Contrarian Investment Strategies
An Assessment of the Value Premium in context to Recessions

Thesis written by

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__________________                          __________________
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Executive Summary

Contrarian investment strategies have been present for decades, generating superior returns for the investors. Investors who follow the contrarian investment strategy are known as value investors. Value investors follow a strategy where stocks with low prices relative to book value and other measures of fundamental value are bought, to be able to generate abnormal returns.

The magnitude of the value premium is huge and it has been persistent on the American stock market. We have investigated how the value premium performs in general and around recessions in order to draw conclusions on the strategy that a value investor should follow when the economy is faced with a recession. We have found that the value premium, sorted on Book-to-Market values, exists throughout our period of investigation from 1947 until 2009 on the American stock market, generating an average quarterly premium of more than 3 % for the investor. We have also found that the value premium is skewed towards the right, implying that value stocks have a higher upside potential than growth stocks.

On average in the four quarters prior to recessions the quarterly value premium is 0.92 %. During the 11 different recessions in our time period of investigation, we found that the average quarterly value premium is 1.37 %. Therefore, we come to the conclusion that value stocks perform worse prior to recessions and during recessions than on average. We have also found that in the four quarters after recessions the value premium is positive in ten out of 11 different recessions, which indicates that there is a clear tendency towards higher returns on value stocks after recessions. The average quarterly value premium is 5.95 %.

We have established that the standard finance theory does not explain the value premium. The traditional systematic risk measure, beta, is on average lower for our value portfolio than for our growth portfolio. This completely contradicts the traditional finance theory.

We believe that the explanation is found within the behavioral finance theory. Investors are subject to several kinds of decision biases, which originate from limited cognitive capacity. We expect that as long as naive investors are challenged by limited cognitive capacity and keep extrapolating past performance into the future the value premium will continue to exist, hence generating possibilities for the value investors.
Table of Contents
1 Introduction........................................................................................................................................ 6
   1.1 Purpose of the Thesis .................................................................................................................. 7
   1.2 Problem Statement ..................................................................................................................... 9
   1.3 Methodology ............................................................................................................................. 10
      1.3.1 Delimitation ......................................................................................................................... 10
      1.3.2 Data ...................................................................................................................................... 11
      1.3.3 Validity and Reliability of Literature ..................................................................................... 12
      1.3.4 Thesis Structure .................................................................................................................... 13
2 Theoretical Outline ............................................................................................................................ 14
   2.1 Contrarian Investment Strategies ............................................................................................... 14
      2.1.1 Contrarian Investment Strategies ......................................................................................... 15
      2.1.2 Two Types of Contrarian Investment Strategies .................................................................. 16
   2.2 Methodology ............................................................................................................................. 24
      2.2.1 Choice of Variables ............................................................................................................... 24
      2.2.2 Holding Periods and Rebalancing ......................................................................................... 25
      2.2.3 Portfolio Weights ................................................................................................................ 25
   2.3 The Value Premium .................................................................................................................... 26
      2.3.1 Description and Definition of the Value Premium ............................................................... 26
      2.3.2 Empirical Evidence on the Value Premium from the Academic World ......................... 26
   2.4 Explanations of the Value Premium ......................................................................................... 32
      2.4.1 Standard Finance Theory and its Limitations ................................................................. 32
      2.4.2 Behavioral Finance Theory ................................................................................................. 33
      2.4.3 Value Stocks and Risk ....................................................................................................... 43
   2.5 Recessions in the American Economy ....................................................................................... 45
      2.5.1 Definition of a Recession .................................................................................................... 45
      2.5.2 Causes and Effects of a Recession ...................................................................................... 46
      2.5.3 Timeline of Recessions in the American History ............................................................. 47
   2.6 Sub Conclusion ......................................................................................................................... 55
3 Empirical Study ................................................................................................................................. 58
   3.1 Introduction to the American Stock Market .............................................................................. 58
      3.1.1 Reasons for choosing the American Stock Market ............................................................ 61
1 Introduction

For many years, contrarian investment strategies has been utilized and discussed. Recent, financial researchers have found statistical evidence of a superior return on these strategies. Investors who follow the contrarian investment strategy are often known as value investors because they attempt to buy stocks that are underpriced and sell stocks that are overpriced.

The theory of ‘value investing’ was formulated by Benjamin Graham and David Dodd as early as 1934 and is based on the assumption that two values are attached to all companies. The first is the market price – the value of the company on the stock exchange. The second is a company’s intrinsic value. Value investors look for securities with prices that are unjustifiably low based on their intrinsic worth. The intrinsic value is sometimes referred to as the business value. The business value can be interpreted as the value of the company in the event of a merger, a takeover situation, or the amount that could be achieved by breaking up the company and selling all its assets. For long-term investors, business value is the stream of future dividends.

Most often, intrinsic worth is estimated by analyzing a company’s fundamentals. Like a bargain hunter, the value investor seeks assets that are beneficial and of high quality but underpriced. In other words, the value investor searches for stocks that he/she believes are undervalued by the market. Like the bargain hunter, the value investor tries to find those items that are valuable but not recognized as such by the majority of other buyers. As the prominent value investor Warren Buffet declares:

“It’s far better to buy a wonderful company at a fair price than a fair company at a wonderful price.”

In order for the value investor to be successful it requires that the market is inefficient. The key question for many researchers is therefore to establish, whether the superior returns on contrarian investment strategies compensate for a higher fundamental risk or if the returns in fact are better because naive investors systematically perceive some companies’ future performance as being too high compared to reality.

Considering the vast amount of empirical support, on the existence of excess return on value stocks, it would be interesting to see if there is any correlation between the excess return, also known as the value premium, and the periodic changes in the economy as a whole.
The world economy faces downturns and upturns. This nature of contractions and expansions is known as either recessions or booms.

During recessions, many macroeconomic indicators follow the same path. Production as measured by the Gross Domestic Product (GDP), employment, investment spending, household income, business profits and inflation all fall during recessions, while bankruptcies and the rate of unemployment rises. The opposite is true during a boom.

The majority of recessions have been anticipated by declines in the stock market. Earlier academic studies acknowledge that the value premium also appears to diminish prior to recessions. Siegel (1994) observe that since 1948, ten recessions in America has been preceded by a stock market decline. It is often argued, by private investors, that during recessions value stocks tend to hold up better. However, when the economy starts to recover and the bottom of the market has passed, growth stocks tend to recover faster.

Therefore, it is interesting to investigate if the value premium follows the same trends. Are the returns on a value portfolio superior during recessions but inferior once the economy picks up the pace again or does the value premium defy the conventional direction. If there is any correlation between recessions and the value premium, investors might take advantage of this when deciding on entry and exit strategies in the stock market.

In other words, we will conduct an investigation on whether there is any correlation between the value premium and the cyclical nature of the world economy.

1.1 Purpose of the Thesis

It has been widely accepted by academics all over the world that the value premium exists. But there appear to be inconsistencies in the value premium. It seems that the value premium diminishes prior to recessions.

We will, for the American stock market, test whether these inconsistencies are systematic throughout our sample period and if it proves to be so, how can it be explained. Furthermore, we will examine if a value investor is able to pursue an exit/entry strategy based upon this knowledge.
Graham and Dodd were the first pioneers to identify the value investment proposition. They believed that value stocks beat growth stocks over longer time periods. The well-known investor Warren Buffett became inspired by Graham’s way of thinking, with regard to long term investment when he attended Graham’s class at Columbia University, New York. Not until several years later were Graham’s, Dodd’s and Buffett’s way of investing recognized by the academic society. Due to the efficient market hypothesis scholars have, for many years, had difficulties in accepting the value proposition. Value investing is now highly accepted by scholars such as Fama, French, Lakonishok, Vishny, and many others.

Fama and French (1992) were the first academics to identify the value premium over a longer time period. They calculated their market value premium by measuring equity returns based on valuation and defined it as the subtraction of a high Book-to-Market ratio portfolio from a low Book-to-Market ratio portfolio. The high Book-to-Market portfolio contains stocks whose prices are considered lower in terms of the Book-to-Market ratio. These stocks are also known as value stocks. Contrary to value stocks in terms of Book-to-Market evaluation are growth stocks. However, to the investment professionals who support the conventional asset pricing theory, the value premium is a dilemma. When the risk based efficient market explanation is not sufficient in explaining the value premium academics must turn to alternative reasons such as the behavioural finance theory.

The main emphasis in this thesis will be based on an assessment of value and growth stocks and how the value premium performs in relation to economic crisis. Thus, we will therefore put emphasis on both theoretical research and on empirical investigation. Our thesis will be based on the following problem statement and underlying questions.
1.2 Problem Statement

The overall purpose of the thesis is:

To investigate the performance of value and growth stocks prior to, during and after recessions in order to find out if there are any systematic trends in the data.

In order to fulfill the purpose of the thesis statement we have identified the sub questions presented in the following.

Almost all academics within the field of economy, agree that contrarian investment strategies yield a superior return and thus there is consensus that a value premium exists but there is little agreement on why it is present. We will therefore present earlier studies by academics and researches in order to shed light on the different explanations presented by others. After presenting evidence of the value premium from former studies, traditional finance theory and behavioral finance theory will be introduced in the search for an explanation of the value premium. This should evidently lead to knowledge about the research that has been conducted on this subject.

Consequently the first sub question aims to explain the value premium in regards to the fundamental theories examined in other studies.

- What are the underlying assumptions of the value premium according to both the traditional finance and the behavioral finance theory?

Once a thorough investigation of earlier work from researchers and academics has been performed, we will have a clear idea on the overall performance of the value premium.

Focus will hereafter revolve around a more specific time period. We will explore the performance of the value premium around recessions in the world economy found in earlier studies, by answering the following sub question:

- Is there evidence on how the value premium reacts when facing a recession in the economy?

After introducing the underlying theories within the field of standard finance and behavioral finance, the empirical study on the American stock market will be presented. We will, via
statistical tests, examine how the value premium reacts prior to, during, and after a recession hit the economy. If there seems to be any significance within the analyzed data, we will then argue whether this information can be useful for investors when faced with the challenges of entering and leaving the financial markets.

- How do contrarian investment strategies, on the American stock market, respond to a recession in the economy?
- Are there correlation between movements in GDP and the value premium?
- Is it possible for value investors, on the American stock market, to strategically use recessions in an investment decision?

Finally, the results of the value premium prior to, during and after recessions will be explained and discussed. We will do this by applying the standard finance and behavioral finance theory and try to answer the following question:

- Can traditional risk measures explain our results obtained or do we have to search for the explanation in alternative theories?
- How can our results obtained be useful for private investors?

1.3 Methodology

In the following sub chapter the methodology used in the thesis will be presented. The outline of the thesis includes five chapters. In the first chapter, the introduction, we introduce our purpose, problem statement, methodology, and thesis structure.

Chapter 2 involves theories and empirical findings of others. The analytical sections are chapter 3 and 4, where chapter 3 is our empirical study and chapter 4 will give an explanation of our results through the theoretical framework introduced in chapter 2 and discuss our findings. Finally, we conclude on the thesis in chapter 5. Each chapter will end with a sub conclusion to put emphasis on the most significant findings.

1.3.1 Delimitation

The overall purpose of this paper is to investigate the value premium during recessions. We will investigate the value and growth portfolios on the American stock market. We will use data
gathered by Fama and French in their data library with US Stock returns. Throughout the thesis, we have used macroeconomic data from Bureau of Economic Analysis (BEA) and the recessions in the thesis are defined using the National Bureau of Economic Research (NBER) definition.

The thesis will rely primarily on standard finance and behavioral finance theory. The purpose is not to test the Efficient Market Hypothesis (EMH) and therefore the question whether the observed pattern in stock returns should lead to a rejection of EMH or not is only possible to answer conditional on the validity of other results. As a result, it will not be considered in greater detail.

We will only focus on the returns of growth – and value portfolios and therefore not go into detail on individual stocks. There are references to former studies of other markets, such as Japan and Europe, but no investigation is made to check whether these analyses are made correctly.

The empirical analysis is made as realistic as possible – however, transaction costs as well as taxes are not included. There will be no considerations made on whether the conclusions would be the same in a world where investors pay taxes and transaction costs.

The accounting based valuation measures, such as the Book-to-Market value, used in the thesis could be affected by changes in the accounting regulation but this kind of bias will not be further investigated. However, a section concerning problems with the data is included in chapter 3.

1.3.2 Data

Our research question necessitates a theoretical and empirical approach. For this reason, we start by applying a theoretical foundation for the value premium.

Our empirical research relies on publicly available information about stocks and macroeconomic data. The market to be studied is the American stock market. This market is chosen due to the fact that it is on the US market that the most consistent and reliable data has been collected going all the way back to 1927. Davis, Fama and French (2000) present reliable stock market data which includes all industrial companies traded on NYSE and later they extend the data to also include industrial companies traded on AMEX and NASDAQ-OMX.
All the stock data has been retrieved from French’s homepage\textsuperscript{1}. The data consists of portfolios divided by the Book-to-Market value of the companies. The 10%-deciles with the highest Book-to-Market value is classified as our value portfolio and the 10%-deciles with the lowest Book-to-Market value is classified as the growth portfolio. GDP is only measured every quarter from 1947 and therefore our sample period is from 1947 to 2009 where there is made a one year rebalancing in June each year on our portfolio. In June 1947, on our first portfolio formation date, the sample contains of 767 stocks. On the last date, June 2009, the sample has grown to 3769 stocks. The US GDP data is chosen when comparing the value premium with the recessions in the economy. The US GDP numbers are downloaded from the website of Bureau of Economic Analysis (BEA). By assessing this information we are able to set up general guidelines for how the value premium ought to be dealt with prior to, during and after recessions. We have chosen to use the definition by NBER when quantifying recessions.

\textbf{1.3.3 Validity and Reliability of Literature}

The degree of validity in our thesis is, a little simplified, whether or not the examination has examined the intended. By constantly returning and focusing on our problem definition during our process, an attempt is made to secure that the collected data material serves the purpose of answering our problem statement.

Throughout the thesis, we have used different sources of external literature such as research literature which is essential for the thesis and acknowledged literature with a high degree of professionalism. Many of the authors are still actively involved as professors or researchers. In our analysis, we have drawn on academic books used in teaching at Copenhagen Business School and we take this at face value. It is believed that articles published in scientific journals or academic books satisfy the academic requirements for references. Data from BEA and NBER is seen as valid and reliable. The same applies to the data collected in the data library.

\textsuperscript{1} French’s Data Library (10/4 2010) \url{http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html}
1.3.4 Thesis Structure
Figure 1 below show the structure of our thesis.

Figure 1: The Structural Framework of the Thesis

Source: Own creation
2 Theoretical Outline

In this chapter, we will create a theoretical outline that can support the analysis of the value premium’s performance prior to, during and after recessions on the American stock market. An introduction to contrarian investment strategies and the methodology behind these will be given. Then, we will outline the different explanations on the existence of the value premium. First, standard finance theory will be introduced, mainly focusing on the efficient market hypothesis. After having defined the explanations of the value premium with the standard finance theory, the behavioral finance theory will be introduced. This will be done mainly focusing on the underlying assumptions of full rationality of agents and hereafter a description of the psychological issues that have an impact on the decision making process of stock picking. This will make it possible to frame the main reasons for irrational behavior of investors. Then we will outline the relationship between value stocks and risk. Finally, we will outline the historical recessions in the American economy from 1947-2009 in order to get an idea of how the stock market performs during the recessions.

2.1 Contrarian Investment Strategies

The purpose of this section is to go through the different contrarian investment strategies. Some of the most important academic studies on the performance of value and growth stocks will be explored in order to gain insight on the existence of the value premium.

Within finance a contrarian investor is one who attempts to make profits by investing in a manner that differs from the conventional idea. A contrarian investor applies this contrarian style in the belief that the path to superior equity returns lies in buying what others are selling and selling what others are buying.

A contrarian investor actively seeks value in all parts of a company’s capital structure, including common and preferred stocks, as well as corporate and convertible bonds. The investor invests in securities that the consensus does not wish to own, searching for stocks and convertibles that reflect low price/earnings ratios (P/Es) and trade at discounts to private market value. This contrarian style leads an investor to those investments that offer absolute value rather than relative value. An absolute value is an investment that trades at a substantial discount to private
market value, rather than one that might appear inexpensive based on a discount to its peer group or the market average. Attention is directed toward those companies offering the best combination of such quality criteria as strong market share, good management, and high normalized return on capital (O’Shaughnessy, 2005).

Since Farma and French in 1992 published their landmark paper ”The Cross-Section of Expected Stock Returns” scholars all over the world have argued whether contrarian investment strategies yield superior returns and almost everyone agrees that this is the case. Thus, much of the controversy with the contrarian investment strategies is related to finding the source of the higher return rather than the return itself (Dreman, 1998). The debate revolves around two different explanations. The first explanation states that markets are efficient and the return from these strategies is a reward for bearing a higher risk. Proponents of the second explanation argues that risk cannot explain the higher return but point to different behavioral finance models that might be able to explain it (Jegadeesh & Titman, 1993).

2.1.1 Contrarian Investment Strategies
In the following section contrarian investment strategies will be defined and evidence from other studies on the value premium is presented.

Contrarian investment is as mentioned above a broad variety of different strategies that attempts to make profits by going against the usual consensus in the market. In this thesis, we will consider the contrarian investment strategies that are designed to take long positions in value/loser stocks and when applicable short positions in growth/winner stocks. A value strategy is a strategy where the investors take on long positions in value/loser stocks while a growth strategy is a strategy where the investors take on long positions in growth/winner stocks (O’Shaughnessy, 2005).

It is necessary to make a distinction between a contrarian strategy and a value/growth strategy. In reality it is not plausible that a contrarian investor has unlimited access to short sales and he or she is therefore forced to invest in either value- or growth strategies. Thus, for practical reasons the risk on a contrarian strategy is measured as the risk on a value investment strategy. The payoff on a contrarian investment strategy is therefore often referred to as a value premium. The
value premium will be positive as long as the value strategy yields a higher return than the growth strategy over a given period of time.

To sum up:

- Value Strategy: to buy value or loser stocks.
- Growth Strategy: to buy growth or winner stocks.
- Contrarian strategy: value strategy minus growth strategy.
- Value premium: payoff on a contrarian strategy.

2.1.2 Two Types of Contrarian Investment Strategies

There is consent among investors that there exists two types of contrarian investment strategies (Dreman, 1998).

The first type of contrarian investment strategy is the *prior returns strategy*. This strategy assumes that extreme stock price movements in one direction will be followed by subsequent extreme movements in the opposite direction. Past losers are believed to become future winners and vice versa.

This type of contrarian investment strategy requires that the stock market “overreacts”. The reason for an overreaction in the stock market can differ, but regardless of the reasons, some investors have a tendency to become exceptionally excited about stocks that have performed well in the past and thus bid their prices up, so that these winner stocks become overpriced in the market. Similarly, investors overreact to stocks that have performed poorly in the past and therefore oversell these loser stocks so they become underpriced in the market. When the overreaction is corrected, “weak” firms have high stock returns and “strong” firms have low stock returns. Proponents of this view include De Bondt and Thaler (1987), Lakonishok, Shleifer & Vishny (1994) and Haugen (1995).

It is therefore possible to argue that investors form their expectations about the future stock prices by simply extrapolating the past stock returns without a full appreciation of the mean reversion concept (Lakonishok et. al., 1994). This implies that strong past performers are expected to continue to perform strongly in the future. Contrarian investors will, as mentioned above, bet
against these naive investors and invest in the value/loser stocks and when possible short portfolios of growth/winner stocks.

The second type of contrarian investment strategy is best classified as a valuation measures strategy. Different ratios that include share price or book –and market value are expected to proxy for past performance or alternatively, to disclose information about the market expectations for future performance. The most common and therefore most thoroughly used valuation measures are the Price-Earnings ratio (P/E), the Price-to-Book-Value (P/BV), the past Growth sales (GS), or the Book-to-Market ratio (B/M). It is possible to use several other valuation measures as there exist a number of different composition possibilities but the basic idea is still the same. Value stocks are chosen on criteria such as poor past performance, low growth sale and a market value close to their book value and growth stocks vice versa.

Based on the evidence from Lakonishok et al. (1994) it is expected that the two types of contrarian investment strategies, by and large, perform equally well. This is so, since the two strategies should classify more or less the same stocks as value/loser stocks and the same stocks as growth/winner stocks.

2.1.2.1 Strategies Based on the Prior Returns Strategy

De Bondt and Thaler presented the prior returns strategy in two seminal papers (1985 & 1987) on the US stock market. Their work was inspired by Kahneman and Tversky (1982) who researched within behavioral psychology and found that people, when dealing with probability revision problems, had a tendency to overweight recent information and underweight prior data.

Addressing the stock market, this kind of behavior could imply that the market would overreact to new or perhaps unexpected information, and hence cause stock prices to be mispriced in comparison to their fundamental values. This would then in turn make the stock prices reversals predictable from past returns alone. In their seminal paper from 1985 De Bondt and Thaler tested this with the use of two specific hypotheses:

1. “Extreme price movements in stock prices will be followed by subsequent price movements in the opposite direction”.
2. “The more extreme the initial price movement, the greater will be the subsequent adjustment”.


In compliance with their expectations, they found that past loser stocks, when ranked on three- to five-year past returns, would tend to be future winners, and vice versa. They also showed that risk, measured as betas, did not explain why past losers after portfolio formation had much higher excess (market-adjusted) returns than past winners.

These results were not accepted by Chan (1988) who offered an alternative interpretation that he believed supported the overreaction hypothesis in a better way. He suggested that the risk of the winner and loser stocks were changing over time. This could imply that there was a risk-based explanation to the returns generated by a contrarian investment strategy. Chan found (using the same data as De Bondt and Thaler) large changes in the betas from the ranking period to the test period. However, these changes were insufficient in explaining the large observed differences in returns.

In their 1987 follow-up paper, De Bondt and Thaler modified their study of the overreaction hypothesis to better incorporate a test of the differences of risk that had been suggested by Chan. An estimation of the betas was therefore made in the test period as opposed to the formation period. As discovered by Chan, this method revealed that the value portfolio during the test period had a higher beta than the growth portfolio. The difference however, was as expected and not capable of explaining the higher returns generated by the value portfolio.

Many other studies have explored the overreaction effect and the superior effects of value strategies both for different countries but also for different time series. Külpmann (2002) found that the overreaction effect was present on the German market. He documented that, in compliance with the first hypothesis suggested by De Bondt and Thaler, stocks with large capital gains or losses experienced large subsequent reversals.

He also acknowledged that risk measured as CAPM-betas could not explain the results. Searching for alternative explanations, Külpmann found that winner firms after a profitable period suffered from unprofitable empire building by their directors. Profits were misused to invest in unprofitable projects. As a result, the profitability of the winners fell during the test period. He also concluded that the loser stocks could experience a successful reengineering of the companies after periods of poor performance. Therefore, they shrunk and became more successful during the test period.
Davis (1994) found similar results on a subsample of large US firms over the period from 1931 to 1960. Chan, Hamao and Lakonishok (1991) found similar results for Japan. Capaul, Rowley, and Sharpe (1993) found similar results for France, Germany, Switzerland, and the United Kingdom, as well as for the United States and Japan. It is interesting to observe that the study by Capaul et al. unambiguously favor the value strategy regardless of the country in question. At the same time the value portfolios had lower beta value in all the countries.

2.1.2.2 Strategies Based on Valuation Measures

Already in 1977 Basu analyzed the trend that value stocks seemed to outperform growth stocks. He focused on the price-earnings multiple and in line with later studies he found that stocks with lower price-earnings yielded higher return using a sample period that stretched from April 1957 to March 1971. Besides being one of the first to investigate the value premium Basu also investigated whether the excess returns generated from value stocks could be explained by the CAPM. He found that value stocks did not have a higher correlation than growth stocks with the stock market, and hence could not explain the premium.

Banz (1981) uncovered another apparent contradiction of the CAPM by showing that the stocks of firms with low market capitalizations have higher average returns than stocks of firms with high market capitalizations. Proponents of the CAPM were quick to point out that small firms tend to have higher betas than large firms, so we would expect to see higher average returns for small firms. However, the beta differences were not large enough to explain the observed return differences. Once again, the CAPM predictions were violated.

Bhandari (1988) found that firms with high leverage (high debt/equity ratios), even after size and beta are included as explanatory variables, have higher average returns than firms with low leverage for the period, 1948-1979. High leverage increases the riskiness of a firm’s equity, but this increased risk should be reflected in a higher beta coefficient. Consequently, Bhandari’s results are yet another deviation from the CAPM predictions.

The studies discussed in this section cast doubt on the ability of the CAPM to explain equilibrium relationships in the financial markets. In spite of all this negative evidence the CAPM was still the default view for most financial economists and practitioners going into the 1990s.
Fama and French published in 1992 an influential paper that drew on earlier empirical studies as well as making their own cross-sectional study. They brought together different multiples such as size, leverage, Earnings-Price, Book-to-Market, and beta in one single study. In a contradiction to the CAPM, they showed that beta does a poor job in explaining average returns. They then attempted to discover which explanatory variables would best explain average returns. By exploring the explanatory power of different variables through cross-sectional regressions they find that size and Book-to-Market are the variables that have the strongest relation to returns. When these two are combined with other variables, the power of the other variables vanishes. Because of the controversial nature of their findings, the results of Fama and French (1992) were subject to a rigorous scrutiny.

In a seminal paper Lakonishok, Shleifer and Vishny (1994) showed that the long-run value strategies, based on classifications of companies with fundamental value measures, yielded significantly higher returns than competing growth strategies in the US stock market in the period from 1963-1990. They showed that by using companies with low sales growth and low price-to-cash ratios actually maximized investors return as compared to using just one of the two multiples. This is an attractive feature for value investors as it shows that the use of several indicators potentially pays off. More intuitively one might argue that by using more than one criterion it will eliminate the possibility of picking the “wrong“ stocks. This could be the case for a stock which might have high multiple due to temporarily depressed earnings. So by using more than one criterion the investor is certain not to pick a growth stock that actually is not supposed to be chosen.

They also demonstrated that by sorting the stocks in the data set, into deciles, they found that the top 10 % stocks with the highest Book-to-Market ratios (the deep value stocks) yield a significantly higher return than the top 30 %.

Furthermore Lakonishok et al. (1994) investigated whether standard risk measures could explain the excess return generated by the value strategies. They found little, if any, support for the view that value strategies were fundamentally riskier.

Falling in line with the overreaction hypothesis Lakonishok et. al. (1994) argued that the value strategy was successful in generating excess returns because it exploited the fact that naive
individual investors made judgment errors and extrapolated past growth rates of growth stocks, and thus past performance, too far into the future.

Puzzled by this Lakonishok et al. (1994) searched for a reason as to why institutional investors did not bet against such naive individual investors. They argued that a possible explanation to why institutional investors were likely not to do so was that it required positions in these strategies that would take years to materialize. In the short-run, these strategies might also fall short of the benchmark indices. Thus the “better-informed” institutional investors were urged to hold growth stocks as they did not want to fall short of their benchmarks and hence fall short of their peers.

Lakonishok et al. (1994) found that with few, or no, institutional investors trading against the naive investors, the return differences between value and growth stocks were never eliminated and the superior return on contrarian investment strategies could accordingly continue.

Davis, Fama and French (2000) made research on the evidence of the value premium on the US stock market from 1929. Each year they allocated the stocks into three groups based on their Book-to-Market values. The stocks with the 30% highest Book-to-Market values were the value portfolio. Davis et al. discovered an annual value premium of 5.5% over the test period. They also found that this premium was highly significant. In the same paper they also found that the premium was higher for small stocks. In an extended analysis of the data applied from 2006, Fama and French confirm the increased tendency for small caps to produce a larger premium than large caps.

Many academics agree that the extra premium for small stocks, also known as the size-premium, reflects the additional risk that comes from liquidity constraints. This is particularly important in a crisis situation where investors might want to get rid of risky assets, and move over to more secure assets such as bonds. This might be difficult to do with the more illiquid stocks.
The table below summarizes the value premium on the American stock market investigated by different academic researchers.

**Table 1: Annual Value Premium for the American Stock Market**

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Time period Investigated</th>
<th>Criteria</th>
<th>Annual Value Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Davis, Fama &amp; French (2000)</td>
<td>1929-1997</td>
<td>30% highest and lowest Book-to-Market Value</td>
<td>5.60%</td>
</tr>
<tr>
<td>Fama &amp; French (2006)</td>
<td>1929-2004</td>
<td>30% highest and lowest Book-to-Market Value</td>
<td>4.80%</td>
</tr>
<tr>
<td>Lakomishok, Shleifer &amp; Vishny (1994)</td>
<td>1963-1990</td>
<td>10% highest and lowest Book-to-Market Value</td>
<td>10.50%</td>
</tr>
<tr>
<td>Lakomishok, Shleifer &amp; Vishny (1994)</td>
<td>1963-1990</td>
<td>10% Price-to-Cash ratio &amp; Fastest Sales Growth</td>
<td>11%</td>
</tr>
<tr>
<td>Cooper, Gulen &amp; Schill (2008)</td>
<td>1966-2003</td>
<td>10% highest and lowest Asset Growth</td>
<td>13%</td>
</tr>
<tr>
<td>Russell 1000 (Risager, 2009)</td>
<td>1998-2008</td>
<td>Price-to-Book</td>
<td>2.07%</td>
</tr>
</tbody>
</table>

Source: Own creation

The value premium is present in all investigated periods. The size of the value premium depends on the specific time period of investigation. It appears that value stocks have performed remarkably better in the period from 1960 to 1990 in comparison to the return data from Russell 1000/Russell 200 from the recent decade.

One of the reasons why most studies are conducted on the US market is due to the long data set available. No other country can contribute with a complete data set going all the way back to the 1920’s. However, different scholars worldwide have presented results on the value premium, with data sets going back to the 1950’s. This is the case with Dimson, Nagel and Quigley (2003) and Risager (2008).

Dimson et al. (2003) present a study on the UK value premium over the period 1955-2001. They find, in consistence with other studies, a significant value premium of around 0.5 % a month, using the same technique as Davis, Fama and French (2000). They also show that the value premium is very persistent. In 35 of the 46 years value stocks outperform growth stocks. Hence in more than 75 % of the years the premium is positive.

Risager (2008) presents a case study on the Danish market for the period 1950-2008. As expected, he finds that the value premium is positive over the period. With data until 2008 however, a disappointing performance for value stocks since 2006 is presented. Seen in context
with our hypothesis this is very informative as it might indicate that growth stocks outperform value stocks prior to recessions.

As shown, a number of studies have been carried out to investigate the performance of different investment styles. These studies have been conducted on stock markets in different countries all over the world. The importance of the Japanese stock market has made it a subject for scholars to investigate if the value premium also exists here. Chan, Hamao and Lakonishok (1991) were the first to study the Japanese value and growth stocks. They demonstrated that there is a value premium in Japan regardless of whether investors sort stocks according to their Book-to-Market multiples, earning yields or cash flow yields.

Cai (1997) tested the existence of the Japanese value premium and received the same results as Chan, Hamao and Lakonishok (1991) which is not surprising as Cai used the same multiples to rank both value and growth stocks. As Cai’s data set extends until 1993, it included the bursting of the equity bubble which was of great importance to both researchers and investors. Over the period 1971-1993 the average annual value premium (using the Book-to-Market multiples as ranking) was a remarkable 11.2%.

**Table 2: Average Annual Returns for Value and Growth Portfolios in Japan, 1971-1993**

<table>
<thead>
<tr>
<th>Value Stocks</th>
<th>Growth Stocks</th>
<th>Value Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>High B/M</td>
<td>Low B/M</td>
<td>11.2</td>
</tr>
<tr>
<td>25.5</td>
<td>14.3</td>
<td></td>
</tr>
<tr>
<td>High C/P</td>
<td>Low C/P</td>
<td>6.0</td>
</tr>
<tr>
<td>24.5</td>
<td>18.5</td>
<td></td>
</tr>
<tr>
<td>High E/P</td>
<td>Low E/P</td>
<td>1.2</td>
</tr>
<tr>
<td>22.2</td>
<td>21.0</td>
<td></td>
</tr>
<tr>
<td>Low Past sales</td>
<td>High Past sales</td>
<td>9.0</td>
</tr>
<tr>
<td>23.0</td>
<td>14.0</td>
<td></td>
</tr>
</tbody>
</table>

*Note: All portfolios are equally weighted*

*Source: Cai (1997)*

The table above illustrate that the value premium is persistent regardless of the multiple used for ranking. However, the best result is generated using the Book-to-Market multiples. Cai also sorts
stocks according to past sales growth. His results are in line with the results obtained by Lakonishok et. al. from 1994 on the US stock market. In this paper it is yet again shown that high growth often hurts investor returns, as the stocks with low past sales growth yield an annual average return of 23%. This is annually an average of 9% higher than the growth stocks with high past sales growth.

2.2 Methodology

When carrying out an investment strategy, whether it is contrarian or not, it is important to acknowledge that some strategies require that the portfolios are held for a longer period while other strategies involve daily trading. A huge change in one stock might imply that diversification effect diminish, because of an overexposure to a particular industry. Hence, investors must have a predefined idea of which stocks to choose, how long to keep them and when to optimize the portfolio.

In this section, we will describe the methodology used in different studies, on different types of investment strategies. The topics include: choice of variables, holding periods and rebalancing, and portfolio weights.

2.2.1 Choice of Variables

When applying a contrarian investment strategy an important choice is the determination of variables to rank stocks as either growth or value stocks. As mentioned earlier, this process involves a decision between Price-Earnings ratio (P/E), the Price-to-Book value (P/B), the past Growth Sales (GS), or the Book-to-Market value (B/M). Once the desired variables have been chosen the investor has to decide on which value stocks to pick. Some studies use top 30% of e.g. the lowest price-earnings as value stocks, while other studies only incorporate the deep value stocks, as a result the top 10% is chosen.

In order to achieve good results investors must have the required information about the stocks. Particular important information is the company’s book value, which historically was only available following the release of their annual report. The different studies vary in the timing definitions but in order to calculate annual returns the starting point should historically be beyond the month of April, e.g. Fama & French (1992) and Davis et al. (2000). If these studies should be
useful for real investors it is important that the timing is precise, such that the investors can actually implement the strategy. There are of course a limited number of investors who can acquire all the stocks in the portfolios that are used in the different studies.

2.2.2 Holding Periods and Rebalancing
The standard holding periods in most studies are one-, two-, three-, and/or five-years. For strategies based on the prior returns criteria, the length of the holding periods is equal to the length of the formation periods. In other words, investors should form their portfolio on the basis of data on past return and then hold the portfolio for the same period.

The standard method used in most studies, e.g. Chin et al. (2002), is to assume that investors invest the same amount in every company and rebalance their portfolios once a year. A yearly rebalancing of the portfolio means that over the course of the year, the market value of each security within the portfolio has earned a different return, resulting in a weighting change. Rebalancing is the process of buying and selling portions of your portfolio in order to set the weight of each asset class back to its original state.

2.2.3 Portfolio Weights
There are two approaches used in most studies. Either the equally weighted portfolio or the value weighted portfolio. The equally weighted approach is a type of weighting that gives the same weight, or importance, to each stock in a portfolio. The smallest companies are given equal weight to the largest companies. This allows all of the companies in the portfolio to be considered on an even playing field. This method differs from the weighting method more-commonly used by investment funds, the value weighted method.

The value weighted approach weighs companies based on their market capitalization, thus giving more importance to the larger companies compared to the smaller ones. A company with a large market capitalization will therefore affect the portfolio performance in proportion to its market value. The value weighted approach therefore has a disadvantage when investors follow a buy and hold strategy. Over time it will mean that stocks with positive returns will carry more weight in the portfolio than stocks with negative returns. Especially for portfolios consisting of few stocks, this could result in a reduction of the diversification.
2.3 The Value Premium

In investing, value premium refers to the greater risk-adjusted return of value stocks over growth stocks. As mentioned earlier, arguments for the existence of the value premium is vast but a more narrow description is called for to find the exact significance of the superior return.

2.3.1 Description and Definition of the Value Premium

The value premium is one of the most well documented facts in finance. To calculate the value premium, financial economists take the return of value stocks defined as stocks within the top 10% to top 30% of stocks when ranked by Book-to-Market value and subtract the return of growth stocks defined as stocks within the bottom 10% to 30% when so ranked. In other words, the value premium is the excess return an investor can generate by investing in a portfolio consisting solely of value stocks compared to a portfolio consisting solely of growth stocks. In this thesis the definition stated above is also the definition used in our calculations.

2.3.2 Empirical Evidence on the Value Premium from the Academic World

For the eighty-year period 1927–2006 on the US stock market, the value premium was 5.0% on an annual average basis. The premium appeared with a high degree of persistence — it was positive in 51 of the 80 years, or 64% of the time (Risager, 2009).

To illustrate that the magnitude of the value premium is huge, assume that two investors decide to invest an equal amount of money in either value stocks or growth stocks in 1927. Assume also that the transaction costs for the two investors are identical and that the investors stick to their strategy throughout the entire period. It is straightforward to demonstrate that the excess stock market wealth of the value stock investor will equal \((1+0.05)^{80} = 49.6\) in 2006. Thus the value investor will have 49.6 times more stock wealth than the growth stock investor. This is an extremely high difference. If the sample period were abridged to 1997 the value premium would improve to 5.5% a year (Davis et. al., 2000).
Below, is a table of the monthly value premium on the US stock market 1927-1997.

Table 3: Monthly Average Returns in Percentage on the US Stock Market and Value Premium for Stocks sorted by Book-to-Market Ratios, 1927-1997

<table>
<thead>
<tr>
<th></th>
<th>High B/M value stocks</th>
<th>low B/M growth stocks</th>
<th>Value Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Cap</td>
<td>0.27</td>
<td>0.47</td>
<td>0.19</td>
</tr>
<tr>
<td>Large Cap</td>
<td>0.40</td>
<td>0.22</td>
<td>0.10</td>
</tr>
<tr>
<td>Average all stocks</td>
<td>0.03</td>
<td>0.40</td>
<td>0.27</td>
</tr>
</tbody>
</table>

Note: Stocks are allocated in three book-to-market groups based on breakpoints for the bottom 30%, middle 40%, and the top 30% of the values of their B/M ratios. Moreover, stocks are allocated to two groups, small or big, based on whether their market capitalization is below or above the median for NYSE stocks. Returns are value weighted. All returns reported are statistically highly significant. Data: Davis, Fama and French (2000)

Source: Risager (2009)

Davis, Fama and French (2000) found that the value premium in the table above was highly significant with a t-statistic equal to 4.24. They also found that a decline in the value premium through the 21st century occurred. However, the highest premium for their data period occurred in 2000, when it reached 37.8%. Ironically, the lowest occurred the prior year when the premium was a negative 26.1%, probably causing many investors to panic and sell (Swedroe, 2007).

There have been relatively long periods where the value premium has been both positive and negative. For example, in the five-year period 1927–31, the premium was negative in four of the five years. It was also negative in four of the six years from 1934–39, three of the five years from 1949-53, three of the five years from 1956–60, four of the six years from 1966 through 1971, all three years from 1978–80, and five of the seven years from 1985–91. On the other hand, it was positive all nine years from 1940 through 1948, all five years from 1961 through 1965, all six years from 1972 through 1977, and all seven years from 2000 through 2006.

When the technology boom hit the world economy in the late 1990s the US value premium disappeared but reappeared in the beginning of the 21st century. As academics lost interest in the value phenomenon fewer studies were conducted. A good indicator of the performance of the value premium in the 21st century however is the Russell Investment Group who composes
portfolios from value and growth stocks for the private investor. Below is presented the returns on Russell 1000 value and growth funds and the returns on their market portfolio, Russell 1000 market.

Table 4: Returns on Russell 1000 Value and Growth Funds, 1998-2008

<table>
<thead>
<tr>
<th></th>
<th>Russell top 1000 value</th>
<th>Russell top 1000 growth</th>
<th>Value Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>15.63</td>
<td>38.71</td>
<td>-23.08</td>
</tr>
<tr>
<td>1999</td>
<td>7.35</td>
<td>33.16</td>
<td>-25.81</td>
</tr>
<tr>
<td>2000</td>
<td>7.01</td>
<td>-22.42</td>
<td>29.43</td>
</tr>
<tr>
<td>2001</td>
<td>-5.59</td>
<td>-20.42</td>
<td>14.83</td>
</tr>
<tr>
<td>2002</td>
<td>-15.52</td>
<td>-27.88</td>
<td>12.36</td>
</tr>
<tr>
<td>2003</td>
<td>30.03</td>
<td>29.75</td>
<td>0.28</td>
</tr>
<tr>
<td>2004</td>
<td>16.49</td>
<td>6.30</td>
<td>10.19</td>
</tr>
<tr>
<td>2005</td>
<td>7.05</td>
<td>5.26</td>
<td>1.79</td>
</tr>
<tr>
<td>2006</td>
<td>22.25</td>
<td>9.07</td>
<td>13.18</td>
</tr>
<tr>
<td>2007</td>
<td>-0.17</td>
<td>11.81</td>
<td>-11.98</td>
</tr>
<tr>
<td>2008</td>
<td>-36.85</td>
<td>-38.44</td>
<td>1.59</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>4.33</strong></td>
<td><strong>2.26</strong></td>
<td><strong>2.07</strong></td>
</tr>
</tbody>
</table>

Note: Returns are value weighted. Average return is the arithmetic return. Data: Russell Investment Group

Source: Risager (2009)

The Russell 1000 value index represents the performance of the 1000 largest US value stocks based on their market capitalization. The value portfolio consists of the 1000 companies with the lowest Price-to-Book ratios and the lowest growth prospects\(^2\). Annually reconstitution is used to ensure that new and growing equities are included and to guarantee that the represented companies continuously reflect the value characteristics. As shown in the table above the value premium is still persistent in the beginning of the new century with an average of 2.07 % annually.

---
\(^2\) The I/B/E/S compiled analysts’ consensus forecast
The value premium has been fairly persistent on the US market, but there have been no obvious predictable patterns to the premium. The only way investors could have reliably earned the value premium is if they had the discipline to maintain their exposure throughout both the good and bad times. If, after experiencing the huge value premiums of the first three years of the new century (2000–2002) when the value premium was 37.8 %, 14.4 % and 12.2 %, respectively, investors might have listened to economists arguing that growth stocks would outperform value stocks the next years. Had investors listened to such calls and sold their value portfolios to buy growth stocks they would have missed the next four years where the value premium was 3.1 %, 8.3 %, 8.2 % and 5.8 %, respectively.

It is important to note that the data on the overall stock market is fairly similar. Over the eighty-year period from 1927–2006, the equity risk premium (calculated as the return to stocks minus the return on one-month Treasury bills) has been 8.2 % (annual basis). Also, stocks have outperformed Treasury bills with a high degree of persistence (the risk premium was positive 74 % of the years).

To further illuminate the persistence of the value premium evidence of the value premium outside of the US is presented below.

As shown by Cai (1997) the Japanese value stocks have outperformed growth stocks since the early 1970s until the early 1990s by a considerable margin regardless of how value stocks are defined. The average annual premium is as high as 11.3 %. Even by adjusting for size effects the value premium is more than 7 % annually which is still a considerable excess return. Over the period from 1998 to 2008 the findings of the Japanese value premium is parallel to the findings in America. The Japanese value premium did however prove its robustness during the bursting of the equity bubble in the late 1980s. In the table below this is shown.
Table 5: Japan’s Value and Equity Premium around the Bursting of the Equity Bubble

<table>
<thead>
<tr>
<th>Equity premium</th>
<th>Value Weighted</th>
<th>Equal Weighted</th>
<th>Value Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>0.27</td>
<td>0.47</td>
<td>0.19</td>
</tr>
<tr>
<td>1986</td>
<td>0.40</td>
<td>0.22</td>
<td>0.10</td>
</tr>
<tr>
<td>1987</td>
<td>0.03</td>
<td>0.40</td>
<td>0.27</td>
</tr>
<tr>
<td>1988</td>
<td>0.05</td>
<td>0.10</td>
<td>0.09</td>
</tr>
<tr>
<td>1989</td>
<td>-0.10</td>
<td>0.19</td>
<td>0.18</td>
</tr>
<tr>
<td>1990</td>
<td>-0.30</td>
<td>-0.31</td>
<td>0.03</td>
</tr>
<tr>
<td>1991</td>
<td>-0.38</td>
<td>-0.39</td>
<td>0.06</td>
</tr>
<tr>
<td>1992</td>
<td>0.26</td>
<td>0.28</td>
<td>0.15</td>
</tr>
</tbody>
</table>

1971-1992

Mean          | 0.08           | 0.13           | 0.12          |
Std.          | 0.23           | 0.23           | 0.13          |
$t$-statistic | 1.65           | 2.72           | 4.45          |
Number of negative occurrences | 8            | 6             | 6             |

Note: Equity premium is the difference between total stock market return and the risk-free interest rate. Value premium is the difference in annual size adjusted return between highest top 10 percent book-to-market stocks and lowest book-to-market stocks.

Source: Cai (1997)

From the peak in the Japanese stock market around December 1989 until the trough in August 1992, Nikkei 225 fell by 62 %. During this three-year period value stocks continued to outperform growth stocks. The average annual value premium around this period is approximately 9 % compared to a mean of 12 % over the period 1971-1992. This indicates that the crisis in Japan was not worse on value than growth stocks, actually on the contrary.

Evidence for the UK, the third largest advanced economy equity market, also supports the value investment strategy, as value stocks clearly outperforms growth stocks over a broad period extending all the way back to the early 1950s. Below, is presented the UK value premium from 1955-2001.
The value premium for both small and large cap stocks is around 0.5% on a monthly basis. This is significant. Once again the value premium is superior and thus supports the evidence found in other countries.

While the three biggest equity markets deserved an individual analysis of the value premium, evidence for other European countries is presented together. Studies on the value premium has been conducted for some of the most important equity markets at the European continent, including, France, Germany, Italy, Spain, Sweden, Switzerland, Belgium and the Netherlands. The table below reports the value premium of these countries based on the Book-to-Market ratio.

**Table 6: The UK Value Premium in Percentage, 1955-2001**

<table>
<thead>
<tr>
<th></th>
<th>High B/M value stocks</th>
<th>Low B/M growth stocks</th>
<th>Value Premium Monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Cap</td>
<td>1.74</td>
<td>1.26</td>
<td>0.48</td>
</tr>
<tr>
<td>Large Cap</td>
<td>1.56</td>
<td>1.06</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Note: Value-Weighted Returns.

Source: Dimson, Nagel and Quigley (2003)

The value premium for both small and large cap stocks is around 0.5% on a monthly basis. This is significant. Once again the value premium is superior and thus supports the evidence found in other countries.

While the three biggest equity markets deserved an individual analysis of the value premium, evidence for other European countries is presented together. Studies on the value premium has been conducted for some of the most important equity markets at the European continent, including, France, Germany, Italy, Spain, Sweden, Switzerland, Belgium and the Netherlands. The table below reports the value premium of these countries based on the Book-to-Market ratio.

**Table 7: Annual Value Premium in Percentage for Specific European Countries, 1975-1995**

<table>
<thead>
<tr>
<th>Country</th>
<th>Value Premium (annually)</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>7.64</td>
</tr>
<tr>
<td>Germany</td>
<td>2.75</td>
</tr>
<tr>
<td>Italy</td>
<td>-5.99</td>
</tr>
<tr>
<td>Netherlands</td>
<td>3.30</td>
</tr>
<tr>
<td>Belgium</td>
<td>4.39</td>
</tr>
<tr>
<td>Switzerland</td>
<td>3.49</td>
</tr>
<tr>
<td>Sweden</td>
<td>8.02</td>
</tr>
</tbody>
</table>

Source: Fama and French (1998)
Sweden seems to be the most value friendly country, but in the Fama and French study from 1998 other ratios for sorting are presented and France excels. Regardless of how stocks are sorted, the French value premium exceeds 6.5% per year. The Italian value premium stands out as being negative and it appears that value investing does not work out in Italy, but unfortunately no further research has been conducted on this subject. Overall it is hard to argue that the value premium is not pervasive in the rest of Europe as in the case with the UK.

The accumulated evidence for the continental European countries is in line with the main findings for the three most important advanced economy equity markets, that is, the value premium exists and is often substantial.

2.4 Explanations of the Value Premium

In the following section we will introduce the different theories and explanations of the value premium. We will look into whether the drivers of the value – growth relationship are behavioral or risk based. Most emphasis will be laid on the behavioral finance theory due to the fact that this theory challenges the standard finance theory and make use of its restrictions to build more practical hypotheses useful for real life investors. However, knowledge of the efficient market hypothesis and mean reversion in the stock market is important in this context and will briefly be described and discussed.

2.4.1 Standard Finance Theory and its Limitations

Traditional standard finance theory has created the fundamentals of the behavioral finance theory and we therefore find it necessary to investigate it further. In many ways, economists who stress psychological and behavioral elements of stock price determination challenge the efficient market hypothesis. By using the limitations of standard finance theory, behavioral finance creates more realistic and practical assumptions concerning the market participant’s behavior.

2.4.1.1 Efficient Market Hypothesis

For several decades, the efficient market hypothesis (EMH) has broadly been accepted by the academic economists such as Eugene Fama who wrote the influential survey article “Efficient Capital Markets” (1970) and to some extent it is still widely used at universities and business
schools around the world. EMH propose that security markets are extremely efficient in reflecting information about individual stocks and the stock market as a whole. The classical view by the supporters of the EMH is that when information arises, the news is immediately reflected in the stock prices without any delay because the news will spread itself quickly. As a consequence, to help investors select “undervalued” stocks, neither the study of past stock prices in an attempt to predict future prices (the technical analysis), nor the analysis of financial information such as book value, price earnings ratio etc. (the fundamental analysis) would make it possible for the investor to outperform the market (Malkiel, 2003). The EMH is associated with the idea of a random walk, which is a term used to describe apparent randomness of up and down movements day-to-day and thus the flow of information reflected in the market. The information is anything that may affect the stock prices and that is inexplicable in the present and thus appears to be random in the future. This indicates that stock prices are unpredictable and they do not follow a systematic pattern at all, as this could be utilized by arbitrageurs and would be traded away instantly.

The EMH is founded on several underlying assumptions such as normal utility maximizing agents and agents with rational expectation. The EMH and the underlying assumptions face difficulties in explaining some well-known puzzles in the financial theory. These puzzles contain the size effect, and the equity risk premium puzzle to mention a few. It is not only the mentioned puzzles that has caused difficulties for the EMH, it is also the assumptions of full rationality and perfect handling of information that is challenged, as empirical evidence have proved that not all information is reflected in the stock prices instantly (Wärneryd, 2001). Due to the above mentioned difficulties, behavioral finance can have more useful explanations of price determination and will be able to give us a more realistic picture than the EMH.

2.4.2 Behavioral Finance Theory

Behavioral finance is the field in finance that put forward psychology based theories to explain anomalies in the stock market. In the security market, many studies have documented the phenomena that contradict the efficient market hypothesis (Barberis & Thaler 2002, Shleifer & Vishny 1997 and Camerer & Hogarth 1999). Behavioral finance theory is based upon the belief that psychology and irrational behavior from investors are in focus, and suggest that there is a possibility that the pricing of financial assets deviates from its fundamental value. In contrast to
behavioral finance, the standard finance theory is influenced by the assumption of rational investors and that market price is accurate and only briefly will deviate from its fundamental value.

Behavioral finance theory questions some of the basic assumptions behind the hypothesis of efficient markets. In the following chapter, we will go through the thoughts and argumentations of the two theoretical building blocks of behavioral finance. The first involves limits to arbitrage and the second is investor’s perception of the market.

2.4.2.1 Theoretical Limits to Arbitrage

Proponents of behavioral finance reason that due to the presence of irrational investors, the stock market moves away from its fundamental value. The EMH proponents argue that this displacement quickly will be undone by rational traders in the market. The argument is based on the fact that when a mispricing takes place, the “error” in the market will be detected by rational investors and speculators quickly. The rational investors will therefore take advantage of this situation and take positions in the market that will bring back the price to its fair value. Supporters of behavioral finance agree that rational investors will exploit the opportunity of a mispricing in the market but they question the issue on self correction of the mispricing. Investors who believe that growth stocks are overpriced will pay less for these stocks. If growth firms then still earn higher returns on their stocks in the future this will contradict the low returns they are expected to earn if low Book-to-Market ratios should indicate overpricing. Therefore, it can be very unattractive for a rational investor to correct a mispricing due to high costs and risk (Barberis & Thaler, 2002). Barberis and Thaler (2002) suggest other and more theoretical aspects that can neutralize the threat of arbitrage. These are called ‘Fundamental risk’ and ‘Noise-trader risk’.

Fundamental risk refers to the most common risk that a rational investor will face. It is connected to holding a position in assets over a specific period and is the risk that an investor bears as a result of the way a firm conducts its activities (Penman, 2010). Suppose an investor has discovered an “error” in the price of an asset and therefore take a position in the market to make profit on this error. While the investor waits for the asset to return to its fundamental value, bad news regarding the asset can influence the fundamental value. This will lead to additional risk for the investor. Therefore, the speculator cannot be certain that the deviation from the assets’
fundamental value involve an arbitrage opportunity. If prices deviate from fundamental value, the investor can be at risk - and be rewarded - by trading at prices that are not at fundamental value. This risk is called price risk. Price risk arises from market inefficiency and liquidity risk (Penman, 2010). To prevent this situation, the investor can hedge the asset.

Another theoretical limit to arbitrage is noise trader risk. This concept refers to risk connected to the investment decision of irrational investors or so-called noise traders. Noise traders do not always trade financial assets at its fundamental value due to their perception of the market and their preferences. The presence of noise traders can therefore apply pressure on asset prices to start moving away from its fundamental value (Barberis & Thaler, 2002). If this movement opens an opportunity of arbitrage, rational investors will take positions to bring back the price in balance.

Just as in the case of price risk, it is not given that an arbitrage opportunity will appear, if a group of irrational investors have already started to push the price away from its fundamental value, there is a possibility that they will continue the pressure and the price will then continue to go towards the extreme, perhaps causing a bubble. Finally, the noise traders will cause the bubble to burst.

Figure 2: Irrational Investors Cause a Price Bubble

Source: Own creation
The graph above shows that in long term, the price of an asset moves towards its fundamental value but for the rational investor with a relative short time horizon this will result in higher risk. Therefore, deviations in an asset’s fundamental value, caused by irrational investors, will not necessarily result in arbitrage opportunities. A classic saying in the financial sector sums up the issue: “The market can stay irrational, longer than I can stay solvent”.

When professional investment managers handle other people’s money, a separation of brains and capital are often seen (Shleifer & Vishny, 1997). Thus it creates a principle-agent problem between the money maker and the investor, since managers are mainly evaluated on their performance. The principal (investor) has engaged the agents (money makers) to perform certain job tasks (Hendrikse, 2003). From the agents’ perspective the level of effort is now chosen. The output or performance of the agents is a function of effort, ability and an error term, capturing all uncontrollable factors from the agents’ perspective (Herpen, Praag & Cools, 2005). However, the principal’s delegation of tasks and responsibilities is not unproblematic: The agents are better informed about the effort and circumstances causing an asymmetric information problem (Hendrikse, 2003). If a money manager explores a mispricing in the market in the belief that the price will return to its fundamental value and instead the mispricing deepens causing the investor to lose money. The investor (principal) might take out the funds and replace the manager as the investor get worried that more funds will be lost by this manager. To avoid that such a situation develops, the manager withdraw from exploiting the mispricing in the first place. This can result in that only arbitrage opportunities with short time horizons are exploited as these opportunities appear less risky. Barberis and Thaler (2002) argue that if the risk is systematic (either fundamental or noise trader risk) the limits to arbitrage will be present because many individual arbitrageurs adding a small position of the mispriced asset to their portfolios will not successfully eliminate the mispricing.

2.4.2.2 Psychology and Investor’s Perception of the Market

The second building block within the behavioral finance theory is psychology which is a broad field covering a wide range of psychological concepts and theories. Section 2.4.2.1 dealt with theoretical reasons for efficient price deviations, not necessarily yield opportunities of arbitrage. The presence of irrational investors on the market is partly due to the precondition for considerable deviations from fundamental value. In this section, we will show why and how
investors show irrational behavior and why the irrational investors’ influence on the market is most likely not a coincidence.

By studying the reason for the existence of irrational behavior, through an examination of psychology and investors sentiment, we will have a greater knowledge on how psychological aspects can influence the investors’ preferences and thereby their behavior on the market. In the following, only terms and theories that we find relevant for the analysis discussion in chapter 3 and 4 respectively will be explained.

Beliefs of the Investor

In the search for alternative explanations to “fight” against standard finance theory, behavioral finance brings up issues regarding limitations with arbitrage and irrational expectations. Another important topic to assess is the beliefs and preferences of the investor when making an investment decision.

Barberis and Thaler (2002) summarize some of the most important, systematic misconceptions people tend to make such as overconfidence, optimism and wishful thinking, belief perseverance and availability biases, which to mention a few, can attenuate biases.

The decision making process in selecting an asset can, for an investor, be affected by the above mentioned factors. Investment experts, equipped with complicated models, tend to exhibit more overconfidence than private investors (O’Shaughnessy, 2005). Although, incentives to some extent can reduce a biased output, Camerer and Hogarth (1999) conclude in several of their studies on this topic that incentives can only take away parts of this irrational behavior. The boom in the information technology has worsened the investor’s analytical competence and it is to a greater extent important to sort out the noise from the valuable information.

Prospect Theory

Investor’s preferences are essential to trading behavior. The psychologists Kahneman and Tversky (1979) developed prospect theory which is a theory that describes the decision process in situations where people have to decide between alternatives that involve risk. The original version of prospect theory was designed to evaluate risky gambles.
Prospect theory is built on the expected utility framework by Van Neumann and Morgenstern (1947) which is the classical model that assumes that investors evaluate gambles according to the expected utility.

However, expected utility theory is a prescriptive theory in regards to how decisions under uncertainty should be made, where prospect theory is a more descriptive theory on how decisions actually are made (Montier, 2002).

Where normal financial models point their attention towards wealth, prospect theory instead concentrates around gains and losses. Kahneman and Tversky use an alternative form of ‘utility function’ – a so called ‘prospect function’ or ‘value function’. They use Markowitz’s standpoint where value is assigned to gains and losses rather than to final assets (Markowitz, 1959).

It was Kahneman and Tversky who showed that people focus more on gains and losses than on the final wealth. Furthermore, the value function for losses differs from the value function for gains. Experimental research prove that when deciding between the case where you gamble for possible gain compared to a case where you gamble for the size of your loss, people would only gamble in the case where they gamble to limit the size of their loss. This type of behavior makes the prospect function change in shape - where a concave function is generally seen when positive changes occur and a convex function is commonly illustrated in regards to negative changes (Kahneman & Tversky, 1979). This implies that investors are risk averse towards possible gains and risk seeking towards possibly minimizing the losses. This is in line with the irrational characteristic, belief perseverance, which Barberis and Thaler mention in their 2002-paper.
The two figures above show the standard, concave utility function and the prospect function. The traditional utility function is not defined with negative values because it is commonly used to look at the wealth or consumption, which is larger than zero. The S-shaped prospect function reflects an attitude toward risk that depends on whether the outcome is a gain (risk aversion) or a loss (risk seeking). Note that the value function is steepest at the reference point – corresponding to the individual who is most sensitively influenced towards the insecurity in this area.

Prospect theory is an attractive alternative because it tries to reconcile theory with behavioral reality. The strength of prospect theory lies within its descriptive approach. For instance, the assumptions on the aspects of human behavior that are proven through psychological experiments can be directly transferred on investor behavior in the financial markets.

Frame Dependence and Loss Aversion
In the experimental literature on decision making process when risk is involved, loss aversion and narrow framing also known as frame dependence or mental accounting, are two of the most important ideas, both of which play a significant role on the behavioral finance stock market setting.

Prospect theory predicts that the formulation of a gamble can be crucial when predicting an outcome as the gamble is framed in a positive (gain) or negative (loss) perspective. A positive
framing will cause the decision makers to be risk averse whereas a negative framing will cause the decision makers to be more risk seeking. It is not only the formulation of the gamble but also the decision maker’s norms and personal characteristics that will influence the outcome (Kahneman & Tversky, 1981). Therefore, the effects on framing can be particularly influential. There is much evidence on shifts in preferences due to the framing of the problem – this is a direct violation with the rational choice theory (Barberis & Thaler, 2002).

Kahneman and Tversky (1979) define loss aversion in their specific finding as people that are more sensitive to losses than to gains of the same size (Mehra, 2005). This simply indicates that losses hurt more than gains satisfy. In the graph of the value function, the function is steeper for losses than for gains which imply loss aversion. A typical example of loss aversion is that people tend to reject gambles such as: “win $110 with probability \( \frac{1}{2} \), lose $100 with probability \( \frac{1}{2} \)” (Mehra, 2005). This example is not only evidence of loss aversion but of narrow framing as well (Barberis, Huang & Thaler, 2003). Narrow framing is the tendency to treat gambles separately from the initial wealth. Loss aversion is often used in parallel with narrow framing because people act intuitively rather than through effortful reasoning (Kahneman, 2003). Therefore, investors tend to evaluate their gains and losses on a short term basis, when framing decisions narrowly. When investors evaluate a gamble individually instead of evaluating the total value of all merged gambles, the effect of a gain or loss seems much more strong (Thaler, 1999).

**Anomalies**

Proponents of the EMH believe that financial markets are efficient because they do not allow investors to earn above-average risk-adjusted returns. Many economists do not deny that psychological factors influence security prices but at the same time they are confident that in the long run true value will win. Skeptics of the behavioral finance view are doubtful that any of the anomalies that have been documented in the literature are adequately strong so as to have created profitable investment opportunities. The value stock phenomena as an anomaly will not be described in this chapter as it has been thoroughly described and analyzed in section 2.3. In this section, we will review some of the other anomalies suggested by the literature on the behavior of past stock prices.

One of the most well-known patterns is the short-term momentum. Economists have in the field of behavioral finance found short-term momentum to be reliable with psychological feedback
mechanisms. An example on this is the “bandwagon effect” that is when investors see a stock increase in value they are drawn into the market. Shiller (2000) illustrates that the rise in the American stock market in the late 1990s as the result of psychological contagion leading to irrational enthusiasm. Standard finance proponents argue that the short-term momentum strategy (buying stocks with a short horizon in order to exploit the present hype in the market) will be too costly to execute on a regularly basis due to the large transaction costs involved (Odean, 1999).

Several economist researchers have found that January has been an outstanding month for the stock market. Stock returns from an equally weighted stock index have tended to be unusually high during the first two weeks of the year (Keim, 1983). There also appear to be a number of day-of-the-week effects. For instance, French (1980) documents significantly higher Monday returns. There also appear to be patterns in returns around the turn of the month (Lakonishok and Smith, 1988), as well as around holidays (Ariel, 1990).

The problem with these anomalies is that they are not dependable from period to period. Furthermore, these non-random effects are very small relative to the transaction costs involved in trying to make use of them. Hence, they do not appear to offer arbitrage opportunities that would enable investors to make excess risk-adjusted returns.

Fama and French examined, in their article from 1992, data in the period between year 1963 and 1990 by dividing all stocks into deciles according to their size as measured by total capitalization.
Figure 4 shows that the deciles made up of portfolios of smaller stocks generated a higher average return than deciles made up of large stocks. But the question is whether the higher returns of small companies will generate excess risk-adjusted returns. The CAPM-model defines risk for a stock as the beta value associated with the stock and with the use of beta as the risk measure the size effect can be interpreted as an anomaly. Fama and French (1992) suggest, however, that the size may be a better measurement for risk than beta.

The different kinds of anomalies described above have been analyzed and proven in the literature with statistically evidence. Nevertheless, the anomalies depend to a certain extent on the chosen sample period and the fact that fundamental valuation of stocks may give a better proxy for measuring risk. At the same time, many of the anomalies described in the literature have disappeared or become self-destructive such as the January effect. However, one anomaly that we believe still exists in the market is the value premium; therefore our focus is directed towards this.
2.4.3 Value Stocks and Risk

In this section, we will discuss the relationship between value stocks and risk to see, from a theoretical point of view, if value stocks are riskier than growth stocks. The issue between return and risk has been analyzed many times in the modern finance theory and several economists state that these two characteristics are joined –you basically do not get one without the other. It is well accepted and empirically proved that value stocks have higher returns than growth stocks and therefore value stocks, according to the EMH proponents, must have higher risk than growth stocks. The value companies simply have to be riskier.

The problem is that risk is not straight forward. Utilizing S&P indices, and Fama and French’s data, the annualized returns and standard deviations for monthly data from July 1963 through April 2002:

Table 8: Annualized Returns and Standard Deviations for Monthly Data, July 1963-April 2002

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>Return</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 500</td>
<td>11.04%</td>
<td>14.88%</td>
</tr>
<tr>
<td>CRSP Universe</td>
<td>11.00%</td>
<td>15.42%</td>
</tr>
<tr>
<td>FF Large Growth</td>
<td>10.25%</td>
<td>16.65%</td>
</tr>
<tr>
<td>FF Large Value</td>
<td>13.71%</td>
<td>15.39%</td>
</tr>
<tr>
<td>FF Small Growth</td>
<td>9.68%</td>
<td>24.60%</td>
</tr>
<tr>
<td>FF Small Value</td>
<td>17.59%</td>
<td>19.20%</td>
</tr>
</tbody>
</table>

Source: Fama and French, 1992

The table clearly states that value portfolios have lower risk than growth portfolios. The most obvious example is for small stocks where small growth stocks definitely have the highest risks and lowest returns of any cross section.

The supporters of the EMH believe that only risk is priced in equilibrium, and consequently the fact that value stocks outperform in the long run is due to higher risk. Fama and French (1993) put forward that the value premium is a reflection of a systemic dislike for financial distress.
However, the value premium appears to be poorly correlated with underlying reasons of economic distress such as bankruptcy (Griffin & Lemmon, 2002).

Additionally, the figure below shows the realized annual standard deviations for the MSCI value and growth indices from 1991-2002.

**Figure 5: Value and Growth Index, 1991-2002**

The difference in risk between growth stocks and value stocks is very little. Except from the Internet bubble in 2000 where growth stock volatility increased rapidly. Proponents of behavioral finance cite this as clear evidence of irrationality of markets.

Another important issue in regards to value stocks and risk is the perception of risk from investors. Risk perception is a subjective judgment that investors make about both characteristics and severity of a certain risk. This concept is important for the understanding of financial markets. How investors perceive risk could help to explain the value premium. If investors believe that portfolios of value stocks are riskier than those of growth stocks there will be a tendency to observe higher returns on the value stocks. A high return on value stocks could reflect that investors perceive these stocks to be fairly risky as many of these companies have had
a poor past performance and are distressed even though a portfolio of these stocks is not significantly riskier on fundamental measures than a growth portfolio. Correspondingly, if investors believe that portfolios of growth stocks are less risky we could observe lower returns. The lower return on growth stocks could reflect that investors perceive these stocks as reasonably safe because many of these firms are investing in and using cutting edge technologies. Investors might therefore believe that these companies are safe to invest in because a solid portion of these firms will be dominant players in the future even though a portfolio of these companies does not perform better when measured on fundamentals such as beta and return volatility.

2.5 Recessions in the American Economy

The performance of the overall stock market is extremely correlated with the development in the economy as a whole. During periods where the economy is booming the stock market tend to follow this trend and deliver high positive returns and vice versa. In this contrast an investigation of how the value premium reacts prior, during and after recessions would be interesting.

2.5.1 Definition of a Recession

Many professionals around the world believe that a true economic recession can only be confirmed if the Gross Domestic Product (GDP) growth is negative for a period of two or more consecutive quarters. Nonetheless, the roots of a recession and its true starting point actually rest in the several quarters of positive but slowing growth before the recession cycle really begins. Often in a mild recession the first quarter of negative growth is followed by slight positive growth, then negative growth returns and the recession trend continues.

While the “two quarter” definition is accepted globally, many economists have trouble supporting it completely as it does not consider other important economic change variables⁴. For instance, current national unemployment rate or consumer confidence and spending levels are all part of the economic system and must be taken into account when defining a recession.

The agency that is officially in charge of declaring a recession in the United States is known as the National Bureau of Economic Research (NBER). The NBER defines a recession as a “significant decline in economic activity spread across the economy, lasting more than a few

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months, normally visible in real GDP, real income, employment, industrial production and wholesale-retail sales”. While economic recessions are foreseeable, they generally are not detected until they are already in motion. The public often do not receive official word of an economic recession until several months into it, as NBER must take time to calculate the multitude of variables available before making their decision.

Countries around the world experience mild economic recessions from time to time. Recession is a natural result of the economic cycle and will adjust for changes in consumer spending and consumption or increasing and decreasing prices of goods and labor. Rarely countries, experiencing a multitude of these negative factors simultaneously, experience a deep recession and even a long economic depression.

2.5.2 Causes and Effects of a Recession

An economic recession can be caused by different factors. Primarily, it is attributed to the action taken to control the money supply in an economy. The Federal Reserve (the Fed) is the agency responsible for maintaining the delicate balance between money supply, interest rates and inflation in America. When the balance is tipped, the economy is forced to correct itself.

The Fed sometimes deals with these situations by dumping huge amounts of money supply into the money market. This helps to keep interest rates low, even as inflation rises. Inflation is the price increase of goods and services over a period of time. A higher level of inflation therefore leads to fewer goods and services sold with a certain amount of money. There can be several contributing factors for inflation which, to mention a few; include increased costs of production, higher costs of energy or national debt.

In an economy where inflation is prevalent, people tend to cut in their own economy. People budget more, spend less on things they usually indulge in, and start saving more money than they are used to. As people and businesses start finding ways to cut costs and avoid unneeded expenditures, the GDP begins to decline. Then, unemployment rates rises as a result of companies starting to lay off workers to cut further costs. It is these sets of circumstances and combined factors that eventually drive the economy into a state of recession.

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4 NBER homepage (25/5 2010) http://www.nber.org/cycles/cyclesmain.html
Generally, an economic recession can be spotted by the well-informed observer. There are ways to spot it before it actually gains momentum by observing the changing economic landscapes in the quarters that comes before the actual onset. GDP might still be growing, but it will be coupled with signs like high unemployment levels, decline in housing prices, stock market losses, and the absence of business investments.

The only real benefit of an economic recession is that it will help to cure inflation. In fact, the delicate balancing act that the Fed struggles to pursue is to slow the growth of the economy enough so that inflation will not occur, while still making sure that a recession will not be triggered in the process.

Considered a part of the natural cycle of the modern economic system, no one can escape recessions in the long run. Huge economies like Germany, the UK, China, and Japan have all had trouble with recessions. As compared to earlier recessions which only affected the specific country, increased globalization has lead to a higher integration between the different economies linking banks, asset markets, housing prices etc., thus causing recessions in one domestic economy to spread to other economies as we have seen in the recent recession.

### 2.5.3 Timeline of Recessions in the American History

Economic recessions in America have been present for over 200 hundred years. From “the Panic of 1819” which was considered the first financial crisis to unveil itself before the relatively new US economy where failing banks, huge unemployment rates and gigantic slump in manufacturing and agriculture caused havoc among Americans, until the recent financial crisis where the same factors forced the economy to a halt.

The causes and hence the effects of these recessions has been very different but they all have one thing in common – they damage the economic growth of the country.

As our data on the American stock market only goes back until the 1920s recessions prior to this point is of no interest to the investigation of the value premium in context with recessions. The crash of Wall Street in 1929 and the recession that followed (The Great Depression) was so uncharacteristic for recessions that we have decided to leave this recession out of our investigation period and hence our analysis of recessions starts with the recession in 1948.
The recession in 1929 is extreme in many ways. After more than 840 market days the stock market was down by 89.2 % when the recession hit the trough, compared to for instance the crisis in the early 2000s where the stock market hit the trough after 630 market days, with a loss of 49.1 % from the beginning of the recession. The bear markets during the three other recessions are very similar.
In the figure below, we have visualized the 11 different recessions in the American history from the beginning of our investigation period.

Figure 7: Time Period for Recessions in the American Economy, 1947-2009

Source: Own creation

At first glance it appears that there has been three considerable long periods without recessions from the 1960 recession until the 1969 recession, from the 1981 recession until the 1990 recession and again in the period after the 1990 recession. On average there has been a recession in the American economy approximately every sixth year during our period of investigation.

Below is the eleven different recessions from 1947-2009 in the American history presented individually to examine if there are any trends that reappear through time.

2.5.3.1 November 1948 – October 1949 (11 months)

The recession in the late 1940s was, what some would call, a routine cycle of the modern economic model. When the Fed fails to maintain the delicate balance that exists between the money supply, the interest rates and inflation – recessions occur. During the late 1940s recession, unemployment rates rose from around 4 % to about 8 %. This is by no means a severe recession. In fact, it was less severe than most recession that the US had experienced earlier. This recession was a consequence of the nature of the post-war dismantling of the military industry.

During this recession the Dow Jones Index fell around 15 %-points from its peak in November 1948 to its trough in July 1949.
2.5.3.2 July 1953 – May 1954 (10 months)

The early 1950s recession, also known as the Recession of 1953, was mainly brought about because of the Korean War and mismanagement of monetary and fiscal policy that often accompanies an end of a war. As inflation was high, the Fed forced a change in policy. They reformed the monetary policy to be more restrictive in hopes of controlling the inflation. Thus, with further straining of the post war economic environment a recession was inevitable.

However, this recession did not affect stock markets negatively. During the recession both the Dow Jones Index and the S&P 500 Index rose with around 20 %-points.

2.5.3.3 August 1957 – April 1958 (8 months)

The late 1950s recession, also called the Recession of 1957, hit the economy in the late 1950s with high unemployment rates and failing businesses. This was mostly due to the tightened monetary policy of the Fed. However, as the policy had been tightened three years previous and then eased towards 1957 and then tightened again, it had a serious impact on the US economy. The budget balance went from a budget surplus of around 1 % of GDP in 1957 to a budget deficit of 0.6 % of GDP in 1958 and a deficit of more than 2.5 % in 1959. Even though the recession only lasted for 8 months it still hit the economy hard causing many people to lose their jobs as a result of massive cost cuts in the companies. Many people were then forced to find new jobs after being laid off. Nevertheless, as businesses were forced to close this was by no means an easy task. During this recession both the Dow and S&P500 fell with around 12 %-points.

2.5.3.4 April 1960 – February 1961 (10 months)

The Early 1960s recession, also called the Recession of 1960, was yet another chapter in the modern economic cycle that has shown its ugly side so many times to the US, as well as to the world. This recession was characterized by, once again, astronomically high unemployment rates, high inflation, and a fall in Gross National Product. These all worked together to cause consumer confidence in the system to plummet, and caused a downward spiral to develop that swallowed many businesses. This in turn caused unemployment to rise even more, and so the cycle began again.
What ended the recession was a decision by President Kennedy to increase government spending to improve the Gross National Product. It reduced unemployment, brought back confidence in the economy, helped out many businesses, and effected the recession to come to an end that year.

During this recession the S&P500 index outperformed the Dow by 5 %-points with a loss from its peak to trough of around 3 %-points.

2.5.3.5 December 1969 – November 1970 (11 months)

The Late 1960s recession, though not nearly as problematic as its predecessor in the early sixties, was characterized once again by unemployment and unhealthy amounts of inflation. The modern economic cycle seems, usually, to bring about smaller “aftershocks” when a notably sized recession comes to an end. The late 1960s recession is no different. While measures were taken to decrease inflation and help get new jobs opened up, this era marks the beginning of a new time of economic analysis in which governments try new ways of solving the recession problem.

Even though this recession was less problematic than the early 1960s recession the two major indices fell more than 30 %-points from their peak to their trough.

2.5.3.6 November 1973 – March 1975 (16 months)

The 1970s oil crisis really began in 1973. What was learnt from this crisis was the fact that prices of commodities such as oil play a vital role in the world economy.

A major cause of the 1970s crisis was the oil price. Prices quadrupled as a result of initiatives from the Organization of the Petroleum Exporting Countries (OPEC). Along with the increased government spending which came with the Vietnam War, this led to a period of slow economic growth and high unemployment coupled with a high rate of inflation. Together this is known as stagflation.

In October 1973, OPEC nations stopped exports to the US and other western nations. They meant to punish the western nations that supported Israel, their foe, in the Yom Kippur War, but they

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6 BEA homepage (12/9 2010) http://www.bea.gov/
7 BEA homepage (16/8 2010) http://www.bea.gov/
8 BEA homepage (16/8 2010) http://www.bea.gov/
soon realized the strong influence that they had on the rest of the world through their oil. One of
the many results of the embargo was higher oil prices throughout the western world, particularly
in America. The embargo forced America to consider many things about energy, such as the cost
and supply, which up to 1973 no one had worried about. The long-term effects remain even
today. Although the embargo ended only a year after it began in 1973, the OPEC nations had
quadrupled the price of oil in the Western world. The vulnerability of the Western world had
been revealed.

While the two consolidated indices, S&P500 and Dow Jones, fell around 40 %-points the new
index, NASDAQ-OMX, fell more than 50 %-points during this recession.

2.5.3.7 January 1980 – November 1982 (22 months)

The 1980s recession can mostly be attributed to the Iranian Revolution which took place in Iran
in the year 1979. This revolution caused a sharp increase in the price of oil all around the world,
causing the 1979 energy crisis. The Fed tried to correct inflation by making monetary changes.
These monetary changes needed to be made not only for the sake of current inflation, but because
of the inflation that had carried over from 1973 oil crisis and the 1979 energy crisis. The Federal
Reserve, in an effort to control this inflation, raised interest rates substantially. The recession
lasted until 1982.

On the stock market all three indexes ended the recession with a positive high, but during the
recession all three indices experienced falls of up to 30 %-points.

2.5.3.8 July 1990 – March 1991 (8 months)

Black Monday, which occurred in October of 1987, caused a stock market collapse that cut 22.6
% off of the Dow Jones Industrial Average. The recession that followed this initial panic was
sharp and the economies of Japan and Europe were also affected however mildly. The early
1990s recession was caused by a savings and loans crisis in America, coupled together the costs
of the first gulf war. At the same time, the Swedish bank crisis affected economies all over the
world. All of this, caused the recession in the US to have a profound impact on the American
society.
2.5.3.9 March 2001 – November 2001 (8 months)

The Early 2000s recession took place in the US for a number of different reasons. One was the collapse of the Dot-Com bubble. Speculation in IT stocks, which became highly overvalued by investors, led to a severe bubble. In addition, the attacks on the World Trade Center on September 11th 2001 caused panic among Americans. Corporate scandals also affected the economy as well known companies such as Enron and WorldCom went bust during the early 2000s.

Since the early 1990s recession the economy had boomed, with both low inflation and low unemployment, so economists worldwide had warned against a correction in the market. This correction hurt especially the technology index NASDAQ-OMX, which fell more than 50% points in a period of only 8 months. This can be seen in figure 5 were the standard deviation for growth stocks exploded around 2001. In fact the Dow Jones was almost unscathed until the September 11 attacks, when all indices fell.

2.5.3.10 December 2007 – April 2009 (16 months)

The crisis that started in mid-2007 is widely seen as the largest disruption of financial markets in decades (OECD, 2008). The crisis originated in the US housing sector following the accumulation of enormous mortgage debt by households. Mortgage loans were “extended” to borrowers who previously were not considered creditworthy, leading to an accumulation of low quality subprime debts. A sudden underperformance in these subprime mortgages were the trigger for the crisis but due to the highly interconnected global financial system it spread throughout the entire world (Aalbers, 2008). The deteriorating performance of subprime mortgages led financial firms worldwide to question the value of a variety of collateral they had been accepting in their lending operations – and to worry about their own finances. This led to a sudden hoarding of cash, which in turn led to severe liquidity constraints on many financial institutions (OECD, 2008). The sudden stop of money flowing through the banking system is also known as the “credit crunch” (Mellor, 2009).
All three major indices fell more than 50%, creating a widespread panic on the stock markets. From the beginning of January 2008 until October 2008 Dow Jones had fallen almost 40% from its original value.

A common denominator for the 11 different recessions is high inflation, high unemployment rates, and fall in GDP. What is interesting though, is the reaction from the stock market. Even though the major indices fell during several of the recessions this was not unanimous. Neither were the causes of these recessions. Some was brought on by changes in monetary or fiscal policy while others came as a consequence of war while others again were caused by bubbles.
2.6 Sub Conclusion

In this chapter, we have given an account of the contrarian investment strategies. Contrarian investing is looking for mispriced investments and buying the investments that appear undervalued by the market. Contrarian investing is related to value investing that derives from the ideas of Graham and Dodd. Where value stocks can be identified by book value or price/earnings ratio, the contrarian investor is, beside the financial metrics, also interested in measures of ‘sentiment’ concerning the stock picking process among other investors. Proponents of contrarian investment also try to exploit some of the principles of behavioral finance, and the overlap between these values is significant. Value investing has by numerous academics proven to be a successful investment strategy and they have demonstrated that, on the American stock market, value stocks outperform growth stocks significantly over time.

**Table 9: Annual Value Premium for the American Stock Market**

<table>
<thead>
<tr>
<th>Author (year)</th>
<th>Time period Investigated</th>
<th>Criterias</th>
<th>Annual Value Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Davis, Fama &amp; French (2000)</td>
<td>1929-1997</td>
<td>30% highest and lowest Book-to-Market Value</td>
<td>5.50%</td>
</tr>
<tr>
<td>Fama &amp; French (2006)</td>
<td>1929-2004</td>
<td>30% highest and lowest Book-to-Market Value</td>
<td>4.80%</td>
</tr>
<tr>
<td>Lakonishok, Shleifer &amp; Vishny (1994)</td>
<td>1963-1990</td>
<td>10% highest and lowest Book-to-Market Value</td>
<td>10.50%</td>
</tr>
<tr>
<td>Lakonishok, Shleifer &amp; Vishny (1994)</td>
<td>1963-1990</td>
<td>10% Price-to-Cash ratio &amp; Fastest Sales Growth</td>
<td>11%</td>
</tr>
<tr>
<td>Cooper, Gulen &amp; Schill (2008)</td>
<td>1966-2003</td>
<td>10% highest and lowest Asset Growth</td>
<td>13%</td>
</tr>
<tr>
<td>Russell 1000 (Risager, 2009)</td>
<td>1998-2008</td>
<td>Price-to-Book</td>
<td>2.07%</td>
</tr>
</tbody>
</table>

Source: Own creation

No matter which period has been investigated, the value strategy has generated an excess return on the portfolio. The same applies for studies conducted outside of the US except from Italy.

The Capital Asset Pricing Model is a theoretical standard finance model developed by economists. CAPM assume that investor’s rationality balances risk against reward. If accepted, CAPM’s premises are useful because it assists the investor when constructing a portfolio. Financial theorists do not only accept the Efficient Market Hypothesis because it is convenient but also as a consequence of the statistical evidence – even though this evidence is based on historical prices.
Proponents of the EMH argue for the idea of random walk in the stock market, which is a term used to describe apparent randomness of up and down movements day-to-day and thus the flow of information reflected in the market. The information is anything that may affect the stock prices and that is inexplicable in the present and thus appears to be random in the future. This indicates that stock prices are unpredictable and they do not follow a systematic pattern at all, as this could be utilized by arbitrageurs and would be traded away instantly.

Neither private investors nor many economists saw the recent financial crisis coming, but more important are the economists’ blindness to the failures in the market economy. During the golden years, investors believed that markets were stable and stocks and other assets were priced correctly. Many investors ignored the signs of increased risk leading to pure speculation which in turn led to bubbles. These investors turned a blind eye to the limitations of human rationality. As an investor, it is necessary to acknowledge the importance of irrational behavior. Important theoretical aspects of irrational behavior are Fundamental risk and Noise-trader risk. Fundamental risk refers to the most common risk that a rational investor will face. It is connected to holding a position in assets over a specific period and is the risk that an investor bears as a result of the way a firm conducts its activities. Suppose an investor has discovered a mispricing of an asset and therefore take a position in the market to make profit on this error. While the investor waits for the asset to return to its fundamental value, bad news regarding the asset can influence the fundamental value. This will lead to additional risk for the investor. Therefore, the speculator cannot be certain that the deviation from the assets’ fundamental value involve an arbitrage opportunity.

Noise-trader risk is connected to the investment decision of irrational investors or so-called noise traders. Noise traders do not always trade financial assets at its fundamental value due to their perception of the market and their preferences. The presence of noise traders can therefore apply pressure on asset prices to start moving away from its fundamental value. If this movement opens an opportunity of arbitrage, rational investors will take positions to bring back the price in balance. However, it is not certain that an arbitrage opportunity will appear. If a group of irrational investors have already started to push the price away from its fundamental value, there is a possibility that they will continue the pressure on the price.
Some of the most important, systematic misconceptions investors tend to make such as overconfidence, optimism and wishful thinking, belief perseverance and availability biases, which to mention a few, can attenuate biases.

The decision making process of selecting an asset can, for an investor, be affected by the above mentioned factors. Investment experts, equipped with complicated models, tend to exhibit more overconfidence than private investors. Although, incentives can reduce a biased output, they only take away parts of this irrational behavior. The boom in the information technology has worsened the investor’s analytical competence and it is to a greater extent important to sort out the noise from the valuable information.

Countries around the world experience economic recessions from time to time. Recessions are natural results of the economic cycle and will adjust for changes in consumer spending and consumption or increasing and decreasing prices of goods and labor. We have seen that a common denominator for the 11 different recessions in our investigation period is high inflation, high unemployment rates, and fall in GDP. However, the causes of these recessions were not completely similar. Some was brought on by changes in monetary or fiscal policy while others came as a consequence of war while others again were caused by bubbles. Generally, an economic recession can be spotted by the well-informed observer. There are ways to spot it before it actually gains momentum by observing the changing economic landscapes in the quarters that comes before the actual onset. GDP might still be growing, but it will be coupled with signs like high unemployment levels, decline in housing prices, stock market losses, and the absence of business investments.
3 Empirical Study

In this chapter, the contrarian investment strategy will be examined on the American stock market. Even though the value premium has been studied on the American stock market previously and the evidence of its existence are well documented c.f. chapter 2, the performance of the value premium prior to, during and after a recession has not been investigated thoroughly. Therefore, we will examine the value premium in these periods to test how it reacts when the economy goes into a recession and if the superior performance of value stocks over growth stocks is continuously present in all three time periods. We will also investigate the connection between the value premium and GDP and we will examine if the American market reverts to the mean by applying a Variance Ratio test. However, the chapter will begin with a description of the American stock market and the economic growth in the US economy. Afterwards, a description of the data used in the test and the methodology applied will be explained. Finally, the results of our investigation will be analyzed and explained.

3.1 Introduction to the American Stock Market

The American stock market has a history of more than 200 years. In the middle of the 19th century, America was experiencing rapid growth and companies needed funding to help expand their business to meet the new demand. Companies also recognized that investors would be interested in buying partial ownership in the company. This partial ownership was evidenced by paper receipts, or stocks. Throughout history stocks have repeatedly facilitated the expansion of corporations. The immense potential of the newly established stock market quickly became obvious to both the investors and the companies.

By the beginning of the 20th century millions of dollars worth of stocks were traded yearly on the street and in 1921, after several years literally on the street, the stock market moved indoors. The Industrial Revolution in the 19th century and 20th century played a big role in the changing stock market. It created new industries, many new corporations, and an alternative for savers or, as time developed, speculators. People started to realize that it was possible to easily trade their ownership interests by re-selling the stock to others that found value in the company. This was the beginning of the secondary market. The NYSE only traded in very large and well-established companies and therefore became highly regarded among investors. It was seen as a more stable
investment alternative compared to smaller markets where poor liquidity in market could cause problems for the investor.

Since the beginning has the stock market in America grown tremendously. Other stock exchanges emerge, such as the American stock exchange (AMEX) and National Association of Securities Dealers Automated Quotations (NASDAQ).

In April 2007 NYSE Euronext is formed from the merger of NYSE and Euronext N.V. For the global financial market this was a milestone, bringing together the European and the US marketplaces. In 2008 NYSE Euronext acquires AMEX, a stock exchange where the stocks of smaller companies were traded. Today the NYSE Euronext, NASDAQ-OMX and many other exchange markets make an important contribution to the national and global economy.

As stock value is based on corporate profitability, upturns and downturns in the economy will be a determinant of how well the stock market as a whole will perform. If the country is experiencing a boom in the economy stocks are likely to increase as a result of expected profit and vice versa. The standard measure for this growth of the economy is the Gross Domestic Product (GDP). The definition of the GDP is the total market value of goods and services produced by workers and capital within a nation's borders during a given period (Jackson & McIver, 2007). The increase or decrease in GDP from one period to the next is an indication of a country's economic health.

A significant change in GDP, whether up or down, often has a significant effect on the stock market. This makes sense as a bad economy means lower profit for companies, which in turn means lower stock prices. Investors worry about negative GDP growth, which is, as mentioned earlier, one of the factors economists use to determine whether an economy is in a recession.

As one can imagine, economic production, has a large impact on nearly everyone within that economy. For example, when the economy is healthy, there will typically be low unemployment and wage increases as businesses demand labor to meet the growing economy. The economic growth of the American economy measured in Real GDP from 1929-2009 is shown in the graph below.
Over the period 1929-2009 a seemingly steady increase has occurred. The Real GDP measured in billions of 2005 dollars has increased from around $1000 billion to around $13000 billion. The annual average growth in GDP has been approximately 3%. This increase is seemingly similar to the increase in the graph below which illustrates the stock returns for the American Stock Exchange, Dow Jones Industrial Average, from 1929-2010.
The graph for the stock market appears more volatile than the graph for GDP, which were expected. Nonetheless it materializes that there is a positive correlation between the steady increase in GDP and the increase in the stock market over time.

However, there are periods in which the GDP growth, and hence stock returns, has been severely negative. These “bumps” are indicators of recessions. In the graph below the recent period from 2006 until 2010 is presented. This is done to visualize the changes in GDP through a recession.

**Figure 10: US Quarterly GDP Growth, 2006-2010**

![Graph of US Quarterly GDP Growth 2006-2010](image)

Source: Bureau of Economic Analysis

The GDP growth fell significantly from the third quarter 2007 until the second quarter of 2009. This is the most extreme decrease in GDP over the entire period of our study from 1929-2009. From 2007 to 2009 the stock market lost more than 50% of its value. This is an indicator of the connection between the condition of the economy and the stock market performance.

### 3.1.1 Reasons for choosing the American Stock Market

Our investigation requires a significant number of observations both in regards to value and growth stocks. It also requires a well documented history of recessionary periods. We have chosen the American stock market for the empirical study because of the length and robustness of its statistical time series.

Considering our investigation objective, it is suitable to incorporate as many recessions as possible, hence a large data set of returns on both value and growth stocks are preferable. The return data from the American stock market dates back to 1927, thus providing by far the largest data sample on stock returns in the world. Furthermore the present size of the American stock
market and hence the size of our most present data ensures that no particular industry or company will bias the more recent results. The earlier returns in the portfolios could be influenced by a particular industry or company. The size of the American stock market is also suitable as it enhances the investors possibilities, both private and professional, to create diversified portfolios.

As mentioned earlier, the chosen time period for our investigation is from 1947 until 2009. We have chosen this period for different reasons. The GDP data from US dates back to 1929, however quarterly data is not published until 1947. Furthermore, the recession proceeding the 1948 recession, the Great Depression in the early 1930s, is so uncharacteristic that it will create a bias in our results if it is incorporated in the analysis, causing us to make incorrect conclusions.

3.2 Methodology
In this section the data that has been collected will be evaluated in order to analyze our problem statement. The origin of the different data types and the different choices that has been made will be discussed. Finally, problems regarding the data will be pointed out.

3.2.1 Outline of the Data Applied
We obtain data from five main sources. The first is the CRSP monthly stock file that contains information on stock returns for NYSE, AMEX, and NASDAQ-OMX stocks. The second source is the COMPUSTAT annual research file that provides accounting information for publicly traded US firms. The third source is Moody’s book equity information collected from French’s data library that can be found at his web page. French and Fama have used the data from this webpage when writing their own articles and therefore, the data has already been corrected in regards to stock splits, companies leaving and entering the stock exchange, dividend payouts etc. Fama and French are, as mentioned earlier, two well-known academics within the field of portfolio management. They are highly recognized for their development of the Fama-French three-factor model which is used to describe market behavior (Fama & French, 1993). Fama and French have constructed portfolios according to different factors such as size, Book-to-Market, Earnings/Price, Cash flow/Price, dividend yield and momentum factor. They update their research data at least once a year and form the portfolios annually and ignore transaction costs. The portfolios include all NYSE, AMEX, and NASDAQ-OMX firms with the necessary data.
The fourth source is the Bureau of Economic Analysis (BEA’s) quarterly GDP data for the American economy. The fifth source is DataStream where we find the data used to perform the variance ratio test. The data we use is the MSCI USA total return index.

As mentioned above, the American stock market is the largest stock market in the world and we will therefore be able to achieve the most diversified portfolios for our investigation objective. We have chosen to use Fama and French’s data due to the fact that their portfolios are made from vast amounts of data and include a large number of different firms within different industries. Considering our objective it is undoubtedly the most excellent database when analyzing value premiums on the American stock market. Even though it is possible to collect US return data for value and growth stocks from 1927 it is not possible to get quarterly US GDP data before 1947, and therefore our research period begins in 1947. The stock returns from Fama and French has not been updated for 2010 returns and therefore our research period ends in 2009. The portfolio is rebalanced each year on the 1\textsuperscript{st} of July since the annual reports for the prior fiscal year needs to be published. The Book-to-Market value consists of the book value from the annual report from year\textsubscript{t-1} and from the market value of the stock 1\textsuperscript{st} of July\textsubscript{t}.

3.2.2 The Variables

In this sub section, we will outline the data variables and returns used in the empirical study of the thesis.

3.2.2.1 Book-to-Market Value

Due to the fact that sorting after Book-to-Market values historically has proven to have the strongest relation to returns (Fama & French, 1992), this sorting variable is chosen in the thesis. Some firms might encounter negative Book value. In general this applies to around 2\% of the firms annually. These firms are not included in our data set. Our definition of Book-to-Market value is from Fama and French (1993). The book-equity value of the stocks is the respective book value of common shareholder’s equity minus the book value of preferred stocks. The Book-to-Market equity ratio is constructed by dividing book-equity value with market-equity value.

Several variables can be used to identify value stocks and growth stocks but we will focus on Book-to-Market. The Book-to-Market variable is anticipated to proxy for past performance. However, the Book-to-Market ratio is not entirely clear and can reflect other aspects than the
growth of the company. If a company has many intangible assets, this will not be reflected in the accounting book value, hence a low Book-to-Market value. This can lead to a misclassification of the stock. Nonetheless, the Book-to-Market ratio is still useable for the allocation process as long as we are aware of the pitfalls (Lakonishok et al., 1994). When looking for growth stocks within the market, it is assumed that a low Book-to-Market value reflects growth opportunities that have reached the market price but not the book price. Hence, companies with a low Book-to-Market ratio have often had a high growth rate in the past and might therefore be described as overvalued and subsequently fail to meet expectations. Opposed to this, stocks with a high Book-to-Market value reflect the fact that growth opportunities have not yet reached the market price, as agents tend to extrapolate the past poor performance into the future (Penman, 2010). The Book-to-Market values in our thesis are presented below.

<table>
<thead>
<tr>
<th></th>
<th>Growth Portfolio</th>
<th>Value Portfolio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average</strong></td>
<td>0,2</td>
<td>2,3</td>
</tr>
<tr>
<td><strong>Minimum</strong></td>
<td>0,1</td>
<td>0,9</td>
</tr>
<tr>
<td><strong>Maximum</strong></td>
<td>0,4</td>
<td>6,1</td>
</tr>
</tbody>
</table>

Source: Own Creation

The average Book-to-Market value from 1947 until 2009 for the growth portfolio is 0.2. For the value portfolio the value is 2.3.

### 3.2.2.2 Value and Growth Portfolios

When implementing the contrarian investment strategy, it is crucial to understand what factors categorize the assets. An identification of growth and value stock are made by Lakonishok et al. (1994) to effectively implement the strategy:

- Growth stocks are stocks that 1) have performed well in the past, and 2) are expected by the market to perform well in the future.
- Value stocks are stocks that 1) have performed poorly in the past and 2) are expected to continue to perform poorly.
The definitions above indicate that growth stocks tend to be favored by investors because the market is in general optimistic about the future performance of these stocks. On the other hand, value stocks tend to be disliked by investors due to the fact that the market is generally pessimistic about the future performance. As a result the contrarian investment strategy tries to benefit from these characteristics and beliefs in the market to make an abnormal profit.

We construct value and growth portfolios by sorting on Book-to-Market ratios. We implement an oneway sort to obtain ten Book-to-Market deciles. We denote the oneway-sorted portfolios as deciles (Low, 2, 3, 4, 5, 6, 7, 8, 9, and High). The difference between deciles High and Low represents the value strategy.

3.2.3 Portfolio Formation
We will determine the holding period and clarify why we use equally weighted portfolios.

Because we use data from French’s data library we have the same holding period as used in their article. At the end of June each year, Davis et al. (2000) allocate stocks into groups based on their Book-to-Market values. The holding periods are to be interpreted as simple buy-and-hold periods, therefore no rebalance or adjustments are made during the period. By following this strategy, the fluctuations during the holding period are not to be taken into account. In this way, transactions are minimal and it is only necessary to be aware of the return when the portfolio is sold at the end of the holding period.

Instead of dividing stock returns into three groups as it is done in the article of Davis et al. (2000), we use ten groups so we only get the deep value and growth stocks. Hence the first group, low, contains the 10% lowest Book-to-Market stocks. This is the growth stock portfolio. The 10% highest Book-to-Market stocks, high, is the value stock portfolio. In the calculation of the portfolio returns, the same amount is invested in all securities each period. Returns are therefore equal weighted. A yearly equal-weighted portfolio is reweighted each year. Using equal weighted portfolio, there is a risk that the potential size effects occur. The size effect is the tendency of small cap stocks to outperform large cap stocks over the long term. This could affect the returns in the portfolio positively.

The equal weighted method is however convenient to work with and the advantage of this method is that it implicitly assumes that all stocks have the same expected return and
consequently should have the same portfolio weight. At the same time the equally weighted returns deliver the best results for our investigation. This is, to a certain extent, due to the fact that there are many large value companies who underperform during recessions. If the value weighted method was applied, this would greatly influence our results as these large companies would have a huge negative impact on the value premium.

As the American GDP data we use is on a quarterly basis, CRSP’s monthly stock file needs to be transformed to quarterly numbers as well. This makes the data consistent for further analysis.

3.2.4 Problems with the Data
When using a buy-and-hold strategy with a rebalancing each year on the 1st of July it is only stocks that have the proper characteristics for the value portfolio that are able to stay in the portfolio. Stocks that only have a significantly high Book-to-Market value for a short time period (less than one year) are not included in the value portfolio unless it is the 1st of July. This generates a bias.

An issue in regards to the portfolio returns from Kenneth French’s data library is the fact that it is not possible to see the individual firms that are included in the specific portfolio for a specific year.

3.2.5 Statistical Test
We will use the student’s t-test to assess whether the differences in the mean between the growth portfolio and the value portfolio is statistically significant or not. The common practice when investigating this is the null hypothesis. The null hypothesis states that the mean of the growth portfolio and the mean of the value portfolio are equal.

3.2.5.1 Description of the t-test
In order to draw conclusions from the results obtained on the value premium, it is necessary to make a statistical significance test. The most common way to do this is by using a t-test, which tests whether the difference in returns between the two strategies is equal to zero. The return differences are tested by a paired two sample for means t-test. The purpose of this testing method is to see if the variation in the return for each strategy is the same in the test period. This will make it possible to get an insight into whether the level of return is the same for both strategies.
The t-statistic has been calculated using the following equation:

\[
t = \frac{\overline{X}_1 - \overline{X}_2}{s_{\overline{X}_1-\overline{X}_2}}, \text{ (eq. 1)}
\]

Where,

\[
s_{\overline{X}_1-\overline{X}_2} = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}, \text{ (eq. 2)}
\]

\(\overline{X}_1\) is the average quarterly return for the growth portfolio, while \(\overline{X}_2\) is the average quarterly return for the value portfolio. \(s_{\overline{X}_1-\overline{X}_2}\) is the standard deviation. The standard deviation is calculated as the square-root of the two portfolios’ variances divided by the number of observations in the sample. The variance is calculated using the following equation

\[
\text{Var}(X) = E[(X - \mu)^2], \text{ (eq. 3)}
\]

The t-statistic, is distributed with \(n-1\) degrees of freedom. The degrees of freedom is calculated using the following equation

\[
d.f. = \frac{(s_1^2/n_1 + s_2^2/n_2)^2}{(s_1^2/n_1)^2/(n_1 - 1) + (s_2^2/n_2)^2/(n_2 - 1)}, \text{ (eq. 4)}
\]

The test conducted in our thesis is testing the null hypothesis and is thus a two-sided test. Therefore, the critical t-test value is 1.960 for \(n \rightarrow \infty\).

A significant problem with the t-test is that we typically accept significance with each t-test of 95% (p=0.05). For multiple tests these accumulate and hence reduce the validity of the results (Overø & Gabrielsen, 2004).
**3.2.5.2 Description of the Different Hypotheses**

The figure below illustrates the relation between the mean of growth and value portfolio. $\mu_{\text{Growth}}$ is equal to the growth portfolio and $\mu_{\text{Value}}$ is equal to the value portfolio.

**Figure 11: The Relation between the Mean of Growth and Value Portfolios**

- $H_0: \mu_{\text{Value}} = \mu_{\text{Growth}}$
- $H_A: \mu_{\text{Value}} - \mu_{\text{Growth}} > 0$

*Source: Own creation*

We come up with the two hypotheses from the figure above and will test them concurrently. Therefore, if the null hypothesis is rejected we can accept the alternative hypothesis and vice versa. The null hypothesis describes that the level of return is the same for both strategies, while the alternative hypothesis is that the difference in returns is different from zero (positive) so that the value strategies earn higher returns than the growth strategies.

Defined differently the alternative hypothesis could be to check if the difference in returns between the two strategies are significantly different from zero without specifying any direction (i.e., $H_A: \mu_{\text{Value}} \neq \mu_{\text{Growth}}$). This definition however would only be appropriate if one had no expectations of the direction of the difference in returns.
3.3 Mean Reversion

Market mean reversion is the theory that all prices move back towards the mean. This reverting move can occur with different speeds and can therefore eliminate the prior change in one day or in one year.

Figure 12: The Concept of Mean Reversion

![Mean Reversion Diagram](image)

Source: Hillebrand, 2003

The principle is essential for the contrarian investment strategy to work as it is exactly the idea that investing in past loser stocks and go short in past winner stocks will generate abnormal return. When prices deviate from the mean e.g. when a stock’s current market price is less than the average price, the stock is attractive to purchase due to the expectation of an increase in price. It is advantageous for the contrarian investment strategy that the market we investigate is mean reverting – in the long run. This has been investigated in several academic articles including Porterba & Summers (1998). They find that the US market shows negative serial correlation, mean reversion in the long horizons and positive serial correlation, momentum in the short run. Additionally, they reject random walk due to low levels of p-values but they find that there is high possibility of type II errors, an error that occur when failing to reject a null hypothesis when it is in fact not true.
3.3.1. The Random Walk Hypothesis for Quarterly Returns

To test for random walk in US stock market prices, we concentrate on the 158 quarters from fourth quarter 1969 to second quarter 2009. It has not been possible to retrieve data earlier than fourth quarter 1969 for US stock returns when using an index.

The data-set used for the Variance Ratio test is the MSCI USA index. The index is collected in a format called Total Return Index\(^9\). In this format dividends and stock splits are included.

We apply the methodology first used by Lo & MacKinlay in their article from 1988. The methodology is reprinted in the textbook by Campbell, Lo & MacKinlay (1997) and we have chosen to use the notations from this textbook and therefore, the equation references are made to the textbook. The general idea is also used by Ole Risager (1998). In the following, the methodology will briefly be stated and then return with the results.

As previously stated the contrarian investment strategy has its basis in mean reversion. Therefore, we find it necessary to complete a test of mean reversion. The Variance Ratio test is a test of the random walk hypothesis but has the useful feature that if it is statistically proven that the ratio is below unity (one) we have statistical significant evidence of mean reversion (Campbell, Lo & MacKinlay, 1997).

Let \( p_t \) denote the natural logarithm of prices and let it follow a random walk, hence:

\[
p_t = \mu + p_{t-1} + \varepsilon_t, \quad \varepsilon_t \sim IID(0, \sigma^2), \quad (\text{eq. 5})^{10}
\]

Where \( \mu \) is the expected price change and \( IID(0, \sigma^2) \) represents that \( \varepsilon_t \) is independently and identically distributed with mean 0 and variance equal to \( \sigma^2 \). If movement of \( p_t \) follows a random walk, then the variance of \( p_t - p_{t-1} \) is \( 1/n \) times the variance of \( p_t - p_{t-n} \). The variances:

\[
\sigma_a^2 = \frac{1}{nq-1} \sum_{k=1}^{nq} (p_k - p_{k-1} - \hat{\mu}), \quad (\text{eq. 6})^{11}
\]

\[
\sigma_c^2(q) = \frac{1}{m} \sum_{k=q}^{nq} (p_k - p_{k-q} - q\hat{\mu}), \quad (\text{eq. 7})^{12}
\]

---

\(^9\) The abbreviation in DataStream is RI
\(^{10}\) (Campbell, Lo & MacKinlay, 1997), equation (2.1.4)
\(^{11}\) Ibid, equation (2.4.35)
\(^{12}\) Ibid, equation (2.4.35)
By the above equation, $\hat{\sigma}_c^2$, is using overlapping q-period returns which yield a more efficient estimator and therefore a more powerful test, where:

$$\hat{\mu} = \frac{1}{nq} \sum_{k=1}^{nq} (p_k - p_{k-1}) = \frac{1}{nq} (p_{nq} - p_0), \text{ (eq. 8)}$$

and,

$$m = q(nq - q + 1)(1 - \frac{q}{nq}), \text{ (eq. 9)}$$

The variance ratio is then calculated:

$$VR(q) = \frac{\hat{\sigma}_c^2(q)}{\hat{\sigma}_a^2}, \text{ (eq. 10)}$$

The asymptotically standard normal test statistic, which tests for $VR(q) = 1$ is calculated:

$$\psi(q) = \sqrt{nq(\overline{VR}(q) - 1)} \left(\frac{2(q-1)(q-2)}{3q}\right)^{-1/2}, \text{ (eq. 11)}$$

Where Lo & ManKinley (1988) not explicitly set up a hypothesis when testing for mean reversion, Ole Risager (1998) put forward a hypothesis for testing mean reversion. He states that the variance ratio is unity under the random walk, significantly below unity under mean reversion, and significantly above unity under mean aversion.

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13 (Campbell, Lo & Mackinlay, 1997), equation (2.4.28)
14 Ibid, equation (2.4.36)
15 Ibid, equation (2.4.37)
16 Ibid, equation (2.4.40)
3.3.2 Results of the Variance Ratio Test

The variance ratio test investigates the hypothesis that the variance increments are linear over the sampling period. Therefore, we test whether \( VR(2) \), \( VR(4) \), \( VR(8) \), \( VR(16) \), \( VR(32) \) and \( VR(64) \) are equal to unity.

Table 11: Variance Ratio and Test Statistic for Quarterly Returns and for \( q=2, 4, 8, 16, 32 \) and 64, under the assumption of IID Increments

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Number ( nq ) of base observations</th>
<th>Number ( q ) of base observations aggregated to form variance ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q4 1969 - Q2 2009</td>
<td>158</td>
<td>2 4 8 16 32 64</td>
</tr>
<tr>
<td></td>
<td>( VR(q) )</td>
<td>1,103 1,118 1,117 1,125 1,226 1,830</td>
</tr>
<tr>
<td></td>
<td>( \psi(q) )</td>
<td>1,299 0,796 0,497 0,357 0,446 1,144</td>
</tr>
</tbody>
</table>

Source: Own creation

The variance ratios are insignificantly different from one. Therefore, it is not possible to reject the random walk hypothesis of linear variance in the increments at any point in our data collection. If the pattern observed would have been significant at a decent statistical level it would signify that stock returns would show momentum effect in the short run, and in the long run we would experience mean reversion. Our results correspond to our initial expectations due to the fact that the MSCI USA covers such a large market and therefore significantly imperfections would be difficult to find with statistical tests.

The results of the variance ratio test do not favor our overall goal of finding statistical significant evidence in, that a contrarian investment strategy is superior. Hence, we are unable to reject the random walk hypothesis and have found no evidence of the presence of mean reversion.
3.4 Value investing in context to Recessions

In the following, we will present our statistical results. First, we look at the results for the value premium throughout our entire period from 1947-2009. Then, we will show the results for the value premium four quarters prior to recessions, during recessions and four quarters after recessions. These results will be evaluated and commented on in regard to both statistical significance and any tendency there might occur.

Finally, the results will be compared with GDP data in order to evaluate if there is any connection between the two, and thus creating a possibility for investors to act on these signals.

3.4.1 Value Investing – Overall Results from 1947-2009

The value premium has throughout the period been both positive and negative. In the figure below the quarterly value premium from 1947-2009 is presented.

Figure 13: Value Premium on Quarterly Basis, 1947-2009

When looking at the graph there are several peaks and troughs that are visible. These are indicators of the volatility related to the value premium but in order to conclude on these events one must take a closer look at the specific period. When viewing the entire period it is difficult to
make a decisive analysis on the behavior of the value premium, however it seems that there is a tendency towards more positive quarters than negative.

Nonetheless, there have been several consecutive quarters with negative value premiums throughout the period. In the period from the second quarter 1955, until the third quarter 1956 the quarterly value premium was constantly negative with an average around -1.8%. Again from the third quarter 1979, until the fourth quarter 1980 where the average value premium is above -7%. On the contrary the value premium has also been positive for several consecutive quarters on multiple occasions throughout our sample period. From the second quarter 1987 until the second quarter 1989 the value premium was positive in every quarter with an average of 5.8%. Only 3 years later the value premium again became positive over a longer consecutive period. From the first quarter 1992 until the second quarter 1995 the average value premium was 8.6%.

In the table below, the minimum and maximum value throughout the entire period has been presented for the growth and value portfolio. This is done in order to get an idea of the difference in volatility on the two portfolios.

Table 12: Minimum and Maximum Values for the Growth and Value portfolios, 1947-2009

<table>
<thead>
<tr>
<th>Minimum quarterly value over the period, 1947-2009</th>
<th>Lowest 10 percent (Growth)</th>
<th>Highest 10 percent (Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-39.32</td>
<td>-39.88</td>
</tr>
<tr>
<td>Maximum quarterly value over the period, 1947-2009</td>
<td>46.74</td>
<td>67.43</td>
</tr>
</tbody>
</table>

Source: Own creation

The minimum quarterly values for the two portfolios are almost identical. This can give an impression of the associated risk related to both portfolios. The worse negative value for the growth portfolio occurred in the fourth quarter of 2000 while the worse negative value for the value portfolio occurred in the fourth quarter of 2008.

The loss on the growth portfolio in 2000 is caused by the Dot-Com crisis which caused IT stocks to plummet while the loss on the value portfolio in 2008 is caused by the financial crisis which caused financial stocks to plummet. Even though the two events cannot be directly compared it is
interesting that these two huge crises (one mainly affecting growth stocks and the other mainly affecting value stocks) generate almost the exact same negative return over a quarter. This can lead to the interpretation that the associated risk on the two different portfolios is similar and hence cannot explain the value premium.

However, the maximum value is found in the same quarter for both the value and growth portfolio. In the first quarter of 1975 after the oil crisis, the value portfolio generated a return of 67.43%, while the growth portfolio produced a return of 46.74%. This could indicate that the value portfolio is skewed to the right, thus implying that with the same risk there is a higher upside potential.

In the two tables below, the “bell-shape” histogram of the value and growth portfolio is shown.

Figure 14: Histogram for the Growth Portfolios Quarterly Return, 1947-2009

Source: Own creation
The two tables are seemingly identical however there are still differences. The value portfolio has fewer observations from -20 % and below. From around -15 % until 10 % the two figures are approximately the same. Between 10 % and 15 % the growth portfolio has more observations but here on after the value portfolio has more observations in roughly every interval.

Although the results from above points toward higher return for the value portfolio a statistical approach is taken in the table below. Throughout the entire period from 1947 until 2009 the average value premium is 3.15 % on a quarterly basis. This is significant as the t-statistic is well above 2 (2.52).

Table 13: Average Returns and Standard Deviations on Quarterly Basis for Equally Weighted Value Stock and Growth Stock Portfolios, 1947-2009

<table>
<thead>
<tr>
<th>Equal Weighted Returns and standard deviation</th>
<th>Lowest 10 percent (Growth)</th>
<th>Highest 10 percent (value)</th>
<th>Value Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return</td>
<td>2.42 %</td>
<td>5.57 %</td>
<td>3.15 % (2.52)</td>
</tr>
<tr>
<td>Std.dev.</td>
<td>13.87</td>
<td>14.11</td>
<td></td>
</tr>
</tbody>
</table>

Note: T-statistic in bracket

Source: Own creation
The value premium of 3.15% on a quarterly basis from 1947 until 2009 is significant. Most investors would prefer this premium. At the same time the risk associated with the value portfolio is not notably different than the risk on the growth portfolio.

3.4.2 Value Investing – Results Prior to Recessions
Below, is presented the average value premium four quarters prior to the 11 different, however consecutive, recessions in the American economy.

Table 14: Average Quarterly Value Premium prior to Recessions, 1947-2009

<table>
<thead>
<tr>
<th>NBER Recessions</th>
<th>1 year average Value Premium prior to recessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 1948(IV)</td>
<td>0,92</td>
</tr>
<tr>
<td>October 1949 (IV)</td>
<td></td>
</tr>
<tr>
<td>July 1953(II)</td>
<td>2,00</td>
</tr>
<tr>
<td>May 1954 (II)</td>
<td></td>
</tr>
<tr>
<td>August 1957(III)</td>
<td>1,06</td>
</tr>
<tr>
<td>April 1958 (II)</td>
<td></td>
</tr>
<tr>
<td>April 1960(II)</td>
<td>-2,86</td>
</tr>
<tr>
<td>February 1961 (I)</td>
<td></td>
</tr>
<tr>
<td>December 1969(IV)</td>
<td>0,59</td>
</tr>
<tr>
<td>November 1970 (IV)</td>
<td></td>
</tr>
<tr>
<td>November 1973(IV)</td>
<td>2,19</td>
</tr>
<tr>
<td>March 1975 (I)</td>
<td></td>
</tr>
<tr>
<td>January 1980(I)</td>
<td>-1,97</td>
</tr>
<tr>
<td>July 1980 (III)</td>
<td></td>
</tr>
<tr>
<td>July 1981(III)</td>
<td>-0,48</td>
</tr>
<tr>
<td>November 1982 (IV)</td>
<td></td>
</tr>
<tr>
<td>July 1990(III)</td>
<td>-4,50</td>
</tr>
<tr>
<td>March 1991(I)</td>
<td></td>
</tr>
<tr>
<td>March 2001(I)</td>
<td>9,74</td>
</tr>
<tr>
<td>November 2001 (IV)</td>
<td></td>
</tr>
<tr>
<td>December 2007 (IV)</td>
<td>-1,16</td>
</tr>
<tr>
<td>April 2009 (II)</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Quarters in brackets. Source: Own creation

The average quarterly value premium prior to recessions is 0.92% which is notably less than the average value premium for the entire period on 3.15% (c.f. table 13). Working with the value premium one year prior to recessions we have found periods with both positive average value premium and periods with negative average value premium. One year prior to the 1948 recession
the average quarterly value premium was positive, generating an excess return on almost 5.50 %. Compared to the average quarterly value premium for the entire period on 3.15 % an excessive premium on 2.35 %-points is high and compared to the average quarterly value premium one year prior to recession on 0.92 % it is extremely high. The same is the case one year prior to the Dot-Com crisis in 2001 with an average value premium of 9.74 %. In the four quarters prior to the 1948 recession we believe that the rebuilding of Europe post World War II generated an abnormal demand for building materials which in turn generated an abnormal profit for construction firms all over the world, hence causing these firms stocks (value stocks) to increase severely. Prior to the 2001 recession we believe that the high value premium was due to the crash of IT stocks (growth stocks) after several successive years, thus resulting in abnormal returns for value stocks compared to the overall market. On the contrary there have also been negative value premiums prior to recessions during our sample period. One year prior to the recession of 1990 the average quarterly value premium was -4.50 %. A few years earlier Black Monday occurred, which had cut more than 20 % of the American stock market in one day. In the same period a banking crisis occurred in Sweden. In an attempt to regain confidence financial stimuli were brought into the market. This however hit especially hard on the financial sector (value stocks), thus causing stock prices to decrease generating a poor average value premium (Dreman, 1998).

There have been six periods where the average quarterly value premium has been positive and five periods where it has been negative. The average quarterly value premium one year prior to the eleven recessions is 0.92 %. Compared to the overall quarterly value premium of 3.15 % this is surprisingly low and one could therefore come to the conclusion that value stocks perform worse prior to recessions than in general. This however is, as shown in the table below, not statistical significant as the t-statistic is well below 2 (0.37).

| Equal Weighted Returns and standard deviation - Average quarterly returns in percentage |
|---------------------------------|-----------------|------------------|
| Lowest 10 percent (Growth)      | Highest 10 percent (value) | Value Premium |
| Return                          | 1,35 %           | 2,27 %           | 0,92 % (0,37) |
| Std.dev.                        | 12,91            | 9,98             |

Note: T-statistic in bracket. Source: Own creation
The average value premium four quarters prior to recessions positive and at the same time the standard deviation is lower for the value portfolio. This result is surprising as we expected growth stocks to outperform value stocks prior to recessions. This result only confirms the persistency of the value premium.

### 3.4.3 Value Investing – Results During Recessions

Below is presented the average value premium during 11 different, however consecutive, recessions in the American economy.

**Table 16: Average Quarterly Value Premium prior to Recessions, 1947-2009**

<table>
<thead>
<tr>
<th>NBER Recessions</th>
<th>Average Value Premium during US recessions 1947 – 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arithmetic average equal weighted Value Premium during a recession (%)</td>
<td></td>
</tr>
<tr>
<td>November 1948(IV)</td>
<td>October 1949 (IV)</td>
</tr>
<tr>
<td>July 1953(II)</td>
<td>May 1954 (II)</td>
</tr>
<tr>
<td>August 1957(III)</td>
<td>April 1958 (II)</td>
</tr>
<tr>
<td>April 1960(II)</td>
<td>February 1961 (I)</td>
</tr>
<tr>
<td>December 1969(IV)</td>
<td>November 1970 (IV)</td>
</tr>
<tr>
<td>November 1973(IV)</td>
<td>March 1975 (I)</td>
</tr>
<tr>
<td>January 1980(I)</td>
<td>July 1980 (III)</td>
</tr>
<tr>
<td>July 1981(III)</td>
<td>November 1982 (IV)</td>
</tr>
<tr>
<td>July 1990(III)</td>
<td>March 1991(I)</td>
</tr>
<tr>
<td>March 2001(I)</td>
<td>November 2001 (IV)</td>
</tr>
<tr>
<td>December 2007 (IV)</td>
<td>April 2009 (II)</td>
</tr>
<tr>
<td><strong>Average Value Premium during recessions</strong></td>
<td><strong>1,37</strong></td>
</tr>
</tbody>
</table>

*Note: Quarters in brackets. Source: Own creation*

During the 11 different recessions there have been both positive and negative average quarterly value premiums. During the recession from 1973-1975, also known as the oil crisis, the average quarterly value premium was positive, generating an excess return on 8.64 %. Growth stocks lost
significantly more value than value stocks during this recession. This is supported by looking at the major indices where the Nasdaq index, which mainly is composed by technology firms (growth stocks), fell more than 50% compared to the Dow Jones index, composed main by industrial firms (value stocks), which “only” fell around 40%.

Five years later during the short recession of 1980 it was growth stocks that outperformed value stocks, generating a negative value premium of almost -5%. However, just one year later during the second recession of the early 1980s the value portfolio once again outperformed the growth portfolio producing a quarterly value premium of 7%. The negative value premium can mainly be attributed to the energy crisis of 1979 which led the Fed to change the monetary policy in order to control inflation. This reduced initial panic and consumer spending picked up generating higher returns on growth stocks than value stocks. Nevertheless the Fed’s intervention prolonged the crisis as it tried to handle both current inflation but also dealt with the inflation levels brought on by the oil crisis several years earlier. With the economy facing yet another recession the firms that have experienced rising stock prices suddenly became the biggest losers, thus generating higher returns for the value portfolio than the growth portfolio.

There has been six times where the average value premium has been positive and five times where it has been negative during the different recessions. The average value premium during the eleven recessions is 1.37%. Compared to the overall value premium of 3.15% this is low and one could therefore come to the conclusion that value stocks perform worse during recessions than in general. This however is, as shown in the table below, not statistical significant as the t-statistic is well below 2 (0.36).

**Table 17: Average Quarterly Returns and Standard Deviations for the Value and Growth Portfolios during Recessions**

<table>
<thead>
<tr>
<th></th>
<th>Lowest 10 percent (Growth)</th>
<th>Highest 10 percent (value)</th>
<th>Value Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Return</strong></td>
<td>1,43</td>
<td>2,79</td>
<td>1,37 (0,36)</td>
</tr>
<tr>
<td><strong>Std.dev.</strong></td>
<td>19,26</td>
<td>19,71</td>
<td></td>
</tr>
</tbody>
</table>

Note: T-statistic in bracket. Source: Own creation

The average quarterly value premium during recessions is positive and the standard deviation is almost identical on the two portfolios. An investor would therefore be rewarded with an excess
return while not undertaking an extra risk. As value stocks tend to be more cyclical in general this is surprising. We expected growth stocks to perform evenly or perhaps better than value stocks during recessions. Had the growth portfolio performed better than value stocks in the four quarters prior to recessions it could have explained this result, however as we have shown this is not the case.

3.4.4 Value Investing – Results After Recessions

Below, is presented the average quarterly value premium four quarters after 11 different, however consecutive, recessions in the American economy.

Table 18: Average Quarterly Value Premium after Recessions, 1947-2009

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Arithmetic average equal weighted Value Premium 4 quarters after a recession (%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>November 1948(IV)</td>
<td>October 1949 (IV)</td>
</tr>
<tr>
<td>July 1953(II)</td>
<td>May 1954 (II)</td>
</tr>
<tr>
<td>August 1957(III)</td>
<td>April 1958 (II)</td>
</tr>
<tr>
<td>April 1960(II)</td>
<td>February 1961 (I)</td>
</tr>
<tr>
<td>December 1969(IV)</td>
<td>November 1970 (IV)</td>
</tr>
<tr>
<td>November 1973(IV)</td>
<td>March 1975 (I)</td>
</tr>
<tr>
<td>January 1980(I)</td>
<td>July 1980 (III)</td>
</tr>
<tr>
<td>July 1981(III)</td>
<td>November 1982 (IV)</td>
</tr>
<tr>
<td>July 1990(III)</td>
<td>March 1991(I)</td>
</tr>
<tr>
<td>March 2001(I)</td>
<td>November 2001 (IV)</td>
</tr>
<tr>
<td>December 2007 (IV)</td>
<td>April 2009 (II)</td>
</tr>
<tr>
<td>1 year average Value Premium after US recessions</td>
<td></td>
</tr>
</tbody>
</table>

Note: Quarters in brackets. Source: Own creation

While the value premium is both positive and negative throughout the period prior to the recessions as well as during the recessions, it is almost solely positive four quarters after the 11
investigated recessions. The only negative value premium of -2.41% is observed after the recession from 1969-1970. The recession from 1969-1970 resembles in many ways both earlier and later recession in the way that unemployment was high and there were unhealthy amounts of inflation. During the recession growth stocks fell more than value stocks which could indicate that the negative premium was due to better and faster recovery on growth stocks. However, for this explanation to be solid, the value premium should be negative after all recessions where growth stocks had lost more than value stocks. This is for instance not the case after the 2001 recession. Growth stocks fell tremendously in this period but the quarterly value premium four quarters after the recession was 11.38%.

Besides the negative value premium after the recession from 1969-1970 the lowest quarterly value premium is 1.95% after the 1957-1958 recession. This is higher than the average value premium both four quarters prior to recessions and during the recessions. A positive value premium four quarters after recessions in ten out of 11 different recessions indicates that there is a clear tendency towards higher returns on value stocks after recessions.

The average quarterly value premium four quarters after the different recessions is 5.95%. Compared to the overall value premium of 3.15% this is high and one could therefore come to the conclusion that value stocks generate superior returns after recessions. This however is, as shown in the table below, not statistical significant as the t-statistic is below 2 (1.89). Even though the t-statistic is below 2, the value premium after recessions is the most significant of the three periods.

| Equal Weighted Returns and standard deviation - Average quarterly returns in percentage |
|---------------------------------|-----------------|-----------------|
| Lowest 10 percent (Growth)      | Highest 10 percent (value) | Value Premium   |
| Return                         | 4.32 %           | 10.27 %         | 5.95 % (1.89) |
| Std.dev.                       | 12.78            | 15.92           |

Note: T-statistic in bracket. Source: Own creation

The value premium on a quarterly basis is extremely high, awarding the value investor with almost 6% excess return. However the investor is facing a higher standard deviation on the value portfolio. Therefore, the investor must determine if he/she is willing to undertake the extra risk in
order to pursue the value premium. A high value premium in the four quarters after recessions is in line with our expectations. However, the large value premium cannot be attributed to better recovery for value stocks once the economy grows again as the value premium also is positive during recessions. Instead the explanation must be found in the fact that value stocks have a higher upside potential than growth stocks.

3.4.5 GDP Comparison with the Value Premium

Below, is presented the quarterly percentage change in GDP from 1947 until 2009 in America. The figure will provide an insight in the volatility of GDP and will give an indication on how the stock market performs over time.

Figure 16: GDP Percentage Change in America, 1947-2009

In the figure above it is clear to see that the growth in GDP changes from period to period. There have been periods with positive change in growth from one period to another of as high as 17.2 % (1950-I) and other periods where the change has been negative with more than 10 % (1958-II).

Compared to the knowledge acquired from the results on the value premium, there seems to be a clear picture that value stocks perform best during periods of economic prosperity but at the same time it also seems that on the downside value stocks are not riskier.
In order to more thoroughly investigate the relation between change in GDP and the performance of the value premium we have compared them in the graph below.

Figure 17: Comparison between Change in GDP and the Equally Weighted Value Premium, 1947-2009

Source: Own creation

It is difficult to point toward any relationship between growth in GDP and the value premium for the entire period even though there seems to be a tendency towards a correlation between the two. Especially in the first years of our investigation, there appear to be a relation whereas in recent years there seem to be larger fluctuations in particularly the value premium.

To investigate this more systematically, we have compared the ten best and worse quarters of GDP growth with the value premium in the two tables below.
<table>
<thead>
<tr>
<th>Year</th>
<th>Change in GDP in percentage from preceding quarter</th>
<th>Value Premium (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950 (I)</td>
<td>17.2</td>
<td>1.99</td>
</tr>
<tr>
<td>1950 (II)</td>
<td>12.7</td>
<td>0.55</td>
</tr>
<tr>
<td>1950 (III)</td>
<td>16.6</td>
<td>21.89</td>
</tr>
<tr>
<td>1952 (IV)</td>
<td>13.9</td>
<td>1.10</td>
</tr>
<tr>
<td>1955 (I)</td>
<td>12.0</td>
<td>5.69</td>
</tr>
<tr>
<td>1959 (II)</td>
<td>10.5</td>
<td>-1.72</td>
</tr>
<tr>
<td>1966 (I)</td>
<td>10.2</td>
<td>4.33</td>
</tr>
<tr>
<td>1971 (I)</td>
<td>11.5</td>
<td>2.86</td>
</tr>
<tr>
<td>1973 (I)</td>
<td>10.6</td>
<td>14.21</td>
</tr>
<tr>
<td>1978 (II)</td>
<td>16.7</td>
<td>10.28</td>
</tr>
<tr>
<td>Average</td>
<td>13.2</td>
<td>6.12</td>
</tr>
</tbody>
</table>

Note: Quarters in brackets
Source: Own creation


<table>
<thead>
<tr>
<th>Year</th>
<th>Change in GDP in percentage from preceding quarter</th>
<th>Value Premium (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1949 (I)</td>
<td>-5.4</td>
<td>0.58</td>
</tr>
<tr>
<td>1953 (III)</td>
<td>-6.2</td>
<td>-8.50</td>
</tr>
<tr>
<td>1958 (I)</td>
<td>-10.4</td>
<td>5.58</td>
</tr>
<tr>
<td>1960 (IV)</td>
<td>-5.0</td>
<td>-8.64</td>
</tr>
<tr>
<td>1975 (I)</td>
<td>-4.8</td>
<td>20.70</td>
</tr>
<tr>
<td>1980 (II)</td>
<td>-7.9</td>
<td>-3.83</td>
</tr>
<tr>
<td>1981 (IV)</td>
<td>-4.9</td>
<td>0.24</td>
</tr>
<tr>
<td>1982 (I)</td>
<td>-6.4</td>
<td>14.98</td>
</tr>
<tr>
<td>2008 (IV)</td>
<td>-5.4</td>
<td>-10.72</td>
</tr>
<tr>
<td>2009 (I)</td>
<td>-6.4</td>
<td>-7.97</td>
</tr>
<tr>
<td>Average</td>
<td>-6.3</td>
<td>0.24</td>
</tr>
</tbody>
</table>

Note: Quarters in brackets
Source: Own creation
The ten best quarters of GDP growth all exceed 10% change from the preceding period. Out of these ten quarters there is only one occasion where the value premium is negative. In five of the ten quarters the value premiums surpass the overall value premium on 3.15% (c.f. table 13) for the entire period. The average for the ten quarters also surpass the overall value premium with almost hundred percent (6.12%). This illustrates that value stocks perform considerably better than growth stocks when the economy is in a good state.

During the ten worst quarters of GDP growth the performance of the value premium is more evenly distributed. In five quarters the value premium is negative and in five quarters it is positive. The average value premium is nonetheless slightly positive with 0.24%. There does not seem to be a clear tendency on the value premium but more important it demonstrates that value stocks are not exposed to more downside risk than growth stocks during bad states of the economy. There is however a critical point in the two tables above. Out of twenty quarters only two of them are from the 21st century and the next is from 1982. To see if the same tendencies still apply we have drawn on more recent data in the table below. We have compared the five best quarters and the five worst quarters of GDP growth in the period 2000-2009 with the corresponding value premium.

Table 22: Five Best and Five Worst Quarters of GDP Growth in the Period 2000-2009 compared with Value Premium

<table>
<thead>
<tr>
<th>Year</th>
<th>Change in GDP in percentage from preceding quarter</th>
<th>Value-Premium</th>
<th>Year</th>
<th>Change in GDP in percentage from preceding quarter</th>
<th>Value-Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 (II)</td>
<td>8.0</td>
<td>4.11</td>
<td>2001 (I)</td>
<td>-1.3</td>
<td>25.37</td>
</tr>
<tr>
<td>2003 (III)</td>
<td>6.9</td>
<td>10.49</td>
<td>2001 (III)</td>
<td>-1.1</td>
<td>15.95</td>
</tr>
<tr>
<td>2005 (I)</td>
<td>4.1</td>
<td>10.55</td>
<td>2008 (III)</td>
<td>-2.7</td>
<td>1.78</td>
</tr>
<tr>
<td>2006 (I)</td>
<td>5.4</td>
<td>0.16</td>
<td>2008 (IV)</td>
<td>-5.4</td>
<td>-10.72</td>
</tr>
<tr>
<td>2009 (IV)</td>
<td>5.9</td>
<td>-1.74</td>
<td>2009 (I)</td>
<td>-6.4</td>
<td>-7.97</td>
</tr>
<tr>
<td>Average</td>
<td>6.1</td>
<td>4.71</td>
<td>Average</td>
<td>-3.4</td>
<td>4.88</td>
</tr>
</tbody>
</table>

Note: Quarters in brackets. Source: Own creation
It appears that the same conclusion about value stocks and growth stocks is valid for more recent data. During the five best quarters there is once again only one quarter with a negative value premium. The average value premium for the period is 4.71%.

More surprisingly, for the period of the five worst quarters the average value premium exceeds the average value premium for the five best quarters. This is due to the extraordinary value premium in the beginning of the 2000’s where growth stocks lost a remarkable part of their value, thus generating abnormal high returns on value stocks. Therefore, it is not possible to conclude that value stocks outperform growth stocks when the economy is in a bad state, but it is once again fair to argue that value stocks does not perform worse than growth stocks. The overall tendency is however clear, value stocks outperform growth stocks during periods of recession even though it is not statistically significant.
3.5 Sub Conclusion

In this chapter, we have tested and analyzed the contrarian investment strategy on the American stock market. We have looked at the overall growth in the US economy. We started with an examination of the American stock market from its origin more than 200 years ago to present.

The connection between the American stock market and the overall economy infers that any up- or downturn in the economy will be an indicator of how well the stock market as a whole will perform. If America is experiencing a boom in the economy, stocks are likely to increase as a result of the growth and vice versa. An important measure for this growth is the GDP where the change in GDP from one period to the next is an indication of a country's economic health.

A significant change in GDP often has a considerable effect on the stock market. This makes sense as a bad economy means lower profits for companies, which in turn means lower stock prices. Investors worry about negative GDP growth which is one of the factors economists use to determine whether an economy is in a recession. From our examination, the stock market appears more volatile than the GDP, which was expected. Nonetheless, it materializes that there is a positive correlation between the steady increase in GDP and the increase in the stock market.

Utilizing the variance ratio test we examine if our data follow a random walk. We find that it is not possible to reject the random walk hypothesis of linearity in the variance of the increments. Even though our test failed in finding mean reversion on the American stock market, the results matched our expectations.

Our results have proven that the value premium is statistically significant for our sample period from 1947-2009. The average quarterly value premium for the period is 3.15 %. We have argued that the overall value premium is skewed towards the right, implying that value stocks have the same risk profile as growth stocks but with a higher upside potential.

We have conducted a more specific investigation of the value premium to analyze how value stocks perform in context to recessions. Prior to the recessions, the average value premium is 0.92 %. Compared to the overall value premium of 3.15 % this is surprisingly low and one could therefore come to the conclusion that value stocks perform worse prior to recessions than on average in our investigation period. However, it is not statistical significant. This
result is surprising as we expected growth stocks to outperform value stocks prior to recessions. This result only confirms the persistency of the value premium.

During the recessions in our data sample, there has been six times where the average value premium has been positive and five times where it has been negative. The average value premium during the 11 recessions is 1.37 %. Compared to the overall value premium of 3.15 % this is low and one could therefore come to the conclusion that value stocks perform worse during recessions than on average in our investigation period. However, it is not statistical significant. As value stocks tend to be more cyclical in general this is surprising. We expected growth stocks to perform evenly or perhaps better than value stocks during recessions. Had the growth portfolio performed better than value stocks in the four quarters prior to recessions it could have explained this result, however as we have shown this is not the case.

In the four quarters after the recessions we find a positive value premium in ten out 11 different recessions which indicates that there is a clear tendency towards higher returns on value stocks after recessions.

The average value premium one year after the different recessions is 5.95 %. Compared to the overall value premium of 3.15 % this is high and one could therefore come to the conclusion that value stocks generate superior returns after recessions. Even though it is not statistical significant the value premium after recessions is the most significant of the three periods. A high value premium in the four quarters after recessions is in line with our expectations. However, the large value premium cannot be attributed to better recovery for value stocks once the economy grows again as the value premium also is positive during recessions. Instead, the explanation must be ascribed to the fact that value stocks have a higher upside potential than growth stocks.

Although, we do not find any statistical significant results in our investigation of the performance of value stocks and the value premium in context to recessions, there is a clear tendency towards a higher performance of value stocks in all three scenarios. At the same time the associated standard deviation has not been able to explain this tendency.

To extend our research even further we have conducted an analysis of the connection between growth in GDP and the value premium.

During the ten best quarters of GDP growth, we find that there is only one occasion where the quarterly value premium is negative. In five out of the ten quarters the value premium
surpasses the overall value premium on 3.15 % for the entire period. The average for the ten quarters also exceeds the overall value premium with almost 100 %. This illustrates that value stocks perform considerably better than growth stocks when the economy is in a good state.

During the ten worst quarters of GDP growth, we find that the performance of the value premium is more evenly distributed. In five quarters the value premium is negative and in five quarters it is positive. The average quarterly value premium is nonetheless slightly positive with 0.24 %. In this case, there does not seem to be a clear tendency on the value premium but more important it demonstrates that value stocks are not particularly riskier than growth stocks during bad states of the economy. With more recent data, the results are the same.

Overall, we can look at the knowledge acquired from the results on the value premium and conclude that there is a clear tendency that value stocks perform particularly better during periods of economic prosperity but at the same time the downside risk for value stocks are not greater than for growth stocks.
4 Discussion of the Results

From the data presented in the previous chapter, we have seen that over time, investing in value stocks generates a higher return than investing in growth stocks. Even though all our results did not come out with statistically significance, the obtained outcomes are in line with the results presented by other academics on studies on the American Stock Market. However, there exists less consensus on the underlying reasons for why value stocks outperform growth stocks.

In chapter two, we analyzed the theoretical explanations of the value premium and put forward two main explanations. The first explanation is the standard finance justification, where proponents believe in the efficient market. They argue that the value premium exists as a consequence of a higher risk associated with value stocks, as compared to growth stocks. The second explanation is the behavioural finance justification. Proponents of the behavioural finance explanation argue that the market is not efficient. They believe that an explanation for the value premium must be found in human’s limited cognitive capacity.

In this chapter, we will discuss the reasons for the existence of the value premium in our period of investigation through the argumentation of standard finance and behavioural finance. We will also examine the practical use of our findings. Finally we will discuss if the value premium can continue in the future.

4.1 Standard Finance Explanation

In chapter 2, we thoroughly went through the theoretical background of the efficient market hypothesis and the rational choice theory as we tried to explain the value premium found by others. These theories should be able to explain the superior performance of value stocks compared to growth stocks if our results fall in line with the standard finance theory.

Standard finance theory, that includes rational asset pricing theory, claims that differences in returns only can be explained by differences in exposures to systematic risk. In the following, we apply a risk measure for the value portfolio and growth portfolio and calculate the systematic risk. This will help us in identifying if value stocks are riskier than growth stocks.

4.1.1 Risk

When testing for systematic risk, we will investigate if the excess returns generated from value stocks can be explained by CAPM. The systematic risk exposure is measured by the
beta value. The beta of our value and growth portfolio describes the relation of its returns with that of the financial market as a whole (Brealey, Myers & Allen, 2008). Beta is estimated quarterly and calculated as:

$$\beta_i = \frac{\sigma_{im}}{\sigma_m^2} \text{ (eq. 12)}$$

Where $\sigma_m^2$ is the variance of the market return and $\sigma_{im}$ is the covariance between the return on asset $i$ and the market return. The expected return is affected by the covariance between the market return and the individual asset return. Investors will demand a higher expected return on assets with a high covariance compared to assets with a low covariance due to the fact that if the covariance is high, the asset contributes with more risk to the market portfolio (Brealey, Myers & Allen, 2008). Hence, stocks with high returns have higher risk than stocks with low returns. According to the standard finance theory, we can expect that the calculated beta values must be that:

$$\beta_{growth} < \beta_{value}.$$  

The table below shows the output of the average beta values for the growth – and value portfolio.

**Table 23: Average Beta Values for the Growth -and Value Portfolio**

<table>
<thead>
<tr>
<th></th>
<th>Growth Portfolio</th>
<th>Value Portfolio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta</td>
<td>1,50</td>
<td>1,19</td>
</tr>
</tbody>
</table>

Source: Own creation

The beta values do not explain the value premium in a satisfying manner with regard to risk. The growth portfolio has a higher beta value than the value portfolio which indicates that the value portfolio is less risky than the growth portfolio. This is in sharp contrast to the expectations put forward by standard finance proponents.

Both beta values are greater than one. According to the rational asset pricing theory, portfolios with a beta greater than one are more risky than the market portfolio. This is in line with our expectations as it is difficult to form portfolios with larger diversification effects than the market portfolio. The value portfolio generates a higher return than the growth portfolio and is also less risky than the growth portfolio. Therefore, we can conclude that the value premium cannot be explained by different exposures to systematic risk. Our result is similar to the results found in other studies. Similarly, there is no evidence, from our empirical
analysis in chapter 3, that value stocks have higher downside risk during recessions. On the other hand, value stocks have a higher upside potential.

Therefore, we can therefore conclude that the evidence of superior returns on value stocks cannot be found in the standard finance theory and we believe that the explanation of the value premium should be found in the behavioral finance theory.

4.2 Behavioral Finance Explanation

In the following, the value premium will be discussed through the behavioral finance theory. As mentioned in chapter 2, the behavioral finance theory is based on two building blocks: limits to arbitrage, and investors’ perception of the market. Even though one superior behavioral finance theory does not exist, closely related theories do. These theories all point at the explanation of limited cognitive capacity of human beings. The theories on limited cognitive capacity are based on empirical studies that all prove that investors are subject to different biases when investing in stocks.

4.2.1 Limits to Arbitrage

In chapter 3, we proved that the value premium exists with statistical significance through our entire period of investigation, even though there are sub-periods where the value premium has been negative. In conducting our analysis, we have shown that the value portfolio significantly outperforms the growth portfolio when tested over six decades and this gives cause to wonder. The result indicates that there are investors within the market who are not fully rational. If the investors traded rationally, the value premium opportunity would be utilized and hence dilute the value premium. Proponents of the EMH argue that rational investors will take positions to bring back the price in balance, due to the fact that attractive investment opportunities in the market are always apparent to the rational investor (Barberis & Thaler, 2002).

Behavioral finance supporters have another explanation for why the value premium is still present after so many decades of existence. They claim that it is both costly and risky to correct a mispricing in the market and consequently, it might be unattractive.

Limits to arbitrage exist in the American stock market and as a consequence stock prices fluctuate away from their fundamental value. Hence, some stocks become overvalued while others undervalued as the market is unable to correct the prices appropriately.
Another important concern is noise trader risk. An arbitrageur can be faced with irrational, pessimistic investors and the stock price, of a given stock, will decrease even further and not return to its fundamental value. Investors are nervous for investing in past loser stocks due to the fact that these stocks might continue to drop in price, but they forget that past winner stocks might turn into losers as well.

4.2.2 Psychology and Investors’ Perception of the Market

The second building block of behavioural finance is the psychology aspect and investors’ perception of the market. In this section, we will discuss how investors form their beliefs and demands for assets.

In our time period of investigation, the American market has gone through an enormous technology development. The daily amounts of information we receive are vast and it has become even more difficult to sort the valuable information from noise. The limited cognitive capacity prevents investors from trading rationally in some situations.

By characterization, the group of contrarian investors is small compared to the group of naive investors. The naive investors overestimate the probability of growth stocks being identical to growing stocks, thus they tend to get too optimistic about the stocks and in that way extrapolate the past trend into the future. When naive investors buy growth stocks, which they expect are growing stocks, they create overvalued stocks compared to the fundamental value. Likewise, naive investors are afraid of investing in value stocks because they extrapolate the poor performance of the past into the future. Therefore, naive investors think they invest in the safe stocks – the stocks that have done well in the past. It creates an opportunity for the contrarian investor to invest in the less popular value stocks.

Another explanation for why naive investors avoid investing in value stocks can be found in the prospect theory. In chapter 2, we mentioned that loss aversion is implied when the value function for losses is steeper than for gains. Investors may avoid investing in value stocks as the companies behind the stocks may look distressed because of lower expectations for their future growth due to their levels of sorting variables.

The investment decision is influenced by many factors such as media coverage and past performance. How companies are perceived by investors depends a great deal on how they are framed e.g. in the media. The effects of framing a company in either a positive or negative direction can determine the investors’ preferences of the future performance of the company.
and consequently whether the company is a good investment. Because value stocks are framed as stocks with a poor performance and risky stocks, investors might be intimidated by the framing. Likewise the investor is presented with growth stocks in the media, thus framing these as stable companies to invest in.

Investors also tend to narrow the framing of decisions e.g. myopic behaviour. Thus, investors will evaluate gains and losses frequently and therefore tend to make short-term decisions, which is not optimal in the long run. Investors might therefore be tempted to avoid the contrarian investment strategy, which normally has a longer time horizon.

Investors can also be misled by analysts’ forecast of stock prices. These forecasts are often too optimistic and as a consequence analysts issue too many buy recommendations relative to sell recommendations (Doukas, Kim & Pantzalis, 2002). A reason as to why analysts are optimistic is because they are paid by investment banks, and therefore like to endorse optimism since fees on a rising market are higher than fees in a declining market. Further, analysts can derive information from their contact to CEO’s in the corporate world. Their willingness to give out information might be diminished if analysts criticize the performance of the company (Risager, 2009).

4.3 Practical Use of Findings
In the following, we will take a more practical approach and evaluate our results with the aim of identifying possibilities for investors, with regard to value investing. Our focus is recessions and we will explore if there are any specific guidelines for investors to consider when entering or leaving the market as value investors.

4.3.1 Exit/Entry Strategies
We can conclude that investors who can pick out the proper value stocks and have kept them for the entire investigation period will have gained an excess return compared to growth stocks. However, there are still periods where value stocks have underperformed and where a growth portfolio would be favorable. Therefore, it is possible to argue that investors should determine on a particular strategy for their value portfolio. If the value investors could use the knowledge and insights gained in our research to establish a strategy for entering and leaving the market, they might be able to increase their returns even further, even though the theory around the value premium instigate that the investors should follow a buy and hold strategy.
Below, we have constructed a figure visualizing the quarterly value premium and recessions in our time period.

**Figure 18: Quarterly Value Premium and Recessions, 1947-2009**

Around recessions the trend of a superior return on the value premium is persistent throughout our investigation period. The value premium is on average positive both in the four quarters prior to a recession, during a recession and in the four quarters after a recession.

We have shown that the average quarterly value premium is highest in the four quarters after recessions. On a quarterly basis, the investor would have gained a superior return of almost 6 % (c.f. table 19 in chapter 3). This means, that if an investor could have predicted when the recession would end, the investor should have bought deep value stocks while going short in the deep growth stocks. On the contrary an investor who had bought a value portfolio prior to a recession and kept it throughout the period around a recession would have gained a quarterly average premium just below 3 %. With an average value premium for the entire period of 3.15 % (c.f. table 13 in chapter 3) the investor gains less return if he/she had bought the portfolio prior to a recession.
Depending on variable costs, such as transaction costs, there could therefore be a profitable gain for the investor if he/she entered the market immediately after a recession. If the investor bought the value portfolio, containing deep value stocks, during the first quarter after a recession and kept the portfolio until the first quarter one year prior to the next recession the gain would surpass the costs of trading.

### 4.3.1.1 Optimal Holding Period for Value Investors in Context to Recessions

Below, we have shown the optimized average quarterly value premium. The period spans from the first quarter after a recession has ended until the first quarter one year prior to the next recession.

**Table 24: Investigation of the Optimal Holding Period – The Period from one Recession until the next**

<table>
<thead>
<tr>
<th>Period between recessions</th>
<th>Value premium (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1947 (I) - 1947 (III)</td>
<td>2.93</td>
</tr>
<tr>
<td>1950 (I) - 1952 (I)</td>
<td>4.81</td>
</tr>
<tr>
<td>1954 (III) - 1956 (II)</td>
<td>1.85</td>
</tr>
<tr>
<td>1961 (II) - 1968 (III)</td>
<td>3.38</td>
</tr>
<tr>
<td>1971 (I) - 1972 (III)</td>
<td>-0.62</td>
</tr>
<tr>
<td>1975 (II) - 1978 (IV)</td>
<td>4.66</td>
</tr>
<tr>
<td>1983 (I) - 1989 (II)</td>
<td>5.35</td>
</tr>
<tr>
<td>1991 (II) - 1999 (IV)</td>
<td>3.91</td>
</tr>
<tr>
<td>2002 (I) - 2006 (III)</td>
<td>6.80</td>
</tr>
<tr>
<td>2009 (III) - 2009 (IV)</td>
<td>10.49</td>
</tr>
<tr>
<td><strong>Average value premium</strong></td>
<td><strong>4.36</strong></td>
</tr>
</tbody>
</table>

Note: Quarters in brackets

Source: Own creation

The average value premium for the period between one recession until the next recession is 4.36 % on a quarterly basis. This is more than 1 % higher than the overall value premium and
almost 1.4% higher than the value premium around recessions. Only in three of the different periods between recessions the value premium is below the overall value premium of 3.15%.

If an investor did not have to take transaction costs into consideration this would definitely prove to be the best strategy for investors to maximize their return. However, there are transaction costs when trading in the market and the investors must therefore determine if these costs exceed the extra potential of more frequent trading.

As the value premium on average, and thus value stocks, is superior to growth stocks both prior to recessions, during recessions and after recessions the investors might find that it is more optimal for them to hold the portfolio throughout the recession. This also depends on the individual investors’ preferences for active or passive portfolio management.

4.3.2 Value Stocks and Business-Cycle Fluctuations
In earlier days, business cycles were thought to be extremely regular, with predictable durations. But today business cycles are widely known to be irregular - varying in frequency, magnitude and duration. An investor would therefore appreciate knowledge on whether the effects of a business-cycle affect value stocks harder than growth stocks or vice versa.

Adverse economic conditions can affect all companies, particularly value companies. It follows, that the risk of value stocks is business-cycle risk — the possibility that value companies as a group will be disproportionately affected by an economic downturn. Thus, one would predict that during economic downturns, growth stocks should beat value stocks. This is however not the case. The above paradigm grossly overstates value risk; Growth industries tend to be composed of relatively volatile and risky stocks. Often investors must be willing to accept increased risk in order to take part in the potentially large gains offered by stocks within a particular growth industry. Growth companies are often seen in the technology industries. The quintessential example of a growth company is Google, which has rapidly grown revenues, cash flows and earnings since its initial public offering. Growth companies such as Google are expected to increase profits markedly in the future, and thus the market bids up their share prices to high valuations. This contrasts with mature companies, such as diversified utility companies, which see very stable earnings with little to no growth – the value companies.

As a result, growth stocks can be priced higher than the present value of their future earnings. Thus, negative earning surprises hit growth stocks harder than value stocks and, in the same
vein, positive surprises benefit value stocks more than growth stocks. An investor should therefore on an overall level not worry more about the effect of business-cycle fluctuations when investing in value stocks compared to growth stocks.

4.3.2.1 Value Premium and GDP
If value stocks are fundamentally riskier than growth stocks then the value premium should underperform during down turns in the economy. If the value premium decreases significantly in periods with decreasing growth in the economy it could indicate increased downside risk. Downside risk is important because a high level of downside risk would make the portfolio riskier during periods of decreasing consumption. Stocks that decrease dramatically during recessions or bad states in the economy will be considered highly correlated with consumption, and therefore be a poor hedge against decreasing wealth. This will make investors require a higher return on these stocks. A poor performance by the value premium during bad states in the economy could therefore indicate that the investor demands compensation for the increased downside risk and thus explain the premium. As we have shown earlier for the overall value premium it does not seem as though the value portfolio has a higher downside risk than the growth portfolio. Rather it shows that the upside potential for the value portfolio is higher than for the growth portfolio. Remember that during the 11 different recessions the average quarterly value premium was positive. Our results indicate that it cannot be concluded that value stocks perform worse during down turns in the economy compared to growth stocks. This information can be useful to value investors when deciding upon whether they should stay in the market or sell out.
In the tables below, we have divided our overall time period of 63 years, from 1947 until 2009, into shorter sub-periods of 15 to 16 years to see if the skewness to the right for the returns also is present when the length of the periods is shortened.

Figure 19: Growth and Value Stock Histograms, 1947-1961

In the first period, from 1947 until 1961, the value stocks definitely have higher positive observations than growth stocks. There are several more observations generating returns higher than 20% on a quarterly basis for the value portfolio than for the growth portfolio. However, it also appears as though there are more negative return observations for the value portfolio. The growth portfolio has almost all returns clustered from around -10% until 15% while the returns on the value portfolio are present in both tails of the distribution. There is a higher upside potential for the value stocks in this time period but there is also a slightly higher downside risk. We find that the average quarterly value premium in this period is 1.20%. This corresponds well with the two histograms.

Source: Own creation
In the second period, from 1962 until 1977, the trend is much more obvious. Here the growth portfolio has several more return observations in the left tail while the value portfolio has more return observations in the right tail. The value portfolio experiences no return observations of more than -30% while the growth portfolio experiences some. The upside potential is clearly present in this period with several return observations of more than 20% for the value portfolio while the growth portfolio experiences no more than a few. The average quarterly value premium for this period is 3.61%. This matches the two histograms above.
4 Discussion of the Results

Figure 21: Growth and value stock histograms, 1978-1993

Source: Own creation

In the third period, from 1978 until 1993, the picture is the same. The value portfolio returns are skewed to the right with fewer negative returns than the growth portfolio. The average quarterly value premium in this period is also similar to the previous period generating an excess return on the value portfolio of 3.74%.

Figure 22: Growth and value stock histograms, 1994-2009

Source: Own creation

In the last and most present period, from 1994 until 2009, the return observations for the growth portfolio is scattered in the figure with returns spanning from -40 % until 45 % while the value portfolio is more clustered with returns around -10 % to 30 %. The trend in this
period is that the downside risk on the value portfolio is significantly smaller than on the growth portfolio. This is particularly interesting when bearing in mind that the two huge recessions in the 21st century affected both the growth industry (Dot-Com crisis) and the value industry (Financial crisis) immensely and one would therefore expect a similar distribution for the two portfolios. The average quarterly value premium in this period is 3.98%. This is higher than in the other three periods. As growth stocks have larger negative returns over the period due to the Dot-Com crisis one could assume that this was the reason. However, value stocks had similar negative returns during the recent financial crisis. This indicates that the value premium is becoming even more persistent.

We can conclude that business-cycle fluctuations do not affect value stocks worse than growth stocks. Investors should acknowledge that value stocks on an average has an upside potential that is higher than that of growth stocks while the downside risk is similar for the two.

4.4 The Future of the Value Premium

Empirical studies conducted by several academic researchers throughout time have shown that the value premium exists and generate an abnormal return for the value investor. Since Graham and Dodd presented their knowledge on the subject, well known investors such as Warren Buffet have used the contrarian strategy to beat the market. Our results in chapter 3 show with statistical significance that the value premium is persistent throughout our investigation period and one could therefore expect that more investors would take advantage of this, thus diluting the possibility of a superior return on the value portfolio in the future. If the investors followed a buy and hold strategy of buying value stocks they would reduce the mispricing of the undervalued value stocks. Meanwhile, growth stocks would become less overpriced thus eliminating some of the behavioral irrationalities mentioned earlier.

However, this strategy forces the investors to keep the stocks in their portfolio for a longer horizon, and hence they could miss out on superior returns in the short run often provided by growth stocks. This would cause professional investors to fall short in comparison to their peers. In an industry where the benchmark for performance is yearly, or quarterly high returns, it does not seem likely that professional investors will change their behavior.
For the ordinary private investor the value strategy could seem as the most obvious choice. There are few transaction costs involved and after forming their portfolio the investor could apply a passive management strategy. However, there are several indicators that points towards a different approach by the private investor. First of all, the process of picking the correct value stocks demands a thorough knowledge of both the stock markets and the practice of valuating the companies behind the stocks. Secondly, the private investor is often trading irrationally due to framing and the limited cognitive bias of human beings. As growth companies often are shown in television or written about in newspapers, the investor believes that he/she knows more about them and interprets these companies as stable and secure for the future. Therefore, they will prefer to invest in these companies compared to the more anonymous value companies.

With the irrationality of both private and institutional investors in mind, we believe that the value premium will continue to persist for a long period and hence there will still be possibilities for the smart and rational investors to take advantage of this and generate superior returns on their value portfolios.
4.5 Sub Conclusion
We have analyzed and discussed if the standard finance theory can explain our results on the value premium. The value portfolio generates a higher return than the growth portfolio while the beta values for the value portfolio are lower than for the growth portfolio. We can conclude, that the value premium cannot be explained by different exposures to systematic risk and that the evidence of superior returns on value stocks cannot be found in the standard finance theory. Therefore, we believe that the explanation of the value premium should be found in the behavioral finance theory.

We believe that the behavioural finance theory is more appropriate in explaining the value premium. The psychology aspect and investors’ perception of the market is both significant factors for the existence of the value premium.

Investors form their expectations to the future of stocks on the past performance. Therefore, when investors realize that they have been too optimistic about their growth stocks they get disappointed. On the contrary, value stocks often surprise the market, and thus the investors, positively. When investors know that investing in growth stocks often ends with disappointment and still do not invest in value stocks, it is due to the fact that cognitive biases are hard to eliminate through experience. It can be very difficult to acknowledge that investing in growth stocks not necessarily generates superior returns and it can be even harder to comprehend that it is not only due to bad luck.

An explanation for why investors are more excited about growth stocks is the information stream. Analysts display systematic optimism because their fees are higher in a rising market than in a decreasing market and also because they derive their information from access to CEO’s, which could be put in danger if analysts communicate reluctance about the future of the company.

We have applied our acquired knowledge to put forward some practical advices for investors. If an investor did not have to take transaction costs into consideration we have found that the optimal holding period for a value investor would be to buy value stocks in the first quarter after a recession and then hold the portfolio until the first quarter one year before the next recession. This would definitely prove to be the best strategy for the investor to maximize the return. However, there are transaction costs when trading in the market and the investor must therefore determine if these costs exceed the extra potential of more frequent trading. As the premium on value stocks is superior to growth stocks both prior to recessions, during
recessions and after recessions, the investor might find that it is more optimal for him/her to hold the portfolio throughout the recession. Another issue for the investor to acknowledge is the difficulty in recognizing when a recession is both coming and ending.

The behavior of value stocks, around recessions, is important for investors. If value stocks are fundamentally riskier than growth stocks then the value premium should underperform during down turns in the economy. If the value premium decreases significantly in periods with decreasing growth in the economy it could indicate increased downside risk. Downside risk is important because a high level of downside risk would make the portfolio riskier during periods of decreasing consumption. Stocks that decrease dramatically during recessions will be considered highly correlated with consumption, and therefore be a bad hedge against decreasing wealth. This will make investors require a higher return of these stocks. As our results indicate, it cannot be concluded that value stocks perform worse during down turns in the economy compared to growth stocks. This information can be useful to value investors when deciding upon whether they should stay in the market or sell out. We can conclude that business-cycle fluctuations do not affect value stocks worse than growth stocks. Investors should acknowledge that value stocks on average have an upside potential that is higher than that of growth stocks while the downside risk is similar for the two.

We have in our analysis found reason to believe, that the contrarian investment strategy will not be completely eliminated in the future due to limited cognitive capacity of human beings and due to investors’ extrapolation of past performance too far into the future.
5 Conclusion

Contrarian investment strategies have been present for decades, generating superior returns for the investors. Investors, who follow the contrarian investment strategy, are known as value investors as they attempt to buy stocks that are underpriced and sell stocks that are overpriced.

We have in our thesis given an account of the contrarian investment strategies. Contrarian investing is related to value investing that derives from the ideas of Graham and Dodd. Numerous academics within the field of economics have proven that value investing is a successful investment strategy and they have demonstrated that value stocks outperform growth stocks over time.

The term “value investing” was first mentioned by Graham and Dodd in the early 1930’s. Since then, several different justifications for the existence of the value premium have been put forward by the academic society. Still today the subject is a center for debate between two opposing financial schools; the standard finance and the behavioral finance, both of whom are searching for clarification.

It has been widely accepted by academics all over the world that the value premium exists. However, there appear to be inconsistencies in the value premium. An earlier study by Lakonishok et. al. (1994) found that the value premium diminishes prior to recessions.

Some recessions have been anticipated by declines in the stock market. Since 1948, ten recessions in the American economy has been preceded by a stock market decline. Therefore, we found it interesting to investigate if the value premium follows the same trends around recessions. Are the returns on a value portfolio superior during recessions but inferior once the economy picks up the pace again or does the value premium defy the conventional direction. If there is any correlation between GDP and the value premium, we believe that investors can take advantage of this when deciding on their contrarian investment strategy.

In our thesis, we have investigated the performance of the value premium in general and around recessions in America. We have found that the connection between the American stock market and the overall economy is present. It infers that any up- or downturn in the economy will be an indicator of how well the stock market as a whole will perform.

Investors worry about negative GDP growth as a bad economy means lower profits for companies, which in turn means lower stock prices. From our examination, the stock market appeared more volatile than GDP, which was expected. Nonetheless, it materialized that there
was a positive correlation between the steady increase in GDP and the increase in the American stock market.

We have comprised a test of mean reversion in the stock market by examining if our data followed a random walk. We found no significant evidence in the American stock market and therefore, we could not reject that the stock market followed a random walk.

With our knowledge on the behavior of the stock market we conducted statistical tests on our data to explore how the value premium performed around recessions and in general.

We found that the value premium was statistically significant for our entire sample period from 1947-2009. The average quarterly value premium for the period was 3.15 %. We have also found that the overall value premium is skewed towards the right, implying that value stocks have a higher upside potential than growth stocks.

We have conducted a more specific and narrow investigation on the performance of the value premium. On average in the four quarters prior to recessions the value premium was 0.92 %. Compared to the overall value premium of 3.15 % this is low. Therefore, we come to the conclusion that value stocks perform worse prior to recessions than on average. However, we did not find statistical evidence for this.

During the 11 different recessions in our time period of investigation, we found that the average quarterly value premium was 1.37 %. Compared to the overall value premium of 3.15 % this is once again low. Therefore, we come to the conclusion that value stocks perform worse during recessions than on average but still outperform growth stocks. Just as with the four quarters prior to recessions we did not find statistical evidence for this.

Finally, we found that in the four quarters after recessions the value premium is positive in ten out of 11 different recessions, which indicates that there was a clear tendency towards higher returns on value stocks after recessions. The average value premium in the four quarters was 5.95 %. Compared to the overall value premium of 3.15 % this is high. Therefore, we come to the conclusion that value stocks perform better after recessions than on average. Even though we once again found no statistical evidence for these results the value premium in the four quarters after recessions was the most statistically significant of the three periods.

The performance of the value premium, in context to recessions, is not statistical significant. However, a clear tendency towards a higher performance of value stocks, compared to growth
stocks in all three scenarios, exists. Therefore, we can conclude that value stocks not only perform better than growth stocks before a recession but also during and after a recession.

To extend our research even further, we conducted an analysis of the connection between growth in GDP and the value premium. During the ten best quarters of GDP growth we found that there is only one occasion where the value premium is negative. In five out of ten quarters the value premium surpassed the overall value premium on 3.15 % for the entire period. The average for the ten quarters also exceeded the overall value premium with almost 100 %. This illustrates that value stocks perform considerably better than growth stocks when the economy is doing well.

However, during the ten worst quarters of GDP growth we did not find that the performance of the value premium deteriorated. In five quarters the value premium was negative and in five quarters it was positive. The average quarterly value premium was nonetheless slightly positive with 0.24 %. In this case, there does not seem to be a clear tendency of a superior performance by value stocks over growth stocks. Equally important, we demonstrated that value stocks are not particularly riskier than growth stocks during down turns in the economy.

Overall, we can look at the knowledge acquired from the results on the value premium and conclude that there is a clear picture that value stocks perform particularly better during periods of economic prosperity but at the same time the downside risk for value stocks is not greater than for growth stocks.

The fact that the value premium exists and the contrarian strategy can be successfully implemented on the American stock market gave cause to wonder for explanations. Further analysis and discussion of the reasons for the present value premium, on the American stock market, was needed.

The value portfolio generated a higher return than the growth portfolio and an analysis and discussion was made of whether value strategies are fundamentally riskier than growth strategies. We tested whether the traditional systematic risk measure beta, known from the CAPM theory, is on average higher for the value portfolio than for the growth portfolio. We found that the value portfolio had a lower beta compared to the growth portfolio, which completely contradicts the traditional finance theory. Additionally, the value portfolio did not perform worse in down turns of the economy, which otherwise would have indicated that the value stocks had increased downside risk. Therefore, we can conclude that the value premium
cannot be explained by different exposures to systematic risk and that the evidence of superior returns of value stocks cannot be found in the standard finance theory. Therefore, the explanation of the value premium should be found in the behavioral finance theory.

We have discussed whether value strategies yielded a higher return than growth strategies, because of their contrary nature compared to naive strategies as a result of the existence of irrational investors. We have accounted for different behavioral finance theories and found that investors, like all other human beings, have limited cognitive capacity, thus they use different heuristic principles when making investment decisions. We have found that investors tend to extrapolate past performance too far into the future, thus overvaluing growth stocks and undervaluing value stocks. Further, we have found that the decision making process, concerning an investment opportunity, depends on how the investment opportunity is framed and perceived by the investors.

An explanation on why investors are more excited about growth stocks is the level of information presented to investors. Analysts display systematic optimism because their fees are higher in a rising market than in a decreasing market and also because they derive their information from access to CEO’s, which could be put in danger if analysts communicate reluctance about the future of the company.

Due to limited cognitive capacity, the contrarian strategy can be difficult, for private investors, to follow. Therefore, we have put forward some practical advices for investors. If investors do not have to take transaction costs into consideration, we have found that the optimal holding period for a value investor would be to buy value stocks in the first quarter after a recession and then hold the portfolio until the first quarter one year before the next recession. This has proved to be the best strategy for the investors to maximize their return.

We can also conclude that business-cycle fluctuations do not affect value stocks worse than growth stocks. Investors should acknowledge that value stocks on average has an upside potential that is higher than that of growth stocks while the downside risk is similar for the two.

In the future, we expect that the contrarian strategy will not be completely eliminated, or diluted, due to limited cognitive capacity of human beings and due to investors’ extrapolation of past performance too far into the future.
All things considered, we can conclude that the value premium exists throughout our period of investigation from 1947 until 2009 on the American stock market, generating an average quarterly premium of more than 3% for the investor. This indicates that former studies from other markets and periods were not sample specific, and hence support our results. We can conclude, that during periods of decreasing GDP growth the value premium is reduced, while still positive on average. We can also conclude that the value premium performs particularly well after recessions. However, it cannot be concluded that value stocks are fundamentally riskier than growth stocks. Thus, we believe that the tests and analysis made in this thesis support the behavioral finance explanation. We further believe that as long as investors are challenged by the limited cognitive capacity and keep extrapolating past performance into the future the value premium will continue to exist.
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