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„I will tell you how to become rich. Close the doors. Be fearful when others are greedy. Be greedy when others are fearful.”

(Warren Buffett)

1 Introduction

Why value investing?

Today, there is a broad variety of different investment strategies to choose from. Why did I choose to write about value investing?

First of all, according to the existing evidence the value investing strategy seems to produce superior results comparing to any other investment strategy over long-term period. At the same time, it is simple and easy to understand. Second, Warren Buffett, one of the richest men in the world, has made a fortune thanks to the value strategy investments. A number of other value practitioners had also succeeded in achieving returns higher than the market. There is a lot of controversy when it comes to the explanation of their success in beating the market. On the one hand, the higher returns are considered to reflect the market risk premium according to the Efficient Market Hypothesis. On the other hand, according to the behavioral finance theory, its sources could rather be found in the market inefficiencies. All of this makes value investing such an intriguing subject: Its results are in contradiction with the “educated” believes. Common for all successful value investors is that their philosophy is based on principles originally derived by so-called father of value investing – Benjamin Graham.

How does value investing work?

The section 2 of my thesis provides an answer to this question. Value investing deals with investing in stocks whose current price is below their true or intrinsic value, assuming that over the time market will correct for any mispricing and value investors will get rewarded for the risk taken. Value investing encourages buying cheap stocks that are out of favor (depending, of course, for what reasons they became “unpopular”). Contrary to what majority of investors do, value investors buy stocks in bad times and sell in good times. Is such a philosophy profitable? Well, many researchers have found that buying stocks that have fallen in price and still offer margin of safety results in successful investment over time. It is widely accepted that value investment works best

when markets are declining. The margin of safety is exactly what protects investors from large losses during recessions. Numerous empirical studies have provided a proof for that.

There are different strategies behind value investing. Some of them are more passive and concentrate mostly on the quantitative factors to identify value stocks. Others are more active strategies and extend the analysis on the qualitative factors as well. Unfortunately, there is no any rule which says which strategy is the best to find the real value of a stock. Many investors rely on the financial ratios when it comes to the quantitative analysis of the companies such as: price-to-book, price-to-earnings, price-to-sales ratio, dividend yield and so on. These are some of the most frequently used “value screens”. In the section 3 of my thesis I provide an insight into the most interesting empirical findings based on these four investing tools. I do not restrict myself only to the US stock market (most of the existing evidence relates to this market), but also mention the international markets.

What are the reasons that value investing outperforms the market over the long run?

There are different replies to this question, which I review in the fourth section of my thesis. The first part of this section introduces the traditional risk-based explanation by exploring several academic papers supporting this point of view. The risk-based theory argues that higher value returns are simply a premium for additional risk taken since value stocks are fundamentally riskier than growth stocks. Academic researchers, Fama and French, challenged the traditional Capital Asset Pricing Model (CAPM) by analyzing this issue. They largely shaped the investment world by providing strong evidence on several contradictions of the Sharpe-Lintner-Black model and introducing the Three Factor Model. On the other hand, there is a research field called behavioral finance which uses the psychological researches to analyze investors' behavior. According to this theory, the explanation of the value premium can be found in a frequent irrational behavior of the individual investors and their tendency to make judgment errors. They usually put an excessive weight on past stock performance which is unlikely to persist in

the future. In the second part of the fourth section, I deal with different behavioral biases considered to be a source of the stocks' mispricing.

How does value investing strategy perform in Europe?

I have tried to find an answer to this question by conducting my own empirical study of the European stock market represented by the market index Dow Jones Stoxx 600. The analysis is based on the four value screens introduced in the theoretical part of my thesis: price-to-book, price-to-earnings, price-to-sales ratio and dividend yield. The main goal was to find out whether value stocks outperformed growth stocks and the market over the seven-year period observed. The results are provided in the section 5.

Even though success of many investors in applying the value method has proven that it works, one of the strange things is that there are still no many who dare to get involved in this strategy. Possible explanation could be that one can never know how long it could last until the market recognizes the true value of a stock. Some investors do not have the patience or the interest to wait for too long, and some do not have the nerves for watching their stocks falling substantially in value (since value investing is associated with high uncertainty and volatility in stock prices). Furthermore, career and reputation concerns force the professional money managers to stick to their short-term strategies. This kind of a behavior, typical for the majority of investors, is of advantage for value investors since they are actually profiting by exploiting mistakes of "typical" investors. In his foreword to Christopher Brown's "The Little Book of Value Investing", Roger Lowenstein says: "...it is the hesitation of the many that creates the opportunity for the few."¹ The fact is, as more and more investors begin to exercise value-investing style the more difficult will be to find bargains and earn returns as high as it was possible in the past.

¹ cf Browne, C., "The Little Book of Value Investing", 2006, Foreword [xvii].

2 Value Investing Strategies

2.1 Definition and Basic Principles

Investment strategies are generally divided into two broad style groups: value and growth investing.

Value investing deals with selecting the stocks that trade at a discount compared to their intrinsic value, assuming that the market will correct for undervaluation in the long run. The core elements of value investing are: intrinsic value, margin of safety and long-term perspective.

Value investors are, first of all, concerned with the intrinsic or actual value of the company, i.e. with its underlying fundamentals. They believe that share prices do not always indicate the true underlying value of the company's shares. Therefore, after determining the true value, the second thing they look at is whether it is possible to purchase shares for less than their intrinsic value is. They see a huge investment opportunity in a difference between market and intrinsic value. This concept, derived by Benjamin Graham, is best known as "margin of safety". It gives investors protection against uncertainty in calculating the true worth of the stock. The intrinsic value and margin of safety concept make value investors to be contrarian to a typical way of thinking in a way that they are buying stocks when everyone else is selling, and selling when everyone else is buying. The stock price higher than its intrinsic value is a signal that the stock should be sold.

Benjamin Graham encourages investors to be the investors buying businesses for the long term, and not speculators seeking for the short-term profits. Distinction between speculation and investment is one of the central points of his investment philosophy: "An investment operation is one which, upon thorough analysis promises safety of principal

and adequate return. Operations not meeting these requirements are speculative.”² Value investors search for the undervalued companies within the safe and solid businesses, the companies that have a long-term history of success. They do not see the shares of stock purchased only as a piece of paper that will bring some profits in the future, but rather as an ownership interest in the underlying business. One of the world’s best investors, Warren Buffett, once said: “I’m a better investor because I am a businessman and a better businessman because I am an investor.”³ Value investors do not really care about a general mood on the market and economic circumstances. They believe that a good business will survive any market volatilities in the long run.

In “The Intelligent Investor” (1949) Graham states that investment is most intelligent when it is most businesslike, i.e. it must be approached as if one was buying a business or a partnership in a business. Warren Buffett regarded these words as the most important words about investment ever written. They incorporate some basic principles by which Graham was guided:

1. Know the business

The business needs to be understandable for investors. They should gather information on company’s operations, competitive environment, long-term prospects etc. It is recommended to invest rather in fewer businesses but well known than on a larger number of businesses that an investor is not very familiar with.

2. Know who runs the business

The investor should make sure that the company has competent and efficient managers who work in the best interest of the shareholders.

² cf Azlan, “Review of The Intelligent Investor”, 2006.
<http://bookreviews.wallstraits.net/bookreviews/value-investing/10/the-intelligent-investor.html>;
Original source: Benjamin Graham, “The Intelligent Investor”, 1949.

³ cf Stone, A., “Homespun Wisdom from the ‘Oracle of Omaha’”, 1999.
www.businessweek.com/1999/99_27/b3636006

3. Invest for profits

The business that investors want to invest in should have reasonable expectations of producing good profits over time.

4. Have confidence

Graham encourages investors to invest if they believe their judgment to be correct. He said that the stock investor can be right or wrong because his facts and analysis are right or wrong, and not because others agree or disagree with him.

Thanks to their high quality, the companies typically chosen by value investors often survive market volatilities and are likely to generate great returns over the long-term horizon. Because value investors do not try to act along with the market, they are prepared to high declines in value of their securities before reaching some gains. They do not try to forecast the market but focus instead on the underlying values and identify companies that are able to recover after any market recession. And of course, they expect that the market will revalue the stocks over time, and that the share price will reach its intrinsic value.

Value investors usually do not give much importance to what the market thinks because companies can be undervalued or overvalued regardless what the overall market is doing. "Being a value investor usually means standing apart from the crowd, challenging conventional wisdom, and opposing the prevailing investment winds."⁴

⁴ cf Klarman, S. A., "Margin of Safety", 1992, p. 88.

2.2 Margin of Safety

The margin of safety concept, as laid down by Benjamin Graham, still makes an essence for value investors. It represents a mathematical part of Graham's work and is defined as a difference between share price and its intrinsic value.

The price should be one at which a share can be bought with a minimal downside risk. It should be well below a fundamental value of the business, which would allow profit to go on the upside as the market revalues the stock to its fair value. The stock bought with a margin of safety should therefore be a "low risk - high return" investment.

It is important to keep in mind that the margin of safety price is not the same as the intrinsic value of a share. The intrinsic value is calculated differently by different investors, and there is always probability that it is calculated wrongly or affected by some external factors. That is why investors should have margin of safety as a protection against incorrect intrinsic value which in many cases cannot be predicted or avoided. The larger is the margin, the safer the investment. The benchmark that Benjamin Graham used for margin of safety was the interest rate for the prime quality bonds. Today, as it is more practical, Warren Buffett uses an interest rate for the government bonds.

To find the stocks with a margin of safety, the popular stocks in general should be avoided because they are likely to be overpriced. Growth stocks for example are considered to be popular stocks. They tend to be overpriced in good markets and perform poorly in bad markets. A concept of finding low price-to-earnings (P/E) ratios, price-to-book (P/B) value ratios etc. should be applied. Graham looked at the companies with P/E ratios below their historical average and less than 40 % of the average market P/E ratio. He was an advocate of paying dividends and believed that conservative investors should search for the companies that have a long dividend-paying history. He also looked at the companies with high liquidity, i.e. those that had current assets twice higher than current liabilities. Upward earnings trend of the companies was also

important: He searched for those with growth of earnings per share 7 % or more for the last decade and no more than two years of decreasing earnings over the last decade.

Today, it is difficult to apply Graham's method and ratios as the world has changed and there are more and more overvalued and profitless companies. Before he died in 1976, Graham admitted that his rules had to be relaxed. Buffett insists though, that even at today's price levels, Graham would have found some bargains.

2.3 Value versus Growth

While the emphasis of value investing is on buying stocks below their intrinsic value, growth investing deals with buying the stocks of the companies with high growth rates without much emphasis on its present prices. As opposed to the value investing strategy that bets on low expectations, the growth investing strategy bets on high expectations for the stocks. What both strategies have in common is belief that these expectations will increase in the future.

It is widely accepted opinion that value and growth investing are two contrasting strategies. However, Warren Buffett states that growth is a component in a value equation, and that investors who see the two strategies as contrasting are simply ignoring this fact. In his Berkshire Hathaway Annual Report in 1992 he said: "In our opinion, the two approaches are joined at the hip: Growth is always a component in the calculation of value, constituting a variable whose importance can range from negligible to enormous and whose impact can be negative as well as positive."⁵ The growth investors can therefore benefit only if growth has a positive impact, i.e. if it increases the market value of the firm.

The growth investing strategy assumes that the market has undervalued companies' future growth potential. In order to be successful, growth investors must forecast the

⁵ cf Professor Paul Johnson, "Value versus Growth Investing", Columbia University, Graduate School of Business, 2004, p. 2;
Original source: Warren Buffett, Berkshire Hathaway Annual Report, 1992.

company's future growth rates and profitability as well as its potential to exceed their expectations. The criteria that the growth investors use are based on past performance of the company as well as its industry performance. They assume that if the company was growing in the last couple of years, it will continue to do so in the future as well. They also assume that the growth companies still have not reached their maximum earnings because they are currently at the beginning of the growth stage. That is why these companies are characterized by a high price-to-earnings ratio. Value investors are more sensitive to a risk and they are not willing to make estimation of the future growth rates as growth investors.

Growth investors generally seek for the high earnings growth rate, high sales growth rate, high return on equity, high profit margins, and low or no dividend yield. The companies meeting those criteria are usually young companies, e.g. small cap technology companies. They have a potential to grow quickly as opposed to large cap companies. What is very important for growth investors is that companies keep reinvesting into themselves. This makes them able to grow at a higher rate by, for example, producing new products and technologies.

Growth investors are considered to be trend-setting. They are pooling almost the whole market to follow their example. This can often lead to overpricing of the security. This was the case in 2000 when technology-driven companies failed to meet expectations set by the market. The majority of the investors are likely to invest when the stock prices are rising and the market is doing well. In his letter to the shareholders in 1997 Warren Buffett gives a comment on this behavior: "Only those who will be sellers of equities in the near future should be happy at seeing stocks rise. Prospective purchasers should much prefer sinking prices."⁶ As more and more investors follow the trend and do what everyone else is doing, they turn out to be at disadvantage because chances of making money from popular stocks decrease. In the letter from the year 2005 Buffett said: "For investors as a whole, returns decrease as motion increases."⁷

⁶ cf Sinha, C., "4 investing gems from Warren Buffett", 2007.
<http://www.rediff.com/money/2007/jul/12invest.htm>

⁷ Ibid.

It is a common characteristic of all people to follow the crowd. Otherwise, investors would feel like missing a good opportunity by not participating in a stock's appreciation. This has a lot to do with psychology: They feel better if everyone loses what they have lost. People also have a certain reaction to bad news: They get scared that a negative trend could last for a long time. After all, it is not in everyone's interest to wait a couple of months or years until the stock gets fairly priced by the market. The fear of not being successful exists not only among individual investors, but also among professional asset managers. The reason for this is obvious: "The reputational and career risk of being a contrarian is far greater than the risk of going with the flow."⁸ Lakonishok, Shleifer, and Vishny (1992) mention the agency problems of institutional asset management. Growth stocks are easier to justify to sponsors, and are unlikely to become subject to financial distress in the near future. Institutional investors are aware of the danger that their sponsors could withdraw from the fund if it underperformed the market or other peer group funds for even short-time periods. They are often under pressure to concentrate on short-term strategies which are less risky and unlikely to generate performance deviating too much from the benchmark. That is why they usually stick to investing in growth stocks.

Since 2000, value stocks have outperformed growth stocks, while during 1990s growth stocks were performing better than value stocks. Investors usually choose value stocks during bad market periods because evidence has shown that recessions do not hurt value stocks as much as they do growth stocks. On the other hand, booming markets are periods when value stocks miss a lot, while growth stocks generate significantly higher returns. In the end, all empirical studies have shown that value stocks still outperform growth stocks in the long run.

2.4 Value Investing versus Efficient Market Hypothesis

The investing philosophy depends on the perceptions about market behavior, i.e. on whether investors see the market as efficient or inefficient.

⁸ cf Browne, C., "The Little Book of Value Investing", 2006, p. 148.

The Efficient Market Hypothesis (EMH) states that all available information on the market (including financial news, researches, political, economic, social events and so on), is already incorporated in the stock price. Since everyone has access to the same information, no investor has an opportunity to beat the market. The prices are assumed to be random making it impossible for investors to predict them. The efficient market is the world of rational investors where the stocks have fair prices at any time.

Value investing is based on the principles opposed to those of EMH, assuming that the prices can be overpriced or underpriced. A number of investors, who have outperformed the market and have made millions following this philosophy, are an obvious proof that it is possible to achieve returns superior to the market. They believe there are some predictable anomalies (phenomenon that cannot be explained) which allow for outperformance. Some of them are: January effect (it argues that usually in January better results can be achieved) and “Blue Monday on Wall Street” (it argues that prices are higher the day before and after the weekend). Another group of inefficiencies is found to be a consequence of investor psychology influencing his decision making process and stock prices. It is researched and analyzed by behavioral finance.

The EMH though does not exclude existence of market anomalies – only explains them by randomness of the stock prices. That is, it states that the prices are sometimes overvalued or undervalued because they deviate randomly from their mean so the investors who catch for these occasions are considered to have luck. Their success is due to the tails of standard deviation and as such unlikely to be achieved again with certainty. As a result of a random deviation, it is assumed that the stocks have equal probability of being overpriced or underpriced at any point in time.

The EMH states furthermore, that even though there are anomalies they will disappear as investors seeking the profits continue to exploit them. This is exactly one of the conditions for the market to become efficient. While trying to beat the market, investors actually make it efficient by trading on inefficiency. In that sense the market can be

observed as a “self-correcting mechanism”⁹ where inefficiencies disappear as investors find them.

As an answer to the EMH postulate that those investors who outperform the market do not do it out of skill but are lucky to catch for the randomness of the stock prices, Warren Buffett in his speech on the fiftieth anniversary of the publication of the Graham and Dodd’s “Security Analysis” (1934) asks whether it is really a luck or do all these investors have actually something in common. He made some examination and found that seven of such successful investors have either studied under Benjamin Graham at Columbia Business School or have worked for him. So they all had the same grounding and methodology, and differed only in the way of applying them. Can this really be result of a lucky circumstance?

Value investors reject the Modern Portfolio Theory (MPT) and its Capital Asset Pricing Model, stating that it wrongly takes historical volatility as a proxy for risk. They reject the whole statistical approach of the MPT, finding standard deviation, beta and alpha misleading. For example, a substantial fall in a stock price, the investors following the MPT would see as increasing volatility of the stock even though a company has good fundamentals. Value investors, on the other hand, would see the stock as a potential bargain.

The EMH and value investors agree that it becomes more and more difficult to make advantage of some inefficiency as more and more investors are able to replicate it. The truth is, as new technologies are being developed, the access to information is much easier and prices can be much quickly adjusted to news. This makes the markets more efficient and brings difficulties to value investors. But, a caution should be taken of the quality of information as it is the main source of inefficiencies in the market. After all, one of the main propositions of the EMH says that a probability of finding inefficiencies increases with the information and transaction costs.

⁹ cf Damodaran, A., “Investment Philosophies”, 2003, p. 143

Every single investor agrees that the market cannot be absolutely efficient or absolutely inefficient. This is based on the fact that if the market was fully efficient, there would not be extraordinary profits generated from beating the market. On the other hand, if the market was always inefficient, then everyone would succeed in achieving excess returns.

2.5 Passive versus Active Value Approach

While an essential idea of all value investors remains the same, there are different techniques they use to screen for potential value stocks. Some are more passive and simply use specific criteria to take position in an attractive company, while others adopt more activist approach where they use their shareholder power to change the way of running company's business.

The passive screener approach originates from Benjamin Graham who explained this technique in his book "Security Analysis" (1934). Passive screeners use the quantitative factors in their fundamental analysis, looking for the stocks that fulfill specific criteria like low price-to-earnings ratio, high dividend-yield and so on.

However, it is clear that today it is not enough to value investment based only on specific value screens – that would leave to having too many investors achieving better performance than the market. There are several reasons for that. One of them is that investors often forget to diversify enough their portfolio. They concentrate on only one financial ratio, the one that is low for the firms from one specific industry group. On the other hand, using multiple ratios as potential screens also has its disadvantages since using of one of them can undercut the effectiveness of the other one. High tax liabilities can also be a problem, which is the case with portfolios containing stocks with high dividends and low price-to-earnings ratios.

As opposed to the passive strategies, an activist value strategy does not invest in undervalued companies waiting for their management to make a turnaround. It rather takes a significant position that allows for an active involvement in creating new

business approaches. The evidence has shown that after changing the management or the way it runs the business, high returns can be earned only if the company's stocks have done badly as a result of an incompetent management and if there is an improvement potential. According to Damodaran's study in "Investment Philosophies" (2003), changes in management are generally viewed as good news, and therefore increase the prices. Moreover, the impact of these changes on prices is greatest if the changes are forced. This is usually the case if returns were negative.

Warren Buffett's strategy can be categorized as an activist strategy. He invests in a company, and then tries to make it more valuable by influencing its management and its way of running the business. As opposed to Graham who stuck to the quantitative factors, Buffett extended his approach to a significant use of the qualitative factors. He analyzes businesses now more subjective than Graham did. He searches the high quality businesses with the great earning power and competitive advantage over their competitors.

In general, value investors nowadays usually conduct some more research regarding the qualitative variables of a company and industry in order to find out whether the stock is cheap for a reason. The qualitative factors typically used are: target market factors, industry conditions, corporate governance, business model, management of a company, brand-name recognition, patents, proprietary technology etc. To gain the necessary information about individual companies, the investment analysts and portfolio managers also visit the companies, suppliers, competitors and meet with senior management (one-to-one or small-group meetings). Each firm's estimated value based on a qualitative and quantitative valuation along with the expected price target are then compared to other firms from the peer group in order to identify the most attractive ones.

2.6 Value Screens

The core value investing strategy has still remained using the "screens" to identify good investments. Since the information needed to calculate the screens is easily found

today, the most important thing is to choose the right ones as valuation criteria. In this subchapter I analyze four mostly used value screens (they are also incorporated in the empirical part of my work): price-to-book, price-to-earnings, price-to-sales ratio and dividend yield.

2.6.1 Price-To-Book Ratio

The price-to-book ratio (P/B) is a fundamental variable that compares market value of a stock to its book value. It is also known as the price-equity ratio. It is calculated by dividing the market share price by its latest quarter's book value. Another way to calculate it is to divide the company's market capitalization by its total book value. Book value of company's equity can be found on the balance sheet as the difference between book value of assets and the book value of liabilities. The intangible assets such as brand name, goodwill or patents, are not incorporated in this value. If the share price is lower than the book value, it means that either the asset value is overstated and it could possibly face a downward correction by the market or the company has a very poor return on its assets (ROA). In the first case, investors are likely to face negative returns. In the second case, if a company has a good management it is possible to make turnaround and give positive returns. The P/B ratio under 1 is considered to be low. The companies with high P/B ratios reflect the high expectations of investors and generally have high earnings growth rates. This ratio is useful to compare companies with the negative earnings since the P/E ratio does not work in that case.

The P/B ratio has also shortcomings that should be taken into consideration. It is best used for the capital intensive and financial businesses, i.e. the companies that have many assets such as banking institutions, manufacturing industries and so on. It does not have much sense to look for a book value of the service-oriented companies that have few tangible assets on the balance sheet. A book value is not very useful for the companies with high debt levels which create artificially high P/B values. The assets of these companies are then understated making their P/B ratio meaningless. The acquisitions and serial acquisitions almost always increase the book value and lower the

P/B ratio because the new assets are reported on the balance sheet at the full price paid. However, a huge part of the book value is stated in the goodwill and tangibles that should be subtracted to get more meaningful P/B.

The P/B ratios should always be compared within the same industry. A low P/B can indicate that the industry at large has a low P/B. But if a company's P/B ratio is low compared to others in the industry then it might be undervalued or the company may be performing poorly. Some industries, such as insurance companies, have low P/B ratios because they are either cyclical or generate low return on equity (ROE). Since ROE is a key growing indicator, it should be observed together with P/B ratio. If a company has high P/B ratio, its ROE should also be high. Otherwise a combination of high P/B and low ROE would be an indicator of overvalued growth stocks. A low P/B indicates that the company will have both poor ROE and ROA. This results from the fact that the firms with a ROE lower than their cost of equity should trade at a discount on the book value.

Another important point which investors should keep in mind is that companies with low P/B (or with the prices below their book value) are possibly performing badly and could go out of business. In this sense, a P/B could be used as a measure of risk and investors should carefully compare possible additional returns on these companies with associated possible risk. The stocks chosen on the low P/B ratio basis should therefore have the reasonable risk exposure and ROE.

The P/B ratio is an easy-to-calculate investing metric but should not be used in isolation when identifying undervalued companies.

2.6.2 Price-To-Earnings Ratio

The price-to-earnings ratio (also known as "price multiple" or "earnings multiple") is probably the most widely used investing tool. It is computed by dividing the current market price of one company's share by the earnings per share (EPS). It is the price an investor is paying for \$1 of the company's earnings. The EPS are the company's after-

tax profit divided by the number of outstanding shares. The share price is the market capitalization divided by the number of shares. If two companies are both selling a share for the same price, it does not mean they are equally expensive. For example, if companies A and B have the price per share \$60, and company A has reported earnings of \$20 per share while company B has reported earnings \$10 per share, then the P/E ratio for company A would be 3, and for company B would be 6. We can conclude that company A is cheaper than company B on relative basis because the investor would get as twice as more earnings from company A (\$20 reported earnings) for every share purchased.

The P/E ratios are usually computed using the earnings per share from the last four quarters and are called trailing or current P/E. Occasionally, the EPS figure can be taken from estimated earnings expected over the next four quarters. This is called projected, forward or leading P/E. There is also a third variation that uses the sum of the last two actual quarters and the estimates of the next two quarters. The trailing P/E uses actual historical data, while the other two variations are based on estimates that are not very precise.

The companies that have a negative EPS deal in different ways with the P/E ratios. Some report negative P/E, some P/E that equals 0, and others simply say that P/E does not exist. The P/E is probably best viewed over time, looking for a trend. The companies that have higher earnings and are expected to grow in the future usually have higher P/E than companies in decline. Holding all else equal, the stocks with a risk perceived to be higher have lower P/E ratios. To choose the right stocks, investors should make sure that there exist at least minimal growth potential or growth rates not lower than an industry average. The risk should also not be lower than the average, and it could be screened for by using, for example, standard deviation or debt-to-equity ratio.

Besides comparing the P/E ratios of companies in the same sector, it is also possible to compare average P/E ratios of different industries in order to determine which ones are underpriced or overpriced. Different sectors have different P/E ratios that are considered to be "normal". For example, technology companies sell at an average of 40 P/E while

textile industry has a quite smaller average P/E of 8. These differences between industries arise from different expectations of their businesses. Those sectors that trade at higher P/E ratios usually have higher returns on equity and higher growth rates. The industries with higher perceived risk attract lower P/E ratios. If all the companies in the industry have an average P/E above the historical average, this means that the industry is overpriced.

Sometimes, the companies have one-time events that affect net earnings (for example, selling one division for more than its book value and recording the difference as a positive in net earnings). This could make the P/E ratio useless and misleading. Besides speculation, another problem with the earnings is their possible volatility typically related to the cyclical industry. In such the cases, normalized earnings could be used to identify the cheap stocks. This is calculated by averaging earnings across an economic cycle.

Investors should be careful when comparing current P/E ratio of a company with its historical average. Caution should be taken especially with average P/E ratios from the late 1990s because during the market bubbles P/Es can be overinflated for some periods of time. In a low-interest-rate environment, the P/E ratios tend to be higher because a company's cost of capital is lower.

The P/E ratio should never be used alone to judge the value of an asset. Some other factors should be taken into consideration to avoid misuse of the PE ratio: interest rates, growth rate of a company, earnings (may not reflect company's current position), industry and so on. Only if difference between company's and average P/E in the same industry cannot be explained by these variables, the company can be considered as undervalued or overvalued.

2.6.3 Price-To-Sales Ratio

The price-to-sales ratio (P/S) is another valuation metric calculated by dividing a stock's current price per share by its revenue per share for the last four fiscal quarters, or by

dividing the company's market capitalization by its revenues for the last four quarters. It tells how much an investor pays for 1\$ of company's sales. The companies with a P/S ratio less than 1 are considered an attractive investment. A low P/S suggests a company with a turnaround potential, while a high P/S suggests that this turnaround has already passed (if ever happened).

The P/S ratios vary across different industries so one should always compare the companies from the same sector or sub-sector. If a company has a P/S less than 1, while other companies from the same industry have P/S higher than 1, it means that the company's shares are valued at a discount compared to other companies (unless that company is going out of business). The cyclical industries tend to have the periods when there is almost no earnings generated but it does not mean that the shares of those companies are worthless. In this case, the P/E ratio cannot be used to assess the shares so a P/S ratio comes into play.

Since the earnings are not very reliable financial indicator and are easier to manipulate than sales revenue, many investors see the P/S ratio as more indicative of performance than the P/E ratio. However, the P/S ratio can also be unreliable if investors do not look at other relevant criteria like the debt levels, growth prospects or profit margins.

The firms with a low P/S ratio are likely to be the most highly levered firms. If a company has a low P/S ratio but high debt levels, there is a possibility that it is going to issue new shares to pay off the debt, expanding by this way its market capitalization and increasing the P/S ratio. One possible way to deal with a high leverage problem is to replace the market value of equity by the enterprise value. The enterprise value is calculated by adding to equity market value of debt and subtracting cash and marketable securities.

Another possible problem could be the fact that a company can book the sales for which it has not yet provided goods or services, or before the customer actually paid for it. This usually leads to inflated sales and earnings lowering therefore the P/S and P/E ratios.

Just as the P/E ratio should be considered with an earnings growth, the P/S ratio should be considered with net profit margin. This is calculated by dividing the net income by total sales. The P/S ratio is particularly useful for young growing companies and those with negative earnings, whereas it is not very appropriate for the service companies that do not really have sales.

2.6.4 Dividend Yield

This financial ratio shows how much shareholders yield from the stock in the form of dividends relative to the company's share price. The higher is the dividend yield, the higher is the cash flow received by an investor for each dollar invested in equity. The companies with the high and increasing dividends are likely to possess high quality. They are usually mature and well-established companies as opposed to young growth companies which pay low or no dividends.

Caution should be taken when dividend yield is high. It could be a case that it is due to a depressed price which could lead to the dividend cut or even dividend elimination. Investors should make sure that a company has enough earnings to cover the dividends. If most of the earnings are used to cover dividends, this means that a company cannot reinvest much in itself and as a result will not have a high growth rate.

One possible way of determining the riskiness of high dividend stock is to calculate the dividend payout ratio. This can be done by dividing a company's dividends by its earnings. That shows how much of company's earnings are used for paying the dividends. The risk-averse investors should seek for the stocks whose dividends are more than covered by earnings, i.e. whose payout ratio is not too close to 100 %. The margin of safety concept says that the dividends should be less than two-thirds of earnings.

Investors should also examine the company's history of the cash flows and earnings to make sure that there has not been a longer negative trend in the past quarters. It could

be a case that a company did not earn more than its dividend in the last couple of quarters but at the same time has the positive and growing cash flows which could make the company able to pay out and, furthermore, to increase its dividends. The debt proportions are also important to observe in order to identify the safe businesses. One should be avoiding the companies that have the significant short-term cash needs as a result of a high debt. These needs can be calculated by dividing company's current assets with its current liabilities. If the current ratio is two or more, the company can be considered to be safe.

One of the drawbacks of this strategy is that it is usually related to high tax costs because the dividends pay higher tax rate than the capital gains.

3 Empirical Evidence on the Value Investing Performance

There is considerable number of empirical studies today which provide clear evidence on a superior performance of value stocks as compared to growth stocks in the long run. Furthermore, they also provide a proof for the effectiveness of the value screens described in the previous section when it comes to identifying undervalued stocks.

3.1 Evidence on Book-To-Market Ratio

Most of the researches on value premium were carried out based on a book-to-market (B/M) ratio.

Rosenberg, Reid and Lanstein (1985) made a survey for the period 1980-1984 using a sample of the stocks which contained 1400 of the largest firms from the COMPUSTAT database. Most of the firms were listed on the New York Stock Exchange (NYSE). These researchers achieved highly significant results in explaining abnormal average stock returns using the B/M ratio. They showed that the stocks with high B/M ratio generated much higher returns than the stocks with low B/M ratio.

Fama and French (1992) examination of the US stock market showed that the B/M ratio explained more of the cross-sectional variation of stock returns than any other fundamental variable used. They found a strong cross-sectional relation between the average returns and book-to-market equity in the 1963-1990 period. Average returns rose from 0.30 % for the lowest B/M portfolio to 1.83 % for the highest, generating a difference of 1.53 % per month. They did not include the firms with negative book equity in their tests.

Damodaran (2003) carried out an analysis of all NYSE stocks based on the B/M and return-on-equity from 1982 to 1991. This analysis was consistent with a theory that combination of the high book-to-market, low default risk and high return-on-equity firms should yield less risky stocks than the high book-to-market firms. At the end of each

year, he created two portfolios: undervalued (including high B/M and high return-on-equity stocks) and overvalued portfolios (including low B/M and low return-on-equity stocks). The average annual returns that he got are summarized in the table below.

Table 3.1: Returns on Mismatched Portfolios: Price-To-Book and ROE

Year	Undervalued Portfolio	Overvalued Portfolio	S & P 500
1982	37.64%	14.64%	40.35%
1983	34.89%	3.07%	0.68%
1984	20.52%	-28.82%	15.43%
1985	46.55%	30.22%	30.97%
1986	33.61%	0.60%	24.44%
1987	-8.80%	-0.56%	-2.69%
1988	23.52%	7.21%	9.67%
1989	37.50%	16.55%	18.11%
1990	-26.71%	-10.98%	6.18%
1991	74.22%	28.76%	31.74%
1982-91	25.60%	10.61%	17.49%

Source: Damodaran, A., "Investment Philosophies", 2003, p. 232.

3.2 Evidence on Price-To-Earnings Ratio

The P/E ratio has also attracted a lot of attention in the academic researches as it proved to be a strong indicator of the company's fundamental value.

Basu (1977) was first who tested the US stock market based on the P/E ratio. He used a sample of 1400 industrial firms from NYSE covering the period from 1956 to 1971. His study showed that the stocks with low P/E significantly outperformed those with high P/E, yielding an average annual return 7 % higher than return of the highest P/E portfolio group.

Josef Lakonishok, Robert Vishney and Andrei Shleifer (1994) have done an impressive work presented in the “Contrarian Investment, Extrapolation and Risk”. They ranked all the stocks from both the New York and American Stock Exchange by P/E ratio in deciles. Each portfolio was held for five years and then sold. They found that over the five-year period, the stocks with low P/E ratio earned almost twice as much return as the stocks with high P/E ratio.

Fama and French (1992) tested portfolios based on E/P from July 1963 to December 1990. Since the analysis does not make sense when the earnings are negative (they cannot be taken as a proxy for the earnings forecasts in that case), they only included the firms with positive earnings, while for those with negative earnings they added a dummy variable. The results showed that the average returns increased with an E/P ratio when it was positive. They also found that the firms with negative earnings had higher average returns.

3.3 Evidence on Price-To-Sales Ratio

Unfortunately, there is not so much evidence on a P/S ratio as compared to the P/B and P/E ratio. One of direct studies was carried out by Senchack and Martin (1987). They used a sample of 400-450 firms each quarter from New York Stock Exchange and American Stock Exchange for the reporting period of 1975-1984. They found that the low P/S portfolios earned superior returns relative to the equally weighted market portfolio but not relative to low P/E portfolios. The low P/E portfolios had a better performance measured both on an absolute and a risk-adjusted basis, generating higher returns in 68 % of the quarters studied. Furthermore, they also found that low P/S portfolios were more biased towards including smaller firms.

James P. O'Shaughnessy has done considerable work in this field, testing both the P/S and P/E ratios. In his work “What Works on Wall-Street” (1996), he argued that the P/S ratio is the strongest single determinant of the excessive stock returns, stronger even than the P/E ratio.

3.4 Evidence on Dividend Yield

Most of the studies related to the dividend yield variable gave positive results, but also showed that a relationship between the average returns and this value screen is not as consistent as between average returns and P/E or P/B ratio.

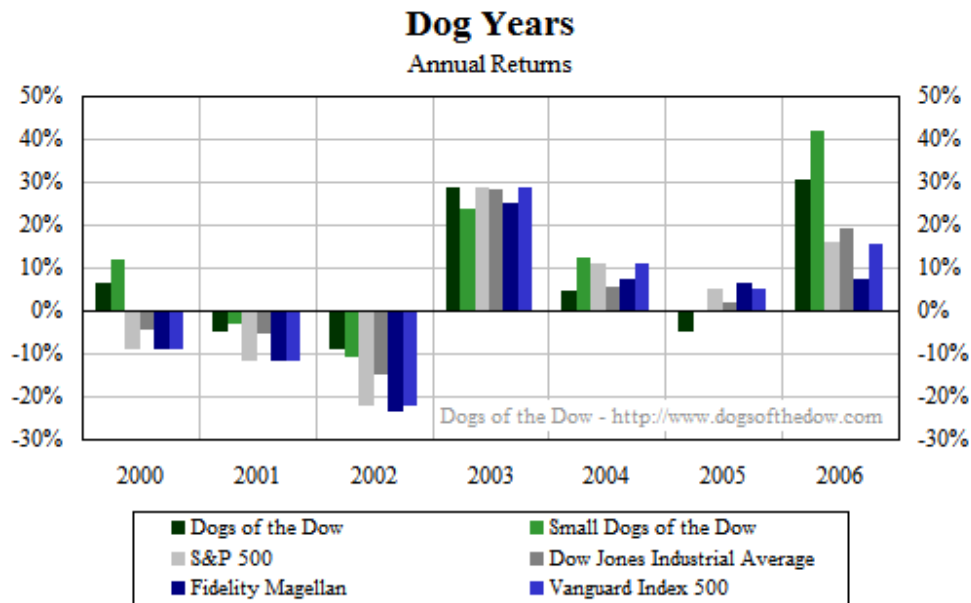
Using raw data from K. French, Damodaran (2003) presented results of testing portfolios classified by a dividend yield between 1952 and 2001. In the periods of 1952-1971 and 1991-2001, portfolios with the highest dividend yield generated higher returns than portfolios with the lowest dividend yield. However, between 1971 and 1990 results were reversed: The highest yield portfolios earned lower returns than the lowest yield portfolios.

One of the most popular dividend yield strategies is the “Dogs of the Dow” strategy which is devoted to picking annually ten Dow Jones Industrial Average stocks with the highest dividend yield. The stocks are always included in the portfolio at the beginning of the year, and hold until the end of the year. Since 1973, they have yielded an average annual return of 17.7 %, while the Dow Jones Industrial Average has earned 11.9 % for the same period.¹⁰ McQueen, Shields, and Thorley (1997) conducted a profound analysis of this strategy using a sample period from 1946 to 1995. Their results confirmed superior performance of “dogs” as compared to Dow-30 over 50 years period (the Dow-10 had average return of 16.77 %, while the Dow-30 earned 13.71 %). However, they also found that an excess return of the Dow-10 was associated with a higher risk (its standard deviation was 19.10 % as compared to 16.64 % for the Dow-30). This is exactly the point which the critics use as the argumentation against this strategy. They argue that the excess return would be eliminated after adjusting for risk and taxes.

The chart below provides an insight into performance of Dogs of the Dow portfolio over years comparing it with some of the largest US equity funds and indexes.

¹⁰ cf www.dogsofthedow.com

Figure 3.1: Performance comparison from 2000 to 2006



Source: www.dogsofthedow.com

3.5 International Evidence

Numerous studies have tested the cross-sectional predictability of the US stock returns. However, some researchers have challenged the reliability of such studies, stating that certain patterns of the stock returns could be time-specific and market-specific. This has motivated some academicians to extend their analysis to the markets outside of the US.

Chan, Hamao, and Lakonishok (1991) analyzed Japanese stock market in the period of 1971-1988. They related cross-sectional return variations to four variables: book-to-market, earnings-to-price, size and cash flow yield. Book-to-market and cash flow yield seemed to have the strongest positive relationship with expected returns. Of all variables, book-to-market was found to be economically and statistically most important. As opposed to other studies done before theirs, they did not find an evidence for a strong earnings yield effect after controlling for other variables.

Capaul, Rowley, and Sharpe (1993) provided strong evidence on the excess returns of value stocks over growth stocks in the six major security markets (US, UK, Germany, Japan, Switzerland and France) from January 1981 to June 1992. They classified portfolios using a price-to-book ratio (value portfolios contained stocks with low P/B and growth portfolios contained high P/B stocks). The results showed that the low P/B stocks outperformed the high P/B stocks. Moreover, a superior performance of the low P/B stocks, indicating high predictable power of the P/B ratio, was evident after adjusting for risk too. A difference between value and growth returns was substantially larger in other countries than in the US. The test on a statistical significance on a global basis confirmed this finding. The differences, however, were not equally significant for every country or at the same time. That is why they suggest that “an investor considering a ‘tilt’ toward value stocks would be well advised to implement a policy globally, rather than within a single country or even a single region”¹¹.

Fama and French (1997) found that value stocks tend to have superior returns to growth stocks in the international markets too. A research that they carried out rejected the theory of Black (1993) and MacKinlay (1995) which says that the value premium is sample-specific, i.e. that the higher returns of the US-value stocks were only a chance result that is unlikely to happen again. Fama and French (1997) studied the market, value and growth returns for the US and 12 major countries in Europe, Australia and Far East (so they constructed 13 portfolios for the individual countries). Their results provide strong evidence on the superior value returns for the portfolios formed on the book-to-market ratio, earnings-to-price ratio, cash-flow-to-price ratio and dividend yield in the period from 1975 to 1995. Among portfolios selected on the B/M, E/P and C/P, 12 out of 13 value portfolios outperformed growth portfolios. The value premiums are not so much consistent for the portfolios formed on dividend yield. However, even in this case 10 out of 13 portfolios generated the positive value-growth premiums. The global value portfolios had average returns from 3.09 % to 5.09 % per year higher than average returns on the global market portfolio, and from 5.56 % to 7.65 % per year higher than those of the global growth portfolios.

¹¹ cf Capaul, Rowley, and Sharpe, “International Value and Growth Stock Returns”, Financial Analysts Journal 49 (1), 1993, p. 32.

4 Explanation of the Value Premium

While investors generally agree that value stocks outperform growth stocks in the long run, their opinions differ when it comes to explanation of the value premium sources.

One explanation is that the higher value returns are compensation for a higher systematic risk. Therefore, in order to generate superior returns, investors must take on an additional risk. As opposed to the traditional EMH explanation, behavioral finance assumes that it is rather people's systematic judgment errors that cause both underpricing and overpricing of the stocks. The financial markets are assumed to be inefficient most of the time while the market efficiency comes up as a special case, unlikely to hold under the plausible circumstances.

4.1 Risk-based Explanation

Academic researchers, Fama and French, shaped the investment world in 1992 by providing strong evidence against the Modern Portfolio Theory (MPT) and Sharpe-Lintner-Black (SLB) model. Market risk is widely accepted risk factor but, according to Fama and French, it failed to explain the realized returns. They say: "If assets are priced rationally, our results suggest that stock risks are multidimensional."¹²

Generally, they divide the stocks into four groups: small value, large value, small growth and large growth stocks.¹³ According to their theory, each of these asset classes are exposed to the different risk levels, which results in the different stock returns. The value companies are in general riskier than growth companies since they, for example, have higher cost of capital. Moreover, the small companies are always associated with higher risk than large companies because they are not able to deal in a proper way with the financial troubles. As a result of these postulates, the small value stocks should have the

¹² cf Fama, E. and French, K., "The Cross Section of Expected Stock Returns", Journal of Finance 47 (2), 1992, p. 428.

¹³ This is general classification used for the portfolio selection. The analysis that Fama and French carried out in 1992 contained more combined portfolios using the value and size criterions.

higher returns than any other of these asset groups. Both value groups should have the higher returns than the two growth groups. The small growth stocks should outperform the large growth stocks. Fama and French model, however, failed to prove the latter one. The small growth class had the worst performance of these four classes in their empirical research.¹⁴

4.1.1 The Three Factor Model

Criticizing the Capital Asset Pricing Model (CAPM) which defines market risk as the only risk factor explaining excess returns, Fama said in 1992 that “beta as the sole variable explaining returns on stocks is dead”.¹⁵ Namely, in “The Cross-Section of Expected Stock Returns”, Fama and French state that their empirical analysis failed to find the relationship between beta and average returns in the period of 1963-1990, as predicted by the MPT. In addition, they identified two more relevant risk factors which they think are the most significant in explaining the value premiums.

The second risk factor they identified is associated with a company size. They found that the small company stocks, as related to a higher risk, deliver better results than the large company stocks. The third risk factor they included to their studies is the factor associated with value of a company. Value is represented by the book-to-market ratio. The stocks with a higher fundamental value than their market price usually outperform those who have low book-to-market ratio and are therefore overpriced.

Together with the market risk, these two factors comprise The Three Factor Model:

$$r_a = r_f + \beta_a(r_m - r_f) + s_a\text{SMB} + h_a\text{HML}$$

β_a – asset exposure to market risk

s_a – level of exposure to size risk

¹⁴ cf Fama, E. and French, K., “The Cross Section of Expected Stock Returns”, Journal of Finance 47 (2), 1992, p. 446.

¹⁵ cf <http://answers.google.com/answers/threadview?id=273817>

h_a – level of exposure to value risk

While the univariate analysis of a simple relation between beta and average return failed to show this relation, Fama and French succeeded in proving a strong univariate relation of the size and book-to-market equity with the average returns. Moreover, they proved that these relations hold in the multivariate analysis too: A strong positive relation between the book-to-market and returns, as well as a strong negative relation between the size and returns are present even when included together or with other variables in a regression.

They also found that a book-to-market ratio had a stronger role in explaining average returns. Comparing returns between the companies with negative or high book-to-market on the one side, and those with low book-to-market on another side, they have come to a conclusion that variations are related to relative distress. This means that the higher average returns for the companies with negative book equity and high book-to-market ratio are due to poor earnings prospects of these companies. When comparing size with book-to-market ratio, they showed that there is a negative correlation between these two variables. For example, the small stocks typically have the low prices and high book-to-market equity because they have poor earnings prospects. On the other side, the large stocks have higher prices and lower book-to-market equity because they usually have good earnings prospects. We can see that both size and book-to-market equity are related to the economic fundamentals.

In order to explain these two risk factors added, they constructed two models: Small Minus Big (SMB) for the size and High Minus Low (HML) for the value risk. For these purposes, they divided the stocks into three groups based on a book-to-market ratio, and two groups based on market equity. They explained this as due to their finding that “book-to-market equity has a stronger role in average stock returns than size”¹⁶. Each of the size groups they divided into three groups again, in a way that both small and large stock groups contained also stocks with low, medium and high book-to-market ratio. In

¹⁶ cf Fama, E. and French, K., “Common risk factors in the returns on stocks and bonds”, Journal of Financial Economics 33, 1993, p. 9.

the end, they got six combined portfolios: small size/low book-to-market (S/L), small size/medium book-to-market (S/M), small size/high book-to-market (S/H), big size/low book-to-market (B/L), big size/medium book-to-market (B/M) and big size/high book-to-market (B/H).

The SMB measures monthly size premium, i.e. the difference between an average return of 50 % of the smallest stocks and an average return of 50 % of the largest stocks each month. In order to capture for return variations between small and big stocks, the comparing portfolios have the same weighted-average book-to-market ratios. This is how they avoided having a book-to-market ratio to influence results.

The HML measures monthly value premium, i.e. the difference between an average return of 30 % of the stocks with the highest book-to-market ratio and an average return of 30 % of the stocks with the lowest book-to-market ratio each month. The two portfolios are constructed in a similar way as the SMB portfolios, i.e. they are equally weighted on the size to make sure that behavior of the average monthly returns reflects solely the high-low book-to-market differences excluding at the same time an influence of the size effect.

By applying these models, Fama and French (1993) succeeded to confirm what they have found earlier: A relation between the book-to-market ratio and the average returns is more consistent than relation between the size and the average returns. The average monthly returns increased with the book-to-market ratio within every size portfolio. For some reason however, the average returns of the lowest book-to-market portfolio did not decrease from the small to the big size portfolios. In every other group they found a negative relation between size and average returns. Their regressions showed that all the three risk factors capture the common variation in the stock returns. However, the excess market return which they used as a proxy for the market factor, did not capture substantial variation when used as the only risk factor. In a contrary, the results are much more convincing when using either the SMB and the HML without market or all three factors together. The three-factor regression has shown that very strong common variation was captured: It produced R^2 higher than 0.9 for 21 out of 25 portfolios. At the

same time, the market alone produced R^2 higher than 0.9 for only two portfolios.

They also examined the average returns behavior using portfolios formed on the earnings-to-price and dividend-to-price ratios. The results were similar to those with the book-to-market and size factors: The highest returns were generated by the firms with a negative and very high earnings-to-price ratio. Furthermore, the returns increased as an earnings-to-price ratio increased across the portfolios. The one-factor model, on the other hand, failed to explain the relation between returns and earnings to price. The reason for that, according to Fama and French (1993), is that “market β s for the positive-E/P portfolios are all close to 1.0, so the one-factor model cannot explain the positive relation between E/P and average return”.¹⁷ They also found a positive relation between E/P and B/M. Small average returns of the low E/P stocks are typical for the stocks with low B/M. They have high earnings, which leads to high prices relative to their book equity. High E/P stocks show the same characteristic associated with high B/M stocks: Low earnings resulting in low prices, and high returns resulting from distress.

Concerning portfolios formed on dividend-to-price ratio, the spread in average returns is much weaker than for E/P portfolios. The three-factor regression has shown that low D/P ratios are typical for growth stocks which have low average returns, while high D/P ratios are associated with distress producing high average returns.

The Three Factor Model makes it able for investors to choose as to how much they want to get exposed to each of three risk factors, depending on the level of returns they expect to reach.

4.1.2 Economic Arguments for the Cross-Section of Expected Returns

There is a point that Fama and French were not sure about. It is an economic explanation for the ability of two variables, size and book-to-market ratio, to explain the

¹⁷ cf Fama, E. and French, K., “Common risk factors in the returns on stocks and bonds”, Journal of Financial Economics 33, 1993, p. 49.

cross-section of the average stock returns. They suggest that there are two possible points of view, depending on whether we assume an asset pricing to be rational or irrational.

In their tests Fama and French used two variables mentioned above as the proxies for a risk assuming that stocks are priced rationally. In that case, we could say that a distress factor is incorporated in the stock returns since distressed firms have poor earnings prospects and are, therefore, associated with the higher risks and higher returns. The book-to-market ratio could be seen as a direct indicator of the company's earnings on the assets. The stocks with a higher book-to-market ratio are expected to have the higher returns because their equity is valued low by the market.

On the other hand, a possibility of observing the market and its pricing as irrational cannot be excluded. This theory assumes that market occasionally overreacts to the relative prospects of the companies and that the book-to-market and size effects are a result of this overreaction. Not even Fama and French ignore this possibility: "It is also possible, however, that BE/ME just captures the unravelling ... of irrational market whims about the prospects of firms."¹⁸

Fama and French deal in a more detail with the economical reasons of the common return variations in their "Size and Book-to-Market Factors in Earnings and Returns" (1995). In this work they examined whether the behavior of the stock prices is consistent with the earnings behavior. Once more they confirmed that both book-to-market equity and size are related to profitability. However, an interesting finding is that the size and profitability did not have a strong relation before recessions in 1981 and 1982. The low profits of the small firms after 1980 have therefore largely contributed to the size effect in the earnings. They have found a persistent property of the earnings related both to book-to-market equity and size. This conclusion is based on the evidence that "small

¹⁸ cf Fama, E. and French, K., "The Cross Section of Expected Stock Returns", Journal of Finance 47 (2), 1992, p. 429.

stocks have persistently lower EI/BE than big stocks”¹⁹, and that, for even a longer period, the low book-to-market stocks have higher earnings-to-equity than the high book-to-market stocks (four years before and at least five years after the portfolios were formed). As opposed to a size factor, they found a relation between book-to-market and earnings to be unconditional, as their both portfolios formed on the low book-to-market ratios were more profitable than the high book-to-market portfolios. This is why they state that a book-to-market factor is generally stronger indicator of profitability than a size factor.

Fama and French (1995) have come to the same conclusion as Lakonishok, Schleifer, and Vishny (LSV, 1994) regarding earnings properties after a portfolio formation: They confirm that the earnings growth rates of both low and high book-to-market stocks tend to converge, i.e. they become similar in the years after a portfolio was formed. Their tests, however, do not confirm the LSV theory that the higher average returns of the high book-to-market stocks are result of an irrational asset pricing and the lack of market’s understanding of the growth rates convergence. In contrary, Fama and French state that the market understands the earnings growth rates behavior, and that it makes unbiased forecast of earnings after the portfolios are formed on the size and book-to-market ratio. Because only a long-term property (strong or poor) of the earnings has an impact on the stock prices and book-to-market ratio, they exclude the possibility of the irrational pricing and investor sentiment impact. They believe that these do not have a lot to do with the long-term earnings and profitability.

Fama and French (1995), therefore, explain the higher risk premium of the high book-to-market firms as a result of a higher distress risk. Those firms generally have common characteristics like persistently low earnings and high financial leverage.

They succeeded in proving that the market and size factors in earnings explain the market and size factors in returns, but they failed to provide strong empirical evidence that exactly these factors explain also risk premiums associated with the size and book-

¹⁹ cf Fama, E. and French, K., “Size and Book-to-Market Factors in Earnings and Returns”, *Journal of Finance* 50 (1), 1995, p. 136.

to-market equity. So, the question which economic variables drive the common variations in the average returns remained open.

Griffin and Lemmon (2002) have provided an interesting analysis of a relation between book-to-market equity, distress risk and stock returns using a measure of the likelihood of bankruptcy as a proxy for distress risk. They ranked the firms with the highest financial distress in the high O-score quintile. Within this ranking they identified more firms with the low B/M ratios and high past stock returns than the firms with the high B/M ratios and low past stock returns. Ranking the firms based on their bankruptcy risk has led them to the results which only by part overlapped with those of Fama and French (1995): Within the low O-score firms, the high BE/ME firms have persistently lower earnings than the low BE/ME firms. On the other hand, the results for the highest O-score quintile differ largely from Fama and French (1995) prediction: The low BE/ME firms with a high likelihood of bankruptcy have the earnings persistently below those of other low BE/ME firms. Their characteristics do not seem to be consistent with a high distress risk, since they have the high past stock returns and lower subsequent returns than those of the other low BE/ME firms. Furthermore, the returns of the high BE/ME O-score firms are only slightly higher than the returns of other high BE/ME firms.

Both low and high BE/ME stocks within a high O-score quintile are characterized by a low profitability and a high leverage; their returns are, however, widely dispersed. Among all quintiles, the firms with the highest distress risk had the largest differences in returns between high and low book-to-market securities. This was largely due to an underperformance of the low BE/ME stocks relative to all other groups. However, the Three Factor Model using the MTB (excess return on the value-weighted market portfolio), SMB and HML factors, did not support Fama and French (1995) prediction that the low returns of the highly distressed low BE/ME firms can be explained by a lower riskiness of these firms compared to other low BE/ME firms. One possible explanation that they examined coincides with the view of LSV (1994), La Porta (1996) and La Porta et al. (1997). It says that a return pattern of the low BE/ME firms mentioned above is due to a mispricing of investors. The mispricing again, is related to the characteristics of firms with a high distress risk. They found that those firms are

typically small ones, with the low current profits but a high sales growth, capital spending and investing in future growth opportunities. These firms are subject to the larger information asymmetries, and as such difficult to value by investors. Their low B/M ratios actually reflect wrongly expected improvements by the market. This assumes that the current earnings of these firms are only temporary weak and that their profits will increase in the future. Because of these expectations, they get awarded by the high multiples.

Griffin and Lemmon argumentation of a mispricing differs from general prediction of behavioral finance advocates which says that investors extrapolate a current performance too far into the future. They say instead that "investors may underestimate the importance of information about current fundamentals and overestimate the payoffs from future growth opportunities".²⁰

Zhang (2005) supports a traditional risk-based explanation of value premium as suggested by Fama and French (1993, 1996) and relates a behavior of the expected returns to the economic fundamentals. His model is different in a way that he uses more fundamental determinants of the risk and expected return. A high spread between expected returns of the value and growth strategies he explains using the assets in place and growth options mechanism. The assets in place are riskier especially in bad times, because a price of risk is high. They are difficult to reduce by the value firms, because these firms face the higher costs in cutting than in an expanding capital. This is why there is a high-risk dispersion between the value and growth strategies in bad times. An expected value premium is much higher in bad times, since the value firms increase their unproductive capital stocks, unable to reduce them due to the higher costs. In good times, on the other hand, risk dispersion between the value and growth strategies is low. This is because the growth firms invest more in good times and, at the same time, previously unproductive capital of the value firms becomes productive. Consistently with Cohen et al. (2003), Zhang (2005) says that the value premium is the highest when a spread in the book-to-market ratios between value and growth stocks is

²⁰ cf Griffin and Lemmon, "Book-To-Market Equity, Distress Risk and Stock Returns", *Journal of Finance* 57 (5), 2002, p. 2333.

wide. He has also found that the book-to-market and value spread are the positive predictors of the future industry returns, since an aggregate productivity (assumed to be the main driving force in the industry) is positively related to the book-to-market ratio and expected excess return. Moreover, a value spread has even higher predictive power as compared to book-to-market. Zhang's regression of the value-weighted industry return on the industry book-to-market and the value spread has led him to the conclusion that the industry cost of capital increases with the industry B/M ratio and with value spread within the industry.

Zhang (2005) emphasizes that rational expectations approach has an advantage over the alternative theories such as behavioral finance in a way that the real economy is easier to measure than an investor sentiment. Moreover, the structural models theoretically have more robust predictions to the alternative assumptions. He argues that "neoclassical framework can be extended to link asset prices to other features of the real economy"²¹, and calls for further research in this area.

4.1.3 Market Anomalies: Fama Defending Efficient Market Hypothesis

In the theory of the Efficient Market Hypothesis, any patterns in the average returns that cannot be explained by the Capital Asset Pricing Model are called the market anomalies. One example would be either short-term or long-term post-event continuation of pre-event abnormal returns. In the behavioral finance theory such deviations from the "normal" returns are explained by the investors' overreaction. The market efficiency theory, on the other hand, sees these anomalies as a chance result. This chance generates the deviations from a zero expected value of the abnormal returns in both directions. This means that a general prediction is that apparent underreaction will be as frequent as overreaction. Consistently, the evidence has shown that a post-event continuation of the pre-event abnormal returns is about as frequent as their reversal.

²¹ cf Zhang, Lu, "The Value Premium", Journal of Finance 60 (1), 2005, p.95.

Fama (1998) shows that, except continuation of the short-term returns, the anomalies largely disappear in a three factor model. The excess return is explained by the sensitivity of the portfolio return to three factors: excess return on a broad market portfolio ($r_m - r_f$), Small Minus Big (SMB) and High Minus Low (HML). The most long-term return anomalies tend to disappear as they are sensitive to methodology or statistical approaches used to measure them. They could not be attributed to a chance only if they were large enough. However, Fama (1998) argues that the most of them are actually shaky and, as such, likely to disappear or become marginal if the reasonable changes in methods used to estimate the abnormal returns are made. Fama and French (1996) have found that a return covariation of the stocks that were subject to an overreaction for the long term is associated with a risk premium. Furthermore, they show that the long-term reversals of DeBondt and Thaler (1985) are captured by a multifactor asset pricing model. Most of the studies of the long-term returns have provided an apparent overreaction as a result. However, according to Fama (1998), overreaction cannot be the whole story because a high distress premium persists for at least five years after a portfolio formation, while the mean reversion of the earnings growth is apparent much sooner.

The general prediction of behavioral finance is that the long-term abnormal returns can be attributed to an investor overreaction. This assumption is based largely on the research done by DeBondt and Thaler in 1985. However, Fama (1998) argues that the market efficiency still cannot be replaced by this behavioral alternative since there are also the event studies that produced abnormal post-event long-term returns as a result of an underreaction. So, because an overreaction comes about as frequent as an underreaction, none of these alternatives can be considered as a dominant phenomenon.

4.2 Behavioral Finance Explanation

According to Lakonishok, Schleifer and Vishny (1994), a success of the value investing strategies lays in the fact that these strategies are contrarian to what they call “naive”

strategies (i.e. popular strategies). Some of these naive strategies extrapolate past earnings performance too far into the future; some assume a trend in the stock prices, while others overreact to either good or bad news and so on. This kind of a behavior leads to overselling of value stocks and their underpricing on the one hand, and overbuying of growth stocks and their overpricing on the other hand. The contrarian investors exploit a suboptimal behavior of the naive investors by investing more in the underpriced stocks and underinvesting in the overpriced stocks, which makes them able to outperform the market.

4.2.1 Overreaction and Underreaction

Overreaction and underreaction are probably two most important hypothesis of the behavioral explanation of the value premium. They are result of investors' systematic mental mistakes. A psychological research has shown that these mistakes happen because a human brain uses shortcuts to solve complex problems and generate estimates, which usually leads to an incorrect data analysis. In other words, the longer an investor analyzes a company the harder is for him to quickly evaluate new data.

An overreaction is generally explained by the psychological theory called the representativeness heuristic. Representativeness is a tool that our brain uses to process and classify data rapidly. For example, individuals systematically make mistakes in predicting uncertain outcomes because they see patterns in random sequences. They usually take a short history of data as a representative for the future uncertain events. They see the patterns in a financial data without realizing that these are not the real features of the data. In fact, the evidence has shown that the company's earnings are random most of the time. Despite this fact, investors become too optimistic and extrapolate a company's short past history of rapid earnings growth too far into the future. If the company's earnings were going up several years in a row, investors believe this is a trend which is going to continue. They ignore the negative signals and fail to perceive the reality that the past earnings growth is unlikely to repeat itself. They overvalue the company, which lowers the future returns as the past growth rates fail to

repeat themselves. In the course of time, as soon as investors realize their mistake, the stock price begins to correct itself.

On the other hand, there are situations when it comes to an underreaction to the certain financial news. For example, investors underreact to good news such as earnings announcements that are substantially higher than expectable. They do push up the prices, but not enough. Since the prices are too low, subsequent returns become higher on average. Similar happens with the bad news announcements. The prices fall, but they do not fall enough. The process of information incorporation into the prices goes slowly.

A phenomenon used to explain an underreaction is called conservatism. It states that the individuals are, once they have formed a certain impression, slow to change their beliefs in the face of new evidence. They are skeptical and disregard the full information content, probably believing that the news are of temporary nature. They adjust their stock valuation only gradually. As they are getting better information over the time, they move from the initial reference point and overcome their mental mistake.

4.2.2 Other Behavioral Biases

Another type of the behavioral biases is a non wealth-maximizing behavior. It happens frequently that investors hold the looser portfolios too long, and sell the winner portfolios too soon. Possible explanation for such a behavior could be a concept of regret or loss aversion, i.e. "the fact that for most investors the pain associated with losses exceeds the pleasure of gains".²² The human emotions, such as fear and greed, play a crucial role in their decision-making process.

Applied to the market, the concept of loss aversion can also be recognized in different amounts of a risk premium required for growth and value stocks. Because the growth

²² cf Russell, J. F., "Behavioral Finance and the Sources of Alpha", Journal of Pension Plan Investing 2 (3), 1998, p. 9.

companies are those that have recently performed well, investors are less concerned about future possible losses and are willing to accept more risk. This is why they require a lower risk premium for growth stocks, driving their prices even higher and lowering the expected returns at the same time. On the other hand, investors usually perceive value stocks as riskier than they actually are. This is due to the fact that the low current prices of the value companies indicate that they have recently suffered losses. Investors require a higher risk premium for these companies, lowering their stocks' prices even further and increasing the expected future returns.

What kind of a decision an investor is going to make, depends also on how a given problem is presented to him. For example, if he sees an impressive history of the long-term stock returns relative to those on bonds, he will invest more in the stocks than he would do if he saw only the volatile short-term stock returns.

The confidence is another factor identified by the psychologists to have a significant influence in people's decision-making process. The numerous studies have shown that people are generally and regularly overconfident in their judgments. This is also logical, because otherwise they would not make any important changes in their lives. Similarly, investors make changes in their portfolios because they believe these changes will do better. The evidence has shown that only about 15 % of investors beat the market over a long period of time. The overconfidence is exactly the reason why the managers and their clients believe they will beat the index despite the fact that the majority will not. Christopher Browne made a psychological experiment with a group of people of approximately the same intelligence. They were asked to rate their own investment skills relative to the others in the room at the rate 1 to 10. The most logical score would be an average result of 5. However, the result was 7.5.²³

²³ cf Browne, C., "The Little Book of Value Investing", 2006.

4.2.3 Empirical Evidence for Behavioral Explanation

In their direct test of the extrapolation theory, Lakonishok, Shleifer and Vishny (LSV, 1994) classified the stocks into ten portfolios at the end of April each year from 1968 to 1989. They used book-to-market (B/M), cash-flow-to-price (C/P), earnings-to-price (E/P) and growth in sales (GS) as a ranking criterion. The first decile portfolio was made up of value stocks, i.e. those with the lowest financial ratios, while the last portfolio was made up of glamour stocks, i.e. the stocks with the highest financial ratios. They used the earnings, cash flow, and past growth in sales to measure the past performance. On the other side, they used price-to-current earnings and cash flow to measure expected performance of the stocks. They made this kind of a distinction because they wanted to test the basic characteristics of value and glamour stocks as defined by the contrarian model: Value stocks are those whose past performance was poor and which are also expected to perform poorly in the future; Glamour stocks are expected to perform well in the future, as they performed well in the past. Or in other words, value stocks are out of the favor stocks and the market is too pessimistic about their future performance. Glamour stocks are those which are favored by the market, and the market is too optimistic about their future performance. LSV (1994) started with a classification of value and glamour stocks based on either past or expected growth but then moved on to classification based on both past and expected growth. They monitored a performance of each portfolio for the next five years after a portfolio formation.

The results of their study showed that value stocks outperformed glamour stocks over the five years period. Furthermore, the results apply to the large companies as well as to the small companies. The portfolios sorted on C/P generated even bigger differences in returns between value and glamour stocks than those sorted on B/M. This confirmed the statement of La Porta (1993) that the value investing strategies generally produce better results when the market's expectations of the future growth are used instead of the financial ratios.

In order to examine the importance of each ratio in explaining the performance variations, LSV conducted a multiple regression analysis each April from 1968 to 1989.

As opposed to Fama and French (1992), they found that B/M and size were not significant once the other variables were included. Instead, they found GS and C/P to be the main drivers.

They also provided evidence that glamour and value stocks are indeed characterized by the expectational errors and an excessive extrapolation. This is the essence of the extrapolation model, which they confirmed by comparing directly the past growth rates of the stocks with the actual and expected growth rates. They showed that glamour stocks had a higher growth in the sales, earnings, and cash flow in the past than value stocks. For example, in the pre-ranking period glamour stocks rose in the earnings by 139 % compared with 22.5 % of value stocks. Over the next five years, the earnings growth was almost the same for both groups. The market forecasts for glamour stocks were obviously too optimistic relative to value stocks, i.e. the actual future growth rates of glamour stocks neither matched their past growth rates, nor the market's expectations. The market belief in the continuation of a long-term trend for many years has resulted in the superior value returns.

LSV exclude the possibility of the risk being the cause for the performance differential between value and glamour stocks since their results apply to most of the years they examined. They analyzed a performance of value stocks dependent on the market state (there were four recessions identified during their sample period). The results showed that value stocks did disproportionately well in the extreme good times, and quite well in the extreme bad times. If value stocks outperformed glamour stocks in some states (according to the traditional risk-based explanation, this should be bad states of the world), one could say that value stocks are fundamentally riskier. In contrast, the value investing strategies appeared to be no riskier than the naive strategies. They confirmed these findings by using the traditional "beta" measures of risk too. A difference within standard deviations of returns namely between value and glamour stocks appeared to be quite small as compared to their average return differential. Furthermore, they found that the size-adjusted returns of both value and glamour stocks had pretty much the same standard deviation. They made a conclusion that the higher standard deviation of value stocks is due to their smaller average size. However, another analysis that they

made has shown that the most of the excess returns from value stocks could be earned by focusing on the larger stocks. Therefore, this higher return of the large value stocks cannot be explained by the higher standard deviation.

LSV, however, do not reject the theory that the securities generating the higher returns “must by definition be fundamentally riskier”²⁴. As the explanation for persistently higher returns of value stocks relative to glamour stocks, they state that it could be simply because investors did not know about these differences. Most of the investors were not able to conduct such an analysis until recently. Investors usually prefer investing in the “popular” stocks, i.e. the companies with a high current profitability. They see these companies as a good investment irrespective of the price.

La Porta, Lakonishok, Shleifer and Vishny (1997) explain the superior returns of value stocks as a result of the market’s expectation that the past growth difference between value and growth stocks “will persist much longer than is reliably predictable from past data”.²⁵ This is reflected in the large difference between the value and growth price-to-earnings multiples. Besides, referring to the existing evidence (among others Little in 1962), they emphasize that the earnings growth rates are predictable only one to two years into the future. They have done a direct test of the expectational errors hypothesis by examining the market’s reactions to earnings announcements over a five-year period after the portfolio formation. They wanted to confirm a pre-assumption that earnings surprises in this period are systematically positive for value stocks and systematically negative for growth stocks (since value stocks were found to have persistent superior returns over a five-year period). For these purposes, they ranked portfolios using two different classifications: The one is consistent with Fama and French (1992) and uses B/M as a ranking criterion, while the other one is two-dimensional and consistent with LSV (1994), using the cash flow-to-price ratio and past growth in sales as a ranking criterion. In the latter one, value stocks were identified as those that had a poor growth in the past, and are expected to grow slowly in the future. As a result, La Porta et al.

²⁴cf Lakonishok, Shleifer and Vishny, “Contrarian Investment, Extrapolation and Risk”, *Journal of Finance* 49 (5), 1994, p. 1574. (Refer here to the “metaphysical” explanation of a risk.)

²⁵ cf La Porta et al., “Good News for Value Stocks: Further Evidence on Market Efficiency”, *Journal of Finance* 52 (2), 1997, p. 860.

(1997) have identified the positive earnings surprises for value stocks which were characterized by the long post-formation persistence. Value stocks had the earnings announcement returns significantly higher than growth stocks. The final conclusion is that the expectational errors about future earnings announcement maybe cannot completely explain a return differential between value and growth stocks but they certainly do explain a significant portion of it.

Coval and Shumway (2005) tested an impact of the behavioral biases on the price-setting process. Their study differs from the existing evidence on this particular issue in a way that it focuses on the traders who work with a significant amount of capital *daily*, covering over 95 % of all trades at the Chicago Board of Trade (CBOT). They examined several common behavioral alternatives such as: self-attribution bias, representativeness bias, the house-money effect and loss aversion. They divided the trading day into two periods in order to show a relationship between the realized profits in the morning and the subsequent risk-taking in the afternoon of professional traders. The results indicate that the CBOT traders are highly loss averse. Therefore, they are more likely to take on additional risk in the afternoon following the losses in the morning (31.2 % chance) than following the gains (27 % chance). In contrary, the traders who attribute past gains to their own ability, or who consider these gains as representative of the future opportunities, take more an above-average risk as their profits grow. Next, Coval and Shumway (2005) also examined whether the loss avers traders are more likely to be “price-setting”, i.e. at which level they tend to purchase at a higher price or sell at a lower price after the losses occurred. They found that the losing traders are around 15 % more likely to trade at different purchase and sales prices in the afternoon than the winning traders. However, an impact of the losing traders on the prices did not seem to have a long-term character. The price changes showed a strong magnitude of reversal to the previous levels.

Consistent with an evidence that investors tend to either underreact or overreact to good or bad news, Barberis, Shleifer, and Vishny (1997) have provided a model that should explain how investors form their beliefs. They examined the nature of mispricing by using one investor and one asset in the model. They assumed that the earnings of a

given firm follow a random walk, while the investor believed that the earnings can be either mean-reverting or that they can trend (i.e. rise further after an increase). If a positive earnings surprise was followed by another positive surprise, the investor believed he was in a trending state. This investor reacted too little to the individual earnings announcements. This behavior is consistent with the conservatism. On the other hand, if a positive earnings surprise was followed by a negative surprise, the investor believed to be in a mean-reverting state. This investor was subject to a representativeness heuristic. The model of Barberis, Shleifer, and Vishny (BSV, 1997) confirmed the theory of Griffin and Tversky (1992) that people pay too much attention to the strength of the evidence and too little attention to its statistical weight. BSV (1997) mention the example of the market crash in 1987. Their interpretation of this event is that “investors overreacted to the news of panic selling by other investors even though there was little fundamental news about security values”²⁶. So, the fact that this was a high-strength-and-low-weight event should explain the overreaction.

In the model specifically, BSV assumed that the corporate earnings announcement was a low-strength-and-high-weight event, while the consistent patterns of the news were the high-strength-and-low-weight news events. The first assumption has led them to the conclusion that the stock prices underreact to the earnings announcements, while the latter one indicated that the stock prices overreact to consistent patterns of good or bad news.

Behavioral finance is relatively new field. This is the reason why considerable empirical evidence supporting this theory still does not exist as compared to the numerous studies dedicated to a traditional Modern Portfolio Theory. Furthermore, the fact is that the traditional theories are much easier to analyze than the psychological issues related to behavioral finance. The problem with the behavioral finance evidence is a time horizon. Very short sample periods are used in the studies to examine an investor behavior – usually one trading day. This is not without importance if we know that the results of such studies are always extended to the long-term periods.

²⁶ cf Barberis, Shleifer, and Vishny, “A Model of Investor Sentiment”, *Journal of Financial Economics* 49 (3), 1998, p. 28.

However, the popularity of behavioral finance is rising. The existing evidence has proven that its theories, based on psychological observation, help explaining the cross-sectional differences in the returns. There is an important advantage of the behavioral finance theory over the traditional investment strategies: It is based on human behavior, and human behavior does not change very fast.

5 Empirical Analysis of the European Stock Market

5.1 Motivation

Many empirical studies have been executed in the field of value investing. Based on historical financial data, nearly all of them found that value stocks delivered superior returns in the long run compared to growth stocks. However, most of these studies concentrated on the American stock market²⁷, and only few of them on the international market including Europe. The European stock market has remained relatively under-researched. This is the reason why I decided to conduct an empirical analysis of the European stock market based on the Dow Jones Stoxx 600 Index.

5.2 Purpose of the Analysis

Purpose of this analysis is to test whether value stocks outperform both growth stocks and the market index over a longer period of time. Constructing portfolios with low financial ratios on the one side (representing the value portfolios), and high financial ratios on the other side (representing the growth portfolios), should generate superior returns of the first group compared to both the market index and the high financial variables group. Furthermore, an observation of performance of different portfolio classes over years should confirm the significance of financial ratios in identifying “winners”. At the same time, the ability of the low-financial-ratio or the value portfolios to outperform the market and the growth portfolios over the observed period should show that the market is inefficient.

²⁷ Fama and French (1992, 1993, 1996); Lakonishok, Shleifer and Vishny (1994); La Porta et al. (1997); Chan, Jegadeesh and Lakonishok (1995).

5.3 Methodology and Data Description

The analysis I have carried out is based on some most important financial ratios: price-to-earnings, price-to-book, price-to-sales ratio and dividend yield. I have used historical data to calculate these ratios for all individual stocks contained in the index Dow Jones Stoxx 600. To form the ranked portfolios, I have divided the stocks into deciles, i.e. 10 % groups classified depending on the level of their ratio. The first group stands for value stocks and contains always 10 % of the stocks with the lowest ratios. (Except for dividend-yield portfolios where the first group of the stocks has the highest multiples.) The last group represents always growth stocks containing 10 % of the stocks with the highest ratios. (This group has the lowest ratios within dividend-yield portfolios.) This kind of portfolio construction is done for each ratio separately, so in the end I have four groups each containing ten decile portfolios. The companies are included in a portfolio for a given ratio even if they do not have data on all the four ratios. The entire data are taken from Bloomberg. In order to get the unbiased portfolios and the returns free of the size factor, I used the same weighted-average size for all stocks. To make sure that all the necessary financial ratios are known before performance is calculated, I collected monthly accounting data for the calendar years $t-1$.²⁸ Based on this data, rebalancing is done on the end of every calendar year from 1999 to 2006 using the same criterion for the portfolio ranking described above.

The prices used in calculations are always the last traded prices in the period and they are adjusted for historical stock splits. The price-to-earnings ratio is calculated using trailing twelve months earnings per share before extraordinary items. Book value used for calculating the price-to-book ratio is the sum of share capital, additional paid-in capital and retained earnings. Sales per share incorporated in the price-to-sales formula are calculated by dividing trailing sales (i.e. sales from the last four quarters) with the average shares outstanding. For the dividend yield formula, I used trailing twelve months dividends per share as disclosed on the income statement. (There is a gap between the share prices at yearend and at the day when dividends are actually paid

²⁸ I refer myself to the relative numbers since the accounting data is actually reported quarterly by the companies.

out.) Dividends per share are based on the regular cash dividends per share, and exclude memorial and special cash dividends.

Performance measurement is done from July of the year t to end of June of the year $t+1$ in order to ensure that returns really reflect the financial data collected before. I assumed that the entire financial data for all the firms involved is fully available and made public six months after the fiscal yearend. Performance is calculated using the Total Return Strategy which includes dividends rather than considering only price variations. This is usually considered a more accurate method of measurement because it assumes that all dividend payments are reinvested. For these purposes, I used monthly data on prices and dividends calculating monthly total return which is then annualized. The time-period used to observe the average return movement covers seven years from 1.07.2000 to 30.06.2007.

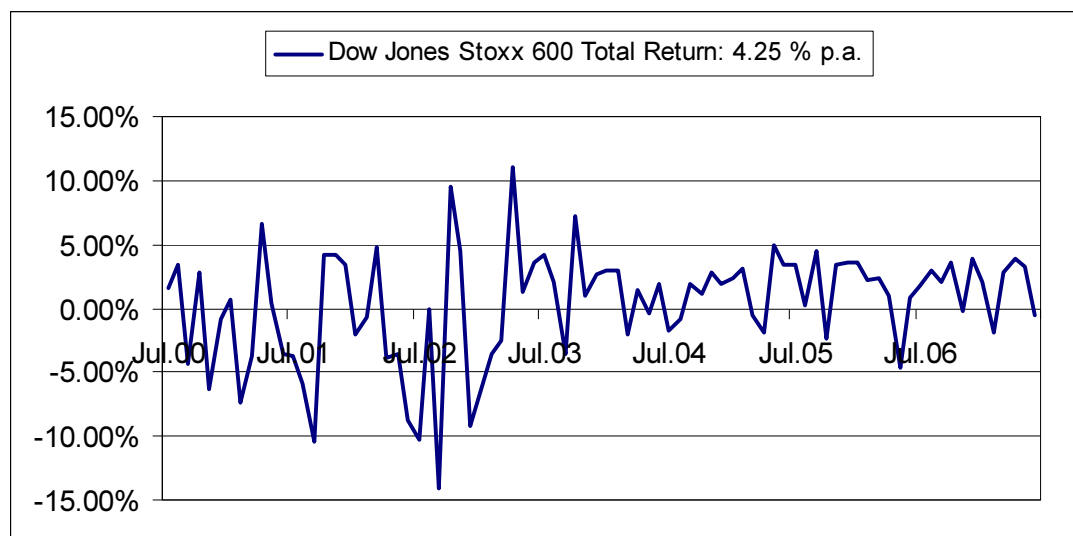
In addition, I have conducted the univariate regression analysis of all the portfolios in order to test the Capital Asset Pricing Model (CAPM). The monthly risk premiums of the stocks ($r_j - r_f$) are regressed against the monthly risk premiums of the index ($r_m - r_f$) over the seven-year period. The excess returns over the market (α) are then annualized. I have used 1 Month EURIBOR as a risk-free rate.

5.4 Dow Jones Stoxx 600 – Index Composition and Performance

The Dow Jones Stoxx 600 (DJ Stoxx 600) is used as a benchmark for many European portfolios. It has a fixed number of 600 constituents, and is designed to represent business activities of the large, mid and small capitalization companies in Europe. Each capitalization group contains 200 constituents. Currently it covers 18 countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxemburg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. The index is available daily back to December 31, 1986, and it was introduced on June 15, 1998. The individual stocks included in the index are ranked using free-float market capitalization. The index composition and free-float weights are

reviewed quarterly. The index is used as a basis for four regional sub-indices: DJ Euro Stoxx, DJ Stoxx ex UK, DJ Stoxx Nordic and DJ Stoxx ex Euro. Current index market capitalization is EUR 7,251.45 bn based on the free-float, and EUR 8,958.41 bn based on the full market capitalization. The graph below should give a first impression of how the index performed over the observed period of time.

Figure 5.1: Index performance based on monthly data from 1.07.2000 to 30.06.2007



5.5 Results of the Study

5.5.1 Price-To-Book Ratio

The results of the annual total returns of all ten portfolios from 1.07.2000 to 30.06.2007 show that the stocks with lower P/B ratio on average had much better performance than the stocks with higher P/B ratio. This period coincides with the reversal of a large bubble in technology in 2000. The average performance of decile portfolios together is much higher than the market performance for the same period of time. This could be due to missing data for some companies contained in the index (only 450 out of 600 companies had data on the P/B ratio). When comparing only the first and the last decile portfolios

(representing the value and the growth portfolios respectively), we can see that value stocks outperformed growth stocks over all the seven years. The magnitude of the value premium was especially strong in the first sample period, when the value portfolio generated return by 46.63 % higher than the growth portfolio return (see Figure 6.3). However, the lowest P/B portfolio (portfolio I) did not have the highest annual return through all the seven years. Also, the highest P/B portfolio (portfolio X) did not always have the lowest annual return compared to the other decile portfolios. For example, in the period from 1.07.2006 to 30.06.2007, the highest return had the portfolio V while the lowest had the portfolio VIII. If we take a look at the seven-year average, the result is following: With the average of 19.28 % per year, value stocks more than outperformed growth stocks that generated only 4.69 % average annual return. However, what was not expected is that the portfolio V with 19.60 % p.a. had the largest average return of all the portfolios. Details can be taken from the table below.

Table 5.1: Average annual returns for decile portfolios sorted on the P/B ratio over 7 years period

The first decile group in the table represents value stocks, i.e. those with the lowest P/B ratio, while the last decile group represents growth stocks, i.e. those with the highest P/B ratio. Mean is a seven-year average performance. The years in the first column represent the periods from July of the year t to end of June of the year $t+1$.

	I (low)	II	III	IV	V	VI	VII	VIII	IX	X (high)
2000	26.48%	19.33%	14.47%	20.30%	20.43%	13.55%	7.53%	2.89%	-14.97%	-20.15%
2001	6.06%	2.14%	5.43%	5.72%	5.60%	-9.35%	-7.52%	-19.47%	-10.19%	-18.77%
2002	0.53%	-0.52%	-5.99%	-3.51%	0.02%	-1.90%	-5.90%	-6.95%	-9.65%	-1.88%
2003	2.67%	3.20%	2.83%	2.35%	2.42%	2.57%	2.38%	2.64%	2.43%	2.45%
2004	29.36%	24.64%	32.88%	28.30%	34.98%	29.39%	22.82%	16.53%	19.91%	15.15%
2005	35.23%	30.29%	21.71%	28.28%	30.32%	38.17%	25.37%	26.95%	29.92%	25.66%
2006	34.65%	33.86%	28.59%	31.84%	43.46%	37.14%	34.07%	27.45%	28.74%	30.34%
mean	19.28%	16.13%	14.27%	16.18%	19.60%	15.65%	11.25%	7.15%	6.60%	4.69%

Figure 5.2: Comparison of the value and growth stocks portfolio based on the P/B ratio

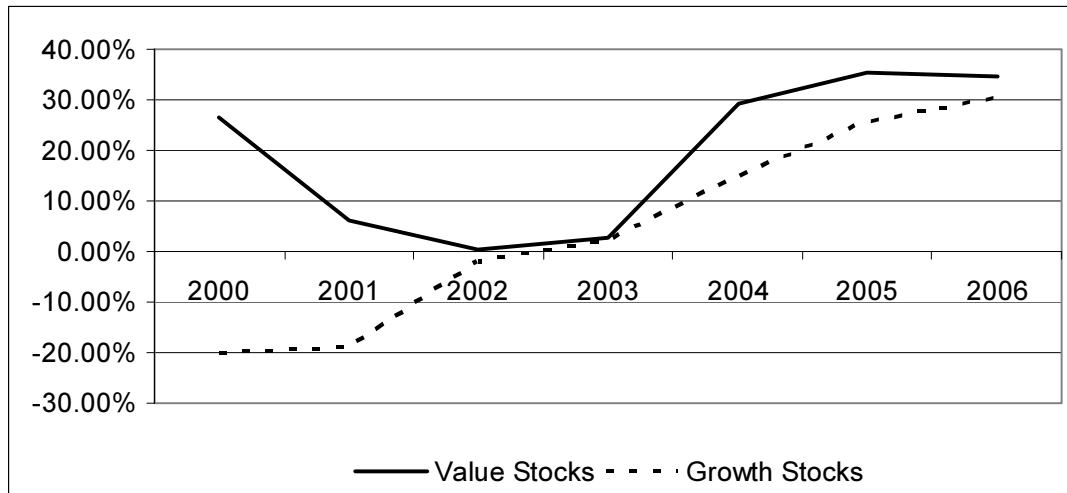
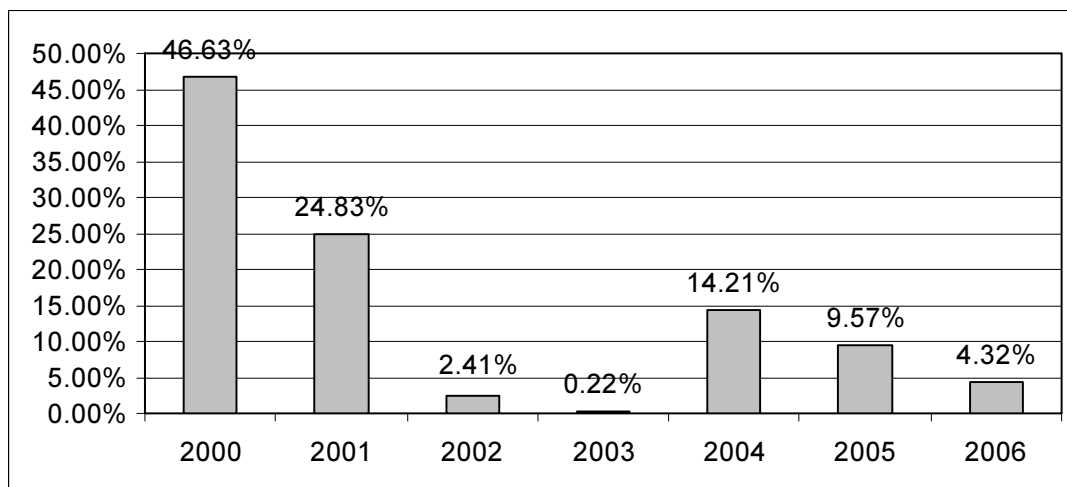


Figure 5.3: Annual value premium based on the P/B ratio



Results of the Regression Analysis

One of the main claims of the CAPM model is that an excess expected return of the assets should equal zero. From the table below we can see that all the portfolios yielded an excess return (α) higher than the CAPM predicts. At the 5 % significance level, the null hypothesis that $\alpha = 0$ can be rejected for all the portfolios except for the

last one. (The first nine portfolios all have t-statistic higher than 2, while the last one has t-statistic of 0.67.) The average value premium, i.e. the difference between α for the first portfolio and α for the last portfolio, is equal 14.91 % annually. Caution should be taken regarding the fact that all the portfolios generated an excess return over the market. One reason for this could be the unavailability of the data for companies that no longer exist.

The results do not provide evidence of a reliable positive correlation between β and average returns. As opposed to the central prediction of the Sharpe-Lintner-Black (SLB) model, the stocks with higher average returns surprisingly have lower estimated β s than those with lower average returns. (The value portfolio has β of 0.85 whereas the growth portfolio has β of 1.37.) This could be explained by the fact that the risk-free rate was higher than the index return over some periods of time. Since the CAPM model is based on a positive risk-return trade off, the market return must be higher than the risk-free rate in order to prove the positive relation between β and the average returns. Negative market premium in 33 out of 84 months observed has contributed that high-beta stocks' realized returns are lower than low-beta stocks' realized returns. In order to know whether the β -variable is sufficient in explaining the risk premiums of the stocks, a regression analysis of the periods with positive and negative market risk premiums should be done separately.

Table 5.2: Results of the univariate regression analysis of the portfolios sorted on the P/B ratio

	I (low)	II	III	IV	V	VI	VII	VIII	IX	X (high)
α	17.28%	15.41%	13.14%	14.11%	16.83%	13.33%	9.47%	5.79%	4.72%	2.38%
t-statistics (α)	5.32	5.24	4.24	5.65	6.31	5.61	4.69	2.28	2.22	0.67
β	0.85	0.90	0.94	0.90	1.01	1.03	0.97	1.02	1.03	1.37
t-statistics (β)	13.79	16.22	16.05	19.08	20.05	23.00	25.35	21.23	25.76	20.33

5.5.2 Price-To-Earnings Ratio

When comparing the annual performance from 1.07.2000 to 30.06.2007 for decile portfolios formed using the P/E ratio, we can see that the first decile portfolio (value stocks) earned superior annual returns over the last decile portfolio (growth stocks). This applies to all periods except to the third (1.07.2002 - 30.06.2003) and the last one (1.07.2006 - 30.06.2007). Apart from these two periods where we have negative value premium, the magnitude of the value premium seems to be very strong across the rest of the years. In 2001 and 2003 it was even stronger than based on the P/B ratio. The results of the average seven-year returns are similar to those based on the P/B ratio: Value stocks do have superior performance compared to growth stocks (the average value premium is 11.77 %). However, the highest average was generated by portfolio II (though only slightly higher than the portfolio I), and the lowest by portfolio IX.

Table 5.3: Average annual returns for decile portfolios sorted on the P/E ratio over 7 years period

	I (low)	II	III	IV	V	VI	VII	VIII	IX	X (high)
2000	22.99%	30.35%	21.08%	12.20%	17.13%	10.18%	12.44%	0.08%	-15.04%	-20.51%
2001	11.10%	17.07%	0.88%	-0.02%	-3.21%	-7.56%	-10.28%	-11.99%	-23.96%	-19.14%
2002	3.11%	-3.25%	-0.77%	-8.02%	-10.82%	-6.30%	-8.18%	-4.05%	-3.02%	6.78%
2003	40.37%	30.80%	31.16%	38.07%	37.21%	45.28%	29.91%	29.59%	45.77%	32.24%
2004	28.73%	29.16%	25.58%	34.15%	28.77%	26.74%	20.19%	19.70%	16.67%	16.59%
2005	31.66%	28.75%	31.82%	26.18%	21.73%	25.02%	34.31%	27.47%	26.70%	27.01%
2006	30.28%	35.69%	31.44%	38.98%	28.06%	34.48%	33.12%	32.25%	27.26%	42.91%
mean	24.03%	24.08%	20.17%	20.22%	16.98%	18.26%	15.93%	13.29%	10.62%	12.27%

Figure 5.4: Comparison of the value and growth stocks portfolio based on the P/E ratio

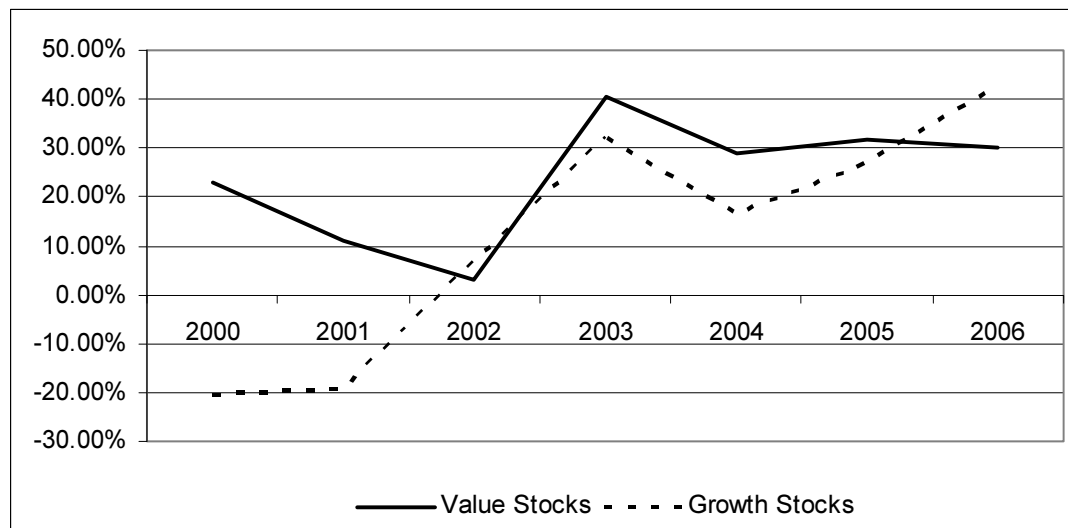
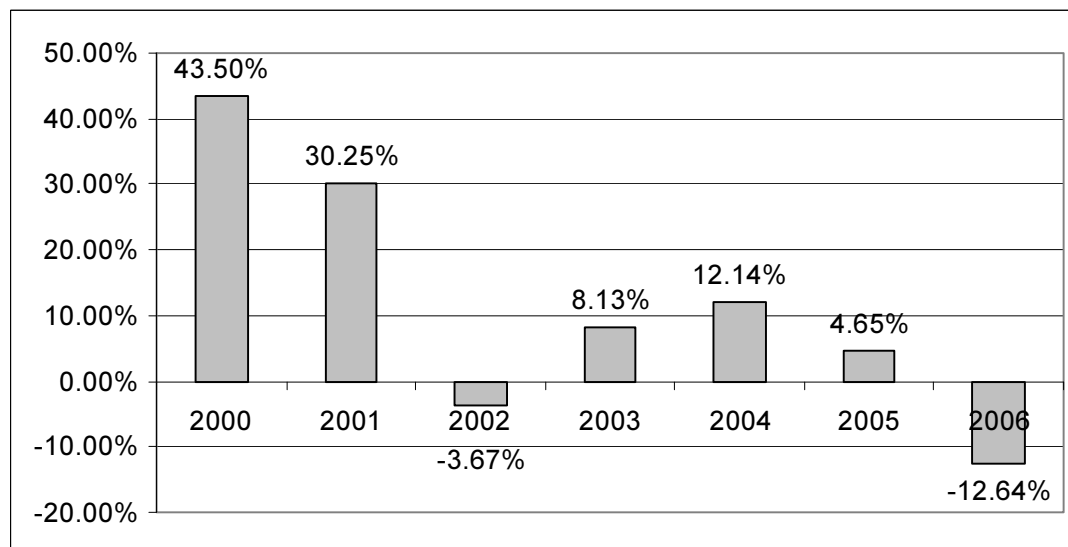


Figure 5.5: Annual value premium based on the P/E ratio



Results of the Regression Analysis

The results of the univariate regression analysis of the portfolios sorted on the P/E ratio are consistent with those based on the P/B ratio. In the table below we can observe positive excess returns of all the portfolios. Only for the last two of them the t-statistics lower than 2 allow that the CAPM model can be accepted. For the rest of the portfolios, the CAPM can be rejected at the significance level of 5 %. The average annual value premium is slightly lower than for the portfolios sorted on the P/B ratio (12.48 %).

The β -variable unfortunately cannot be used to check the validity of the CAPM since the results are similar to those of the P/B portfolios. The same argumentation that I stated above for the P/B portfolios can be applied in this case too.

Table 5.4: Results of the univariate regression analysis of the portfolios sorted on the P/E ratio

	I (low)	II	III	IV	V	VI	VII	VIII	IX	X (high)
α	17.32%	17.33%	14.00%	13.41%	10.87%	11.61%	9.51%	7.18%	3.42%	4.76%
t-statistics (α)	6.42	5.95	5.11	5.65	4.18	4.91	4.52	2.90	1.15	1.30
β	0.82	0.78	0.77	0.93	0.79	0.92	1.07	1.12	1.33	1.57
t-statistics (β)	16.10	14.22	14.84	20.72	16.06	20.57	26.81	23.86	23.81	22.70

5.5.3 Price-To-Sales Ratio

If we observe the portfolio returns through the years, we can see that value stocks outperformed growth stocks each year except from 1.07.2002 to 30.06.2003 when they generated losses of 8.83 %. If we compare the seven-year annual returns, we can see that the first decile portfolio had the highest one (24.32 %), while the last decile portfolio had the lowest one (11.32 %).

Table 5.5: Average annual returns for decile portfolios sorted on the P/S ratio over 7 years period

	I (low)	II	III	IV	V	VI	VII	VIII	IX	X (high)
2000	25.47%	14.50%	18.53%	12.47%	14.04%	6.01%	5.99%	0.42%	-7.13%	-11.67%
2001	5.69%	4.86%	-0.97%	-2.30%	-4.93%	2.24%	-7.29%	-10.68%	-11.72%	-25.17%
2002	-8.83%	-4.93%	-3.65%	-6.00%	-5.45%	1.07%	4.05%	-1.28%	-2.79%	6.11%
2003	56.32%	36.54%	40.19%	40.30%	39.43%	38.55%	29.94%	30.24%	27.69%	35.18%
2004	26.52%	36.21%	20.77%	25.05%	24.33%	25.81%	25.54%	26.69%	26.00%	25.32%
2005	27.28%	38.28%	26.99%	23.13%	26.49%	26.71%	28.25%	27.58%	27.70%	22.09%
2006	37.81%	31.82%	33.27%	36.41%	26.97%	39.11%	25.79%	32.26%	29.30%	27.40%
mean	24.32%	22.47%	19.31%	18.44%	17.27%	19.93%	16.04%	15.03%	12.72%	11.32%

Figure 5.6: Comparison of the value and growth stocks portfolio based on the P/S ratio

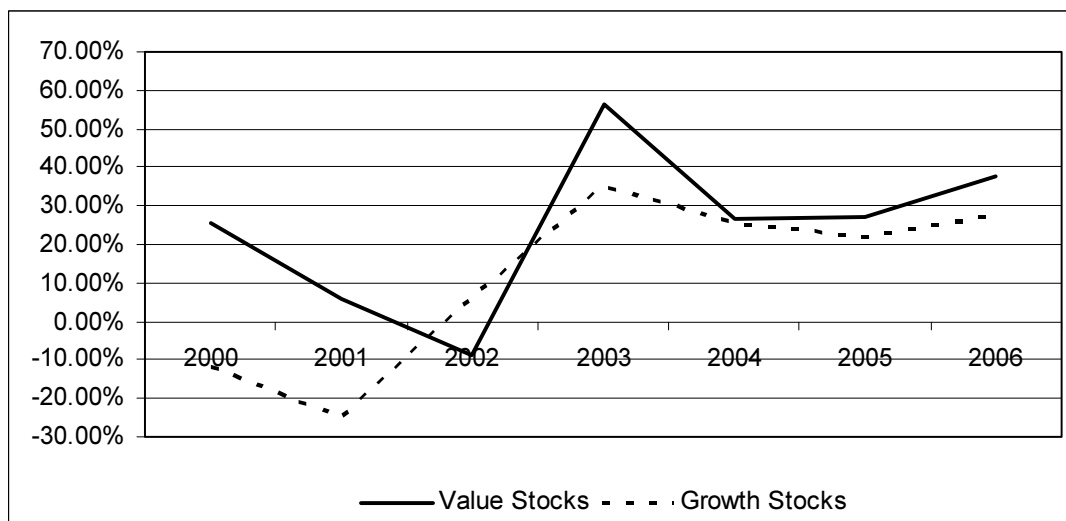
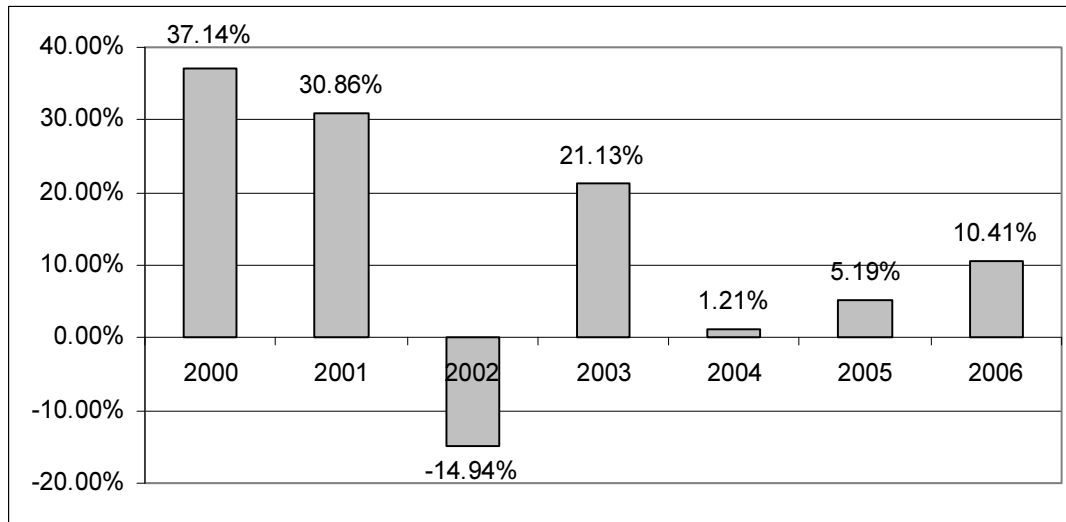


Figure 5.7: Annual value premium based on the P/S ratio



Results of the Regression Analysis

The null hypothesis that $\alpha = 0$ can be rejected for all the portfolios except for the last one. The average value premium is 11.76 % annually. As opposed to the portfolios sorted on the P/B and P/E ratios, we can see that in this case there is not much difference in the β -value across decile portfolios. Moreover, β of the value portfolio is almost the same as for the growth portfolio (difference is only 0.02). At the same time, the difference in their excess returns is relatively high. The same could be said for the portfolios V and IX: They even have exactly the same β of 1. So, no reliable relationship between β and average returns over the observed period can be found.

Table 5.6: Results of the univariate regression analysis of the portfolios sorted on the P/S ratio

	I (low)	II	III	IV	V	VI	VII	VIII	IX	X (high)
α	16.44%	15.47%	12.91%	11.97%	10.99%	13.45%	10.32%	8.90%	6.70%	4.62%
t-statistics (α)	4.45	5.43	4.41	4.80	4.75	5.67	5.34	4.17	2.69	1.42
β	1.15	0.94	0.92	0.96	1.00	0.93	0.82	0.99	1.00	1.17
t-statistics (β)	16.44	17.43	16.62	20.31	22.88	20.71	22.55	24.50	21.34	19.11

5.5.4 Dividend Yield

Consistent with the results of most of the studies that analyze the relationship between dividend yield (DY) and average stock returns, I have found this relationship to be relatively weak over the observed period. There is a small difference in the seven-year performance of the value and growth portfolios (22.72 % and 20.02 % respectively). Moreover, the value portfolio (represented by the stocks with the highest DY) outperformed the growth portfolio (represented by the stocks with the lowest DY) in only three periods out of seven. The value premium was very high in the first two periods (in the first period the second-highest, and in the second period the highest of all portfolios sorted on other ratios). On the other hand, there was an extremely negative value premium from 1.07.2003 to 30.06.2004 and from 1.07.2005 to 30.06.2006. Although the value portfolio generated positive performance over all the seven years, there were periods when the growth portfolio significantly outperformed the value portfolio. Furthermore, the portfolio with the highest average return over seven years is the portfolio III with 22.94 % annually. More details are given in the table below.

Table 5.7: Average annual returns for decile portfolios sorted on DY over 7 years period

	I (high)	II	III	IV	V	VI	VII	VIII	IX	X (low)
2000	28.65%	27.04%	26.03%	16.91%	15.66%	11.69%	-11.73%	31.39%	-11.29%	-15.61%
2001	14.78%	7.67%	4.13%	2.38%	-5.13%	-6.82%	-15.45%	-16.40%	-14.17%	-27.10%
2002	1.36%	-2.00%	-1.42%	-7.19%	-8.83%	-1.28%	-5.63%	-14.40%	-2.81%	1.82%
2003	31.38%	34.10%	35.70%	38.83%	34.09%	26.44%	30.66%	31.33%	35.76%	73.27%
2004	26.33%	23.82%	29.74%	32.11%	26.37%	26.08%	21.95%	20.07%	20.15%	17.93%
2005	27.00%	29.30%	32.87%	24.94%	24.50%	21.41%	26.20%	24.51%	36.68%	54.26%
2006	29.57%	31.39%	33.54%	39.37%	38.29%	33.54%	38.23%	36.74%	32.82%	35.58%
mean	22.72%	21.62%	22.94%	21.05%	17.85%	15.86%	12.03%	16.18%	13.88%	20.02%

Figure 5.8: Comparison of the value and growth stocks portfolio based on DY

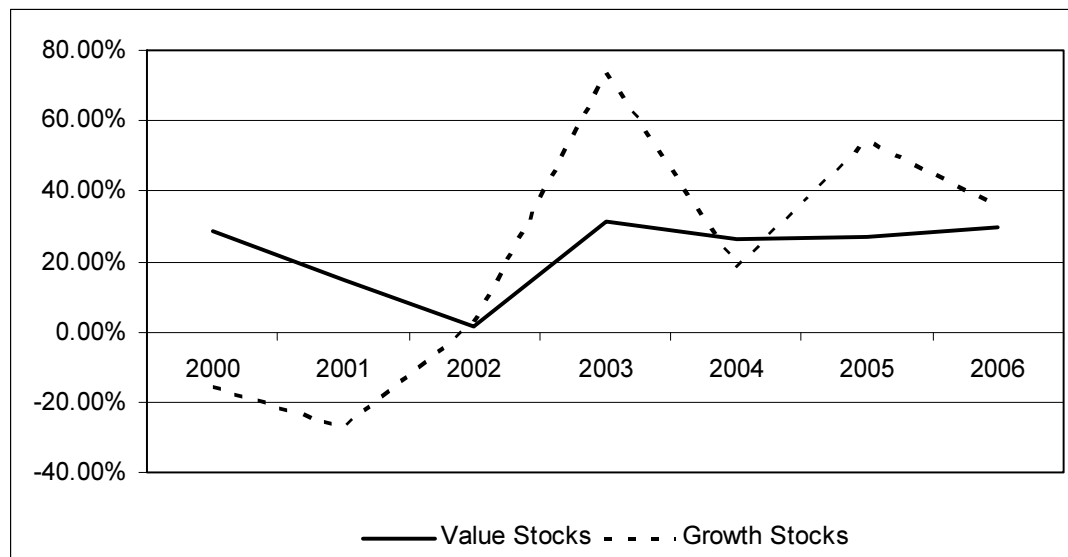
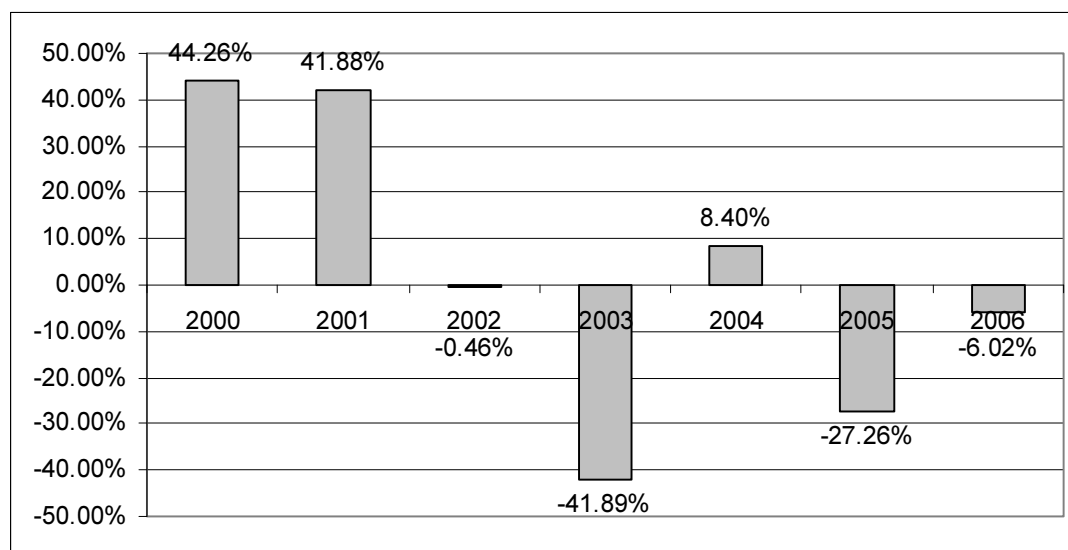


Figure 5.9: Annual value premium based on DY



Results of the Regression Analysis

The univariate regression analysis provided once more a positive average excess return for all the decile portfolios. In this case, the CAPM model cannot be accepted for none of

the ten portfolios when checking the null hypothesis $\alpha = 0$. The annual value premium is 6.74 %. The relation between β -values and average returns is similar to the one seen for the P/B and P/E portfolios. The results are reversed to the general prediction that the portfolios with higher average returns should also have higher β .

Table 5.8: Results of the univariate regression analysis of the portfolios sorted on DY

	I (high)	II	III	IV	V	VI	VII	VIII	IX	X (low)
α	16.42%	15.27%	16.14%	14.20%	11.42%	10.06%	9.50%	5.45%	6.95%	9.68%
t-statistics (α)	5.25	5.24	5.82	5.32	4.65	4.49	3.27	2.62	2.65	2.28
β	0.75	0.79	0.89	0.95	0.92	0.89	1.01	1.15	1.27	1.60
t-statistics (β)	12.75	14.30	16.96	18.78	19.81	20.96	18.36	29.33	25.55	19.87

5.6 Summary

The results of my empirical analysis confirm the prediction of the value investing theory that value stocks outperform both the market and growth stocks over a longer period of time. The most significant difference between value and growth stocks is observable in the period from 1.07.2000 to 30.06.2003. During this period, value stocks generally had positive performance, while growth stocks had extremely negative performance. I assume that this is due to the market crisis caused by the technology bubble, the negative consequences of which were present at least until 2002. As opposed to growth stocks, value stocks performed well in bad as well as in good times.

I can confirm a great significance of the P/B, P/E and P/S ratios for identifying value stocks, since they have yielded a very high premium over growth stocks. Unfortunately, this cannot be said for the DY ratio whose value portfolio generated the average return only by 2.70 % higher than the growth portfolio. This is due to the extremely good performance of growth stocks (sorted on DY) in the sample periods 2003, 2005 and 2006 during the economic recovery.

From the table below we can see that the highest average value premium over the whole sample period was achieved by the value portfolio sorted on the P/B ratio.

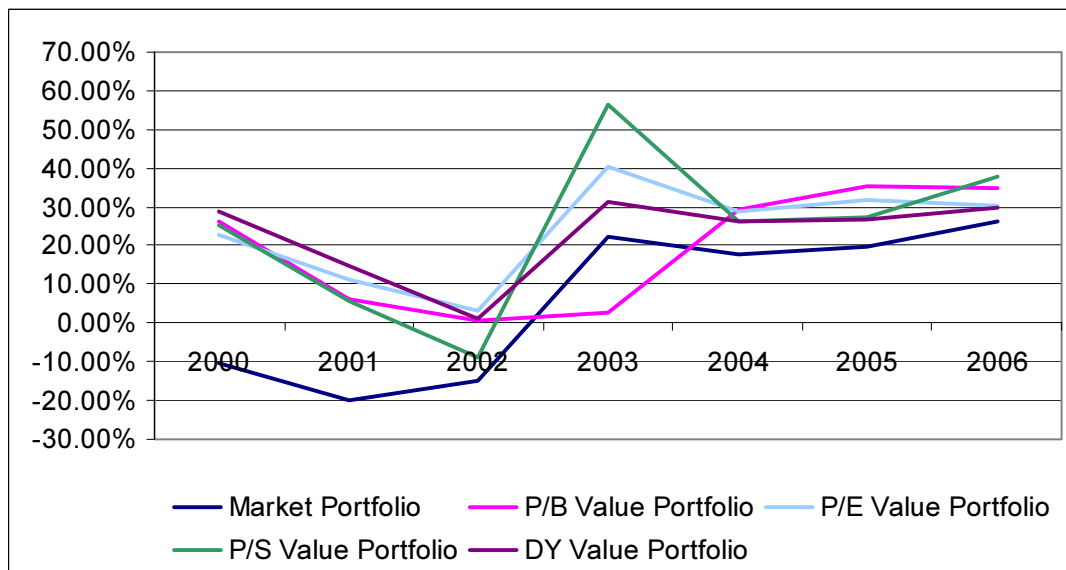
Furthermore, all the value portfolios generated an extremely high average excess return over the market. The highest one had the value portfolio sorted on the P/S ratio.

Table 5.9: The average value premium and the average excess return for the P/B, P/E, P/S and DY value portfolios over 7 years period

	P/B	P/E	P/S	DY
Mean VP	14.60%	11.77%	13.00%	2.70%
Sample Mean α	15.03%	19.78%	20.07%	18.47%

The graph below provides an insight into how the four value portfolios performed compared to the market over the seven years period. We can see that all of them significantly outperformed the market during the whole period observed. An exception is the P/B value portfolio which underperformed the market in the fourth period.

Figure 5.10: Performance of the market index and value portfolios based on the P/B, P/E, P/S and DY ratios



The regression analysis did not provide results which could support the CAPM model or confirm the efficiency of the market. First, reliable relation between β and the average

excess returns could not be found (in addition, t-statistics were extremely high). I assume that the negative market premium has contributed to the results which are opposed to the central prediction of the SLB model: The portfolios with higher excess return generally had lower β than the portfolios with lower excess return. However, β -variables for the portfolios sorted on the P/S ratio did not follow this pattern. They provided very similar values for all the portfolios. The question remains opened whether the excess returns could be explained by adding some additional explanatory variables to the analysis (e.g. those used by Fama and French in the Three Factor Model). Second, the analysis of the average excess return could not confirm the validity of the CAPM model either. For almost all the portfolios the CAPM was rejected using the significance level of 5 %. Surprisingly, every single portfolio achieved the average return higher than the average market return. Third, the average R^2 values varied from 80.72 % for the DY portfolios to 82.67 % for the P/S portfolios. This indicates that 17.33 % or more than 17.33 % of the variation observed in realized returns could not be explained by the CAPM model.

5.7 Shortcomings of the Study

The quality and accuracy of my analysis depend highly on the quality and reliability of data collected. Furthermore, it is highly debatable whether historical data can be a good indicator of the future results.

Regarding the results that are obtained by comparing the value and the growth stocks over time, the critical point is the time period observed. The seven years period could be too short period of time to make some serious conclusions. It is also questionable whether the portfolios formed on different financial ratios should be compared between each other since the sample of the firms used is not the same for all the four ratios. The companies that no longer exist are not included in the study, which means that a survivorship bias is present.

6 Conclusion

The common characteristic for all the value practitioners is their contrarian behavior. They are going against the crowd and market trends: Looking for the stocks that trade at a discount, they buy when everyone sells and sell when everyone buys. The essence of their strategy is margin of safety or the difference between the true and the market value of a stock. It should be large enough to protect investors against uncertainty. A success of the value investors challenges the Efficient Market Hypothesis and its proposition that the excess returns are result of a lucky circumstance. There is a lot of debate among investors about the exact sources of the superior value returns. Some investors are in favor of the traditional theory which says that the superior value returns are simply compensation for the higher risk associated with value stocks. Other investors are in favor of behavioral finance theory whose popularity is rising in the recent time. It says that the source of the value premium is investors' systematical judgment errors caused by different behavioral biases. There is a considerable amount of evidence supporting both of these explanations but it still cannot be said whether any of them is completely correct or completely incorrect. Some future surveys will hopefully provide further proofs on reliability or unreliability of these theories in explaining the value premium.

While the basic principles of value investing, laid down by Benjamin Graham decades ago, remained the same, the methods for identifying value stocks and the criteria used to define the value have changed over time. In the past, the value investors were more passive and used mainly the quantitative variables to identify value stocks. Some of these strategies are still used today since numerous empirical studies have proved their importance in determining the true value of a stock. For example, many analyses of the US stock market, but also of the stock markets outside the US, have found a significant power of some financial ratios (such as P/B, P/E, P/S and so on) in explaining the abnormal stock returns. Today however, most of the value investors apply the qualitative factors as well when it comes to identifying good businesses.

After analyzing the market index Dow Jones Stoxx 600, I can confirm that value stocks outperformed both the market and growth stocks over the seven-year period. No reliable relationship could be found between the excess returns and β s, so the CAPM model and the market efficiency theory cannot be supported when analyzed by the univariate regression analysis. The value investing strategy once more has proven that it works in both good and bad times. Thanks to this analysis, a success of the value investing strategy in beating the growth investing strategy and the market can be confirmed for the European market particularly.

Nowadays, it is much easier to access all the necessary information as technology has developed. Furthermore, the way of trading has changed as well. The most of the transactions are now done electronically. Under today's conditions, even for Warren Buffett it would be hard to replicate his success from 1960s and 1970s when data needed was unavailable to most of the investors. The changes in the economy make it hard for the value investors. The economy is no more driven by big manufacturing industries but by the technology and service industries. The screening for value stocks based on the fundamental variables alone is no more enough. The truth is, if the value investors stick only to the tangible-asset businesses, they could miss many opportunities since these businesses will in the future continue to represent smaller part of the economy. For the dynamic world new dynamic methods have to be found in order to be able to capture the changes in the economic conditions and new business models. This has led some value investors to rather focus on the earnings estimates – as proposed by the economist John Burr Williams.

The majority of investors still make a wrong choice as they are driven by the crowd, by the emotional responses dictated by greed and fear, and by the short-term orientation. They are looking for a formula of the successful investment strategy that would make it possible to speculate and jump in or out the market in order to make the high near-term returns while ignoring the risk. What we can conclude from this thesis is that an investment success cannot be captured in some mathematical equation. By contrast, the value investors suggest making a sound investment by focusing on the preservation of capital instead on a return. Without an unusual strict discipline and a high level of

commitment, it is certainly impossible to make this work. Most of the investors are unfortunately unwilling to accept this challenge.

In my opinion, value investing is still the best way to beat the market and increase the wealth over time. As Warren Buffett points out, we do not have to be particularly smart to understand the philosophy behind this strategy. He once said: “The most important quality for an investor is temperament, not intellect... You need a temperament that neither derives great pleasure from being with the crowd or against the crowd.”²⁹

The value investing strategy is simple to understand but relatively difficult to implement. Its hardest part is actually patience. There is no way to know exactly when and, if at all, a particular stock will appreciate. Value investing should be viewed as buying the business, rather than the stocks, for the long term. A key to the successful long-term investing is the patience, an ability to maintain a steady state of mind in bad as well as in good times, and a “stomach” for the short-term losses.

²⁹ cf <http://www.afterquotes.com/great/quotes/investing.htm>

References

Allentuck, A.: *Bargain Hunters*, 2006.

<http://magazine.globeinvestor.com/servlet/ArticleNews/story/GIGOLD/20060816/wallentuck0815/GIGOLDMAG/news>

Allianz Global Investors: *Value oder Growth - Mehr als eine Stilfrage*, 2007.

Azlan: *Review of "The Intelligent Investor"*, 2006.

<http://bookreviews.wallstraits.net/bookreviews/value-investing/10/the-intelligent-investor.html>

Barberis, N., Shleifer, A., and Vishny, R.: *A Model of Investor Sentiment*, Journal of Financial Economics 49 (3), 1998, 309-343.

Basu, S.: *Investment Performance of Common Stocks in Relation to Their Price-Earnings Ratios: A Test of the Efficient Market Hypothesis*, Journal of Finance 32 (3), 1977, 663-682.

Benoit-Lapointe, Christian: *Academic Investing*, 2004.

http://www.dfaca.com/library/reprints/academic_investing/

Black, A.J., Fraser, P.: *The Value Premium: Rational, Irrational or Random*, Managerial Finance 29 (10), 2003, 57-75.

Bodie, Z., Kane, A., Marcus, A.: *Investments*, 5th Edition, McGraw-Hill, 2002.

Browne, Christopher H.: *Value Investing and Behavioral Finance*, 2000.

http://www.tweedy.com/library_docs/papers/ColumbiaSpeech2000.pdf

Browne, Christopher H.: *The Little Book of Value Investing*, John Wiley & Sons, 2006.

Carmona, René A.: *Statistical Analysis of Financial Data in S-Plus*, Springer, 2004.

Capaul, Rowley, and Sharpe: *International Value and Growth Stock Returns*, Financial Analysts Journal 49 (1), 1993, 27-36.

Chan, L., Hamao, Y., and Lakonishok, J.: *Fundamentals and Stock Returns in Japan*, Journal of Finance 46 (5), 1991, 1739-1764.

Chan, L., Jegadeesh, N., and Lakonishok, J.: *Evaluating the Performance of Value Versus Glamour Stocks: The Impact of Selection Bias*, Journal of Financial Economics 38 (3), 1995, 269-296.

Chan, L., Lakonishok, J.: *Value and Growth Investing: A Review and Update*, Financial Analysts Journal 60 (1), 2004, 71-86.

Coval, J. D., Shumway, T.: *Do Behavioral Biases Affect Prices?*, Journal of Finance 60 (1), 2005, 1-34.

Damodaran, Aswath: *Investment Philosophies*, Wiley, 2003.

Doukas, J. A., Kim, C., and Pantzalis, C.: *Investor Uncertainty and the Superior Performance of Value Stocks*, Financial Analysts Journal (September), 2002.

Doukas, J. A., Kim, C., and Pantzalis, C.: *Disagreement and the Superior Performance of Value Stocks*, Working Paper Series, 2004.

Fama, E.: *Market Efficiency, Long-Term Returns, and Behavioral Finance*, Journal of Financial Economics 49, 1998, 283-306.

Fama, E., French, K.: *The Cross-Section of Expected Stock Returns*, Journal of Finance 47 (2), 1992, 427-465.

Fama, E., French, K.: *Multifactor Explanations of Asset Pricing Anomalies*, Journal of Finance 51 (1), 1996, 55-84.

Fama, E., French, K.: *Common Risk Factors in the Returns on Stocks and Bonds*, Journal of Financial Economics 33, 1993, 3-56.

Fama, E., French, K.: *Size and Book-to-Market Factors in Earnings and Returns*, Journal of Finance 50 (1), 1995, 131-155.

Fama, E., French, K.: *Value versus Growth: The International Evidence*, Journal of Finance 53 (6), 1998, 1975-1999.

Fama, E., French, K.: *Profitability, Investment and Average Returns*, Journal of Financial Economics 82 (3), 2006, 491-518.

Fuller, R. J.: *Behavioral Finance and the Sources of Alpha*, Journal of Pension Plan Investing 2 (3), 1998.

Griffin, J., Lemmon, M.: *Book-to-Market Equity, Distress Risk, and Stock Returns*, Journal of Finance 57 (5), 2002, 2317-2336.

Grinblatt, M., Titman, S.: *Financial Markets and Corporate Strategy*, 2nd Edition, McGraw-Hill, 1998.

Haugen, Robert A.: *Modern Investment Theory*, 4th Edition, Prentice Hall, 2001.

Kent, D., Titman, S.: *Evidence on the Characteristics of Cross Sectional Variation in Stock Returns*, Journal of Finance 52 (1), 1997, 1-33.

Klarman, Seth A.: *Margin of Safety*, Harper, 1992.

Laderman, Jeffrey M.: *Value Investors Learn New Tricks*, 1999.

http://www.businessweek.com/1999/99_24/b3633003.htm

Lakonishok, J., Shleifer, A., and Vishny, R.: *Contrarian Investment, Extrapolation, and Risk*, *Journal of Finance* 49 (5), 1994, 1541-1578.

La Porta, R., Lakonishok, J., Shleifer, A., Vishny, R.: *Good News for Value Stocks: Further Evidence on Market Efficiency*, *Journal of Finance* 52 (2), 1997, 859-874.

LeBaron, Dean: *Value Investing*, 1999.

http://www.deanlebaron.com/book/ultimate/chapters/val_inv.html

McQueen, G., Shields, K., and Thorley, S. R.: *Does the Dow-10 Investment Strategy Beat the Dow Statistically and Economically?*, *Financial Analysts Journal*, July/August 1997, 66-72.

Pakman, David: *Value Investing*, 2007.

<http://www.freeinvestinginformation.info/1446.php>

Piotroski, J. D.: *Value Investing: The Use of Historical Financial Statement Information to Separate Winners from Losers*, *Journal of Accounting Research* 38, 2000, 1-41.

Professor Paul Johnson: *Value versus Growth Investing*, 2000.

<http://www.capatcolumbia.com/essays/value%20vs%20growth.pdf>

Professor Ron Bird, UTS and MIR & Michael Triguboff, MIR: *The Academic Papers that Shaped the MIR Investment Process*, 2004.

<http://www.mir.com.au/invpivotal.php>

Rosenberg, B., Reid K., Lanstein R.: *Persuasive Evidence of Market Inefficiency*, *Journal of Portfolio Management* 11 (3), 1985, 9-17.

Sacco, Robert: *Expanding the Idea of Value Investing*, 2006.

<http://www.gurufocus.com/news.php?id=2314>

Senchack, A. J., Martin, J. D.: *The Relative Performance of the PSR and PER Investment Strategies*, Financial Analysts Journal 43 (2), 1987, 46-56.

Sewell, Martin: *Behavioural Finance*, 2007.

<http://www.behaviouralfinance.net/behavioural-finance.pdf>

Shiller, R. J.: *From Efficient Market Theory to Behavioral Finance*, Cowles Foundation Discussion Paper No. 1385, 2002.

Shleifer, Andrei: *Inefficient Markets: An Introduction to Behavioral Finance*, Oxford, 2000.

Sinha, C.: *4 investing gems from Warren Buffett*, 2007.

<http://www.rediff.com///money/2007/jul/12invest.htm>

Stone, Amey: *Homespun Wisdom from the „Oracle of Omaha“*, 1999.

http://www.businessweek.com/1999/99_27/b3636006

The Brandes Insitute: *Value Investing and Falling Knives*, 2005.

<http://www.brandes.com/NR/rdonlyres/2BFAFE97-1A5D-4509-81C7-04643E0D480F/0/FOCUSValueInvestingandFallingKnives0805.pdf>

Undiscovered Managers, LLC: *Introduction to Behavioral Finance*, 1999.

Zhang, Lu: *The Value Premium*, Journal of Finance 60 (1), 2005, 67-103.

Websources

www.investopedia.com

www.wikipedia.com

www.djindexes.com

www.afterquotes.com

www.bnet.com

www.value-investing-center.com

www.dogsofthedow.com

http://www.stoxx.com/indices/index_information.html?symbol=SXXP

<http://www.stoxx.com/indices/types/benchmark.html>

<http://answers.google.com/answers/threadview?id=273817>

<http://www.ndir.com/cgi-bin/stingynews.cgi?Topic=Value+Investing>

Appendix

A) Abstract

Value investing deals with selecting the stocks that trade at a discount compared to their true or intrinsic value, assuming that over time the market will correct for its mispricing and the stocks will reach its real value. Difference between the true and the market value of a stock is called “margin of safety” and it is exactly what protects investors from the uncertainty related to the value investing strategy. Value investors do not act along with the market, i.e. they avoid popular stocks as opposed to their major rivals – growth investors. The success of many value investors has challenged the Efficient Market Hypothesis (EMH). EMH states that the stock prices are not predictable since they already incorporate all the available information on the market. The truth is that the technology development nowadays is such that it is difficult to make advantage of market inefficiencies since the stock prices can rapidly be adjusted to new information.

There are different strategies used by value investors to identify value companies and calculate the true value of a stock. Some investors are more passive and use mainly quantitative factors such as low price-to-book ratio, high dividend yield and so on. Others are more active and try to make a company more valuable by influencing the way it runs the business. Numerous empirical studies have proved the ability of some financial ratios (also called “value screens”) to identify value stocks. The most widely used are: price-to-book, price-to-earnings, price-to-sales ratio and dividend yield. Most of these studies concentrated on the US market, showing that the stocks sorted on the low price-to-book, price-to-earnings etc. provide superior returns to the stocks sorted on high financial ratios over the longer time period. Some researchers have also extended their analysis to the markets outside the US, proving that the cross-sectional predictability of the stock returns is not market-specific.

There is a lot of debate about the sources of the value premium. On the one hand, there is traditional explanation of the Efficient Market Hypothesis which says that the value premium is a result of an additional risk taken by an investor. Famous academics, Fama and French, identified two more risk factors which together with the market risk explain

the variability in the stock returns. These are the factors associated with a company size and its value, introduced in their “Three Factor Model”. Some investors, on the other hand, believe in the behavioral finance explanation of the value premium. Behavioral finance states that the markets are inefficient as a result of investors’ systematical judgment errors. There are many behavioral biases influencing investors’ decision-making. The most important one is overreaction, i.e. extrapolation of the past stock earnings too far into the future. This results in the underpricing of value stocks and overpricing of growth stocks.

Empirical analysis that I carried out based on the Dow Jones Stoxx 600 Index has shown that value investing works in Europe too. Value stocks, identified by using price-to-book, price-to-earnings, price-to-sales ratio and dividend yield, outperformed both the market and growth stocks over the observed period of seven years. The regression analysis did not show any reliable relationship between excess returns and β s, so the CAPM model could not be supported.

B) German Abstract

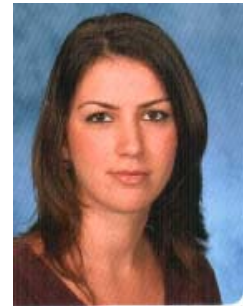
Value Investing beschäftigt sich mit der Auswahl von Aktien die im Vergleich zu ihrem wahren oder intrinsischen Wert mit einem Abschlag notieren, unter der Annahme, dass der Markt die Fehlbewertung im Laufe der Zeit korrigieren wird und dass die Aktien ihren richtigen Wert erreichen werden. Die Differenz zwischen dem wahren Wert und dem Marktwert der Aktie wird „Margin Of Safety“ genannt und ist genau das, was die Investoren vor der Unsicherheit der Value-Investing-Strategie schützt. Value-Investoren handeln nicht so wie der restliche Markt, d.h. sie meiden populäre Aktien im Gegensatz zu ihren größten Rivalen, den Growth-Investoren. Der Erfolg von vielen Value-Investoren hat die Effizienzmarkthypothese in Frage gestellt. Diese besagt, dass die Aktienkurse nicht prognostizierbar sind da alle auf dem Markt zugängliche Informationen bereits in den Aktienkursen enthalten sind. Die Wahrheit ist, mit der Technologieentwicklung heutzutage ist es schwierig die Marktineffizienzen zu nutzen, da die Aktienkurse aufgrund von neuen Informationen schnell angepasst werden können.

Value-Investoren benützen verschiedene Strategien um Value-Unternehmen zu identifizieren und den wahren Aktienwert zu berechnen. Einige dieser Investoren sind mehr passiv und benützen meistens quantitative Faktoren wie niedriges Kurs-Buchwert-Verhältnis, hohe Dividendenrendite usw. Andere sind wiederum mehr aktiv und versuchen unter Beeinflussung der Geschäftsführung das Unternehmen wertvoller zu machen. Viele empirische Studien haben die Fähigkeit von finanzwirtschaftlichen Kennzahlen (so genannte „Value Screens“), die Value-Aktien zu identifizieren, bewiesen. Die dabei am meisten verwendeten sind: Kurs-Buchwert-, Kurs-Gewinn-, Kurs-Umsatz-Verhältnis und Dividendenrendite. Die meisten von diesen Studien wurden für den US-Markt gemacht und haben gezeigt, dass die Aktien die anhand von niedrigem Kurs-Buchwert-, Kurs-Gewinn-Verhältnis usw. ausgewählt wurden, langfristig höhere Renditen erwirtschaften als Aktien mit hohen Kennzahlen. Einige Forscher haben ihre Analyse auch auf die Märkte außerhalb US erweitert und haben damit bewiesen, dass die „cross-sectional“ Prognose von Aktienrenditen nicht marktspezifisch ist.

Es wird derzeit viel über den Ursprung des Value Premium diskutiert. Zum einen gibt es die traditionelle Erklärung der Effizienzmarkthypothese die besagt, dass das Value Premium Ergebnis des Zusatzrisikos ist das ein Investor eingeht. Die beiden bekannte Wissenschaftler, Fama und French, haben zwei Risikofaktoren identifiziert die zusammen mit dem Marktrisiko Schwankungen von Aktienrenditen erklären. Diese Faktoren sind die Unternehmensgröße und der Unternehmenswert. Sie wurden unter dem Begriff „Three Factor Model“ publiziert. Zum anderen gibt es Investoren die an die „Behavioral Finance“ Erklärung des Value Premium glauben. Behavioral Finance besagt, dass die Markteffizienz das Ergebnis der systematischen Fehler in der Beurteilung von Seite der Investoren ist. Es gibt viele Vorurteilen die letztendlich die Investmententscheidung der Investoren beeinflussen. Eines der wichtigsten ist Überreaktion, bzw. die zu starke Extrapolation von historischen Aktienrenditen in die Zukunft. Dies führt in weiterer Folge zu Unterbewertung von Value-Aktien und Überbewertung von Growth-Aktien.

Die empirische Analyse die ich basierend auf den Dow Jones Stoxx 600 Index durchgeführt habe, hat gezeigt dass Value Investing auch in Europa funktioniert. Value-Aktien, die anhand von Kurs-Buchwert-, Kurs-Gewinn-, Kurs-Umsatz-Verhältnis und Dividendenrendite ausgewählt wurden, haben sowohl den Markt als auch die Growth-Aktien über den betrachteten Zeitraum von sieben Jahren outperformt. Die darauffolgende Regressionsanalyse hat keine zuverlässige Beziehung zwischen Überrenditen und β s gezeigt, sodass das „Capital Asset Pricing Model“ nicht bestätigt werden konnte.

C) Curriculum Vitae



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