"I'M BUYING U.S. SHARES"

DOES THE BROAD FEAR OF THE FINANCIAL CRISIS 2007 - 2009 LEAD TO UNDERVALUATION OF COMPANIES WHICH HAVE NOT EXPERIENCED INFLUENCES FROM THE FINANCIAL CRISIS?

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Umeå, the 27th of May 2009
Abstract
The starting point of this Master Thesis have been utterances of well known investors during the financial crisis which recommend to buy shares especially in the time of financial downturn because one could buy good performing companies at a low price. This arouse the question if broad fear of market participants during the financial crisis of 2007 to 2009 leads to undervaluation of companies which have not experienced influences of the financial crisis.

The researchers found that this question must be answered positively.

The authors come to this result after they, in a first step, detected unaffected companies by observing the key financial indicators (earnings, book value and operating cash flow) of the 600 constituents companies of the S&P 600 Small Cap Index during the time period from 2004 to 2008 (before and during the financial crisis).

In a second step the writers selected one company out of all unaffected companies and carried out a valuation to find the fundamental (or intrinsic value) of this company. By comparing the fundamental value of the company with its share price they found that this company was undervalued.

In a third and last step the researchers discovered the indication that this undervaluation results from investors' fear, as they could show that a confidence indicator that measures the confidence of institutional investors correlates with the value of the S&P 600 Small Cap Index but not with the financial indicators (in this case EBIT and Book Value) of the constituents companies of the S&P 600 Small Cap Index.

Thus, the main research question if the broad fear of market participants leads to undervaluation of companies which have not experienced influences of the financial crisis of 2007 – 2009 must be answered positively, as mentioned before.

Moreover, the hypothesis: Markets can be inefficient in the times of the financial crisis 2007 to 2009, which the researchers established must be seen as true.
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<td>Abnormal Earnings Growth</td>
</tr>
<tr>
<td>B</td>
<td>Book Value</td>
</tr>
<tr>
<td>(beta)</td>
<td>Beta estimation of the company</td>
</tr>
<tr>
<td>C_E</td>
<td>Cost of Equity</td>
</tr>
<tr>
<td>CV</td>
<td>Continuous Value</td>
</tr>
<tr>
<td>D</td>
<td>Dividend in a certain year</td>
</tr>
<tr>
<td>d</td>
<td>Dividends</td>
</tr>
<tr>
<td>E (r_m)</td>
<td>Expected return on the market Portfolio</td>
</tr>
<tr>
<td>Earn</td>
<td>Earnings</td>
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<tr>
<td>EVA</td>
<td>Economic Value Added</td>
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<tr>
<td>g</td>
<td>Residual earnings growth rate</td>
</tr>
<tr>
<td>K</td>
<td>Capital stock of the company at the beginning of year</td>
</tr>
<tr>
<td>k_s</td>
<td>Cost of equity</td>
</tr>
<tr>
<td>MV</td>
<td>Market Value</td>
</tr>
<tr>
<td>n</td>
<td>Number of years in the explicit period</td>
</tr>
<tr>
<td>p_E</td>
<td>Required rate of return on equity (where 5% = 1 + 0.05)</td>
</tr>
<tr>
<td>r_f</td>
<td>Risk-free rate</td>
</tr>
<tr>
<td>RE</td>
<td>Residual Earnings</td>
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<tr>
<td>ROCE</td>
<td>Return On Common Equity</td>
</tr>
<tr>
<td>ROIC</td>
<td>Return for Invested Capital</td>
</tr>
<tr>
<td>T</td>
<td>Time after the forecast horizon</td>
</tr>
<tr>
<td>TV</td>
<td>Terminal Value</td>
</tr>
<tr>
<td>V_E</td>
<td>Value of Equity</td>
</tr>
<tr>
<td>V_RE</td>
<td>Value of Residual Earnings</td>
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<tr>
<td>WACC</td>
<td>Weighted Average Cost of Capital</td>
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<th>Abbreviation</th>
<th>Description</th>
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<tr>
<td>ABCP</td>
<td>Asset Backed Commercial Papers</td>
</tr>
<tr>
<td>ABS</td>
<td>Asset Backed Securities</td>
</tr>
<tr>
<td>AEG</td>
<td>Abnormal Earnings Growth Model</td>
</tr>
<tr>
<td>AIT</td>
<td>Applied Industrial Technology Inc.</td>
</tr>
<tr>
<td>BPS</td>
<td>Book value Per Share</td>
</tr>
<tr>
<td>CAPM</td>
<td>Capital Asset Pricing Model</td>
</tr>
<tr>
<td>CASY</td>
<td>Casey's General Stores Inc.</td>
</tr>
<tr>
<td>CDO</td>
<td>Collateralized Dept Obligations</td>
</tr>
<tr>
<td>CDS</td>
<td>Credit Default Swaps</td>
</tr>
<tr>
<td>CI</td>
<td>State Street Confidence Index</td>
</tr>
<tr>
<td>CP</td>
<td>Commercial Paper</td>
</tr>
<tr>
<td>CW</td>
<td>Curtiss-Wright Corp.</td>
</tr>
<tr>
<td>DCF</td>
<td>Discounted Cash Flow Model</td>
</tr>
<tr>
<td>DDM</td>
<td>Dividend Discount Model</td>
</tr>
<tr>
<td>DPS</td>
<td>Dividends Per Share</td>
</tr>
<tr>
<td>EBIT</td>
<td>Earnings Before Interest and Tax</td>
</tr>
<tr>
<td>EMH</td>
<td>Efficient Market Hypothesis</td>
</tr>
<tr>
<td>EPS</td>
<td>Earnings Per Share</td>
</tr>
<tr>
<td>EVA</td>
<td>Economic Value Added</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>HAIN</td>
<td>Hain Celestial Group</td>
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<tr>
<td>IFRS</td>
<td>International Financial Reporting Standards</td>
</tr>
<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
</tr>
<tr>
<td>JJSF</td>
<td>J &amp; J Snack Foods</td>
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<tr>
<td>LNCE</td>
<td>Lance, Inc.</td>
</tr>
<tr>
<td>MVA</td>
<td>Market Value Added</td>
</tr>
<tr>
<td>NYSE</td>
<td>New York Stock Exchange</td>
</tr>
<tr>
<td>P/B</td>
<td>Price to Book Ratio</td>
</tr>
<tr>
<td>P/E</td>
<td>Price to Earnings Ratio</td>
</tr>
<tr>
<td>PEET</td>
<td>Peet's Coffee</td>
</tr>
<tr>
<td>PFCB</td>
<td>P. F. Change's China</td>
</tr>
<tr>
<td>PhD</td>
<td>A Doctor of Philosophy degree</td>
</tr>
<tr>
<td>PPD</td>
<td>Pre-Paid Legal Services</td>
</tr>
<tr>
<td>P/S</td>
<td>Price to Sales Ratio</td>
</tr>
<tr>
<td>RE</td>
<td>Residual Earnings</td>
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<tr>
<td>repo</td>
<td>Repurchase Agreement</td>
</tr>
<tr>
<td>ROCE</td>
<td>Return On Common Equity</td>
</tr>
<tr>
<td>ROIC</td>
<td>Return On Capital Invested</td>
</tr>
<tr>
<td>RRGB</td>
<td>Red Rubin Gourmet</td>
</tr>
<tr>
<td>SAM</td>
<td>Boston Beer Company</td>
</tr>
<tr>
<td>SEC</td>
<td>Security and Exchange Commission</td>
</tr>
<tr>
<td>SIV</td>
<td>Structured Investment Vehicles</td>
</tr>
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<td>SSYS</td>
<td>Stratasys Inc.</td>
</tr>
<tr>
<td>USD</td>
<td>US Dollar</td>
</tr>
<tr>
<td>US-GAAP</td>
<td>United States Generally Accepted Accounting Principles</td>
</tr>
<tr>
<td>WACC</td>
<td>Weighted Average Cost of Capital</td>
</tr>
<tr>
<td>WDFC</td>
<td>WD-40 Company</td>
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1 Introduction

In the first paragraph of this study the authors will describe from which background their research project arrived. After the formulation of the main research question they will explain the purpose of their study and what goals they want to achieve with it. In a next step they will also establish three more research questions which will guide the whole work to the final conclusions. Moreover the authors will discuss basic methodological assumptions they make and will present the research strategy as well as the research design they choose for their work.

1.1 Background

The emergence of financial crisis (2007-2009) was caused by many factors. However, the spark, which has an impact on wide spreading it, was the depreciation on the American housing market in the first quarter of 2006. The market naively expected that the prices of property could increase indefinite and it did not create any system security (regulations), which could protect the economy from wide spreading the default from real estate market to others industry.¹ The first victims of the wave of collapsing property industry were sub prime lenders, whose market role relied on lending money to borrowers, who did not meet the requirements of mainstream lenders. Such borrowers had to pay higher interest rates, because the risk of insolvency was significantly higher and their financial situation could change rapidly to the worst in the time of their financial problems.² Moreover most of sub prime loans were not given to finance the purchase of a house, but they were sold to the customers, who wanted to refinance their existing loans.³

The process of gradual bankruptcy of such risk lenders caused decline of the value of sub prime asset-based securities, which were possessed by hedge funds of big investment banks such as Bear Stearns, Merrill Lynch or BNP Paribas.⁴ The worst the situation of the sub prime-lenders, the cheaper and less liquid become the derivatives based on their performance. Moreover these derivatives were significant part of the assets of these investment banks and they could lead them to the state of bankruptcy, which could have an impact on creating a dangerous situation in the world financial market.⁵ Such dangerous situation undermined the trust of the big financial players to each other, which were uncertain how many of the toxic financial instruments could possess its business counterparties and as a result it caused the reduction of the credit line. The banks stopped borrowing themselves on three-months period,

¹ Acharya / Philippon / Richardson / Roubini (2009), p. 89
² Gerardi / Lehnert / Sherland / Willen (2009), p. 7
³ Gerardi / Lehnert / Sherland / Willen (2009), p. 8
⁴ Acharya / Philippon / Richardson / Roubini (2009), p. 89
⁵ Acharya / Philippon / Richardson / Roubini, (2009), p. 93
reducing the inside branch activity to only overnight borrowing. The widespread of distrust among the banks lead to decrease of their liquidity and finally to the reduction of loans for the entrepreneurs, who could not continue or start investments. These interconnections between the different sectors of economy and unhealthy financial system caused the creation of self-propelled spiral, which lead to decreasing the Gross Domestic Products, the value of stock prices and increasing of unemployment rate. It is very important to stress that the USA economy is the biggest in the world and it has a great influence on the economies of other nations in a globalizing world. That’s why the paramount position of the USA economy was decisive of wide spreading the financial crisis to other countries. According to the data, the economy of USA shrinks of 1,6% in the last quarter of 2008 (in a comparison to previous quarter), 27 European countries of 1,5% and Japan 3,2%. The unemployment rate increased in USA from March 2008 to March 2009 of 3,4%, in European Union area from February 2008 to February 2009 of 1,1 % and in Japan from February 2008 to February 2009 of 0,6%. Finally, the value of the indexes of the biggest stock markets also decreased: the London Stock Exchange Market from 1390 (3rd April 2008) to 612 (3rd April 2009), S&P 500 from 1350 (3rd April 2008) to 842,5 (3rd April 2009) and Japanese Nikei from 68 (3rd April 2008) to 52 (3rd April 2009). At worst, the predictions for the economy are not optimistic, the GDP of the most countries will slow down in the 2009 and world GDP will shrink down of 0,5 - 1% in 2009 according to IMF. Moreover the world trade, which was the lever of increasing world GDP in the last decade, will also be lower of 2,1% than in 2008. Obviously the data shows a black picture of the whole world economy. However, in between this abundance of ongoing bad news reporting the economy goes from bad to worse, some authors of newspaper articles and prominent investors recommend that this time is the best time for buying shares. The probably most famous investor Warren Buffet for instance recognizes a widespread fear in the market and sees the chance, that in this point of time, substantial companies can be bought at an attractive price. He claims that shares will outperform cash over the next decade. Another example is the article ”Cheap shares snap up now” which draws the same picture. It is stated that the decline of the stock markets brings

6 Acharya / Philippon / Roubini (2009), p. 92
7 http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/
8 http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/
9 Bureau of Labour Statistics (2009)
10 http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/
11 www.google.com/finance
12 www.google.com/finance
13 www.google.com/finance
14 International Monetary Fund (2009)
15 The World Bank (2008)
16 Wearden (2008)
good opportunities especially in the field of normally expensive and conservative shares. Moreover the investors could find company stocks which are unevaluated at the moment because the high volatile market has not brought them down.17

So on the one hand the most common economic indicators show that the economy is in the worst downturn since the great depression and on the other hand some people in the financial scene are of the opinion that exactly this downturn is a good opportunity to invest in shares because most of these stocks are on a historical low level. Especially in the article "Cheap shares to snap up now" it is emphasised that the financial crisis has not put down all companies and moreover that companies might under valued.18

The resulting question for any investor in these days is of course, who is right? Is it possible that a company has not experienced any influences resulting from the financial crisis? Isn't it the case that the financial crisis has an impact on everything, even on the real economy? Can we find really companies which are unevaluated and which might be a chance of abnormal earnings when the economy recovers? And if this is the case, which companies are unevaluated and to what extent? Or are the authors of these kinds of newspaper or magazine articles wrong and shares are valuated correct by the market?

All these questions an investor (or a common person following the economic developments) might keep in mind these days and they can be summarized to one research question which answer is the subject of this study:

"Does the broad fear of the financial crisis 2007 - 2009 lead to undervaluation of companies which have not experienced significant influences from the financial crisis?"

1.2 Research purpose

The results of this study will detect a case of a listed company which is undervalued by the market participants because of the broad fear that dominates the financial markets in the time of the financial crisis 2007 - 2009. The study will prove that particular firms have not experienced influences resulting from the financial crisis 2007 – 2009. After selecting one case which will be investigated in a deeper fashion the study will detect that the firm drop in its share prices for no economic reason but because of the broad fear of market participants who are uncertain about the future.

17 Hill (2008)
18 Hill (2008)
1.3 Research questions

To achieve the main goal of the research: Prove that the financial crisis leads to particular undervaluation of firms which are not influenced by the impact of the financial crisis because of broad fear of market participants, several Sub-questions will be answered.

First, the question if there are existing listed companies which demonstrate that they are in no way influenced by the financial crisis will be detected. Some examples for influences which result from the global financial crisis might be: higher refinancing costs, decrease or increase of demand, difficulties in loan commitments, etc. In this study the authors will show that none of the selected companies which should be subject to further investigation are exposed to such influence factors.

Second, the question if the selected firms are under valued will be scrutinized. The authors will choose one case out of the uninfluenced firm and present an assessment of its firm value and an argumentation why they believe that their suggested estimates are true values of the company. Furthermore, they will compare their estimations with share prices which allows them to make statements if and to what extent the valued company is undervalued.

The last question to be answered is if that under valuation is a result of the broad fear of market participants or if there might be other reasons for that. To answer this question the authors will examine how the financial performance (indicators) of the selected company and S&P 600; the share price of the selected company and S&P 600; and an investor confidence index interact. If the share price drops in the same fashion as the confidence index and if at the same time the financial performance stays stable this must be seen a strong indication that the market is not driven by rational but emotional investors.

There are three sub-questions:

- Are there companies to find which are not influenced by the financial crisis?
- Are these firms under valued?
- Does this under valuation result from broad fear of market participants during the financial crisis?

The consideration of these sub-questions will allow the authors to answer the major question of this study.

2 Research strategy and design

In this paragraph the authors will discuss theory related, epistemological and ontological assumptions in relation to the research topic. Based on these considerations they will determine a research strategy which represents the fundament of this study.
2.1 Role of theory

Thinking about the appropriate research strategy starts with considerations about the role of theory. Any research is in some way linked to theory. There are two views of the relationship between theory and research: Deductive and inductive theory. The nature of deductive theory is that at first a particular hypothesis is established which arises from already known aspects of a certain field of study and from theoretical considerations which are related to it. After that the established hypothesis is tested by finding empirical evidence that this hypothesis is true or false. The last step is a feedback or the revision of former theory. The inductive is the opposite of the deductive approach. In this instance at first, data is collected. After that it is tried to find relations between the observations. At the end the relationships are generalized to create a new theory. Of course a clear delineation between these two approaches is not possible: "However, just as deduction entails an element of induction, the inductive process is likely to entail a modicum of deduction." However, some researches add to these two categories another one, which is called the functional theory. That kind of theory combines the elements from deductive and inductive theory and it is especially useful in the area of psychological research.

This work follows the deductive approach. This study is related to the Efficient Market Hypotheses and to the theories of behavioural finance because these theories explain on the one hand when, why and how markets act efficient and rational and on the other hand under what circumstances markets act irrational and inefficient. Resulting from these theories this study aims to clarify whether the fear of the financial crisis leads to a undervaluation of particular companies or if the market acts even in this special situation rational, logically and efficient. In this study it is tested if and how these theories work under the conditions of the current financial crisis and if the established hypotheses can be proved as true.

In other words an established hypothesis which results from existing theories is tested by empirical data to state if the hypotheses hold true. This procedure reflects a typical deductive approach.

2.2 Epistemological considerations

After defining the role of theory epistemological considerations are taken into account as a second step to the appropriate research strategy of this work. Epistemology deals with the question of what should be seen as knowledge in a certain field of study. The main question is
if social relationships should be studied in the same way as the naturalistic science.\textsuperscript{24}

The primary epistemological positions are positivism, realism and interpretivism.

The positivistic position is characterized by different attributes. First of all only phenomena that can be proved by senses can be seen as reality. Moreover the objective of theory is to create hypotheses. The testing activity of this hypothesis allow to explaining the reality. Further more knowledge is generated by examining the real world and summarizing the findings of these examinations in basic relationships. In addition to that scientific examinations must be objective. The last important characteristic of the positivist position is that a scientific study has to deal with scientific statements and not with normative statements.\textsuperscript{25}

The second epistemological position is realism. In general realism has the same attributes as the positivistic position that is: natural and social science should use the same approaches when collecting and explaining data and the conception that there exists an external reality which is examined by scientists.\textsuperscript{26} Apart form these basic similarities there are two main forms of realism the empirical realism and the critical realism.

Empirical realism means that reality can be understood by employing suitable methods. The critical realism view includes not only the examination of the reality but also the exploration of events and discourses of the social world.\textsuperscript{27}

The last epistemological position is the interpretivism. This position is almost the opposite of the positivistic view. Interpretivism distinguishes between the social action of individuals and the naturalistic science view of reality. According to the interpretivitic reality is a social construct. Because of that the scientist must analyse the social behaviour to understand the reality.\textsuperscript{28}

Regarding this study it is difficult to determine an epistemological position. On the one hand the study will examine the development of share prices and after that analyse them and draws conclusions which result from the analyses. In this case the scientists observe a subject (share prices) from a outstanding perspective which can not be influenced. This train of thoughts would lead clearly to a positivistic epistemological position. On the other hand is the development of share prices a result of supply and demand and one step further the supply and demand is a result of social interaction. It deals with how market participants assess the actual and future economic situation. The people assessment depends on confidence or fears.

\begin{itemize}
  \item \textsuperscript{24} Bryman / Bell (2007), p. 16
  \item \textsuperscript{25} Bryman / Bell (2007), p. 16
  \item \textsuperscript{26} Bryman / Bell (2007), p. 18
  \item \textsuperscript{27} Bryman / Bell (2007), p. 18
  \item \textsuperscript{28} Bryman / Bell (2007), p. 19
\end{itemize}
in the present and in the future. In short share prices are consequences of complex social interaction. When this study claims to examines share prices against the background of the financial crisis\textsuperscript{29} the only suitable epistemological position which allows to explaining and hence understand the development of share prices is the interpretivistic position.

Because this study includes both the outstanding objective scientist who examines invariable facts and tries to draw his conclusions from them and the researcher who wants furthermore understand why the in retrospect unchangeable data developed like this\textsuperscript{30} the most appropriate epistemological position is the critical realism because first: "Realism shares two features with positivism: a belief that the natural and the social science can and should apply the same kinds of approach to the collection of data and to explanation, and a commitment to the view that there is an external reality to which scientists direct their attention."\textsuperscript{31}, and in addition to that: " … critical realists unlike positivists are perfectly content to admit into their explanations theoretical terms that are not directly amenable to observation. As a result, hypothetical entities to account for regularities in the natural or social orders (the generative mechanisms to which Bhaskar refers) are perfectly admissible for realists, but not for positivists."\textsuperscript{32}

2.3 Ontological considerations

After determining a deductive theory approach and a critical realistic epistemology position for this work the next step to the appropriate research strategy is to establish the ontological position of the study. In general there are two major positions which reflect opposite views. "The central point of orientation here is the question of whether social entities can and should be considered social constructions built up from the perceptions and actions of social actors."\textsuperscript{33}

The term objectivism describes the view that social phenomena (social reality) are existing separately or independent from social actors.\textsuperscript{34} The constructivist view on the other hand claims that this social phenomena or social reality is not existing independent from the social actors but it is created by them.\textsuperscript{35} In other words reality does not only exist out there but it is created by participants of social life by interaction.

This study in which specific relationships of stock markets should be examined the objectivistic position is of major importance. In this study market data must be collected and

\textsuperscript{29} In the Situation of a crisis emotions and beliefs play even a larger role

\textsuperscript{30} Especially related to the behaviour of finance

\textsuperscript{31} Bryman / Bell (2007), p. 18

\textsuperscript{32} Bryman / Bell (2007), p. 18

\textsuperscript{33} Bryman / Bell (2007), p. 22

\textsuperscript{34} Bryman / Bell (2007), p. 22

\textsuperscript{35} Bryman / Bell (2007), p. 23
analysed. These tasks require a strict objective attitude. Only when it comes to the analyses of why the share prices developed like they did the ontological position changes a very little step in the direction of constructivism because this question deals with the behavioural of finance and hence with social interaction.

2.4 Paradigmatic positions

Since ontological and epistemological assumptions are the basement of business research it is fundamental to understand the ontological and epistemological assumptions authors make in their research papers and the relationship between these two. Because paradigms cluster different beliefs of what and how some specific topics should be studied and moreover how the results should be interpreted they are a good possibility to summarize epistemological and ontological assumptions.

In the field of business studies there are four main paradigms which are clusters of certain assumptions: functionalist, interpretative, radical humanist, radical structuralist. For this study the most important is the functionalist paradigm which combines an objectivist view on reality and a regulatory research purpose. Especially the data collection and analyse part of this study will be mainly influenced by this paradigm. Only when it comes to the investigation of possible reasons of certain developments the interpretative paradigm which combines a subjectivist view on reality with regulatory research purpose guides the further discussion.

2.5 Determination of the research strategy

Finally, after discussing all important points related to the field of research strategy, a statement on an appropriate research strategy can be made.

Although the distinction of between qualitative and quantitative research strategy is seen as not useful the authors will use this differentiation because it combines and includes the assumptions which had been made so far and gives (against the background of these assumptions) a general orientation how business research should be carried out.

The appropriate research strategy results from the assumptions which had been made:

- A deductive approach to the use of theory
- An epistemological position of a critical realist
- Mainly a strict objectivistic ontological position
- Mainly an underlying functionalist paradigm for the business research

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36 Bryman / Bell (2007), p. 25
37 Bryman / Bell (2007), p. 25
38 Bryman / Bell (2007), p. 25
39 Bryman / Bell (2007), p. 28
40 Bryman / Bell (2007), p. 28
From these assumptions results a mainly quantitative research strategy. Because the authors wanted, to a certain extent, also answer questions concerning underlying relationships which might have lead to the observed developments, the study will in some parts, to a very small extent, fluctuate from an otherwise strict quantitative research strategy.

2.6 Research design

After determining the research strategy which should be the fundament of this study, another important point is discussed: What research design should this study follow? The research design fulfills the important role of guiding the data collection. It is a method of completion the data by the researchers.\(^4\)

The first type of research design – the experimental design – relies on different combinations of two variables, of which one is dependent from the other. The change of the independent variable has an impact on the dependent variable.\(^2\) That kind of research is conducted in two kinds of surroundings: laboratory or field and observation groups are exposure to the manipulation of the independent variable.\(^3\) Such research design allows to measure, the correlation between the independent and dependent variable. Obviously, that research design has the delimitations, because with this kind of research design it is not possible to measure the interaction between more variables and thus it is useless to apply for a more complicated reality such as society, sophisticated economical models. Therefore, the authors consider that this type of research design will not support their research which deals with many variables like company performance, share prices and confidence indices and in addition to that (to a small extend) with immeasurable (behavioral finance) factors.

The cross-sectional design bases on the collection of different kind of data for more than one case in a particular single time in order to find relations between them. The purpose of this kind of research design is suitable to find variations between different cases.\(^4\) Such research design is especially useful to detect the deep difference between some cohorts or samples.\(^5\) However, the main obstacle of using this type of research design in this research paper is connected with the data collection in only one single point of time. The authors think that the data, which comes only from one single particular moment, can not fully give an answer if the theory (Efficient Market Theory) works during the current financial crisis (the whole financial crisis has been lasting for two years now). Further more, the authors are of the opinion that their observations should be repeated a few times to give a clear answer if particular theory

\(^{41}\) Bryman / Bell (2007), p. 40
\(^{42}\) Graziano / Raulin (2000), p. 50-51
\(^{43}\) Bryman / Bell (2007), p. 45, 46
\(^{44}\) Bryman / Bell (2007), p. 65
\(^{45}\) Graziano/ Raulin (2000), p. 152
works under these specific conditions. That’s why this type of research design should not be fully applied by the authors in their work. However, the cross-sectional design is in some extent applicable for this work, because it puts pressure on the variation between the cases. The examination of many cases can be useful regarding the detection of companies which are not influenced by the financial crisis. A possible scenario might be to determinate certain criteria a company must fulfill to be “not influenced” by the financial crisis. That’s why some elements of this type of research design are going to be implemented in this work.

Longitudinal design concentrates on changes, which are done during a specific period of time. In other words, the researchers collect data from different points in time in order to compare them. There are two kinds of sample in this type of research design: panel study and cohort study. In the panel study, the choice of sample is done randomly among the population and the collection of data is conducted during the meetings with the individuals or organizations at least twice times. Whereas the cohort study includes the sample of the entire population, which possesses some special characteristic, which can be: the purchase of the same products, the similar age, the same weight in particular period of time. The biggest disadvantage of this kind research design can be the change of the sample during the long time of examination. In our case some of the analyzed companies can be withdrawn from the stock exchange because of the bankruptcy, especially in the times of the financial crisis. However, some parts of longitudinal research design can help the researchers to achieve satisfactory research results, because when not influenced companies should be detected, the performance of each of the companies must be observed over a longer period of time. If a company fulfills over this time certain requirements it can be seen as not influenced by the financial crisis.

It does not make any sense to comparing the fluctuation of stock prices before and during the financial crisis. The fluctuations of the stocks during the financial crisis are higher and it is caused by bigger uncertainty of market participants. During the financial troubles people have a bigger tendency to imitate the behavior of others, even thought they can behave irrational. Such phenomena are called by the psychological researchers ‘herding behavior’. This kind of behavior causes that people resign with taking their own decisions, which based on their own rational consideration and they follow for the action of others. Unfortunately the irrational decision of the herd causes ‘non-optimal Pareto equilibrium’. The financial crisis in the countries of East Asia can prove the occurrence of investors’ panic, which was

46 Bryman / Bell (2007), p. 60
47 Bryman / Bell (2007), p. 60, 61
48 Graziano / M. Raulin (2000), p. 146
49 Morone / Samanidou (2008), p. 640
50 Morone / Samanidou (2008), p. 640
characterized by the herd behavior during the financial troubles for local economies in 1997 and 1998.\textsuperscript{51} Furthermore we can not compare the current financial crisis with the similar events - Great Depression 1929-1935, because of the significant technological change, which allowed to developing the instruments on the financial market. In the face of the presented facts, the authors consider that longitudinal research design can not be used to examine the valuation of the stock prices before and during financial crisis. However, this type of research design can be helpful for collection of data in the different times during the financial crisis. The comparative research design concentrates its efforts to find the difference or similarities between two contrasting cases. Such research is very useful in the cross-national comparisons, because it shows clearly the differences between two groups. These kinds of studies are of qualitative nature, because they highlight social issues such as: lifestyle, behavior, code of culture. This research design can not be applicable to this study, because the purpose of this paper does not rely on the comparisons between the groups of people and furthermore the main task of such type of study is to explain the differences based on the culture contexts. The comparative research design is mainly useful to conduct qualitative research than quantitative research. Because the grounding of this paper is a quantitative research strategy a research design which supports mainly qualitative research is unfavorable for this research work. The authors think that the case study design is best suitable to their work because it combines the different types of research designs and it allows a deeper examination of a problem. The great advantage of this type of research design is also the possibility to detect the unique features of the analyzed problems.\textsuperscript{52} Furthermore, the authors are going to use this approach, because it offers the possibility to deduct tests\textsuperscript{53} and the design fits for studies which include a deductive approach of the role of theory. Especially, the critical case might be helpful for this study, because it examines a hypothesis in order to hold or refute them. Such critical approach allows the authors to see the validity and reliability of Efficient Market Theory against the background of the financial crisis.

In summary it must be stated that the main research design of this paper will be the case study because it offers the possibility to analyze an entity in great detail. This will be important when it comes to the valuation of the selected case. Only in the part when uninfluenced companies should be detected, from which the case for the valuation will be selected, elements of the cross-sectional and longitudinal research designs will be included in the work because if one want to detect a company which is not influenced by the financial crisis it must

\textsuperscript{51} Baig / Goldfajn (1999), p. 194  
\textsuperscript{52} Bryman / Bell (2007), p. 63  
\textsuperscript{53} Bryman / Bell (2007), p. 64
show stability in certain key indicators over a period over several years (before and during the times of the financial crisis). Only if a company maintains stability in these key indicators over the time it can be seen as not affected. If a case is selected out of the pool of unaffected companies the further examination of this case will follow only the case study design. Because of the case study design must be seen as the main research design of this study.

The case study takes into consideration sample, which includes 600 companies which are constituents of the S&P 600. Such sample allows to generalizing the conclusions from our case to the whole market, because it consists of the companies from different industries and it is big. The case study design in this work will be relied on criteria which detect clearly if company is not affected during the time of financial disturbance in 2008 and 2009. The criteria will be based on basic accounting figures such as earnings, book value and cash flow, which will be apply to both company and its industries performance. Later, the researchers will choose a few companies, which meet the requirements of stable ratios. From these smaller sample will be selected one most hopeful companies in order to estimate its values based on the valuation models chosen. The next step will be the comparisons of the estimated company value with the actual market prices. If significant differences between market price and firm value can be observed, the author have some arguments for refutation of efficient market theory in the times of financial crisis.

3 Theory and hypothesis

In this paragraph the authors will describe all necessary theories and concepts which underlie the study topic. They will discuss the different theories in respect of the research topic and will come up with hypotheses resulting from this discussion.

3.1 Efficient Market Hypothesis (EMH)

3.1.1 Summarized description

This study deals with share prices and if the market sets these share prices correctly (efficient, retinal) in times of financial disturbance. Because of that economic theories are of main importance which occupy with the behaviour of stock market prices.

First of all, the studies which dealt with the behaviour of stock prices were made by Maurice Kendall. He analysed time series and found that stock prices do not reflect the prospects of a certain company, but that they seem to evolve randomly.54

One of the probably best known theories in this field is the Efficient Market Hypothesis developed by Eugene F. Farma during his PhD studies in the year 1965. After two other

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54 Bodie / Kane / Marcus (2008), p. 357
publications of Fama concerning this topic, a summary of all his findings regarding the behaviour of stock prices was published 1970 under the title "Efficient capital markets: A review of theory and empirical work" in "The Journal of Finance". This publication is considered as a milestone in financial theory. The Efficient Market Hypothesis claims two main circumstances:

- Stock prices follow a random walk
- Stock prices fully reflect available information

Security prices change in respect to available information. If a new piece of information appears the security price changes respectively. The term "new information" is always considered as unpredictable. If a piece of information allows to interpreting the future, this piece of information is considered as today's news and as yet included in the share prices. Because new information appears randomly (unpredictable), share prices behave randomly, too.

Security prices are considered to reflect all available information because markets are always analysed and observed deeply by investors and analysts in the hope to find more information or find information earlier than competitors, so that they can use arbitrage strategies to generate abnormal returns. So, the competition among investors and analysts leads to security prices which reflect all available information.

3.1.2 Forms of the Efficient Market Hypothesis

The empirical work carried out regarding stock price behaviour can be divided in three main groups. This three groups (referred to as forms) depend on the kind of information which is considered.

The weak-form includes only historical information, which is for example: past prices, trading volume or short interest rates. Because this data is publicly available and almost costless all investors are well informed and because of that prices are set efficiently. Generating abnormal earnings with the use of trend analyses is not possible.

The semi-strong-form includes information which is "obviously publicly available". This term includes historical information plus all public available information. Examples of this kind of information is: "past prices, fundamental data on the firm's product line, quality of

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55 Fama (1965), p. 55
56 Fama (1970), p. 48, 49
57 Bodie / Kane / Marcus (2008), p. 358
58 Bodie / Kane / Marcus (2008), p. 359-361
59 Fama (1970), p. 414
60 Bodie / Kane / Marcus (2008), p. 361
61 Fama (1970), p. 414
management, balance sheet composition, patents held, earnings forecasts, and accounting practices. Because this information is all publicly available the security prices should reflect this information. And because that is the case, it would be not possible to generate abnormal earnings, too.

The strong-form includes information of the past (historical information), all public available information and in addition to that information to which only specific groups have access to. (Also referred to as insider information) Possible insiders might be a few corporate officers because they have access to important information before the public. However, The Securities and Exchange Commission (SEC) put much effort in preventing insider trade.

3.1.3 EMH and Fundamental analyses

In respect to the research topic of this study it is important to point out the relationship between the Efficient Market Hypothesis and the Fundamental analyses because the authors will use fundamental analyses in a later section of this study to detect companies which not have experienced influences of the financial crisis and to give an estimate on the firm value based on fundamental data.

Fundamental analysts try to use earnings, dividend prospects, expectations of future interest rates, and risk assessments of a company to estimate an adequate stock price. The financial information needed is gathered from past and actual balance sheets. Also information from economic analyses, evaluation of the abilities of the management, the companies’ position in the industry and the future changes of the whole industry are added. If this data the analyst uses for his fundamental analyses is publicly available than this analyses will according to the Efficient Market Hypothesis give the analyst not the chance of generating abnormal returns. This is because under the theoretical framework of the Efficient Market Hypothesis the analyst's analyse will not be better than any analyses of his rivals. Because there are many well informed analysts and investors its very hard to detect knowledge which none else has yet and which can give an analyst a competitive advantage.

In short: Under the theory of EMH, fundamental analyses can not provide an investor or an analyst the possibility of generating abnormal earnings. If the previous statement is true, why do the authors than wanted to carry out a firm valuation in this study and estimate the certain
companies? If the EMH is right, than companies must be valued adequately and a firm valuation which relies on available data won't give the authors more insight.

3.1.4 Market anomalies

There are serious doubts in the research society that the EMH holds true in any case. The so-called "market anomalies" give a first indication, that the EMH might have some vulnerabilities and does not explain any price movement. Some examples for such anomalies are described in the following.

The P/E effect was detected by Basu. He found that: "During the period April 1957-March 1971, the low P/E portfolios seem to have, on average, earned higher absolute and risk-adjusted rates of return than the high P/E securities. This is also generally true when bias on the performance measures resulting from the effect of risk is taken into account." Basu concluded from his findings that: "Contrary to the growing belief that publicly available information is instantaneously impounded in security prices, there seem to be lags and frictions in the adjustment process." By that he criticises partly the theory of efficient markets.

Another anomaly is called the small-firm-effect and was discovered by Banz. He found that: "On average, small NYSE firms have had significantly larger risk adjusted returns than large NYSE firms over a forty year period." He pointed out that: "There is no theoretical foundation for such an effect," which mean that in this special case the EMH gives no explanation. The small-firm-effect after its detection by Banz has been complemented by Keim who found that: "... daily abnormal return distributions in January have large means relative to the remaining eleven months, and that the relation between abnormal returns and size is always negative and more pronounced in January than in any other month...." Because of that the name of the small-firm-effect was changed into the small-firm-in-January effect.

The neglected-firm effect was detected by the researchers Arbel and Strebel. They interpreted the small-firm effect differently in the sense that because small firms are often neglected by large institutional traders, information about such small firms is not that extensive. The lack

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68 Basu (1977), p. 680
69 Basu (1977), p. 681
70 Banz (1981), p. 16
71 Banz (1981), p. 16
72 Keim (1983), p. 31
of information results in higher risk which requires higher returns. However, the neglected-firm effect can't be seen as the strict market inefficiency.73

The book-to-marked effect was established by Fama and French in the year 1992. The researchers found that: "...beta seemed to have no power to explain average security returns."74 These findings have a great importance regarding the idea of efficient markets, because it claims that: "...a factor that should affect returns – systematic risk – seems not to matter, while a factor that should not matter – the book-market-ratio – seems capable of predicting future returns."75

The last effect which should be mentioned here is the post-earnings-announcement price drift discovered by Ball and Brown in 1968. The researchers found that although the annual report of a company captures one-half of all information of this firm which was published during a year, the market does not adjust prices according to the abundance fast (as it is implied by the EMH), but more in a drifting fashion.76

After describing the main market anomalies the question arises, if those anomalies must be seen as market inefficiencies (explanation not conform to the EMH) or as a form of risk premium (explanation conform to the EMH). If the anomalies turn out to be as market inefficiencies the authors have evidence that the efficient pricing of securities does not work at any circumstances and by that an indication that undervaluation of companies is possible and may be the case.

3.1.5 Interpretation of market anomalies

Several studies had been carried out by different researchers to answer the question whether market anomalies indicate market inefficiencies or risk premiums. Fama and French found that: "...stocks with higher 'betas' (also known as factor loadings) on size or market-to-book factors have higher average returns; they interpret these returns as evidence of a risk premium associated with the factor."77 This means in other words, that company size and book-to-market ratios can be seen as proxies for fundamental risks. The higher returns of small firms and firms with a low book-to-market ratio are consistent with the EMH in the way that a different risk levels asks for different returns.78

A similar study carried out by Lakonishok, Shleifer and Vishney offered almost the same findings (value stock outperform glamour stocks) is interpreted by the researchers in a

73 Bodie / Kane / Marcus (2008), p. 375
74 Bodie / Kane / Marcus (2008), p. 376
75 Bodie / Kane / Marcus (2008), p. 376
76 Ball / Brown (1968), p. 168–171
77 Bodie / Kane / Marcus (2008), p. 379
78 Bodie / Kane / Marcus (2008), p. 379
different way.\textsuperscript{79} They state that: "While one can never reject the 'metaphysical' version of the risk story, in which securities that earn higher returns must by definition be fundamentally riskier, the weight of evidence suggests a more straightforward model. In this model, out-of-favour (or value) stocks have been under priced relative to their risk and return characteristics and investing in them has indeed earned abnormal returns."\textsuperscript{80} The researchers are of the opinion that analysts make evaluation errors in the sense that they overprice firms with good past performance and under priced firms with poor performance. When these evaluation errors are detected by the market and prices are adjusted value stocks outperform glamour stocks.\textsuperscript{81}

These two studies are only two examples of research which is concerned with the question if the detected anomalies are market inefficiencies or a form of risk premiums. Some researchers are even of the opinion that these anomalies have no other explanation than data mining. They argue that: "...if one reruns the computer database of past returns over and over and examines stock returns along enough dimensions, simple chance will cause some criteria to appear to predict returns."\textsuperscript{82} This idea becomes even more interesting when it was observed that some of these anomalies disappear after they had been detected. However, the examination of data not already researched (other security markets around the world revealed the same anomalies which had been detected before.\textsuperscript{83}

In summary it can be stated that the EMH is a grounding theory of the behaviour of stock prices and because of that an essential part of this research paper. The EMH states that market prices are set efficiently in the sense that they reflect all available information. Although some researchers doubt that the EMH does not cover every case (see anomalies) it is not clear if this anomalies must be seen as market inefficiencies or as a form of risk premium. Nevertheless the findings of anomalies has lead to remaining doubts if the EMH can really explain any price movement or if there are other factors influencing the pricing of securities. This idea is especially interesting against the background of this research paper because if it is true that the EMH explains not all price movements than the security prices might be wrong priced. The detection of the true value of miss priced securities might then offers the possibility of earning abnormal returns when prices adjust again after market participants detected the miss pricing. Arguments for other factors influencing price changes offer another

\textsuperscript{79} Lakonishok / Shleifer / Vishney (1994), p. 1574
\textsuperscript{80} Lakonishok / Shleifer / Vishney (1994), p. 1574
\textsuperscript{81} Bodie / Kane / Marcus (2008), p. 379
\textsuperscript{82} Bodie / Kane / Marcus (2008), p. 381
\textsuperscript{83} Bodie / Kane / Marcus (2008), p. 381
(more modern) theory which combines economic with psychological aspects. This theory is known under the term "Behavioural finance" which will be introduced in the next paragraph.

3.2 Behavioural finance

*Behavioural finance raises issue of psychological influences on taking the decisions by market participants. The task of that branch of finance relies on explanation of irrational investors’ decisions based on the psychological theories of human behaviour.*

3.2.1 Summarized description

The milestone of the development of such theories was the paper ‘Prospect theory: an analysis decisions under risk’ by D. Kahneman and A. Tversky, which undermined the importance of utility theory and developed another alternative, the prospect theory. This alternative draws attention to how the decisions are made with emphasizing on the role of psychology. After the publication of Kahnemen's and Tversky's work, other scientists conducted researches in this area and this results in the creation of a new economic discipline, the ‘behavioural finance’ which joins the elements of financial models and psychology. The behavioural finance researches have recognized a few psychological tendencies such as: overconfidence; representativeness; conservatism; narrow framing; ambiguity aversion; positive feedback and extrapolative expectations; regret; cognitive dissonance; availability bias and miscalculation of probabilities, which have an impact on taking the decisions by market participants.

3.2.2 Phenomena of behavioural finance

The phenomenon of *overconfidence* derives from the peoples’ belief in their own ability to predict correctly future events. The bigger the self-estimation of particular person of being an expert in specific field, the higher possibility of overestimation the success of own prognoses. Furthermore, people who once predicted future events correctly, have the tendency to believe too much in their capability to repeat it. It causes that their overconfidence blocks them to take into consideration all factors, which can have impact on the situation development. However the psychologists state that people do not believe in themselves when the task, which they have to do, is too complicated from their perspective. They underestimate their ability to complete it. In the time of financial crisis, when the

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84 Glen (2001), p. 599
85 Kahneman / Tversky (1979), p. 263-291
86 Goldberg / Nitzsch / Rüdiger (2001), p. IX
87 Glen (2001), p. 635-638
88 Goldberg / Nitzsch / Rüdiger (2001), p. 117
89 Goldberg / Nitzsch / Rüdiger (2001), p. 118
90 Moore / Cain (2007), p. 197
events occur rapidly and the reality is more complicated and different than before, people can have the tendency to unbelief in control the sequence of events. This lack of control causes their nervous reaction, unbelief in market’s predictions and it leads to higher violability of stock prices with any rationality reasons.

*Representativeness* causes the prediction of the reality which is based on our previous experiences. If market participants observe that the stock price of particular company has been increased for a few years, they have the tendency to believe in glamorous future of that firm. On the other hand if the company has suffered, people can claim that the trend will continue in the future. Such premature decisions, which are not based on the detail companies’ analysis, but on the stereotypes, mislead often the investors.⁹¹

*Conservatism* is connected with the reluctance to change the mind of previous taken decisions. Although people receive the negative information of their action, they continue maintaining their own decisions.⁹²

*Narrow framing* emphasizes that market investors are reluctant to see the whole picture of the market reality and they have the inclinations to concentrate on the small fragment, which particularly interest them. Such perception of the reality drives them to missing the chance of better investment and forces them to take considerable higher risk.⁹³

*Ambiguity aversion* paralyzes the willingness to taking decisions because of the limitation of knowledge about the specific object (another market, overseas investment). Such tendency is unable people to invest in more profitable markets or stocks.⁹⁴

*Positive feedback and extrapolative expectations* causes that market participants purchases the stocks, which have the tendency to increase and this drives to creation of self-propelled spiral of increasing the share prices. The appreciation of such stock prices does not have the solid fundament in the financial statements of these companies. That’s why after a while, when the market participants realize that these stock are overpriced, it caused to suddenly fall down of them.⁹⁵

*Regret* is connected with the human hedonism. Some people try to take as much happiness as possible and they want to avoid sorrow. This approach to life leads them from avoiding the situation, which can lead them to disappointment.⁹⁶

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⁹¹ Glen (2001), p. 599
⁹² Glen (2001), p. 600
⁹³ Glen (2001), p. 600
⁹⁴ Glen (2001), p. 600
⁹⁵ Glen (2001), p. 600
⁹⁶ Glen (2001), p. 600
**Confirmation bias** drives people to avoid the information, which are not coherent with their perception of their reality. They only absorb information, which confirm their choices, decisions or worldview. That’s why they can ignore the negative information from the market, because they can be contradictory to their beliefs.\(^\text{97}\)

**Cognitive dissonance** applies to human’s tendency to hold personal opinions as long as possible, despite of finding proofs that they are not any more actual.\(^\text{98}\)

**Availability bias** is the irrational fear, which pushes away people from some things. For example, if one of the big companies from a particular industry collapses, people can be afraid of purchasing the stocks of healthy enterprises from this branch.\(^\text{99}\)

**Miscalculation of probabilities** proves that people have the tendency to believe in the events, whose probability is very low and they can underestimates the occurrence of highly possible things.\(^\text{100}\)

**Anchoring** is formed by the people based on the receiving information. However people need the time to transform the past information to the market value. We can observe these phenomena by gradually increasing the stock prices after the publishing of good financial company’s results.\(^\text{101}\)

### 3.2.3 Theories of behavioural finance

Furthermore if we treat the stock like the normal commodity, it allows us for the deeper psychological analysis of some financial behaviour phenomena. First of all, the balance theory can explain the reasons of the creation of the availability biases. According to that theory, we judge the reality by the observation of triad, which include such elements as ‘1) a person and his or her perceptions of (2) an attitude object and (3) some other person or object.’\(^\text{102}\) These two last elements are strictly connected with each other and they affect strongly of themselves. If a consumer changes his/her opinion about one of these two last triad elements, he/she automatically passes it to another. For instance, if a person has negative experience with the stock from a particular industry, he/she can pass his/her disappointment at others among these branches, despite of the fact that they are healthy.

What’s more the **cognitive dissonance** theory can be used to explain the importance of time to change of opinion or why people maintain it.\(^\text{103}\) The market participants have a strong belief

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\(^\text{97}\) Glen (2001), p. 600

\(^\text{98}\) Glen (2001), p. 601


\(^\text{100}\) Glen (2001), p. 601

\(^\text{101}\) Glen (2001), p. 601

\(^\text{102}\) Solomon (1996), p. 171

\(^\text{103}\) Solomon (1996), p. 169
in a good condition of particular stock, however the flow of the negative information about the performance of that shares undermine the attitude to the adoration object. The previous good perception of the stock is a buffer, which protect it from losing the credibility too fast and encouragement to look for the alternatives source of information, which can admit their old good view of stocks. Although the weight of the information, which allows to maintaining a good opinion of adoration object, is inferior to the flow of negative information. It is a satisfaction excuse to hold the decreasing stocks.

Social judgment theory suggests that people have tendency to categorize the things according to their net of framework, which includes such elements as their previous experience, knowledge and feeling. This tendency causes that some information is refused by them, because it is not included in their frame of reference. Such theory can explain why the financial behaviour phenomena: narrow framing and ambiguity aversion occur. Furthermore heuristics are shortcut in taking the decisions by consumer, because they allow to saving the consumer time essential for the consideration of their market choices. Examples of heuristics can be ‘I buy the stock prices of that company, because most of my friends have purchased it recently’ or ‘many people have purchased the stock of these companies, that’s why it must be a good investment’. Heuristics can fulfil the function of explanation of human financial behaviour in case of positive feedback and extrapolative expectations.

3.2.4 Summery of the behavioural finance and impact in the research work

These examples of psychological tendencies stress how important input is human behaviour to understand the compliance of setting the prices of the stock market. Furthermore, these psychological tendencies are contradictions to the rational Efficient Market Model. However, without taking into consideration these two opposite approaches of setting prices, which fulfil and overlaps themselves, we can not fully understand the functionality market stock. If we engage Freudian theory in explanation of setting the prices, we can conclude that behavioural finance is like ‘id’, which is responsible for fulfilment of human desires, which are selfish and illogical. On the other hand the Market Efficient Model is like ‘superego’, which imposes the rational market rules on selfish and illogical id. However, the stock market prices are like ego, which conciliate the rights of both contradictory sides of human nature. But the readers should realize that id and superego fights fiercely on the dominancy on the setting stock prices and authors' task will rely on in which extent this id is stronger in the times of financial crisis than in the other periods.

\footnote{Solomon (1996), p. 170-171}

\footnote{Salomon (1996), p. 134-135}
3.3 Financial crisis

This study deals with the development of share prices and fundamental firm value under the special circumstances of financial disturbance. Because times of economic or financial turmoil have apart from some similarities always its own unique features the authors describe in the next paragraph the financial crisis 2007 – 2009. Special emphasise will be put on the causes which lead to the crisis, as well as the influences on the real economy and the market participants' mental health, because these points are important for further considerations in this research paper.

3.3.1 Causes

In the years before the financial crisis the U.S. economy was experiencing an environment which was characterized by large capital inflows (mainly from Asia) and a loose interest rate policy by the Federal Reserve. In this environment the banking sector underwent an important transformation from the traditional banking model (holding loans on the banks' balance sheets) to the 'pass through' model in which banks repack the loan and push them further to other financial investors. This development in this special environment laid the foundation of the financial crisis. The transformation of bank practices is described in greater detail in the next paragraphs.

3.3.1.1 Securitization

One change in the banking system was the securitization of mortgages or loans. The term "securitization" describes the practice of banks to build diversified portfolios out of mortgages and other kinds of loans, cutting these diversified portfolios in trenches and after that, sell these trenches to other investors. The trenches are divided in different risk classes so that every investor can choose the trench which appeals to his risk aversion. Investors who bought a risky trench protect themselves with credit default swaps (CDS). An investment in risky trenches in connection with a CDS is considered as a safe and less risky in these days, because the probability that the CDS counterparty to fail was estimated as very small.

3.3.1.2 Maturity mismatches

In the years before the financial crisis the trend towards short maturity assets increased. Investors prefer this kind of assets because they offer many advantages for them. The main of these advantages are: that funds can be withdrawn at a short notice, that they can be used as a

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106 Brunnermeier (2009), p. 77
107 Brunnenmeier (2009), p. 78
108 Brunnenmeier (2009), p. 78, 79
commitment device to discipline banks because of the possibility of immediate withdrawal of funds and that the use of this kind of assets signals confidence in the own ability to achieve good results in the future. The problem of this development was that the investment projects the raised funds had been invested in had a far longer maturity. In other words there was a huge discrepancy in maturities (maturity mismatch) existing.\footnote{Brunnenmeier (2009), p. 79, 80}

A mismatch of maturities was observed by so-called "off-balance-sheet vehicles" or "conduits". The strategy of these vehicles raised funds by selling short-term assed backed commercial papers (borrow short-term) and invests these funds in long term assets. This strategy exposes the sponsoring banks to funding risk in the way that they grant credit lines to the off-balance-sheet investment vehicles in case that investors might stop buying the assed-backed securities from the vehicles so that they are not be able to roll over their short-term dept.\footnote{Brunnenmeier (2009), p. 79, 80}

Moreover the mismatch of maturities on the balance sheet of investment banks enhance, too because banks started to finance their balance sheets increasingly with short-time "repos". In a repo contract a company borrows funds by selling a collateral asset today and promises at the same time to repurchase this asset at a later date. The greater financing trough short-term instruments forced the banks t roll over a great portion of their founding.\footnote{Brunnenmeier (2009), p. 80}

The great maturity mismatch resulting from granting credit lines to off-balance-sheet vehicles and from the increasingly use of repo financing exposed the financial system to the great risk of stress if for some reason the founding liquidity is reduced.\footnote{Brunnenmeier (2009), p. 80}

3.3.1.3. \textit{Structured products gain popularity}

In the first two paragraphs it was illustrated which trends led to the financial crisis. This paragraph will illuminate the question what causes create this trends.

The first two reasons why structured financial products became more and more popular was that they offer the possibility to shift risks to investors who wanted to bear the risks and that the risk could be widely spread with this kind of financial product.\footnote{Brunnenmeier (2009), p. 80} This advantages lead to lower mortgage rates and to lower interest rates for other kinds of loans. Moreover, the characteristics of structured products allowed some institutional investors like pension funds to hold indirectly assets which they are normally not allowed holding. For example pension funds are only allowed to hold triple “A” rated assets. Any asset which is rated lower than
triple A is not available for pension funds. With the help of structured products it is possible to construct a triple “A” rated asset trench out of less rated assets. This triple “A” rated trench is now available for certain financial institutions like pension funds. Although this kind of financial products offer the possibility of shifting or selling off the risk most of the risk stayed in the banking system because banks were one of the greatest buyers of this products. This had different reasons.

Regulatory and rating arbitrage possibilities are the main reasons which made this kind of investment products especially interesting for banks. With the use of structured investment vehicles (off-balance-sheet) banks had the possibility to circumvent the Basel I accord which required a capital charge of 8 percent of their loan on their balance sheets. This capital charge is less for contractual credit lines and is missing for no contractual credit lines. Thus, moving a pool of loans into off-balance-sheet vehicles, and then granting a credit line to that pool to ensure a AAA-rating, allowed banks to reduce the amount of capital they needed to hold to conform with Basel I regulations while the risk for the bank remained essentially unchanged. The Basel II accord which tight the interest rate to the rating has only a little correcting effect because with the practice of pooling different securities and the diversification of related risk the banks get a better rating for the whole pooled securities than for each security alone.

Further more, these products become popular because they offer good ratings. This good ratings result on the one from the statistical models of many rating agencies or professional investors which show mainly optimistic forecasts. However, these results were not reflecting the actual situation but were promoting the valuations of AAA trenches because these models were based on historical low mortgage default rates and low cross-regional correlation of house prices.

Other reasons for good ratings may also be the following. Maybe structured products get better ratings because of the higher fees rating agencies get for rating this kind of financial products. Moreover so-called "rating at the edge" took place in which bank and rating agencies worked together closely so that the financial products can be structured in that way that they just get an AAA rating.

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114 Brunnenmeier (2009), p. 80
115 Brunnenmeier (2009), p. 81
116 Brunnenmeier (2009), p. 81
117 Brunnenmeier (2009), p. 81
118 Brunnenmeier (2009), p. 81
119 Brunnenmeier (2009), p. 81
One reason why fund managers might favour especially bad trenches is that this trenches are only traded infrequently and because of that it is difficult to value them. This gives the fund manager flexibility in valuation and by that the possibility to make his returns appearing smoothly.  

3.3.1.4. **Consequences**

The consequences of this developments lead to a huge amount of cheap credit. Banks had only to bear the risk of loan default until they are purchased further to other investors. Because of that banks had a only a little interest to take care about the quality of applicants. Further more it was expected that a borrower could always pay off a loan because house prices (houses were used as collateral) were likely to rise further. As a result the whole lending standard fell. The combination of cheap credits and low lending standards result in a rush on the housing market which can be seen as the basement of the financial crisis.

3.3.2 **From a sub-prime to a global financial crisis**

In the last preceding paragraph the causes of the financial crisis had been discussed. In this paragraph the development from a sub-prime towards a financial crisis is described. While the beginning of the crisis had been the defaults in the sub-prime market, the first event which indicates a broad financial crisis was the breakdown of two high levered Bear Stearns hedge funds which ware highly invested in asset-backed-securities (ABS). The breakdown was the result of the following development: Fist the prices of collateralized dept obligations fell, so that the lenders to the fund ask for more collateral. When it was tried to sell off assets only a very small part of these assets found a buyer, so that the illiquid ness of these assets became obvious. To avoid fire sales the sponsoring bank Bear Stearns had to lend a huge loan to the fund to keep it afloat. The example of the Bear Stearns case highlights typical characteristics of a financial crisis. The cheap credits (leading to high leverage in financial institutions) and the housing market bubble that burst result in a fall of prices of assed backed securities. This caused margin calls which forced investors to sell the asset. This leads to the deflation of the asset. This caused the decline of value of collateral that was backing the former credit boom. This development result in a downturn spiral of margin calls, fire sales of assets and further fall in asset prices.

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120 Brunnenmeier (2009), p. 81, 82
121 Brunnenmeier (2009), p. 82
122 Acharya / Philippon / Richardson / Roubini (2009), p. 89, 90
123 Acharya / Philippon / Richardson / Roubini (2009), p. 90
The next great happening that showed how the sub-prime crisis became a broad financial crisis was the run on structured investment vehicles (SIV) of BNP Paribas. This run was so great that the bank had to suspend the redemptions. From that time on asset backed commercial papers (ABCP), which until then were considered as safe, must be seen as not that safe short-term vehicles. On the contrary these papers relied on sub-prime credit quality assets which lost their liquidity. This led to freezing of the ABCP market.\textsuperscript{124} PNP Paribas was only an example. Almost every financial institute had to face the same situation. This led to a: "… lack of transparency on what financial institutions were holding and how much of the conduit loss would get passed back to the sponsoring institutions caused the entire market to shut down."\textsuperscript{125} All short-terms markets like the commercial paper (CP) or repo market freeze. The only expectations had been money injections of the central banks.\textsuperscript{126} In general this situation can be described as follows. Private financial markets need information, reporting and disclosure to function. If now, because of the non-transparent structure of the financial system, none knows which bank or institute holds which risks a great uncertainty came up. This causes risk aversion, lack of trust and decreasing confidence. As a result the liquidity in particular financial market dries up.\textsuperscript{127} In the period thereafter sub-prime lenders became bankrupt and banks had to undertake massive write downs. Because banks were cross linked with each other and none know which institute is exposed to what extend of sub-prime risk, the probability of counterparty failure arose. This counterparty risk made banks not trusting each other any longer and as a result hording excess liquidity instead of lending it to other banks. This development dries up the liquidity also in the inter bank market which makes the sub-prime crisis become a systematic global financial crisis. That the counterparty risk which had made the marked dies up was valid showed the bankruptcies of two of the larges investment banks Bear Stearns and Lehman Brothers.\textsuperscript{128}

3.3.3 Influences on the real economy

This study should give an insight if every company was affected or influenced by the financial crisis. To be able to make a statement about this issue it is important that it is pointed out how the financial crisis influences the companies or generally spoken the real economy.

\textsuperscript{124} Acharya / Philippon / Richardson / Roubini (2009), p. 91
\textsuperscript{125} Acharya / Philippon / Richardson / Roubini (2009), p. 92
\textsuperscript{126} Acharya / Philippon / Richardson / Roubini (2009), p. 92
\textsuperscript{127} Acharya / Philippon / Richardson / Roubini (2009), p. 92
\textsuperscript{128} Acharya / Philippon / Richardson / Roubini (2009), p. 92-94
The connection between the financial sector and the real economy are loans from banks to private companies and households. The extent of lending from banks to the real economy is the main influencing factor of the financial crisis on the real economy. When lending to the stops the real economy will be extent to financing and founding problems.129

The authors of the article: "The credit crunch and the real economy." Diana Farrell and Susan Lund try to evaluate the decline of funding capital to the real economy.130 Although the values of this article might not be accurate because of the early stage of the financial crisis which does not allow precise calculation and although the presented numbers reflect only the U.S. economy the article is of importance for this study because it offers a more detailed insight in possible credit channels from financial institutions to real economy participants.

The authors of the article identify five main credit channels though which maintain the real economy with capital: bank lending to households and companies, lending by no bank intermediates (pension funds, insurance companies, and the government), dept owned or securitized by government-sponsored institutions (Fannie Mae and Freddie Mac), corporate bond and commercial papers and securitization papers.131

Further more the authors make statement about the extent to which they believe the different channels will dry up or decrease in loan supply. Although the banks could get new founding through government lending and private investors the money supply through this channel will decline because of the massive write downs the banks had to undertake. The recapitalisation, reduction of bank leverage and the payable taxes will use up much of the new funds so that the leftover money which is available for lending will be only a small amount.132

The loan channel of insurance companies, pensions and the government is, according to the authors of the article dried up and will remain in this situation for about two years.133

The channel through government-sponsored institutions is the only source which increased lending trough the crisis and by that set-off some of the credit reduction of other channels.134

Lending through corporate bond and commercial-paper market is the greatest source of company founding (and by that especially important regarding this research paper) has decreased in investment-grade sector only modestly but in the high-yield sector to a big

129 Acharya / Philippon / Richardson / Roubini (2009), p. 92
130 Farrell / Lund (2009), p. 30-31
131 Farrell / Lund (2009), p. 30-31
132 Farrell / Lund (2009), p. 30-31
133 Farrell / Lund (2009), p. 30-31
134 Farrell / Lund (2009), p. 30-31
extend. The founding activity through this channel will continuously be on a low level for the next quarters of 2009 and 2010.\textsuperscript{135}

The channel through securitization markets decreased massively. The authors of the article believe that only so-called plain vanilla (simplest structure) form of securitization will offer a little possibility to raise funds through that channel. More exotically structured instruments will be not used during a long time.\textsuperscript{136}

The articles provide a detailed insight how the financial crisis might influence the real economy. Of course one could argue that companies have to face other risks like the decrease of demand but if this one thinks further in this direction one will come up with purchasing power of consummates which is only a result of money supply and the money supply is caused lending ability and the lending willingness by financial institutions. So the author of this paper will consider restrictions in lending ability and willingness from financial institutions to the real economy a major and most important influencing factor form the financial crisis on the real economy. This assumption will become especially important when is comes to defining of selection criteria to select companies which do not have to suffer from bad influences from the financial crisis.

The last important point which is important to mention and which at the same time leads to the next paragraph can be described with the following quote: "Each of these scenarios depends on many assumptions and comes with caveats, which offer cause for either hope or worry."\textsuperscript{137} This sentence which Farrell and Lund, put at the end of their calculated estimates, detects an important issue in the financial crisis and for this study. The sentence says that the authors do not know if there estimates were right. It is always speculation in estimating the extent of the financial crisis. Regarding this study this is important, because it can anticipate the possibility that analysts draw a too bad or too good picture in its estimations. This is exactly the point where the investigations of this study starts. If market observers, analysts and investors misjudge the actual situation then there might be a possibility of finding miss priced company stocks. Indications that market observes draw a too bad picture of the actual situation and as a result some companies might be under valued should be presented in the next paragraph.

\textsuperscript{135} Farrell / Lund (2009), p. 30-31 
\textsuperscript{136} Farrell / Lund (2009), p. 30-31 
\textsuperscript{137} Farrell / Lund (2009), p. 31
3.3.4 Market and emotions

Many articles these days give an insight about the main emotional state of investors, financial institutions and the common public. Allan Sloan who has been writing about business since forty years comments that this financial crisis feels worst. Furthermore, he compares the current crisis with the great depression.\textsuperscript{138} And in deed, according to a CNN/Opinion Research Corp. poll to which Mark W. Riepe refers in his column "Depression Fear is Overblown", sixty percent of the Americans believe that the economy will fall into a depression.\textsuperscript{139} Moreover many of them are very frightened to loose their jobs\textsuperscript{140} and as a result, consumer confidence is almost gone.\textsuperscript{141} In short: "…people feel less safe and more insecure…".\textsuperscript{142}

When moving from the general public to the financial sector one can observe similar emotions. Cary Cooper state that in the economic downturn uncertainty is a prime feeling which has created: "…a negative psychological state…” in market participants (consumers, savers, households and investors).\textsuperscript{143}

In a panel discussion dealing with the financial crisis, many comments were made regarding the emotion and feelings during the economic downturn, but the statement which describes the situation best was made by Miller: "Many of the institutions are scared to death…”\textsuperscript{144}

Moreover many investors are frightened about political decisions which may result from the economic decline. Some investors fear a massive intervention of the government like nationalization of banks, and some are worried that the administration might act not strong enough to get a grasp of the crisis.\textsuperscript{145}

Summarizing this paragraph one can state that nobody has an idea what the next phase of the financial crisis will look like. Because nobody knows if the measures taken are the right ones, and will have a positive impact on the shrinking economy, uncertainty and fear dominates the minds, and the confidence in what the future will bring diminishes.\textsuperscript{146}

3.4 Establish the hypothesis

To this point the EMH was considered which claims that prices are set efficiently. In the end of the explanations regarding the EMH anomalies are emphasised which indicate that the

\textsuperscript{138} Sloan (2008), p. 26
\textsuperscript{139} Riepe (2008), p. 32
\textsuperscript{140} McKellar (2009), p. 18
\textsuperscript{141} Treanor / Katsoris / Fisch / Kaswell / Cohen / Miller / Morgenson / Neiman / Cave (2009), p. 1-47
\textsuperscript{142} Cooper (2008), p. 26
\textsuperscript{143} Cooper (2008), p. 26
\textsuperscript{144} Treanor / Katsoris / Fisch / Kaswell / Cohen / Miller / Morgenson / Neiman / Cave (2009), p. 31
\textsuperscript{145} Steverman (2009), p. 8
\textsuperscript{146} Treanor / Katsoris / Fisch / Kaswell / Cohen / Miller / Morgenson / Neiman / Cave (2009), p. 31
EMH might not fully explain any price movement. These anomalies however could not totally prove that the market acts inefficient.

After considering different items of the behavioural of finance theory which includes psychological aspects in the consideration serious doubts arose, if the EMH is the ultimate explanation of price setting. Especially against the background of the financial crisis with many bad company and economic news, concepts like narrow framing, confirmation bias etc. might give a better explanation of how prices might be set during this time. If it is true, these psychological reasons are responsible for the pricing of securities these days of economic disturbance and no longer rational consideration, than companies might be undervalued by market participants. Some authors are exactly of this opinion. Cary Cooper for instance state that: "…fluctuations are more often about the public's mood, their perceptions and psychology about markets…”\textsuperscript{147} He continuous that in these times of the financial crisis investors’ decision-making is irrational.\textsuperscript{148} Allan Sloan also believes that stocks have been fallen to unreasonable (inefficient) levels.\textsuperscript{149} The last author which should be cited here is Ben Steverman. He is of the opinion that especially in the November of 2008 the irrational tendencies could be observed.\textsuperscript{150}

If irrational price setting has taken place and as a result companies might be undervalued, that implies the advantage of realizing abnormal returns when the prices of fundamentally not affected companies adjust after the crisis to its true value again.

Because the authors are of the opinion that the fear of the financial crisis lead to irrational decisions which follow the theory of the behaviour of finance they put forward the hypothesis that:

\textit{Markets can be inefficient in the times of the financial crisis 2007 to 2009.}

4 Methods

4.1 Valuation models

There are many models of company valuation. However, in most academic scripts one can find the following: the economic value added, multiply analysis, discounted cash flow, the dividend discount model (DDM), Abnormal Earnings Growth (AEG), the discounted cash flow (DCF). Because the author’s work is limited in the extent, they must reduce themselves to describe all of them shortly with the presentation of their advantages and drawbacks.

\textsuperscript{147} Cooper (2008), p. 26
\textsuperscript{148} Cooper (2008), p. 26
\textsuperscript{149} Sloan (2008), p. 27
\textsuperscript{150} Steverman (2009), p. 8
4.1.1 The economic value added

4.1.1.1. Introduction
This approach to company valuation shows the profitability of the firm. This model is calculated by the difference between the return on capital investment and the cost of capital. Next this difference is multiplied by the capital companies stock at the end of the year.\textsuperscript{151}

\begin{equation}
1) \text{EVA} = (\text{ROIC} - \text{WACC}) \times K
\end{equation}

The reasons for applying EVA to company valuation are to show, if the firm in a particular year adds or destroy its value.

4.1.1.2. Advantages and drawbacks
The biggest advantage of this valuation approach is the possibility of observance the company's performance in small elements such as projects and activities. If the WACC is greater than ROIC, it points out the company, that some of its activities or projects should be withdrawn. It must be highlighted that the purpose of the management should not be maximized the EVA for the particular projects or activities in one year, but the increase of the value of EVA for a whole company in the long time perspective. This long-term EVA is called MVA (Market Value Added).\textsuperscript{152}

4.1.2 Multiple analysis

4.1.2.1. Introduction
This valuation approach relies on comparisons between the companies’ ratios (multiplies) such as: price to sales, price to earnings or price to book value. It should be emphasized that comparative companies should have many similarities such as: size, products, clients etc. In order to compare them, it should be calculated firstly the average or median of: their sales, earnings before extraordinary items, book value and market value. In the next step this items from the financial statements are used to compute the ratios such as: P/S, P/E and P/B. The multiple comparisons between the different companies’ ratios allow to set the fair prices of the particular stock among the inside industry comparisons.

4.1.2.2. Advantages and drawbacks
Although this valuation is very simple, fast and cheap, it has many drawbacks. First of all, it is difficult to find the companies, which are almost identical or at least very similar. In the face

\textsuperscript{151} Frykman / Tolleryd (2003), p. 33
\textsuperscript{152} Frykman / Tolleryd (2003), p. 34
of these problems, it can not make any sense to comparing the companies, which are different in to a big extent. Furthermore, it might occur the negative ratio in one of the comparative companies and it is not able to assess the value of the stock based on that model.\textsuperscript{153} Furthermore the use of the different accounting approaches cause difficulties in comparisons.\textsuperscript{154} This model is used especially for the valuation of companies, which can not fairly and reliable be priced or if the investments bank is going to list the companies on the exchange market.\textsuperscript{155}

4.1.3 Discounted cash flow model

4.1.3.1. Introduction

This model calculates the value of equity. In the first step all future free cash flow, which is the difference between its cash flow from the operations and investments, is discounted to the present value. In the next step, from the discounted company’s free cash flow it is deducted the firm’s debt and this calculated amount shows the value of the company.\textsuperscript{156}

4.1.3.2. Advantages and drawbacks

Although that model is easy and useful to apply for different size of companies, it supports such theory as the CAPM and moreover accounting rules does not affect it\textsuperscript{157}, it has many drawbacks. First of all the decrease of the investment causes the increase of companies value. However, in the long-time future each company requires the investments to develop itself and they should be considered like the positive issue. However, the DCF assesses them like the loss of value. In addition to that the model does not meet the requirements of matching principle. It means that cash receipts from the operations do not cover with the investments, which create them in the same year. The effect of the investment is visible on the operations cash flow in the next year. Furthermore, there is a lack of good forecasts of cash flows, because the financial specialists concentrate their efforts on predicting the earnings.\textsuperscript{158} Finally, this model does not allow companies to compare with their main competitors, because of it does not take into considerations the role of business strategy, which includes besides the

\textsuperscript{153} Penman (2007), p. 76-77  
\textsuperscript{154} Copeland / Koller / Murrin (2000), p. 67  
\textsuperscript{155} Penman (2007), p. 78  
\textsuperscript{156} Penman (2007), p. 122-123  
\textsuperscript{157} Frykman / Tolleryd (2003), p. 70-71  
\textsuperscript{158} Penman (2007), p. 126, 127
finance, for instance such important business elements like marketing, implementation of innovation and management.\textsuperscript{159}

4.1.4 The dividend discount model

4.1.4.1. Introduction

The DDM model "equals the equity value to the value of all future dividends discounted back to today using the appropriate cost of capital"\textsuperscript{160} First of all to predict the value of company, the dividends should be forecasted for the next a few years. These dividends are usually taken from the following one to five years. This time is called ‘explicit period’. Furthermore, after this ‘explicit period’ the long-term dividend growth should be founded to count terminal value, which shows all capital flows after the explicit period to infinity. Both expected dividends to time T and expected terminal value at T should be discounted to present value by using the cost of capital.\textsuperscript{161} The mathematical formula below can completely summarize this model:

\begin{equation}
MV = D_1 / (1 + k) + D_2 / (1 + k)^2 + ... + D_n / (1 + k)^n + TV / (1 + k)^n
\end{equation}

The formula for TV is:

\begin{equation}
TV = D_{n+1} / C_E - g
\end{equation}

4.1.4.2. Advantages and drawbacks

The advantages of that model are simplicity and predictability, because it is easy to predict and calculate dividends in the short-period of time. However, this model also possesses many serious drawbacks such as the lack of the relevant connection between the creation of real value and dividend’s payoff. Dividend does not have any influence on creation of the company’s value, but actually there is the distribution of firms’ wealth.\textsuperscript{162} Furthermore, dividends can be paid to stockholders from borrowing money, that’s why it can not be a good indicator of the value creation by the company.\textsuperscript{163} Finally, there are many obstacles to forecast realistically the dividends in the long period of time. Nevertheless it is recommended to use this model, when the payoff ratio of a company is fixed.\textsuperscript{164}

\textsuperscript{159} del Sol / Ghemawat (1999), p. 42-56
\textsuperscript{160} Frykman / Tolleryd (2003), p. 29
\textsuperscript{161} Frykman / Tolleryd (2003), p. 29
\textsuperscript{162} Penman (2007), p. 122
\textsuperscript{163} Penman (2007), p. 247
\textsuperscript{164} Penman (2007), p. 122
4.1.5  Residual Earnings Model

4.1.5.1. Introduction

This method relies on the valuation of residual earnings (abnormal earnings) in order to assess the value of the company. The return which exceeds the required rate of return from the investment is called residual earnings. The rate of return for a particular company is computed by the use of company’s beta (based on the CAPM model):  

$$4) \text{Residual earnings}_1 = \text{Earnings}_1 - (\text{Required return} \times \text{Investment}_0)$$

Furthermore we can calculate (RE) based on another mathematic formula.  

$$5) \text{Residual earnings} = (\text{ROCE} - \text{Required Return on equity}) \times \text{Book value of common equity}$$

The growth of two drivers of residual earnings: return on common equity (comprehensive earnings to book value of net assets) and book value of common equity cause the increase of this ratio, which results the higher value of the company’s stock. RE company valuation relies on both, forecasting ROCE and the growth of book value of common equity for the following years. Both of these ratios are essential to compute RE in the next phase of the valuation, which should be additionally discounted to present value. In the last phase to find the company’s value, discounted RE should be added to the current book value. These phases are summarized by the following mathematic formulas:

1) When residuals earnings is expected to be 0, after predicted period:  

$$6) V^E_0 = B_0 + (\text{RE}_1 / p^E) + (\text{RE}_2 / p^2_E) + \ldots + (\text{RE}_T / p^T_E)$$

2) When residual earnings is expected to be constant:  

$$7) V^E_0 = B_0 + (\text{RE}_1 / p^E) + (\text{RE}_2 / p^2_E) + \ldots + (\text{RE}_T / p^T_E) + (\text{RE}_{T+1} / p_{E-1}) / p^T_E$$

3) When residual earnings is expected to grow with stable rate:  

$$8) V^E_0 = B_0 + (\text{RE}_1 / p^E) + (\text{RE}_2 / p^2_E) + (\text{RE}_3 / p^3_E) + \ldots + (\text{RE}_T / p^T_E) + (\text{RE}_{T+1} / p_{E-g}) / p^T_E$$

4.1.5.2. Advantages and drawbacks

The biggest advantages of using this model are: focus on the value drivers (profitability), investments are treated like the creation rather than lost of value, many accounting principles can be applicable to it, protect investors for paying too much for companies and furthermore is applicable even if the company does not generate free cash flow or not pay...
dividends. The disadvantages of that model are: dependence too heavily on accounting data, reliance on the assumption that book value can be a good reflection of owner’s equity in the companies.¹⁷²

4.1.6 The Abnormal Earnings Growth Model

4.1.6.1. Introduction

This model takes into consideration the future earnings and earnings growth in the company’s valuation as the inventors of the AEG Model Ohlson and Juettner-Nauroth state: "In a very real sense, the core of the [AEG] model shows how the current price depends on forward EPS and their subsequent growth as captured by two dividend-policy independent measures of EPS growth".¹⁷³ To calculate the equity value based on this model some mathematical quotation must be introduced:¹⁷⁴

9) Abnormal earnings growth, = Cum-dividend earnings, - normal earnings,

10) Cum-dividend earnings, = Earnings, + (p²E-1) * dividend,⁻¹

11) Normal earnings = pE * Earnings,⁻¹

To estimate the company’s value according these model it should be used the following steps:

1. Forecast one year-ahead earnings
2. Add the present value (at the end of Year 1) of expected abnormal earnings growth for year 2 ahead and onward.
3. Capitalize the total of forward earnings and the value of abnormal growth."¹⁷⁵

To summarize these steps one can apply the following mathematical formula:¹⁷⁶

12) \( V^E_0 = \frac{1}{p_E - 1}[Earnings_1 + AEG_2 / p_E + AEG_3 / p^2_E + AEG_4 / p^3_E + ...] \)

4.1.6.2. Advantages and drawbacks

The strong point of this model is the focus on the most useful financial ratio (P/E). The paramount importance of that ratio draws the investors attention to the value added to the companies from firms’ market operations. The model is also compatible with many accounting principles.¹⁷⁷ The research proved the applicability of this model in the reality. According to Swedish scientists most of the stock prices calculated on this model assumptions was closed to real.¹⁷⁸ However, the model possesses also drawbacks such as: the compliancy

¹⁷² Peterson Drake (2008), p. 4
¹⁷³ Jennergren / Skogsvik (2007), p. 2
¹⁷⁴ Penman (2007), p. 205
¹⁷⁵ Penman (2007), p. 204-205
¹⁷⁶ Penman (2007), p. 204-205
¹⁷⁷ Penman (2007), p. 213
¹⁷⁸ Wingård / Viklund Emil (2007), p. 41
for laics, the lack of deeper inside into drivers of earnings, sensitiveness to the creative accounting.\textsuperscript{179}

5 Research strategy in practice

In this paragraph the authors discuss which concepts the researchers want to analyse to be able to answer the research questions. And in addition to that they will introduce measures of each concept.

5.1 Concepts in question

Bryman and Bell define concepts as: "...the building blocks of theory and represent the point around which business research is conducted."\textsuperscript{180} They continue their explanations and state that: "Each presents a label that we give to elements of the social world that seem to have common features and that strike us as significant."\textsuperscript{181}

In this research work four study areas are of major importance. The first deals with the question if it is possible to find companies which have not experienced significant influences from the financial crisis. Second, what the current real value of companies is. Third, how market participants estimate the current situation. And fourth, what leads market participants in their estimations (rationality or emotion). For every field of this study an adequate concept must be found, which captures the particular area.

In the first study area companies should be detected which have not experienced significant influences from the current financial crisis. Or in other words, companies which are still in a similar condition in the times of the financial crisis as they were before the crisis. A concept which reflects the financial situation of a company is the company's financial performance. The authors are aware that this concept is highly aggregated because it aimed to reflect the financial performance of the whole company instead of concentrating to a more detailed concept like credit risk. Although one could argue that a more detailed concept like credit risk might be a better one because it refers more directly to possible impacts of the financial crisis (credit risk increased during the financial crisis) and because of that gives a deeper insight in how companies may be influenced by the financial crisis, the authors choose the more aggregated concept of company's financial performance. The main reason for this are, that the financial crisis has not only obvious or direct influences on companies like a declining lending willingness or maybe higher interest rates for borrowing and as a result higher cost of capital, but also indirect influences like the decline of demand as a result of declining purchasing power because many people have lost their jobs in the economic downturn. An

\textsuperscript{179} Penman (2007), p. 213-215
\textsuperscript{180} Bryman / Bell (2007), p. 157
\textsuperscript{181} Bryman / Bell (2007), p. 157
aggregated concept like company's financial performance captures these indirect influences, too.

The second study area refers to the current real value of the company. In this part the authors want to detect how much a company is really worth. An appropriate concept of this study is the fundamental value of the company. The authors believe that the fundamental value is the real value (or an estimate as close to the real value as possible) of a company because as described in the introduction of the behavioural finance theory framework, market values might be driven by market participants emotions and by that fluctuate from the appropriate value the business is really worth. By using the method of fundamental analyses an analyst or investor tries to detect: "...intrinsic values, warranted values, or fundamental values."\(^\text{182}\) The term intrinsic value describe according to Penman: "...the worth of an investment that is justified by the information about its payoffs."\(^\text{183}\) In other words: With the use of fundamental analyses an investor tries to concentrate on discovering the real value of an asset which is determined by its future payoffs. By that he avoids being miss leaded by his emotions and as a result get as close as possible to the real value of the company. Because of that the authors believe that the fundamental value is the right concept in the third study field.

The third study field deals with the market participants’ estimation of the situation of the financial crisis. The concept that describes market participant’s estimation of the current situation is the market value of an asset. According to the Efficient Market Hypothesis any new information appearing will be included into the market value of an asset though supply and demand which result from market participants estimations of the current situation with a new peace of information. Because of that the concept of the market value should be used in this study to describe the market participants’ estimation of the current situation.

The fourth study field refers to the reasons why the market participants estimate the current situation in the way they do. What leads the market participants in their estimations? Are market participants acting rational or are their actions driven by emotions? These kinds of questions are difficult to answer because they require extensive surveys about the feelings, hopes and fears of market participants. Although it is difficult, the authors want to include a concept that reflects the emotional condition of the market participants in their work. The concept which fits best it is confidence. The authors are aware that only the concept of confidence can describe the whole emotional situation of the market participants but in a relatively small research project like this work is useful, as it describes partly the emotional condition of market participants and (as we see later) data about the confidence of market

\(^{182}\) Penman (2007), p. 4

\(^{183}\) Penman (2007), p. 4
participants is provided by several financial service providers and thus relatively easy to gather without extended surveys.

5.2 Finding adequate measures of the concepts

After the introduction of the concepts which should be examined in this study, the next step is to find adequate measures of these concepts. Following a quantitative research strategy, which is the fundament of this study as described in the beginning, the introduced concepts must be measured. After the concepts of a study are measured they reveal insight in the studied topic in the form of relationships (independent or dependent variables) between them. By that hey: "… may provide an explanation of a certain aspect of the social world, or they may stand for things we want to explain." Moreover measures have many advantages. The most important of them are: Measurement allows to detecting fine differences, measurement provides a consistent device and measurement allows more precise estimates of the degree of relationship between concepts. It should be pointed out that when determining appropriate measures it must be vigilant about that the measures must be reliable and valid and of course that they are related in a special manner to the possible financial crisis impacts.

5.2.1 Measures of company's financial performance

When it comes to find appropriate measures for the first concept "company's financial performance" many authors in various articles give recommendations. The article "Pricing with performance-controlled multiples" deals with the accuracy of the valuation of a company with multiples. The author state that the company's earnings are a:" …highly aggregated performance measure." In contrast to earnings multiples, book equity, invested capital or sales multiples lead to a smaller pricing accuracy. The results of the study "Stock Prices and Accounting Information: A Review of the State of Play" even confirms the view of Herrmann and Richter. The authors claim that:" …a number of studies that explore the value relevance and predictive power of accounting variables in a wide range of countries around the world. These studies generally find that book value and earnings can explain a substantial part of the variation in share prices, and that they can play a useful role in predicting future returns." This quote includes three main advantages regarding this study. First, earnings and book value of a company can predict future returns in an appropriate way.

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184 Bryman / Bell (2007), p. 158
185 Bryman / Bell (2007), p. 158
188 Herrmann / Richter (2003), p. 217
189 Herrmann / Richter (2003), p. 217
190 Pirie / Smith (2008), p. 22-36
This feature is important when it comes to the observation of company performance during the crisis. Two other advantages, which are not connected with this paragraphs topic of finding a measure for the concept but not less important, are that these two figures can explain a great part of the variation in share prices and the value relevance of this numbers. These two advantages become more important when it comes to miss pricing of shares and the real (fundamental) value of a selected company. In short, the results of both articles show that earning and book value multiples are appropriate measures of firm performance.

However, the authors want to add other measures for these concepts to account for the special situation of the financial crisis. Because of that three more measures should be introduced which first measure the company's financial performance and second are especially connected with possible financial distress. The article "The Early Indicators of Financial Failure: A Study of Bankrupt and Solvent Health Systems" deals with the topic of how financial failure can be detected as soon as possible. Although this article refers to health systems as study subjects the authors of this paper believe that the results can be transferred to the company sector because the principles of funding are always the same. The author of the article found that: "Traditional measures of financial performance related to debt and receivables management did not provide such clear early warning signals of problems for the bankrupt health systems." Instead he suggests to using cash flow related figures. Three ratios are of main importance for him: Operating Cash Flow (percentage change from prior to current period), Operating Cash flow to net revenues, Cash Flow to total liabilities. Because of the before mentioned connection of these figures to financial distress the authors of this paper will include these measures in their work. Only for simplification purpose the authors will summarize the three different cash-flow related measures to one measure, namely Operating Cash Flow.

In summery the authors of this study will use three figures to measure the concept of company's performance. These measures are:

- Earnings
- Book value
- Operating cash flow

These measures (or indicators) will also be the selection criteria when it comes to find companies which are not influenced by the financial crisis later in this paper.

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191 Coyne / Singh (2008), p. 333-345
192 Coyne / Singh (2008), p. 343
193 Coyne / Singh (2008), p. 343
5.2.2 Measure of fundamental value

The third area of interest – the real value of the company - is described by the concept of fundamental value. As one can see in the part "Valuation Models" of this study there exist many different possibilities to measure the fundamental value of a company. Several valuation models with different input variables can be employed to calculate the value of a firm. Because the models differ quite a lot the authors draw up a certain section named "Selecting a Valuation Model" to discuss in a greater extent why they choose a certain valuation model as a measure of the concept of fundamental value. Because of that and because this concepts increase importance first when it comes to the valuation of the selected company the measure of the third concept will be introduced later in that specific section.

5.2.3 Measure of market value

The measure for the concept of market value of a company is of course the share price. The market value of a company can be calculated by multiplying the actual price of common stock of a company with its shares outstanding. In this study the share price should be used as the measure of a company's market value.

5.2.4 Measure the market participants confidence

By measuring the market participants’ confidence the researchers fondly hope to insight in the emotional condition of the investors during the financial crisis. Bodie, Kane and Marcus recommend confidence indices as an appropriate measure to estimate the market participants’ current confidence in the situation. The authors state that a "Confidence Index" which includes data from the bond market gives insight in market participant's estimations, because: "… the actions of the bond traders reveal trends that will emerge soon in the stock market." Furthermore Bodie, Kane and Marcus recommend a confidence index computed by the company Barron's. As it was not possible for the researchers of this paper to gather data of Barron's confidence index they use an index computed by the State Street Corporation. It is stated on the company's webpage the State Street Confidence index. " … measures the attitude of investors to risk." The index was developed by the Harvard professor Ken Froot and an associate of State Street Corporation. The confidence index provides a measure of actual and changing risk included in investment portfolios and gives by that insight in the actual confidence of investors.

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194 Bodie / Kane / Marcus (2008), p. 604
195 Bodie / Kane / Marcus (2008), p. 412
196 www.statestreet.com/investorconfidenceindex/
197 www.statestreet.com/investorconfidenceindex/
6 Seeking not influenced companies

After defining the questionable concepts and their measures the first step of finding an appropriate valuation case can be taken, the detection of companies which are not influenced by the financial crisis. To discover appropriate cases the following questions must be answered: What indicates that a company is affected by the financial crisis?, Which and how many companies should be researched?, How do the researchers want to find a cases out of the not affected firms that they valuate with the chosen valuation model? What assumptions and criteria do they use? In the next paragraph the authors will discuss these issues in detail.

6.1 Definition of selection criteria

As mentioned before in the paragraph "Measures of company's financial performance" the concept of a company's performance should be measured by the use of three indicators which are: earnings, book value and operating cash flow. By observing these criteria during the time before and in the financial crisis companies which are not influenced by the financial crisis will be detected. How the sorting of companies will be deducted in detail is described in the next paragraphs.

6.2 Definition of research sample

6.2.1 The research sample

The ideal sample for the authors would be the entire stock market. There are two main reasons for that. First, if the entire market is researched the possibility of finding companies which are undervalued and at the same time not influenced by the financial crisis is greater. Second, and this must be seen as the main reason, the possibility of generalisation is given if the whole market is examined. For example is it possible for the researches to give statements if undervaluation can be observed to a greater extent in the small firm sector or in the sector of the biggest firms. Or maybe companies of certain branches (for example the energy industry) are not affected to such a great extent like companies of the banking or automotive industry. In short, exploring the whole market gives more knowledge in which parts of the market possible undervaluation is more common. The knowledge, gained by this study would be greater.

Because the extent of this study does not allow to examining the entire market the authors must limit themselves to a smaller sample. The search of an appropriate research sample is guided by two criteria from which the first must be seen as more important than the latter: The sample should allow an overview over different (most important) industries and by that

197 www.statestreet.com/investorconfidenceindex/
provide the possibility of generalisation of results; the sample should include companies where an undervaluation can be anticipated.

The first criteria lead the researchers to the idea to research constituents companies of stock market indices because an index includes several companies from different branches which would allow for generalisation. The second criteria lead the researchers to the use of an index that include small sized companies. If one recall the market anomalies introduced in the paragraph (3.1.4 Market anomalies) one might remember that miss pricing or undervaluation can be found in the sector of small sized companies which because these companies are less carefully observed by market participants. Because the financial crisis starts in the United States the index that should be the research sample of this study is the S&P 600 Small Cap Index (The market capitalisation of constituents must be located between 200 million USD and 1,0 billion USD). The authors are aware that they can't make any generalisations regarding different firm sizes if they select the S&P 600 Small Cap Index. The authors must accept this disadvantage because first of all they have to deduct the study according to the research purpose of their study. The purpose of this study is finding a company that is not affected by the financial crisis and detect its undervaluation and not finding out which kind of companies (small or big ones) are more likely to be not influenced by the financial crisis.

6.2.2 Exclusion of the telecommunication industry

When the authors divided the S&P 600 index according to different industries, they reveal that one industry (telecommunication service) is consists only of a few companies. First, such small industry including only four companies can not reflect the situation in the whole industry. Possible reason of a small number of telecommunication companies in the S&P 600 index might be a result from the industry specifications. Because economies of scale play an important role in this branch most of the companies operate in this business field are included in stock indices including medium or big sized companies. Second, the average results for this industry can be affected too much by one company that differs significantly from the others in the branch. Because the industry average of each indicator is important for further calculations a significant change in the average resulting only from one company will adulterate the results of further calculation. Such situation occurs during the calculations for the telecommunication industry, because the financial indicators of Neutral Tandem differ from others companies in the branch significantly. Because of that the authors exclude the companies of the telecommunication branch from their research sample.

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198 Bodie / Kane / Marcus (2008), p. 375
199 www.standardandpoors.com
6.3 Definition of seeking concept

6.3.1 Difficulties

One of the most difficult questions of this research paper will be discussed in the following: How does one find a company which has not experienced significant influences from the financial crisis?

This prime question involves many sub questions which must be answered. Some of the main questions are presented in the following list:

- Is a company affected by the financial crisis if the key indicators change negatively or positively?
- In which extent can key indicators change to state that companies are not affected by the financial crisis?
- What is a normal state for the particular company?
- How should the normal state be found?
- How should the normal state be combined with the financial crisis?
- Does a normal state of the company should be depended only on companies’ performance or on the industry performance?
- Is a company affected by the financial crisis although its key indicators fall in value, but the firm still performs better than other companies in the branch?
- Or is a company affected by the financial crisis if its key indicators grow, but they increase slower than whole industry?

6.3.2 Basic idea

After the discussion of all this issues a final seeking concept was found, that is based on the following condition:

*A company must be seen as not influenced by the financial crisis if the company performs according the industry average (which is an extrapolation of the historical industry average development calculated from the time 2004 to 2006) in the times before as well as during the times of the financial crisis (2006 – 2008).*

This condition combines company performance with branch performance. This is essential because if the industry a company belongs to is not taken into account one cannot make a statement if a certain company is influenced by the financial crisis or not. If for instance the data of a certain a company in the years before and during the financial crisis is compared and the company shows a stable performance, one might say that this company is not influenced by the crisis. If however, the whole industry of this particular firm performs better, than the
company, the firm must be seen as affected by the financial crisis although its performance is stable when only the data of this particular company in the times before and during the financial crisis is compared. Because of this the consideration of the specific firm performance in connection with the average branch performance is of major importance to detect uninfluenced companies. In short, a company can only be seen as not affected by the financial crisis if it performs according to its industry average.

To be able to compare industry and company specific values industry average and firm specific growth rates should be calculated. The standard deviation of the average growth rate form the industries should be used to establish minimum and maximum growth bands. Only the companies with growth figures which are located in between this, from historical values from 2004 to 2006 calculated bands, can be seen as not affected by the financial crisis. Moreover it is essential that the companies’ growth is located in between these bands during the time of the financial crisis as well as before the financial crisis. This is to avoid the following scenario. If for instance a company performs above the industry average before the financial crisis and performs in relation to the industry average in the financial crisis this means that the company is negatively affected by the financial crisis. Now, if the only condition would be that the company must perform in relation to the industry average in the times of the financial crisis the above mentioned company would fulfil this condition (and because of that is seen a not affected company) although it was influenced in a negative fashion during the financial crisis. To avoid that this kind of cases it is essential that the companies develop according to the industry average before and in the times of the financial crisis. Therefore the company performance must be located between the minimum and maximum bands in both periods (before and during the financial crisis).

6.3.3 Defining an observation period

As mentioned in the paragraph before the observation period in which companies must maintain certain levels of the established indicators should be from the year 2004 to 2006 for the time before the financial crisis and 2007 and 2008 for the times of the financial crisis. The authors decide to establish a time period of only three years for the time before the financial crisis. This decision has several reasons. First, the economy nowadays is ruled by the process of creative destruction. This means that our companies experience rapidly technologically and social changes, which both destroy and launch a new companies, create new industries, modify economical cycles, shorten the product life and as a result influence the economic performance of companies (in the case of this study measured by earnings, book value or cash flow). Thus the company indicators fluctuate to a great extend in unpredictable
directions. If for instance, among an industry a break-through innovation is discovered, it can lead to a rapid change in the demand, which in turn influence the firm’s economic performance and thus the measures established in this research. That is why the authors consider that it can be too risky to include a longer period than three years before the financial crisis in order to set the bands of average economic indicators for each industry. If the authors would decide to choose a longer time period, the variance of the earnings, book value and cash flow could be significantly higher. This might lead to the setting of too wide bands, which will result the inclusion of too many companies sorted out as not affected by the financial crisis. In order to avoid the selection of too many companies, the researchers decide to use only a three years observation period for the companies indicators before the financial crisis.

6.3.4 Mathematical Implementation of the seeking concept

After introducing an concept according to that the not influenced firms should be sorted out the researchers had to implement this concept in an excel spreadsheet that allows for proceeding the 600 constituent companies of the S&P 600 Small Cap Index. The spreadsheet (for each indicator one spreadsheet was established) was created according to the following explanation:

First, the average value of the indicator from 2004 to 2006 is calculated. The numbers at the bottom line of each industry are the industry values. After that, the growth rates from the year 2004 to 2005 and 2005 to 2006 as well as the average growth from 2004 to 2006 of the indicator were calculated. The standard deviation of the two growth figures was calculated afterwards. For each industry bands were established which reflect the average growth plus two times the standard deviation. If the average growth of an industry is for instance 15% and if the standard deviation of growth is 8% than the maximum band is 8% x 2 + 15 = 31% and the minimum band is 8% x 2 – 15 = -1%. By the introduction of bands a corridor of possible growth values for the years 2004 to 2008 is created. Under "normal" conditions (the absence of the financial crisis) most of the growth rates of the companies in 2004 and 2008 will lay between the minimum and the maximum band in the created corridor.

In the second table sheet in the excel file first the average of the values of the particular indicator is of the years 2007 and 2008 is calculated. Afterwards the growth rate of the value of the indicator form 2006 to 2007 and from 2007 to 2008. Moreover the average of the growth rates is calculated. At this stage two conditions are implemented which reflect the seeking concept the researchers established in under the point (6.3.2 Basic idea).
With the first condition it is proved if the average growth of the indicator of the years 2004 to 2006 is located in the established bands. If that is the case the condition is fulfilled. The second condition refers to growth rate of the indicator in the times of the financial crisis. With this condition it is proved if the average growth rate from the years 2006 to 2008 is located between the minimum band and maximum band. If that is the case the condition is fulfilled. This means that the particular indicator grows in relation to the industry average – the company can be viewed as not influenced by the financial crisis. If the average growth of the years 2006 to 2008 is not situated in the bands (growth is greater or smaller). This means that the particular indicator grows either too much or too little in the time of the financial crisis in relation to the industry – the company is either influenced in a good or in a bad fashion by the financial crisis. These kinds of companies are sorted out by this condition, too. Only the company which passes both conditions in each of the key indicators can be seen as not influenced by the financial crisis because the indicator grows before an in the times of the financial crisis in relation to the historical industry average. Only companies which fulfil both conditions in each indicator will be part of further investigation.

6.4 Selecting of an appropriate case for further investigation
The selection process which followed the above described calculations and includes all constituents companies of the S&P 600 Small Cap Index (detailed description of underlying data can be found in the appendix number 14) lead to the following results. Firms which are according to the researchers approach not influenced by the financial crisis are:

- Applied Ind'l Tech (AIT), Industrials
- Boston Beer Company (SAM), Consumer Staples
- Caseys General Stores Inc. (CASY), Consumer Staples
- Curtiss-Wright Corp. (CW), Industrials
- Hain Celestial Group (HAIN), Consumer Staples
- J & J Snack Foods (JJSF), Consumer Staples
- Lance, Inc. (LNCE), Consumer Staples
- P. F. Chang's China (PFCB), Consumer Discretionary
- Peet's Coffee (PEET), Consumer Discretionary
- Pre-Paid Legal Svs (PPD), Consumer Discretionary
- Red Robin Gourmet (RRGB), Consumer Discretionary
- Stratasys Inc. (SSYS), Information Technology
- WD-40 Company (WDFC), Consumer Staples
Thirteen companies out of 600 pass the restrictions the researchers established to find unaffected firms. Because the extent of this research paper is limited the authors will select the most promising case for further investigation. The authors are of the opinion that a company that indicator values steadily rise must be seen as most promising, because first each of this companies must be seen as not affected by the financial crisis and in addition to that continuously rising indicator values of certain companies indicate that the company performs slightly better year after year. A drop in the share price by especially this kind of companies first, should be really rare and second if a drop in share price should be really the case this must be seen as a strong indication of possible undervaluation. If one compare the development of the indicators of the selected companies (see Appendix 1 – 13) then one can recognize that only one company shows a slightly continuous upward trend namely: Applied Industrial Tech (AIT). The mentioned company shows from year to year in all indicators a slightly increase.

7 Valuation of a selected case

7.1 Selecting an appropriate valuation model

Under the point (4.1 Valuation models) of this work, the authors describe the different models of company’s valuation with stressing their weak and strong points. However, when the situation of the financial market is tension, the authors should carefully check it again to choose the most suitable model to conduct the current company valuation. The authors decide to use the Residuals Earnings Model, because of several reasons.

Initially, the authors of two academic articles recommend residual earnings based valuation as accurate measures of the firm value. First, the article "Residual-Income-Based Valuation Predicts Future Stock Returns: Evidence on Mispricing vs. Risk Explanations" written by Ali, Hwang and Trombley support the residual-income-model because the authors used this model to estimate the fundamental value of companies in their study. Moreover this model is especially suitable to predict future stock returns. Second, Pirie and Smith state in their paper "Stock Prices and Accounting information: A Review of the State of Play" in which they review the theoretical background of the residual income model and after that discuss the results of empirical studies based upon it, that: "These findings suggest that the residual income model, and the Ohlson version of it in particular, form a useful framework for exploring empirical relationships between share prices and accounting figures." In

201 Ali / Hwang / Trombley (2003), p. 394
202 Pirie / Smith (2008), p. 22 - 36
203 Pirie / Smith (2008), p. 34
summary, one can say that the findings of both articles support the use of the residual-income-model. Firstly because of, it is used in both studies to discover the fundamental company value and secondly, the model has a special relationship with share prices. These relationships must be seen as a special advantage when it comes to the comparison between share price and fundamental value of certain companies.

Moreover the decision in favour of the residual earnings valuation approach has some technical advantages. The central point of this model there are residual earnings, which testify about the profitability and growth of the company.\textsuperscript{204} In order to calculate the RE, information about the ROCE has to be possessed, which points out how the company generates the earnings from shareholders’ investments in the firm. In other words ROCE is the rate of return from 1$ invested by the shareholders in the company. There is a good point of companies’ comparisons, because it shows how the companies generate the earnings in the time of financial crisis. Some of them can be better adopt to deal with the financial crisis, because their management could predict the appearance of the storm of the financial market and prepared company to that event or firm’s wise strategy includes the elements, which protect them from negative consequences of financial disturbance (2007 - 2009). Generally, that element of the computation of Residual Earnings Model is in the bigger extent rational, because it shows the skills of management of leading the company in difficult times of the financial crisis and firm’s flexibility to adoption to the permanent changing conditions. However, other elements of the Residual Earnings model: required return of equity and book value, are to great extent affected by the irrationality of the financial markets in the time of financial crisis. The companies required rate of return depends on the assessment done by the credit rating agencies. At the first glance, the analyses of companies’ performance are conducted by the specialists, who scrutinize carefully all available public financial statements\textsuperscript{205} to assess the credibility of the company. The higher company’s credibility, the lower interest rate is for it.\textsuperscript{206} It is important to stress that credit rating agencies have managed with their role quite well for many years.\textsuperscript{207} However, it must be stated that they operate in such unstable business surrounding first time, because their role in the economy became bigger just after the Great Financial Crisis (1929 - 1933) and since that crisis the world have not copied with such huge disturbance on the financial markets again. Moreover the rating agencies have been one of the creators of the financial crisis, because they did not asses

\textsuperscript{204} Penman (2007), p. 372
\textsuperscript{205} Kim / Nofsinger (2007), p. 79
\textsuperscript{206} Kim / Nofsinger (2007), p. 80
\textsuperscript{207} Kim / Nofsinger (2007), p. 81
properly the risk of collateralized debt obligations (CDO). They were too optimistic according to the credibility of such financial instruments.\footnote{The Wall Street Journal (2009)} If they had predicted too optimistically performance of CDO, they could be too pessimistic of the assessment the companies’ credibility in the times of financial crisis, which could result the higher rates of required return. The research, which has been done by one of the biggest rating agencies (Moody's), shows that the percent of global speculative-grade companies has been increased from 1.5\% to 7.1\% during one year.\footnote{www.moodys.com/} In which extent, this rapid change is caused by rational facts taken from financial statements and in which extent, by the psychological patterns described by the authors in the paragraph ‘behavioural finance’. Another part of model - book value is the difference between assets and liabilities. It represented the shareholders investment in the company.\footnote{Penman (2007), p. 155} In the times of the financial crisis shareholders usually liquidate their investments into companies. However, this process can be speeded up by the phenomena of herds, which the authors explained earlier and causes that most of the investors used to buy stocks "high" and sell them "low". It is contradicted to profitable investment strategy.\footnote{Lynott (2008), p. 72-73} We can conclude that this model contain the features with absorb also the irrational behaviour of human nature. That’s why the price, which are set based on it combine the irrational and rational elements. It can be interested how the stock exchange real price is different from this computed price based on models to observe how the stock exchange is affected by the irrationality.

\subsection*{7.1.1 Necessary financial Data}

To be able to apply the residual earnings valuation model, certain financial data must be collected from the selected case companies. The necessary financial data result mainly from the residual earnings drivers. Residual earnings are driven by the following items: Return on common equity (ROCE), cost of capital for equity and the book value of common equity.\footnote{Penman (2007), p. 162} All of these items except the ROCE must be collected from the financial statements of the case companies. The ROCE must not be collected because it can be calculated with the help of the following equation:\footnote{Penman (2007), p. 162}

\begin{equation}
13) \text{Earn}_t - (p_E - 1)B_{t-1} = [\text{ROCE}_t - (p_E - 1)]B_{t-1}
\end{equation}
To be able to calculate the future book values (book values during the forecast horizon) two other items must be added to the yet existing ones. The future book values are calculated according to the stocks and flows formula:\(^\text{214}\) 


From this equation it follows that data about the net dividends of a company must also be collected so that the list of necessary data now consists of four items: Earnings, book value, net dividends and required return on equity.

Since the object to be valued in this study is a company on terms of shares (equity) some of the general items mentioned can be changed to share related items: Earnings per share (EPS), dividends per share (DPS), book values per share (BPS).\(^\text{215}\)

When it comes to the calculation of the continuing value another figure might be needed. In case the residual earnings after beyond the forecast horizon increase at a certain amount a year, then the growth rate of residual earnings is needed, too.

The definitive list of necessary data consists therefore of: Earnings per share (EPS), dividends per share (DPS), book value per share (BPS), cost of capital for equity and (if the certain case requires that) the residual earnings growth rate after the forecasting horizon.

### 7.1.2 Estimating the cost of capital

The cost of capital for equity is also called opportunity cost of equity financing and describes the rate of return that is required by the company's common shareholders ("Cost of capital is the opportunity cost of having money tied up in an investment"\(^\text{216}\)). Estimating the cost of capital for equity is an important step in valuating shares (or companies) as it is used in the calculation of the residual earnings and as it is the figure by that the future residual earnings are discounted to present the present value. Penman\(^\text{217}\) as well as Copeland, Koller and Murrin\(^\text{218}\) recommend to using the capital asset pricing model (CAPM) to calculate the cost of capital for equity. Copeland, Koller and Murrin summarize the idea behind this technique as follows: "CAPM postulates that the opportunity cost of equity is equal to the return on risk-free securities plus the company's systematic risk (beta) multiplied by the market price of risk (market risk premium)."\(^\text{219}\) This relationship is described by the equation:

\[ k_s = r_f + [E (r_m) - r_f] \times (\text{beta}) \]

\(^{214}\) Penman (2007), p. 165  
\(^{215}\) Penman (2007), p. 167  
\(^{216}\) Penman (2007), p. 99  
\(^{217}\) Penman (2007), p. 167, 474  
\(^{218}\) Copeland / Koller / Murrin (2000), p. 214  
\(^{219}\) Copeland / Koller / Murrin (2000), p. 214
Consequently, before one arrives at the cost of capital for equity one must first determine the variables of the equation.

7.1.2.1. Estimating the risk free rate

The first step that should be taken is to estimate the risk-free rate. In theory the risk free rate is the return on a portfolio which has no risk and it is in addition to that totally uncorrelated with any returns in the economy. The most appropriate risk-free rate is therefore the return on a zero-beta portfolio with a minimum variance. Because contracting this kind of portfolio is complex and costly it is not common in estimating the risk-free rate.220

The authors Copeland, Koller and Murrin recommend to using a 10-year Treasury-bond rate. Reasons for that are according to the authors: It is a long-term rate which normally matches the duration of the cash flow of the company of investigation, it approximates the duration of stock market index portfolios like the S&P 500, it is less sensitive to unexpected inflation changes and the liquidity premium which is built into the rate might be slightly lower than that of 30-year bonds.221 Penman also mentioned bonds that cover the duration of the investment as a "readily measured" risk-free rate.222 Because of the author's recommendations the rate of return of 10-year U.S. Treasury Bills (at the end of 2008) will be used as the risk-free rate in this study which amounts 2.240%.223

7.1.2.2. Estimating Beta

The company's beta represents: "...the sensitivity of the investment's return to the market return..."224 The beta of a specific company is determined by the covariance of the returns on the specific company and the return on the market, divided by the variance of the return on the market.225

Company's betas are ready calculated by financial data service providers and therefore can be downloaded from the service provider's databases. The problem this pre calculated beta estimations is that they are mostly related to the S&P 500 index. Because in this paper the S&P 600 Small Cap Index is used the authors calculated their own beta estimations for this paper. The beta the researchers compute reflect the correlation between the selected case company and the S&P 600 Small Cap Index. Moreover, the calculation of own beta estimates protects the writers from the confusion caused by different beta estimates given by the

221 Copeland / Koller / Murrin (2000), p. 216
222 Penman (2007), p. 114
223 www.finance.yahoo.com
224 Penman (2007), p. 114
225 Penman (2007), p. 114
financial data service providers. Furthermore, most of the financial data service providers do
not offer the historical betas for a particular day and the authors need the selected company’s
beta for the 31.12.2008 to be accurate and reliable in the valuation of case.
In order to calculate AIT’s beta, firstly the authors computed the monthly returns from both,
the selected company and the S&P 600 Index (detailed description of the collection of data
can be found in the appendix 14). Next, the covariance between the returns of the selected
company and the index was calculated. The covariance between these two variables was
positive, but very low (0.0028) in the years 2004 – 2008. This means that the strength of the
linear relationship between these two variables was very weak. Furthermore, the variance of
S&P 600 was computed and it was also very low (0.0026), which indicates that the monthly
returns of the index was almost similar to each other in the period 2004 – 2008. Finally, the
selected company’s beta was calculated by the division of its covariance (with S&P 600) with
the variance of S&P 600 index and it amounted 1.1377. This number states that the volatility
of the company’s returns exceeds that of the index by 13.77% in the period 2004 – 2008.

7.1.2.3. **Estimating the market risk premium**

The only variable which is still missing is the *market risk premium*. The market risk premium
describes the price of risk and is calculated by subtracting the risk-free rate of return by the
expected rate of return on the market portfolio.

The estimation of the market risk premium turned out to be difficult. First, the authors try to
calculate the risk premium by themselves. However, the result was not satisfactory. The
calculation relies on first finding the yearly returns from S&P 600. Second, the average return
is calculated for the time period chosen by the authors. Finally, from the average market
return of the particular period the risk-free rate is subtracted. The authors chose data from
different time periods from which they then calculated the market risk premium. In the case of
years 1989 – 2009 the market risk-premium amounts 8.52%. If data from the period 2004 –
2008 was used the risk-premium amounts 12.54%. Moreover, the market risk premium for the
time of the financial crisis (2007 – 2008) was negative at a value of –0.5%. Such great
discrepancy of results causes the untrustworthiness of the authors’ results. Furthermore, it is
difficult to predict the market risk premium for 2009, because of the uncertainty about the
actual situation. Usually the stock exchange (share prices) anticipates first the recovery from
an economic recession. However, because of the scale of financial crisis it is difficult to state
that stock exchange will recover in 2009. That’s why the authors decide to take the risk
premium from the article: "Market Risk Premium: Required, Historical and Expected". In this
article different experts recommend the use of different historical market risk-premiums. The
writers decide to use the lowest from the proposed, because in the time of the financial crisis the risk-premium must be low. An indications for that is the risk-premium the authors calculated from data of the years 2007 to 2008 which had a value of – 0,5%. The market risk-premium for further calculations will be 3%.  

7.1.2.4. **Calculation of the cost of equity capital**

The cost of equity capital for further calculations in this work results from the formula:

\[ k_s = r_f + [E (r_m) – r_f] \times \beta \]

If the equation is applied with the use of the before established estimates of the variables it results:

\[ k_s = 2.240\% + 3\% \times 1.1377 \]

The cost of equity capital is therefore 5.653\%.

7.1.2.5. **Criticism of the CAPM method for estimating the cost of equity capital**

At this stage it is important to mention that the CAPM technology for estimating the cost of capital for equity has serious drawbacks. For one, different commercial service providers offer different beta estimates, each claiming that their own estimate is the most accurate. In short: "No one knows the true beta and inevitably betas are measured with error." Moreover, and this is even a greater issue, the determination of the market risk premium is problematic. Like the variation in the beta estimates the numbers for the market risk premium also vary from one another (sometimes in a very extent way). And of course: "…this degree of uncertainty, estimates of required returns are likely to be highly unreliable." Unfortunately the authors of this paper have to deal with these drawbacks, because: "…despite a huge effort to build an empirically valid asset pricing model, research in finance has not delivered a reliable technology. In short, we really don't know what the cost of capital for most firms is."  

7.1.3 **The forecast horizon and growth rate of RE after the forecast horizon**

7.1.3.1. **Determination of the forecast horizon**

In the book "Financial Statement Analysis and Security Valuation" from Penman the forecast horizon lasts for five years. Unfortunately, the authors’ had to undertake the valuation with a

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226 Fernandez (2004), p. 4
227 Penman (2007), p. 115
228 Penman (2007), p. 115
229 Penman (2007), p. 115
shorter forecast period, which lasts only for three years. The reason of for this is caused by the availability of data delivered by the DataStream database, which was used by the authors to collect the forecasts of EPS and DPS. The database offers only expert forecasts of these variables for three years. The reason for the shorter period of available forecasts might be caused by the uncertainty connected with the financial crisis. The financial experts might be afraid of the accuracy of their predictions in the environment of financial crisis, and this in turn might be the reason why only forecast estimates of three years are available in the DataStream database. In short, the decision of the length of the forecast horizon was not driven by methodological considerations but by the fact that forecast estimates were only available for three years.

7.1.3.2. Determination of the growth rate of RE after the forecast horizon

The estimation of the growth rate of RE after the forecast horizon is pivotal for the calculation of the company value because even small changes of this figure can lead to a great change of the company value. That’s why the authors had a fierce discussion about this variable. Penman recommends as one possible growth rate for residual earnings the GPD rate.231 The authors will not follow his advice since they are of the opinion that the actual growth rate is driven by the financial crisis and thus is not a favour. Another possibility is to take the 5 year average growth rate of earnings which is 15.32% for this company. According the authors, the maintenance of such dynamic is impossible in the face of financial crisis (too optimistic). From the authors point of view the growth of residual earnings for the years 2009 – 2011 is an adequate growth rate because it takes into account the growth for the next few years which seem to be a realistic growth for the future years. Thus, the authors decide to choose the three years average growth rate of residual earnings form the years 2009 to 2011 which amounts 2.38%.

7.1.4 Calculating the value of the selected case according to the RE model.

In the following paragraph the detailed calculations are presented which in the context of valuation using the residual earnings model were implemented. The calculation of the company value by using the residual earnings model is guided by the calculation Penman used when applying the residual earnings model.

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231 Penman (2007), p. 172
7.1.4.1. The starting position

The calculation of the fundamental value of the company starts with the gathered data (a
detailed description of the collection of data can be found in the appendix 14). The data that
represents the starting point of the calculation is: The book value per share in 2008 (11,88
USD), the forecasted earnings per share (1,44 USD 2009, 1,27 USD 2010, 1,49 USD 2011)
and dividends per share (assumed to stay stable at 0,60 USD) for the forecast horizon, the RE
growth rate of 2,38% and the cost of equity capital of 5,653%.

7.1.4.2. Detailed description of the calculations

Initially the stocks and flows equation is applied to forecast the book value per share for the
forecast horizon:

17) Ending equity = Beginning equity + Total (comprehensive) income – Net payout to
shareholders

This general relationship applied in the special case of company valuation will result in:

18) \( B_t = B_{t-1} + \text{Earn}_t - d_t \)

The ROCE now can be calculated by applying the next formula:

See formula 13 of this study

For simplification issues one can reformulate this formula as follows:

19) \( \text{Earn}_t / B_{t-1} = \text{ROCE}_t \)

After that the residual earnings for the forecast horizon can be calculated in two ways. First,
one can start with the earnings and book values and use the formula below to calculate the
residual earnings for the forecast horizon:

20) \( \text{RE}_t = \text{Earn}_t - (p - 1)B_{t-1} \)

Second, one can start with the forecasts of the ROCE and use the ROCE equation above to
calculate the residual earnings for the forecast horizon.

Next, the value of the residual earnings discounted to the time 0 is calculated for each year of
the forecast horizon:

21) \( V_{REt}^0 = \text{RE}_t / p^t_E \)

After that, the present values of all residual earnings are added together to calculate the total
present value of residual earnings for the forecast horizon:

22) \( V_{RE}^0 = V_{RE1}^0 + V_{RE2}^0 + V_{RE3}^0 + \ldots + V_{RET}^0 \)

As a next step, the so called "continuing value" is calculated. As mentioned before there are
three different possibilities how residual earning may develop in the future (beyond the
forecast horizon: The residual earning might be zero after the forecast horizon, residual
earnings might be stable (not growing) after the forecast horizon or residual earnings may grow at a constant rate after the forecast horizon.

In the first case, if the residual earnings are zero after the forecast horizon no additional calculations are necessary because there is no continuing value of residual earnings.

In the second case, if the residual earnings after the forecast horizon are stable, the continuing value can be calculated by the following formula:

\[
23) \text{CV}_T = \frac{(\text{RE}_{T+1} / p_E) - 1)}
\]

In the third case, if the residual earnings grow at a constant rate after the forecast horizon the equation below must be used to calculate the continuing value:

\[
24) \text{CV}_T = \frac{(\text{RE}_{T+1} / p_E - g)}
\]

After that, the continuous value must be discounted back to time 0 by using the cost of capital for equity:

\[
25) \text{CV}_0 = \frac{\text{CV}_T}{p^r_E}
\]

The last step in the present values of the continuing value, the residual earning in between the forecast horizon and the book value at time 0 are summed up to get the fundamental value of the specific company:

\[
26) V^E_0 = B_0 + V^{RE}_0 + CV_0
\]

The detailed description of calculations the authors of this paper presented to explain all calculations carried out in the estimation process of the company value can also be described in following summarized by the formulas:

- Formula 6 of this study for the fist case (zero residual earnings after the forecast horizon)
- Formula 7 of this study for the second case (stable residual earnings after the forecast horizon)
- Formula 8 of this study for the third case (growing residual earnings after the forecast horizon)

The excel spreadsheet of the calculations of the firm value can be found in the appendix 15.

7.1.5 Result of the company valuation and comparison with the actual share price

After the calculations have been conducted the company valuation results in a company value of 33.16 UDS per share.

If one compare this with the share price (a chart of the development of the share price can be found in the appendix 18) of the share at the last day in 2008 which was 18.62 USD\textsuperscript{232} one

\textsuperscript{232} www.finance.yahoo.com
recognize a difference between fundamental and market value of 14.54 USD or circa 43.85%. Because the researchers believe that the fundamental (or intrinsic) value of the company that results from the valuation is the true value of the company and not the market value, the company must be seen as under valued.

### 7.2 Undervaluation and emotional driven markets

After the researchers presented companies which are according to the established criteria must be seen as not affected by the financial crisis and after valuating of one of these companies and by that detect undervaluation of this stock, the last remaining question is if it can be proved that this undervaluation results from broad fear of market participants?

To answer this question the writers examined the relations (correlations): First, between the State Street Investor Confidence Index (CI) for the region of North America (including Canada and the United States) with historical prices of the S&P 600 index and AIT; and secondly between the CI and the sum of two of the author’s former financial indicators earnings and book value of all constituents of the S&P 600 Index and the selected companies (AIT).

In the first part of the correlation research the data of the Consumer Index, the price of S&P 600 and AIT was taken from the period January 2006 – Mai 2009 (a detailed description of the collection of the data can be found in the appendix 14). The results show between all of these three variables a relative strong positive correlation. The correlation between CI and AIT’s share prices amounts 0.542, between CI and S&P 600 0.706 and finally between S&P 600 and AIT share prices 0.851. This indicates that the mood of the investors influences the stock prices during the times of the financial crisis, at least for the S&P 600 Index.

In the second part of the correlation research the authors take data of the CI, the book value and EBIT of the constituents of the S&P 600 Index and AIT for four particular moments in different years (May 2006, May 2007, May 2008, and May 2009). There is a small miss match between the periods of these two parts of the correlation research, because in the second part a little bit longer period is analyzed. This is caused by needs of more times series to put to the correlation model. However, the authors believe such small miss match still allow to comparing both parts of their research. The results from the second part of the correlation research show negative correlation between the CI and the financial indicators of the constituents companies of the S&P 600 Index. The correlations between the CI and earnings amount – 0.6151, and between the CI and the book value – 0.1579. The big difference in correlation of price S&P 600 and Confidence Index on the one side, and S&P 600 earnings and S&P 600 from others amounts 1.32. This could indicate that the unjustified
fear of investors during the financial crisis (indicated by the behavior of the CI) can influence the S&P 600 Index too deeply and the prices of S&P 600 can be undervaluated, but such statement requires further detailed examination. Furthermore the price and book value of AIT are a little positively correlated with the Consumer Index 0.117 and 0.026. This means that it could be many companies on the market, which are undervaluated, because of the negative difference between the correlation of AIT earnings and CI, and S&P 600 Earnings and CI, which amounts 0.761. However, such statements require further researches and calculations. (a summary of the correlation research results can be found in the appendix 16 and 17).

8 Conclusions

8.1 Description of results

The goal of this study was to find out, if the fear of the market participants during the financial crisis 2007 to 2009 leads to undervaluation of companies which are not influenced by the financial crisis and thus in the times of the financial crisis the market is partially inefficient.

This goal must be seen as achieved as the researchers in the first part of their study (6. Seeking not influenced companies) detected firms which have not been influenced by the financial crisis. By this the authors answered the first research question.

In the second part of the study (7. Valuation of a selected case), the authors showed with the valuation of one company out of the thirteen detected uninfluenced firms that the particular firm was undervaluated. By this the researchers answered the second research question.

In the last part of their research (7.2 Undervaluation and emotional driven markets) the authors provide strong indication that the under valuation (miss pricing) of the company results from an emotion driven market, as the performance of the selected company stays stable (see appendix 1) during the financial crisis but the share price falls (see appendix 18). This behaviour of the stock price is irrational from the viewpoint of the efficient market hypothesis. If a company achieves good results in a stable fashion the share price should not fall but develop in relation to the good results of the company. If the share price drops anyway this indicates that the market reacts irrational and might be driven by emotion. A strong signal that the market is driven by emotions provides the State Street Investor Confidence Index. The indicator falls continuously from August 2007 to December 2008 whereas the companies of the S&P 600 Small Cap Index perform stable. Because of that the authors believe that the undervaluation of the company is due to broad fear of market participants. By this the third research question is answered.
Furthermore, the writers of this research paper must mention that the established hypothesis turned out to be true.

The authors consider that all of their research questions were proved by the deeper analysis of the S&P 600, the selected company (AIT) and correlation between the Consumer Index with both stock prices and indicators of cumulated S&P 600 and AIT.

8.1.1 Possibilities of generalisation and limitations of the study

Unfortunately, the generalisation possibility of the authors’ research paper is limited. The authors believe that this limitation results from the research design of a case study. The authors proved their research questions and hypothesis by finding one example (case) which indicates that their beliefs turn out to be true and by that the established research questions and the hypothesis must be answered positively. This research design of finding only one case which examination gives answers of all questions limits the possibility of generalisation because the researchers are only able to refer to this case. Because of that they are not able to make statements about their findings in general.

Although the authors examined all companies included in the S&P 600 Index and found that that most of the companies which are according to the writers are not affected by the financial crisis belong to the branches Consumer Staples and Consumer Discretionary the researchers believe that they can not make a general statement in the way that especially the branches Consumer Staples and Consumer Discretionary seem to be less affected than other branches because the researchers are of the opinion that their findings are not statistical significant.

Moreover does the examination and valuation of only one case company not allow general statements that companies are in general under valued in the times of the financial crisis?

Furthermore, the findings presented at the end of the correlation research part which might indicate that the broad fear of investors lead in general to the undervaluation of most companies is mot possible because to be sure that such a relationship exists further, deeper studies of this specific area are necessary.

In short, the researcher answered the research questions and by that the main question of this study but are not able to make statements which go beyond these questions.

8.1.2 Reliability and Validity of the results

In this paragraph the authors will reflect the reliability and validity of their research work and by that verify if the results they have achieved hold strict scientific criteria. To check the reliability and validity first the measures used in this study should be recalled: the measure of the concept of company performance have been earnings, book value and operating cash flow
(multiple measure), the measure of the concept of market value has been the share price, the measure of the concept of fundamental (intrinsic) value of a company has been the fundamental value calculated according to the residual earnings model and the measure of the emotional condition of market participants has been the State Street Confidence Index.

8.1.2.1. Reliability

The term reliability of a measure refers to: "… the consistency of a measure of a concept."233 This sentence means if the application of the same measures used in this study under the same assumptions the authors made, will show exactly the same results.

First, the authors believe that all their measures are reliable. The measures share price (for the market value of a company) and fundamental (intrinsic) value of the company (calculated according to the residual earnings model) result from financial theory and has been adequately proved regarding their reliability by the scientific society.

All measures describing the performance of the firm (earnings, book value, cash flow) are taken from financial statements of the respective company and must be seen as reliable as the financial statements must be established according accounting rules. Moreover the financial statements are checked by an auditor if the accountancies draw up the financial statements according to these rules.

The S&P 600 Small Cap Index as well as the State Street Confidence Index are calculated by well known companies which must have proved the reliability of their indices before publishing them and thus these two measures must be seen as reliable, too.

Further more the authors believe that it is possible for other researchers to achieve the same results if they conduct the same research. The writers base their judgment about the possibility of replication on several reasons. First, the researchers used in their work data, which is relatively easy to gather (even the DataStream database which is not public available should be available for researchers at their respective institutions). The accounting numbers must be published by every listed company. Moreover, historical share prices, values of the S&P 600 Small Cap Index, values for the State Street Confidence Index are public available, too through the internet. In addition to that the authors give a detailed description how they gathered their data so that other researchers can find the same data when they follow the descriptions.

Second, all the steps and calculations which change the data to gain insight and answers to the research questions had been explained in great detail. Further more, all assumptions the

233 Bryman / Bell (2007), p. 163
authors set (especially in the part of the company valuation) had been discussed and established clearly before the calculations. Because of that reasons the authors believe that the other researchers are provided with all important information about the deduction of this research and thus must be able to achieve the same results if deducting this research for their own.

8.1.2.2. Validity

The validity of a measure: "… refers to the issue of weather or not an indicator (or set of indicators) that is devised to gauge a concept really measures that concept."\(^{234}\) From the measures used in this study the share price and the fundamental value calculated according to the residual earnings model must be seen as beyond question because these two measures arrive from financial theory and have been adequately reviewed regarding their validity by the scientific society.

That means that the remaining measures which must be discussed at this stage are the measures of the company performance (which consists of earnings, book value and operating cash flow) and the measure of the emotional condition of market participants the State Street Confidence Index.

Do the book value, earnings and the operating cash flow really measures the companies performance. To answer this question first one must examine how this figures come about. Earnings, book value and cash flow are key numbers taken from financial statements of a company. These financial statements must be drawn up according to certain accounting rules. In Europe this accounting rules are known under the item IFRS and in the United States they are called US-GAAP. His two accounting frameworks differ in some point. Because in this study only companies from the United States are examined the rules according to which the numbers are calculated are coherent. However, it must be mentioned that the figures might be manipulated by the accountancies of the respective company because the accounting rules leave space of interpretations. Unfortunately the authors as well as anyone else outside the company must trust this figures after they have been proved to be calculated regularly by an audit agency.

The second question is, if these three indicators can really measure the whole performance of the company. This is especially questionable if one recall the part about the financial crisis of this study in which so-called off-balance sheet vehicles where introduced. The problem with these off-balance sheet vehicles or items (swaps are not covered in the balance sheet as well)

\(^{234}\) Bryman / Bell (2007), p. 165
is, as the name indicates, that they do not show up on the balance sheet of the company and thus are not captured with the established indicators although they can bear risk or include profits. The authors of this work must accept this because they are not able to gain more insight in items which are hold apart from the balance sheet. Because regulatory restrictions for these items have been less strict even institutional control authorities have not deeper insight in these positions. Nevertheless the authors believe that profits and losses out this kind of items soon or later will appear and influence the performance of the whole company that holds this items (as one can see at the case of Bear Sterns introduced in the financial crisis part of this study) and thus be captured by the introduced measures of company performance the authors established according to recommendations of other business researchers.

The last measure in question is the Confidence Index. According to the State Street Corporation: "...the Index provides a quantitative measure of the actual and changing risk contained in investment portfolios..." and by that gives an insight of the confidence of the investors. But is it possible to draw conclusions of the investors emotional condition (if they are feared or not) by examine their confidence measured by the fact how much risk they take?

The first connection between the willingness to take risks and the state of the confidence of market participants is obvious. The more confident one is the greater gets the willingness to take risks. The smaller the trust in the future is the smaller the willingness to take risks. But the second connection between the confidence and the fear is questionable. Are these tow issues really linked? Must a loss of confidence inevitably result from fear? Of course not. A loss of confidence can be caused by many things: less trust in the own abilities, less expectations about the future performance of companies, a different risk aversion of investors, expectations of political and financial stability etc. All these different factors influence the confidence. None would talk about fear if the Confidence index would fall by some points in value because the expectations of the future performance of companies are not good. The fluctuation of the index resulting from such reason is normal.

The point which makes the authors believes that the confidence indicator is able to reflect investor's fear is the extent and the timeframe in that the confidence index shrinks. A fast, huge drop of the confidence to historical all-time lows would imply that the investors (in the case of the State Street Confidence Index institutional investors) loose at the same time, confidence in the future and maybe even in their own skills and maybe in the financial stability. Because of this the authors believe that the Confidence Index can give insight in the

235 www.statestreet.com/investorconfidenceindex/
emotional condition of investors and is able to detect the fear of investors during the financial crisis.

8.2 Lessons from the research work

The authors have learned several lessons from their research work. First, the most general and most obvious conclusion is to be sceptical of the judgment of others, before the careful examination of the case for your own.

Secondly, the authors consider that valuation models which can be found in most of the financial students books are not suitable with the times of financial disturbance. Because the most of their variables must be positive (earnings, growth earnings, market risk premium) in order to find the value of the company. Thus, the appearance of such financial crisis could lead the financial experts to disorientation of the companies’ valuation, which experienced negative ratios. The lack of appropriate companies’ valuation tools could result in the panic of the financial markets and undervaluation of many companies. Such optimistically approach to permanent growth of the companies’ ratios, which are presented in most of the financial books, should be replaced by more counterbalanced, which take into consideration the negative values, especially in the face of globally changes. The Western societies become older and older in comparisons to the rest of the world. The senescence of the Western societies can lead to decrease of their innovativeness, efficiency and flexibility, which can have a great impact on decline their competiveness, demand for the products and finally being gradually replaced by the companies from developing countries. Moreover, the reality is seen in more black colours by Wallerstein, who does not see the difference between the young developed societies and old western. He states generally about capitalism: ”The system reaches a point of bifurcation. There are many signs that today, we have reached this point. Deruralization, ecological exhaustion and democratisation, each in different ways, reduce the ability to cumulate capital.”236 This reduction of ability to cumulate capital will lead to decrease of investments and without them, it is impossible to sustain the permanent growth of capitalistic world. That’s why it should be created models of company valuation, which took into consideration the negative value of company’s ratios.

Thirdly, authors learn that the choice of the research design (or in general the methodology pre-conceptions) have a big influence on the outcome of the study. By choosing the case study design for this research paper the authors recognized that they can answer their research questions and hypothesis but that they are not able to make general statements with their findings because they are very limited.

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236 Wallerstein (1999), p. 74
Maybe the authors wanted to answer too many questions at the same time. If they for instance concentrate only on the topic if companies are not influenced by the financial crisis they could choose other research design which allows for the comparison of many companies. By that they might then be able to make statements about which branch is less affected than another.

Fourthly, the writers learned that their results mainly depend on their assumptions they made. Other researchers can state for instance that the author’s approach is wrong, because they might have chosen the wrong observation period for in the part in which they seek unaffected companies. The three years before the financial crisis were very well for most of the companies listed on the S&P 600 and they achieved wonderful financial results and even without the appearance of the financial crisis such extreme high pace of growth of companies’ indicators could not be sustained. That’s why the others researchers could point out that another period of time should be better for creating observation period to the financial crisis.

Moreover other scientists might criticize that the authors create the adequacy of the bands the researcher established to detect unaffected firms. The bands created based on standard deviation from the average results. The standard deviations from the average results are lower than from the normal companies’ results. That’s why if the authors change the technique of creating the bands from the average to normal results, the bands could be bigger and by that significantly more unaffected companies could be included than in their case.

8.2.1 Recommendations for further research in this study area

The limitations of this study as well as the lessons the authors draw from it lead to the recommendations the authors of this research paper give for further research in this field of study.

As mentioned before the possibility of generalisation of the findings of this study is very limited. Therefore other researchers could deduct investigations which allow for more general statements. This might be achieved by changing the research design or by the concentration of only one research question.

Another possibility of further research would be the deduction of the same study with changed assumptions. As the writes discussed before their assumptions have a great influence on their results and in addition to that might be wrong or not accurate. A study with different assumptions would give answers of the question if changes in the assumptions change the basic massage of this study (in the times of the financial crisis the market is inefficient).

Moreover further research could examine the same questions but later in time. The days this study was carried out are maybe at the end of the financial crisis or maybe in the financial crisis. At the actual point in time none knows if the financial crisis is over yet. Maybe the real
impact of the financial crisis on the companies appears with delay and thus is still in front of us. Maybe a study like this in a later point of time (when it is really possible to delimit the time periods before, during and after the financial crisis) detect that the market is efficient (maybe because the drop in share price anticipates the fall of earnings in the future) and thus, the findings of this study must be revised.

All this further research recommendations aim the deeper study of market efficiency during the times of the financial crisis.
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Working papers


Master Thesis


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http://www.statestreet.com/investorconfidenceindex/

http://www.moodys.com/

http://www.standardandpoors.com
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Appendix

Appendix 1: Performance Indicators of Applied Ind'l Tech (2004 – 2008) in 1.000 USD

<table>
<thead>
<tr>
<th>Time</th>
<th>Book value</th>
<th>Cash flow</th>
<th>Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>502075</td>
<td>110303</td>
<td>95456</td>
</tr>
<tr>
<td>2005</td>
<td>450983</td>
<td>70925</td>
<td>86022</td>
</tr>
<tr>
<td>2006</td>
<td>414822</td>
<td>69853</td>
<td>72299</td>
</tr>
<tr>
<td>2007</td>
<td>393287</td>
<td>81034</td>
<td>55339</td>
</tr>
<tr>
<td>2008</td>
<td>339535</td>
<td>43088</td>
<td>29871</td>
</tr>
</tbody>
</table>

(Source: DataStream)

Appendix 2: Performance Indicators of Boston Beer Company (2004 – 2008) in 1.000 USD

<table>
<thead>
<tr>
<th>Time</th>
<th>Book value</th>
<th>Cash flow</th>
<th>Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
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<td>39842</td>
<td>8088</td>
</tr>
<tr>
<td>2005</td>
<td>133588</td>
<td>53794</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>108589</td>
<td>28977</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>85979</td>
<td>28841</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>78370</td>
<td>19273</td>
<td></td>
</tr>
</tbody>
</table>

(Source: DataStream)
Appendix 3: Performance Indicators of Casey's Gen Stores (2004 – 2008) in 1.000 USD

(Source: DataStream)

Appendix 4: Performance Indicators of Curtiss-Wright Corp. (2004 – 2008) in 1.000 USD

(Source: DataStream)
Appendix 5: Performance Indicators of Hain Celestial Group (2004 – 2008) in 1.000 USD

(Source: DataStream)


(Source: DataStream)
Appendix 7: Performance Indicators of Lance, Inc. (2004 – 2008) in 1.000 USD

(Source: DataStream)

Appendix 8: Performance Indicators of P. F. Chang's China (2004 – 2008) in 1.000 USD

(Source: DataStream)
Appendix 9: Performance Indicators of Peet's Coffee (2004 – 2008) in 1.000 USD

(Source: DataStream)

Appendix 10: Performance Indicators of Pre-Paid Legal Svcs. (2004 – 2008) in 1.000 USD

(Source: DataStream)
Appendix 11: Performance Indicators of Red Robin Gourmet (2004 – 2008) in 1.000 USD

(Source: DataStream)

Appendix 12: Performance Indicators of Stratasys, Inc. (2004 – 2008) in 1.000 USD

(Source: DataStream)
Appendix 13: Performance Indicators of WD-40 Company (2004 – 2008) in 1.000 USD

<table>
<thead>
<tr>
<th>Time</th>
<th>Earnings</th>
<th>Book value</th>
<th>Cash flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>25643</td>
<td>112418</td>
<td>31491</td>
</tr>
<tr>
<td>2005</td>
<td>27798</td>
<td>130066</td>
<td>31564</td>
</tr>
<tr>
<td>2006</td>
<td>28112</td>
<td>155731</td>
<td>28197</td>
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<tr>
<td>2007</td>
<td>31534</td>
<td>168272</td>
<td>51651</td>
</tr>
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<td>2008</td>
<td>27622</td>
<td>163992</td>
<td>29362</td>
</tr>
</tbody>
</table>

(Source: DataStream)

Appendix 14: Detailed description of collecting the data

Because putting all the data which was the basis of the author's research paper was not possible because it was too much data material the authors describe in this paragraph how they gathered the data and from which sources it was taken, so that other researchers are able to reproduce the findings of this work.

The authors concentrate their efforts on companies listed on S&P 600. To find companies, which are not affected by the financial crisis, the researchers analyzed three indicators: earnings, book value and net value of cash flow? These indicators for all listed companies on S&P 600 was taken yearly from 2004 - 2008 from program ‘Datastream’, which is run by the company Thomson Financial and one of the best sources for financial data. Secondly, the data to the valuation models such as: Book Value, prediction of EPS and DPS was taken yearly for years 2008 - 2011 from the same database. Finally, the data used in the correlation was taken from:

1) State Street Confidence Index in period January 2006 – Mai 2009 from website http://www.globallink.com/en/About/InvestorConfidenceIndex/index, which publishes the result of the researches conducted by Global Link Overview.


3) Earnings and Book Value yearly from Mai 2006 – Mai 2009 from DataStream.
Finally, the calculation for the beta is based on stock prices of S&P 600 and selected companies (AIT) from the website http://finance.yahoo.com.
## Applied ITN'L Group (2008)

### Forecast Years

<table>
<thead>
<tr>
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<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPS</td>
<td>1.44</td>
<td>1.27</td>
<td>1.49</td>
<td></td>
</tr>
<tr>
<td>DPS</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
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<tr>
<td>BPS</td>
<td>11.88</td>
<td>12.72</td>
<td>13.39</td>
<td>14.28</td>
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<tr>
<td>ROCE</td>
<td>12.12%</td>
<td>9.98%</td>
<td>11.12%</td>
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<tr>
<td>RE (5.653% Charge)</td>
<td>0.768</td>
<td>0.551</td>
<td>0.733</td>
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</tr>
<tr>
<td>Discount rate</td>
<td>1.057</td>
<td>1.116</td>
<td>1.179</td>
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<tr>
<td>Present value of RE</td>
<td>0.727</td>
<td>0.493</td>
<td>0.621</td>
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<tr>
<td>Total present value of RE to 2008</td>
<td>1.84</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Continuing value</td>
<td></td>
<td></td>
<td>22.92</td>
<td></td>
</tr>
<tr>
<td>Present value of continuing value</td>
<td>19.44</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value per share</td>
<td>33.16</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The continuing value: 22.92

### Financial Data

<table>
<thead>
<tr>
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<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common equity</td>
<td>502075000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of shares outstanding</td>
<td>42250000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BPS</td>
<td>11.88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPS and EPS forecast</td>
<td>1.44</td>
<td>1.27</td>
<td>1.49</td>
<td></td>
</tr>
<tr>
<td>Historical 5 year growth</td>
<td>2.38%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Calculation of the Cost of Equity Capital:

- **Risk free rate:** 2.240%
- **Beta:** 1.1377
- **Market risk premium:** 3.000%
- **Cost of equity capital:** 5.653%

(Source: Residual Earnings Valuation Table according to Penman (2007), p. 172)
Appendix 16: Correlation between CI, AIT’s share prices and S&P 600

| Correlation between CI and AIT’s share prices: | 0.5424 |
| Correlation between CI and S&P 600: | 0.7062 |
| Correlation between S&P 600 and AIT’s share prices: | 0.8517 |

(Source: Based on own Calculations)

Appendix 17: Correlation between CI, EBIT and Book Value of AIT and S&P 600

<table>
<thead>
<tr>
<th>Correlation between CI and sum of S&amp;P 600 EBIT</th>
<th>Correlation between CI and sum of S&amp;P 600 Book Value</th>
<th>Correlation between CI and AIT EBIT</th>
<th>Correlation between CI and AIT Book Value</th>
<th>Correlation between S&amp;P 600 and AIT EBIT</th>
<th>Correlation between S&amp;P 600 and AIT Book value</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.6151</td>
<td>-0.1579</td>
<td>0.1170</td>
<td>0.0267</td>
<td>-0.4751</td>
<td>0.6181</td>
</tr>
</tbody>
</table>

(Source: Based on own Calculations)

Appendix 18: Historical share prices of Applied Ind'l Tech (Adjusted close values)

(Source: http://finance.yahoo.com)