An empirical study into value investing on the Stockholm stock exchange

Authors: Erik Bratland and David Mäki

Supervisor: Janne Äijö

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Abstract

Investors are always searching the market for stocks that are undervalued and that can potentially create value. One way of finding undervalued stocks is to carefully analyze firms’ accounting ratios. Researchers have in the past found evidence that an investment in value stocks, often categorized as low P/E and low P/B ratio stocks, in most cases generates more value than an investment in growth stocks (categorized as high P/E and P/B). However, we found a lack of studies that investigates if this relationship exists on the Swedish market and if it holds true during the financial crisis. This resulted in the following research question:

Would a portfolio consisting of value stocks outperform a portfolio consisting of growth stocks on NASDAQ OMX Stockholm?

In order to answer the research question a quantitative method with a deductive approach has been applied and historical stock prices and accounting ratios over the time period 2005-2013 have been collected from Thomson Reuters Datastream. Returns were then calculated and portfolios of value and growth stocks were created based on the accounting ratios for every year. The returns where risk-adjusted with the help of the Sharpe-ratio before the Mann-Whitney U test was used in order to see if there is a significant difference between value and growth portfolios.

For the price to earnings ratio the risk-adjusted returns of the value portfolio only outperformed the risk-adjusted returns of the growth portfolio two years out of the nine years tested. For the price to book measure the risk-adjusted returns of the growth portfolio outperformed the risk-adjusted value portfolio seven out of nine times.

The results of the study seems to indicate that growth stocks outperform value stocks, contrary to much of the previous research that has concluded that value stocks outperform growth stocks. However, our findings were not statistically significant and we could not draw any clear conclusions from our results. The study did contribute with new knowledge however, by increasing the data available for value investing in Sweden and highlighting a need for more studies into smaller stock markets and for a period of financial distress, such as the financial crisis.
Chapter 1 – Introduction

This chapter will introduce the reader to the research topic. First, a discussion of the problem background will be provided followed by the research question and research purpose. The limitations, research gap and the expected contribution will be discussed in the later parts of the chapter.

1.1 - Problem Background

Trying to improve one's situation or maximizing the benefits in any given situation is a driving factor for most people. This is echoed in Finance, where stock purchases made by investors are done in the hopes of making additional gains on their capital and maximizing profits without being exposed to too much risk. Because this is a major goal for investors generally, money and effort are put into finding ways of accomplishing those goals. Generally trading of stocks is made on official stock markets. Trading on stock markets are a big business, according to World Federation Exchanges (WFE) monthly reports, as of February 2014 the combined market capitalization of all the stock markets in the world is worth more than 60 trillion USD.

One fundamental mechanism of the stock market is based on assumptions of market efficiency, first described and explained by Fama (1970, p. 414), stating that the price of a security on the market reflects the information and the actual value of the underlying asset being traded. A lot of research has been done to supports this theory. However there are a lot of evidence against it as well, one early example is Grossman and Stiglitz (1980, p.404) who argued that complete and full information is almost impossible to attain and the mere reasons that there is a group of investors that are trying to beat the market and making a living out of it, should indicate that there are some issues with the theory.

One of the more popular methods investors use to make money on the stock market is called value investing. (Arnold 2008, p. 584) He further mentions that the goal with a value strategy is to try to discover undervalued stocks and investing in them with the hopes of them eventually rising to their accurate value.

Arnold (2008, p. 584) continues to explain what usually constitutes as an undervalued stock, or simply value stock, as “a share with a price which is a low multiple of the earnings per share (low P/E ratios or PERs)” and “a share price with low relative balance sheet assets (book-to-market ratio)”. A growth stock is then the contrary; they usually have high price to earnings and book to market ratios Deb, 2012, p.48).

Evidence seems to indicate that there is some truth to the claim that value stocks do outperform growth stocks. Basu (1975, 1977, 1983) got results that all spoke for abnormal returns for low P/E stocks compared to high P/E stocks on the U.S Market. Fama and French (1992), proponents of the market efficiency theory, argued that the reason value stocks outperformed growth stocks was because of higher risk of value stocks. Lakonishok et. al (1994) tested this on U.S stocks and found that value stocks on the contrary were less risky compared to growth stocks, and still outperformed them.
Newer studies also seem to confirm this behavior, examples of this being Fama, French (2012) where risk adjusted value premiums were found in all the regions tested (North America, Europe, Asia Pacific and Japan). Value premium was also found in Thailand, (Sareewiwatthana, 2011) in India (Deb, 2012) in New Zealand (Truong, 2009) and finally Australia (Gharghori, et al 2013)

Refocusing the attention to the beginning of 2008, at a time where the financial markets had enjoyed years of more or less stable growth, so much so that investors and analysts had coined a new term, the “Great Moderation” to describe business cycles that were milder and less volatile than experienced before (Bodie et al, 2011, p. 44). What happened during that year came to change the view. In September of 2008, the crisis culminated with the bankruptcy of Lehman Brothers and the emergency U.S government loans to AIG and Merrill Lynch. (Bodie et al, 2011, p. 49-50). The U.S economy was hit hard but so was most other economies in the world with debt crises in European countries and massive increase in unemployment as a result (Bodie et al, 2011, p. 49-50). Obviously most of the stocks on the stock market was hit hard because of the crisis, one question is if value stocks still is a better investment than growth stocks?

The subject of value premiums for stocks during a time of financial crisis is something that needs further studies. Although for example (Gharghori, et al 2013) and (Fama, French 2012) both have the time period of the financial crisis within their samples no focus or attention is placed upon the effects that this could have had on their research outcomes.

With this information in mind, a study into value investing on the Swedish stock exchange during the financial crisis will bring new and interesting knowledge to the field.

1.2 - Research Question

Building on the problem background we recognized that research has been conducted on whether value stocks outperform growth stocks but mainly on the larger markets and not on smaller markets. Most of the research has concluded that value stocks do outperform growth stocks. On these grounds we are interested in examining how the situation with value and growth stocks is on the Swedish market. Accordingly, we have formulated the following research question:

*Would a portfolio consisting of value stocks outperform a portfolio consisting of growth stocks on NASDAQ OMX Stockholm?*

1.3 - Research Purpose

The purpose of this study is to investigate if an investment in a portfolio of value stocks would generate a higher return than an investment in a portfolio of growth stocks in companies listed on the Stockholm stock exchange (NASDAQ OMX Stockholm) over the time span 2005-2013. Further, since the financial markets have experienced large amounts of fluctuation and the years of the financial crisis are included in the time period that we are investigating the purpose is also to examine in what way the crisis
affected the returns. Since little research so far has focused on this time period we intend to bring some new results and information into the field.

1.4 - Research Gap

The subject of value investments and growth/value stock return differences is a topic that has been widely studied and investigated over several decades all across the globe. Bauman, Miller (1997) tested the assumption that value stocks would yield higher returns than growth stocks from stocks on American stock markets. Deb (2012) conducted a similar study focusing on the Indian stock market. Fama & French (2012) tested the performance of value stocks compared to growth stocks in four different regions with Europe being one of the regions. The Swedish market was included as part of their sample but no specific focus was placed upon the Swedish market.

Much of the previous research has focused mainly on the large markets such as the American, or has used the European market as one single market. Some studies have been conducted on country specific markets, however, to our knowledge after conducting a literature research there are no studies placing an in-depth focus on value investing solely on the Swedish stock market. This leaves us with an obvious research gap and this study intends to fulfill this gap. Further, although there are studies covering the time period of the financial crisis there is a lack of studies focusing on how the recent financial crisis actually affected the concept of value investing and this study will also aim to investigate how the Swedish stock market was affected by the crisis.

1.5 - Research Contribution

This study will go further into the financial anomalies that are observed when it comes to value versus growth stocks. It will be beneficial for academics since there is room for a deeper look into the specifics of this phenomenon on the Swedish market. As already mentioned in the research gap, Sweden has been included in a larger sample like a European sample before, but not focused on. New practical contributions on Sweden as a sample will help researchers to further the knowledge within this field of study.

Additionally, with research on value investing and a special focus on the years of the financial crisis the results from this study will contribute with a deeper understanding of the effects on value and growth stocks during a period of financial uncertainty. By highlighting the period of the financial crisis, as opposed to just including it in a larger sample and not recognizing a potential a new area of research in the context of value investing, this study contributes with new knowledge that can help academics in the field as well as investors looking for safe and profitable investments.

1.6 – Delimitations

This study will be limited to the companies that are listed on the NASDAQ OMX Stockholm stock exchange. There are several reasons behind this decision; the first one being that the authors easily have the availability of the data from the Stockholm stock
exchange. Further, the researchers have some previous familiarity and understanding of the Swedish stock market which could ease the work. Lastly, the Swedish market has a moderate size, which makes it relatively easy to use the whole market as a sample.

However, for different reasons some of the companies will have to be excluded from the sample. First, the companies that will be included in our study must have data available for the whole time period of this study which are the years 2005-2013. This means that companies that have entered the Stockholm stock exchange market after 2005 will be excluded from the sample and so will companies that have been delisted from the exchange market during this time period. Further, in order for the companies to be included in our sample it must be possible to collect their price to book ratio (P/B) and price to earnings ratio (P/E) during our time sample. These ratios will be used to determine whether the firms have a value stock or a growth stock.
Chapter 2 - Research Methodology

This chapter will start off with presenting why this specific subject is chosen and what thoughts the authors have on preconceptions. Further the chapter will discuss the research philosophies, research approach and the research method. Next the literature and data sources will be explored. The chapter ends with discussing the quality criteria and ethical considerations of the research.

2.1 - Choice of Subject and Preconceptions

Both authors of this research paper have finished the International Business Program at Umeå School of Business and Economics and are currently enrolled on the second year Master program. Further, both students have chosen to specialize their Master studies within the field of finance. Through a large interest and completing various finance courses both at Umeå University and other international Universities the authors have developed in-depth theoretical knowledge and understanding within finance. Both the previous knowledge and the interest in finance are main reasons behind the choice of subject. Moreover, both of us are open for the possibility of having future careers within the area of finance.

From the start of the project we had a few different ideas in mind and after some research and with guidance from our supervisor we decided to conduct research on whether values stocks outperform growth stocks. This specific topic seemed interesting, doable with the amount of knowledge possessed and is not a widely researched topic. This especially holds for the Swedish market meaning that our study will generate new contributions to the already existing research.

When conducting a research study there is always a risk that the authors have preconceptions that could affect their work. In the case of research this would mean that the authors could have formed an opinion about the subject in advance. These opinions can be based on previous experiences and academic background but also on values and beliefs that the authors possess. Bryman and Bell (2011, p. 30) are advising researchers to be objective and independent from their personal opinions and to avoid preconceptions in their research. In order for us to avoid the problem of preconceptions we are making sure to have other people read our study on a regular basis making sure that we stay away from being subjective. Further, since we are conducting a quantitative research the risk for subjectivity is rather small since our statistical analysis will be based on objective data.

2.2 - Methodological Position

When doing research it is important consider what philosophical position that the study will be based on. This because it will have an impact on how the authors treat and define knowledge and how social reality is studied (Flowers 2009, p.1). He continues to explain the two main positions that affect how these issues are viewed are Epistemology and Ontology.
2.2.1 Epistemology

Epistemology concerns itself with what can be regarded as acceptable knowledge in the field of study (Bryman and Bell, 2011, p.714). Here, a distinction is often made with how knowledge and research is done in natural sciences and if these methods are applicable in social sciences (Bryman and Bell, 2011, p.15). Saunders et al (2009, p.112-113) discusses this, where a study is conducted with focus on reliable objective data collection is more in line with the methods used in the natural science world. Further, on the other hand a researcher that is more concerned with the attitudes and subjective feelings of the test subjects would not have the same definition of acceptable knowledge that studies in natural science have. This disparity has created two main branches within Epistemology, positivism and interpretivism (Bryman and Bell, 2011, p.15-16).

Positivism is the social science branch where only knowledge based upon empirical and scientific testing is accepted as knowledge (Bryman and Bell, 2011, p.15). The only phenomena that you can observe will be treated as knowledge and that in the end can produce theory like generalizations, very much alike the research made by natural scientists (Saunders et al, 2009, p. 113). Social scientists, that do not share this view of knowledge and instead believe that the science of people is fundamentally different from the natural sciences and therefore deserves a different view on knowledge, instead promotes the branch interpretivism (Flowers 2009, p.3). These scientists believe that in order to makes sense of the social world and knowledge, a subjective grasp of social action is needed (Bryman and Bell 2011, p.17).

Our research will be done on stock price data from the NASDAQ OMX Stockholm gathered from a respectable source and our goal is to get an objective view of the data. In addition to this we do not really accept the findings we come across unless they are empirically observed, testable and acceptable significance level. Because of that this, the papers epistemological position has to be that of positivism.

2.2.2 Ontology

Ontology is a philosophical position that aims to describe the social reality around social entities (Bryman and Bell, 2011, p.716). The key question asked is whether social entities are created and shaped by social actor’s actions within it or if the social entities are external of the social actors within it (Bryman and Bell, 2011, p.20).

As with Epistemology, two branches are developed within Ontology, with contrasting views. These two are objectivism and constructionism (Bryman and Bell, 2011, p.21).

Objectivism is the position that recognizes the world in general and the social reality in particular as external to the actors inside of it. (Bryman and Bell (2011, p.21) Bryman and Bell (2011) uses an example of an organization to highlight the features of the branches within Ontology. Consider an organization with rules and regulation that act upon the employees. With an objectivist mindset the organization can be seen as having an external reality separated from its components i.e the employees. The employees are then shaped and pressured by the rules and behave according to a mission statement
created from the external force. This organization can then be seen as an object, as an existing reality.

According to Bryman and Bell (2011, p.21) constructionism has the opposite view on the social reality. Here it is argued that the social actors inside of an entity shape it and change it through actions and decisions. The entity is not external nor an existing object, but only the sum of all the actors inside of it. Take the same organization as the above example, here constructionists would instead argue that the organization is controlled, changed and developed by its employees and even though there are rules within the company, these rules were created and can be changed by the same employees.

Our research and indeed the results of the research will be performed using objective unbiased and empirical methods. Our ontological position is therefore objectivism since we would agree that there is a single objective external reality that affects how the value and growth stocks behave on the market. The data collected for this research is external and cannot be influenced by the researchers themselves. Would the research been made with a more constructivist point of view, the results and the data would be open to influence and change by the researchers themselves. This view does not makes sense in our study on the stock portfolios since our tests will be built on an unchangeable objective external data, which we will use statistical tools to interpret, making any subjective interpretation from us impossible.

2.3 - Research Approach

After the philosophical questions of the study the methodological questions follows. The approach taken when reviewing literature critically is important since the approach changes depending on what kind of research is to be conducted (Saunders, 2009, p.61) There are two distinctive approaches to research, a deductive and an inductive approach (Bryman and Bell, 2011, p.11). A further useful distinction between these two is that they usually tie together with qualitative and quantitative research respectively (Bryman and Bell, 2011, p.11). An inductive approach is when a researcher creating a theory from data collected and patterns studied (Bryman and Bell, 2011, p.13). A deductive approach on the other hand is the one taken by a researcher when a theory already exists (Bryman and Bell, 2011, p.13). A hypothesis is then created and tested with the data collected (Bryman and Bell, 2011, p.13). To conclude, an inductive approach is used to in some sense create a new theory while a deductive approach tests whether existing theory is valid and accurate (Saunders et. al, 2009, p.124).

Our research aim is to find out whether the theories about risk adjusted value stocks outperform growth stocks by setting up hypotheses and testing them. Since we are testing the theories on the Swedish market and during the financial crisis and not trying to create new theories, the research clearly fits into the deductive approach.
2.4 - Research Method

Bryman and Bell (2011, p. 26) are presenting two different research methods that can be chosen between when conducting a research, the quantitative and the qualitative method. Both methods are used to collect and analyze data, however there are some differences between the methods. A very basic distinction between the methods is said to be the fact that the quantitative method mainly deals with numbers and the qualitative method is more focused on words. (Bryman and Bell, 2011, p.386). However, there are more differences between the methods.

The quantitative method is linked to the deductive research approach meaning that a hypothesis is created from already existing theories and then tested(Bryman and Bell, 2011, p.150). Moreover, the quantitative research is said to be less focused on details and more on generalizing a larger sample in order to draw rather general conclusions. (Saunders, 2009, p.414). Further, in order to analyze and get a deeper understanding for the quantitative data tools like graphs, charts and statistics can be used.

The qualitative research on the other hand is mainly used in order to generate new theories meaning that it follows in the line of the inductive research approach. (Bryman and Bell, 2011, p.386). Moreover, it is focusing more on deep understanding through expressing thoughts and conclusions using words.

Before deciding what method to go with it is important to be sure of what type of data you intend to collect. Since we are going to investigate whether value stocks or growth stocks are paying the best return we will collect numerical data leading to the use of the quantitative method. We are going to create hypotheses from already existing theories.
rather than developing new theories. Choosing this method will enable us answer our research question in the best possible way. Moreover, as earlier stated we are going to have a positivistic and objectivistic view and use the deductive approach which almost always corresponds to choosing the quantitative method.

The table below presents the main contrasts between the quantitative and qualitative research method.

<table>
<thead>
<tr>
<th>Quantitative</th>
<th>Qualitative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numbers</td>
<td>Words</td>
</tr>
<tr>
<td>Point of view of researcher</td>
<td>Points of view of participants</td>
</tr>
<tr>
<td>Researcher distant</td>
<td>Researcher close</td>
</tr>
<tr>
<td>Theory testing</td>
<td>Theory emergent</td>
</tr>
<tr>
<td>Static</td>
<td>Process</td>
</tr>
<tr>
<td>Structured</td>
<td>Unstructured</td>
</tr>
<tr>
<td>Generalization</td>
<td>Contextual understanding</td>
</tr>
<tr>
<td>Hard, reliable data</td>
<td>Rich, deep data</td>
</tr>
<tr>
<td>Macro</td>
<td>Micro</td>
</tr>
<tr>
<td>Behavior</td>
<td>Meaning</td>
</tr>
<tr>
<td>Artificial settings</td>
<td>Natural settings</td>
</tr>
</tbody>
</table>

Table 1: Contrast between quantitative and qualitative research

Source: Bryman and Bell, 2011, p. 410

2.5 - Research Design

The research design explains how the researchers attempt to both collect and analyze their data (Bryman and Bell, 2011, p.40). Further, the research design can be seen as an overall plan on how to answer the research question and meet the objectives that are set up (Saunders, 2009, p.136). Bryman and Bell (2011, p.45) define five different research designs: the experimental design, the cross-sectional design, the longitudinal design, the case study design and the comparative design. This study is conducted in accordance with the longitudinal design which is used to investigate development and change over time. In order to do so data is collected at different periods in time and then the changes that appear are analyzed. (Saunders, 2009, p.155).

The main reason why we consider our study to fit the longitudinal design is since we are investigating the chosen sample at more than just one time. We are collecting data that covers nine years (2005-2013) and we will analyze how the returns differ and change between the years and also how the financial crisis was affecting the results of the stock returns.

2.6 - Literature and Data Sources

There are three different literature sources for researchers to collect from, primary literature, secondary literature and tertiary literature (Saunders et al., 2009, p. 69). A primary literature source is referred to work that appears for the first time and could be
reports, government publications, manuscripts or memos (Saunders et al., 2009, p. 69). Secondary literature sources are publications that discuss information that has already been published as primary literature somewhere else (Saunders et al., 2009, p. 69). Examples could be books, databases and articles. Tertiary literature are tools that could help finding both primary and secondary literature, it includes indexes, encyclopedias and bibliographies (Saunders et al., 2009, p. 69).

In this research secondary literature sources such as books, academic journals and official data from databases will be used. The theoretical framework and the literature review will mainly be based on databases, books and journals that have been collected from Umeå University Library, Business Source Premier, Google Scholar and other databases. Main keywords that were used during the data collection include: value stocks, growth stocks, market anomalies, value premium, market risk, distressed stocks, financial crisis and market efficiency.

The numerical data that is needed in order to conduct this research is gathered through Thomson Reuters DataStream which we have access to through the university.

The use of secondary literature sources is both time saving, has low costs and will provide the writers with new and useful interpretations but there are a few disadvantages as well (Bryman & Bell, 2011, p. 313-314). The researcher does for example not have any familiarity with the data and the data can be complex (Bryman & Bell, 2011, p. 320). This is however solved through spending extra time on understanding the data correctly. Moreover the writers do not have control over the quality of the data but we are attempting to only use peer-reviewed articles which are counted as reliable (Bryman & Bell, 2011, p. 320). Through doing so we are avoiding this problem and it will give us a study without major mistakes or biases.

2.7 - Reliability, Replication and Validity

Reliability, validity and replicability are three of the most crucial evaluation criteria to consider when conducting research within business (Bryman & Bell, 2011, p. 41). These criteria’s are needed to be evaluated in order for our research to have a high credibility and quality. Each one of the criteria’s will be explained and examined in order to show that our research fulfills them.

Reliability concerns if the results that are presented in a study are possible to repeat. In other words if a similar study would generate the same results. Reliability is closely connected to the quantitative research meaning that it concerns this study. (Bryman & Bell, 2011, p. 41). Reliability within research is based on three factors, stability, internal reliability and inter-observer consistency (Bryman & Bell, 2011, p. 157). Stability is concerned about whether a measure is stable over time or not and if the results would be the same if the study was conducted in another point of time (Bryman & Bell, 2011, p. 157). Internal reliability refers to if there are consistencies in the different indicators that form the scale or index of the research (Bryman & Bell, 2011, p. 158). Inter-observer consistency deals with how much of subjective judgment the research has.(Bryman and Bell, 2011, p.158).

This research will have a rather high degree of reliability. There are a few reasons for this, first since this research will be based on historical data that is collected from the
reliable source Thomson Reuters Datastream leading to that the results will have little or no variation over time if the study was done again in the future. Furthermore since we have historical numerical data we will categorize it according to theoretical models which gives a little risk of subjective judgment.

Replication is in many ways similar to Reliability. It can be achieved if other research is done in the same way and gets the same results (Bryman, Bell, 2011, p.42). For this to be possible a lot of effort needs to be done to make sure that what is being done during the process of research is well and clearly presented (Bryman, Bell, 2011, p.42). Generally, this is a specific goal more for quantitative research than for qualitative. Since the goal of a quantitative study is to generalize and test a theory already presented, it only makes sense that Replication is of more importance here (Bryman, Bell, 2011, p.165-167).

With all this in mind, and since we are writing a quantitative study, we will make sure that we explain and show the process clearly throughout the research. Since the data that we use and test will be collected from Thomson Reuters Datastream, we are confident that the results should be replicable.

Validity is concerned with whether the indicators that are supposed to measure a concept actually measures the right concept (Bryman & Bell, 2011, p. 42). They argue that validity is said to be the most important quality criteria. Validity can be divided into four subcategories; measurement validity, internal validity, external validity and ecological validity. Measurement validity concerns if a measure is actually measuring what it is supposed to measure (Bryman & Bell, 2011, p. 42). Internal validity on the other hand is connected to the causality of the research, meaning that it tests if there is a causal relationship between variables (Bryman & Bell, 2011, p. 42). External validity is related to how well the research can be generalized beyond the context of the research (Bryman & Bell, 2011, p. 43). Lastly, ecological validity concerns with if the findings in the research actually can be applied to people’s everyday life (Bryman & Bell, 2011, p. 42).

In order to establish measurement validity in this research we will make sure that the tools we are using in order to establish if stocks are growth stocks or value stocks are precise and the same yields for the statistic tests. External reliability of this research can be considered to be rather high since we are using all the firms listed on the NASDAQ OMX Stockholm. The results of this study could apply to other countries with the same market conditions meaning that external validity exists. Since this research does not have human representatives as test objects the question of ecological validity does not apply to this study.

2.8 - Ethical and societal issues

Ethical issues are important for researchers to consider when conducting studies. In social sciences, studies are often done on people and Saunders et. al (2009, p.124) states that the participants in the research should not be exposed to any harm. Additionally they argue that the researchers should prioritize making sure that the people being studied have consented to the things that they are being exposed to. This aspect of the ethical issues should in our case not be an area of concern, since our research is done on stock price data and not on people.
One other aspect of the ethical problems researchers can face is very relevant for us however, Crandall and Diener (1978) discusses how important accurate and honest data and results are for researchers. They go further when they state that some researchers can feel tempted to change or even falsify data from their studies to be able to present significant results. (Crandall and Diener 1978, p. 151-152)

The authors of this study understand and appreciate how important honesty and accuracy are and we have no motivation to falsify any data or result we get. There are no affiliations between the companies that own the stock we will study and us so no bias can come from that. Bryman and Bell (2011, p.139) also brings up the concern of data management, meaning if the data collected will be used in another purpose. Since our research will be quantitative and our goal is to create results that can be replicated we will make sure that the procedures and results will be visible and credible.

Trying to put the research into a wider context and examining it from a societal aspect can give a clearer picture of how exactly it will affect the surroundings. Although not directly applicable for the general society, a study on value versus growth stocks when it comes to profitability, and in turn market efficiency can still be valuable. Professional investors will for sure benefit, but a lot of people not active in the financial world still have stakes on the stock market, whether through direct ownership of securities or pension funds that invest in stocks for example. Making sure that stock markets are reliable, in terms of knowledge of what drives prices of securities is very important for a society since a crisis on the financial market, like the one that started 2008, will bleed over and affect all sectors within a society.
2.9 Summary of Theoretical Methodology

Figure 2: Summarizing figure of the research methodology

Source: By the authors

We have included a summary figure of our theoretical methodology to give the readers a better overview of the methodological positions that will guide us through the research. Our epistemological position is that of Positivism, that is we only accept knowledge that can be confirmed by empirical results. Our ontological position is Objectivism and it corresponds to a view of reality that is external from the social actors within it. Our research approach is deductive since the goal of the thesis is to test hypotheses built from existing theories. The method is quantitative as is goes well in line with our research. Finally our research design is longitudinal.
Chapter 3 - Theoretical Framework and Literature Review

In this chapter, theories and concepts that are relevant for this research are presented and further explained. The chapter starts off with examining the efficient market hypothesis, modern portfolio theory and behavior finance. Next value investing is explained and the concepts of value and growth stocks are defined. In the later part of the chapter the financial crisis is briefly explained and previous studies are summarized.

3.1 – Random Walk and Efficient Market Hypothesis (EMH)

In 1970 Eugene Fama proposed a theory that came to be known as the Efficient Market Hypothesis (EMH). It was a continuation of theories such as the Random Walk Hypothesis, where it was discovered that today’s stock prices were independent from previous historical stock prices (Kendall, 1953, p.13). Kendall discovered that the stocks he studied seemed to have a “random walk” and did not seem to be dependent on historical prices (Kendall, 1953, p.13). Randomness does not imply that investors cannot make money on the market, shown by the graph below where the solid line is the upward sloping mean or $\mu$ is 0.5 and the dotted lines are the mean ± the standard deviation (Ruppert, 2004, p.82).

![Random Walk Graph]

Figure 3: Random Walk

Source: Statistics and Finance, an introduction, David Ruppert, 2004 p.82

Fama built upon this theory when he presented the ideas of the efficient markets. As a general description of the concept, Fama stated that an efficient market was a market where the prices always fully reflected the information on the market (Fama, 1970, p.383). This is based on three main assumptions about investors and the market; firstly no transaction costs can exist, secondly, current and correct information is available for
everyone and lastly, everyone would interpret the results similarly and act as to realize them (Fama, 1970, p.415).

Schleifer (2000, p. 3) writes about these assumptions and adds that the actual important ideas that needs to be true if the EMH is correct are that investors are rational in their security valuation and that if there are irrational investors they are not correlated so as their effects on the securities’ prices cancel each other out. He continues that even if irrational investors are making correlating decisions on the market, rational investors are there to take advantage of this, in turn resetting the effects and changing the price back to its true value (Schleifer 2000, p.3).

Fama created and explained the theory in three different forms, the first being the weak form of market efficiency stating that a securities price reflects all its past time's prices, essentially rejecting the idea that future movements of a stock could be predicted with the help of historical prices, mirroring the ideas of the Random Walk Hypothesis (Fama, 1970, p.383). The second form also called the semi-strong form, states that not only does a price reflect historical data but also all the public information available about the company, such as announcements of future earnings and annual reports for example (Fama, 1970, p.383). The third and last form, called the strong form of market efficiency says that not only does prices reflect historical data and public information but it also reflects information not available for the public, such as inside information that managers might have for example (Fama, 1970, p.384).

Fama concludes by writing that the implications of the EMH is that not only does it not make sense to look at historical data, it does not even make sense to dig through reports or even try and get a hold of information that is privileged to only a few within the company, if there is any information it is reflected in the stock price (Fama, 1970, p.415).

If the Efficient Market Hypothesis holds completely true, this research into value investing in general, and low P/E and P/B ratio stock portfolios versus high P/E and P/B stock portfolios in particular should not show any superior profits. This is since the prices of these stocks should incorporate the potential gains from them in the future. In other words, no significant risk adjusted returns should be found.

3.2 - Behavioral Finance

Not everyone within Finance is so sure about the accuracy of the EMH and that the portfolio theory is the only way to make money on the stock markets, a whole school of economists instead follows something called Behavioral Finance. These critics argue that the EMH ignores the fact that human beings are not rational in nature and that this does make a difference when it comes to investing (Bodie et al, 2011, p. 410). Most of the proponents of Behavioral Finance agree with the assumption that if the prices reflected the intrinsic value of the stock, there would not be any quick ways of making a profit. Where the disagreement lies is rather that these advocates argue that the irrational investors impact the market in such a way that prices rarely reflects the intrinsic value of the stock (Bodie et al, 2011, p. 410).

There are a number of areas where actions of investors lead to violations of the EMH according to behavioral finance proponents. One example is a study by Kahneman and
Tversky (1973) where it was concluded that people tend to overemphasize recent experiences compared to the overall picture of a phenomena. This manifests itself as too extreme of reactions built on not enough evidence, depending on how recent events have unfolded. A study on mismatching with the P/E ratio can be explained by this effect, investors forecast earnings too much dependent on recent events. This makes shares with high P/E ratios too high since the earnings expectations are driven up too much by recent development and the other way around for shares with low P/E ratios (Debondt & Thaler 1990).

Barber and Odean (2001) looked into overconfidence in trading ability between men and women as well as how frequent and active trading affected the overall investment performance (Barber & Odean, 2001, p.288-289) They concluded that men trade more actively than women and more interestingly, that this more active style of trading lead to a 7 percent lower return than portfolios that did not experience the same turnover (Barber & Odean, 2001, p.289). In other words, there seemed to be an overconfidence effect displayed by men, which lead to poorer investment performance.

Another way that investors tend to be bias in the way they process information is sometimes referred to as sample size neglect and representativeness (Bodie et al, 2011, p. 411). A study made by Chopra et al (1992) showed that stock prices from stocks with good recent performance was pushed down right around the time earnings reports came out (Chopra et al ,1992, p.262). The discussion behind why the stocks became overvalued concluded that patterns drawn from too small samples was inferred to stocks with recently good results which lead to an increase in price that was corrected when an earnings report that did not match the price with the intrinsic value of the stock (Chopra et al ,1992, p.261-263).

Another behavioral bias that a lot of investors display, according to Debondt and Thaler (1987) is regret avoidance, where investors regret a stock losing in value more if this stock is unconventional. This means that a stock that does not have a high future expected performance (for example a stock with low P/E or P/B) more than a stock that is conventional, that is its price compared to its book value or earnings is high. (Debondt, Thaler 1987) This then leads to investors staying away from stocks with low P/E and P/B ratios, making them underpriced (Bodie et al, 2011, p. 413).

There are countless other examples of studies were humans in general and investors in particular show behavior not consistent with the assumptions of EMH, the conclusions from all of them seems to be that there are ways of making abnormal returns on the stock market (Bodie et al, 2011, p. 409).

This paper’s main point is to test some assumptions of behavioral scientists, if some stocks (those with low P/E and low P/B ratios) are undervalued or if the stock prices on the market match the intrinsic values of the companies.

3.3 - Modern Portfolio Theory

Modern portfolio theory (MPT) is a theory on how to create maximum return for a set degree of risk or minimizing risk for a set degree of return (Markowitz 1952, p.89). This according to the theory is done through diversification; with the goal of diversifying away the unsystematic risk that you are exposed to if you own one or few stocks that are
very correlated (Markowitz 1952, p.89) Markowitz divided the theory into two basic constructs; One statistical concept, which is the returns of a portfolio with stocks in it can be illustrated by taking two assets, the expected return \( r_p \) of this portfolio is the weight of stock A \( (W_A) \) times the expected return of stock A \( (r_A) \) added together with the weight of stock B \( (W_B) \) times the expected return of stock B \( (r_B) \) (Ogden et al, 2003, p.37):

\[
r_p = W_A r_A + W_B r_B
\]

The other concept was the idea of how investors viewed risk, specifically that if the returns were sufficient they would tolerate this risk. Calculating the risk for this portfolio would look something like this:

\[
\sigma_p = \left[ W_A^2 \sigma_A^2 + W_B^2 \sigma_B^2 + 2 W_A W_B \sigma_A \sigma_B \rho_{AB} \right]^{1/2}
\]

That is, the risk level, or the standard deviation \( (\sigma) \) of the portfolio depended on the weights of the assets and the assets individual variance \( (\sigma^2) \) times the standard deviation of the assets and the correlation between them \( (\rho_{AB}) \). The key for diversifying away the risk here is the correlation between the stocks. The idea behind this is if a company or a sector is hit with bad news, the stock price of a stock in your portfolio will go down. If the price of another stock in the portfolio is highly correlated to this stock it will also go down. If this other stock is not correlated to the first stock however, it will not be affected. That is, a portfolio with a lot of stocks that are not too positively correlated to each other takes away the unsystematic risk. (Brealey, Myers, Allen, 2006, p. 162), (Ogden et al, 2003, p.37)

There are assumptions that need to hold true when it comes to the modern portfolio theory as well. Basically the same assumptions as the ones for market efficiency, no transaction costs for stock purchases and rational and risk averse investors. (Fama, 1970, p.415)

Putting the modern portfolio theory into the context of this thesis, the idea of the finding undervalued stocks that make an abnormal risk adjusted return goes against the ideas of MPT and the set levels of risk to reward that it is built on.

### 3.4 - Risk

Every investment is exposed to some type of risk, meaning that you could risk losing parts of the capital that you have invested (Arnold, 2008, p. 178). It is hard to predict the future but there are two types of expectations that one can have on the future, either expecting certainty or uncertainty. In the case of certainty there is most likely only one future outcome and the risk that you are exposed to is low (Arnold, 2008, p. 178). However, since the risk is low the return is expected to be low as well. On the other hand one can predict uncertainty, which is a situation where more than one outcome is possible. This leads to the investment being risky and the more risk you are exposed to the bigger return you can expect (Arnold, 2008, p. 178). One way to minimize the risk
is by diversifying. This means that you spread your portfolio over many investments in order to limit the risk that associated with one particular asset. If one of the assets within the portfolio is developing negative another asset in the portfolio will perform well making sure that the portfolio is not making a loss (Bodie et al, 2011, p. 38).

The total risk that a stock is exposed to is made up of systematic risk and nonsystematic risk. Systematic risk are risk factors that are common to the whole market and impossible to diversify away. Nonsystematic risk on the other hand can be lowered and even eliminated by diversification. (Bodie et al, 2011, p. 225)

Moore et al. (2009, p.40) explain that the standard deviation measures the spread by looking at how far the observations are from their mean. Further they argue that in finance, it is common to use the standard deviation of the returns when measuring risk. If the spread of an investment is large from year to year it means that it is more unpredictable and therefore more risky than returns that show a small spread.

### 3.5 - Value Investing

Arnold (2009, p. 584) states that investors are always searching for shares that potentially could create value, meaning that an investor should search the market and find stocks that are undervalued and have the potential to generate a capital gain. Graham & Dodd (1934) where the pioneers when it comes to theories concerning value investing and they argued that investors carefully can analyze firm’s financial statements in order to find undervalued stocks to invest in. One strategy to discover stocks that might be undervalued is to analyze different accounting ratios of firms or looking at their dividends relative to share price (Arnold 2009, p. 584). If this analysis is carried out in the correct way it will lead to the investor ending up with two different types of stocks, value stocks and growth stocks. The difference in returns between value and growth stocks has been called a value premium in previous research. (Athanassakos, 2009, p. 109).

According to various well established studies such as Fama & French (1998), Basu (1975, 1977, 1983) and Lakonishok et. al (1994) value stocks are in most cases outperforming growth stocks. This means that if an investor is following the principle of value investing it would in most cases be appropriate to look for value stocks to invest in. This is also what this study aims to investigate and see if the concept of value investing holds for the Swedish market during the time period 2005-2013. However there is more to the concept of value and growth stocks and their characteristics will be further explained in the upcoming sections of this chapter.

#### 3.5.1 - Value stocks

The concept of value stocks can be traced back as far as to 1934 and since then investors have been searching for value stocks to invest in (Graham & Dodd, 1934). This is since value stocks promise high returns and are often rather cheap to purchase (Arnold 2009, p. 584). Typically, the earnings for companies who have value stocks are depressed in the past and their future is rather uncertain or the companies have reached maturity and are presenting a stable performance. (Chen and Zhang 1998, p. 501-502). According to Fama & French (1998) the rather high returns of a value stock often arises since the market has undervalues distressed stocks and when these pricing errors later
are corrected the value stocks yield high returns. In order to evaluate if a stock actually can be considered to be a value stocks different ratios are used as measurement of this. If a company has low ratios of price to earnings (P/E), price to book (P/B) and/or price to cash flow (P/C) they can be assumed to have value stocks (Fama & French, 1998, p.1975).

3.5.2 - Growth stocks

Growth stocks are stocks that have high expectations on their future earnings, their growth rate are high compared to market average and they are expected to continuous raise further in the future (Bourguignon & De Jong, 2003, p.71). Investors who might be interested in buying this type of stocks are referred to as growth investors. Growth stocks are often a rather popular investment choice since the companies who possess these stocks tend to create innovative products with market opportunities (Bourguignon & De Jong, 2003, p.71). Investors are then hoping that the market value of these innovative firms will rise rapidly leading to higher returns from the growth stocks. (Bourguignon & De Jong, p.71-72). According to Bauman & Miller (1997, p.57) an investment in growth stock is especially popular and attractive during times of strong economic growth. Further, they explain that a stock can be characterized as a growth stock if the stock has high earnings to price (P/E), price to book (P/B) and/or price to cash flow (P/C).

3.6 - Classifying stocks as either value or growth

In order to establish if a stock is a value or a growth stock the most commonly method used is as mentioned above to use the companies P/E, P/B and P/C ratios. According to Fama & French (1998, p.1975) the reason to why these multiples are most commonly used is since they produce stable results in returns. Below, each one of the multiplies will shortly be described.

3.6.1 - Price-to-earnings

The price to earnings ratio is a multiple comparing firm’s stock price with the earnings per share of the company. The P/E ratio tells how much an investor of a stock needs to pay per dollar of earnings that the company generates. (Bodie et al, 2011, p. 781. Further, the P/E ratio is said to partly be an indicator of the expectations of growth opportunities that a firm has (Bodie et al, 2011, p. 781). According to Fama & French (1998, p. 1975) stocks that have a low P/E ratio are identified as value stocks and stocks with a high P/E ratio are characterized as growth stocks.

3.6.2 - Price-to-book

The price to book ratio is a multiple that compares the market price of a common share with the book value, which is the same as the shareholders equity per share (Bodie et al, 2011, p. 820). The higher the ratio is the more investors are expecting the firm to generate earnings in the future with the assets that the firm is holding (Bodie et al, 2011, p. 820). The price-to-book ratio is sometimes used as an equivalent towards the market-to-book ratio and book-to-market ratio, this is for example what Fama & French (1998,
Researchers such as Bourguignon & De Jong (2003, p. 71) among others associate a low P/B ratio with value stocks and a high P/B ratio with growth stocks.

3.7 - NASDAQ OMX Stockholm

NASDAQ OMX Stockholm AB, more commonly known as Stockholm Stock Exchange is the official stock exchange in Sweden. It was founded in 1863 and since 2008 it is also a part of NASDAQ OMX Nordic which includes the stock exchanges of Copenhagen, Helsinki, and Iceland. (NASDAQ OMX, 2014).

The number of firms that are listed on NASDAQ OMX Stockholm differs from year to year but as of 2014 there are around 300 stocks listed (NASDAQ OMX, 2014). The number of stocks is however a bit higher than the number of companies listed, this is since some of the companies have both their A and B shares listed. The shares are divided into three different segments depending on the size of the firm. The different segments are small caps, mid caps and large caps. Further the firms are also divided into groups depending on what industry they operate in. (NASDAQ OMX, 2014).

3.8 - Financial crisis

The financial crisis started in 2008 and as a result, Lehman Brothers, a major U.S bank went bankrupt. In addition to this both AIG and Merrill Lynch got emergency U.S government loans to not fail, since their failure would destabilize the whole banking industry (Bodie et al, 2011, p. 49-50). What were the causes that drove one of the biggest banks in the US to bankruptcy? To be able to untangle the issues one first need to take a look at the how homeowners finance their house purchases (Bodie et al, 2011, p. 45).

Normally a homeowner would go to a bank or other financial institution and take out a mortgage to finance the purchase. The owner would then repay the loan to this bank over a long time period and time. What changed was that companies, like for example Freddie Mac and Fannie Mae bought a lot of mortgages from the bank and pooled them into something called mortgage backed securities (Bodie et al, 2011, p. 45). These securities were then offered to investors, who bought them and collected the payments from the homeowner that was paying off their mortgages (Bodie et al, 2011, p. 46).
This phenomena grew quickly and soon all the mortgages available were bought up (Troshkin, 2008, p. 4). What happened next was that a desire to find new mortgages evolved and to do this rules that was previously in place, like the ratio of the loan amount to the house value not being higher than 80% and other criteria that assessed the ability of the lender to pay back the money was being dropped (Troshkin, 2008, p. 4). Now a lot more people with less financial ability could buy a house through these new mortgages (Bodie et al, 2011, p. 46). These loans were called sub-prime mortgages but since housing prices were just increasing (see chart above) the investors were not concerned with homeowners defaulting on loans (Troshkin, 2008, p. 6). When the housing prices stopped increasing and began falling more and more people found themselves with loans far greater than the value of their houses, leading to a lot of them walking away from their loans (Bodie et al, 2011, p. 46). More and more people defaulting on their mortgages lead to less and less payments from them reaching the investors (Bodie et al, 2011, p. 46). The companies and banks owning these debt financed mortgage backed securities tried to sell them but no one wanted to buy them anymore, making these mortgages and securities stemming from them almost worthless (Bodie et al, 2011, p. 46). Lehman Brothers were one of the banks with most exposure to these securities and since they were more or less worthless, they did not have enough capital to pay off their loans and went bankrupt (Bodie et al, 2011, p. 49).

The effects of the crisis did not stay in the U.S but spread and affected more or less the whole world. Andreosso and Lenihan (2011, p.327) showed that Sweden had a negative real GDP for both 2008 (-0.4%) and 2009 (-5.1%). But compared to other
countries in the EU, Sweden were not hit as severely as for example Ireland, where the negative real GDP was -3.5%,-7.5% and -0.2% for 2008, 2009 and 2010 (Andreossi, Lenihan, 2011, p.327). In this study we will investigate how the financial crisis affected value and growth stocks and that is the reason to why we wanted to provide the reader some basic information regarding the financial crisis.

3.9 - Previous research

As mentioned earlier there are a number of research articles that investigate the concept of value and growth stocks and which of the stocks that generates the highest return. Many of these studies have studied the bigger markets such as the U.S Market or the U.K Market. Some of them have covered more than one market and a few have focused on smaller markets such as the Finnish market. However, there is to our knowledge no study that has focused only on the Swedish market as we mentioned in our research gap. The sections below will explain some of the previous studies that we think are most important and related to our study.

Basu (1975, p. 53-64) was one of the earliest researchers to test low P/E stocks in order to see whether they outperformed high P/E stocks on the New York Stock Exchange between the years 1956 to 1969. The results were that low P/E stocks consistently outperformed high P/E stocks and earned abnormal returns.

Basu (1977, p. 663-682) continued to test the low versus high P/E ratios on the New York Stock Exchange between the years 1956 to 1971. This time focusing on critics from market efficiency advocates who argued that the reason value stocks seemed to outperform growth stock was because they were much riskier. Basu showed with his research that, even when risk-adjusted, value stocks outperformed growth stocks.

Basu (1983, p. 129-156) wrote another article on low price to earnings ratio stocks or earnings yield as a response to a lot of previous market efficiency research claiming that a low price to earnings stocks would not have a consisting superior return compared to other stocks. He divided all the stocks on the New York Stock Exchange during the period 1963 through 1979 into different portfolios depending on their P/E ratios. They concluded that a portfolio of low price to earnings ratio on average outperformed other portfolios tested.

Fama and French (1992, p. 427-465) conducted research on the New York stock exchange on the accuracy of the beta and how company size and price to book ratios effected the returns. The study was conducted during the years 1963 to 1990 and showed that low price to book ratios had a better performance than high price to book ratios. Furthermore the company size also seemed to affect the returns.

Lakonishok, Shleifer and Vishny (1994, p.1541-1577) conducted a research on value and growth stocks during the years 1968-1990. In this study the aim was to focus mainly on why value strategies actually seem to work. They have used fast performance data in order to classify stocks into both value or growth portfolios and then evaluating which of the stocks performed best. Further they also wanted to investigate if value stocks are riskier than growth stocks. Their results showed that investing in value stocks outperformed investing in growth stocks in many cases over their time period. They found that one reason for this could be that future growth rates of earnings and cash
flows of growth stocks relative to value stocks were much lower than they were in the past. This means that future growth rates of growth stocks has been overestimated. Further, they concluded that value strategies did not appear to be more risky than growth strategies. That means that the higher value premium on value stocks cannot be explained by risk as for the sample of this study.

Fama and French (1998, p. 1975-1998) extended their study from not just including the US market but this time they investigated if value stocks are performing better than growth stock around the world. They conducted their study on the time period 1975-1995 and used the US and twelve major EAFE (Europe, Australia, and the Far East) stock markets as their sample. Data was collected and they created portfolios of value and growth stock. In order to determine if a stock was considered to be a value stock or a growth stock they used accounting ratios (B/M, E/P, C/P, and D/P). Stocks with high ratios were said to be value stocks and stocks with low ratios were considered to be growth stocks. After performing various statistical tests Fama & French come up with the conclusion that value stocks tend to have higher returns than growth stocks in markets around the world. This was the fact in twelve out of thirteen markets. Value stocks performed 7.68% better than growth stocks per year. They created a model that showed that most in most of the countries the value premium was due to a higher level of risk.

Bauman, Conover & Miller (1998, p. 75-88) conducted a study investigating if value stock-strategies outperformed growth stock-strategies. The study was done on the international market including return observations in 21 countries over ten years. The study was carried out in similar ways as earlier researches, meaning that valuation ratios were used to determine the characteristics of the stocks. They came to the conclusion that value stocks generally outperformed growth stocks but what made their study somewhat different from others was that they also investigated if the firm size affected the results. They found that the difference in performance between large cap value stocks and large cap growth stocks were bigger than the difference between small cap value stocks and small cap growth stocks.

Gregory et al (2003, p. 213-255) agreed with previous research saying that value stocks outperformed growth stocks but wanted to test whether this was due to a higher risk level for the value stocks. They used valuation ratios such as P/E and P/CF to distinguish the value and growth portfolios from each other. During the time period from 1980 to 1998 they tested all the stocks on the New York stock exchange. Their findings suggested that value portfolios were not riskier than the growth portfolios but still outperformed the growth portfolio.

Zhang (2005, p. 67-95) was trying to find out why value stocks are related to higher risk and thereby earn higher returns than growth stocks although growth stocks depend on future economic conditions and actually should bear higher risk. They tested this on the New York Stock Exchange and in Japan, Hong Kong, Malaysia, Taiwan and Thailand. Rational expectation and the neoclassical industry equilibrium framework along with various economic variables are used to analyze the relationship between risk and expected return. Zhang concludes that costly reversibility and countercyclical price are the reason behind why value stocks are more risky than growth stocks and especially during an economic distressed situation.
Cameron Truong (2009, p. 1-7) conducted a study on the New Zealand Stock Exchange over the time period 1997-2007 investigating if a value premium exists. The price-to-earnings- ratio is used and the conclusion that is drawn is that low PE stocks outperform high PE stocks in New Zealand meaning that stocks that are considered to be value stocks once again are performing better than growth stocks.

Pätäri & Leivo (2009, p.5-19) conducted a study on different value strategies on the Finnish market over the years 1993-2008. Their sample of stocks was divided into three different portfolios depending on six different accounting variables, the ratios used were E/P, EBITDA/EV, CF/P, D/P, B/P and S/P. The stocks with the lowest ratios are placed in a portfolio consisting of value stocks and the stock with highest ratios are belonging to a portfolio of glamour (growth) stocks. In order to risk adjust their stock returns Pätäri & Leivo use several performance metrics such as the Sharpe ratio, the adjusted Sharpe ratio, the Jensen alpha, and 2-factor alpha. The results of the study are in line with previous results from other researchers, meaning that the portfolio of value stocks in most cases outperforms the portfolio consisting of glamour stocks.

Pätäri & Leivo, this time along with Kilpiä (2009, p. 7-29) conducted another similar research on the Finnish market, this time over the period 1991-2006. Now they focused on how value and growth portfolios perform in bull and bear markets. Their findings of this study show that the portfolios with values stocks are less affected by bear markets than other stocks on average are. Further it showed that the difference between the portfolios is much smaller during a bull period.

Sareewiwatthana (2011, p. 1-13) investigated if it could be profitable using the value investing strategy on an emerging market. The study is conducted on the Securities Exchange of Thailand during the time period 1996-2010. Using the price-to-earnings and price-to-book ratios he concluded that the portfolios he created outperformed the market and that value stocks outperformed growth stocks during this period of time.

Deb (2012, p. 48-62) wanted to build upon previous research on value investing and therefore tested if the trend that value stocks outperformed growth stocks was true on the Indian stock market. On the years 1996 to 2010 the author chose a buy and holds strategy for 5 years and found a more or less consisting value premium. He failed to find a value premium in India for the first stocks from 1996 to 1997 and did not find any significant results from the last portfolio that was formed in 2006 and held until 2010.

Fama and French (2012, p. 457-472) conducted a study where the aim was to find a value premium, momentum and whether a possible value premium was different when the size of the firm changed all else being equal. The study was done during the years 1989 to 2011 on four different regions, North America, Europe, Asia Pacific and Japan. The returns from the regions were calculated as averages from all the countries stock returns added together. The results of the study were that all the regions except Japan displayed a value premium that decreased with the size of the companies.

Asness et al (2013, p. 929-985) wanted to expand the research done by Fama and French (2012) by testing if a value premium and momentum existed from 1972 to 2011
and additionally also tested other assets than stocks. They used a similar division of regions as Fama and French and found again similarly to Fama and French a consistent value premium.

Gharghoria, Stryjkowskib and Veeraraghavan (2013, p. 393–417) investigate if there is a value-growth effect on the Australian market and aimed to evaluate which accounting ratio identified this effect in the best way. The results indicate that there is a strong value-growth effect on the Australian market, meaning that value stocks are performing better than growth stocks. Further their results indicate that the book-to-market ratio along with the cash flow-to-price is the best ratios to use in order to evaluate how stocks perform.

3.10 - Previous research in context

When following the development of research in the field of value investing, a clear and consistent pattern of the superiority of value stocks compared to growth stocks can be seen. The reason behind this phenomenon is not as clear cut however. Two camps of researchers debating this can be found early on, where Basu (1975, 1977, 1983) together with Lakonishok, Shleifer and Vishny (1994) and Gregory et al (2003) to name a few were under the impression that the differences between value stocks and growth stocks existed because the value stocks were undervalued in the traditional sense, due to irrational behavior explained by behavioral finance. The other side of researchers, led by Fama, French (1992, 1998, 2012) came to the same conclusion that value stocks outperformed growth stocks, but do not agree with the notion that a so called value stock is an intrinsically better investment, leading to a violation of the EMH, but that it instead would incorporate a higher risk with its higher returns. The proponents of the behavioral finance explanation responded to the criticism of the market efficiency advocates by using measures like the Sharpe ratio (see section 4.7 for a more detailed explanation) to risk adjust the value stocks, that still seemed to outperform the growth stocks. Fama and French through a series of articles then developed a model that seemingly could explain some of the excess returns displayed by value stocks.

These differences of opinions is still a source of research in the area and more data from different economic climates and regions can only further the knowledge and lead to a better understanding of the securities markets. Some other trends found was that firm size also seemed to affect the returns for value and growth stocks. Bauman, Conover & Miller (1998, p. 75-88) is an example of this where large cap value stocks outperformed large cap growth stocks by a larger margin than small cap value stocks to its counterpart. Fama and French (2012 457-472) on the contrary found that the value premium seemed to be less prominent for large cap firms.

The fact that no research that we have found has focused on the Swedish market should mean that this paper can contribute with new knowledge. As a considerable part of the focus of this paper is to examine how the phenomena of value investing behaves during the financial crisis this will also help with furthering the knowledge. It will be interesting to see how the studies done on the Finnish market match the results of our study since the economic climates and stock markets of Sweden and Finland are quite similar. If our research would be in line with Pätäri & Leivo (2009, p.5-19) we should find a majority of years where value stocks are a better investment option than
growth stocks. There are of course differences, the biggest perhaps being that the time period tested is quite different in character (in large because of the financial crisis) which could affect the results.

3.11 - Summary of theoretical framework

The main aim of this paper is to study if value stocks outperform growth stocks on the Swedish stock market. The strategy of searching for the stock that has the biggest potential to generate a capital gain is called value investing. Value stocks can be defined as stocks with low accounting ratios and growth stocks are said to have the opposite characteristics, high accounting ratios. Theory and previous studies say that value stocks in many cases actually do perform better than growth stocks. In order to answer the research question of the study several theories related to finance have been explained and discussed in the theoretical framework.

In the first part of the chapter the Random Walk Theory and the Efficient Market Hypothesis was presented, which together states that it is impossible to beat the market since the market always is fully informed which also reflects the prices. If the Efficient Market Hypothesis holds true value stocks should not be outperforming growth stocks.

Secondly, behavior finance was examined which is critical against the Efficient Market Hypothesis and instead argues that human beings are not rational in nature which affects their decisions made when investing. They say that the irrational investors impact the market in a way that leads to prices that are not always reflecting the intrinsic value of a stock. If the behavior finance theory actually holds in reality it should be possible to earn a value premium.

Thirdly, the Modern Portfolio Theory is discussed. This theory explains how a diversified portfolio can optimize expected return but also minimize the risk. This study goes against the Modern Portfolio Theory since it aims to find undervalued stocks that make an abnormal risk adjusted return.

The chapter also includes a short description of the Swedish stock market, examination of risk and explanations of the accounting ratios that are used in order to classify stocks as either value stocks or growth stocks. Lastly, since the time period of the study includes the financial crisis the upcoming of the crisis and how it affected the world is presented in this chapter.

These theories provide us with the theoretical groundwork that is needed in order to build hypotheses, help us find and interpret our empirical findings and in the end aid us in answering the research question in an appropriate manner.
Chapter 4 - Practical Method

The upcoming chapter aims to explain the practical methodology of the research. First the sample data and the time period of the study are presented followed by an explanation of how the portfolios are created, how the returns are calculated and in what way we are treating the risk. In the end of the chapter the statistical test that is used is explained and the hypotheses are listed.

4.1 – Sample Data

This study includes all the companies listed on NASDAQ OMX Stockholm and according to Moore et al (2008 p. 178) this sample can be considered to be a population since the whole group available is included. However, a few of the companies will be excluded from the population for various reasons in order to avoid or minimize the risk of misleading results. First, if companies have both “A” and “B” shares only the “B” share will be part of the population. Second, companies that have been listed after 2005 or delisted during the time period of our study will be excluded as well. Third, for some companies there is no data available and they will be eliminated from the population. Lastly, some companies could have either very high or very low multiplies which creates rather extreme outliers and these will be excluded from the population.

The initial number of stocks that were collected was 280 but after excluding companies based on the above mentioned reasons the final sample consisted out of 174 companies. According to Saunders et al. (2009, p.450) it is quite insensitive for the statistical tests to us a small sample and this number of companies will provide us with observations enough to answer our research question.

4.2 - Time Period

The time period that this study will cover contains the years 2005-2013. This time period will be long enough to see trends in our observations and results. Further, the financial crisis is included in this time frame which will make it possible for us to contribute with new insights on the concept of value and growth stocks. The graph below shows how the Swedish stock market has performed over the time period of this study and the downturn from the end of 2008 lasting to mid-2009 shows evidence of how the Swedish market was affected by the financial crisis. The graph also shows a smaller economic downturn in 2011 which is known as the European sovereign debt crisis (Constâncio, 2012, p. 110). However, since then and up to the end of 2013 the market has recovered from years of financial distress which can also be seen in the graph.
4.3 - Data Collection

The data we will need for our research will be collected from the widely used and trusted Thomson Datastream. We will access it and download daily stock prices for all the stocks from Nasdaq OMX Stockholm. Additionally we will download a corresponding index for the whole market for comparison. Finally we will download two financial ratios from all the companies listed on the Stockholm stock exchange, the P/E and P/B ratio that will help us divide the stocks into value or growth stocks. Since we will use the returns of the stocks rather than raw stock prices in our research we will transform the daily stock price data into daily returns and from these daily returns the yearly return can be calculated as well.

4.4 - Creation of portfolios

In order to compare the performance of value and growth stocks two portfolios are going to be created. One portfolio will consist of value stocks and the other of growth stocks. The portfolios are created with the help of the financial ratios P/E and P/B. Portfolios are created for each one of the years 2005-2013 and for each year there will be two portfolio based on the P/E and two on the P/B. This will in total result in 18 different portfolios, 9 of them are growth stock portfolios and 9 are value stock portfolios. This means that the portfolios are held for one year and after each year a new portfolio is created. The one year holding period has been used in various studies such as Lakonishok et al (1994) and Fama & French (1998) studies. The reason for creating new portfolios every year is since the financial ratios can change rather drastically over time and in-between years.
25% of the stocks with the highest ratios are placed in the portfolio of growth stocks and 25% of the stocks with the lowest ratios are ending up in the portfolios consisting of value stocks. The remaining 50% of the stocks are left out of the study since they are viewed as neutral stocks. Fama and French created their portfolios in a similar way in their study on the U.S stock market from 1998. The figure below shows how the portfolios are created.

**Figure 6: Portfolio creation**

**Source: By the authors**

The size of the portfolios will differ somewhat between the years since the same data is not available for all years and in some years extreme outliers are excluded. Value and growth portfolios created from the same ratio and for the same year are however the same number of stocks. This will not affect the results in a negative way but the more stocks that are included in the portfolio the more reliable the results will turn out to be.

Microsoft Excel is used for all calculations of the returns and also for the construction of the different portfolios. This is since the authors have some pre-knowledge of this program and since it presents the results easily and clearly.

**4.5 - Calculation of Returns**

Data on daily stock prices has been collected from DataStream but in order to measure how successful a stock is and how much its value has grown from one period to another net returns needs to be calculated (Ruppert 2004, p.75). Instead of using raw stock prices the stock returns are often used when financial data is analyzed. The advantage with this is that they show the revenues that are relative to the size of the initial investment. Further, it is argued that returns are more appropriate to use when conducting statistical analyzes as is the case in this study (Ruppert 2004, p.75). The returns from time $t - 1$ to time $t$ is
In order to calculate the net returns adjusted stock prices were gathered from Thomson Reuters Datastream. Adjusted stock prices are official closing prices and that they already are adjusted for capital actions. This means that the effect of dividends is already taken into account. Using the formula above we first calculated daily stock returns. As a second step we calculated a daily average for all the companies and then used these 260 values for each year included in our time period. These returns were then risk adjusted and used in our statistical tests. However, for presentational purposes we also calculated the yearly returns by multiplying the daily return with the number of trading days in each year since the daily returns were very low and less straight forward in terms of visual confirmation.

4.6 - Market Index

In order to evaluate how well the portfolios that we have created have performed over the years that we are investigating we are going to compare them to the market index. The market index that we have decided to use is the OMX STOCKHOLM (OMXS) index that consists out of all listed on the Stockholm stock exchange and was previous called the SAX-index. (NASDAQ OMX, 2014).

4.7 - Risk adjustment

As mentioned previously when discussing risk, a portfolio with low risk usually means that the expected return of the same portfolio is also expected to be low (Arnold, 2008, p. 178). Since the opposite is also true, not taking into account what risk levels the portfolios have and only comparing returns would only tell half of the story (Bodie et al, 2011, p. 224). A result of higher returns for portfolio A does not mean that this portfolio is a better option than portfolio B with lower returns if the risk is much higher for portfolio A. In order to fairly compare A and B these portfolios needs to be risk adjusted so that the potential difference in returns between the two is not because of differences in risk.

According to Bodie et al (2011, p.849) evaluating the performance of firms on just the basis of returns are not very useful. The returns must be adjusted for risk in order for a comparison to be meaningful.

One common way to go about risk adjustment is through something called the Sharpe ratio. Sharpe ratio is the expected return of the portfolio $R_p$ minus the risk free rate $\tau_f$ divided by the standard deviation of the portfolio $\sigma_p$. (Sharpe, 1966, p.131). The formula is presented below:

$$ R_t = \frac{P_t}{P_{t-1}} - 1 $$

Source: (Sharpe, 1966, p.131)
The Sharpe ratio gives a numerical value that can be compared between the different portfolios (Bodie et al, 2011, p. 161-162). The greater this number is, the better the portfolio is in terms of performance. A negative Sharpe ratio would imply that the investment performed worse than the risk free alternative (Sharpe, 1966, p.134). Examples of studies utilizing the Sharpe ratio to risk adjust for their tests of value versus growth stocks are Pätäri & Leivo (2009) and Gregory et al (2003).

4.8 – Risk-free rate

In order to calculate the Sharpe ratio the risk-free rate is needed. Bodie et al (2011, p. 157) defines the risk free rate as the rate that an investor can earn just by investing their money in an risk-free asset such as treasury bills, money market funds or put them in the bank. The data for the risk-free rate are collected from Thomson Datastream and is presented in the table below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Risk free rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>3.5%</td>
</tr>
<tr>
<td>2006</td>
<td>4.0%</td>
</tr>
<tr>
<td>2007</td>
<td>4.2%</td>
</tr>
<tr>
<td>2008</td>
<td>3.4%</td>
</tr>
<tr>
<td>2009</td>
<td>3.0%</td>
</tr>
<tr>
<td>2010</td>
<td>2.6%</td>
</tr>
<tr>
<td>2011</td>
<td>2.1%</td>
</tr>
<tr>
<td>2012</td>
<td>1.5%</td>
</tr>
<tr>
<td>2013</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

Table 2: Risk free rate

4.9 - Hypotheses

In this section the hypotheses that will help us answering our research question will be presented. Each hypothesis will contain a null hypothesis and an alternative hypothesis. However, in order to understand how to decide if a hypothesis should be rejected or not some statistical terms are explained in the section below before listing the actual hypothesis.

In order to either reject or accept the null hypotheses one has to evaluate if the findings are statistically significant (Bryman & Bell, 2011, p. 353). Statistical significance gives an indication on how confident you can be that the results are generalizable to the whole population from which the sample is drawn (Bryman & Bell, 2011, p. 353). The most commonly used significance levels in statistics are 10%, 5% or 1%. However, most common of them all is the use of 5% significant level and this is the level that will be used in this study. (Moore et al., 2009, p. 399). Simply explained this means that there are less than 5 possibilities out of 100 showing a false relation. (Bryman & Bell, 2011, p. 353). This means that in the case of this study, if the P-Value \( \leq 0.05 \) the null hypothesis is rejected. However, there is no exact point where a test becomes significant or insignificant, meaning that there is no practical distinction between a p-value of 0.049 and a p-value of 0.051. (Moore et al., 2009, p. 399).
In the process of accepting or rejecting the null hypotheses some errors can occur and they are divided into type 1 and type 2 errors (Bryman & Bell, 2011, p. 354). Type 1 errors are when the null hypothesis is wrongly rejected and type 2 errors on the other hand occur when the null hypothesis is accepted but should actually be rejected (Bryman & Bell, 2011, p. 354).

We will test if the hypotheses concerning the low P/E and P/B (value stocks) portfolios outperforms the high P/E and P/B (growth stocks) portfolios for all the years between 2005 to 2013. This leads to the following hypotheses:

**Hypothesis 1-9**

H0: *The returns from a portfolio of low P/E ratios are not higher than the returns from a portfolio of high P/E ratios during the years 2005-2013.*

HA: *The returns from a portfolio of low P/E ratios are higher than the returns from a portfolio of high P/E ratios during the years 2005-2013.*

**Hypothesis 9-18**

H0: *The returns from a portfolio of low P/B ratios are not higher than the returns from a portfolio of high P/B ratios during the years 2005-2013.*

HA: *The returns from a portfolio of low P/B ratios are higher than the returns from a portfolio of high P/B ratios during the years 2005-2013.*

**4.10 - Normality**

A lot of statistical tests assume normal distribution of the data (Bodie et al, 2011, p.162). An easy way to get an initial view of normality is to plot the data into graphs according to probability and if the data looks reasonable close to the bell shape more test can be performed in statistical programs since the data then can be classified as normal distributed. (Ruppert, 2004, p. 23-24). The Shapiro–Wilk test has been shown to produce the best power of results to the level of significance (Razali, Wah, 2011).

A normally distributed sample of data should have a skewness of 0 and a kurtosis of 3 (Ruppert, 2004, p. 24-25). Skewness is the measure of how asymmetrical the data is, and the kurtosis is a measure of how much of the data is concentrated in the bell shape compared to what is in the tails (Ruppert, 2004, p. 25). Our normality graphs and potential normality tests will be tested in IBM SPSS 21 and displayed in chapter 5.

**4.11 - Selection of variables**

When looking at our hypotheses the goal is to find out if the returns from one portfolio are significantly different from another portfolio. A compared mean test is necessary and normally the most common test would be an independent sample t-test (Rice, 2006, p.421). This test is called a parametric test and assumes normal distribution and is appropriate for comparing samples that are not related to each other (Ruppert, 2004, p. 23-24), (Bryman, Cramer 2005, p.144).
An equivalent test to the independent sample t-test that does not assume normal distribution, and compares not the means but the medians of the sample, is a non-parametric test called the Mann-Whitney U test or simply Mann Whitney test (also known as the Wilcoxon Rank-sum test) (Mann, Whitney 1947, p.50).

The null hypothesis in this test is that they are not different while the alternative hypothesis is that they are different (Mann, Whitney 1947, p.51). The formula is presented below:

\[ U, R_p = N_{p1}N_{p2} + \frac{N_{p1}(N_{p1} + 1)}{2} - T_{p1} \]

Source: (Mann, Whitney 1947, p.51)

Where \( N_{p1} \) and \( N_{p2} \) are the numbers of the daily returns for the P/E and P/B portfolios and \( T_{p1} \) is the sum of the ranks for portfolio 1.

This test gives more reliable and exact information than a non-parametric t-test and almost as efficient and reliable as t-tests on parametric data (Rice, 2006, p.435). Other scientific papers that used this test when they looked at differences between value and growth stocks were Bauman, et. al (1998) and Athanassakos (2009). The tests that will be performed in this study will be done in IBM SPSS 21.
Chapter 5 - Empirical Findings

This chapter will present the empirical findings of the research. The chapter starts off with presenting and explaining the descriptive statistics of the study along with the normality testing of the data. An overview of the results and the statistical tests that have been performed are then presented. The chapter ends with a summary of the results of the hypotheses testing.

5.1 – Descriptive statistics

In order to conduct the research and actually see if value stocks are outperforming growth stocks on the Stockholm exchange market data has to be collected, sorted and statistically tested. In the following section some descriptive data is highlighted in both tables and words.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>V=Value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G=Growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nr of firms</td>
<td>35</td>
<td>37</td>
<td>37</td>
<td>38</td>
<td>34</td>
<td>32</td>
<td>36</td>
<td>35</td>
<td>32</td>
</tr>
<tr>
<td>Mean P/E</td>
<td>9,0</td>
<td>37</td>
<td>9,2</td>
<td>41</td>
<td>8,5</td>
<td>44</td>
<td>6,6</td>
<td>28</td>
<td>4,8</td>
</tr>
<tr>
<td>Median P/E</td>
<td>9,6</td>
<td>35</td>
<td>9,5</td>
<td>39</td>
<td>8,6</td>
<td>39</td>
<td>6,8</td>
<td>22</td>
<td>5,1</td>
</tr>
</tbody>
</table>

Table 3: Descriptives for the P/E ratio

Table 3 presents descriptive statistics for both the value and growth portfolios when ranked by the P/E ratio over the years 2005-2013. The table shows that the number of firms differs somewhat between the years and this is due to that some extreme outliers have been excluded during some of the years but also because that data was missing for some of the firms. Based on the numbers for mean P/E it can easily be recognized that value portfolios are consisting of companies with low ratio and growth portfolios of firms with a high ratio. Further the average (mean) P/E ratio is rather stable over the whole time period of this study except in the years 2008 and 2009 for both value and growth stocks. 2008 was the year when the financial crisis started and along with 2009 the crisis had a huge impact on these years. Since then the average P/E ratio has recovered and is back on the same level as before the economic distress.
Table 4: Descriptives for the P/B ratio

Table 4 shows the descriptive statistics for value and growth portfolios based on the P/B ratio over the whole time period of the study. The number of firms in each portfolio is higher than when the portfolios are ranked by the P/E ratio and this is since more companies had their P/B ratio available in Thomson Datastream. As for the mean P/B the same trend with a lower average during the years of the financial crisis does not really exist. Instead the mean is rather consistent around the same level over the whole time period.

5.2 - Normality testing

In order to figure out if our data was normally distributed or not we plotted two graphs, one on the portfolio consisting of growth stocks that are based on the P/E ratio and one on the portfolio with growth stocks based on the P/B ratio. The graphs that we found did not seem to follow normal distribution and it can be seen below in figures 7 and 8.

Figure 7: Normality, Figure 8: Normality

However, in order to be totally certain that the data is not normally distributed we decided to perform a Shapiro-Wilk test and the results are presented in the figures below.
The tables tell us that there is a 0.00 significance level and that the data is as suspected from looking at the histograms not normally distributed. This means as explained in chapter 4 that a non-parametric test is needed in order to reach as correct results as possible.

5.3 – Portfolio and market returns

Table 5 shows the yearly returns of both the value portfolios and the growth portfolios when the stocks are placed in portfolios based on the P/E ratio over the time period 2005-2013.

<table>
<thead>
<tr>
<th>Year</th>
<th>Value portfolio returns</th>
<th>Growth portfolio returns</th>
<th>Value-growth spread</th>
<th>Market index</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>0.413328</td>
<td>0.589277</td>
<td>-0.175949</td>
<td>0.281572</td>
</tr>
<tr>
<td>2006</td>
<td>0.31989</td>
<td>0.288532</td>
<td>0.031358</td>
<td>0.229464</td>
</tr>
<tr>
<td>2007</td>
<td>-0.17743</td>
<td>0.013226</td>
<td>-0.190656</td>
<td>-0.04356</td>
</tr>
<tr>
<td>2008</td>
<td>-0.6914</td>
<td>-0.52054</td>
<td>-0.17086</td>
<td>-0.47142</td>
</tr>
<tr>
<td>2009</td>
<td>0.676409</td>
<td>0.660905</td>
<td>0.015504</td>
<td>0.420322</td>
</tr>
<tr>
<td>2010</td>
<td>0.16</td>
<td>0.221021</td>
<td>-0.061021</td>
<td>0.224972</td>
</tr>
<tr>
<td>2011</td>
<td>-0.19248</td>
<td>-0.09855</td>
<td>-0.09393</td>
<td>-0.14654</td>
</tr>
<tr>
<td>2012</td>
<td>0.131981</td>
<td>0.13098</td>
<td>0.001001</td>
<td>0.129643</td>
</tr>
<tr>
<td>2013</td>
<td>0.313827</td>
<td>0.307815</td>
<td>0.006012</td>
<td>0.215929</td>
</tr>
</tbody>
</table>

Table 5: Value and growth portfolio returns in percentages when ranked by the P/E ratio

From the table above, it can easily be seen that the yearly returns differ widely from year to year for both the growth and the value portfolios. The highest yearly return is as high as 67.6% and the lowest is as low as -69.1%. The year 2008 yielded the lowest return both for the value and the growth portfolio and this can partly be explained by the financial crisis. 2008 was the year when the financial crisis started and this is clearly reflected in the yearly returns for that year. The following year, 2009, has the highest returns for both value and growth portfolios which give an indication that the market
reached a bottom low in the beginning of 2009 and then started to recover from the economic downturn. Further, the reader can see that the year 2011 has yielded negative returns as well which can be explained by the European sovereign debt crisis that made stock prices across the world drop rather drastically. However, the returns for the portfolios during the latter part of the time period shows that the Swedish market has started the process of recovering from years with economic distress.

Further, the table shows that the portfolio of value stocks outperforms growth stocks in four out of nine years. In the years 2006, 2009, 2012 and 2013 the value portfolio is generating a higher annual return than the growth portfolio. Another interesting aspect to take into consideration is the fact that for the majority of the years the both portfolios are performing rather similar to each other and the difference in return in-between the portfolios is lower than 10%.

In order to see how the both portfolios have performed compared to the rest of the market the market index yearly returns are presented as well. The market index follows the same pattern as the both portfolios when it comes to the negative returns for year 2008 and 2011 confirming that the whole Swedish market was affected by the crises. In 2009 the pattern of the market index is in line with both portfolios as well, showing high returns likely due to the fact that the market started to recover from when the crisis was the worst.

When comparing the yearly returns for the value portfolios to the market index it can be seen that the value portfolio outperforms the market index at five out of nine occasions. This means that for these years it would have been preferable to place an investment in value stocks. The growth stock portfolios on the other hand outperform the market index seven out of nine years.

The results of the yearly returns for both value and growth portfolios along with the market index is plotted in the graph below in order for the reader to get a clear picture of how the different portfolios have performed.

**Figure 11: Graph of returns for the P/E ratio**
Table 6 shows the yearly returns of both the value portfolios and the growth portfolios when the stocks are placed in portfolios based on the P/B ratio over the time period 2005-2013.

<table>
<thead>
<tr>
<th>Year</th>
<th>Value portfolio returns</th>
<th>Growth portfolio returns</th>
<th>Value-growth spread</th>
<th>Market index</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>0.318693</td>
<td>0.526564</td>
<td>-0.207871</td>
<td>0.281572</td>
</tr>
<tr>
<td>2006</td>
<td>0.311376</td>
<td>0.304321</td>
<td>0.007055</td>
<td>0.229464</td>
</tr>
<tr>
<td>2007</td>
<td>-0.1518</td>
<td>0.043855</td>
<td>-0.195655</td>
<td>-0.04356</td>
</tr>
<tr>
<td>2008</td>
<td>-0.53189</td>
<td>-0.44654881</td>
<td>-0.08534119</td>
<td>-0.47142</td>
</tr>
<tr>
<td>2009</td>
<td>0.737055</td>
<td>0.644351</td>
<td>0.092704</td>
<td>0.420322</td>
</tr>
<tr>
<td>2010</td>
<td>0.169344</td>
<td>0.209963</td>
<td>-0.040619</td>
<td>0.224972</td>
</tr>
<tr>
<td>2011</td>
<td>-0.3016</td>
<td>-0.19362</td>
<td>-0.10798</td>
<td>-0.14654</td>
</tr>
<tr>
<td>2012</td>
<td>0.066775</td>
<td>0.059269</td>
<td>0.007506</td>
<td>0.129643</td>
</tr>
<tr>
<td>2013</td>
<td>0.326489</td>
<td>0.295413</td>
<td>0.031076</td>
<td>0.215929</td>
</tr>
</tbody>
</table>

Table 6: Value and growth portfolios returns in percentages when ranked by the P/B ratio

Just as for the portfolios based on the P/E ratio the portfolios based on the P/B ratio show a great spread in returns over the different years with the highest return being 73.7% and the lowest -53.1%. Again the year 2008 resulted in the lowest yearly returns due to the economic distress that Sweden along with the rest of the world where dealing with during that time. 2011 present’s negative returns as well due to the turbulent times surrounding the European debt crisis. The market has however recovered after these major crises which is reflected in the rather high positive returns for year 2013.

In the years 2006, 2009, 2012 and 2013 the portfolio consisting out of value stocks is performing better than the portfolio with growth stocks. Interesting is that these are the same years as for when the portfolios are created with the P/E as basis.

The market index shows negative returns for the years 2007, 2008 and 2011 but positive returns for the remaining years. When comparing the returns of the value portfolio to the market index the value portfolios are outperforming the market index at four out of nine occasions. The growth portfolios on the other hand outperform the market index in six out of nine years.

The results of the yearly returns for both value and growth portfolios along with the market index is plotted in the graph below in order to show how they change over the years.
The goal of the next step of the study is to find out how the risk adjusted measure for the growth and value stock portfolios looked like to figure out how well they performed. This process was first done with all the price-to-earnings stock portfolios and then it was repeated for the price-to-book-value stock portfolios.

What to take away from the Sharpe ratios presented in table 7 is that the data produced is a numerical value meant to rank the best portfolio when it is risk-adjusted. A negative value does however indicate that the portfolio’s return is lower than the risk-free interest rate. If these kinds of results would persist, the ideas about the risk and return

### Table 7: Risk-adjusted returns for the P/E ratio

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>3.949824</td>
<td>5.661210099</td>
</tr>
<tr>
<td>2006</td>
<td>1.844969</td>
<td>1.222089</td>
</tr>
<tr>
<td>2007</td>
<td>-1.27938</td>
<td>-0.1817</td>
</tr>
<tr>
<td>2008</td>
<td>-2.10595</td>
<td>-1.85647</td>
</tr>
<tr>
<td>2009</td>
<td>2.43794</td>
<td>3.420588</td>
</tr>
<tr>
<td>2010</td>
<td>0.935737</td>
<td>1.09774</td>
</tr>
<tr>
<td>2011</td>
<td>-0.99647</td>
<td>-0.54023508</td>
</tr>
<tr>
<td>2012</td>
<td>1.143628</td>
<td>0.88136</td>
</tr>
<tr>
<td>2013</td>
<td>2.759353</td>
<td>2.753998</td>
</tr>
</tbody>
</table>
relationship within Modern Portfolio Theory would be questioned since an investor expects a return premium for holding a riskier asset.

Negative Sharpe ratios occurred around the time of the financial crisis, something that might be expected, as relatively high risk free rates at that period together with very low returns explains that. The second time negative Sharpe ratios appeared was during 2011 when, as previously stated, a sovereign debt crisis in Europe had a negative effect on stock prices.

When comparing the portfolios for 2005, both of them produced a very good Sharpe ratio of 3.9 and 5.7 making investments in both high P/E (growth) and low P/E (value) portfolios a good option. The growth portfolio did however outperform the value portfolio. 2006 was another year with Sharpe ratios above 1 which intuitively would seem to be a good investment, since the excess returns over the risk free rate was higher than the standard deviation or the risk of that portfolio. This year the value portfolio was the better alternative with a ratio of 1.8 compared to the 1.2 of the growth portfolio. For all the years with negative Sharpe ratios (2007, 2008 and 2011), the growth portfolio even though it was negative, outperformed the value portfolio. Especially during 2007 when the difference between -0.1817 and -1.27938 is very large.

After the downturn of the debt crisis the returns once again started to increase and 2012 showed a year with a ratio of 1.14 and 0.88. This year the value portfolio is again the winning portfolio. The trend of higher Sharpe ratios continued for 2013 where both growth and value stocks presented a ratio of 2.75. Over the tested time period, value portfolios outperformed growth portfolios three out of nine times.

<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>2,787913</td>
<td>4,20324</td>
</tr>
<tr>
<td>2006</td>
<td>2,014347</td>
<td>1,386039</td>
</tr>
<tr>
<td>2007</td>
<td>-1,30753</td>
<td>0,01095</td>
</tr>
<tr>
<td>2008</td>
<td>-1,89703</td>
<td>-1,61243685</td>
</tr>
<tr>
<td>2009</td>
<td>2,880448</td>
<td>3,553403</td>
</tr>
<tr>
<td>2010</td>
<td>0,933797</td>
<td>1,19442</td>
</tr>
<tr>
<td>2011</td>
<td>-0,3016</td>
<td>-0,9989</td>
</tr>
<tr>
<td>2012</td>
<td>0,090746</td>
<td>0,318913</td>
</tr>
<tr>
<td>2013</td>
<td>2,58095</td>
<td>2,750265</td>
</tr>
</tbody>
</table>

Table 8: Risk-adjusted returns for the P/B ratio

Looking at the Sharpe ratios of price-to-book measure of the value and growth portfolios, the results seem to look similar to the price-to-earnings ratios. What is clearly similar is that the general trends that could be seen from year to year in the P/E portfolios can also be seen in the P/B portfolios. Here as well as with the P/E portfolios 2005 was a good year to hold both value and growth stocks. The growth portfolios did outperform the value portfolios with a Sharpe ratio of 4.2 to the value portfolios 2.8. During 2006 the ratios were lower at 2.0 and 1.4 and this year, like the with the P/E
portfolio, the value portfolio is the winner. In 2007 the difference was large between the portfolios, the growth portfolio just above zero at 0.01 while the value portfolio was way below, at -1.3. Similarly with the P/E portfolio during the year of the financial crisis both the growth stocks and the value stocks displayed a negative portfolio ratio with -1.9 and -1.61 with the growth portfolio again being the one performing better. In 2010 both the portfolios did better with ratios of 0.9 and 1.2 and the growth portfolio again outperformed the value portfolio. In 2012 the value portfolio had a bad year with only a ratio of 0.09 while the growth portfolio did a little bit better at 0.3. Finally in 2013 both portfolios did better and landed at 2.6 for the value portfolio and 2.8 for the growth portfolio. Out of nine years the growth portfolio outperformed the value portfolio seven times.

5.5 - Significance testing of the variables

Figure 13, Figure 14 and Figure 15: Daily significant testing of the risk adjusted measures for the P/E values 2005-2007

Above the results of the daily significance testing for the risk adjusted measures for the time period 2005-2007 can be seen. For the results to be significant the last row of the boxes labeled Asymp. Sig (2-tailed), which is the asymptote significance level for a two tailed test, usually needs to be less than 5% or 0.05 to be seen as significant. A result of 0.05 means that the difference found between the two tested samples appears 5% of the time out of pure random chance, which is usually low enough to be able to conclude that the results found are significant enough to draw some conclusions. A quick look at the results for all three years shows that the p-value of them are all higher than 0.05. The p-value for the 2005 risk-adjusted P/E portfolios was 0.255, which indicates that the difference between the two portfolios appears 25.5% of the times by chance. The values for 2006 and for 2007 are 0.456 and 0.396.

Figure 16, Figure 17 and Figure 18: Daily significant testing of the risk adjusted measures for the P/E values 2008-2010

For 2008 the p-value is very high; 0.885, which means that 88.5% of the times this difference can be attributed to chance. 2009 and 2010 displayed p-values of 0.459 and 0.695.
Figure 19, Figure 20 and Figure 21: Daily significant testing of the risk adjusted measures for the P/E values 2011-2013

For the years 2011 to 2013 all the p-values were high, highest 2012 with 0.918. 2011 had a p-value of 0.635 and 2013 had a p-value of 0.890.

Figure 22, Figure 23 and Figure 24: Daily significant testing of the risk adjusted measures for the P/B values 2005-2007

The p-value from 2005 is 0.427, which tells us that difference in the portfolios could appear just out of pure chance 42.7% of the times. The corresponding p-values for 2006 and 2007 are 0.337 and 0.447.

Figure 25, Figure 26 and Figure 27: Daily significant testing of the risk adjusted measures for the P/B values 2008-2010

The p-value from 2008 is very high, at 0.936 the difference that appeared would appear 93.6% by chance. For 2009 the p-value was 0.649 and for 2010 the p-value was 0.878.

Figure 28, Figure 29 and Figure 30: Daily significant testing of the risk adjusted measures for the P/B values 2011-2013
The last years presented generally high p-values with 0.656, 0.860 and 0.608.

What the high p-values for the P/E and P/B portfolios means is that the differences within them, more specifically, the differences between the growth stocks and the value stocks in the samples can be said to appear by chance instead of actual differences in the intrinsic nature of the portfolios. This does not mean that we can definitely say that there are no differences in the sample but that we with our testing have not found them.

5.6 - Hypotheses testing

Table 9: Significance levels for the tested portfolios

<table>
<thead>
<tr>
<th>Significance level P/B</th>
<th>Significance level P/E</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.427</td>
<td>0.255</td>
</tr>
<tr>
<td>0.337</td>
<td>0.456</td>
</tr>
<tr>
<td>0.447</td>
<td>0.396</td>
</tr>
<tr>
<td>0.936</td>
<td>0.885</td>
</tr>
<tr>
<td>0.649</td>
<td>0.459</td>
</tr>
<tr>
<td>0.878</td>
<td>0.695</td>
</tr>
<tr>
<td>0.656</td>
<td>0.635</td>
</tr>
<tr>
<td>0.860</td>
<td>0.918</td>
</tr>
<tr>
<td>0.608</td>
<td>0.890</td>
</tr>
</tbody>
</table>

Significance levels for the tested portfolios

Hypotheses 1-9

H0: The returns from a portfolio of low P/E ratios are not higher than the returns from a portfolio of high P/E ratios during the years 2005-2013.

HA: The returns from a portfolio of low P/E ratios are higher than the returns from a portfolio of high P/E ratios during the years 2005-2013.

As seen by the table above no significant results for any of the years was found for the P/E ratio portfolios, and therefore we fail to reject H0.

Hypothesis 9-18

H0: The returns from a portfolio of low P/B ratios are not higher than the returns from a portfolio of high P/B ratios during the years 2005-2013.

HA: The returns from a portfolio of low P/B ratios are higher than the returns from a portfolio of high P/B ratios during the years 2005-2013.
Similarly to the P/E portfolio, none of the p-values during the years 2005-2013 were low enough to be significant, and therefore we fail to reject H0.
Chapter 6 - Discussion

This chapter will contain a discussion of the empirical results. First the results are going to be discussed in regards to theories such as the Efficient Market Hypothesis and Behavioral Finance. Next the results for the period of the financial crisis are evaluated and discussed. Further the results are discussed in connection to what previous researches have concluded upon. The chapter ends with a discussion on how the insignificant results are interpreted.

The results that are presented in the previous chapter give an indication that growth stocks are performing better than value stocks on the Swedish stock exchange. After risk-adjusting the returns growth stocks are still performing better than value stocks. However, when the risk-adjusted measures are tested with a Mann-Whitney test the results are statistically insignificant.

6.1 - Efficient Market Hypothesis, Behavioral Finance and the results from P/E and P/B testing

Fama (1970) established the Efficient Market Hypothesis (EMH) to explain how stocks and the returns of stocks corresponded to their intrinsic values. He argued that the market was efficient and that this meant that the intrinsic values of the stocks were represented perfectly by the stock price (Fama, 1970, p.415). This would then mean that making positive consistent risk-adjusted returns is impossible. The implications that this would have on our research would then first of all mean that a portfolio, any portfolio whether it was a high or low P/E or high or low P/B could not beat the returns, if adjusted to risk, from the market. What it also implies is that finding differences between the portfolios itself, like the portfolio with low P/E outperforming the high P/E portfolio for example, would not be possible, again if the conditions of risk-adjustment and that the effects are persisting is fulfilled. Another school of thought has started to criticize the ideas around them, behavioral scientists like Kahneman and Tversky (1973) for example argued that irrational investors made sure that the intrinsic value of the stocks did not match the price of the stock. In this case different risk-adjusted portfolios like the low P/E and the high P/E portfolios might well produce different returns over a significant period of time.

Looking at the returns in this study the growth portfolio outperformed the value portfolio five times out of nine while the value portfolio was a smarter choice four out nine times for both the P/E and the P/B measure. When the portfolios were risk-adjusted the growth portfolio was the better choice six times out of nine for both the measures. This would then go against the ideas of the EMH, since when accounting for risk, one portfolio of stocks should not be outperforming another. For behavioral finance this is instead explained by the actions of irrational investors. The difference between the pure returns and the risk adjusted measure seems to indicate that the returns of the value portfolio from 2009 for price-to-book stocks (the year that the returns were different from the risk-adjusted return in comparison) had a much higher risk associated with it and therefore making it a less desirable portfolio when risk was accounted for. The same seem to be true for the price-to-earnings portfolios where the pure returns from the value portfolio outperform the growth portfolio but the best investment option after risk is considered is the growth portfolio.
6.2 - Results during the financial crisis

The results that we found during the period 2008-2009 should have been affected by the global financial crisis and therefore deserves some attention. It can be interesting to shed some light upon how value and growth stocks behave in times of economic distress. The returns from 2008 shows negative values for all the tested portfolios, both for price-to-earnings and price-to-book. The highest decrease was 69%, for the value portfolio calculated with the price-to-earnings ratio. The market also went down with 47%. This means that the effects of the financial crisis could clearly be seen on the Stockholm Stock exchange. The value stocks for both the ratios seemed to be hit harder than their corresponding growth portfolios in 2008, -69% versus -52% and -53% versus -44%. Quite the opposite happened when the portfolios bounced back the following year; the value portfolios for the P/E ratio slightly outperformed the growth portfolio 67% versus 66% and 73% versus 64% for the P/B portfolio. The volatility (beta) for the value stocks might be a bit higher since they react stronger to the shifts of the market.

When the returns were adjusted for risk, the results were a bit different (see table below) compared to the pure returns. For 2008 the growth portfolios stayed the smartest option with a smaller negative result than the value portfolios. For 2009, the pure returns suggested that the value portfolios were better options but after being adjusted for risk both growth portfolios outperformed the value portfolios as can be seen in the table below.

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price-to-book ratio</strong></td>
<td><strong>Value</strong></td>
<td><strong>Growth</strong></td>
</tr>
<tr>
<td>Value</td>
<td>-1,89703</td>
<td>-1,61243685</td>
</tr>
<tr>
<td>Growth</td>
<td>2,880448</td>
<td>3,553403</td>
</tr>
<tr>
<td><strong>Price-to-earnings ratio</strong></td>
<td><strong>Value</strong></td>
<td><strong>Growth</strong></td>
</tr>
<tr>
<td>Value</td>
<td>-2,10595</td>
<td>-1,85647</td>
</tr>
<tr>
<td>Growth</td>
<td>2,880448</td>
<td>3,553403</td>
</tr>
</tbody>
</table>

Figure 31: Risk-adjusted returns during the financial crisis

As mentioned earlier in this study, various studies have concluded that value stocks outperform growth stocks (something that will be discussed further in section 6.3) in a majority of the years within a time period. However, this is not the case for this study; instead growth stocks outperform value stocks for the majority of years. One speculation towards why this is the case could be since big part of the time period investigated in this study includes the financial crisis and the turbulent economic years that followed. During unstable economic periods it could be harder to earn a value premium due to the high volatility of stocks. However, this cannot be concluded in this study but is worth looking further into in the future.

6.3 - Previous research and the results

What became clear from these results is that the value stocks did not outperform growth stocks that often and that it in fact was the other way around; six out of nine years the portfolio consisting of growth stocks were a better investment choice. This result went against Basu (1975, p. 53-64), where he concluded that low P/E stocks outperformed low P/E stocks, since no consistency over the years that weighed in the favor of the value stocks was found. Again, the results of Basu (1977, p. 663-682) were not seen in
our research because the value stocks did not outperform growth stocks for the P/E portfolios, and when the portfolios were risk-adjusted the results weighed even heavier in the favor of the growth stocks.

Lakonishok, et. al (1994, p.1541-1577) found that value stocks outperformed growth stocks and that it again did not seem to be because of any difference in risk level, contrary to our findings. They also found that one reason for the performance difference between the portfolios was that there was an overestimation of future earnings for the growth portfolios in comparison to the value stocks. This effect does not seem to be present in our findings.

Fama and French (1998, p.1975-1998) was one of the first research papers to expand the tests on an international market between the years 1975 to 1995 and Sweden was included within this sample. The results overall was that the value stocks again outperformed the growth stocks, and this included Sweden. They managed to conclude that in most of the cases this value premium was because of higher risk for the value stocks. To some extent that was mirrored in our research where the risk adjusted return made for a poorer investment choice even though the returns were higher. This was only true for one year though and our overall findings did not match those of Fama and French.

As a reaction to the model that Fama and French presented to explain why value stocks outperformed the growth stocks, Bauman et. al (1998, p.7588) and Gregory et. al (2003, 213-255) both tested risk-adjusted stocks on the U.S market and internationally. Bauman et. al found that value stocks outperform growth stocks and tested whether the effect they found was larger on large-cap value versus growth stocks than on small cap value versus growth stocks. The concluded that this was the case and that it was not risk sensitive but that value stocks had the same amount of risk tied to them. Gregory et al built on this tests done by Fama and French and Bauman et. al and concluded, in favor of Bauman et. al results, that indeed value stocks were more profitable even when risk-adjusted. These findings go against what we have found in our research, since only two out of nine years were in favor of the value stocks for the price-to-book ratio and three out of nine for the price-to-earnings ratio.

Zhang (2005, p. 67-95) tested value stocks on the New York Stock Exchange and in Japan, Hong Kong, Malaysia, Taiwan and Thailand with view of them being more risky, and concludes that not only are they more risky but also that this is due to the fact that many of the stocks classified as value stocks are from firms in a distressed situation with higher uncertainty about future earnings, making the higher returns a compensation for the higher risks. This study mirrors the results from the Fama and French (1998) and expands it to show that similar patterns of higher risks for value stocks outside of the U.S and also our research to some degree. That is the part about value stocks generally being a bit more risky seems to hold true in our study, but it does not seem to produce higher returns.

Truong (2009, p. 1-7) investigated if a value premium existed on the stock exchange of New Zealand and using the P/E ratio as a measure showed that value stocks were performing better than growth stocks. These results are clearly contrary to the results of our study.

Pätäri & Leivo (2009, p.5-19) presented a study on value strategies on the Finnish market that should be interesting to compare to our study since the Finnish and the
Swedish market could be said to have similar characteristics and trends. However, the results of Pätäri & Leivo’s study showed that portfolios of value stocks outperformed portfolios of growth stocks in most years which was not the case in our study. Although we used a different time period than the Finnish study it is still interesting to see that the results can differ among neighbor countries were the markets are supposed to be rather similar.

Sareewiwatthana (2011, p. 1-13) found that the portfolios he created outperformed the market and that there is a value premium existing on the Securities Exchange of Thailand. In our study the created portfolios outperform the market index in a majority of the years that we have examined which is a similarity to Sareewiwatthana’s (2011) study. However, we did not find a clear value premium and in that sense our findings differ from each other.

Deb (2012, p. 48-62) investigated if value stocks outperformed growth stocks on the Indian market. He discovered a value premium for most of the years that he studied, however he did not find significant results during the period 2006-2010. This is interesting in two aspects, first since we did not reach any significant results in our study meaning that there are more researchers who had similar results. Secondly, the time period that did not reach significant findings is during the financial crisis which could indicate during turbulent financial times it could be hard to establish if the results appeared by chance or not.

Clearly previous research has shown that value stocks in the long run usually outperform growth stocks. What can also be said is that for our research this does not necessary hold true. Many reasons for the differences can of course exist. One reason, and the most straight forward one, is that during this time period on the Swedish market not much of a value premium existed, making our results possible. Another idea that might explain some of the differences of results is that the holding period of the value and growth portfolio was only a year. After that a new portfolio was created with new value and growth stocks according to the ratios used. Using another longer holding period might give other results. Important to note was however that many of the same stocks classified as value and growth stocks for more than one year, suggesting that the effects might not be that different.

6.4 - Implications of the significance testing

The results we got from the portfolios for both the P/E and P/B measure was shown to be insignificant, since they had a p-value higher than 0.05, they need to be questioned.

An insignificant result means is that the findings we got could have appeared by chance and not because there was a real difference between the tested samples. Take an example of a significance of 0.936, this means that the results can occur 93.6% of the time just out of pure chance. What has previously been discussed is the fact that the growth stocks seemed to outperform the value stocks, eight out of nine times for the P/B ratio and seven out of nine times for the P/E ratio when they are risk-adjusted. The significance testing we did was to see if the two samples (one value portfolio and one growth portfolio) were significantly different from each other.

What an insignificant result then means is that we cannot conclude that the growth portfolio is better than the value portfolio during those eight (7) years nor can we say
that the value portfolio was a better option during the two (3) years it outperformed the growth portfolio. In the context of the previous research this means that we cannot find any evidence of a value portfolio outperforming a growth portfolio nor can we find the opposite. Even though we cannot find this relationship it does not mean that it does not exist. The only way we could safely say that the value stocks was outperformed by the growth stocks would have been to find significant results on the years that the growth portfolios got a higher Sharpe ratio. These results go against all the studies that found evidence of a value premium for value stocks. To clarify and summarize, by failing to reject the null hypothesis we are saying that during our time period (2005-2013) there was no significant difference in risk adjusted returns between value stocks and the growth stocks.
Chapter 7 – Conclusion

This chapter will provide an answer to the research question along with some concluding remarks. Further the theoretical and practical contributions that this research brings will be discussed. Limitations and how well the quality criterion has been fulfilled will then be discussed. Finally, the chapter ends with some suggestions for future research.

7.1 - Answer to the Research Question

The main objective of this research was to investigate if a portfolio of value stocks would outperform a portfolio of growth stocks on the Swedish stock exchange. The research question that we developed and have built the whole research around reads as follows:

Would a portfolio consisting of value stocks outperform a portfolio consisting of growth stocks on NASDAQ OMX Stockholm?

The deductive approach along with the quantitative method was followed and hypotheses were developed in order to answer the research question. Further, relevant data was collected from Thomson Reuters DataStream, returns were calculated and portfolios created. Next, the returns where risk-adjusted using the Sharpe-ratio. The Mann-Whitney U test was used in order to find if there is a significant difference between value and growth portfolios. The results of these tests are then presented in the fifth chapter and discussed in the sixth chapter.

Previous studies have shown that value stocks often display a value premium compared to growth stocks. The empirical findings from this research however show that value stocks only outperform growth stocks in four out of nine years on the Stockholm stock exchange during the years 2005-2013. As for the portfolios after risk-adjustment portfolios of value stocks outperform portfolios of growth stocks in even fewer years. However, the empirical results did not reach any statistical significance and therefore the results cannot be statistically concluded upon.

This means that in the context of answering the research question, we found no significant evidence of a portfolio of value stocks outperforming a portfolio of growth stocks on the NASDAQ OMX Stockholm.

In the research purpose of this paper it is mentioned that the goal also is to investigate how the financial crisis affected the situation with value and growth stocks. The risk-adjusted returns during the years of the financial crisis showed that growth stocks do perform somewhat better than value stocks. However, once again no significance was reached and therefore it cannot be said that a portfolio of value stocks outperforms a portfolio of growth stocks during the financial crisis.

7.2 - Contributions and research gap

Before conducting this research many studies had investigated if value stocks perform better than growth stocks, however, there was a lack of empirical studies on this phenomenon on the Swedish market. Previous studies only included the Swedish market as a part of a bigger sample such as the whole of Europe. These facts left us with
an obvious research gap and this study contributes with new empirical results and knowledge concerning the Swedish market which can be interesting for investors planning to invest on the Swedish stock market. Further, this study expands the theoretical knowledge within the field of finance and more specifically value investing in a rather small stock market such as the Swedish. Even though the results are not significant they still matter and future research can be built upon this paper.

Although there are researches covering the time period of the financial crisis we discovered a research gap of studies focusing on if value investing is actually affected by financial distress. The results of this study contribute with new results and theoretical knowledge on how value investing was affected by the recent financial crisis on the Swedish stock market. Since value investing is a popular strategy to undertake when investing it is important for investors to know if the strategy is successful even when the economic environment is turbulent and this study can be a guiding step in the right direction towards a superior investment strategy.

7.3 – Quality Criteria

In chapter two the authors address the phenomenon of Reliability, Replication and Validity and it is important to evaluate how well these concepts are fulfilled in this research.

The reliability of this study can be considered as high since the data collection and the empirical results are based on historical data that would not change over time (Bryman & Bell, 2011, p. 41). This means that the stability of the study is high and if the same method, measurements and data source for observing the same time period would be used again the same conclusion would be reached (Bryman & Bell, 2011, p. 157). Since the study is based on theoretical models with historical data the authors have not included any subjective judgments meaning that the inter-observer consistency of the research can be considered as high (Bryman & Bell, 2011, p. 158).

The replication of the study can be regarded as high since every step taken is well explained in the practical methodology. Further the personal backgrounds of the researchers are presented which can be taken into consideration by researchers aiming to replicate this study. These two points makes it possible for others to rather easily replicate this study.

Validity deals with if a concept actually measures what it is supposed to measure (Bryman & Bell, 2011, p. 42). The measurement validity of this study can be said to be high since the methods, theories and statistical tests have been used in previous studies in similar ways in the past. The external validity of this study can be considered as rather high since the whole Swedish stock market is investigated. However in order to generalize the results to another population the characteristics of that market need to be similar to the Swedish market. Lastly as mentioned in chapter 2 ecological validity does not apply to this research since the study does not include human representatives.

7.4 – Limitations

Since the results of this study are a bit contradictive to previous studies we have to be somewhat critical against some of the choices we have made in this research. First, for
some companies the P/E and P/B ratio was not available in Thomson Reuters DataStream and this lead to us excluding them from our sample which can have somewhat skewed the results. The optimal solution would instead have been to collect the data for the ratios manually from the company’s annual reports, however this could not be done due to time limitations we had. Further, we used daily data for our calculations of stock returns. Some previous studies have however used monthly data instead which could have given us different empirical results. Lastly, if there would have been more time it would have been both interesting and appropriate to use and test more than one measurement for risk-adjustment. In this paper we used the Sharpe-ratio but measures such as Treynor measure and Jensen’s alpha would have been good to include.

7.5 - Suggestions for future research

Along the process of conducting this research we have come up with a few suggestions for further research in fields surrounding value and growth stocks. These suggestions could bring a deeper understanding into the subject but also confirm results that previous studies have provided.

Firstly, the time period of this study is 2005-2013 but it would be interesting to study a longer or a different time frame. Since there is very little research done on the Swedish stock market it would make sense to further investigate it. A longer time period would provide clearer trends in the results and also reduce the effect of economic turbulent times. Using another time frame would show if the results have been different in the past but also how the future will turn out.

Secondly, it would be interesting to investigate if and how value and growth stocks perform within the different size segments that the Swedish market is divided into. This would provide information on if there is a value premium for the large-caps, mid-caps and small-caps separately on the Swedish market.

Thirdly, this research was limited to NASDAQ OMX Stockholm but one idea for future researchers could be to instead investigate the whole Nordic market. This would generate a bigger sample and the result might turn out in a differently way due to that.

Fourthly, it would also be interesting to in contrast to this study instead conduct a qualitative study focusing more on how investors are thinking when they are placing an investment into either value or growth stocks. This would result in more in-depth results surrounding behavioral finance and human’s psychological aspects regarding investment decisions.

Fifthly, in this research the portfolios are held only one year. It would be interesting to see if the results would turn out differently if the portfolios were held for a longer period than one year.
Reference list


Mann, Henry B. & Whitney, Donald R. (1947). "On a Test of Whether one of Two Random Variables is Stochastically Larger than the Other". *Annals of Mathematical Statistics* 18 (1): 50–60


