficult to imagine and may exceed one's cognitive abilities. Therefore, when making a forecast people may think that the likelihood of such events is insignificant and consequently they do not influence the forecast.

The above results show that a little time and energy is enough to reduce optimism in the initial phase. Collecting counter-explanations is a way to fight representativeness heuristic. With regard to conjunctive and disjunctive events, optimistic probability values can be decreased if events are drawn up as lists instead of thinking about them in scenarios.

2.2.4.2.2 *Fight against anchor fixation*

I have highlighted mental accounting as the most comprehensive influence on anchor fixation. A key to the solution can be if the financial planner identifies the signs of mental accounting observing themselves. Another option is to involve an external consultant to draw their attention to such behaviour.

With regard to mergers and acquisitions, the following factors called red flags by the authors (Lovallo et al. , 2007) draw attention to the role of mental accounting:

1. Only the CEO is committed to the merger.
2. Someone emphasises that too much time, energy and money have already been invested in the project.
3. The common opinion is that the transaction should be concluded no matter what.
4. A further warning sign is when synergy occurs in revenues rather than costs, without significant investment.
5. In many mergers it is cultural differences that create problems, so it also means a red flag if cultural due diligence is superficially carried out.

The equivalents of red flags listed by Lovallo et al. (2007) can be found in the case of any financial investment where the phenomenon of mental accounting analogous to the above can be captured:

1. Instead of the CEO it is the creator of the idea who is committed alone and others are not particularly enthusiastic.
2. The phenomena of *"it has already cost too much time, energy and money"* and *"now we will definitely finish this"* are well known in everyday life, too (e.g. house construction/refurbishment). It is difficult to realise losses by terminating or abandoning a project.
3. By analogy to the overestimation of synergy effects, in the case of any financial plan special attention must be paid to estimating the growth rate of revenues, investment costs and implementation time.

4. By analogy to cultural differences, it must be considered whether the key people involved in project implementation are really able to work together and bring success to the business.

For balancing the negative effects of mental accounting Moisland (2000) proposed the deceleration of the decision-making process. Decision-makers have to think over the project from the start, in other words they have to clarify the main objectives of project implementation[69] again. Another important step is to treat financial resources as if they had been produced by the company itself. Hard-earned money is always considered more valuable than a windfall of a cash prize, bank loan or tax refund, etc[70].

Anchor fixation is further strengthened if it is put in writing or is incorporated in the analysis. Koonce (1992) examined the succession of steps to lessen the fixation of the anchor. He found that the traditional order, i.e. first the pros and then the cons of the causes identified, had a greater influence on questioning initial expectations than the order where the cons came first followed by the pros of initial expectations.

One of the most difficult tasks is to overcome mental accounting. Extremely strong self-control and discipline are needed to give up long-awaited success because of rational arguments. Just as Moisland (2000) pointed out we cannot expect anyone to change their opinion from one day to another. One might need days, weeks or (if time permits) often even years to overcome and re-evaluate a situation. In case of corporate life a simple but painful solution is to change the decision-maker, involve an adviser or just simply stop the project.

2.2.4.2.3   *Fight against insufficient adjustment*

In the context of insufficient adjustment, the understanding of the information-gathering process is supported by the conclusions of bounded rationality. Having an understanding of the phenomenon of bounded rationality alone can help anyone stretch their cognitive abilities and continue to seek more and more information rather than interrupting the information-gathering process. Another, and probably the most prevalent, factor with regard to insufficient adjustment is confirmation bias, which

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[69] Moisland (2000) focuses on personal financial advisers.

[70] Research has proven that those who used a credit card made twice as many bets as those who paid cash.

makes the process of information-gathering futile, since confirmatory information weighs more in the decision-making process. Let us examine now the techniques that can be applied to overcome insufficient adjustment.

When eliminating insufficient adjustment the analyst has to seek information contradicting expectations. When dealing with anchor fixation it is also the counter-explanations that help overcome thinking in stereotypes. Here the aim of seeking contradicting information is to assist the decision-maker in moving away from the anchor that has been formed and fixed. As an example Lovallo et al. (2007) describe the case of a company that aspires to buy a new technology enabling it to develop a new product for a given market in the hope of a significant revenue growth but fails to consider the growth trends in the target market or whether there will be a demand to absorb growth ensured by the new technology. While concentrating on opportunities provided by the technology and their revenue-increase effect, decision-makers fail to see threats that will hinder the realisation of those potentials.

Financial advisers propose three steps for their clients to overcome confirmation bias (Moisland, 2000):

1. The first step is to **have a realistic look at things again**. It can be very difficult in a situation requiring a rapid decision, e.g. when somebody feels that a security is underpriced by the market and there is a chance that it will rise.
2. The second step is to **have a look at their own decision from the other side**. If they want to buy securities there has to be someone who sells them. Why does someone want to sell their securities in such an exceptional market situation?
3. The third step for the client is to consider the consequences of a bad decision.

The above steps can be usefully applied in the field of financial planning. Reconsidering the entire financial plan and slowing down decision-making have already been mentioned among the solutions. The second step is more interesting: For us to be able to buy something (e.g. a company or a real property) someone has to sell that thing. Why does anybody want to sell something if that is such a good business, or why is it that there is no other buyer for that price? When it comes to a new product or a new market we have to take into consideration that others will also grab the opportunity and the capacity cannot be exploited in the end, etc. Finally, it is also crucial to think over the risks of our decision and create a financial plan accordingly.

2.2.4.3   Summary

Several techniques have been introduced to overcome the illusion of knowledge. The first solution was the outside view, which completely eliminates the whole anchoring process. Decision-makers, however, like adopting the inner view, i.e. they like to go over all the details of the financial plan. The main advantage of such an approach is that during the implementation phase they have the overall view of how each sub-event leads to the success of the project.

The disadvantage of the inner view is that the overcoming of the illusion of knowledge must be kept in mind all the time. For this purpose it is vital to understand the process of how the illusion of knowledge is formed. In general, **counter-explanations** must be collected against the existing opinions, i.e. the emerging financial plan should be viewed with continued scepticism. Such critical approach can contribute to overcoming the representativeness heuristic in the initial phase and the confirmation bias in the adjustment phase, when there is already a strong attachment to the prepared plan.

To overcome mental accounting as the intermediary phase of the development of the illusion of knowledge is the most difficult task. The techniques listed here are not about how to fight against mental accounting rather about how to recognise its development for ourselves or for other people who have an important role in the financial planning. Such recognition can assist the financial planner to become open to generating and accepting counter-explanations.

2.2.5   Summary: The development of the illusion of knowledge

To reach the state of being perfectly informed necessary for making a rational decision would require a vast amount of time, while the information-processing capacity of the human brain is also limited. The analyst seeks to make a decision as fast as possible, i.e. with less time expenditure, while taking into account that the future performance of a company is influenced by many factors whose separate examination and the analysis of their interaction need a lot of time and energy as well as the

processing of a huge amount of information. The process of information-gathering is influenced by the fact that there is usually a desired final forecast that the analyst would like to justify either intentionally or unintentionally.
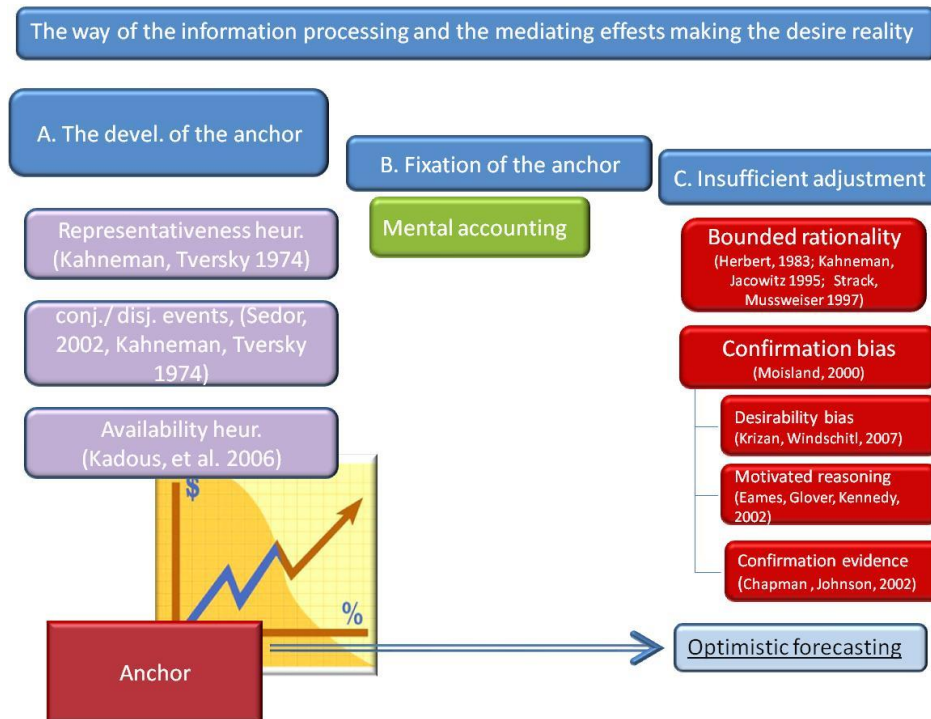
Figure 15. Cognitive factors influencing the development of the illusion of knowledge

The development of the illusion of knowledge, the reason for which lies in information-processing, involves numerous cognitive thinking mechanisms. There are several publications examining and demonstrating each effect and I have used their findings to present the development of the illusion of knowledge in the preparation of the financial plan along the anchoring heuristic. The anchoring effect is typically divided into two parts in the studies, namely anchoring, i.e. the formation of the anchor, and insufficient adjustment. In the case of financial plans, to these two parts can be added a third phase, namely anchor fixation.

Initial bits of information together with impressions play an important role in the **formation of the anchor**. Information influencing stereotypes is weighted more than objective facts due to the *representativeness heuristic*. The foregoing has been evidenced by subjects who underweighted the posterior probability distribution of a universe against information influencing stereotypes, or when the management's ideas

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are assigned greater weights in forecasting EPS than unfavourable past performance. Return to average performance, or rather its disregard, is manifested as the projection of above-average performance for years ahead. The success of a company is the result of the positive outcomes of several interconnected *conjunctive* factors, and the overall subjective probability of such factors is judged higher than its objective degree. Risks jeopardising the project, however, are assessed as separate *disjunctive* events since a few of them are enough to cause a company to fail, and thus their probability is underestimated compared to their objective probability. Finally, when the probability of uncertain events is judged subjectively, due to the availability bias, probability is either underestimated or overestimated against objective probability based on personal experiences. The events of the near past are considered more probable than earlier ones, and thus after the crisis the coverage of exchange rate risks is more important than it was before it.

All three mechanisms listed above provide an explanation of the influence of managers' strategic ideas on EPS forecasting. Representativeness heuristic draws attention to the effects of positive impressions about the managers or the company. The positive influence of strategic plans outlined in a scenario are explained by the subjective judgement of conjunctive and disjunctive events; in addition, strategic steps are more easy to recall when they are described in a scenario, and thus availability heuristic also contributes to the explanation of why the success of a series of conjunctive events is overestimated.

The financial planner ultimately feels the probability of success increasingly certain, i.e. **the anchor** is increasingly **fixated**. Theories linked to the reference point of the value function in prospect theory helps understand underlying cognitive mechanisms. Mental accounting is the most seminal mechanism. In case of financial planning, it is the reference point of the value function that marks the anchor. In many cases, there is a connection between EPS forecasting and the analyst's personal sense of utility (bonus, good relationship with the management, etc.). In such cases, negative information has a negative influence, while positive information has a positive influence on the analyst's sense of utility. This explains the underestimation of negative information, while positive news increases the analyst's sense of utility and thus they more easily change the forecast in the positive direction.

There are a number explanations of **insufficient adjustment,** which can be classified around two main biases. The first one is ***bounded rationality***, which introduces the elements of the actual information search process militating against the state of being perfectly informed. The other one is ***confirmation bias***, which makes the decision-maker look for, and attach greater weight to, information that meets their expectations. Desirability bias is related to confirmation bias while also connecting mental accounting with confirmation bias (also known as motivated reasoning or confirmation evidence).

As a closure to the chapter, I have also introduced the **techniques against the development of the illusion of knowledge**. The first step is *the understanding of cognitive mechanisms*. The next stage is when the ***generation of counter-explanations*** weakens the effect made by the anchor both in the initial phase, i.e. anchor formation, and the adjustment, i.e. the information-processing, phase. A high level of ***self-observation*** is needed to overcome mental accounting as it cannot be avoided and so it is necessary to ***raise awareness*** of it.

2.3   The illusion of control

People remain operational if they are in the illusion that the control is in their hand. (Taylor, Brown, 2003)

I have classified the mechanisms responsible for overplanning around the following three main effects:

1.   overconfidence and overoptimism, i.e. the world through rose-coloured glasses
2.   the illusion of knowledge, and
3.   the illusion of control.

Each mechanism is strongly connected to the other two, which is depicted by arrows in the figure. The relationship between the illusion of knowledge and a worldview through rose-coloured glasses is characterised

Figure 16. The connection of the illusion of control to the illusion of knowledge and overconfidence and overoptimism

by the tendency of more self-confident people to reach the illusion of knowledge more quickly, i.e. after processing less information. A growing sense of the illusion of knowledge results in growing confidence. To this is related the third part of the model, i.e. the illusion of control. As a result of a stronger sense of knowledge and confidence, people find the future more predictable and controllable. First, I introduce the notion of the illusion of control then explain how it is related to the other two concepts.

The illusion of control means that a person **overestimates their own ability to influence and control** events while underestimating the role of luck. The illusion of control can also be detected with events that cannot be controlled, yet the decision-maker believes that they have the ability to keep them under control. The illusion of control leads to underweighting in the subjective judgement of risk factors and to optimistic values in the judgement of positive outcomes (Krizan and Windschitl, 2007).

Nofsinger (2007) defines the illusion of control as: *It is when people believe that they can have influence over the outcome of uncontrollable events*[71].

2.3.1 The illusion of control, overconfidence and overoptimism

Overconfidence means that a person overestimates their relative abilities, mental or physical. As we have seen before, there is no unambiguous definition of abilities to start with. We can differentiate between easy-to-define abilities and hard-to-define abilities, which depends on how clear-cut the criteria of competence and excellence are in the judgement of ability.

Corporate executives also tend to overestimate their abilities, especially managerial ones. Such confidence makes them believe that *they will be able to avoid or easily solve the problems occurring during project implementation* (Lovallo and Kahneman, 2003). They often think that they can have control over such uncontrollable events as the weather, economic trends, etc., and in some cases they actually deny the role of luck in the planned outcome of a project. They interpret risks as a challenge or task they can manage with their abilities. In such an ideal world the executives are not entrepreneurs but prudent and explicit agents controlling both events and people. Thus they tend to ignore or downplay the probability of the occurrence of uncontrollable events or accidents (Lovallo and Kahneman, 2003; March and Shapira, 1987).

Armor and Taylor (2000) observed that when a decision-maker had to choose from objectives they were less optimistic than when they had to make a decision about how to realise an objective that they had already chosen. The individual was less optimistic and confident about their own performance and actions when they had to evaluate themselves *as a participant* in a project compared to other members. When

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[71] The illusion of control has been demonstrated by the following experiment: a red lamp in a room was flashing randomly. The participants of the experiment were requested to make the lamp flash with the help of their actions. Of course, there was no connection whatsoever between the flashing of the lamp and the movements of the participants; however, most of them believed that they were really able to influence when it flashed (Kahneman, Tversky, 1974).

requested to perform a task *on their own* they started the process with more confidence. The highest level of optimism was observed when people were asked about the *actual performance of a task* since in this case it was them who exercised control over events and actions. Less optimism was detected when they had to consider the difficulties and advantages occurring during the implementation, but it was the lowest when they had to evaluate performance as participants since they were neither in a decision-making nor in a controlling role. To perform a task alone one needs to have individual abilities such as organising and evaluating skills, which cannot be fully exploited in a simple implementing role. To sum it up, the level of optimism differs according to the participant's role, i.e. their level of control over events in the decision-making and implementation processes. The level of optimism and, accordingly, the illusion of control decrease in the following order:

1. Optimism is the highest when the person is a decision-maker responsible for implementation.

2. When the person's responsibility includes the performance, implementation, or planning of a task, the level of optimism is lower.

3. The level of optimism is the lowest when the person takes part in the implementation but has no decision-making power over the whole project.

All in all, the overestimation of abilities directly results in the decision-maker's belief that they can manage and control a wider range of events than it is possible in reality. It is very important to note, however, that the illusion of control can only develop when a subject actually exercises a controlling function. In such cases they actually feel that they can have control even over those events which are in fact beyond their control.

2.3.2 The illusion of control and the illusion of knowledge

The illusion of control and the illusion of knowledge are closely interrelated. As the illusion of knowledge grows so does the illusion of control, and the subject feels there is a realistic chance of controlling events that nobody can control.

When decision-makers put together a financial plan they believe that by way of thorough planning and outstanding managerial performance they will be able to handle problems that may arise and even go as far as to explicitly deny the role of (mis)fortune in the project outcome (Kahneman, Lovallo, 2003).

Kahneman and Lovallo (2003) attributes the increase in the illusion of control to thorough planning, while Nofsinger (2007) explains it with, among other things, *active participation, the increase in the amount of information* and *active decision-making*. In essence, the more information someone processes and is more intensely engaged in project preparation, the more they will feel they have control over events – they are able to deal with difficulties that may arise such as the weather, inflation, the entire economic situation, or the current recession.

Nofsinger (2007) has identified factors in behavioural finance strengthening the illusion of control as follows:

1. After an **active decision-making process**, the possibility of choice increases the illusion of control. A case in point is lottery numbers. If someone bets on numbers of their own choice they will feel the chance of winning stronger than if the numbers had been selected randomly (e.g. by a computer or draw). In financial planning, it is often the executives who must say the final value in respect of a particular variable such as costs or the value of investment.

2. The **changeability of outcomes** also influences the illusion of control. If the variable moves in the **positive direction immediately in the initial period** the illusion of control will be greater than if it had moved in the negative direction from the anticipated value. In the early 1990s there was a strong upward trend in the securities market. Investors – at a time when online trading began spreading

– saw many positive changes and felt they were in control of events. But when prices move downwards the illusion of control will drop to a much lesser extent, if any at all (due to the attribution error negative outcomes are blamed on acts of God so the sense of personal control may not diminish).

3. As the **amount of information grows** so does the illusion of control. The internet greatly contributes to the increase in the amount of information, which adds not only to the illusion of knowledge but also to the sense of control.

4. The more **active engagement** is in solving a task, the more the illusion of control will strengthen. It has been observed in the field of behavioural finance that online investors who collect and evaluate information, make investment decisions and trade on their own are much more active in trading. It has been concluded that more active trading goes with a greater sense of control in respect of the yield of the portfolio.

In summary, the more deeply someone is involved in planning the future of a business, the more they will feel – especially if they are actively engaged in the planning process and decision-making – that they possess thorough knowledge about a particular business segment and so can influence and control any change in events.

2.3.3 Summary

We have seen in the foregoing sections that the subject's self-confidence and how they view their own abilities that may lead to success play an important role in the development of the illusion of control. If thanks to a fortunate turn of events their expectations are met, their self-confidence and hence the illusion of control will further increase since they invariably ascribe all success to their own abilities.

Closely related to the illusion of control is the illusion of knowledge. Active involvement in planning and decision-making during information-processing cause the subject to feel increasingly able to control certain events. Many times they believe to be in control of incontrollable events.

2.4 Summary

2. Chapter of the paper has arranged into a single system cognitive thinking patterns underlying the systematic optimism of capital outlays and EPS forecasts. Many publications have proven the existence and role of individual cognitive mechanisms in financial planning, and some have also systemised the relationships between some of these mechanisms. Based on existing research findings, I have systemised into a coherent structure the most important cognitive patterns. It should be noted that the current systemisation applies to and explains the illusion of knowledge typical of financial planning and is not a universally valid model for all disciplines.

The psychological causes of overplanning

Figure 17. The theoretical structure of the paper

Studies have so far explained overplanning with three main causative factors: overconfidence, the illusion of knowledge and the illusion of control (see figure). The most common reason has been overconfidence and, used synonymously, overoptimism, from which many authors have derived the development of the illusion of knowledge and the illusion of control. Naturally, people with more self-confidence believe that they are better able to make sense of information and control processes. In the figure above I indicate with arrows that in processing information self-confidence and the illusion of control increase in parallel to the growing illusion of knowledge.

The **rose-coloured glasses** can be ascribed to two reasons. One is that people rate their own abilities higher than what they actually are; this is overconfidence. The other is that people think positive events are bound to happen to them more probably than to others while negative events will avoid them. Therefore, in financial planning, executives and analysts believe that they are better managers, analysts and strategists than others. To this is related the overrating of acquired private information, which brings us the subject of the development of the illusion of knowledge. Two cognitive thinking patterns have been presented that protect overconfidence and overoptimism and remedy the soul when confronted with contrary information. With the help of

hindsight bias, in the light of actual events people believe about information they had access to in the past that they would have given priority to those bits of information and probability values that have been proven right. As a result of the attribution error, they put down positive outcomes to their own capabilities while always blaming negative events on other, uncontrollable events.

I have presented the development of the **illusion of knowledge** along the anchoring heuristic. The initial expectation is the anchor itself, from which the analyst is unable to detach themselves in the course of information-processing. The anchor has been a subject of many studies and categorisations. We distinguish provided and self-generated, informative and non-informative and numerical and non-numerical anchors.

Using the results of earlier studies I have discussed what cognitive processes are at play in the formation and fixation of the anchor and in insufficient adjustment causing the analyst to depart from objective judgement and distorting information-processing and decision-making.

In dealing with **anchor formation** I focussed on the self-generated anchor. The greatest role in anchor formation is played by representativeness heuristic. Information affecting stereotypes overrule facts in the weighting of information. I have taken a particularly close look at the impact of managerial plans and the effect of factual data, as well as the overrating of profitable years and the underrating of loss-making years as the consequences of the representativeness heuristic. I have also introduced the impact of managerial plans in the light of interpreting conjunctive and disjunctive events. The operation of a company is a conjunctive series of events. Management's strategic plans also reflect a conjunctive structure of events, the probability of which is overrated by both managers and EPS analysts. They underrate the probability of negative events as separate disjunctive events, the occurrence of only one of which is often enough for initial expectations to distort information-processing in the optimistic direction. Finally, in judging the likelihood of uncertain events, availability bias has the most critical role to play. People believe events that can be recalled more easily to occur more frequently. Recent events, interesting and unusual occurrences and easily conceivable events are thought to take place more often as they are easier to conjure up. Events presented in a scenario and therefore easier to recall, together with easily recallable strategic plans, also appear more probable than the same events listed as bullet points.

In relation to high-key capital outlays it is important to mention cognitive thinking patterns influencing *anchor fixation*. I have presented the fixation of the anchor through theories connected to the reference point of prospect theory's value function. The more an analyst deals with a given company the more they will insist on their favoured forecast. They have already "posted" successes stemming from the EPS forecast and so any change in that would come as a loss.

Lastly, *insufficient adjustment* leads to the illusion of knowledge. *Bounded rationality* theory uncovers the real pattern of information-processing. In the course of analysis, the financial planner seeks information while focussing on a problem (revenues, suppliers, buyers, operational costs) and keeps searching until they find the information obtained and its contents satisfactory. In processing information they take into account information confirming their opinion, which is referred to as *confirmation bias*. Consequently, optimistic EPS forecasts are made that are consistent with the analyst's initial expectations.

The best technique to prevent the *illusion of knowledge* is to use the outside view. When using the inside view, the analyst gives optimistic plan figures. As a first step to prevent it, awareness must be raised of the above processes and then by exercising intensive self-observation and self-control contrary information must be sought. Mental accounting is the hardest to fight against; the signs of mental accounting should be identified by way of self-observation or with the help of external consultants.

The third most frequent cause underlying overplanning is the **illusion of control**, which is closely connected to the other two reasons. Overconfidence causes people to feel in control of events including those over which they do not have any control. If events prove right the decision-maker's expectations it will increase both their illusion of control and self-confidence. The illusion of control grows concurrently with the illusion of knowledge, especially when someone is actively engaged in planning and later implementation.

Theoretical research can be continued in all three areas. In respect of the illusion of knowledge, the anchoring heuristic itself and related heuristics offer many potential interesting discoveries. There are a great many publications devoted to the illusion of control and its connection to the other two effects, which can also open up interesting avenues for further research.

3   Chapter Empirical Research: Study of the EPS forecasting error in Hungary and Austria

There is ample empirical evidence for systematic optimism observed in financial planning. Some research has centred on corporate financial plans, with special regard to investments (reviewed by Kahneman and Lovallo, 2003), acquisitions (Lovallo, Viguerie, Uhlaner and Horn, 2007), business start-ups (Dunne, Timothy, Roberts, Mark J. Samuelson and Larry, 1988) and annual planning (Darrough, Russel, 2002, DeBondt and Thaler, 1990).

Other studies have focussed on EPS forecasts:

1. Most of the evidence comes from analyses of EPSerr of American companies listed on the stock exchange (Zacks, 1979, DeBondt, Thaler, 1990, Dreman, Berry, 1995, Clayman, Schwartz, 1994, Easterwood, Nutt, 1999, summary study Brown, 1983).
2. Some researchers analysed the EPSerr of companies floating on stock exchanges in Western-Europe (Capstaff, Paudyal, Rees, 2001, Beckers, Steliaros, Thomson, 2004, Bagella, Becchetti, Ciciretti, 2007).
3. I have only found one study on Central and Eastern European countries (Djatej, Gao, Sarikas, Senteney, 2008), which examines how the introduction of the IFRS has impacted EPS forecasting accuracy.

A great advantage of EPS forecasts is that a large number of projections are made for the same company and for a particular time period of that company. Thus, in view of the purpose of the forecasts, it is possible to compile a homogenous database. Another important advantage is that the large number of forecasts allows examining factors influencing the extent of overplanning. Thirdly, data are publicly available, which facilitates the assembly of the database.

Studies on EPS forecasting examined the phenomenon of overplanning until no later than the year 2000 . From as early as the 1990s, many publications already focussed on the cognitive causes of overplanning.

My current empirical research encompasses the past 7 years, specifically the period 2003-2010. From the aspect of the impact of the crisis, I have divided this period into two sub-periods: the pre-crisis years (2003-2007)[72] and the period following the fall of Lehman Brothers, which signaled the onset of the crisis (17.09.2008-2010)[73]. In accordance with international specialised literature, I consider the EPSerr over 200% as an outlying data. The crisis of 2008 has given an opportunity to study the processing and weighting of negative information and the impact of uncertainty in the **real environment,** which is unprecedented. In addition, I have also been able to examine the effect of positive news in the real environment[74] in the banking sector and oil industry in the period 2003-2007[75].

I have narrowed the scope of my study to the EPS forecasts of companies listed on the Hungarian stock exchange and, for comparison, to their Austrian counterparts. The sample is exhaustive in respect of forecasts for both the period and the companies under review.

In the theory part of the paper, I have presented the psychological causes of overplanning around three major effects, including: I. Overconfidence and overoptimism; II. Illusion of knowledge; and finally, closely related to them, III. Illusion of control.

---

[72]I have examined 1528 individual EPS forecasts for the period 2003-2007 (number of EPS forecasts hereinafter: N).

[73] I have been able to examine 972 individual forecasts for the period 17.09.2008-2010.

[74] Sedor (2002), Kadous, et al. (2006), who investigated the pattern of information-processing, performed their study in a laboratory environment.

[75] The research has revealed that in the banking sector and the oil industry the 2003-2007 period was characterised by outstanding EPS growth. I present the study in the section *"Systematic optimism?"*.
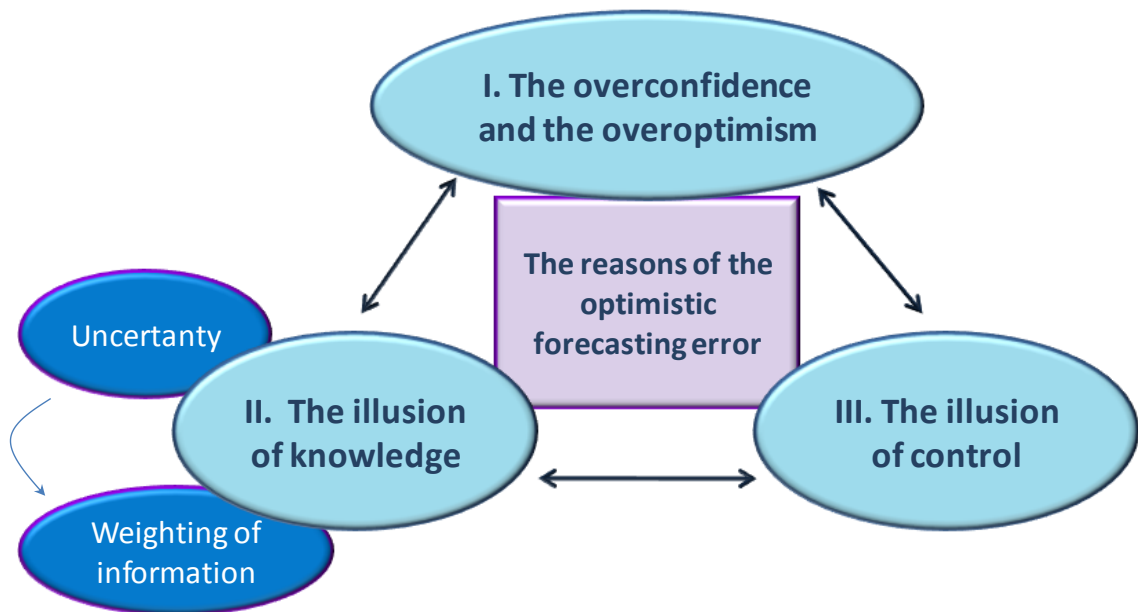
Figure 18. The link between theory and empirical research

The current empirical research is primarily connected to the illusion of knowledge. Heuristics affect the weighting of new information, i.e. positive news and that confirming expectations are overrated while negative news are underrated. In the case of EPS forecasts positive news increase the EPS forecasting error (hereinafter: EPSerr) because its effect is exaggerated while negative news increases it because it is downplayed by analysts. **Uncertainty** is a key factor determining the effects of heuristics. In the empirical research I look at the effect of both uncertainty and positive and negative news on the EPSerr.

3.1 Database

For the empirical study I make a distinction between the periods 2003-2007 and 17.09.2008-2010. I have excluded from the analysis forecasts made for the year 2008 before 17.09.2008, as in that period analysts did not yet took into account the impact of the global financial crisis, and therefore those data may bias the conclusions.

Geographically, the study analyses EPS forecasts made for 3 Hungarian and 4 Austrian companies:

Hungarian firms:

1. Hungarian Telecom Ltd. (MATAV)
2. Hungarian Oil and Gas Trust Ltd. (MOL)
3. OTP Bank Ltd. (OTP)

Austrian firms:

1. Telekom Austria AG (TKA)
2. OMV AG (OMV)
3. Raiffeisen Bank International AG (RBI)
4. Erste Group Bank AG (EBS)

As opposed to earlier research studies proving the systematic optimism of EPSerr, the research I have carried out is different in both its temporal focus (post-2003 years) and geographical scope (Hungary and Austria).

The limitation of the research is that it covers 2 countries, 7 companies and 3 industries, and thus its conclusions are only valid for those data. That said, its great advantage is that the database is exhaustive, i.e. it includes all the EPS forecasts made for the companies under review in that given period.

3.2   Hypotheses and methodology

I have grouped my hypotheses into three areas. First, I looked into whether in the two periods – 2003-2007 and 17.09.2008-2010 – one can speak of **systematic optimism** in respect of the EPSerr.

> *H1. On the analysed database, individual EPS forecasts are generally optimistic, i.e. the EPSerr exceeds zero in the period 2003-2007.*
>
> *H2. On the analysed database, individual EPS forecasts are generally optimistic, i.e. the EPSerr exceeds zero in the period 17.09.2008-2010.*

Then I go on to focus on the **impact of the crisis**. First, comparing the two periods I investigate whether the systematic optimism of the EPSerr increases as a result of the crisis.

> *H3. On the analysed database, the optimism of the EPSerr is greater in the crisis years (17.09.2008-2010) than in the pre-crisis period (2003-2007).*

I perform a separate analysis of whether analysts appropriately weighted the news of the crisis as negative information in their projections and how in the uncertain environment in the wake of the crisis the scatter of EPSerr changed. Naturally, a distinction must be made here between the period where the crisis was a piece of news and the period where it was a factor of uncertainty. That can be accurately defined based on the scatter of the forecasted ΔEPS.

> *H4. On the analysed database, analysts underreacted to the news of the crisis after 17.09.2008 and thus the EPSerr was optimistic.*
>
> *H5. On the analysed database, the uncertainty triggered by the crisis after 17.09.2008 caused the EPSerr to grow in the optimistic direction.*

I perform a further test for **weighting the information**. Many studies (Sedor, 2002; Kadous, Krische, Sedor, 2006; Ali, Klein, Rosenfeld, 1992; Easterwood, Nutt, 1999) have proven that ΔEPS_{t-1} works as an anchor in making EPS forecasts. The increase in ΔEPS_{t-1} is positive information drawing overreaction from analysts, which

causes the EPSerr to increase, while its decrease is considered negative information drawing underreaction, which again causes the EPSerr to increase.

> *H6.On the analysed database, a higher ΔEPSt-1 value increases the systematic optimism of the EPSerr as analysts overreact to positive information in both sub-periods.*
>
> *H7. On the analysed database, a lower ΔEPSt-1 value increases the systematic optimism of the EPSerr as analysts underreact to negative information in both sub-periods.*

What follows, I present the hypotheses and test methods according the following topics.

I. Systematic optimism
H1. On the analysed database the EPSerr is syst. opt. betw. 2003-2007.
H2. On the analysed database the EPSerr is syst. opt. betw. 09.17.2008- 2010.

II. **The effect of the financial crisis on EPSerr**
H3. On the analysed database the EPSerr syst. opt. grew due to the fin. crisis
H4. On the analysed database the EPSerr syst. opt. grew due to underreaction to negative information about the finanacial crisis.
H5. On the analysed database the EPSerr syst. opt. grew under uncertainty caused by the finanacial crisis.

III. **Weighting information**:
H6. On the analysed database greater ΔEPS_{t-1} as overreaction to positive information increased the EPSerr syst. opt. in both sub-periods.
H7. On the analysed database lower ΔEPS_{t-1} as underreaction to negative information increased the EPSerr syst. opt. in both sub-periods.

Figure 19. The structure of hypotheses

3.2.1　Systematic optimism

The following equation is routinely used to **measure the EPSerr**:

$$EPS_{fc,t} - EPS_{ac,t} = Err,$$

(1)

where Err signifies the forecasting error. If there is no systematic forecasting error:

$$Err = 0,$$

For the comparability of the EPSerr in the case of different companies and currencies, the relative value of the error must be determined. The above-defined EPSerr must be compared with an arbitrary value. I have found several methods for that examination in previous research[76]. I have found Capstaff et al.'s (2001) EPSerr definition (2) the most suitable for studying planning fallacy, as the actual EPS does not change within the same period and so the extent of the error only depends on the degree of the absolute error.

$$Rel.Err = \frac{EPS_{fc,\ t} - EPS_{ac,t}}{|EPS_{ac,t}|}$$

(2)

The use the absolute value in the denominator is important if the company closes a loss-making year as then the EPSerr value is negative, which changes the direction of the error measured in the denominator[77].

> *H1. On the analysed database, individual EPS forecasts are generally optimistic, i.e. the EPSerr exceeds zero in the period 2003-2007.*
>
> *H2. On the analysed database, individual EPS forecasts are generally optimistic, i.e. the EPSerr exceeds zero in the period 17.09.2008-2010.*

---

[76] Easterwood and Nutt (1999) compared the relative planning error to the current share price and the price at start of the year. Ashbaugh, Pincus (2000), DeBondt and Thaler (1990) compared it to the actual value of the preceding period.

[77] Other authors did not use the absolute value (DeBondt and Thaler, 1990, Easterwood and Nutt, 1999). This was not a problem in their study as both the actual EPS and the share price typically assume a positive value. The current database also includes exclusively positive actual EPS.

I have used descriptive statistical tools to study changes in the EPSerr and, in line with previous research, performed the ANOVA test to check whether the EPSerr averages significantly differ between the two sub-periods.

For the analysis of H1 and H2, I use **DeBondt and Thaler's (1990)** research method considered to be a milestone in EPS forecast studies, whereby they performed a regression analysis of the actual and forecasted change in EPS.

$$AC = \alpha + \beta\, FC, \tag{3}$$

$$AC_T = \frac{EPS_{acT} - EPS_{acT-1}}{EPS_{acT-1}} \tag{4}$$

$$FC_T = \frac{EPS_{fcT,h} - EPS_{acT-1}}{EPS_{acT-1}} \tag{5}$$

$$\frac{EPS_{acT} - EPS_{acT-1}}{EPS_{acT-1}} = \alpha + \beta\, \frac{EPS_{fcT,h} - EPS_{acT-1}}{EPS_{acT-1}} \tag{6}$$

where:

AC: the actual relative change in EPS value

FC the forecasted relative change in EPS value

T forecasted year

h the date of the forecast was made
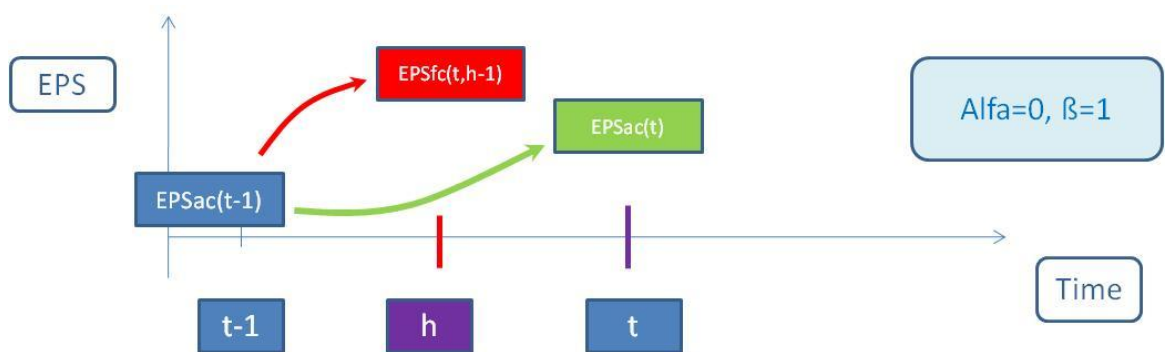
Figure 20. DeBondt and Thaler (1990) regression analysis

The forecasts is punctual, if $(\alpha, \beta) = (0,1)$, i.e. the actual ΔEPS equivalent to the forecasted ΔEPS:

$$AC = 0 + 1 * FC, \text{ i.e.}$$

$$AC = FC$$

If $\alpha < 0$ than the estimations are too optimistic if $\alpha > 0$ than they are too pessimistic.

If $\beta < 1$ than the forecasts were „too extreme" if $\beta > 1$ than they were not „extreme" enough. The studies concentrated on the value of the ß and they framed the hypotheses also the changing of the value of ß. Their research has demonstrated the optimism of EPSerr. More importantly, the use of regression analysis was considered a novelty in verifying the accuracy of EPS forecasts. After its publication, regression analysis became a favoured method used to analyse EPS forecasts.

DeBondt and Thaler (1990) studied EPS forecasts made for American companies in the period 1976-1984.

Capstaff, Paudyal and Rees (2001) conducted the same study for 9 European countries for the period 1987-1994, based on which both descriptive statistics and the values of ß and α confirmed forecasting optimism.

In their study, Capstaff et al. (2001) also used another method to analyse the EPSerr. They used naive forecasts as the baseline. In the case of naive forecasts the forecast value agrees with the actual value of the preceding period.

$$EPS_{F,t} = EPS_{A,(t-1)} \tag{7}$$

The authors examined whether analysts corrected their forecasts downward as the publication date of actual values was approaching, thereby further confirming the fact of systematic optimism.

$$\frac{EPS_{fc(T,h)} - EPS_{fc(T,h-1)}}{EPS_{ac(T)}} = \alpha + \beta \left(\frac{EPS_{fc(T,h-1)} - EPS_{ac(T-1)}}{EPS_{ac(T)}} \right) + \epsilon \tag{8}$$

In the figure below, dependent (green) and independent (red) variables are indicated by arrows.
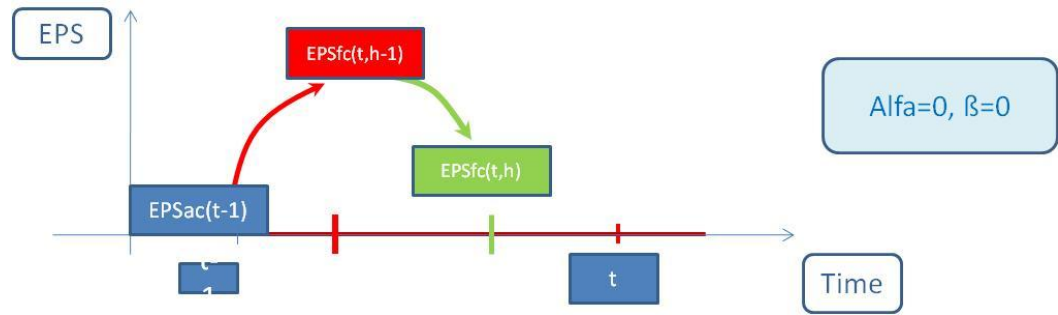
Figure 21. Capstaff, Paudyal and Rees's (2001) regression analysis

If the forecast is accurate there will be no need for correction, and thus $\beta=0$. If the analyst should deem the previous forecast too optimistic in the light of information they would correct it downward, and thus $\beta<0$, while if they thought they had made too pessimistic a forecast the correction would be upward: $\beta>0$.

In equation (8), the value of β is hard to interpret and the study has also revealed (see *Regression analysis*) that there is no linear relationship between the variables (Annex 8). In equation (9), the dependent variable also shows the forecasted change, and the equation similarly verifies the extent of correction. The results are easier to interpret and there is a strong linear relationship between the two variables (Annex 9). In this case, the values of α and β can be evaluated similarly to DeBondt and Thaler's equation, i.e. the value of $(\alpha,\beta)=(0,1)$ shows the lack of revision; the values of $\alpha<0$ and $\beta<1$ suggest a downward correction, while the values of $\alpha>0$ and $\beta>1$ are indicative of an upward correction.

$$\frac{EPS_{fc(T,h)} - EPS_{ac(T-1)}}{EPS_{ac(T)}} = \alpha + \beta\left(\frac{EPS_{fc(T,h-1)} - EPS_{ac(T-1)}}{EPS_{ac(T)}}\right) + \epsilon \qquad (9)$$
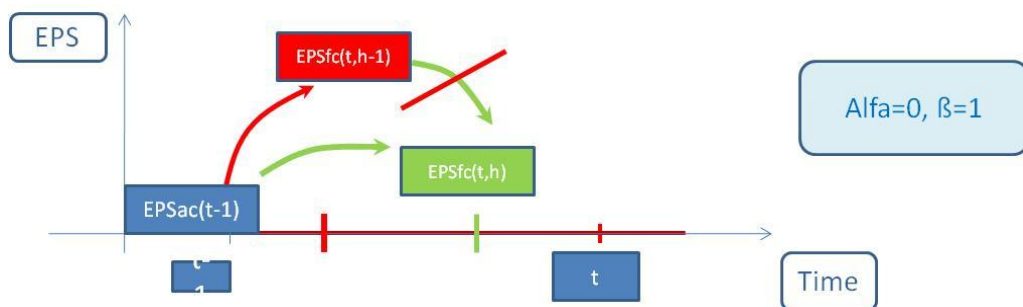
Figure 22. Author's regression analysis

3.2.1.1 The effect of the financial crisis on EPSerr

On the one hand, the crisis is negative information, to which analysts underreact as so far shown by results, and thus the EPSerr grows in the optimistic direction (Easterwood, Nutt, 1999, Sedor, 2002). On the other hand, the crisis has resulted in increased uncertainty, as a consequence of which heuristics come into play during information processing, again pushing the final decision in the optimistic direction78. As the product of the two, what we experience is that the systematic optimism of the EPSerr increases as a result of the crisis. To find out whether the averages of the two sub-periods significantly differ, I have performed the ANOVA test.

H3.On the analysed database, the optimism of the EPSerr is greater in the crisis years (17.09.2008-2010) than in the pre-crisis period (2003-2007).

With regard to the global financial crisis (as *negative news*) Easterwood and Nutt's (1999) research is critically important. In their study they have demonstrated that it is not about misinterpreting information but the fact that analysts interpret it in an arbitrary optimistic way. They underrate negative information and overrate positive information. According to Easterwood and Nutt's (1999) study, we had to reckon with underreaction to news of global recession, i.e. analysts did not correct EPS values sufficiently in response to the crisis. My expectation was that the extent of overplanning would be greater than that in the preceding period.

H4.On the analysed database, analysts underreacted to the news of the crisis after 17.09.2008 and thus the EPSerr was optimistic.

In addition, as a consequence of the crisis, *uncertainty* has increased. Analysts had to work from many contradictory analyses, which increased reliance on personal intuitions and subjective judgements whereby decision-making, as has been shown in the theory part, is distorted by heuristics.

---

[78] Many studies have proven that as uncertainty grows so does the optimism of the EPSerr (Ackert, Athanassakos, 1997; Irwin, 1953, Marks 1951, Ashbaugh, Pincus, 2001, De Bondt, Thaler 1990, Duru, Reeb, 2002, Das, Levine, Sivaramakrishnan, 1998, Haw, Jung, Ruland, 1994).

H5.On the analysed database, the uncertainty triggered by the crisis after 17.09.2008 caused the EPSerr to grow in the optimistic direction.

Many studies have proven that as uncertainty grows so does optimism (Ackert and Athanassakos, 1997). Uncertainty has been defined with countless factors, which include, but are not limited to, the following: reduced probability of success (Irwin, 1953, Marks 1951), international diversification (Ashbaugh and Pincus, 2001, Duru and Reeb, 2002), time horizon[79] (De Bondt and Thaler 1990, Kadous et al. 2006, Duru and Reeb, 2002), standard deviation of stock prices (Duru and Reeb, 2002), predictability (Das, Levine and Sivaramakrishnan, 1998) and post-merger period (Haw, Jung and Ruland, 1994), etc.

I test H4 and H5 by analysing the independent variable in DeBondt and Thaler's (1990) equation (6) with the use of descriptive statistics.

$$FC_T = \frac{EPS_{fcTh} - EPS_{acT-1}}{EPS_{acT-1}}$$ (5)

As uncertainty increases so does the standard deviation of the forecasted ΔEPS. I compare the quarters of 2009 and 2010 with descriptive statistical tools. The collapse of Lehman Brothers, which signaled the onset of the crisis, was first a piece of negative news and there was no discernible uncertainty. In that period, the standard deviation of forecasts is nearly identical with that of previous years. In line with the hypothesis, the EPSerr assumes a positive value.

$$AC_T = \frac{EPS_{acT} - EPS_{acT-1}}{EPS_{acT-1}}$$ (4)

According to the hypothesis, due to the uncertainty caused by the crisis the standard deviation of the forecasted ΔEPS increases and the EPSerr grows – compared to previous years – in the positive direction.

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[79] Most studies define **uncertainty** based on the planning time horizon and have clearly concluded that as the time horizon grows so does the systematic optimism of the EPSerr. (DeBondt and Thaler 1990; Sedor 2002, Capstaff, et al. 2001). Dreman and Berry (1995) studied the effect of the shortening time horizon on planning fallacy on a quarterly basis. I have looked at the planning time horizon on a quarterly basis with descriptive statistical tools and then with the ANOVA test (see Annex 10).

3.2.2 Weighting information

Several studies (Sedor, 2002; Kadous, Krische and Sedor, 2006; Ali, Klein and Rosenfeld, 1992; Easterwood and Nutt, 1999) have shown evidence that ΔEPS_{t-1} acts as an anchor in EPS forecasting. Studies were conducted under laboratory[80] conditions with the purpose of analysing the effect of this bit of information in isolation.

Sedor (2002) has found that analysts' EPS forecasts are characterised by asymmetrical optimism. They underreact to loss-making years but not to profitable years. He saw the reason for this in the fact that loss-making years could not be repeated in the long run in the future and thus the historical data of loss-making years were not informative in respect of the future; therefore, analysts considered other bits of information with greater weights.

Easterwood and Nutt (1999) studied the relationship between the previous year's ΔEPS and the forecasting error. They observed that earlier years' EPS decline was underrated while the performance of successful years was overrated by analysts, i.e. in both cases they forecasted a larger ΔEPS than what the case was in reality. EPS decline is negative information, which is underreacted to by analysts, and therefore the extent of overplanning is bigger. A large growth in ΔEPS as positive news is overrated, which adds to systematic optimism. Compared to medium or average growth in performance, we should experience greater optimism in both cases, in accordance with earlier studies.

> *H6. On the analysed database, a higher ΔEPSt-1 value increases the systematic optimism of the EPSerr as analysts overreact to positive information in both sub-periods.*
>
> *H7. On the analysed database, a lower ΔEPSt-1 value increases the systematic optimism of the EPSerr as analysts underreact to negative information in both sub-periods.*

I have checked the effect of ΔEPS_{t-1} on EPS forecasts based on Easterwood and Nutt (1999), with some modification of their model. The authors also used regression

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[80] It should be noted that Lawrence and O'Connor (1995) conducted similar laboratory studies but either found that earlier years' results did not act as anchors in forecasting or observed extreme adjustments.

analysis in their study and, as we have seen earlier, they defined the EPSerr based on the current share price valid on the forecast date.

$$Rel.Err_t = \frac{EPS_{F,t} - EPS_{A,t}}{P_{(at\ the\ date\ of\ the\ forecast)}}$$
(10)

They focussed on the effect of the relative change of ΔEPS_{t-1} on the EPSerr, for the study of which they defined the $PERF_{t-1}$ indicator:

$$PERF_{t-1} = \frac{EPS_{t-1} - EPS_{t-2}}{P_{t-1}}$$
(11)

$$Rel.Err_t = \alpha + \beta\ PERF_{t-1} + \epsilon t,$$
(12)

Strangely enough, they compared the forecasting accuracy with a changing value, the share price, whereas share price changes are much more likely to follow from EPS forecasts than vice versa. Accordingly, I have used the EPSerr defined earlier in equation (2) instead of equation (10). On the other hand, I have also used the EPSerr of the preceding period, instead of the current share price, in the denominator of equation (11).

$$AC_{t-1} = \Delta EPS_{t-1} = \frac{EPS_{t-1} - EPS_{t-2}}{EPS_{t-2}}$$
(13)

$$FC_T = \alpha + \beta\ AC_{t-1} + \epsilon t,$$
(14)

$$\frac{EPS_{fcT,h} - EPS_{acT}}{EPS_{acT}} = \alpha + \beta\ \frac{EPS_{t-1} - EPS_{t-2}}{EPS_{t-2}} + \epsilon t,$$
(15)

According to the authors, both positive and negative information adds to optimism, and therefore these two cases should be distinguished from a situation where the change in EPS is considered to be neither particularly positive nor negative news.

The figure below shows the connection outlined in the equation of regression analysis. It is clearly seen that when a great positive EPS change occur from Year t-2 in respect of Year t-1, analysts project the same growth rate for the next year. Similarly, if a significant decline is experienced for the t-2 and t-1 time horizons they still expect large growth and therefore forecast larger growth between Year t-1 and Year t than what would be justified. However, a much smaller forecasting error should be observed in a case where EPS increase can be considered *"normal"*.

Figure 23. Theoretical effect of earlier years' EPS changes on overplanning

The interpretation of coefficients is identical with DeBondt and Thaler's formula with the tests here also focussing on the value of β, but the interpretation of ß is rather complicated.

A more simple analysis will be made possible if I divide $\Delta EPSt-1$ into quartiles and percentiles and look at whether a more optimistic EPSerr is characteristic with extreme percentiles and quartiles as opposed to middle $\Delta EPSt-1$. As in previous studies, I also verify the correlation by using the ANOVA test.

3.3   Results

3.3.1   Systematic optimism
Verifying H1, H2 and H3

Below I first present the findings of descriptive statistics in respect of EPSerr for the periods of 2003-2007 and 17.09.2008-2010. Surprisingly, pessimistic forecasts were made for the pre-crisis period, the probable reason for which I briefly outline. Then I present and evaluate the results of regression analyses. H3: *the EPSerr increased in the positive direction as a result of the crisis* follows from the comparison of H1 and H2 study results. The EPSerr averages of the two periods are significantly different, which I have verified with the ANOVA test.

3.3.1.1 Descriptive statistics

The table below shows the results of descriptive statistics. It is conspicuous that, contrary to expectations, the average EPSerr is -5,93% for the period 2003-2007, i.e. EPS forecasts were pessimistic in the period under review. This finding is confirmed by the median, -4,94%, but the mean is 0%. It is more pointed compared to a normal distribution, which follows from the high number of 0% values and is inclined to the right, which again is indicative of an EPSerr shift in the negative direction (histogram Annex 7).

For the period 17.09.2008-2010, the average of the EPSerr is opposite to that, +5,29%, and its median, +1,32%, is also positive; the mean is also at 0%. The standard deviation of EPSerr increased 1.5 times (from 20.19% to36.68%) compared to the period 2003-2007, which can be explained by uncertainty. Accordingly, the range also grew from 190% to 356% (histogram Annex 7).

EPS forecast error		2003 - 2007	17.09.2008-2010
N	Valid	1528	973
Mean		-5,93%	5,29%
Stand. Err.		0,52%	1,18%
Median		-4,94%	1,32%
Mode		0,00%	0,00%
Std. Deviation		20,19%	36,68%
Skewness		126,98%	88,96%
Std. Error of		6,26%	7,84%
Kurtosis		661,16%	415,12%
Std. Error of Kurtosis		12,51%	15,67%
Range		190,27%	356,57%
Minimum		-79,56%	-163,64%
Maximum		110,71%	192,93%

1.   Table Systematic optimism, descriptive statistics

The table below shows the results of t-statistics for the period 2003-2007, confirming that in the given period the EPSerr with a 95% confidence interval shows a significantly pessimistic value, i.e. it assumes a negative value (interval: -6.94%- -4.92%).

One-Sample Statistics 2003-2007

	N	Mean	Std. Deviation	Std. Error Mean
eps err%	1528	-5,93%	20,19%	0,52%

One-Sample Test 2003-2007

	Test Value = 0					
					Interval of the	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
eps err%	-11,475	1527	,000	-5,93%	-6,94%	-4,92%

2.   Table One-sample T-statistics; 2003-2007

The table below shows the results of t-statistics for the period 17.09.2008-2010, confirming that in the given period the EPSerr with a 95% confidence interval shows a significantly optimistic value, it assumes a positive value (interval: 2.99%-7.6%).

One-Sample Statistics 17.09.2008-2010

	N	Mean	Std. Deviation	Std. Error Mean
eps err%	973	5,29%	36,68%	1,18%

One-Sample Test 17.09.2008-2010

	Test Value = 0					
					Interval of the	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
eps err%	4,502	972	,000	5,29%	2,99%	7,60%

3.   Table One-sample T-statistic; 17.09.2008-2010

H1 is rejected based on the analysis of EPSerr since in the period 2003-2007 forecasts were significantly pessimistic on average.

I accept H2 as after 17.09.2008 the EPSerr was in the positive direction in respect of both the average and median values.

I accept H3 since, as opposed to the pessimistic average forecasting error of the period 2003-2007, in the crisis years – 17.09.2008-2010 – the EPSerr assumed a positive value, i.e. systematically optimistic forecasts were made.

I have also verified H3 with the ANOVA test, whose results I present below.

3.3.1.2 H3 ANOVA

Many researchers (Agans and Shaffer, 1994; Strack and Mussweiler, 1997; Sedor, 2002; Kadeus et al., 2006) have used the ANOVA test to prove the relationship between group formation and the EPSerr. I have prepared an ANOVA test for comparing the two periods. The EPSerr does not have normal distribution in either period, which we have also seen based on the values of descriptive analysis. Kolgomorov and Smirnova, and also the Shapiro-Wilk tests, give an objective value for the normality test of the two periods, confirming that the EPSerr does not have normal distribution in either period.

Tests of Normality

Period	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
2003-2007	,148	173	,000	,901	173	,000
2008.09.17 .-2010	,178	131	,000	,851	131	,000

4.   Table EPSerr; normality test

The Levene test also proves the divergence of EPSerr variances in the two periods. Based on the results of descriptive statistics, the scatter of EPSerr increased one and a half times, a consequence of great uncertainty caused by the crisis.

Test of Homogeneity of Variances EPSerr 2003-2007 és 17.09.2008-2010

Levene Statistic	df1	df2	Sig.
177,303	1	2499	,000

5.   Table H3 Levene test

Based on the ANOVA, the EPSerr averages significantly differ in the two periods. The correlation is weak, eta2=0.037.

ANOVA Table

ANOVA table 2003-2007 and 17.09.2008-2010	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7,486	1	7,486	96,919	,000
Within Groups	193,032	2499	,077		
Total	200,519	2500			

Measures of Association

Eta Squared	0,037

6.   Table H3 ANOVA test

Overall, the above tests have confirmed that the two periods significantly differ in respect of both scatter on the basis of the Levene test and average values based on the ANOVA test. These findings are also borne out by the values of descriptive statistics, and thus I accept H3.

3.3.1.2.1   What could cause the pessimistic EPSerr between 2003 and 2007?

The results of the period 2003-2007 contradict many earlier studies[81]. First, it is important to look at the EPSerr by company in the given period[82]. The table below shows that the EPSerr was the most pessimistic, -22.14%, at MOL, followed by OMV's -8,41%. Overall, the *oil industry* (in respect of MOL and OMV) was characterised by a pessimistic EPSerr of -14.37% in the period 2003-2007.

OTP was third in line with its EPSerr of -7.36%. In the **banking sector**, forecasts for Erste Bank were characterised by an error of -3.75% while for Raiffeisen bank forecasts were optimistic with an error of 2%.

In *telecommunications*, a large difference can be observed between the Hungarian and Austrian companies. While with MATÁV we find an optimistic EPSerr of 14.59%, in the case of TKA the EPSerr is negative at -6.57%.

2003-2007 EPS error

Company/Industry	N	Mean	Std. Deviation	Minimum	Maximum
matav	**184**	**14,59%**	**28,97%**	**-35,21%**	**110,71%**
TKA	245	-6,57%	14,49%	-51,72%	70,88%
telekom	*429*	*2,51%*	*24,26%*	*-51,72%*	*110,71%*
MOL	**236**	**-22,14%**	**18,00%**	**-79,56%**	**29,71%**
OMV	308	-8,41%	16,40%	-74,51%	26,92%
oil	*544*	*-14,37%*	*18,40%*	*-79,56%*	*29,71%*
OTP	**203**	**-7,36%**	**9,73%**	**-34,77%**	**12,08%**
RBI	86	2,00%	26,13%	-24,74%	98,80%
EBS	266	-3,75%	11,25%	-40,49%	36,59%
bank	*555*	*-4,18%*	*14,47%*	*-40,49%*	*98,80%*

7.   Table EPSerr by company and industry, 2003-2007; descriptive statistics

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[81] Zhaoyang Gu and Jian Xue (2007) have studied the effect of extreme positive news and demonstrated that analysts' EPSerr grows in the optimistic direction. Becchetti, Hasan, Santoro and Anandarajan (2007) studied the effect of the high-tech stock exchange boom between 1995 and 2001 and showed evidence for analysts' optimism. Bagella, Becchetti and Ciciretti (2007) also examined the effect of the high-tech boom but compared the US and the Eurozone (Western-Europe) and came to the same conlusion as the other study.

[82] For an explanation of the above results I asked for help from Attila Gyurcsik, telecommunications and oil industry analyst of Concord Értékpapírpiaci Zrt.

When we look to known specialised literature for explanations we can see that the results are the same as those of Eames and Glover's[83] (2003) study, which draws attention of the fact that management is interested in a positive earnings surprise and therefore seeks to correct forecasts downward while adjusting actual values upward. The authors also point out that EPS forecasts are optimistic when the company's revenues are uncertain, i.e. difficult to predict. To evaluate this observation it is worth studying the relationship between the EPSerr and the standard deviations of EPS forecasts by company between 2003 and 2007 (see chart below).
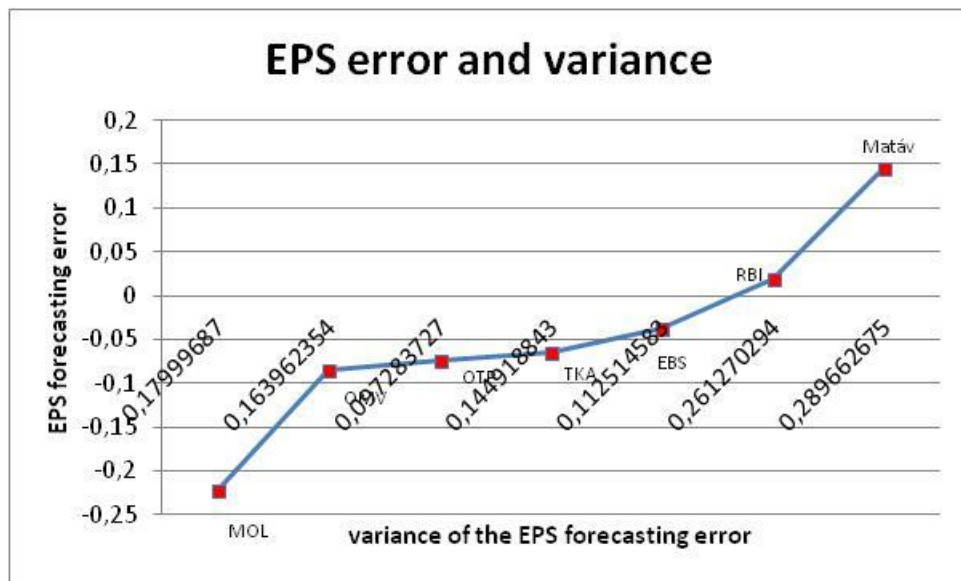
Figure 24. EPSerr and its standard deviation

If we measure uncertainty by the standard deviation of EPS forecasts we can see that as uncertainty grows so does the _absolute_ value of the EPSerr but it increases both in the pessimistic and optimistic directions. This contradicts the results of the past five decades, which proved the increase in optimism under uncertainty (Myungsoo and Chung, 2007, Kadous et al. 2006, Duru and Reeb, 2002, Ashbaugh and Pincus, 2001, Sivaramakrishnan, 1998, Ackert and Athanassakos, 1997, Das, Levine, Haw, Jung and

---

[83] 29,432 observations were studied for the period 1987-1999. They included Value Line forecasts in 20 industries broken down into four quartely periods, which excluded incentives as there was no obligation to subscribe or investment banking relationship. During the 4 quarters the averages of the forecasting error: -8%, -7%, -5%, -3%, and their standard deviations: -3.5%, -3.1%, - 2.6%, -1.9% were falling in absolute terms. It should be added that the plan versus variance was devided by the share price.

Ruland, 1994, De Bondt and Thaler 1990, Irwin, 1953, Marks, 1951). What was the reason for uncertainty in the oil industry and in the case of MATÁV?

In the case of **oil industry**, the period was characterised by higher-than-expected fuel price increases and, due to favourable credit terms, a growing number of cars (see Annex 6). As a result, oil companies realised record-high revenues between 2003 and 2007, which analysts did not dare to incorporate in their forecasts. Both MOL and OMV produced outstanding EPS growth in every year, which confirms that analysts underreact to extreme good news, whereas, based on research findings so far, optimism should increase as a consequence of extreme good news.
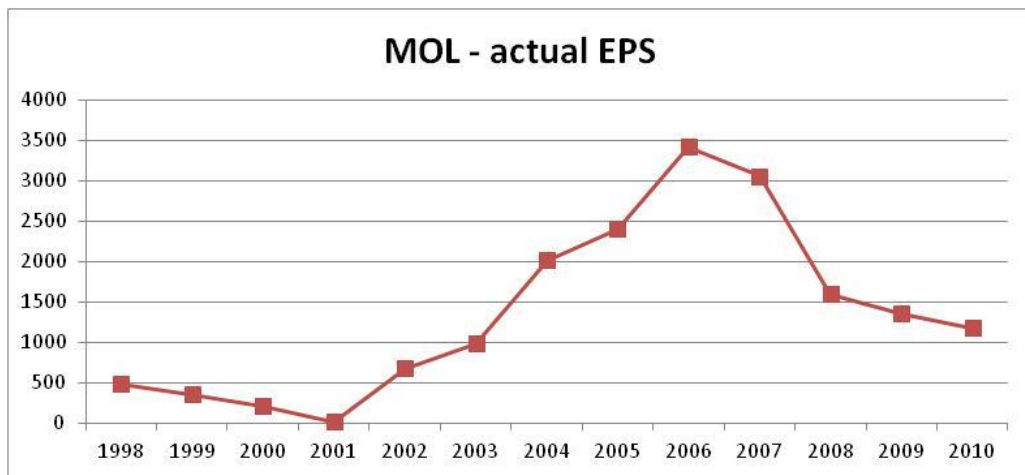
Figure 25. MOL's actual EPS, 1998-2010
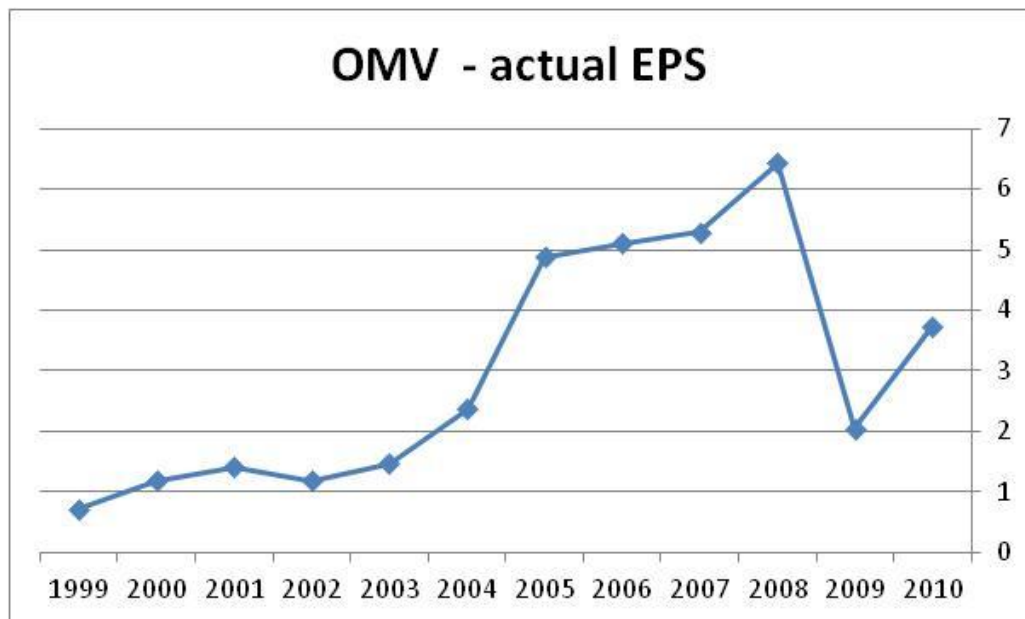
Figure 26. OMV's actual EPS, 1999-2010

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In the banking sector, these years were strikingly profitable. In **OTP's** case the loan portfolio increased, to which, in addition to an overall favourable environment, the outstanding growth in housing and other consumer loan portfolios also contributed. These were extreme positive bits of news, as was also reflected by the outstanding performance of OTP's actual EPS during that period. The same trend was observed in the case of Raiffeisen and Erste banks (see Annex 6). However, with Raiffeisen, in addition to great uncertainty indicated by the standard deviation of EPS forecasts (26.13%), the average of EPSerr was slightly optimistic (2%). For Erste bank, however, the EPSerr was pessimistic with a standard deviation of 11.25%, which again suggests underreaction to positive news.
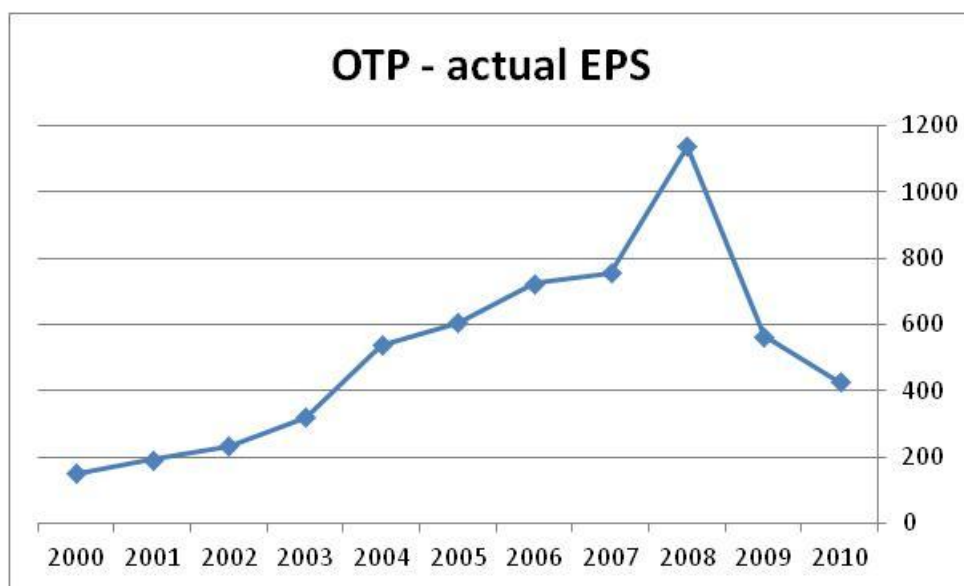
Figure 27. OMV's actual EPS, 2000-2010

MATÁV was the only company in the study for which optimistic EPS forecasts were made in the period 2003-2007. In MATÁV's case, there was great uncertainty based on the standard deviation of EPSerr (28.97%) and it is also shown by fluctuations of the actual EPS value(see chart below). MATÁV's positive forecasts (14.59%) were caused not by insufficient weighting of positive or negative news but far more by fluctuations in revenue-generating capacity, i.e. they can be attributed to uncertainty.
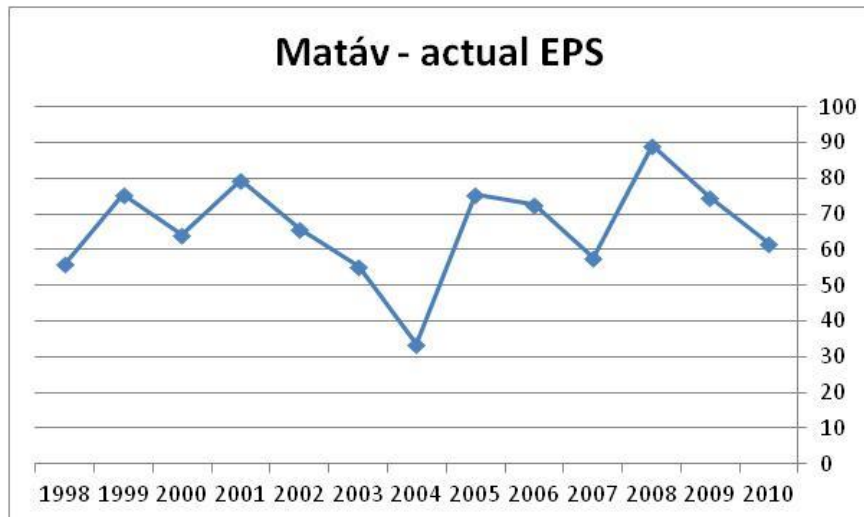
Figure 28. Matáv's actual EPS, 1998-2010

In TKA's case the growth is similar to the other companies in the study and the EPSerr is pessimistic (-6.57%), too.
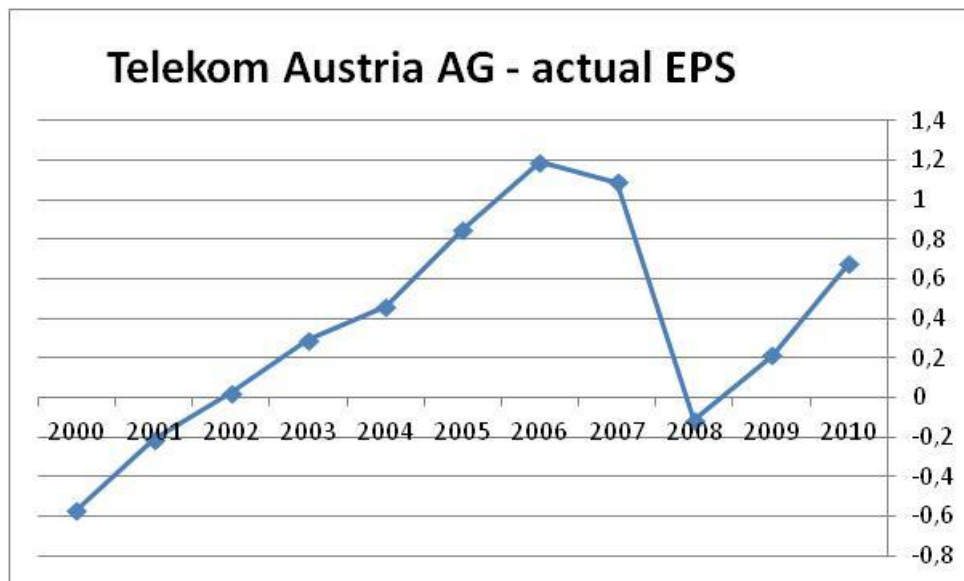
Figure 29. TKA's actual EPS, 1998-2010

In studying the effect of ΔEPS_{t-1} (see section on *Weighting information and the effect of ΔEPS_{t-1} on the EPSerr*) it is striking that extreme good news is underrated rather than overrated by analysts, i.e. they do not believe it. By contrast, very bad news, e.g. news of the crisis is overrated rather than underrated by analysts. In overall terms, overreaction to positive and underreaction to negative news is only valid within the limits of authenticity (see section on *"Crisis as negative information and uncertainty factor"*).

3.3.1.3 Regression analysis

The table presents the results of three regression analyses. DeBondt and Thaler's (1990) study analyses the relationship between forecasted and actual ΔEPS, while Capstaff et al. (2001) and the equation corrected by me scrutinise the revision of EPS forecasts.

Method	Period	α	t-stat	Sig.	ß	t-stat	Sig.	R^2%	N	Pearson	Szig. (2-
DeBondt, Thaler (1990)	2003-2007	,122	9,160	,000	1,044	110,499	,000	88,89%	1528	,943	,000
	17.09.2008-2010	,091	4,532	,000	,983	49,748	,000	71,82%	973	,847	,000
Capstaff et al.	2003-2007	,018	5,732	,000	-,061	-5,148	,000	1,94%	1344	-,139	,000
	17.09.2008-2010	-,015	-,642	,521	-,010	-,631	,529	0,05%	876	-,021	,529
Author	2003-2007	,018	5,732	,000	,939	78,713	,000	82,20%	1344	,907	,000
	17.09.2008-2010	-,015	-,642	,521	,990	64,615	,000	82,69%	876	,909	,000

8. Table Results of regression analyses

The results of linear regression analysis applied by DeBondt and Thaler (1990) confirm those of descriptive statistics. In the period 2003-2007, the values of α=0.122 and ß=1.044 suggest pessimistic forecasts. The crisis period is not that simple to evaluate as the value of α=0.091 is near zero but still in positive territory, as opposed to the negative value found in earlier studies. However, the value of ß=0.983 indicates slight optimism. Given that the descriptive analysis also revealed moderate optimism, the value of ß around one and that of α around zero are acceptable.

Studying the extent of revision, Capstaff et al. (2001) examined optimistic forecasts where downward correction led to lower EPSerr. However, in the period 2003-2007 pessimistic forecasts were made and here it was upward revision that reduced the EPSerr in absolute terms. It should be stressed that the relationship between Capstaff et al.'s (2001) dependent and independent variables is very small based on the Pearson correlation and is not significant for the period 17.09.2008-2010, nor are the values of α and ß for that period. That is why it makes no sense to evaluate the results. The representation of dependent and independent variables in a dot diagram also confirms that there is no linear relationship between the two variables (see Annex 8).

The equation I have made also examines the EPS revision, and the interpretation of α and ß is identical with that of DeBondt and Thaler's coefficients. The linear relationship between the dependent and independent variables is evident on the basis of the dot diagram (Annex 10). Further, the Pearson correlation also shows a strong positive relationship. The values α= -0.015 and ß=0.99 for the 17.09.2008-2010 period

indicate that analyst almost made no corrections at all, except to a minimum extent downward. The coefficient α= 0.018 indicates a slight upward correction and ß=0.939 a moderate downward correction in the period 2003-2007, which makes it difficult to form an opinion.

The extent of revision is easier to interpret by analysing Capstaff et al.'s (2001) dependent variable by descriptive statistics.

$$\frac{EPS_{fc(T,h)} - EPS_{fc(T,h-1)}}{EPS_{ac(T)}}$$ (16)

Revision, Cap. dependent variable		2003 - 2007	17.09.2008.-2010
N	Valid	1344	876
Mean		1,06%	-1,33%
Median		0,00%	0,00%
Mode		0,00%	0,00%
Std. Deviation		10,42%	70,06%
Skewness		-0,72	8,51
Std. Error of		0,07	0,08
Kurtosis		15,20	136,33
Std. Error of Kurtosis		0,13	0,17
Range		167,99%	1544,81%
Minimum		-83,58%	-533,87%
Maximum		84,41%	1010,95%

9.   Table Descriptive statistics of Capstaff et al.'s (2001) dependent variable

The extent of revision in the period 2003-2007 is in the positive direction, which can be expected in making pessimistic forecasts, while it is in the negative direction for the period 09.17.2008-2010, where the EPSerr is positive. The standard deviation of revisions grew seven times (from 10.42% to 70%) in the post-crisis period, i.e. analysts modified their forecasts greatly under uncertainty. This is confirmed by the extent of revisions, which grew from 167.99% to 1544.81%.

All in all, the regression analysis has confirmed the results of descriptive statistics.

3.3.2   Crisis as negative information and uncertainty factor – H4 and H5

H4. On the analysed database, analysts underreacted to the news of the crisis after 17.09.2008 and thus the EPSerr was optimistic.

H5. On the analysed database, the uncertainty triggered by the crisis after 17.09.2008 caused the EPSerr to grow in the optimistic direction.

The crisis as negative information had news value immediately after the fall of Lehman Brothers in 2008. The uncertainty caused by the crisis became discernible by Austrian and Hungarian companies only later. For a while the crisis as negative information appeared in EPS forecasts. During this time the standard deviation of EPS forecasts did not change as analysts did not sense the uncertainty. Under the hypothesis the EPSerr therefore grew in the positive direction.

The uncertainty caused by the crisis became discernible in the Austrian and Hungarian economies only month later. This time the crisis was no longer a bit news but an uncertainty factor as a result of which the range and scatter of EPS forecasts increased. If the EPSerr is positive with a larger range then the uncertain environment causes optimistic EPS forecasts.

For comparison, I study EPS forecasts between 2006 and 2010, whereby it must be taken into account that as early as in the pre-2008 years references had already been made to the breakout of the crisis in 2008.

The chart below shows the averages of DeBondt and Thaler's (1990) dependent (actual ΔEPS) and independent (forecasted ΔEPS) variables on a quarterly basis. It can be seen clearly how the average of forecasted ΔEPS (FC) was changing in the years around the crisis. I have deleted forecasts which were made in the preceding year as the sample contained too few items, between 9-23, while in the other quarters the typical number of items was 45-95 (see Annex 11).
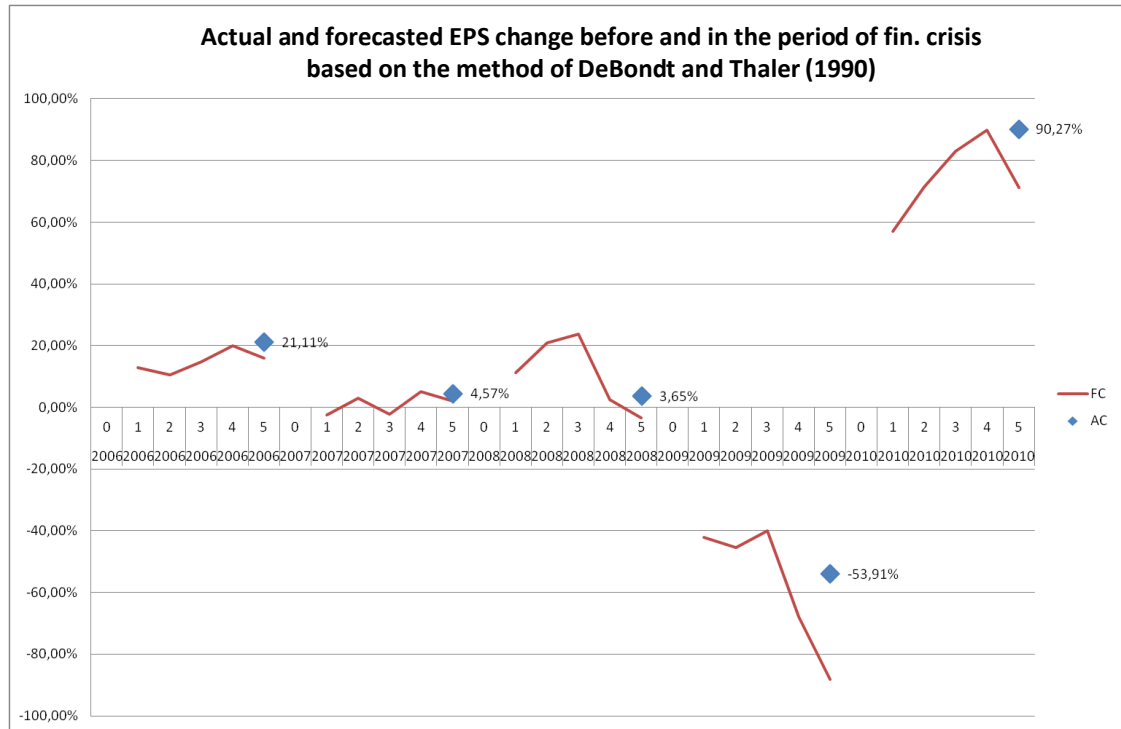
Figure 30. Average forecasted ΔEPS and actual EPS by quarter, 2006-2010

Forecasted change					
quarter	2006	2007	2008	2009	2010
1	12,97%	-2,40%	11,11%	-42,20%	56,96%
2	10,51%	3,03%	20,89%	-45,37%	71,33%
3	14,80%	-2,13%	23,69%	-39,96%	83,01%
4	19,96%	5,18%	2,56%	-67,99%	89,94%
5	16,03%	1,99%	-3,41%	-88,30%	71,08%

10.   Table Average forecasted ΔEPS by quarter, 2006-2010

The chart above reflects well how in 2006 and 2007 the forecasted ΔEPS (FC) fluctuated around the actual ΔEPS (AC) with limited scatter. In the first three quarters of the years 2008 and 2009, the forecasted change was above the actual value, i.e. forecasts were optimistic, and then in Q4 and Q5 it approximated the actual value. It was not until the last two quarters of 2009, when the scatter of the forecasted ΔEPS increased, that analysts made heavy downward revisions. In this period they already gave pessimistic forecasts. In 2010 they overreacted to the effect of the crisis, i.e. forecasts remained pessimistic in Q1-3, excluding Q4, and then in Q5, after the closure of the year, they were pessimistic again.

If analysts are uncertain there will be a wider range of FC values, while if the effect of the crisis (as negative news) is underweighted, then the range of FC will not change to a great degree.

The chart below helps illustrate this effect. In the above chart we can see that in Q1-3 of 2009 analysts still forecasted a -40% decline on average. The chart below shows that the range of forecasts does not differ significantly from Q1-3 of 2008. I conclude from this that analysts underestimated the extent of decline not because uncertainty caused by the crisis but because they underrated the crisis itself as negative information. The range of the _FC_ increased drastically in Q4-5 of 2009. At this time the crisis was no longer a piece of news but an uncertainty factor. But then analysts overreacted to the effect of the crisis on the EPS in 2009. In 2010 we could no longer speak about overreaction to negative information as the range of _FC_ was large in each quarter.

The influence of the crisis on the forecasted ΔEPS

	1 2008	2 2008	3 2008	4 2008	5 2008	1 2009	2 2009	3 2009	4 2009	5 2009	1 2010	2 2010	3 2010	4 2010	5 2010
átlag+szórás	30,65%	48,32%	48,01%	44,62%	39,39%	-15,36%	-21,42%	-17,41%	19,57%	43,38%	143,45%	163,68%	178,34%	212,57%	157,03%
min	-35,60%	-37,22%	-35,00%	-113,96%	-110,55%	-91,24%	-104,79%	-88,45%	-523,42%	-550,45%	-148,48%	-214,14%	-50,64%	-52,64%	-38,60%
max	65,83%	86,88%	84,73%	85,24%	85,31%	59,43%	18,60%	5,80%	40,52%	61,72%	317,67%	290,70%	309,30%	415,15%	374,75%
átlag-szórás	-8,43%	-6,54%	-0,63%	-39,51%	-46,22%	-69,03%	-69,31%	-62,51%	-155,55%	-199,36%	-29,52%	-21,01%	-12,32%	-32,69%	-14,86%

Figure 31. Effect of crisis on forecasted ΔEPS

3.3.2.1 Regression analysis – based on DeBondt and Thaler (1990)

The results of regression analysis also confirm the fact that while the crisis was negative information (09.2008-09.2009), forecasts remained optimistic based on the values of ß=0.872 and α=-0.16, where the confidence interval of ß is also below zero. By contrast, when the crisis was an uncertainty factor (09.2009-2010), optimistic forecasts were made based on the values of ß=1.091 and α=0.086.

Period	α	t-stat	Sig.	ß	t-stat	Sig.	Lowwer Bound	Upper Bound	R²%	N	Durbin Watson
09.2008-09.2009	-,016	-1,113	,267	,872	28,086	,000	,811	,933	68,2%	370	,943
10.2009-2010	,086	2,710	,007	1,091	39,525	,000	1,037	1,145	75,0%	522	,847

11.   Table Study of the crisis as negative information and then as uncertainty factor using DeBondt and Thaler's regression analysis

Regression analysis also confirms the results of descriptive statistics according to which when the crisis was a negative piece of information the EPS forecasts were optimistic, while when it was an uncertainty factor, pessimistic forecasts were made.

3.3.2.2 H4 and H5, ANOVA – Forecasted ΔEPS

The Levene statistics prove that the *standard deviations of FC* significantly diverge in the two periods, 09.2008-09.2009 and 10.2009-2010, and thus on that basis we can speak about **uncertainty** one year after the fall of Lehman Brothers.

Test of Homogeneity of Variances
Forecasted ΔEPS 09.2008-09.2009 and 10.2009-2010

Levene Statistic	df1	df2	Sig.
136,079	1	898	,000

12.   Table H4 and H5 FC; Levene test

From descriptive statistical data it can be seen that in the period 17.09.2008-09.2009 (up to Q3) – i.e. during the year following the collapse of Lehman Brothers – the standard deviation of *FC* was 39.49%, with a projected average decline of -23.67%. By contrast, during the one-and-half-year period 10.2009-2010, the

standard deviation increased to 123.47% and an average EPS growth of 26.95% was projected.

Descriptives

Forecasted ΔEPS	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
09.2008-09.2009	370	-23,67%	39,49%	2,05%	-113,96%	85,31%
10.2009-2010	530	26,95%	123,47%	5,36%	-550,45%	415,15%

13.   Table Forecasted ΔEPS; descriptive statistics

The averages of the _FC_ also significantly differ based on the ANOVA test in the two periods. The strength of the relationship, eta^2=0.061, shows a value very close to those in the studies above.

Anova table

ANOVA - Forecasted ΔEPS 09.2008-09.2009 and 10.2009-2010	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	55,839	1	55,839	58,032	,000
Within Groups	864,062	898	,962		
Total	919,901	899			

Measures of Association

Eta Squared	0,061

14.   Table H4 and H5 forecasted ΔEPS; ANOVA test

Overall, analysts overweighted the effect of the crisis for EPS values in 2008 after 17.09.2008 and thus the EPSerr was pessimistic. For 2009, its effect was underrated in Q1-3 then it was overrated in Q4 and, after closure of the year, in Q5, i.e. the EPSerr was optimistic. In this period the crisis already was an uncertainty factor. The EPSerr of the <u>last </u>EPS forecasts for 2009 was pessimistic and so the actual EPS for 2009 came as a "positive surprise" to the financial market, which is manifested in the strong upward correction of forecasts made for 2010. In Q4 of 2010, the average of the forecasted change almost gave an accurate projection; however, Q5 (after closure of year) the average FC was largely corrected downwards. Based on the results I accept H4 as the news of the crisis was underreacted, while I reject H5 since due to uncertainty pessimistic estimates were made. An interesting finding of the study is that uncertainty and negative news on the crisis caused pessimistic EPSerr rather than optimistic EPSerr.

3.3.3 Weighting information and the effect of ΔEPS$_{t-1}$ on the EPSerr: H6 and H7

H6. On the analysed database, a higher ΔEPSt-1 value increases the systematic optimism of the EPSerr as analysts overreact to positive information in both sub-periods.

H7. On the analysed database, a lower ΔEPSt-1 value increases the systematic optimism of the EPSerr as analysts underreact to negative information in both sub-periods.

In my study the EPS forecasts made in the 2003-2007 period have demonstrated the insufficient weighting of positive information. However, contrary to findings drawn from previous studies, analysts did not overreact to positive news but underreacted to them and consistently pessimistic forecasts were made in this period. I ascribe this phenomenon to analysts' overreaction to *extreme* good news.

Another interesting conclusion is the crisis as negative news, which analysts overreacted to, i.e. they made pessimistic forecasts. Can it be that analysts overreact rather than underreact to *extreme* bad news? Let us see how the EPSerr changes in the light of actual ΔEPS$_{t-1}$.

3.3.3.1 Descriptive statistics

In the years **2003-2007** growth was much more typical than decline. In forming groups my goal was to have an equal number items in each group but I have separated declines (N=237) in order not to mix them post-growth forecasts. Further, I have treated separately growth rates above 1,000% (N=85), which far exceeded the other growth rates (N=1443), whose average was 32.62% and maximum rate 126,57%. The average rate of the ΔEPS$_{t-1}$ in the category of *above 1,000% growth* was 2646.15%.

2003-2007		decline	gentle growth	middle growth	great growth	I∆EPS$_{t-1}$I< 2, a the four category together	above 1000% growth
N		237	396	389	421	1443	85
N %		15,51%	25,92%	25,46%	27,55%	94,44%	5,56%
∆EPS$_{t-1}$	Range	-108,34%	25,46%	72,67%	185,19%	239,01%	6107,69%
	Minimum	-112,44%	4,51%	23,21%	58,62%	-112,44%	1015,38%
	Maximum	-4,10%	20,95%	49,46%	126,57%	126,57%	5092,31%
	Mean	-32,29%	11,84%	37,58%	84,12%	32,62%	2646,15%
EPSerr	Range	162,43%	116,15%	162,45%	104,22%	190,27%	78,32%
	Minimum	-51,72%	-79,56%	-63,65%	-74,51%	-79,56%	-52,28%
	Maximum	110,71%	36,59%	98,80%	29,71%	110,71%	26,04%
	Mean	9,74%	-6,02%	-11,79%	-6,58%	-5,15%	-19,16%

15.   Table Statistical values of ∆EPS$_{t-1}$ group formation, 2003-2007

The chart below shows well, in accordance with earlier research findings, that in the 5 years preceding the global financial crisis analysts underrated decline as negative news, which caused the EPSerr to increase. However, growth is overrated rather than underrated, as we have seen in the section *"What could cause the pessimistic EPSerr between 2003 and 2007?"* It should be noted, however, that in the case of *above 1,000% growth* the absolute value of the EPSerr was even greater but in the pessimistic (negative) direction. Analysts underweighted *extreme* good news and therefore forecasts underestimated EPS for the next year. This is consistent with what was experienced in the period 2003-2007, i.e. the underweighting of *extreme* good news.
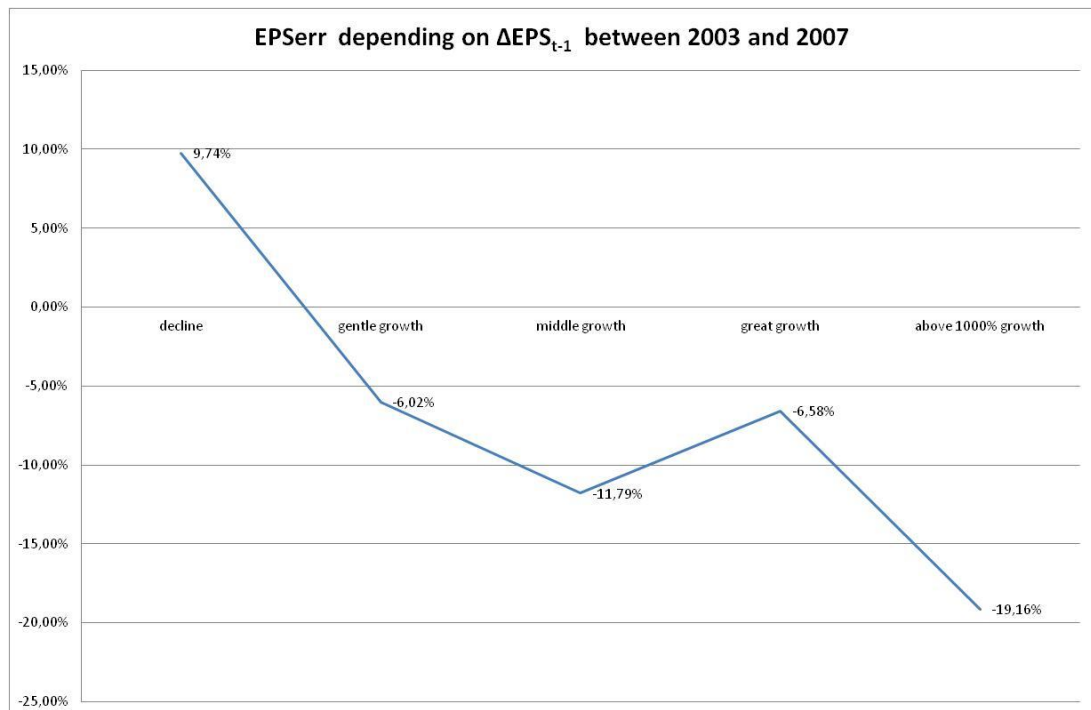

Figure 32. EPSerr relative to ∆EPSt-1, 2003-2007

For the period 17.09.2008–2010, I have been able to analyse (N=973) EPS forecasts in the light of 21 ΔEPS_{t-1} values. Here again I sought to form groups with identical item numbers. As opposed to the preceding five years, the period under review was characterised by decline and so I have evaluated those forecasts which were made after growth (N=251, ΔEPS: 21.63% - 54.59%). I call ΔEPS change between -10.72%-10.17% stagnation and have categorised decline as gentle, middle and drastic. The characteristics of each group are shown in the table below.

17.09.2008-2010		drastic decline	middle decline	gentle decline	stagnation	growth
N		228	190	173	131	251
N %		23,43%	19,53%	17,78%	13,46%	25,80%
ΔEPS_{t-1}	Range	225,51%	23,10%	6,80%	20,89%	32,96%
	Minimum	-293,69%	-50,44%	-20,34%	-10,72%	21,63%
	Maximum	-68,19%	-27,33%	-13,54%	10,17%	54,59%
	Mean	-147,43%	-40,35%	-15,26%	2,81%	35,33%
EPSerr	Range	257,34%	173,00%	208,16%	356,57%	249,38%
	Minimum	-124,78%	-76,71%	-42,91%	-163,64%	-65,27%
	Maximum	132,56%	96,29%	165,25%	192,93%	184,11%
	Mean	-8,40%	-2,58%	18,42%	0,17%	17,32%

16.   Table Statistical values of ΔEPS_{t-1} group formation, 09.2008- 2010

In the chart below, it is along the last three categories that we see a V-shaped curve (highlighted in red line). The growth path called *stagnation* was followed by what can be considered accurate forecasts (EPSerr=0.17%), while *growth* per se (EPSerr=17.32%) was over and the *gentle decline* phase (EPSerr=18,42%) was underreacted by analysts and so the EPSerr increased in both cases. In the case of *drastic decline* (EPSerr=-147.43%) and *middle decline* (EPSerr=-40.35%), the EPSerr was pessimistic, i.e. it is a case of overreaction to negative news. This agrees with overreaction to the news of the crisis in the period 09.2009-2010, when uncertainty was also felt. Here we can speak of extreme negative news, which already drew overreaction from analysts.
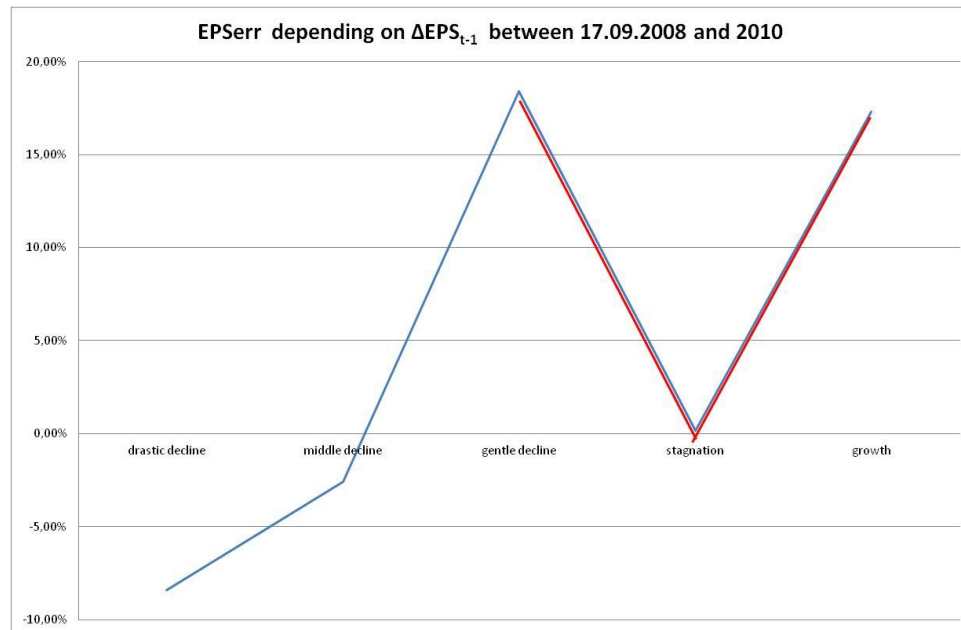
Figure 33. EPSerr relative to ΔEPSt-1, 09.2008 -2010

Overall, it cannot definitely be concluded that analysts overreacted to positive news and underreacted to negative news, and therefore H6 and H7 are rejected. Interestingly, however, in the period 17.09.2008 this hypothesis can be accepted for the *gentle decline – stagnation – growth* phase. The negative news (the *gentle decline* of ΔEPS$_{t-1}$) still drew underreaction, i.e. analysts did not take it seriously. However, they overreacted to *drastic* and *middle decline*, i.e. took it too seriously, which is why H7 has been rejected. In the case of the 2003-2007, following *above 1.000% growth* I observed underraction to it as *extreme* positive news, which was the reason for rejecting H6.

3.3.3.2 Based on Easterwood and Nutt's (1999) methodology

Easterwood and Nutt (1999) and Ali et al. (1992) have repeated Abardanell and Bernard's (1992) study which scrutinised the effect of actual ΔEPS$_{t-1}$ on next year's EPS forecasts. I have reperformed the study with a modification whereby I used EPS$_{t-2}$ instead of the share price in the denominator.

In the five years of the pre-crisis period the category of *decline* emerges from the other data where the EPSerr=9.74% was. Based on the Pearson correlation, there is a strong opposite-directed relationship between variables, which means that after such a sharp decline analysts forecast massive growth as is also suggested by ß=-8.542.

In the case of great growth (EPSerr=-6.58%) and *above 1,000% growth* (EPSerr=-19.16%), the value of the Pearson correlation indicates a moderately negative relationship. In the case of *great growth*, analysts project a decline for the next year based on the value ß=-0.885, and thus pessimistic values are forecasted, while in the case of *above 1,000% growth,* ß=-0.006 indicates that such an extent of growth is not taken into consideration for the next year.

In the event of *gentle* and *middle growth*, the correlation is very weak; thus ΔEPS_{t-1} has hardly any impact on forecasts made for the next year.

Easterwood és Nutt (1999)

2003-2007	α	t-stat	Sig.	β	t-stat	Sig.	R^2%	N	Pearson korr.	Szig. (2-tailed)
decline	-1,300	-12,793	,000	-8,542	-39,690	,000	87,02%	237	-,933	,000
gentle growth	,155	8,614	,000	-,290	-2,132	,034	1,14%	396	-,107	,034
middle growth	,544	6,452	,000	-,749	-3,437	,001	2,96%	389	-,172	,001
great growth	1,005	18,643	,000	-,885	-14,262	,000	32,68%	421	-,572	,000
above 1000% growth	,413	10,618	,000	-,006	-5,395	,000	25,96%	85	-,510	,000

17. **Table Results of regression analysis, Easterwood and Nutt (1999), based on ΔEPS_{t-1} for 2003-2007,**

Examining the period 17.09.2008-2010 it is striking that there is no or little correlation between the two variables and further that the relationship is typically not significant. The significance level of the value of ß is similar to that. The R^2 indicator is also evidence that the independent variable only explains a negligible part of the dependent variable's scatter. Similarly to Capstaff, Paudyal and Rees's (2001) study, again is not worth examining the values of α and ß. The absence of correlation draws the attention to the fact that in the two years after the crisis the value of ΔEPS_{t-1} did not influence forecasts for the next year. The absence of a linear relationship between the two variables is also suggested by the dot diagram (see Annex 12).

Easterwood és Nutt (1999)

17.09.2008-2010	α	t-stat	Sig.	β	t-stat	Sig.	R^2%	N	Pearson korr.	Szig. (2-tailed)
drastic decline	,188	1,066	,288	-,599	-6,072	,000	14,03%	228	-,375	,000
middle decline	-,176	-2,422	,016	,063	,360	,720	0,07%	190	,026	,720
gentle decline	-,502	-2,860	,005	-3,961	-3,472	,001	6,59%	173	-,257	,001
stagnation	-,291	-5,662	,000	,245	,363	,717	0,10%	131	,032	,717
growth	-,469	-9,404	,000	,359	2,743	,007	2,93%	251	,171	,007

18. **Table Regression analysis results based on $\Delta EPS_{t-1,}$ 09.2008-2010, Easterwood and Nutt (1999)**

In Easterwood and Nutt's (1999) study R^2=0.02, while it is even lower (R^2=0.01) in Abardanell and Bernard's (1992) study. My conclusion from the value of R^2 is that in their case, too, the correlation was very low.

Overall, study results in this period cannot be evaluated.

3.3.3.3   H6 és H7 ANOVA

3.3.3.3.1   *In the period 2003-2007*

Groups formed on the basis of the ANOVA for the 2003-2007 do not have normal distributions and also significantly deviate from normal distribution based on Kolmogorov-Smirnova and the Shapiro-Wilk tests.

Tests of Normality

2003-2007	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
decline	,150	237	,000	,909	237	,000
gentle growth	,112	396	,000	,931	396	,000
middle growth	,107	389	,000	,880	389	,000
great growth	,135	421	,000	,887	421	,000
above 1000% gro	,053	85	,200	,980	85	,222

19.   Table Normality test based on $\Delta EPS_{t-1,}$ 2003-2007

The variances of the groups also significantly diverge based on the Levene test.

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
37,226	4	1523	,000

20.   Table Levene test based on $\Delta EPS_{t-1,}$ 2003-2007

Further, the ANOVA test has also revealed a significant relationship between group formation and the EPSerr, with eta^2=0,139.

ANOVA Table

ANOVA table 2003 - 2007		Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)	8,662	4	2,166	61,519	,000
Within Groups		53,614	1523	,035		
Total		62,276	1527			

Measures of Association

Eta Squared	0,139

21.   Table ANOVA test based on ΔEPS_{t-1}, 2003-2007

3.3.3.3.2   *In the period 17.09.2008-2010*

Groups formed for the period 17.09.2008-2010 also significantly differed from normal distribution based on the tests below.

Tests of Normality

2008.09.17. - 2010	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
gentle decline	,148	173	,000	,901	173	,000
stagnation	,178	131	,000	,851	131	,000
growth	,180	251	,000	,857	251	,000
drastic decline	,140	228	,000	,874	228	,000
middle decline	,074	190	,014	,985	190	,046

22.   Table Normality test based on ΔEPS_{t-1}, 17.09.2008-2010

However, the groups formed differed from each other significantly but at a lower level of significance.

Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3,317	4	968	,010

23.   Table Levene test based on ΔEPS_{t-1}, 17.09.2008-2010

Based on the ANOVA test the group averages significantly diverge but the relationship is weaker than in the case of groups for the period 2003-2007, with $eta^2=0.095$.

ANOVA Table

ANOVA táblázat 2008.09.17 - 2010		Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)	12,411	4	3,103	25,380	,000
Within Groups		118,345	968	,122		
Total		130,756	972			

Measures of Association

Eta Squared	0,095

24.   Table ANOVA test based on ΔEPS_{t-1}, 17.09.2008-2010

3.4 Conclusion

The empirical part of the thesis examined the EPSerr between 2003-2010 in the case of 3 Hungarian and 4 Austrian companies. I distinguished between two periods – the pre-crisis years (2003-2007) and the period after the bankruptcy of Lehman Brothers identified as the starting point of the crisis (17.09.2008-2010). The period 2003-2007 was characterised by positive news, and therefore I was able to study their weighting in the actual environment. During the crisis I was able to examine negative news in its actual environment. In the course of the research several highly **interesting conclusions** were drawn.

One was that, contrary to previous research findings, I observed **systematic pessimism** in the period 2003-2007, the reason being a highly favourable economic climate in this period, in particular in the banking sector and oil industry, which was also reflected by the profitability of the companies under review. That phenomenon is evidence that analysts did not believe **positive news** and underrated growth trends. All this proves that positive news was undervalued, which contradicts existing research results.

Another interesting finding is that analysts continued to underrate **news of the crisis** throughout the first three quarters of 2009. I was able to examine the news value of the crisis through the change of the scatter of *forecasted ΔEPS*. Its value remained unchanged until 09.2009 compared to the preceding period, and so the crisis still had news value, which drew underreaction, i.e. the EPSerr was optimistic.

The uncertainty caused by the crisis was felt after 10.2009; then the scatter of the _forecasted ΔEPS_ significantly increased and the EPSerr turned into pessimistic. That was the third interesting finding, namely **the uncertainty**, which arose from the crisis, did not add to the optimism of the EPSerr but pessimistic forecasts were made. In examining the period 2003-2007, what we can also see with regard to uncertainty is that uncertainty can increase the EPSerr not only in a clearly optimistic direction but also in a negative direction, i.e. it can raise the value of EPSerr in absolute terms while the latter's direction is pessimistic (negative). In this particular case analysts overreacted to negative news in a highly uncertain environment. Researchers have tried to capture uncertainty with several factors. Their favoured tool is the effect of time horizon on forecasts. I have performed this study for both periods and received similar results to earlier research findings (see Annex 10).

In order to weight positive and negative information I conducted an analysis (in line with previous research) of the effect of ΔEPS_{t-1} on the EPSerr. Between 2003 and 2007, the revenue-generating capacity of the oil industry, i.e. MOL and OMV, and of the banking sector, i.e. OTP and Erste Bank, was characterised by _extreme_ good news, as was also evidenced by those firms' EPS growth. The level of EPSerr in the period 2003-2007 was pessimistic and thus I found pessimistic EPSerr in all ΔEPS_{t-1} categories except _decline_ ($\Delta EPS_{t-1}<0$). Interestingly, however, in the case of _above 1,000% growth_ the EPSerr was even more pessimistic, i.e. the growth in the preceding period was even more underweighted. In other words, analysts underreacted to _extreme_ positive news. Examining negative news was made possible in the period 07.09.2008-2010. Again, an interesting finding here was that analysts overreacted to _drastic decline_, i.e. the EPSerr assumed a pessimistic value.

It can be concluded from the overall results that credible and acceptable news draws overreaction, while _extreme_ news draws underreaction from analysts. Underreaction, i.e. disbelief, is also typical with negative news but _extreme_ bad news causes overreaction. It must be added that _extreme_ news also intensifies uncertainty. Both _extreme_ positive and negative news causes a pessimistic EPSerr. As a consequence of overconfidence and optimism, people are more inclined to believe the good news than the bad news. Initially they believe and overreact to the good news and gather

information that provides confirmation. In the event of bad news, they seek the opposite information and try to *"play down"* and thus underweight the bad news, but as the bad news is confirmed so grows uncertainty causing the EPSerr to increase in the pessimistic direction.

From the aspect of **methodology,** among previous studies it was not possible to use Capstaff et al.'s (2001) regression analysis because of the very weak correlation between the defined dependent and independent variables, as was also the case in Easterwood and Nutt's (1999) regression analysis. In both studies, the linear relationship between the dependent and independent variable was absent. Having rewritten Capstaff et al's (2001) equation I managed to make a regression analysis in which the correlation is strong between the variables. Overall, I do not consider the use of regression analysis appropriate for studying the EPSerr even where the correlation between variables is significant and strong, as in the equation defined by me and applied by DeBondt and Thaler (1990). The studies of both DeBondt and Thaler (1990) and Easterwood and Nutt (1999) focused on the value of ß but it is erroneous to disregard the value of α, especially in the case of pessimistic forecasts. In many cases, a descriptive analysis of the dependent and independent variables led to information that was easier to interpret than the results of regression analysis.

The research would be worth extending to the whole of Europe, e.g. to include Central and Eastern European and Western European countries in order to compare the regions. Another option is to extend the study to oil companies and examine how rising oil prices as positive news from a revenue-generating aspect impact the EPSerr. Yet another interesting possibility could be to repeat the foregoing studies for 2011 and subsequent years. Just as exciting would be to look into how sell-side and buy-side analysts react to positive news or, knowing analysts' nationality, to see whether EPS analysts enjoy any *"home-ground"* advantage, i.e. whether a local analyst makes forecasts with a smaller EPSerr compared to a foreign analyst.

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ANNEXES

Annex 1. Systemisation of cognitive thinking causes explaining financial overplanning and presentation of the most relevant specialised literature

Lovallo, Viguerie, Uhlaner and Horn (2007) believe that corporate executive's *"hubris in decision-making"* explains the phenomenon of overplanning in part only, which they ascribe to further cognitive factors. Of them I only highlight two[84]; one is *overconfidence* in forecasting sales revenues and expenses, which I do not distinguish from hubris in decision-making while processing the theme but instead present the underlying causative factors and processes. The other factor to be highlighted is *confirmation bias* in information-processing, which leads to the illusion of knowledge. Its consequence is that those bits of information are taken into account or assigned greater weights which confirm the decision-maker's already existing assumptions.

These authors' conclusions differ from the findings of other studies in that they list causes separately and in isolation, without scrutinising correlations between them.
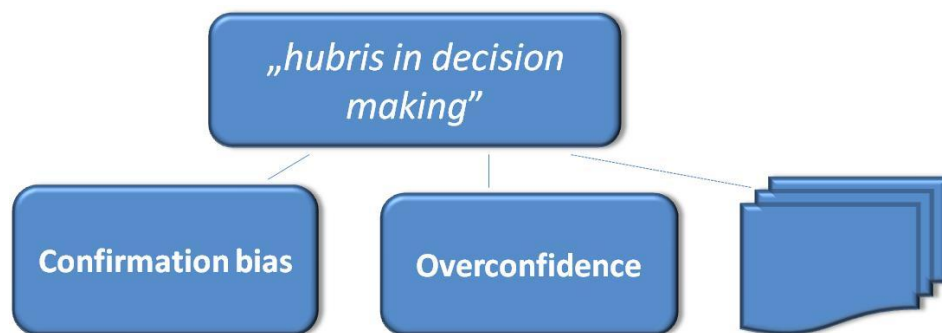

Figure 34. The causes of overplanning according to Lovallo, Viguerie, Uhlaner and Horn (2007)

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[84] The authors list five factors in addition to the above two. They include, explicitly in the case of M&A, the underrating of cultural differences; conflict of interests; and planning fallacy, where they point back to overconfidence. This dissertation examines the phenomenon of overplanning and thus I handle planning fallacy as an effect rather than a cause of overplanning.

Psychologists have revealed that as a consequence of overconfidence people overrate their own knowledge, which psychologists refer to as the *illusion of knowledge*, while underrating risks and thinking that they can influence events, which is known as the *illusion of control* (Nofsinger, 2007). I agree that optimism observed in financial planning can be ascribed to these three main factors. However, I do not think that the relationship is unidirectional; rather, it is reciprocal. In budgeting, the illusion of control and the illusion of knowledge emerge and intensify during the planning process as the forecaster or analyst feels increasingly competent and proficient in that particular sector or industry, which in turn adds to their self-confidence and thus the three factors reinforce each other.
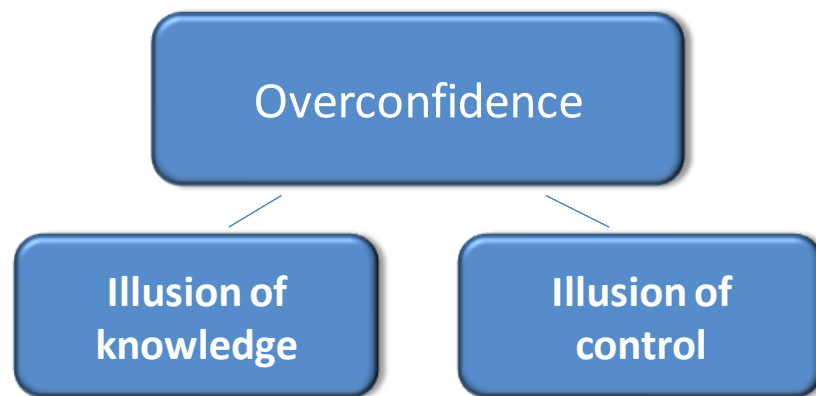

Figure 35. The causes of overplanning based on Nofsinger (2007)

Kahneman and Lovallo (2003) attributed overplanning characteristic of financial planning to corporate executives' overoptimism, which is explained by further two factors. One is *corporate pressure*, which was presented in the section on incentives, and the other is *overconfidence*, which they further broke down into the *illusion of knowledge, the illusion of control* and *the attribution error*. Besides all this they also touched on the effect of *anchoring heuristic*[85] but did not give an explanation of underlying causes or the correlation between phenomena. What I agree with from this systemisation is that the attribution error indeed increases self-confidence, but I can only repeat again that the illusion of knowledge and the illusion of control are not unidirectionally dependent on self-confidence but as the illusion of knowledge grows in the process of planning, so does self-confidence, together with the illusion of control, whose increase will in turn have an effect back on the growth of self-confidence.

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[85] I present these concepts and their role in overplanning typical of financial planning later.
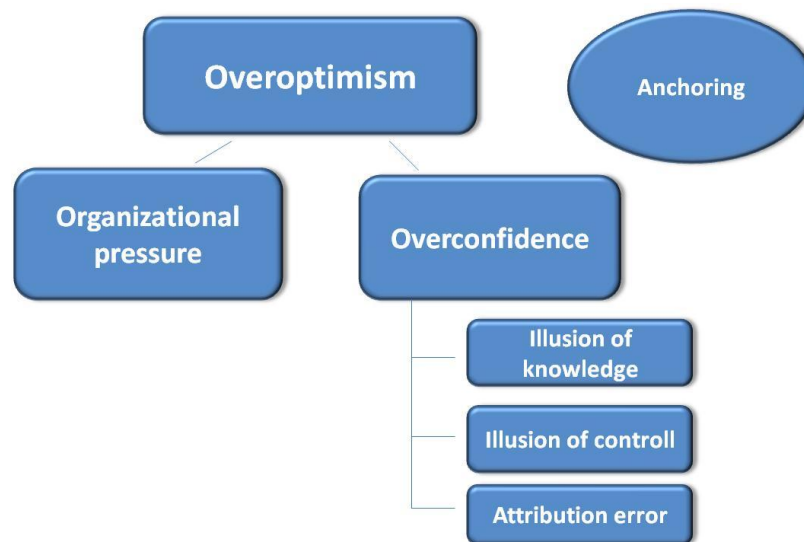
Figure 36. The causes of overplanning according to Kahneman and Lovallo (2003)

In their article, DeBondt and Thaler (1990) identify analysts' unrealistic optimism as the reason for the overoptimism of EPS forecasts with the qualification that it must be taken into account that analysts' goal is to boost trade and sell analyses. It is obvious that positive analyses are easier to sell, which can be a possible explanation of optimism. What contradicts these alternative explanations – as is also quoted by the authors – is that optimism is present even without the above-mentioned incentives, which has been demonstrated by Camerer and Lovallo, (1999) using the method of experimental economics, i.e. case studies on students.

Annex 2. Research on overrating abilities

3.5   Dunning, Meyerowitz and Holzberg's (2002) study

In their study, the authors listed two or four of the following criteria of *talent* as ability: (1) god storyteller and comedian; (2) writing stories, poems and plays; (3) good actor; (4) singing well, etc. When two criteria were listed with an ability, the subject's self-confidence was lower than when four criteria were given but it was the highest when no criteria were listed. When it comes to assessing negative abilities the situation is not so simple. When criteria were listed with negative criteria then as their number grew the subjects found the given ability increasingly characteristic of themselves. By contrast, when no criteria were given they found that particular ability the least characteristic, which again indicates higher self-confidence. Further, the subjects were asked to define the criteria of the given ability, against which they assessed themselves. It was found that they rated themselves higher against their own criteria than against criteria which had been set by others.

3.6   2.2   Camerer and Lovallo's (1999) study

In the study N players, say 100, chose simultaneously whether to enter a market or not. They were not able to communicate with each other. Before the decision the players knew that the market capacity is c, say 20 persons. Those who stayed out, earned a payment K, say HUF 1,000. If E number of players, in this case 10 or 30 persons, entered the market, then the amount earned by the entrants would be K+ rK(c-E), with rK >0. With the given value they received HUF 1,000 + r*HUF 1,000 (20-30), or HUF 1000 - r * HUF 10,000, i.e. less than if they would not have entered the market, while if 10 players entered, they would earn HUF 1,000 + r*HUF10,000. Thus the players had to make a decision based on their judgement of how many of N players would enter the market with capacity c and risk the loss of a secure payment of K.

Rationally one enters the market if they expect that fewer persons than c will enter since then rK (c-E) will assume a positive value, i.e. their earnings will grow by entering the market. The subject of the study was to see whether E (number of entrants)

would be around c (market capacity), and how E would change with the change of c. It was very interesting that E was around {c+2, c-2}, which had already been confirmed by earlier studies.

The next of the study was for the players to test their skills, e.g. solving a puzzle, knowledge of sports, whereby a ranking was made among the players. A c number of persons corresponding to the market capacity had a share of the money while the others lost it. The results of the study demonstrated that the subjects overrated their own abilities within the community.

Annex 3. Experiments proving the anchoring heuristic

In Tversky and Kahneman's (1974) milestone article an arbitrary value irrelevant to the question significantly influenced the answer to the question. Such an anchor was for example the last four digits of one's social security number or a number generated by the lucky wheel. Let us see some outstanding study results.

The **best-known example** of evidence for anchoring is when the study subjects are requested to

1. Write down last four digits of their social security number.
2. Then they have to estimate whether the number of physicists in Manhattan is more or less than that number.
3. Finally, what is the number of physicists in Manhattan.

The authors found positive correlation between the last four digits of the social security number and the estimated number of physicist in Manhattan (Kahneman and Lovallo, 2003).

A popular and often used and proven method of demonstrating insufficient adjustment is the following couple of questions:

"1. Do you think more or less than 2,000,000 people live in Budapest?

 2. How many people live in Budapest?"

A significant relationship has been demonstrated between the number used as anchor and the estimated number.

Another example: Please give an estimate of the result of the following operation in 5 seconds. The two multiplications were flashed separately in two separate groups:

1*2*3*4*5*6*7*8	the average was 512, while
8*7*6*5*4*3*2*1	the average was 2,250.

The correct result is: 40,320.

A typical example of insufficient adjustment known from **marketing** is when selling a car the salesman goes from the more expensive cars towards the cheaper cars as this way the customer is anchored to the higher price and will finally buy a more expensive car than if they had been shown the cheapest car first. This has been demonstrated by the following situational game:

We tell the seller that they would like to sell an old car for at least HUF 200,000, while we tell the buyer that they want to buy a special old car for which they would intend to pay up to HUF 1,000,000. The seller and the buyer can agree in a range of HUF 800,000. Which value the final price will be closer depends on who says the price first.

Annex 4. Proving the misconstrual of conjunctive and disjunctive events

The misconstrual of conjunctive and disjunctive events has been proven by Kahneman and Tversky (1974) in the following study:

Three different events were distinguished. A choice had to be made as to when it was the most probable that the subject would draw a red ball from an urn containing 100 coloured balls:

- Simple event: half of 100 balls are red, half are white. In this case, there is a 50% chance of selecting a red ball.

- A conjunctive event is where a series of events has to happen. In the experiment, the probability of always drawing a red ball from an urn containing 90 red and 10 white balls seven consecutive times with the ball placed back each time is $0.9^7 = 47.8\%$

- A disjunctive event is when a red ball is selected at least once out of seven draws from an urn containing 10 red and 90 white balls with the ball placed back after each draw; in this case, the probability is 52%.

Of the simple (probability: 50%) and conjunctive (probability: 47.8%) events, the participants bet on the conjunctive one. By contrast, of the simple (probability: 50%) and the disjunctive (probability: 52%) events they bet on the simple one, i.e. they chose the less likely event in both cases. In summary, they overrated the probability of conjunctive events and underrated the probability of disjunctive events.

Annex 5. Database

Data were provided by FactSet[86] (financial database):

1. target company of forecasting
2. forecasted year
3. analyst company
4. forecast date
5. EPS estimate and
6. earlier EPS forecasts related to the given period.

Compensated factual EPS data have been taken from the Bloomberg[87] database. In the case of missing values, I took over undiluted factual EPS data from annual reports. The number of forecasts subject to study (hereinafter: N) was 2,793, of which 1,045 were made for Hungarian and 1,748 for Austrian companies. Three industries were examined including telecommunications (N=752); oil industry (N=943); and the banking sector (N=1,098). The database is exhaustive (not sample-based).

Company/Industry	2003	2004	2005	2006	2007	2008	2009	2010	Sum.
Matav	32	43	41	34	34	35	37	30	286
TKA	34	51	53	45	62	67	81	73	466
Telekom.	66	94	94	79	96	102	118	103	752
MOL	34	43	51	58	50	43	55	53	387
OMV	53	61	67	68	59	70	93	85	556
Oil	87	104	118	126	109	113	148	138	943
OTP	29	46	46	46	36	51	59	59	372
RBI			13	31	42	55	45	52	238
EBS	35	54	57	60	60	72	76	74	488
Bank	64	100	116	137	138	178	180	185	1098
Sum.	217	298	328	342	343	393	446	426	2793
Hungarian company									1045
Austrian company									1748

25.   Table Number of database items broken down by company and year

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[86] FactSet was established in 1978; its main activities are the collection and analysis of financial data.

[87] Bloomberg is a leading business and financial information news website.

I studied the forecasts of 54 analyst companies in my research.

Ord.	Analyst company	N	Mean	Ord.	Analyst company	N	Mean
1	ismeretlen	560	0,21%	28	Mainfirst bank AG	12	21,20%
2	Deutsche Bank Research	193	-3,17%	29	United Financial Group	10	7,74%
3	Erste Bank	164	-0,28%	30	OTP bank	9	16,23%
4	KBC Sec	164	2,08%	31	Commerzbank	8	-9,41%
5	Raiffeisen Centrobank	161	-1,75%	32	Keefe Bruyette & Woods	8	-1,35%
6	Concorde Sec	121	-4,55%	33	Berenberg bank	7	-12,57%
7	Wood & Company	119	7,15%	34	Collins Stewart	5	18,04%
8	CA IB	107	-6,78%	35	IIR Group	5	2,40%
9	ING Wholesale Banking	100	3,04%	36	Evolution sec	4	29,97%
10	Credit Suisse	91	5,92%	37	Global Eq. (Fr)	4	-14,76%
11	Buda Cash	77	-4,79%	38	Jefferies	4	47,90%
12	CA Cheuvreux	73	2,22%	39	alfa bank	3	-6,62%
13	Natixis	71	-3,57%	40	FBR Capital Markets & Co	3	16,94%
14	Lehman Bros	70	-5,87%	41	Peel Hunt	3	21,51%
15	Unicredit Markets & Inv. Bank	63	7,95%	42	Bordier & Cie	2	2,30%
16	Sal. Oppenheim	56	2,97%	43	Helvea SA	2	-20,24%
17	Societe Generale	55	-0,92%	44	MF Global Sec	2	-0,95%
18	Nomura Eq. Research	50	6,11%	45	Oppenheimer	2	21,74%
19	Kepler Cap. Markt	45	-6,31%	46	Standars & Poors	2	35,12%
20	WestLB Equity Markets	41	0,87%	47	BGC Partners	1	-24,99%
21	Bank Austria	40	-14,26%	48	BRE Bank Sec	1	-14,17%
22	Cashline Sec	32	-9,86%	49	Davy Stockbroker	1	-3,93%
23	landesbank Baden-Württemberg	30	-0,26%	50	Fox Pitt Kelton Sochran C.W.	1	9,64%
24	bear stearns	28	1,59%	51	HSH Nordbank	1	-50,39%
25	Daiwa Sec Cap MKTs	27	-1,98%	52	Inteligo SAB	1	57,28%
26	Atlantik Sec	13	18,77%	53	Renaissance Cap	1	66,57%
27	BNP Paribas	13	7,90%	54	Suprema Sec	1	57,00%

26.   Table List analyst firms providing data

I defined the following independent variables in the database:

From the aspect of companies under review:

1. *Target companies* N=7

2. *Industry*: telecommunications, oil industry or banking industry

3. *Nationality of parent companies:* Hungarian, Austrian

From the aspect of the date of forecast:

4. *Target year,* for which the EPS forecast is made

5. *Year of planning*

6. *Month of planning*

7. *Differential month of planning.* In this case, I designated with Month 0 those forecasts which were made in Year t-1 (e.g. in 2007 for 2008), i.e. in the year preceding the target year. Here I examined forecasts made no more than 4 months before and excluded the rest from the analysis. I marked forecasts made after closing the year with Month 13 as those

were prepared in Year t+1 (in 2009 for 2008) before actual values were made public!

8. *Quarter of planning.* Similarly as above, I marked forecasts made in Year t-1 as Q0; in Months 1-3 of Year t as Q1; in Months 4-6 of Year t as Q2; in Months 7-9 of Year t as Q3; in Months 10-12 of Year t as Q4; and in Year t+1 as Q5.

From the aspect of analyst companies:

9. Analyst companies N=54.

10. Analyst companies' countries of origin N=21.

11. Nationality of analysts: Hungarian, Austrian or other

12. Europan, American or Japanese analyst companies.

From the aspect of EPS:

13. EPS forecasts

14. Earlier EPS forecasts for the same period based on data provided by FactSet

15. Actual EPS for the target year and the preceding 2 years, i.e. Years t-1 and t-2

I produced further variables necessary for the study by using the above data, analysing descriptive data and after calculating average and median values.

Annex 6. Raiffeisen and Erste Banks' actual EPS, 2003-2007

The two diagrams below show that the banking sector was characterised by outstanding EPS growth, similarly to OTP Bank, in the period 2003-2007, as also shown by the case of Raiffeisen Bank Int. and Erste Group Bank.
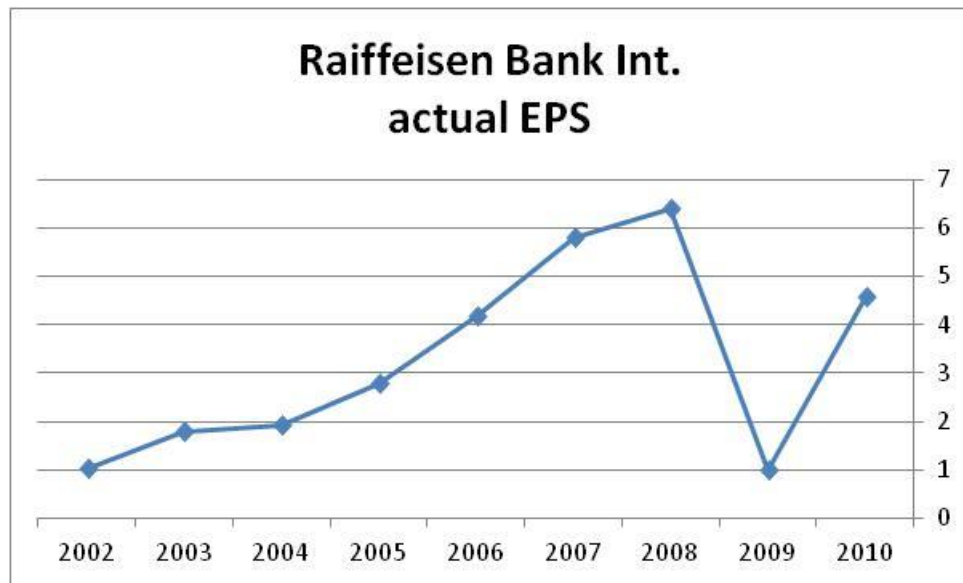

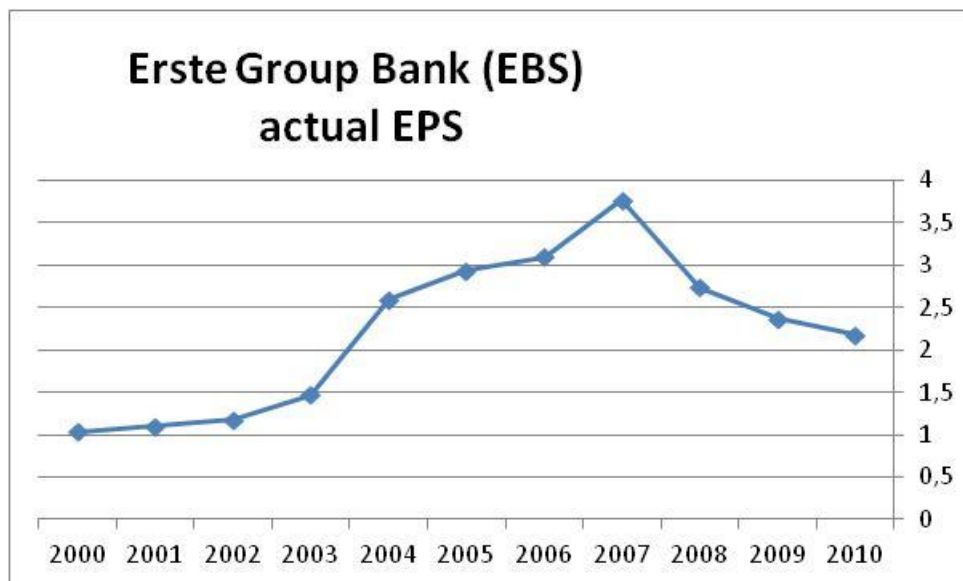**Figure 37. Raiffeisen Bank Int.'s actual EPS, 2002-2010**

Figure 38. Erste Group Bank's actual EPS, 2000-2010
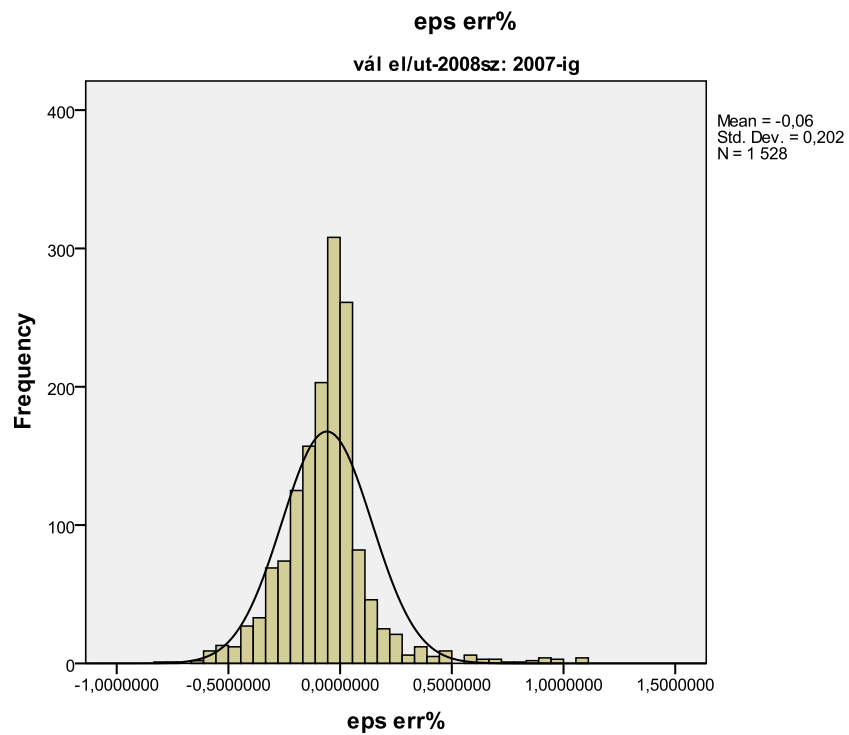
Annex 7. EPSerr histogram

eps err%

vál el/ut-2008sz: 2007-ig

Mean = -0,06
Std. Dev. = 0,202
N = 1 528

Figure 39. Histogram: EPSerr, 2003-2007

eps err%

vál el/ut-2008sz: 2008 szept után

Mean = 0,05
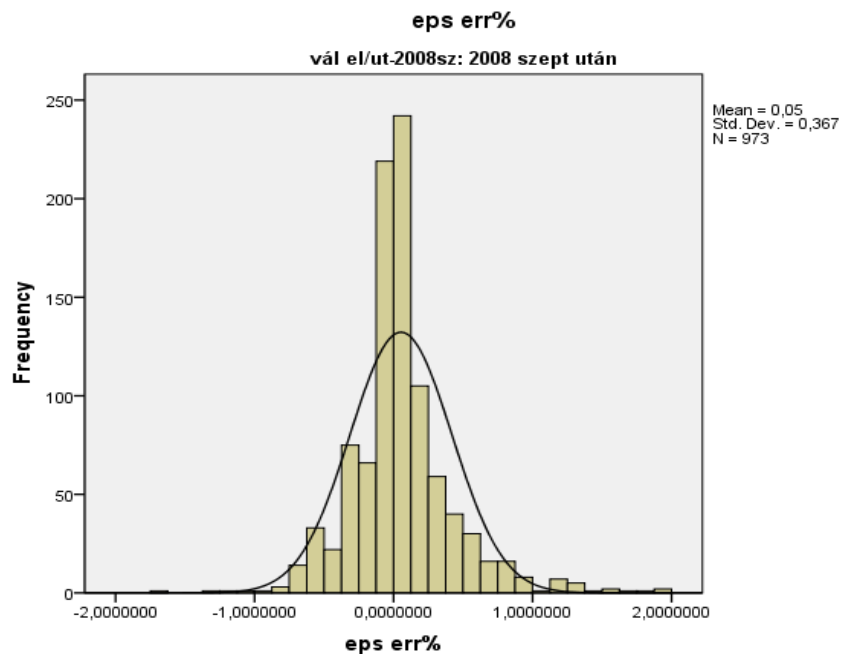Std. Dev. = 0,367
N = 973

Figure 40. Histogram: EPSerr, 17.09.2008-2010

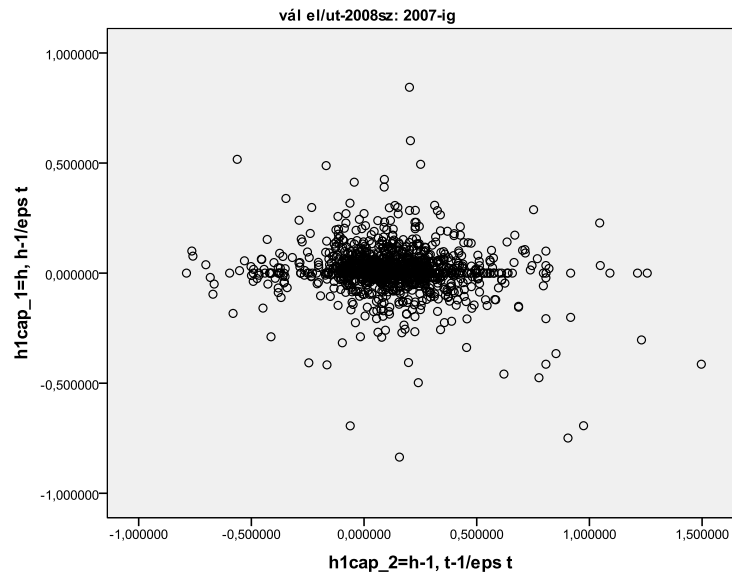# Annex 8. Capstaff et al.'s dependent and independent variables

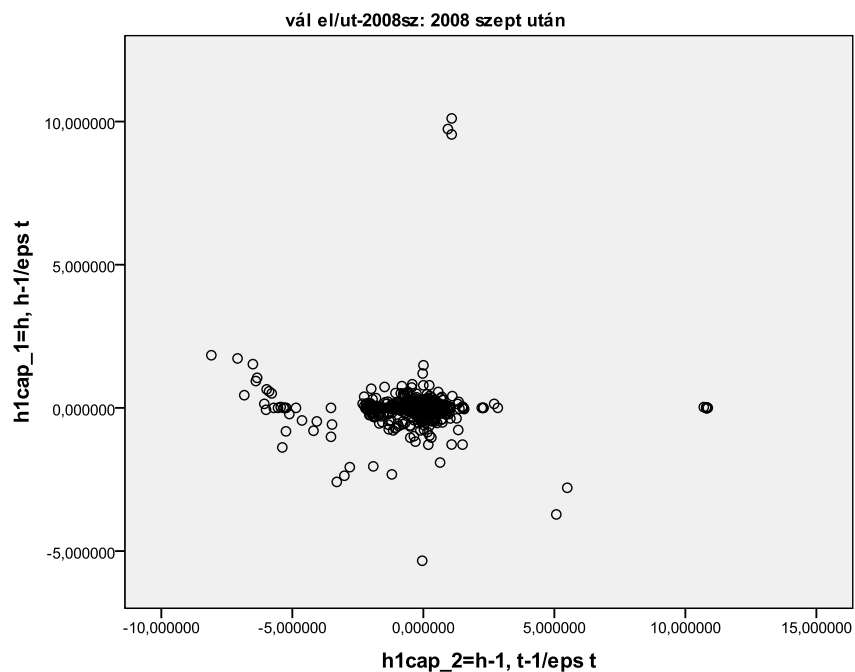**Figure 41. Dot diagram: Capstaff et al.'s (2001) dependent and independent variables, 2003-2007**

Figure 42. Dot diagram: Capstaff et al.'s (2001) dependent and independent variables, 17.09.2008-2010

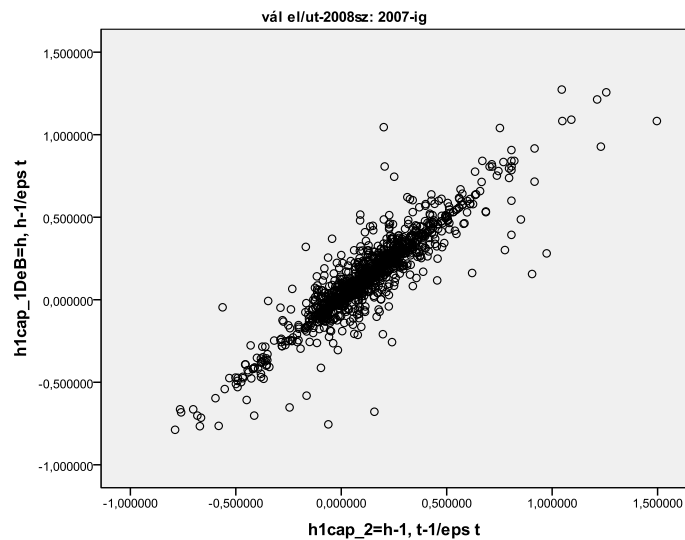# Annex 9. Author's dependent and independent variables

Figure 43. Dot diagram: Author's dependent and independent variables, 2003-2007
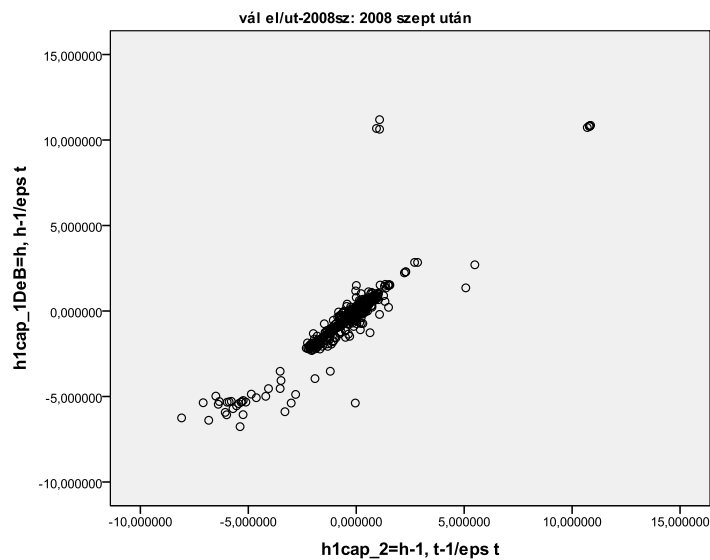

Figure 44. Dot diagram: Author's dependent and independent variables, 17.09.2008-2010

Annex 10. Effect of uncertainty (time horizon) on EPSerr

*Hypothesis: Uncertainty increases the systematic optimism of the EPSerr; therefore as the **time horizon** grows so does the systematic optimism of planning fallacy.*

3.7   10.1 Analysis of quarters

The diagram below reveals how the EPSerr decreases in absolute terms with the shortening of the time horizon, in accordance with the hypothesis. In line with earlier research findings, it dropped from 16.76% to 2.8% in the period 17.09.2008-2010. The outstanding 4.85% in Q4 is explained by forecasts made in 2010. In the five-year period before the crisis it decreased from -8.9% to -2.37%.
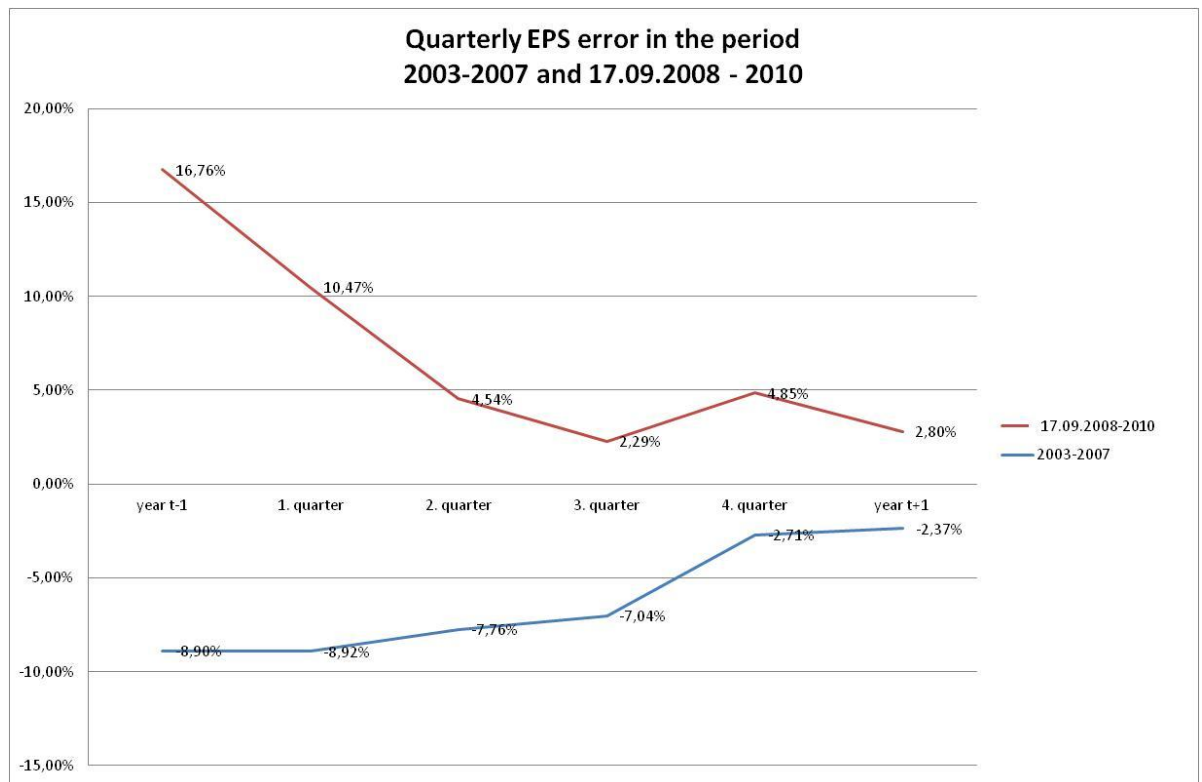

Figure 45. Quarterly EPSerr change, 2003-2007 and 09.2008.-2010

EPS forecasting error in the period 2003-2007		0	1	2	3	4	5
		year t-1	1. quarter	2. quarter	3. quarter	4. quarter	year t+1
N	Valid	61	326	296	258	302	285
	Missing	0	0	0	0	0	0
Mean		-8,90%	-8,92%	-7,76%	-7,04%	-2,71%	-2,37%
Median		-6,52%	-8,76%	-8,14%	-6,40%	-2,75%	-0,89%
Mode		-11,73%	-14,87%	-0,21%	-19,97%	0,00%	0,00%
Std. Deviation		15,19%	25,04%	20,91%	18,69%	19,09%	15,16%
Skewness		-,500	1,055	,966	,674	2,396	3,258
Std. Error of Skewness		,306	,135	,142	,152	,140	,144
Kurtosis		,664	3,674	3,549	3,021	12,645	22,089
Std. Error of Kurtosis		,604	,269	,282	,302	,280	,288
Range		82,31%	170,36%	170,03%	145,97%	166,35%	141,25%
Minimum		-57,52%	-63,65%	-79,56%	-74,51%	-55,64%	-42,45%
Maximum		24,79%	106,71%	90,47%	71,46%	110,71%	98,80%

EPS forecasting error in the period 17.09.2008-2010		0	1	2	3	4	5
		year t-1	1. quarter	2. quarter	3. quarter	4. quarter	year t+1
N	Valid	32	171	142	159	244	225
	Missing	0	0	0	0	0	0
Mean		16,76%	10,47%	4,54%	2,29%	4,85%	2,80%
Median		14,94%	7,27%	2,80%	2,09%	2,59%	-0,02%
Mode		-66,45%	-61,75%	-53,95%	-54,61%	2,14%	0,00%
Std. Deviation		47,11%	50,03%	39,58%	26,89%	31,65%	31,55%
Skewness		,748	,893	-,006	,665	-,001	2,014
Std. Error of Skewness		,414	,186	,203	,192	,156	,162
Kurtosis		2,109	1,927	2,187	1,974	4,994	7,113
Std. Error of Kurtosis		,809	,369	,404	,383	,310	,323
Range		231,70%	303,46%	280,97%	168,81%	284,88%	231,73%
Minimum		-66,45%	-110,53%	-130,89%	-55,75%	-163,64%	-76,71%
Maximum		165,25%	192,93%	150,08%	113,06%	121,24%	155,02%

27. Table Quarterly EPSerr change; descriptive statistics

3.8   10.2 ANOVA test of quarters between 2003 and 2007

The normality test confirmed that the EPSerr differed from normal standard deviation in every quarter in the period 2003-2007.

Tests of Normality

EPS error 2003-2007		Kolmogorov-Smirnova			Shapiro-Wilk		
Quarter		Statistic	df	Sig.	Statistic	df	Sig.
0	year t-1	,078	61	,200	,981	61	,446
1	1. quarter	,104	326	,000	,931	326	,000
2	2. quarter	,105	296	,000	,935	296	,000
3	3. quarter	,096	258	,000	,948	258	,000
4	4. quarter	,186	302	,000	,774	302	,000
5	year t+1	,243	285	,000	,639	285	,000

28.   Table Quarterly EPSerr, 2003-2007; normality test

By the Levene test it has been confirmed that standard deviations of EPSerr significantly differ from each other. Based on descriptive statistics (see above), we can see that standard deviations of EPSerr indeed show a declining tendency as they near the actual period.

Test of Homogeneity of Variances quarterly EPS error 2003-2007

Levene Statistic	df1	df2	Sig.
16,795	5	1522	,000

29.   Table Quarterly EPSerr, 2003-2007; Levene test

This chart shows well that as the EPS actual date approaches so does the standard deviation of EPSerr decreases, which is indicative of the reduction in uncertainty, while the EPSerr also declines in absolute terms.
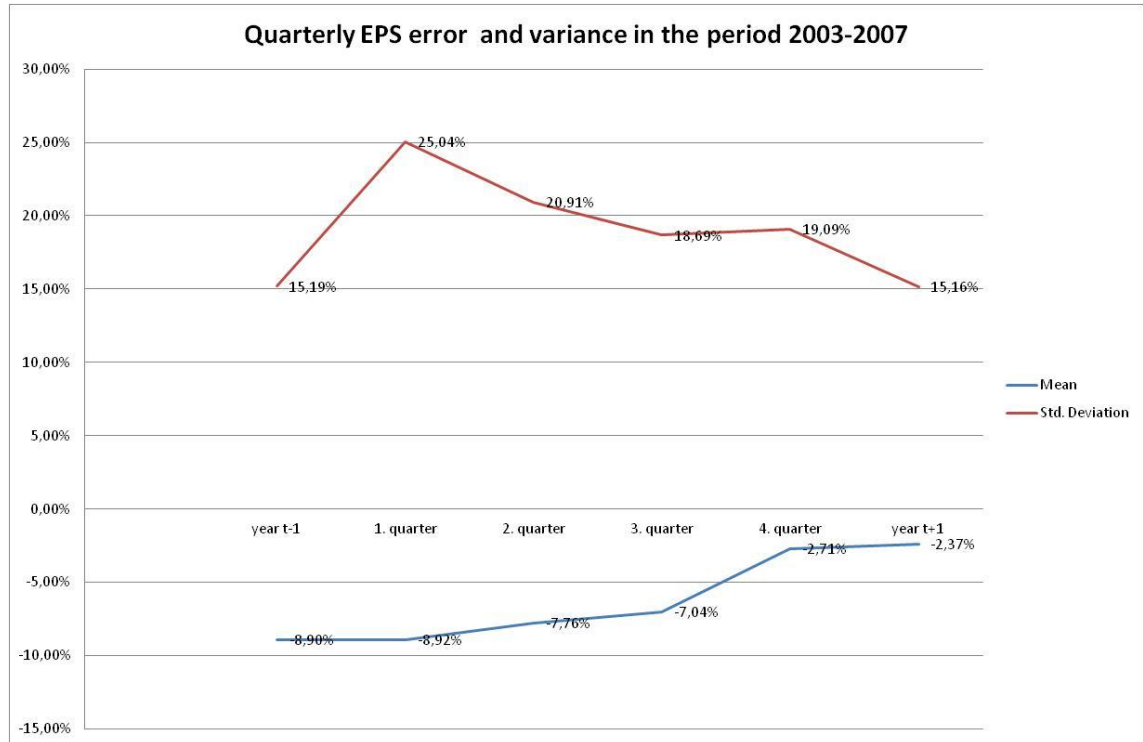

Figure 46. Average and standard deviation of EPSerr, 2003-2007

The ANOVA test confirms that the averages of EPSerr significantly differ on a quarterly basis; the strength of the correlation is eta^2=0,018.

Anova table

ANOVA - quarterly EPS error 2003-2007	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1,150	5	,230	5,729	,000
Within Groups	61,126	1522	,040		
Total	62,276	1527			

Measures of Association

Eta Squared	,018

30.   Table Quarterly EPSerr, 2003-2007; ANOVA

3.9   ANOVA test of quarters between 17.09.2008 and 2010

EPSerr values did not have normal distribution in the post-crisis period either, which supports the values of descriptive statistics.

Tests of Normality

EPS error 17.09.2008-2010		Kolmogorov-Smirnova			Shapiro-Wilk		
	Quarter	Statistic	df	Sig.	Statistic	df	Sig.
0	year t-1	,105	32	,200	,944	32	,095
1	1. quarter	,085	171	,005	,951	171	,000
2	2. quarter	,097	142	,002	,965	142	,001
3	3. quarter	,114	159	,000	,956	159	,000
4	4. quarter	,119	244	,000	,910	244	,000
5	year t+1	,224	225	,000	,780	225	,000

31.   Table Quarterly EPSerr, 09.2008-2010; normality test

Quarterly standard deviations of EPSerr also significantly differ based on the Levene test.

Test of Homogeneity of Variances quarterly EPS error 17.09.2008-2010

Levene Statistic	df1	df2	Sig.
14,357	5	967	,000

32.   Table Quarterly EPSerr, 09.2008-2010; Levene test

Again, similarly to the previous period, it can be clearly seen here that as the publication date of actual figures approaches both the standard deviation and the value of the EPSerr decreases, too. The only difference is that forecasts here are optimistic while in the period 2003-2007 they were pessimistic.
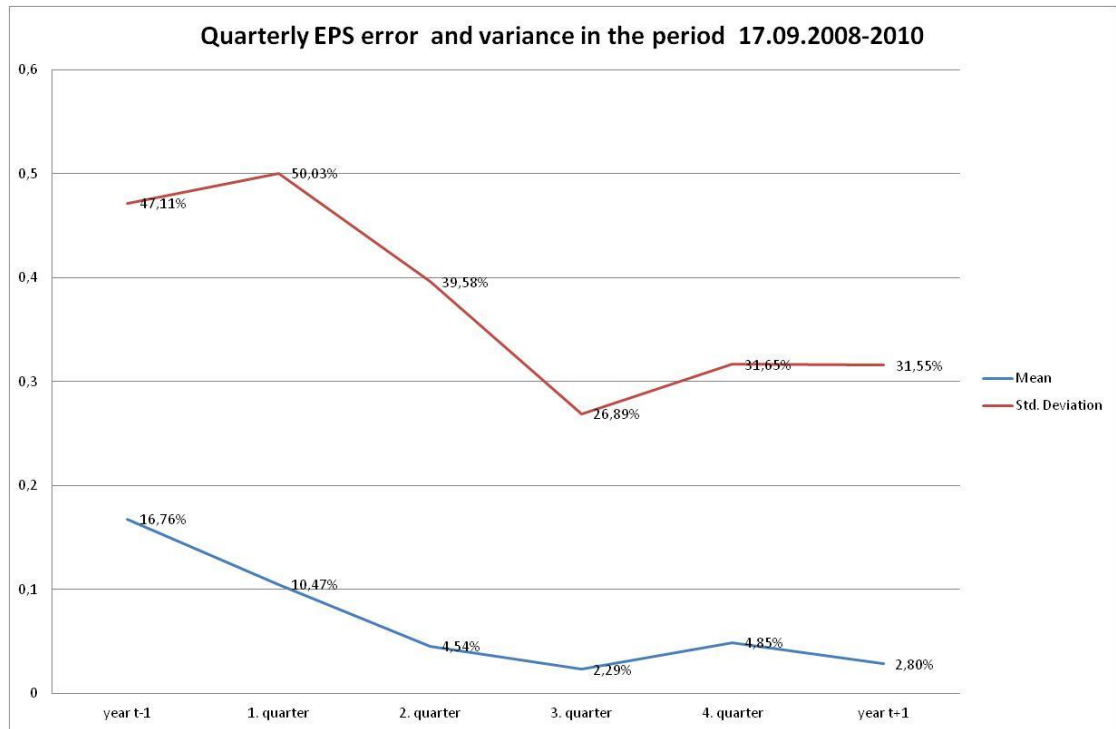

Figure 47. Averages and standard deviation of EPSerr, 09.2008-2010

However, the ANOVA test reveals low significance and a very weak correlation. The reason may be the proximity of Q2 and Q4 values and of Q3 and Q5 values.

ANOVA table

ANOVA - quarterly EPS error 17.09.2008-2010	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1,175	5	,235	1,754	,120
Within Groups	129,581	967	,134		
Total	130,756	972			

Measures of Association

Eta Squared	,009

33.   Table Quarterly EPSerr, 09.2008-2010; ANOVA

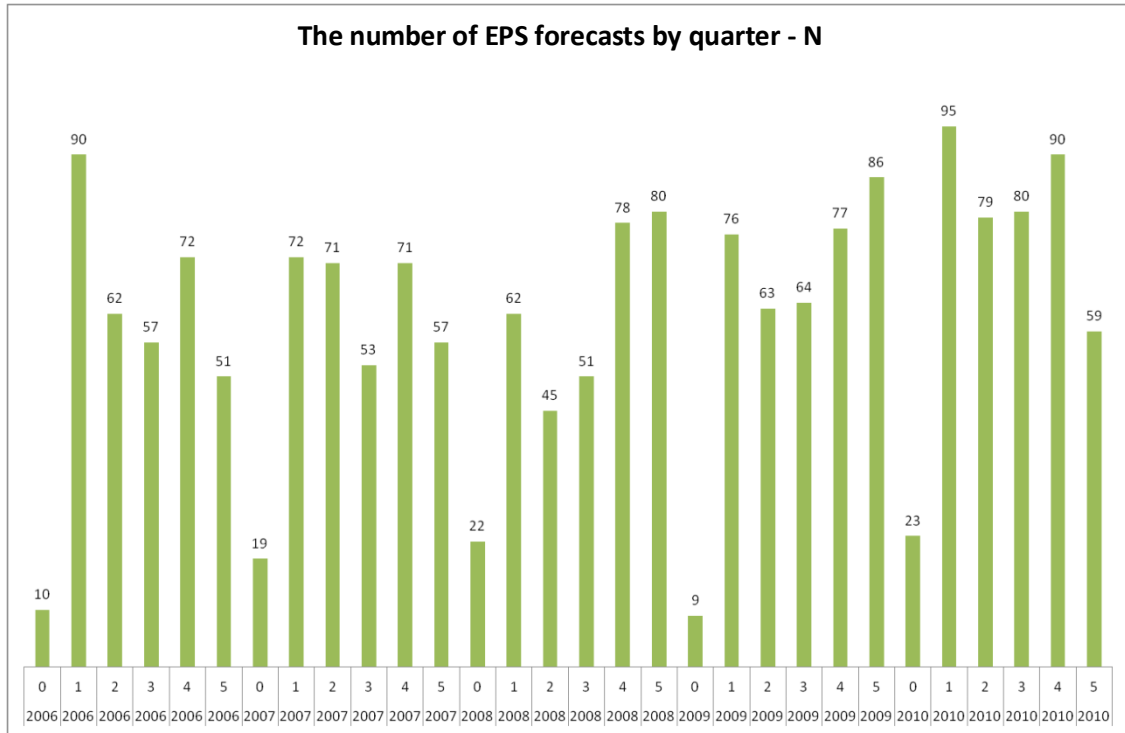# Annex 11. Number of quarterly EPS forecasts (N), 2006-2010

Figure 48. Number of EPS forecasts by quarter, 2006-2010

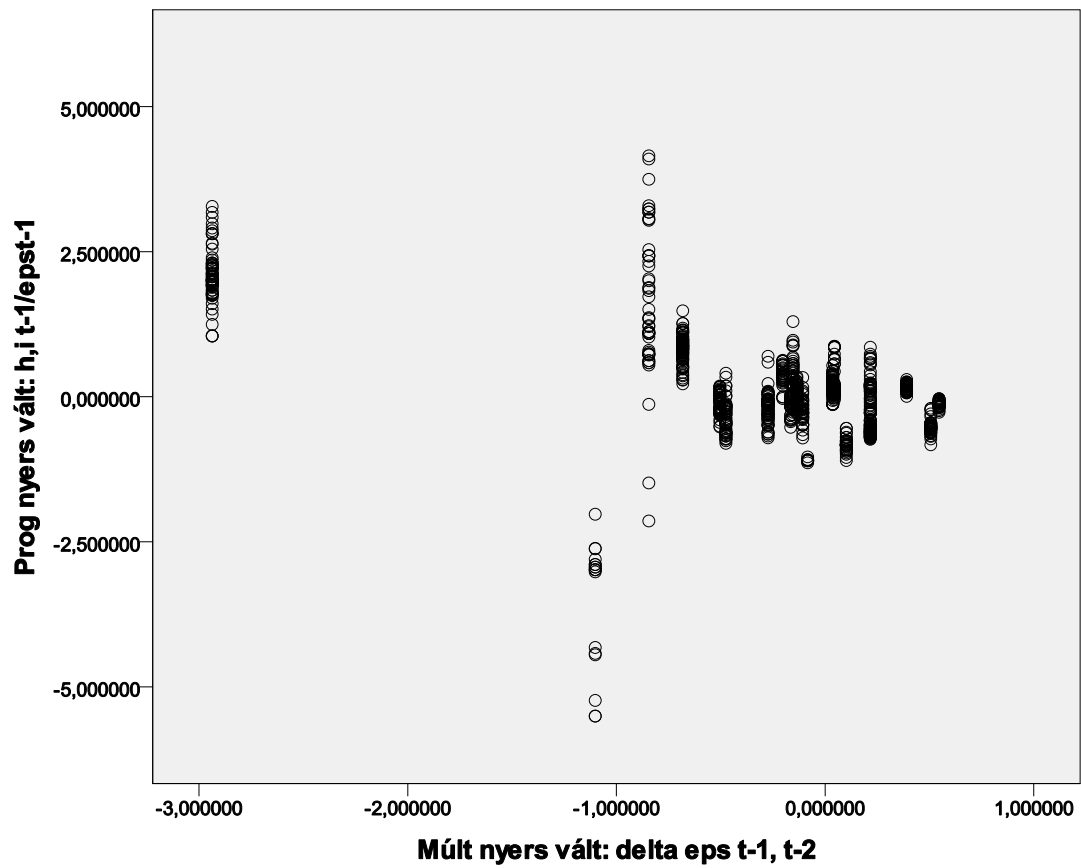# Annex 12. Easterwood and Nutt (1999), ACt-1 and FCt dot diagram

Figure 49. Easterwood and Nutt's (1999) dependent and independent variables