Risk management in Swedish hedge funds
A study of how different Swedish hedge fund managers perceive and manage risk

Master Thesis in Business Administration
Authors: Samuel Fri
         Joakim Nilsson
Tutors: Johan Eklund and Andreas Högberg
Jönköping May 2011
Preface

We first of all wish to show our gratitude to the respondents at Adrigo Asset Management, Sentat Asset Management, Dnb Nor, Risk Portfolio Management and Finansinspektionen for making the effort to participate in our thesis through interviews and a questionnaire.

We also want to thank our tutors Johan Eklund and Andreas Högborg for their most valuable help during the process of writing and for their opinions and guidance.

Jönköping, May 2011

__________________________
Samuel Fri

__________________________
Joakim Nilsson
Abstract

Background: Risk management has always been a complex topic, especially when it comes to hedge funds. Since hedge funds are able to utilize many kinds of financial instruments it is difficult to find a risk management strategy that goes well with them. Not much research regarding the Swedish hedge fund industry and its risk management has been done; hence we find it an interesting topic to focus this thesis on.

Purpose: The purpose of this thesis is to increase the knowledge of how Swedish hedge fund managers perceive and manage different types of risk and how they construct their portfolios with regards to risk management. We also want to investigate how risk measurements are used when it comes to risk management and how valid they are when applied to hedge funds.

Method: In this thesis a combination of exploratory and descriptive research strategies are used. The research method used is the inductive method. A qualitative study is performed as well as a semi-structured interview technique.

Conclusion: We conclude that the definitions of risk are ambiguous and differed greatly between the hedge fund managers. The risk in the hedge funds is managed differently depending on manager’s opinion regarding the nature and controllability of risk. We found that all managers agree on that risk is controllable to some degree but that there are always limits and that an uncertainty aspect is at all times present in a portfolio. The fund managers have to use their experience and knowledge in conjunction with an active risk management to run an efficient hedge fund. We conclude that all managers realize the importance of risk management, not only as a tool to achieve superior returns but also as an incentive for investors to choose their hedge fund over others.

We conclude that hedge fund managers believe that there is a need for restrictions and limits within their funds. It can be argued that by enforcing and following restrictions and limits the fund has established a foundation to build its risk management and investment philosophy upon. The larger hedge funds relied on strict enforcement of their rules and guidelines and had a high degree of hierarchy; the managers of the smaller hedge funds seemed to have a higher degree of freedom and a less complicated investment process.

We also find that the smaller a firm is the less enthusiasm is expressed regarding the usage of the different risk variables in their risk management and it is expressed to be more of a demand from different stakeholders. We conclude also that even though the risk measurements are used mostly in the larger firms one is still aware that they are not able to capture all the risks. Their validity is questioned by all sizes of firms.
**Abbreviations**

**CVaR** – Conditional Value-at-Risk

**ES** – Expected Shortfall

**GFC** – Global Financial Crisis

**LTCM** – Long Term Capital Management

**MSCI** – Morgan Stanley Capital International

**SEC** – Securities and Exchange Commission

**SD** – Standard Deviation

**TMT** – Technology, Media, Telecommunications

**VaR** – Value-at-risk
# Table of Contents

1 Introduction .........................................................................................................................1
  1.1 Background ....................................................................................................................1
  1.2 Problem discussion .........................................................................................................3
  1.3 Purpose ...........................................................................................................................4
    1.3.1 Problem definition ......................................................................................................4
  1.4 Limitations ......................................................................................................................4
  1.5 Perspective ......................................................................................................................4
  1.6 Outline ............................................................................................................................5

2 Methodology ........................................................................................................................6
  2.1 Research philosophy ........................................................................................................6
    2.1.1 Research strategies ....................................................................................................6
  2.2 Research method ..............................................................................................................7
  2.3 Method of data collection ...............................................................................................8
    2.3.1 Primary and secondary data .......................................................................................8
    2.3.2 Qualitative and quantitative method .........................................................................8
  2.4 Interview .........................................................................................................................9
    2.4.1 Interviewee selection .................................................................................................10
    2.4.2 The questionnaire .....................................................................................................11
  2.5 Primary data analysis .....................................................................................................12
  2.6 The credibility of the thesis ............................................................................................13
    2.6.1 Working approach ....................................................................................................13
    2.6.2 Reliability and validity ............................................................................................14

3 Theoretical framework .........................................................................................................15
  3.1 Definitions ......................................................................................................................15
    3.1.1 Risk ..........................................................................................................................15
    3.1.2 Hedge fund ...............................................................................................................16
    3.1.3 Risk management .....................................................................................................16
  3.2 Portfolio construction with regards to risk management .................................................18
  3.3 Diversification ...............................................................................................................19
  3.4 Hedging ..........................................................................................................................20

4 Empirical findings & Analysis .............................................................................................20
  3.5 Risk measurement ..........................................................................................................20
    3.5.1 Components of risk measure calculation ................................................................20
    3.5.2 Risk measures .........................................................................................................21
    3.5.3 Implications for risk measurement ..........................................................................25
Introduction

In the introductory chapter a background will be given to the thesis. It provides the circumstances surrounding the hedge fund industry and why it has become such a popular topic in recent years. Later a discussion of the situation today regarding hedge funds and its fund managers and how risk is perceived and managed leads the reader to the problem definition and the purpose. Limitations, perspective and an outline of the thesis finish the chapter.

Risk management has been associated with substantial complexity and rapid change, which has made it one of the toughest topics in the hedge fund industry. There exist hardly any specific risk management strategies that suit hedge funds. Both hedge funds and risk management have progressed considerably in the last years, where the tools and strategies associated with them have become more and more complex. Hence, these two areas combined means that the complexity multiplies. (Blum, Dacorogna & Jaeger, 2003)

Hedge fund is a term that has always been associated with much controversy. In the wake of spectacular failures such as the two Bear Stearns associated hedge funds, which made the company’s third quarter net-profit decline by approximately 61% due to losses incurred by the hedge funds, many questioned the strategies and the risk management employed by hedge funds (Grynbaum, 2007). Calculating and understanding the risk characteristics associated with the types of investments and the positions faced by hedge funds is very complicated, combine this with the typical lack of transparency and information regarding the hedge fund and the subject gets even more complicated. This is what led many investors to take legal actions against many of the prominent hedge funds involved in the sub-prime mortgage crisis; the reasoning was that the hedge funds had failed to inform the investors of the risks associated with the investments that the funds had undertaken (Graybow, 2007).

Hedge funds are a relatively new financial vehicle in Sweden and its popularity is increasing rapidly (Anderlind, Dotevall, Eidolf & Sommerlau, 2003). The regulations in Sweden are much stricter regarding the operation of the hedge funds than in USA, but freedom for the managers and a complicated risk characteristic are still significant parts of the domestic hedge funds (Aronsson, 2006). Seeing as the hedge funds has access to a much larger market and can trade in different types of financial instruments, derivatives and commodities, the strategies available to the managers are seemingly endless (Reuters, 2011). As risk management is an important part of managing a fund and considering the complexity of the risks faced by hedge funds, this is an interesting subject to study. We have hence decided to study the risk management used in Swedish hedge funds, how the fund managers’ construct their portfolio when it comes to risk and the validity of different risk measures used to calculate the risk.

1.1 Background

Alfred Winslow Jones, who also became the founder of the first hedge fund, was born in Australia 1901 but moved, still young, to the United States where he began his education (McWhinney, 2010). He graduated from Harvard at the age of 22 and became an American diplomat in his early thirties. Jones got his PhD from the University of Columbia and in the early 1940s he started working for the Fortune magazine (McWhinney, 2010). While Jones
was writing an article regarding the trends of new alternatives for investing capital for the magazine in 1948, he became motivated to try managing capital himself (Cottier, 2000). His financial innovation, which today is more known as the classic long/short equities model, was to try to reduce the risk in owning long-term stock positions by short selling other stocks. In accordance with the long/short equities model, Jones was thus able to limit the risk of the market, which was present in the portfolio. Further Jones managed to attain positive return both when the market went up and down due to differences in the composition of long and short positions. The goal of hedge funds today is still to generate absolute returns in the same way (Cottier, 2000). Jones also wanted to improve the returns and tried to do so by using leverage (McWhinney, 2010). In 1949 Jones launched the world’s first hedge fund (Cottier, 2000).

In the next few years Jones changed the structure of the hedge fund, converting it from a general to a limited partnership. He also added an incentive fee to compensate the partner who was managing the fund (McWhinney, 2010). Another major difference from mutual funds is that many of the hedge fund managers, to show that they believe in their decisions to reach absolute returns, invest private capital in to the fund (Ineichen, 2003). To be able to reach absolute return the placement rules of hedge funds are less regulated than those of mutual funds. Since hedge funds are less regulated compared to mutual funds, this demands that the hedge fund managers possess superior knowledge about the market and the available asset classes than the regular fund managers (Cottier, 2000). Due to the placements rules being freer, the hedge funds will be more dependent on a liquid market, where both sellers and buyers are prepared to buy and sell at fair market value (Ineichen, 2003).

The hedge fund industry started to rise in the mid-sixties when Fortune magazine highlighted this new financial vehicle which outperformed every existing mutual fund on the market, sometimes by as much as 87 percent in the last decade. Thus the hedge fund industry was here to stay (Ineichen, 2003). After the article became known many people around the world tried to copy what Jones had done and in the end of the sixties there were over 100 hedge funds operating in the market (Cottier, 2000). However, the new hedge fund managers were very inexperienced, and consequently the boom of hedge funds resulted in huge losses and many bankruptcies due to poor management, which made the market quiet for a number of years.

With an article in the Institutional Investor magazine regarding the outstanding performance of Julian Robertson’s Tiger fund, the public’s attention was yet again captured and many investors rushed into the industry again which now offered thousands of options to invest your capital in (Cottier, 2000). In the early 1990s many famous money managers abandoned the traditional funds to be able to try their chances as hedge fund managers. Sadly, similarly to what happened in the sixties, the market failed again in the late 1990s leaving many people bankrupt.

Because of the attention in media regarding the collapses of some of the hedge funds in the last decade, a shift towards more regulation regarding the hedge fund industry has occurred (McWhinney, 2010). In America, President Obama signed the Private Fund Investment Adviser Act of 2010 in July 2010, thus greatly changing the rules concerning the registration requirements for fund managers. The effect of this act is that it has become harder than ever to avoid registration with the SEC which was significantly easier before (Hedgecock & Loving, 2011).
In Sweden, the hedge fund industry took off in 1996 when Brummer & Partners started the hedge fund called Zenit (Brummer & Partners, 2011). At the same time in the US, there were around 2000 active hedge funds (Strömqvist, 2009b). Since 1996, the number of hedge funds and the capital invested in them has grown substantially. There were around 10,000 hedge funds in the US at the end of 2007, at the same time in Sweden; there were around 70 active hedge funds (Strömqvist, 2009b). The capital invested in Swedish hedge funds were in the end of 2010 estimated to roughly 4.9% of the total capital invested in funds in Sweden. This would equal about 38 billion SEK (Fondbolagen, 2011).

The regulation in Sweden regarding hedge funds can be found in the Swedish Investment Funds Act (SFS 2004:46), the Swedish Statute of Investment Funds (SFS 2004:75) and Finansinspektionen’s, the Swedish financial government agency’s, Regulations On Investment Funds (FFFS 2008:11). In the 6th chapter of the Swedish Investment Funds Act (SFS 2004:46) there are three articles that deal specifically with special funds such as hedge funds (Strömqvist, 2009a);

1. The first article declare that, with the condition of Finansinspektionen’s approval, that hedge funds can include limitations when it comes to the rights an investor has to buy shares in a hedge fund. The hedge funds must also be open for its investors to sell their assets at least once every year.
2. The second article declares that Finansinspektionen should evaluate, when approving a hedge fund, if the diversification and investment strategy is in agreement with the given risk level and management guidelines of the fund.
3. The third article declares that the management of every hedge fund must calculate and report to Finansinspektionen about the hedge funds’ risk levels on a monthly basis.

One of the caveats with evaluating the risk present in hedge funds is that most risk measurements to estimate the risk are originally developed for other investment vehicles and might thus not be valid for hedge funds. Alternatives to the traditional risk management tools are not yet well established (Liang & Park, 2007).

As has been explained earlier, hedge funds are not a new financial vehicle. It can be argued though that they were relatively unknown to the public until recent major collapses of some of the more famous hedge funds (McWhinney, 2010). When Long Term Capital Management (LTCM) failed back in 1998, the Tiger Fund and Quantum Fund in early 2000 and the two Bear Stearns hedge funds in 2007, all of the attention of media that followed made it impossible to not be aware of their existence (McWhinney, 2010). One of the consequences of these previous collapses has resulted in that risk management in hedge funds is seen as more important than ever before.

1.2 Problem discussion

Risk management has always been a complex topic, especially when it comes to the hedge fund industry. Since hedge funds are able to utilize many different kinds of financial instruments, it is difficult to find a single risk management strategy that goes well with hedge funds. Even though the industry has evolved rapidly in the last decade, little emphasis has been put on how risk management should be performed. The hedge fund industry is a relatively new topic in Sweden, where the first hedge fund was founded not more than 15 years ago. Because of this, not much research regarding the Swedish hedge
Introduction

fund industry and its risk management strategies has been carried out. Hence, we find it an interesting topic to focus this thesis on.

Since hedge fund portfolios are constructed in a similar manner as mutual funds, the risk management implemented should be especially vital during this process when it comes to hedge funds. Hence, we wish to investigate if the fund managers take this into account when constructing their hedge funds. Another interesting topic is to investigate which risk variables the fund managers’ use, since many researchers question their validity.

We wish to research what role risk management currently has in the Swedish hedge fund industry from a fund manager perspective, as well as if these opinions differ considering the size of the hedge fund.

1.3 Purpose

The purpose of this thesis is to increase the knowledge of how Swedish hedge fund managers perceive and manage different types of risk and how they construct their portfolios with regards to risk management. We also want to investigate how risk measurements are used when it comes to risk management and how valid they are when applied to hedge funds.

1.3.1 Problem definition

This thesis aims to increase the knowledge regarding how risk management is performed in Swedish hedge funds. From the above problem discussion our research questions can be formulated as:

How do Swedish hedge fund managers perceive risk in their portfolios and how do they manage it?

How do Swedish hedge fund managers construct their portfolios with regards to risk management?

How is risk measurement used when it comes to risk management and how valid are they when applied to Swedish hedge funds?

1.4 Limitations

To narrow our field of study we will focus on hedge funds operated from Sweden but who are not limited to trade in assets and commodities traded exclusively on the Swedish market. We do this to be able to capture the mindset and views on risk and strategy of participants in the Swedish market without excluding international risks such as those born from currency trading and macro economical changes. This will also increase the hedge fund manager's ability to diversify the portfolio, which should be an important factor in the design of the portfolio.

1.5 Perspective

This thesis is written from a fund manager perspective, managers being individuals who manage the different hedge funds. This thesis will be interesting for fund managers who wish to increase their knowledge regarding risk management and how accurate the different risk measurements capture the risk when it comes to hedge funds. It will also increase the knowledge for people who wish to invest or is currently investing in hedge funds, as it will make them more aware of the complexity of the hedge fund industry. Hence the importance for hedge fund managers to employ a well-established risk management strategy will be examined.
1.6 Outline

Below is the disposition that we have chosen that presents the remaining parts of our thesis.

This section justifies the choice of research method and the data collection method used for our research. Furthermore it justifies the usage of personal interviews, the questionnaire used and the selection of secondary data.

The theoretical framework explains and presents researchers’ views on risk management and risk measurements when it comes to hedge funds.

The fourth chapter presents the empirical findings collected through personal interviews as well as a questionnaire. This is later examined against the theoretical framework in the analysis.

The last section concludes the thesis and summaries the findings of our study.
2 Methodology

In the methodology chapter it is illustrated how the empirical material have been collected and analyzed. The choice of research method is motivated; pros and cons are also discussed. Later, the choice of using interviews as a method for collecting primary data and the choice of interview participants is motivated. The chapter is concluded with a discussion regarding the validity and reliability of the thesis.

2.1 Research philosophy

When it comes to research philosophies, there are generally three philosophies that are dominating the literature; positivism, interpretivism and realism. (Lewis, Saunders & Thornhill, 2003)

Positivism aims at a scientific approach to research, which seeks to work with a social visible reality from where one can draw general conclusions. The researcher can therefore take an objective role where he can make generalizations, free from values. The focus lies upon quantifiable observations from which one can review and analyze the studied object. Interpretivism, on the other hand, aims to research the philosophy, which says that the business world is too complex to be generalized and analyzed statically. Almost every business event is unique and complex and functions of social interactions between individuals. Hence, researchers try to understand the complexity and the dynamic business world to be able to analyse, examine and draw conclusions about it. (Lewis et al, 2003)

Further, realism is based on the idea that there is a reality, which is independent of human values and thoughts. However, there are strong social influences that affect the human behaviour, even though we might not be aware of them. Hence, people are affected by social phenomena’s and researchers should try to gain knowledge of the humans’ socially constructed world and subjective evaluations. (Lewis et al, 2003)

Various research philosophies are appropriate depending on the type of study one wishes to conduct. However, most of the business related studies performed falls somewhere under positivism, interpretivism or somewhere in between. (Lewis et al, 2003)

Our study follows mainly the interpretivistic philosophy since we believe that the business world is highly complex and a function of social interactions between certain individuals and circumstances. Furthermore, we believe that this study’s focus, risk management in Swedish hedge funds, is dependant upon factors unique to each company such as the fund managers’ own experience, amount of capital invested in the fund, corporate culture, etc.

2.1.1 Research strategies

There are many research strategies within business studies. However, exploratory, descriptive and explanatory studies are the most common. If a study has multiple purposes, it can also make use of several research strategies (Lewis et al, 2003).

The exploratory approach seeks to increase the knowledge of what is currently happening, find new insights and explore certain phenomena’s in a new way. It is also useful when one wishes to clarify the understanding of a certain problem. Thus, it is a flexible and adaptive approach. On the other hand, a descriptive approach aims at describing and explaining why certain phenomena occur. Descriptive strategy has a focus on illustrating and providing an accurate picture of people, events, circumstances or situations and is suitable for studies of a general nature. Finally, there is the explanatory approach, which aims to establish
casual correlations between variables by studying specific situations. An example is when quantitative data and statistical tests on a firm’s flawy products follow the explanatory approach. (Lewis et al, 2003)

In this thesis, mainly exploratory and descriptive research strategies will be applied. Since our aim is to understand how Swedish hedge fund managers perceives and manages risk in their funds, how they construct their portfolios and how accurate certain risk measurements are to capture the risk in hedge funds, we believe that these research strategies are optimal.

2.2 Research method

The choice of research method should be determined by the purpose of the study and the problem definitions. Within research methods there are mainly two discussed, the deductive research method and the inductive research method. The goal of the two methods is the same, to be able to increase the knowledge of the research questions. However, they are different in how they reach that goal. (Andersen, 1998)

With a deductive research method, one tries to make use of existing theories to analyse, adapt and give meaning to the qualitative data (Andersen, 1998). A deductive method is characterized by a low degree of interpretation and a relatively structured approach. The deductive approach makes use of statistical tests to be able to confirm certain hypothesise and then tries to simplify the world through them. Thus, this approach does not consider certain events and with responding to them through interviews, instead it tries to apply already established principles and then test a certain hypothesis (Holme & Solvang, 1991). According to Carlsson (1991), this approach is mostly used when working with quantitative data, and since we will work with qualitative data in our thesis this method will not be utilized.

The inductive research method aims to understand the world today through empirical studies already recognized, which leads to new interpretations and in conclusion to new theories. Testing hypothesizes through statistics is not often used; instead the approach is usually conducted through interviews (Carlsson, 1991). With an inductive method one strives to collect qualitative data to later understand what questions you wish to investigate further. Further, one tries to find conclusions from experiences and real events, but also build a theory that is well founded in the qualitative data one have collected (Lewis et al, 2003). An inductive method can be characterized with a high degree of interpretation and a relative unstructured approach. When choosing an inductive research method, it is useful to try to associate and relate one’s studies to the existing literature and theories in the field of research.

The research method we will use is the inductive method. This choice is made since there already exists a significant amount of studies done on the subject. There is hence no need to try to test a hypothesis through statistics, which makes the inductive research method appropriate. This method is most often used when it comes to qualitative data according to Carlsson (1991), and often done through interviews. Another reason for choosing the inductive method is that Lewis et al (2003) argues that when the sample size is relatively small, the inductive research method is more appropriate to use.
2.3 Method of data collection

In this part of the methodology chapter, an outline of the chosen method and how this choice was made will be presented. We will further explain how the data, necessary to be able to answer our research questions, was gathered.

2.3.1 Primary and secondary data

One vital part of the methodology when writing a thesis is to choose between primary or secondary data. Primary data means that the researchers’ wish to find new information, hence this method is more involved and close to the subject of research. When making use of the secondary data method, researchers’ wish to study the subject of study more objectively and attempts to find the information that is needed in previously available data. (Lewis et al, 2003)

Primary and secondary data have a close correlation to quantitative and qualitative methods. Lewis et al (2003) argues that when using a qualitative approach, primary data is frequently a part of the research. One of the reasons to make use of primary data is that the researchers’ are able to modify the data based on certain research questions, hence be able to collect the information that is needed specifically for their particular study (Lewis et al, 2003). Lewis et al (2003) argues further that primary data is often collected through interviews.

Secondary data is more correlated to the quantitative method. The data and information have been collected previously, originally for other purposes. This data is used due to the increased speed in which you can gather data, lower costs associated with gathering data and for certain research questions, it might be exactly what is needed (Lewis et al, 2003).

The empirical chapter of this thesis comes from both primary and secondary data. Since it was difficult to locate important facts and data regarding risk management in hedge funds, collecting primary data from the Swedish hedge fund managers was essential. Some secondary data has been gathered through different databases, such as Google Scholar.

2.3.2 Qualitative and quantitative method

Within the research field there are two main methods used, the qualitative and the quantitative. They both have in common that their purpose is to create a better understanding of the society, which we live in, and how people, groups and institutions affect each other through actions. Apart from the same purpose, the two methods are quite different. (Holme & Solvang, 1997)

According to Holme and Solvang (1997), the qualitative methodology is focusing at developing an understanding of the subject of research, instead of observing a specific event. Lewis et al (2003) argues that the qualitative method is more suited to be able to answer questions and also explain how and why they happened and to give the reader a deeper understanding of the specific subject. A qualitative method approach seeks to explain a particular event or experience and describe how different factors are interconnected. When the process is at focus and one is aiming to understand what actually happens, it seems natural to find certain experts, share their experiences and try to understand how they interpret events. Hence, one has to find a smaller but more specific amount of data that gives a clearer and more specific focus. (Bell & Bryman, 2005)

The study in this thesis seeks the answers to research questions regarding how risk management is perceived and managed in Swedish hedge funds and how the hedge fund
The theoretical framework

managers’ use and value risk measurements while dealing with risk management. The risk management in Swedish hedge funds will vary depending on several factors such as size and age of the fund and its managers, but mostly because that risk management in every hedge fund is individually developed. Hence risk management will look very different from firm to firm. Thus, we have chosen the qualitative research methodology that have a more exploring approach and is suitable to answer the questions that this thesis study concerns.

The quantitative methodology’s focus lies in giving explanations (Holme & Solvang, 2007). The quantitative data takes the form of numbers and can be produced by different research methods where the most common one consists of surveys (Denscombe, 2009). This particular methodology’s purpose is to collect a larger amount of data and then be able to analyze and interpret it with assistance from statistical techniques. Hence, the quantitative method is used to clarify the relationship between different variables and determine how much different factors come into play (Holme & Solvang, 2007).

We believe that the understanding of risk management in Swedish hedge funds is not primarily a question of numbers; instead there are more unique aspects to it that differentiates the funds from each other that can only be derived from interviews. The problem, the solutions and the underlying factors in this thesis problem discussion and purpose are not easily quantified. Hence, the qualitative methodologies are more suitable for this thesis.

2.4 Interview

The method of using interviews to collect primary data has both advantages and disadvantages. A major advantage is that a personal interview is flexible and adaptable. In an interview one has the possibility to be able to follow up ideas that arise during the interview and to interpret answers given during the interviews differently depending on intonation, body language and pauses. This is not possible in a written reply on a sent out questionnaire. If one subsequently needs additional information or clarification of the primary data collected this method is flexible enough so that one could simply contact the interviewees again if necessary (Holme & Solvang, 1997).

A disadvantage with interviews is that they are time-consuming since they usually require one to three hours to perform. Furthermore it is also very time-consuming to analyze and categorize the data collected during the interviews (Holme & Solvang, 1997).

As stated in the purpose, the aim of this thesis is to provide a greater understanding of the topic; therefore the questions will be prepared prior to the interviews. This together with discussions throughout the interviews should supply significant results. We as authors’ believe that this will give the thesis valid empirical data compared to only working with a questionnaire. The problem with a questionnaire is that it is not possible to react to unexpected thoughts and answers from the persons interviewed, which might be very significant for the thesis. Hence, we have chosen to conduct interviews and further qualitative techniques can be separated into three groups, which are decided depending on how strict the interview is conducted. The three groups are: unstructured interviews, semi-structured interviews and structured interviews. (Darmer & Freytag, 1995)

In the interviews performed to collect the primary data for this thesis we seek to ask the same type of questions in all interviews but to also have the possibility to ask appropriate questions in response to individual manager’s answers. Thus, the semi-structured technique is the most appropriate interview technique for our thesis. According to Darmer and
Theoretical framework

Freytag (1995) the semi-structured interview technique is a mixture of the unstructured and the structured techniques. This is because the technique makes use of follow-up questions that allows access to more depth in the topic and also the possibility to consider unexpected data derived from the subject. The structure can therefore be seen as flexible and the order in which the questions are asked is not an important matter. As an interviewer, the prepared questions will be used during interviews to make sure that all research questions of the thesis are covered (Darmer & Freytag, 1995).

There are a few reasons why the unstructured and structured techniques of interviews have not been used. The issue with the unstructured technique is that when the interviewer has nothing to follow, the interviewee tends to take over and the interviewer becomes an inactive listener. The problem with the pure structured technique is that the interviewer tends to follow the prepared questionnaire too strictly and there is usually a lack of follow-up questions and interactions between the participants (Darmer & Freytag, 1995). Thus, neither of these two techniques is appropriate for this thesis and therefore have we chosen a mixture of these two techniques, the semi-structured technique.

2.4.1 Interviewee selection

It is important to consider the purpose of the thesis when selecting the interviewee sample. According to Lewis et al (2003), there are two main techniques used for sampling, probability or non-probability sampling. The choice between them derives from the purpose of the thesis. Probability sampling is correlated to statistics; it is used when one wants to be sure that the sample chosen is as neutral as possible. The probability sampling is mostly used in quantitative studies where there is a large amount of data that is to be examined (Lewis et al, 2003). Our thesis is a qualitative study and focuses on how risk management is perceived and managed in hedge funds, where the hedge fund managers are interviewed and asked in depth. Hence, the non-probability technique is used in this thesis.

To be able to choose the interviewees we had a few prerequisites. The interviewees are fund managers or similar in the Swedish hedge fund industry and they have a deep knowledge of how the risk management is exercised in their hedge funds. From these characteristics we choose 10 hedge funds, 5 larger that manages more than 1 billion SEK and 5 smaller that manages less than 1 billion SEK. From these 10, six respondents preliminary accepted to participate in an interview. From these six, four final interviewees were then chosen, two from larger firms that manages more than 1 billion SEK and two from smaller firms that manages less than 1 billion SEK. Before the interviews were conducted we emailed the interview questions to the interviewees, which was chosen for the thesis (Appendix 1). The purpose with this was that the interviewees could get a good insight to what kind of information we were looking for and thus they could prepare themselves for the interview in a way they found appropriate. Beside these four interviews we also took contact with the regulatory body in Sweden that oversees the hedge fund industry, Finansinspektionen. We chose to contact Finansinspektionen to get their view on how risk management is perceived and how it is managed in Swedish hedge funds as well as how valid they find the different risk measurements to be when it comes to capture the risk in hedge funds. Since our focus in this thesis is risk management within Swedish hedge funds from a managers’ perspective we saw that the contact with Finansinspektionen could be a valuable compliment to receive a greater understanding of the subject. Finansinspektionen agreed to respond to a written questionnaire that was emailed to them (Appendix 2). These four interviews and the written answer from Finansinspektionen will be our primary data, which will give us insight in to how risk management is perceived and managed in hedge funds.
Theoretical framework

Since most hedge fund managers in Sweden are situated in Stockholm we decided to conduct the interviews there. We conducted our four interviews over two days, early April 2011. We received the response to our questionnaire from FI in the middle of April 2011.

The sample selection of four fund managers and the regulatory body of Sweden (FI) will not be able give a complete picture of how risk management is perceived and managed in Swedish hedge funds but will provide a greater understanding of the managers’ view on risk management. Because of that the non-probability sampling method was chosen, we were not able to make any conclusions based on statistics (Lewis et al, 2003).

2.4.2 The questionnaire

Since we chose a semi-structured interview, as explained earlier, we had prior to the interviews formed appropriate questions and follow-up questions that could be used during the interviews. These interviews were done in person since it, according to Lewis et al (2003), permits us to gain trust and also an individual contact with the interviewee that is extremely significant to receive trustworthy responses to the questions. As can be seen in Appendix 1 and 2, the questionnaire is built on open questions, which permits the interviewee to give his answers in a way which might give more significant data to us than if the questions were designed in a more closed style. Lewis et al (2003) further argues that a personal interview permit us to also modify some questions and even find new ones in response to the answers that are received. We are also able to explain the questions in case the interviewees do not understand it completely.

Prior to the interviews, we formed our questions in a way so that we would be able to answer our research questions. Hence, we would later be able to use this information to arrive at a valuable conclusion to the purpose of the thesis. Below we will present our research questions and sub-categories related to each research question. From the questionnaire (Appendix 1) that we used during the interviews and questionnaire (Appendix 2) used with Finansinspektionen, we have ended up with nine sub-categories. A description will be made of these sub-categories to make it clear why we found them particularly interesting for the result of this thesis. These sub-categories will also be used when presenting our primary data and analysis in chapter four of this thesis, Empirical findings & Analysis. We found it more efficient to write the thesis this way and believe that the reader will find it easier to follow when some of the questions and answers are put together for a more complete view of the collected primary data.

The first research question “How do Swedish hedge fund managers perceive risk in their portfolios and how do they manage it?” can be divided into the following sub-categories:

- **The definition and nature of risk** – It is important to distinguish between each manager’s definitions of risk as this will serve as our basis for understanding how he or she perceives the concept of risk. The definition of the nature of risk will further influence the manager’s view on the controllability and characteristics of risk.

- **The justification of risk management** – This is vital as to understand how each manager views the usefulness of risk management will affect the risk management processes implemented in the portfolios.
Theoretical framework

- *The utilized risk management strategies* – This will show how each manager effectively manages risk; it will further describe the strategy of the portfolio by stating characteristics such as geographical focus, diversification and hedging strategies.

- *The distinction between the measurement and the management of risk* – This topic will be relevant as research in the field often mentions the vague distinctions between the two. The managers’ view of the differences may prove to be important for our analysis about the subject.

Our second research question “How do Swedish hedge fund managers construct their portfolios with regards to risk management?” has the following sub-categories:

- *The management of risk in the construction process* – This will provide an overview as to how risk management is implemented in the portfolio and if any limits, restrictions or other factors that affects the available strategies for the managers exist.

- *The characteristics of the portfolio* – This question will provide insight in to how knowledgeable hedge fund managers are concerning how their portfolios behave in different market conditions and in response to certain events. We will further determine how, and if, managers utilize scenario analysis and/or stress test their portfolios.

The sub-categories to our final research question “How is risk measurement used when it comes to risk management and how valid are they when applied to Swedish hedge funds?” are:

- *The risk variables used* – This question will serve as the foundation for our research regarding risk measurement by examining what risk variables the managers’ actually utilize in their portfolios.

- *The validity of the variables* – A discussion about the validity and accuracy of risk variables will examine how hedge fund managers perceive the different risk measurements used and how accurately they believe the variables capture the true risk.

- *The consequent use of the variables* – This question will further develop the distinction between risk management and measurement by examining how managers use the calculated risk variables and how they use them for developing a well functioning risk management system.

2.5 Primary data analysis

According to Brinkmann and Kvale (2009) there are three different stages to how empirical material ought to be processed. The first stage is the structured stage where the empirical data is moved from an audio file to a written paper. When the interviews were conducted,
we transferred the recordings made during the interviews and wrote the answers from every question out on paper.

The second stage, also called the demonstrative stage, puts its focus on the significant information within the data gained from the interviews and leaving out the data that does not contribute to the thesis. Vital throughout this stage is to put emphasis on the purpose, thus the significant facts will be easier to distinguish (Brinkmann & Kvale, 2009). Once the answers from the interviewees were written down we made a more comprehensive analysis and all that was unrelated to our purpose was removed. Because that we put the questions from the interviews into nine sub-categories the responses from the interviewees were also presented in the same way in section 4.2 of this thesis. This way of presenting the interviewees made it less complicated to make the comparison from one fund manager to another and also against valid theories. We believe that the reader will also find it easier to understand the interviewees’ perception of risk management in Swedish hedge funds and the differences between them.

The third and final stage is the distinct stage of making a complete analysis of the interviewees’ answers and views on risk management. This is done to be able to explain the answers and thus realize if the responses brings new data and angles to the thesis (Brinkmann & Kvale, 2009). The empirical findings will be explained in the nine sub-categories and together with the theoretical framework the reader will find a more complete analysis.

In case we had a hard time understanding any of the answers or finding some answers not satisfactory, the interviewees had offered to answer us over e-mail or by telephone. This is due to the personal connection established when the interviews were conducted. The analysis of this thesis is found together with the empirical findings in chapter four of this thesis.

2.6 The credibility of the thesis

In this section will we further describe the working approach we have used in this thesis as well as discuss the reliability and validity of our study.

2.6.1 Working approach

When conducting a qualitative research there is a risk that researcher’s bias arises from the fact that people are involved during the collection and with processing the data of the research. According to Andersen (1998) it is therefore important that the writer is self critical in his working approach and is not creating patterns, which does not naturally exist in the data gathered.

We believe it is considered to be an advantage to be two writers in this thesis since it is possible, in addition to critically review your own work as individual writer, but also review the work of the co-author. We have chosen to divide some parts of the thesis. Once one part has been written it has been critically reviewed by the co-author to eliminate the risk of researcher bias. Throughout the whole writing of the thesis have we discussed various ideas about what information to be included in every paragraph and section. This is done to involve us both throughout the thesis in the same manner as if the thesis had not been broken up. We have both written the concluding chapters of the thesis, as a lot of analysis and discussion was required.
### 2.6.2 Reliability and validity

When a study is conducted the authors’ should take the reliability and the validity of the information sources into account. According to Lewis et al. (2003) the validity of the data concerns if the empirical findings are what they seem to be. The reliability is to what level the methodology of collecting data will be dependable and trustworthy.

When making use of a methodology where interviews are conducted with specific persons, it is very difficult to perform similar interviews at a later date. As we were both present during all interviews the risk of misinterpretation was eliminated, which increases the reliability of the thesis. Further, we used a semi-structured form of interviews in which we have provided the questions to the interviewees in advance, which should make it possible to make a similar study in the future with similar results.

However, while conducting the interviews follow-up questions and comments based on the responses occurred, which may be regarded as difficult to duplicate in a future study. The questions have been given different responses by the interviewees depending on their personal experience and interest. Some of the respondents have answered some of the questions very detailed while others have answered with less information. We considered the fact that the interviewees answered the questions to different extents, and that they, in our opinion, possess different degrees of knowledge and experience when it comes to risk management in hedge funds.

Furthermore, there is a continuous development in the market in terms of how risk management is performed and regulations tend to become stricter as time passes. This reduces the probability of gaining the same answers if a future study was conducted. One should consider that the fund managers are representing the hedge fund industry from a managerial perspective, which means that their opinions has been affected by their professional roles and thus cannot be seen as purely objective. Since the interviewees are not anonymous in the thesis, this might also influence their answers as they represent their respective organizations.

The validity can be questioned since we only conducted a few interviews in the Stockholm area but since this is where most Swedish hedge funds are situated, we believe that conclusions made are valid for the whole of Sweden. We further believe that even with four interviews and one answered questionnaire from Finansinspektionen, the results of the thesis should give a valid picture of reality. All the interviewees possess many years of solid experience with risk management within the hedge fund industry.

Bell and Bryman (2005) argues that when one speaks of the validity in a thesis it is related to whether the answer to a certain question reflects the response the questions was intended to give. Further one should determine if the answers are the same as the authors’ could have expected. The meaning of this is that it is important that the questions are designed well and correctly formulated and thus provides a high validity. The questionnaire (Appendix 1 & 2), which was designed by us with input from our tutors, is based on secondary data retrieved from the theoretical framework. This way of getting questions of greater quality was done to be able to receive a higher reliability and validity in our thesis. The intention was to be able to answer the research questions and purpose in the best possible way. We believe that the questionnaire is well formulated, have answered our research questions, meet our purpose and gave us a valid conclusion.
3 Theoretical framework

The thesis discusses risk management in hedge funds; hence risk management is further explained from a theoretical perspective. Later the construction of hedge funds with regards to risk management is further discussed. The chapter is finished by explaining the role of risk measurement when it comes to risk management, which includes a few of the most used risk measurement tools used in the world today.

3.1 Definitions

To clarify the theoretical discussion, we emphasise the definitions of several imperative concepts in theory of finance.

3.1.1 Risk

According to Parker and Warsafer (2000) risk is generally defined with an example instead of a distinct definition. The reason for this is that there does not exist an agreed upon definition of what risk is. The authors then states their personal opinion of the definition of risk as that:

"Risk is the potential for loss of control and/or value. Risk may range from the benign to the malignant, from the dormant to the brewing to the exploding. Risk may be expected or it may be a surprise. Most importantly, risk is ever-present.” (Parker & Warsafer, 2000, p. 23)

Jaeger (2000) states that:

"Whatever risk is, it is not the annualised standard deviation of the daily (weekly or monthly) returns. Nor is it value-at-risk (VAR), measured at the 95% (99% or 99.9%) confidence level. Nor is it semi-variance, shortfall probability, or any other simple quantitative measure. These various measures may shed light on risk, and may help us to estimate risk, but they do not define the nature of risk.” (Jaeger, 2000, p. 69)

Further Jaeger (2000) argues that attempts to discover a single definition of risk are bound to fail as ones view on risk is very subjective and thus the definitions can vary a lot. Instead, Jaeger (2000) offers a simple definition of risk as expected pain. The author continues to state that in the simple definition presented one should consider the probability of the unfavourable outcome occurring and the level of pain associated with the outcome if it occurs.

Frank Knight (1921) made a clear difference between risk and uncertainty:

“But uncertainty must be taken in a sense radically distinct from the familiar notion of risk from which it has never been properly separated...The essential fact is that “risk” means in some cases a quantity susceptible of measurement, while at other times it is something distinctly not of this character; and there are far-reaching and crucial differences in the bearings of the phenomenon depending on which of the two is really present and operating...It will appear that a measureable uncertainty, or “risk” proper, as we shall use the term, is so far different from an unmeasureable one that it is not in effect uncertainty at all. We shall accordingly restrict the term “uncertainty” to cases of the non-quantitative type” (Knight, 1921, pp 19-20)

This means, interpreted by Powers (2010), that one is able to predict risk with the help of empirical data using methods of statistics. It is on the other hand not possible to predict uncertainties since they have no earlier occurrence in history.
3.1.2 Hedge fund

The term hedge fund is a general term for many different types of investment funds that are difficult to categorize. Finansinspektionen (2007) classifies hedge funds as special funds, which means that the hedge funds are subject to a more liberal regime than other investment funds. This means that they can be allowed to sell short, utilize a high degree of leverage and use financial derivatives.

Strömqvist (2009a) states that a hedge fund is a fund with an absolute return strategy. The author further states that many hedge funds shield their investors from losses by hedging their positions. While this is a common strategy for hedge funds to use, Strömqvist (2009a) argues that not all hedge funds shield their positions by hedging. Further he argues that one of the key characteristics of a hedge fund is in the vast availability of different investment strategies for the individual fund to choose from.

What sets hedge funds apart from the more conventional mutual funds is its aim for absolute returns. While mutual funds measure their returns on a relative scale, i.e. comparing it to a market benchmark, the goal of a hedge fund is to always achieve a high positive return without comparing it to a benchmark or by using the return on the risk-free asset as the benchmark (Ineichen, 2003). Hedge funds are thus expected to achieve this excess return in both bearish and bullish markets. The regulations on hedge funds are not as strict as those concerning mutual funds and this opens up new strategies for the funds to be able to achieve this goal. While mutual funds are restricted to only going long in different stocks and bonds in different markets, hedge funds can use a multitude of investment strategies and financial instruments. Some of these features are the hedge funds ability to sell short, its ability to buy and sell options, futures, different derivatives and the possibility to trade in unconventional assets such as CDO’s. A hedge fund is often characterized by a high degree of leverage, which in turn increases the fluctuations in the funds profits (Ang, Gorovyy & Inwegen, 2010). While all of these features allow hedge funds to achieve abnormal returns in both bullish and bearish markets, it also increases the risks that the funds are exposed to and can undertake compared to that of mutual funds. It also increases the number of strategies that the fund managers have at their disposal to counter different types of risks and exploit possibilities in the markets.

3.1.3 Risk management

Norland, Quintana and Wilford (2000) means that it is hard to find a single definition of what risk management is and thus defines the process of risk management as:

“Managing risk is more than just measuring the degree of risk inherent in portfolios that have already been put into place: it entails using certain risk measures to allocate risk optimally among different assets, while using other types of risk measures to monitor exposures and make refinements. There is, unfortunately, no one single risk allocation process that can be applied to all types of investment strategies”. (Norland et al, 2000, pp. 144-145)

The reason that it is difficult to find a single definition of risk management is that the definition of risk is highly subjective, as mentioned earlier, and tends to vary wildly from individual to individual, the subsequent process of managing that risk will therefore also differ wildly. According to Norland et al (2000) it is important to distinguish between the measurement and the management of risk. Unlike the measurement of risk, which is a passive activity, the process of managing risk implies action.
Jaeger (2003) states that risk management is both a science and an art. While one big portion of risk management consists of quantitative calculations and the measurement of risk, dubbed the scientific portion by Jaeger (2003), he also argues that for risk management to be effective the manager has to be able to apply and use his professional experience to make wise decisions. The author distinguishes between risk measurement and risk management; while he argues that risk measurement is an important part of risk management he states that the measurement of risk in itself is a passive activity. Risk management implies action and activity. The manager must enforce a dynamic and optimal allocation of risk among different assets and markets to be able to respond to and counter market fluctuations (Jaeger, 2003).

Ineichen (2003) finds that the most profitable hedge funds consistently excel in the areas of risk control and capital preservation in the form of effective risk management. Managers of hedge funds are also said to minimize the dead weight in the portfolio and in doing so the manager is able to add value to the portfolio (White, 1995). The reasoning for this is that managers of conventional funds often hold positions for the sole purpose of controlling volatility relative to a specified benchmark. Further these positions are often in areas outside of the managers’ expertise, significant in size and do not add any value to the portfolio. White (1995) states that as a hedge fund only takes long and short positions in assets that the manager has conviction in and as no capital is wasted as dead weight, a bigger portion of the funds capital will be utilized in the portfolio and thus add value. Hedge funds will control its risk with the help of risk management tools and strategies instead of holding dead weight positions, which tend to be costly.

According to Blum et al (2003) there has been a rapid increase in the development of financial risk management and in hedge funds during recent years. These developments have offered new tools and more complexity in the strategies available. The authors mean that these changes do not necessarily correlate to each other but instead the developments might make risk management harder to use when considering hedge funds. This is a consequence of that the market for hedge funds is dynamic and rapidly changing while the tools used to assess risk are becoming increasingly complex. Considering both risk management and the nature of hedge funds together the complexity multiplies (Blum et al, 2003).

Lo (2001) argues that it is important to distinguish between risk management and the characteristics of a hedge fund in contrast to conventional financial vehicles such as mutual funds. The most important difference, according to Lo, is that they have different risk and return objectives. Hedge funds are associated with higher risk levels, and as a result of that, a higher return. Hedge funds are not necessarily more risky than conventional financial vehicles; on the contrary, the increased availability of strategies and assets to the hedge funds might actually give it a lower risk than many conventional fund investments. Lo (2001) states that only a relatively small amount of hedge fund managers pay much attention to active risk management and argues that this is a consequence of that it is taken for granted that hedge funds are risky investments. It could thus be argued that it is a self-fulfilling prophecy; as the public views hedge funds as a risky investment, the managers do not devote enough time at risk management of the hedge fund.

Blum et al (2003) points out that as there is a big difference in the characteristics of conventional financial vehicles and hedge funds, and as most risk management techniques are developed with the conventional financial vehicles in mind, it is hard to implement a particular risk management technique to suit a hedge fund. The authors further state that as hedge funds are a part of the overall financial markets and trade in conventional asset
classes the same risk management strategies that are utilized by managers of conventional financial vehicles should be used for hedge funds as well. The difficulty when utilizing the same methods with hedge funds is the wide spectrum of instruments that the hedge fund manager has at his disposal and the dynamic nature of the hedge funds trading strategies (Blum et al, 2003).

3.2 Portfolio construction with regards to risk management

The first step concerns the creation of the portfolio in which the researchers emphasises the importance for managers to allocate the risk towards areas in which the managers’ expertise lies and to stick to these areas of the market. The creation of the portfolio enables the manager to specify the characteristics of the finished portfolio as he chooses the appropriate asset allocation, specify which securities and derivatives the portfolio will consist of and determine which strategies will be implemented (Ezra, Hensel & Ilkiw, 1991). These variables will impact the performance of the portfolio and determine much of the risk management process to be used since different diversification policies and strategies entail a different set of uncertainties and opportunities. Putnam (1997) states that the most common reasons that fund managers underperform is due to concentrated market bets or a lack of diversification, excess cash reserves for betting on market turns and that the fund managers take risks in areas outside of their main expertise.

When determining and computing the preferred risk allocation of a portfolio it is important to note that the tools required differ from those that are used to merely measure risk for informational purposes (Norland et al, 2000). While risk measures for informational purposes are able to focus on historical information on volatility, returns and correlations, measures for risk allocation have to be forward-looking. Historical information does a poor job at estimating future values and as such is ineffective while allocating risk.

Markowitz’s (1952, 1959) Modern portfolio theory, while now expanded by further research, is still a widely used and accepted method for portfolio construction. Markowitz (1952, 1959) demonstrated that to create efficient portfolios one needed to consider the expected return for each asset, the standard deviation of each asset and the correlation between these assets. These variables help determine the efficient frontier which is a set of efficient portfolios that can be chosen depending on the preferred risk return characteristics. It should be noted that the variables calculated for the assets are forward-looking and thus suitable for risk allocation.

In essence, modern portfolio theory states that assets cannot be chosen exclusively on specific traits concerning that asset. Instead the correlation between assets should also be considered. By considering the expected return for each asset, the standard deviation of each asset and the correlation between these assets, Markowitz (1952, 1959) proves that it is possible to construct a portfolio with the same expected return but with lower risk than a portfolio constructed without considering these variables. (Elton & Gruber, 1997)

The second step of risk management is to measure the amount of risk present in the portfolio and to test how the portfolio will respond to certain events and changes in the market. It is vital that the managers know how all assets in the portfolio are correlated, how changes in market sectors affect the portfolio, how volatile individual assets are and how they contribute to overall portfolio risk-levels (Norland et al, 2000). The portfolio should also be stress tested by using methods such as scenario analysis, mimicking market crashes and anomalies to see how the current portfolio would react to volatile and unstable market conditions.
The third step in the risk management process is to convert the information gained when identifying and evaluating the different risks present in the portfolio into decisions concerning the different risks to take, their probability of occurrence and how to react if certain conditions occur. With this information the manager is able to evaluate how different risks and market conditions might affect the portfolio and with this he gains an insight into what instruments and strategies might be helpful for countering different types of risk and for hedging the portfolio against market volatility. It is important that the manager has a deep knowledge of how the portfolio is constructed and that he knows how it will react to different market conditions and events. Just because a well-developed risk management system is implemented on a portfolio it does not mean that the portfolio is safe. Risk management implies action and while a well-developed risk management system might be implemented on a portfolio it is still vital that the manager is able to understand the effects and consequences of different market events and as a response to these choose the appropriate actions for countering them (Norland et al, 2000).

Now that the manager knows the different risks that exist in the portfolio and how the portfolio will behave in different market environments, the manager can make adjustments to achieve the desired characteristics of the portfolio according to the manager’s estimation of future market developments.

3.3 Diversification

The practice on diversification builds on the assumptions first presented by Markowitz (1952). According to the theory, the total risk of a portfolio consisting of several securities is mostly determined by the correlation between the securities rather than the individual volatility present in the securities. Thus the total risk present in a carefully constructed portfolio should be less than what the sum of all the individual securities risks combined would be (Lhabitant & Learned, 2002).

According to Grinblatt and Titman (2001), a well-diversified portfolio can completely eliminate the unsystematic risk present in a portfolio and lower the total risk level in the portfolio towards the current market risk. The authors state that as it is inexpensive to diversify a portfolio and as unsystematic risk is unrewarded by the markets, the practice of diversification should be implemented by all investors.

While the value of diversification is agreed upon, determining the appropriate number of securities in a well-diversified portfolio seems to be a bigger problem. Evans and Archer (1968) found in their research that there is a relationship between the number of assets in a portfolio and the reduction of unsystematic risk and that the optimal level of diversification is obtained in the range between 8-10 securities. According to the research, it is not economically justifiable to increase the number of assets in the portfolio above 10. Similarly Statman (1987) found in his research that the optimal level of diversification is not obtained until the borrowing investor holds at least 30 stocks or the lending investor holds 40 stocks. Lhabitant and Learned (2002) states that it is impossible to get a single value for the optimal number of assets needed for an optimal diversification and points out that factors such as market conditions, transaction costs and individual characteristics of the assets has to be considered. According to the authors, investors should perform a marginal analysis of their portfolio to see the costs and benefits associated with adding a new security to the portfolio to determine the optimal level of diversification.
3.4 Hedging

According to Keiter (2000), hedging strategies are used by the manager of a portfolio to reduce or completely eliminate a specific risk, which is deemed as unwanted or undesirable by the manager. The author further states that the purpose of a hedging strategy is not to completely eliminate all the risks in a portfolio, instead it enables the manager to isolate and control specific risks that is seen as mispriced or that has a high uncertainty attached to it. Hedging can be useful when controlling factors such as currency risks, price fluctuations or to lock in a specific cash flow.

3.5 Risk measurement

Risk management and risk measurement are highly associated with each other due to the different ways of measurement, which are highly used by fund managers while they are working with risk management to achieve a greater understanding of the risks in hedge funds (Lo, 2001). To see this connection a few definitions of the components of risk measures has been made and also implications for risk measurement has been defined.

3.5.1 Components of risk measure calculation

Blum et al (2003) argues that there are three primary components of calculating risk measures in all portfolios. First the risk factors of the portfolio positions have to be mapped. Secondly, the risk factor covariance matrix needs to be calculated based on historical prices. Finally the risk model has to be chosen and the risk measure calculated.

3.5.1.1 Mapping the portfolios position to risk factors

The first of the three primary components of calculating risk is to map the risk factor of the portfolio. This is done through breaking down each single security from a portfolio, and then to classify the different risks they correspond to into risks where the portfolio manager has significant control. Further one has to determine where the risks are derived from external factors and thus affect the market as a whole. These are also called risk factors, and they are especially hard to manage and foresee. A variable that is able to instantly affect a securities value is called a risk factor and some examples are interest rates, stock index values and FX rates. (Blum et al, 2003)

The dependence of the securities relating to a certain risk factor, i.e. how sensitive a security is, are often articulated in a function that can take both linear and non-linear form. The amount of risk factors can differ and noticed is that non-linear functions appear to be especially practical when it comes to hedge funds. The idea of sensitivity and risk factors has been around for a long time. The concept of understanding how sensitive a security is to a specified factor has been used for a lot of years in risk management of options as well as the risks associated with yield curves. (Blum et al, 2003)

3.5.1.2 Covariance Matrix calculation

The second primary component in calculating the risk of a portfolio is to try to estimate how the different risk factors are connected, hence how they depend on each other. If we make the assumption that the returns of a portfolio is normally distributed, then the correlation matrix can decide the distribution of the returns and also the risk measures for the portfolio. These assumptions should however only be applied after cautious testing of their validity, in particular in examples where the outcomes are excessive. There are many methods to calculate the variances (volatility) and the co-variances (correlations). The primary issue when trying to estimate a covariance matrix is that there can be quite a
significant amount of risk factors. Another issue of the covariance matrix is that dependency between the different risk factors is usually not static or linear. Researchers believe that the dependency can increase during times of financial crises. (Blum et al, 2003)

3.5.1.3 Risk measures calculation

There are many different methods that can be used when it comes to calculating risk. The methods are mainly different when it comes to two factors. Firstly, one has to determine how sensitive a security’s price are to changes in risk factors. It is important to make a distinction between methods of local valuation and full valuation. Secondly, it is vital to distinguish between parametric distributions and historical distributions. (Blum et al, 2003)

3.5.2 Risk measures

There are significant amounts of risk measures that can be used to calculate the risk. Below risk measures will be presented which are used in the hedge funds industry and further establish and describe how suitable they are for the task. We will initially present the three different measures that the Swedish financial government agency, Finansinspektionen, demands that every hedge fund in Sweden declares every month (Finansinspektionen, 2011b).

3.5.2.1 Standard Deviation (SD)

The Standard Deviation is in Sweden one of three measures that the fund managers have to declare every month to Finansinspektionen. It is calculated in the end of every month and is based on the hedge funds rate of return. SD is a statistical measure that, for example, is describing a funds exchange fluctuation and specifies the deviation from a mean value in a series of measure. A high value is equivalent to large fluctuations and vice versa. The purpose by publishing the SD is to illustrate the hedge funds level of risk over time and how the actual level of risk relates to a desired level of risk. (Finansinspektionen, 2011b)

When it comes to SD and its usefulness for measuring the risk in hedge funds, researchers have mainly negative opinions. Standard Deviation assumes normal distribution, according to David, Hartley and Pearson (1954), and hedge funds in general have fat tails in contrast to normal distribution, which means that extreme and rare events tend to happen more often than normal distribution implies (Lhabitant, 2001). Liang and Park (2007) argues that hedge funds use dynamic strategies, implement management fees that give a non-linear payoff and trade derivative securities, which gives them an abnormal distribution. According to Stulz (2007) the return of a hedge fund can be viewed as a basket of exotic derivatives that gives a non-linear return. It is assumed when using SD that returns are normally distributed around the mean, which is not the case for hedge funds (Blum et al, 2003). Therefore the usage of standard deviation is an incomplete way of measuring the risk in hedge funds even though it is still used widely to measure the total risk in hedge funds, it is not able to capture the tail risk in these alternative investments, hence better alternatives to measure risk in hedge funds are needed (Liang and Park, 2007).

Edwards (1999) argues that Standard Deviation is a risk measure of hedge funds not to be trusted since he derived from research, done from 1989 to 1998, that even when some hedge funds had their worst experienced return the SD was relatively high during that time. He stated a hypothesis that hedge funds receive higher returns since they take greater risks, which was proven wrong during this period of time. Stulz (2007) argues on the other hand that even though the Long Term Capital Fund had a lower volatility than the S&P 500 for close to the funds whole life, it did not stop it from going bankrupt in a period of only one month. Further Chan, Getmansky, Haas and Lo (2006) states that the type of risks which
are associated with hedge funds are not well captured by a traditional and static risk measure such as SD, hence there is a need for an analysis that is more sophisticated regarding hedge fund returns and which accounts for asymmetries and nonlinearities. Ackermann, McEnally and Ravenscraft (1999) agree with this when stating that Standard Deviation is not able to completely capture the complexity of the risks coming from hedge funds highly leveraged and dynamic trading strategies. According to Jaeger (2000) many people objects to the usage of SD as a risk measure since it gives the same equal weight to deviations both below and above the mean. Investors are more interested in the upside and the downside deviations considered separately. According to Giamouridis and Vrontos (2007) mean-variance framework, such as SD, is only appropriate for returns which are normally distributed, thus making it far from perfect when it comes to the application to hedge funds.

3.5.2.2 Monthly rate of return

The value regarding the development for hedge funds during every month is the second of the three measures that the fund managers have to declare every month to Finansinspektionen. One example of such a value is the return derived from the last day in October, which declares the rate of return for October. The return is indicated less realized and unrealized fixed and variable management fees. In cases where a fund has an individually calculated management fee, calculations has been made on the assumption that it refers to a shareholder who has been involved since when the hedge fund was established. (Finansinspektionen, 2011b)

3.5.2.3 Concentration

Concentration is the third measure that the fund managers have to declare every month to Finansinspektionen. The fund managers have to report the value of the five largest exposures to a certain issuer/underlying in the hedge fund. The value is expressed as a percentage of the hedge funds total value. The exposure to a certain issuer/underlying is defined here as the net position of the hedge fund against the issuer/underlying. Subsequently, the absolute values (i.e. a negative exposure is given positive terms) of these are added up, placed in relation to the hedge funds total value and reported to Finansinspektionen. (Finansinspektionen, 2011b)

The risk measure aims to illustrate how much the hedge fund’s capital is exposed to the largest holdings. A high value should not be treated as taking a high risk by default, because the various holdings carry in themselves different risks. If, for example, a hedge fund has two equally large exposures to treasury bills and shares, the exposure to the shares is more risky even though the two exposures are equal in percentage of the total fund value. It is therefore important when analyzing a hedge funds risk level to take other risk measures and information into account. (Finansinspektionen, 2011b)

3.5.2.4 Monte Carlo simulation

According to Blum et al (2003) the Monte Carlo simulation is a full valuation method which is based on the simulation of how the underlying risk factors behaves when put through a substantial number of draws which has been made by a random generator. This method takes non-linearity fully into consideration in the relationship between the risk factor and the financial instrument. Every new random draw of a risk factor results in a new valuation of the entire portfolio. From a high number of draws, sometimes several thousand, the return distribution of the portfolio can be simulated and can be used for
Theoretical framework

further calculations. Value-at-Risk (VaR) or Expected Shortfall (ES) can be determined for instance (Blum et al, 2003).

Norland et al (2000) states that the Monte Carlo simulation can be used for different kinds of instruments, especially where historical data is hard to attain and the instrument produces payouts which are complex non-linear functions, which hedge funds are characterized by. Blum et al (2003) on the other hand argues that the Monte Carlo method does not take the problem of abnormal distribution into account and therefore may underestimate the actual risks, which is the case for hedge funds. The Monte Carlo simulation is however a great start for forming fat tails and non-linear dependencies for researchers who wish to go one-step further in measuring risk (Blum et al, 2003).

3.5.2.5 Value-at-Risk (VaR)

Value-at-Risk is the largest possible loss that is able to occur over a specified time-period, set at a certain confidence level. The risk measurement of VaR is however only as accurate as what you put in while measuring. To have a risk management based on VaR has been greatly criticised since the failure of Long Term Capital Management (LTCM) in 1998. Researchers have analysed the failure of LTCM and concluded that people relied too heavily upon the short-term history and that the risks were extensively underestimated in the fund (Jorion, 2000a). LTCM had a rather sophisticated VaR system, which was based on historical data in an attempt to try to limit possible losses. A mixture of deteriorating market conditions in the end of 1998 combined with an extreme use of leverage eventually led to a catastrophe (Lhabitant, 2001). VaR is also argued to have theoretical shortcomings. As described earlier, VaR is the maximum loss that can happen during a certain time-period but it should still be taken into account that there is a tiny but nonzero chance that a greater loss than VaR still can be experienced and once the level is breached VaR does not give any further information. (Liang & Park, 2007)

Lo (2001) also points out that only a number of years of historical data may not show the true distribution of returns, since they are abnormal when it comes to hedge funds and not much historical data may be available. Therefore risk management that is based on VaR is questioned. Lo (2001) further argues that VaR is incapable of capturing all of the risk which are present in hedge funds, this due to the multitude of different hedge funds on the market and since VaR was initially developed to evaluate the risk exposure of portfolios derivative securities, it is not suitable to investments of other kinds. According to Lo (2001) VaR does not capture a number of risks such as liquidity risk, event risk, credit risks, risk factor exposures or time-varying risks that comes from dynamic trading strategies. VaR is also computed under the assumption that the distribution of the returns is normal which is not the case when it comes to hedge funds. Hedge funds returns are extremely abnormal, they are greatly skewed, often characterized by many different modes of activity, asymmetrically distributed and have fat tails which says that extreme events occur more frequently than a normal distribution would imply.

Gupta and Liang (2005) compared VaR to more traditional risk measurements regarding its ability to estimate the risk in hedge funds and conclude that Value-at-Risk is more appropriate than Standard Deviation because of the negative skewness and high kurtosis that appear in the returns of hedge funds. Even though VaR is still the most used quantitative tool used in risk management today according to Blum et al (2003), one has to still use it as a complement to human judgement and market experience (Lhabitant, 2001). Agarwal and Naik (2004) states that the Basel committee for banking supervision adopts and supports risk management based on VaR, but Edwards (1999) argues that this is not to
be trusted since bank regulation has fallen behind when it comes to market developments, such as with hedge funds.

3.5.2.6 Expected Shortfall (ES)/Conditional VaR (CVaR)

The implication with VaR is that it does not give any information regarding the magnitude of the losses in case of unexpected events and thus, a number of expansions of VaR have been developed to better suit the nature of hedge funds. Expected Shortfall (ES) is a one of those risk measures. It is the expected sum of loss conditional on the fact that VaR is breached (Jorion, 2000b). ES is also called conditional VaR (CVaR). CVaR is preferred to VaR as risks measure since VaR experiences some mathematical irregularities, for example the lack of convexity and monotonicity (Liang & Park, 2007). According to Artzner, Delbean, Eber and Heath (1999) CVaR entails mathematical properties such as continuity, which is a desirable measure of risk, something that VaR does not provide.

ES focuses on measuring both the frequency and the size of losses in case of extreme events (Agarwal & Naik, 2004). Researchers also argue that CVaR has many advantages over VaR, especially when it comes to having a risk management tool that is able to monitor the tail risk in a hedge funds portfolio. It is argued that CVaR has substantial advantages compared to VaR when it comes to a risk management perspective and it is demonstrated that CVaR is the most solid method to construct an optimal hedge fund portfolio (Krokhmal, Uryasev & Zrazhevsky, 2002). It is further argued by Giamouridis and Vrontos (2007) that CVaR is the superior tool of risk management to be able to manage the tail-risk in hedge funds. Liang and Park (2007) also show that CVaR is more suitable as a coherent risk measure of hedge funds than what VaR is.

3.5.2.7 Sharpe ratio

Sharpe ratio is a performance measurement used by practitioners to be able to compare different kinds of investments based on their risk adjusted returns. This ratio is the excess return from an investment above the payoff on the riskless Treasury bill where the volatility of the payoffs on the specific investment is measured as the Standard Deviation of the payoff. If an investment has a higher Sharpe ratio, then it is regarded to have a higher risk adjusted return. The Sharpe ratios on hedge funds can be very impressive (Edwards, 1999). According to Fung, Xu and Yau (2002) leverage, which is often high in hedge funds, found to have a strong positive effect on the Sharpe ratio. Liang (1999) argues that compared to mutual funds, hedge funds have a higher Sharpe ratio and the managers of the funds are more skilled.

This kind of analysis on investments is functioning very well with traditional funds and portfolios (Sharpe, 1992), but the Sharpe ratio is considered to perform poorly when it comes to hedge funds. There are two reasons for this. Firstly, the fundamental factors of hedge funds payoffs have not been completely identified in research. Secondly, the trading strategies utilized by hedge funds are extremely dynamic compared to that of traditional funds (Lhabitant, 2001). Fung and Hsieh (2001) argue that the Sharpe ratio is not designed to capture non-linear returns, which is associated with hedge funds. This may wrongly lead fund managers and investors to conclude that there are no systematic risks present in hedge funds. According to Chan et al (2006) the Sharpe ratio is quite easily manipulated through “performance smoothing”. It is the practice of only reporting a portion of the gains in months of a hedge funds positive return to be able to reduce volatility and improve the Sharpe ratio. Lo (2001) state that hedge fund managers tend to smoothen the returns of their funds to achieve a lower volatility, hence a higher Sharpe ratio. Ackerman et al (1999)
argues that hedge funds achieve a higher Sharpe ratio even though they hold a higher total risk.

3.5.2.8 Beta

Beta can, according to Stone (1974), be described as the systematic risk, volatility or simply how an instrument responds to changes in the market. If the Beta value is greater than 1.0 the instrument is more volatile than the market and if the value is less than 1.0, then the instrument is less volatile than the market itself. Stone (1974) also argues that Beta is accepted as a measure of non-diversifiable risk and is often a part of many performance measures.

When it comes to the application of Beta on hedge funds, Chan et al (2006) argues that hedge funds risks are not adequately captured by measures such as Beta and therefore not to be trusted. Even when hedge funds have low beta values they can still exhibit a high degree of risk according to Ackerman et al (1999). According to Liang (1999) mutual funds tend, in general, to have higher beta values than hedge funds. Liang (1999) further argues that since hedge funds present low Betas, they are not traditional investments and are hence less correlated with fluctuations in the market than traditional investment vehicles. Even though hedge funds generate low Beta values and hence has a low systematic risk, one has to remember that hedge funds apply the usage of dynamic trading strategies, which can include substantial market risk (Liang 1999).

3.5.3 Implications for risk measurement

Implications for risk measurement become indirectly implications for risk management since risk management is associated with the usage and the validity of the different risk measurements. We will in this section mention and discuss implications such as survivorship bias and dynamic risk analytics.

3.5.3.1 Survivorship bias

Survivorship bias is the tendency for funds that has performed poorly in the past to be shut down by fund companies and excluded from databases (Fung & Hsieh, 2001). In general this is due to poor results or that the asset accumulation has been to low. This trend also impacts, according to Lo (2001), the hedge funds industry where fund managers will only include those hedge funds that have been a success in the past, hence only survivors are included. Lo (2001) further argues that many hedge funds have been closed down and sometimes merged into other funds to hide their failures, hence it is vital to take this into account when analyzing historical data regarding hedge funds. In those few occasions when databases include closed down or “dead” hedge funds, it has been concluded from previous research that the influence of survivorship bias can be extensive. Since funds managers hide their shut down hedge funds, one can wrongly conclude that the fund managers possess great skill (Lo, 2001).

Blum et al (2003) argues that survivorship biases are complex to deal with since they can substantially interfere with the validity of risk measurement. According to Edwards (1999) the returns that are reported by hedge funds might be exaggerated for the reason of survivorship bias. Agarwal and Naik (2004) states that hedge funds indexes and databases are not put together in the same way, hence the survivorship bias that occurs when funds are excluded from databases when they die can complicate the comparison between different databases.
Lhabitant (2001) argues that a way to minimize survivorship bias is for funds to be included in different indexes, to be reselected every quarter and not be excluded until they are liquidated or fail to meet the requirements of financial reporting (Bondarenko, 2004). According to research done by Ackermann et al (1999), survivorship bias did not appear to have any remarkable effects since positive and negative biases can cancel each other to a certain degree. Liang (2000) states that previous research regarding survivorship bias in mutual funds have been documented at 0.5-1.4% per year. Liang (2000) further expects that because of the usage of leverage, derivatives and the growth of the hedge fund industry the survivorship bias of hedge funds is higher than in mutual funds.

3.5.3.2 Dynamic risk exposures

Lo (2001) argues that there is no correct way of measuring risk in hedge funds because of the dynamic investment strategies they implement, hence there is a need for risk measurements that can capture their dynamic risk exposures (Chan et al, 2006). Lo (2001) further argues that there is no single measurement to capture the risk of the exposure when it comes to a hedge fund, since they are not static investments. Many of the measurements used today, such as Standard Deviation, are not operating well enough to give risk transparency to the investors, hence they resort to using risk measurements that are more sophisticated and that are functional when it comes to capturing dynamic risk exposures (Lo, 2001).
4 Empirical findings & Analysis

In the fourth chapter of the thesis the empirical findings are presented. The chapter starts with a short presentation of the 5 interview participants and the hedge funds they represent. Later the result is presented of the interviews where risk management and risk measurement is comprehensively described and the empirical findings is critically analysed against the theories discussed in chapter three.

4.1 Presentation of interview participants

Here we provide a short description of our interview participants and give some general information about the hedge funds or organizations they work for. All the information presented here was obtained either through the interview itself or was found on respective firms' webpage.

- **DnB Nor**: Interview with Lars Lövgren & Niklas Lundquist (2011-04-04), Lars Lövgren is Head of Hedge funds and Niklas Lundquist is Head of portfolio management at DnB Nor. DnB Nor is one of the leading Nordic players in banking, finance and insurance. The Group is the market leader in Norway and is growing on the Swedish market. DnB Nor’s hedge funds in Sweden are managed by Carlson Investment Management, a subdivision of DnB Nor. Carlson manages about 600 billion SEK and is currently running four different hedge funds (Carlson Investment Management, 2011).

- **Adrigo Asset Management (Adrigo)**: Interview with Håkan Filipson (2011-04-04), CEO and analyst at Adrigo Hedge. Adrigo Hedge is a hedge fund that is managed by Adrigo Asset Management. Adrigo Hedge is to only invest in the Nordic market and to trade in highly liquid assets. The fund manages about 350 million SEK and was nominated as the Swedish Hedge Fund of the year in 2011 (Adrigo, 2011).

- **Risk & Portfolio Management (RPM)**: Interview with John Sjödin (2011-04-05), Investment analyst at RPM Asset Management. Risk and Portfolio Management is an alternative investment house, focusing on directional investment strategies, specifically Managed Futures and Global Macro. The fund manages about 40 billion SEK and offers risk monitoring and risk management capabilities as a stand-alone service to clients. Risk and Portfolio Management is a technology-heavy fund and has very sophisticated tools for measuring and managing risks (RPM Asset Management, 2011).

- **Sentat Asset Management (Sentat)**: Interview with Robert D’Agostino (2011-04-05), co-manager and trader of Thyra Hedge. Thyra Hedge is an international hedge fund with its focus in the technology, multimedia & telecommunications sector. Sentat Asset Management manages a total of about 600 million SEK split between three different hedge funds (Sentat, 2011).

- **Finansinspektionen (FI)**: Answered questionnaire from Per Nordkvist (2011-04-12), financial inspector at Finansinspektionen. FI is the governmental agency that oversees all investment funds and special funds, including hedge funds, in Sweden. (Finansinspektionen, 2011a)
4.2 Questions

In order to simplify our presentation of our empirical findings and subsequently, the analysis of these findings, we will further refer to our interviewees by the names of the hedge funds or the firms that they work for. To avoid unnecessary waste of writing space we will use abbreviations of the firms as well. Adrigo Asset Management will be named Adrigo, Risk & Portfolio Management will be named RPM, Sentat Asset Management will be shortened to Sentat and Finansinspektionen will be written as FI in each new section and subsequently written as FI. To make it easier for the reader the sections 4.2.1-4.2.4 will be used to answer the first research question:

"How do Swedish hedge fund managers perceive risk in their portfolios and how do they manage it?"

Section 4.2.5-4.2.6 will help answer the second research question:

"How do Swedish hedge fund managers construct their portfolios with regards to risk management?"

Finally sections 4.2.7-4.2.9 will be used to be able to give a response to the third research question:

"How is risk measurement used when it comes to risk management and how valid are they when applied to Swedish hedge funds?"

4.2.1 The definition and nature of risk

It is important to distinguish between each manager’s definitions of risk as this will serve as our basis for understanding how he or she perceives the concept of risk. The definition of the nature of risk will further influence the manager’s view on the controllability and characteristics of risk.

Empirical findings

Finansinspektionen states that risk is an elusive concept, which also depends on the situation that you consider. They further state that total risk consists of different risk-components such as operational risk and financial risk. It is important to understand how all of these components influence total risk as well as the characteristics of these components to be able to get an idea of what risk is. FI provides a general definition of risk as that it can be seen as the probability of an unwanted event together with the effects of that event. FI states that risk can be partially controlled but that controlling the total risk of a fund has its limitations, which is something that you have to be aware of. The reason for the limitation is that risk measurement and thus management is based on historical numbers and because of this one must understand the difficulties in projecting future values.

Adrigo defines the concept of risk with the description that it is ones possibility to sleep at night. The meaning of this is that as a fund manager, who is living with his portfolio, the risks you have undertaken in your portfolio should not make your conscience heavy. Adrigo argues that risk can be controlled to a great extent and that risk could also be seen as the possibility to lose money, something which should keep most fund managers up at night.

RPM does not give a clear definition of risk during the interview; instead they shift the conversation towards the process of quantifying risk and the risk measures they use in the fund. The risk measurement platforms they use in the fund are extremely complicated and they track and measure many different risk aspects on thousands of different trades and
commodities. RPM states that the primary risk that they face in the fund is the daily price risk, which is quite different to the general risks faced by conventional hedge funds.

Funds may either increase or decrease in value. In these future changes in value there exists an uncertainty and this uncertainty is what Dnb Nor defines as risk. They further state that one can look at the VaR, standard deviation, credit risks and liquidity risks but eventually a risk will surface which has not been captured in your measurements. Thus Dnb Nor concludes that risk is to some degree controllable but considered as a whole can risk not be controlled.

Instead of defining risk, Sentat distinguished between different types of risks. The ones that are mentioned, and that constitutes the biggest threat to the fund, are market risk, liquidity risk and currency risk. Total risk would then be viewed as the sum of all of these components. Further Sentat emphasizes that Thyra Hedge is a low-risk hedge fund and that the view on risk concerning the fund is simply the loss of capital and excessive volatility.

Analysis

In accordance with the theoretical framework on the definition of risk, our participants had a hard time to define what risk is. This ambiguity about what risk is seems to be present in all of the research done on the subject and often researchers, such as Parker and Warsafer (2000), rely on providing examples instead of a clear-cut definition of what risk is. In fact, Jaeger (2000) strengthens this argument by providing the statement that attempts to discover a single definition of risk are bound to fail as ones view on risk is very subjective and thus the definitions can vary a lot. Our findings suggest that what Jaeger (2000) says is true as none of our participants managed to agree on a single definition. Dnb Nor and Adrigo followed the path taken by Parker and Warsafer (2000) and provided examples of real life events, which would highlight what risk was to these managers. Sentat and RPM were instead quick to change the subject from defining risk to the process of quantifying it and the components of risk instead. One can derive an understanding of what risk is to these managers by the way they tackled the problem of defining risk. We believe that RPM provides the best example of this. This hedge fund is extremely focused on quantifying risk and calculates an abundance of risk variables, thus it was no surprise that they shifted the discussion to the process of quantifying risk instead of defining the concept of risk. We find that ones view on risk is highly influenced by the way which with the hedge fund is managed. Adrigo further proves this statement as they live closely with their fund and have substantial sums of private capital invested in the fund. Their example of what risk is was that it was ones ability to sleep at night. This definition is highly influenced by the style of management employed by the fund.

Considering the controllability and nature of risk our participants seemed to agree on the limitations present in risk control. All of our participants stated that risk can be controlled to some degree but argues that there will always be one aspect of uncertainty left which is uncontrollable. Finansinspektionen states that this is due to the usage of historical numbers when calculating risk variables and with this, difficulties in projecting future values will arise. Dnb Nor argues that it is impossible to predict this uncertainty component of risk, which is why it will always surface risks which have not been captured by your risk variables, no matter how many you calculate. What both FI and Dnb Nor means with this is that it is important to be aware of the shortcomings and limitations when it comes to controlling risk. It is important to monitor your risk variables and to have an active risk management but it is equally important to understand that these variables will not capture
Empirical findings & Analysis

the total risk present in the portfolio. These empirical findings can be linked to the research conducted by Knight (1921), which makes a distinction between risk and uncertainty. In this theory, Knight (1921) states that it is possible to predict and thus control risks with the help of empirical data using methods of statistics. Further he argues that it is not possible to predict uncertainties since they have no earlier occurrence in history.

4.2.2 The justification of risk management

This is vital as to understand how each manager views the usefulness of risk management will affect the risk management processes implemented in the portfolios.

Empirical findings

According to Dnb Nor all risk management processes adds value to the hedge funds. It is important to emphasize the importance of competent people involved in the hedge fund but in combination with a competent staff, risk management will add value to the fund and give it an advantage relative to its competitors. Dnb Nor further states that by having a well developed risk management system the hedge fund will not be profitable per se, it is vital that the managers are skilled, experienced and that they are focusing on the business field in which they are experts. One important risk management strategy for Dnb Nor is to research who it is that is behind the companies and funds that they are investing in. The reason for this is that fund and company performance tends to be highly correlated to the current state of mind of the people responsible for managing them. Dnb Nor states that a fund that has achieved a good return in the past couple of years has a fairly high probability of achieving good returns in the future but there are no certainties what so ever that it will actually happen. It is more certain then that a fund that has presented bad returns in the past will continue to do so in the future. The pressure on successful managers will increase as their funds become more profitable and it is important to consider the effects of this pressure on the managers. Some examples of dangerous developments in the managers would be an increasing ego and an increased risk exposure as a consequence of this. It is also vital to monitor the capital controlled by fund managers, it is not uncommon that a successful fund will increase its capital by more than set guidelines and thus be forced to switch managing- and trading strategies. Dnb Nor concludes by stating that a well developed risk management system will not only protect the hedge fund from making bad investment decisions as a consequence of poor research, it will also protect the hedge fund itself from poor management.

According to Adrigo the importance of proper risk management for hedge funds has increased rapidly after the market crash that occurred in 2008. Not only was it clear that many strategies and tools used for and by hedge funds during this period failed to capture and control risks in a desired fashion, the public’s opinion regarding alternative investments and especially hedge funds plummeted. To be able to attract and maintain investors a hedge fund today has to specify the risk management employed and the risk levels that the hedge fund has. As the demand for proper risk management is so high the funds today has to actively work at improving the strategies that they use. Adrigo summarizes their view on risk management by saying that:

"Without risk management there is no value in hedge funds. Risk management is more important in the hedge fund industry now than ever before."

(H. Filipson, personal communication, 2011-04-04)
Sentat argues that as their hedge fund, Thyra Hedge, focuses on the TMT-sector, risk management is even more important. The TMT-sector is characterized as highly volatile and the uncertainty regarding companies is high. This is mainly in response to the uncertainty about technological breakthroughs, patents and the presence of a great number of competitors in the market. Because of the characteristics and nature of the TMT-sector, Sentat states that they have to monitor their risk measurements closely and actively work at keeping them at desired levels. They emphasize the importance of fundamental analysis and knowing the companies that you invest in but also state that the feeling you get about trades i.e. the gut feeling, plays a big role in investment decisions. Sentat argues that it is a fairly unstructured hedge fund but argues that the size of the fund and the freedom that the managers enjoy is one of the funds competitive advantages. They believe that smaller funds enjoy more advantages relative to the bigger ones. The reason for this is that smaller funds can change market positions easier and faster and thus trade more efficiently than big hedge funds. Hedge funds can control a vast amount of capital and can thus be limited in its investment decisions as some of these decisions could shake the markets or influence stock prices. Sentat states that risk management is especially important to the investors of hedge funds but argues that many investors fail to understand the concept of risk. Too many investors focus only on returns and fail to understand the correlation between risk and return. As Thyra Hedge is a low-risk hedge fund, risk management plays a big role in the fund. Many of the private investors in the fund fail to understand this and focus only on the return of the fund. Because of this Sentat prefers to work with professional investors as these appreciate and understand effective risk management.

Finansinspektionen states that when an investor has chosen to invest his capital in a hedge fund it is under the premise that a certain risk-level will be maintained. As nearly all hedge funds attract new customers by advertising the risk-levels and management techniques employed by the fund it is vital that the funds continue to operate within these levels. They continue by saying that it is equally important that other risks are controlled by the funds and not just the financial risks. Risks such as operational- and counterparty risk are equally important to maintain at satisfactory levels and these risks are easily overlooked when comparing funds as they usually require some extensive analysis to understand. FI concludes by stating that risk management is a central function of the hedge fund industry.

When addressing the justification of risk management, RPM distinguishes between two different kinds of fund managers. They label these managers as either systematic or discretionary fund managers. When considering the usefulness of risk management it is important to understand which kind of manager you are dealing with. Risk management for a systematic manager is often relatively straightforward as it is one of the components of the systematic approach to investing whereas the management and measurement of risk for a discretionary manager is not as vital. The discretionary manager is often trading by himself and does not have to present any measurements or other risk variables as the guidelines have already been established in the beginning of the fund. Thus they argue that the usefulness of risk management is dependent on which type of fund you are considering. If we shift our focus to hedge funds, RPM states that risk management that uses techniques and tools which are not available to the individual investors will add value to the fund as they can provide a service which is not available otherwise. They conclude their explanation by saying that:

"In hedge funds you want to maximize your risk-adjusted return. You cannot achieve a high return without undertaking a high level of risk. Hedge funds are created to counter risk, it is their main purpose"

(J. Sjödin, personal communication, 2011-04-05)
Empirical findings & Analysis

Analysis

While analyzing our empirical framework we notice that all of the hedge funds, which we have interviewed, found risk management to be an important part of the management process. We find that in accordance with the theories of Ineichen (2003), which states that the most profitable hedge funds consistently excel due to effective risk management; our interviewees believe that risk management adds value to the hedge funds and gives them a competitive advantage. Noteworthy answers regarding this subject are presented by Adrigo, which states that without risk management there is no value in hedge funds. The meaning of this is that the advantage of investing in hedge funds compared to regular investment vehicles, such as mutual funds, lies in the utilization of risk management strategies and investment tools not available to the other funds. RPM gave a similar explanation to this when they stated that the main purpose of hedge funds was to counter risk. Dnb Nor also seemed to realize the importance of risk management and agreed that some of the added value of hedge funds came from effective risk management. This theory that efficient risk management would add value to the fund is consistent with the theory presented by White (1995) which states that management of hedge funds is able to add value to the fund by decreasing dead weight loss due to a more efficient usage of capital.

Another pattern, which becomes apparent from our empirical findings, is that risk management has become increasingly important in today’s hedge fund industry. Following the theories presented by Adrigo, we believe that this is a consequence of the market failure in 2008 and more specifically the publics’ decrease in confidence in the hedge fund industry. Strengthening our belief, Sentat claims that risk management is especially important to the investors of hedge funds, which could indicate that to be able to attract new investors the funds have to present a satisfactory framework for how risk management is utilized. These observations are confirmed by the research conducted by Blum et al (2003) where they found that there has been a rapid increase in the development of new and improved risk management strategies as well as in the hedge fund industry as a whole. By analyzing the answers presented by Finansinspektionen we get a better overview of the subject, as these are more in-line with investor opinions than what perhaps some of the managers answers are. In their answer they states that when an investor has chosen to invest his capital in a hedge fund it is under the premise that a certain risk level will be maintained. Once again, these answers provide more evidence which strengthens our belief that risk management is justifiable not only on the premise of adding value to the fund, but also as an important feature to attract and protect investors.

4.2.3 The utilized risk management strategies

This will show how each manager effectively manages risk; it will further describe the strategy of the portfolio by stating characteristics such as geographical focus, diversification and hedging strategies.

Empirical findings

According to Adrigo, risk management is present in every step of their investment and management process. Their investment process consists of a very thorough analysis and valuation of the considered company, both the firm’s fundamentals and the specific market is evaluated. They usually complement the calculations with actual visits to the potential companies to get to know the culture and the management. After conducting this thorough analysis and considering all different aspects of the firm and its market sector the potential gains from the investment is compared to the additional risks that would enter their fund.
Empirical findings & Analysis

portfolio. Adrigo argues that this stock picking approach to the investment process is an important part of their risk management and states that it is vital to know what you are investing your money in. To further manage the risks in the portfolio and to decrease the beta-risk, they hedge their positions by selling short and by using futures on the OMX Stockholm stock exchange. According to Adrigo a well diversified portfolio is one of the key components to proper risk management and they aim to keep 10-20 long and short positions in their portfolio at all times. Neither of these positions is allowed to amount for more than 7-8% of total portfolio capital. To minimize the administrative risk and to prove to investors that incentives are aligned, the managers of Adrigo have invested a large sum of their own money in to the fund and they are forbidden to own any stock outside of the fund.

Sentat states that controlling liquidity risk is becoming an increasingly important component of risk management for hedge funds and emphasizes how difficult this task can be. Liquidity risk is mainly a problem for fund of funds but it is still present in an ordinary hedge fund. It is important to make projections of future cash flows in the fund to be able to avoid liquidity mismatches. According to Sentat, currency risk is another topic that has been receiving increased attention in the hedge fund industry. To counter currency risk in the portfolio, positions deemed as risky due to uncertainties about currency values are hedged using a variety of different types of options. Sentat reduces the market risk in its portfolio by using future contracts to hedge risky positions. Further the portfolio consists of 10-20 long positions and 4-5 short positions to diversify the risk among several different markets and industries. These positions are entered only after the companies have been extensively analyzed and their effects on the portfolio have been considered. Sentat emphasizes the importance of fundamental analysis by stating that:

“It is much easier to undertake large investments if you know everything about the company you are about to invest in.”

(R. D’Agostino, personal communication, 2011-04-05)

As Sentat invests in the TMT-sector the diversification of the portfolio can be seen as somewhat lacking. They counter this risk by spreading investments across these industries and by diversifying according to what type of products the companies offer in combination with rigorous analysis of the companies considered. Sentat argues that the value creation of companies in the TMT-sector can differentiate substantially; some can, for example, derive their value from patents while others have access to superior technology. Other than focusing on the TMT-sector, the fund trades in only Nordic and American securities and option. Sentat states that they have some positions in their portfolio that contributes to more than 10% of total portfolio value, but that mostly they try to restrict the size of each position. The managers’ of the fund prefers to invest in companies that has produced consistently good results even through times of financial crisis as this shows that the companies can handle both good and bad market conditions and is run efficiently.

RPM manages the total risk level in their portfolio by allocating their assets between 3-10 different fund managers. As the nature of the fund forces it to rely on the performance and competence of other fund managers they conduct extensive due diligence and investment research before investing in a new fund. By allocating capital differently between the different funds that they have chosen to invest in they can control the total risk in their portfolio. As RPM has access to an extensive system for measuring risk and are monitoring all risk variables they have adopted a dynamic risk management system in response to these
variables. Capital can quickly be reallocated or invested in new funds in response to changes in current macroeconomic conditions or unwanted changes in current risk levels.

_Dnb Nor_ states that the ground principle in their risk management is to adjust their risk level relative to the current market risk. If the market volatility increases they counter this by reducing the balance sheet for the management of the hedge fund, thus decreasing their exposure to the market. Their hedge funds trade in an international market and follow the world map, which the MSCI has established, in which America occupies a big part. They try to hedge for currency risks in their portfolios as well as they can but states that this process can be extremely complicated. Further they state that they accept to have some small unhedged positions and emphasizes that it can sometimes cost more to hedge a position for currency risk than what the expected gain from the actual hedge would be. To hedge for currency risks they look at the accounting currency and then buy or sell some stock to secure the currency exposure present in the investment. Concerning the usefulness of hedging for currency risks, _Dnb Nor_ states that:

“There is a big difference between a pension fund and a hedge fund when it comes to the time horizon of the investment. The longer the time horizon of a fund, the more willing you are to keep the currency risks open. As a hedge fund has a short time horizon by nature it is much more common that you secure the currency risks by hedging them.”

(L. Lövgren & N. Lundquist, personal communication, 2011-04-04)

The managers at _Dnb Nor_ state that they are always well diversified and argue that this is an extremely important aspect of a hedge fund. Hedge funds have access to a huge variety of different assets and tools, which would mean that it has the ability to be better diversified than a normal mutual fund. They state that they do not want to be too diversified though, as this would entail a lot of different stock positions and as the marginal benefit of adding new positions is diminishing. Thus, new positions should only be taken as long as there is a marginal benefit to doing so. _Dnb Nor_ states that their portfolios usually consist of 30-40 positions, which has been extensively analysed, and argues that it is in this range that the optimal diversification factor is obtained.

_Dnb Nor_ states that they employ a very personal risk management strategy in their hedge funds. What they mean with personal risk management is that they consider personal experiences, cultural differences and other personal or characteristical traits, which might affect the companies and funds that they invest in. They conclude by stating that:

“To be successful in the hedge fund industry you have to be careful, know what you are doing, know how you should do it and have all relevant information at all occasions.”

(L. Lövgren & N. Lundquist, personal communication, 2011-04-04)

**Analysis**

While analyzing our empirical findings we notice some similarities, which consistently appear among the interviewed managers.

The first thing that we notice is that all of the managers agree about the importance of due diligence and fundamental analysis concerning new investments for an efficient risk management. This is not surprising as it is always important to know what kind of companies that you are investing in and it is equally important to analyse and project what the future developments in the market will be. By really knowing the companies, and by
extension knowing the whole portfolio, the managers are able to predict how the portfolio will behave in certain market conditions and trends. It can be argued that fundamental analysis and due diligence is the foundation of efficient risk management as subsequent actions and strategies are based on the companies and, more specifically, the composition of the portfolio.

Another thing that we notice is that all managers emphasize the importance of having a well-diversified portfolio. We should note however that not all of the interviewed managers agree on the specific number of positions required to achieve the optimal diversification factor. This is consistent with the theoretical framework available concerning diversification. While the usefulness and effects of diversification are agreed upon in studies such as those conducted by Grinblatt and Titman (2001), the actual number of positions required to achieve an optimal diversification is debated. Evans and Archer (1968) found in their research that the optimal level of diversification is obtained in the range between 8-10 securities, while Statman (1987) found in his research that the optimal level of diversification is obtained by holding 30-40 stocks. Dnb Nor states that they are always trying to keep their positions within the 30-40 range while both Sentat and Adrigo aims at keeping 10-20 positions at all time. It should be noted that these numbers include both long and short positions. The theoretical framework on diversification is conducted with focus on regular funds and thus some of the added tools and assets available to hedge funds are not considered in the research. Selling ordinary stock short will not influence the diversification in an unusual way and can thus be treated as normal stock, but the effects of alternative assets and investments on diversification has not been researched. The difference in number of positions observed between the hedge funds would suggest that the research conducted by Lhabitant and Learned (2002), which found that it was impossible to find a single, optimal number of assets needed for an optimal diversification, seems to hold. Instead you have to consider factors such as market conditions, transaction costs and individual characteristics of the hedge funds to determine the optimal number of positions.

In accordance with the theories stated by Keiter (2000), hedge fund managers seem to utilize hedging strategies to isolate and control unwanted risks in their portfolios. From our empirical findings we can see that the utilized strategies to hedge unwanted risks are mainly done by using either futures contracts or by short selling stock. Both Dnb Nor and Sentat states that currency risks are the primary focus of hedging strategies but they also add that this can be extremely difficult. Hedging strategies should only be utilized when there is a marginal benefit attached to the strategy as hedging can be expensive and even increase the risk in a portfolio.

Another trend found from our interviews is that risk management seems to be getting more personal and nearly all of the managers employed what Dnb Nor calls personal risk management. This means that you are focusing a lot of attention towards the people behind the companies and the funds that you are investing in. As these people will be the main determinants of how well the companies will perform it is crucial that you invest in competent people that you can trust. Adrigo for example, states that one of their biggest competitive advantages lies in its small size and thus its ability to make personal visits to the companies before investing in them. Dnb Nor expands on the subject of personal risk management by stating that personal factors such as the occurrence of tragic events or changes in the manager such as hubris will affect the managers’ performance. Further they state that they have seen a clear correlation between bad fund performances and that a fund manager is currently in a divorce.
4.2.4 The distinction between the measurement and the management of risk

This topic will be relevant as research in the field often mentions the vague distinctions between the two. The managers’ view of the differences may prove to be important for our analysis about the subject.

Empirical findings

Concerning the distinction between the management and the measurement of risk many of the hedge fund managers seemed to agree. Dnb NOR, Adrigo & RPM all agreed on the definition of risk measurement as the quantification of current risk levels and the calculation of these variables while risk management was simply the consequent usage of these variables to control and influence current risk levels.

Sentat provided a similar distinction between them by stating that the measurement of risk provided you with a static picture of current risk levels while risk management was more operative and tried to control risk by action, i.e. investment decisions or other trading activities. They emphasize the importance of utilizing both components to be able to manage a hedge fund effectively.

According to Finansinspektionen, the quantification and calculation of risk variables is a component of the bigger process, which is risk management. This would mean that the two are intertwined and that risk measurement is simply one component of risk management.

Analysis

Our empirical findings here suggest that the managers of the hedge funds make similar distinctions between the management and the measurement of risk as one another. Finansinspektionen’s distinction is perhaps the one that summarizes it best by stating that the two are intertwined and that risk measurement is simply one component of risk management. Our empirical findings in this section supports the distinctions presented in the theoretical framework by Jaeger (2003) in which he stated that risk measurement is an important part of risk management but also argues that the measurement of risk in itself is a passive activity while risk management implies action and activity.

4.2.5 The management of risk in the construction process

This will provide an overview as to how risk management is implemented in the portfolio and if any limits, restrictions or other factors that affects the available strategies for the managers exist.

Empirical findings

Adrigo states that the most vital part when constructing a portfolio is to not have too many eggs in the same basket, hence diversification is very important. Adrigo argues that they never wish to invest more than 7-8% of total fund capital in each position of the hedge fund to be able to protect the portfolio from failure in case of one instrument performing poorly. Adrigo has a few frames and limits established regarding risk management when it comes to the portfolio construction but the main idea is that the fund managers in Adrigo is able to do almost anything. Some restrictions are that the hedge fund is always kept in between 20-50% exposure to the stock markets and that the fund managers are only able to invest in the Scandinavian stock markets. Another guideline is that the hedge fund has a low loan-to-value ratio, which means that a large portion of the money invested in the fund
comes from investors and is hence not borrowed from financial institutions. Adrigo also makes sure to only invest in instruments where they are able to calculate and understand all of the numbers as well as the business plan of the company.

Another action that Adrigo takes in their risk management to be able to understand and control the risk when constructing their hedge fund portfolio is to get to know what they invest in. Hence, Adrigo will often personally meet representatives for the different firms they plan to invest in to be able reduce the risk and exposure to uncertainties. They argue that the more you know about your portfolio and the companies that you have invested in, the less you have to worry regarding an uncertain future. Another essential part of Adrigo’s risk management when constructing a portfolio is that they would never invest in anything that they personally do not believe in. This is the reason why all the fund managers at Adrigo have personally invested capital in their hedge fund. Since Adrigo is a relatively small fund, they argue that they have more control when it comes to risk management compared to larger competitors. This is due to that everything is very personal in Adrigo. They have their own money invested, the fund managers know each other well and they live with the fund at all times. The risk management impregnates the whole investment process, every step of the way. If Adrigo does not perform well they will loose their own money invested as well as the capital from its investors. The risk management in portfolio construction is not written out. Adrigo also argues that when one well-functioning risk management strategy is found one should stick with it, changes can be a great danger in risk management.

Sentat put a lot of emphasis on that they have very wide guidelines in their hedge fund portfolio construction. They argue that their guidelines are much wider than necessary. The main reason for this is that Sentat wishes to give their fund managers the ability to have the freedom to do whatever they want when building a portfolio. They do not worry about the risks involved in having too wide and not very strict guidelines when it comes to risk management in their hedge fund portfolio construction. The only thing that Sentat mentions is that they do not wish to have a beta value that is too high.

RPM is very careful and precise in their risk management when constructing their portfolios. An exhaustive analysis is performed on the potential investments. Each instrument that is considered is broken down to understand their performance and what risk management that has to be carried out to limit the risks in the best possible manner. RPM’s investment research also thoroughly analyses the different bond-, market- and commodity exposures of the considered fund.

RPM never invests directly in to other funds, instead they have created an artificial pool of funds in which all selected fund managers get access to a sum of capital. The managers of these funds then reports to RPM how to invest the available capital so that it is invested in the same way as they have invested it in their individual funds. By creating this artificial pool of fund, RPM manages to eliminate the risk of fraud and the management risk associated with investing in other funds. As the fund managers of these funds do not have access to the capital of the fund, or even knowledge about the total capital available, RPM is able to control all the risks associated with transactions of this type.

Dnb Nor has an extensive risk management process in the construction of their hedge fund portfolios. One has to break down the different risks one wish to measure before investing in any assets. Initially there is market risk, which is measured by different kinds of volatility variables and also complemented with a review of the balance sheet. Dnb Nor occasionally enforce restrictions as to how large the balance sheet is allowed to be in a potential
Empirical findings & Analysis

investment. Dnb Nor further argues that they are flexible in how the risk management is performed and the process is modified uniquely to match every hedge fund. Hence they have no static model of any kind on how to perform the risk management regarding their portfolio construction. The foundation in Dnb Nor's portfolio construction is all the risk variables that measure differences in volatility and on top of that, as mentioned earlier, comes the restrictions in the balance sheets. When discussing the volatility, Dnb Nor states that they are able to capture the true volatility in the market for the last 30, 60 and 90 days, sometimes even longer back in time.

With the use of different volatility variables, such as VaR, the volatility is captured. Dnb Nor states however that they do not construct a portfolio subject to VaR. Hence the volatility is only kept in mind during the construction process. Dnb Nor takes the risk variables into account and constructs a hedge fund portfolio that is proven risk effective. Hence, not only the risk variables are considered in the construction of the portfolio. If this is done one obtains an abnormal portfolio where risks might be added and hence are hard to capture. Examples of these risks are the counterparty risk, the credit risk and the operational risks.

Dnb Nor is also careful when constructing a portfolio not to have investments in too many different instruments. Usually a portfolio consists of in between 30-40 different instruments. If one has more investments Dnb Nor argues that one easily overdiversifies the hedge fund and that risks will instead be added. The fund manager is also able to achieve a greater understanding of the positions in 20 investments than having 50 investments.

Dnb Nor states that they have different kinds of risk management processes active within their company. The first kind is the risk management the fund managers make use of. The second one is the risk management that the fund managers’ superiors are utilizing. The third one is the risk management performed by independent analysts that monitor the managers every move and initiatives to make sure they do not move outside the frames and limits established within the firm.

Dnb Nor further explains that they possess advanced machines when it comes to stock picking to help them choose what stocks and investments are profitable to buy and sell. These machines build upon different valuation models and are programmed to avoid high concentration and stock specific risks. All for the reason of being able to build hedge fund portfolios with an acceptable risk level.

According to Dnb Nor the fund managers are not able to invest in anything that the analysts have not yet approved. Hence there are strict frames established for portfolio construction. The fund manager also has to sell an investment if told to do so by the analysts. It is further not a fast and easy process to enter a new investment, the decision normally has to pass a few desks before approval. Hence, it can be argued that this is a part of the risk management at Dnb Nor. There is always one individual fund manager that manages every portfolio; hence there is no collective responsible for the actions taken. The individual manager is also able to make fast decisions if necessary, as long as they keep within the set limits. Dnb Nor has implemented extremely clear frames and limits in their hedge funds to make sure that no mistakes are made.
Dnb Nor’s view on risk management in the portfolio construction process is:

"The management communicates risk limits down to the individual who manages the fund. Hence, they have certain degrees of freedom to act within these risk limits. When an opportunity opens, the fund manager has to act quickly and be or she has freedom to do so as long as the risk limits are respected."

(L. Lövgren, personal communication, 2011-04-04)

Analysis

While analyzing our empirical findings in this section we notice some similarities and some differences between the interviewees.

As mentioned in previous sections, all the managers emphasize the importance of rigorous due diligence analysis and the importance of a well-diversified portfolio. Another factor, which seems to be consistently presented throughout the interviews, is the need for some restrictions and limits within the fund. While the severities of the limits differ widely some consistencies can be observed.

The first consistency we notice is the range and size of market positions. The managers of the hedge funds have guidelines set which states how many positions should be kept at all times as well as restrictions as to how big any one of these positions are allowed to be in the portfolio. All interviewed hedge fund managers stated a range of investment positions, which it tries to hold at all times to keep diversified. Further Adrigo stated that no one position is allowed to exceed 7-8% of total portfolio capital while Sentat stated that they tried to keep all positions under 10% of total portfolio capital but that this was more of a guideline than a limit and exceptions occurred.

The other consistency we found is the geographical restrictions or focus implemented in the funds and the occurrence of industrial and market restrictions in some of them. The hedge funds managed by Sentat, RPM & Dnb Nor have an international focus and trade in all markets but these funds usually have other restrictions implemented which affects trading to some degree. We should note that Dnb Nor currently manages four different hedge funds with different restrictions that all have an international focus. Both Thyra Hedge, which is managed by Sentat, and TMT absolute return, which is managed by Dnb Nor, are TMT-focused hedge funds and thus are restricted to invest in only the TMT-markets but without regards to the companies' geographical origin. Adrigo only invests in stocks listed in the Nordic stock markets.

Both of these consistencies can be linked to the theories presented by Ezra et al (1991), in which they state the importance for managers to allocate the capital and thus the risk towards areas in which the managers’ expertise lies and to stick to these areas of the market. If the managers’ expertise is within the TMT sector then the fund should limit its investments to this sector, similarly the geographical expertise of the manager has to be considered as well. Putnam (1997) found in his research that the most common reasons that fund managers underperform is due to concentrated market bets or a lack of diversification, excess cash reserves for betting on market turns and that the fund managers take risks in areas outside of their main expertise. By establishing and following clear guidelines and restrictions the fund has effectively eliminated the risk of trading in unknown territories or markets as well as making sure that the portfolio will be well diversified at all times.
One of the main differences that we found between the interviewed hedge funds was with regards to the freedom enjoyed and the trading processes implemented by the funds. By analyzing our empirical findings we can clearly see that there is a big difference in these processes when considering the large hedge funds managed by Dnb Nor and comparing the results with the smaller ones, managed by Adrigo and Sentat.

Dnb Nor has extremely defined limits and guidelines while the trading process consists of many steps and is rather complicated. It should be emphasized that they have three separate risk management systems implemented at the same time in its funds. These consisted of the risk management the fund managers make use of, the one that the fund managers’ superiors are utilizing and the third one was performed by independent analysts that monitors the managers every action in the fund to make sure they do not move outside of the frames and limits established within the firm. As can be noticed the guidelines are consistently enforced in the fund and the managers are forced to keep within the limits. The managers are not allowed to invest in whatever they want either as the assets has to be approved by analysts prior to the investment, which in turn, has to be approved by additional departments such as the board of directors. They managers are also forced to sell their positions if the analysts say so. Dnb Nor states that the board of directors and the management sets the guidelines and limits for the funds but argues that the managers are enjoying some freedom as they are allowed to make fast decisions as long as they are within the set limits.

Both Adrigo and Sentat argue that one of the biggest advantages that their funds has is due to its relatively small size. Adrigo states that they have employed few frames and limits regarding risk management in the fund to give the managers’ a sense of freedom and the ability to make fast investment decisions. Similarly, Sentat put a lot of emphasis on that they have very wide guidelines in their fund and that the set limits are much wider than necessary. The main reason for this is that Sentat wish to give their fund managers the ability and freedom to make the trades that they find most profitable.

As can be seen the rules and restrictions enforced by the bigger hedge funds managed by Dnb Nor is much more sever than what the smaller hedge funds Adrigo and Sentat has. The degree of freedom that the smaller hedge funds enjoy should not be overseen and we believe that this may be an advantage. It should also be noted that as the capital controlled by Adrigo and Sentat is fairly small the hedge funds have the ability to quickly make big changes in their portfolio without the risk of shaking the markets, something that big hedge funds are not allowed to do. We would like to add that it could also be argued that the risk management system implemented in Dnb Nor is more effective than the ones in Sentat and Adrigo as there is virtually no room for spontaneous investments or unwise market bets by the managers as every decision has to be approved by others.

4.2.6 The characteristics of the portfolio

This question will provide insight in to how knowledgeable hedge fund managers are concerning how their portfolios behave in different market conditions and in response to certain events. We will further determine how, and if, managers utilize scenario analysis and/or stress test their portfolios.

Empirical findings

Adrigo argues that when it comes to risk management, the most important thing is to constantly live with your hedge fund. For this reason Adrigo do not waste neither time nor
effort in performing any scenario analysis or stresstests. Adrigo further argues that through studying the net exposure of the hedge fund one gets a sense of how great the risk is. Due to that the managers of Adrigo constantly lives with their fund they only act when certain events happen that affects their portfolio. Hence, Adrigo has no masterplan to be able to handle unexpected events; instead they take one day at a time.

Sentat, like Adrigo, neither performs stresstests nor scenario analyses. Instead Sentat argues that one receives an equivalent to these tests and analysis when certain real life events occur. The important thing is then to learn from these events. When these events occur Sentat takes them into account and tries to become better in their management as they will be able to act faster when something similar happens in the future. This works, according to Sentat, in a small hedge fund but not in a larger one. Sentat further argues that they certainly know what to do when something do happen in order to limit their losses. There are always a few core holdings that are kept despite what occurs and then there are others that can be sold rapidly to be able to save the fund if necessary. When one has a small hedge fund it is possible to act very fast and therefore the stresstests and scenario analyses are not needed.

RPM is utilizing all kinds of stresstest and scenario analyses in their advanced risk management IT system. They are able to do all things imaginable with their technology to be able to predict future market developments and hence be able to tackle any event that occurs in the best possible manner. However, when it comes to events such as the GFC, RPM states that not one variable will be able to capture risk like this since neither scenario analyses nor stresstests can capture it, instead managers must act fast with all their knowledge and experience to avoid a disaster in their hedge funds.

Dnb Nor is utilizing different kinds of scenario analyses and stresstests in their hedge funds. They specifically discuss a proactive usage of the calculated risk variables, to be able to understand what will occur when a new instrument is put into the hedge fund portfolios. As the risk variables change the managers can verify if it is appropriate or not to use the new instrument. Dnb Nor argues that one cannot limit their risks constantly and perform stresstests of everything that could possibly occur, instead they try to have hedge funds that are as market neutral as possible, thus they are not extremely affected by an event such as the GFC. By trying to have a market neutral hedge fund, DnB Nor argues that they have a lower beta value and net exposure than their competitors. There are strict rules and limits that the fund managers must follow to be able to stay as market neutral as possible. DnB Nor also questions how accurate scenario analysis is when events such as the GFC happens. What people thought was not possible still happened during this period of time; hence scenario analysis can never be completely accurate. DnB Nor further argues that one has to construct a portfolio which is flexible to be able to adapt when events such as the GFC occurs. The worst thing one could do after the GFC is to build a portfolio that will handle the GFC well since the exact same crises will most certain not occur again in a near future. To summarize:

“We must create a hedge fund portfolio that can handle the unknown in a decent manner. However, one does always draw lessons of what happens.”

(L. Lövgren, personal communication, 2011-04-04)
Analysis

In this analysis the fund managers’ view on scenario analyses and stress tests will be compared, which are the main tools used when trying to predict different market conditions and to determine how the fund should respond to certain events. This will be analysed against our theoretical framework.

Adrigo and Sentat, being the smallest firms of the interviewees, are the ones that care the least about scenario analyses and stress tests. They believe that the most important thing is to live with your portfolio at all times and thus be able to act instantly when something happens. They state that when an event occurs, they learn from it and become better in their management. Since Adrigo and Sentat are relatively small hedge funds this way of operating their portfolio becomes possible. RPM and Dnb Nor are operating opposite to their smaller competitors. They make use of both scenario analyses and stress tests in the portfolios. They perform stress tests to be able to test the effects when new instruments are added to their portfolios and especially Dnb Nor prefers this proactive usage of their calculated risk variables. Even though both firms are in favour of both scenario analyses and stress tests they still both question the accuracy of them when it comes to events such as the GFC. Dnb Nor and Sentat both argue that in case of extreme events the firms must be flexible and act fast enough to avoid a disaster. The smaller firms, Adrigo and Sentat, are both against the theory presented by Norland et al (2000) that states that a portfolio should be subjected to stress tests and scenario analyses to be able to some how get a feeling of how the portfolio would behave in the occurrence of certain events. Hence, both RPM and Dnb Nor argues in accordance with Norland et al (2000) since they both, as part of their risk management, tests how their hedge fund portfolios responds to events that more or less affects the market. They are however partly against the researcher since they believe that neither scenario analyses nor stress tests are able to mimic market crashes, such as the GFC. The way of performing stress tests and scenario analyses is also in accordance with the Monte Carlo valuation method, presented by Blum et al (2003), where one performs simulations to see how the risk variables in the portfolio changes when for instance new instruments are added. This is in agreement with RPM and Dnb Nor’s way of performing risk management in their portfolios through understanding different risk variables used, such as VaR and ES/CVaR.

4.2.7 The risk variables used

This question will serve as the foundation for our research regarding risk measurement by examining what risk variables the managers’ actually utilize in their portfolios.

Empirical findings

Adrigo monitors only the Sharpe ratio in addition to the required Standard Deviation (SD), Monthly rate of return and Concentration, which are demanded by Finansinspektionen every month. Because of that Adrigo is relatively small they do not calculate risk variables such as VaR, ES/CVaR or Beta in their portfolios since they do not possess enough resources to calculate them. Adrigo has an external back-office that handles all of their calculations for them.

Sentat is using VaR, Beta and Sharpe ratio as their risk measurements in addition of those asked from FI. Sentat does not make use ES/CVaR as part of their risk variables. Sentat also has an external back-office, which takes care of all the calculations needed and communicates them to Sentat and FI.
RPM is focusing a lot on risk measurement as part of their risk management. Because of their advanced risk management IT system, which has been developed over a decade, RPM is able to produce a 100 page report of risk variables every day to their different investors who sometimes demand them. These include all of the risk measurements we have researched about and even more.

*Dnb Nor* calculates all of the risk variables that we asked about including VaR, ES/CVaR, Beta and Share ratio. As one of the simplest risk variables *Dnb Nor* uses VaR and it has been used in one way or another throughout the firms history.

**Analysis**

In this analysis we will compare the fund managers’ preferences when it comes to the utilized risk variables.

The trend seems to be that larger firms make use of more risk variables and vice versa. *Dnb Nor* and *RPM* make use of all the different risk variables to measure risk, which is done by analysts from their own firms. *Sentat* have access to most of them through their external back-office. *Adrigo*, also being the smallest firm of the interviewees, has the least access to risk variables through their external back-office much because of the limited amount of resources that is put into this aspect of their risk management.

### 4.2.8 The validity of the variables

A discussion about the validity and accuracy of risk variables will examine how hedge fund managers perceive the different risk measurements used and how accurately they believe the variables capture the true risk.

**Empirical findings**

When asked about the validity of risk variables *Adrigo* states that they do not believe that they are enough when it comes to measure and capture the risks in a hedge fund. Adrigo believes that the risk variables are not very important; instead the measurements are more of a notification of how well the funds has performed in the last period of time. Hedge funds are very different since they can invest in almost anything and because of their nature Adrigo further believes that there are some hedge funds where the need for more risk variables is huge, while it is not that vital in others. Adrigo argues that one of the most important factors when discussing risk management in a hedge fund is with the people involved, investors and managers, to get to know each other and learn how the work is performed and what is important to the risk taker. The only specific opinion that Adrigo has regarding the risk variables is that they don’t want to have a Sharpe ratio that is too high. When asked regarding the three risk variables that are demanded by *Finansinspektionen* every month Adrigo believes that these risk variables are reasonable to ask for. This is because Adrigo believes that they will give a fairly accurate picture of how the hedge fund performs, but to obtain a complete picture of the hedge fund these risk measures are far from enough.

*Sentat’s* opinion regarding the validity of risk variables is that none of them are able to capture the risk in hedge funds very well. Since hedge funds has extremely broad investment possibilities and since most financial instruments can be used Sentat believes that neither of the risk variables are valid. Sentat argues that Sharpe ratio is a simple but blunt risk measure, however it is still good for comparing different hedge funds. Sharpe ratio is also used to be able get their hedge funds put into a certain risk class, hence they
Empirical findings & Analysis

make sure the ratio does not move too much in either direction away from what has been decided. Sentat mainly uses Beta to be able to continually understand what is happening in the hedge fund portfolio and if they need to act, however they still know that Beta does not capture the risk in the fund well. When it comes to the risk measurements asked by FI Sentat argues that they are valid and especially that Concentration has a good purpose. According to Sentat Concentration operates as a reasonable risk management but overall the risk variables asked by FI are not relevant when it comes to hedge funds. In the end it all comes down to if the fund manager delivers or not. Sentat’s general opinion on risk measurements can be understood by the citation:

“One should not nag or get caught up in the risk variables, instead the fund managers should be left alone to do his or her job.”

(R. D’Agostino, personal communication, 2011-04-05)

RPM does not believe that there exists one single risk management system and thus risk variables that can predict risk. The reason that this is not possible is due to the nature and the dynamic trading strategies employed hedge funds. However, if you consider many risk measures and variables together they can provide a valid picture of the risk but there is always one dimension that is unpredictable. It is according to RPM not possible to predict and capture unexpected events such as what happened 9/11-01 with any risk variables. Further, RPM argues that it is impossible to look at a risk variable and know if it works well due to the variables being too complex and that there exists too many uncertainties.

According to Dnb Nor people tend to rely too much on risk variables. One should be aware that some things are impossible for the risk measurements to capture and it is important not to focus on a few single risk variables, instead one should have an open mind and be able to see the whole picture of the risks associated with hedge funds. Hedge funds are very different to mutual funds, much because that they do not have many restrictions and is thus able to invest in what suits the managers. Dnb Nor always calculate all the risk variables but since their validity often is questioned they are sometimes stored instead of used. To locate the risks through using risk variables can be a very difficult activity.

One can look at VaR, SD, credit risk and liquidity risks but once in a while there will surface risks which have not been captured. Hence, one must according to Dnb Nor take the risk variables one calculates with a pinch of salt. Dnb Nor is still using the same risk measures as they were doing 10 years ago. Hence, no significant changes have been made after the GFC 2008. Dnb Nor argues that it is fairly easy to abuse and manipulate all risk measurements. This could be seen 2008 when the GFC was not captured or communicated through any risk variables that were used. When risk measurements are manipulated they end up being worthless. According to Dnb Nor some say that it is good to have a high Sharpe ratio, but if you do you are not protected against market shocks. One must understand the Sharpe ratio to be able to use it. When it comes to Beta Dnb Nor does not believe in having one that is too high. The measurements that are demanded by FI every month gives a hint of what has happen in the fund up until today but does not say much of what will happen in the future, no risk measurement can. Dnb Nor does not believe there is any significant difference between VaR and SD and they do not put much emphasis on more elegant risk measures.
Dnb Nor’s understanding of risk variables can be summarized through a citation:

“People believe that risk variables are some kind of mirror of the future, which is incorrect. Instead the interpretation of the variables is an indication of what will happen in the future.”

(N. Lundqvist, personal communication, 2011-04-04)

Analysis

The fund managers’ opinions regarding the validity and accuracy in the risk variables are important factors to be able to understand how well they are believed to be operating in the Swedish hedge fund industry. This will be analysed against our theoretical framework.

When it comes to risk variables the firms have slightly different opinions about them. Adrigo does not at all believe in them because of their broad investment possibilities, instead they only take them as notice to be able to understand if anything needs to be changed in the future. Sentat does not believe that neither of the risk variables has a high validity since hedge funds can make use of most financial instruments on the market and thus is of a highly dynamic nature. RPM is more positive towards risk variables when they argue that if many risk variables are put together one can get a reasonable picture of the risk in a hedge fund, but one must always remember that there is an unpredictable part that no risk variable can capture. This is connected with the dynamic trading strategies that hedge funds employ. Dnb Nor believes that one has to be careful of what to expect from the risk variables and that they should always be taken with a pinch of salt i.e. not blindly believe in them. This is because hedge fund managers are able to invest in almost anything that exists on the market. According to Dnb Nor risk variables are just an indication of what will happen in the future, nothing more. One can thus argue that all the hedge fund managers agree with researchers, such as Lo (2001) and Chan et al (2006), regarding dynamic risk exposures. In these theories researchers argue that there is no correct way of measuring risk in hedge funds since they employ dynamic investment strategies.

We will now analyse each risk variable more closely to be able to gain a greater understanding of how the firms are different in their opinions. Initially we will analyse the risk variables asked by Finansinspektionen i.e. SD, Monthly rate of return and Concentration. However, the emphasis on the analysis will be put on SD since it is a risk variable used worldwide in the hedge fund industry and as there is not much research available on how valid Monthly rate of return and Concentration are as risk measures in hedge funds. Since these risk variables are demanded by FI every month they are more than familiar to all hedge fund managers. Adrigo argues that they are reasonable to ask for but believes that they will never be able to give a complete picture of the hedge fund. Sentat presents a similar opinion when they argue that overall, the risk variables asked by FI are not relevant when it comes to hedge funds. According to Dnb Nor the variables only gives a hint of what has happened in the hedge fund up until today but does not say much of what the future looks like in the hedge fund. Most the hedge fund managers interviewed thus agrees on that the variables demanded, including SD, does not operate well when it comes to hedge funds. This is in accordance with most of the theoretical framework discussed in section 3.5.2.1 where most researchers believe, including Ackermann et al (1999) and Chan et al (2006), that SD does not capture the risk in hedge funds.

Secondly we will look into the interviewees’ opinions regarding the validity of both VaR and ES/CVaR that both can be derived from the Monte Carlo simulation (Blum et al, 2003). Adrigo uses neither VaR nor ES/CVaR. Sentat has only access to VaR but does not
express any specific opinions regarding it apart from that no risk variables capture the risk in hedge funds very well. Both RPM and Dnb Nor have access and make use of these two risk variables but Dnb Nor argues that they do not put much emphasis on risk variables more advanced than VaR, such as ES/CVaR. Both firms also have similar opinions when it comes to the usage of risk variables such as VaR and ES/CVaR in hedge funds when they express that one can study these but you always have to remember that there is a part that is impossible to detect in advance. Dnb Nor further argues that one cannot just apply these results, one have to carefully evaluate them first to see if they are suitable to use. The views of the hedge fund managers are in accordance with the theoretical framework from section 3.5.2.5 where the researchers, such as Liang and Park (2007), argue that one has to be careful when using VaR since it has theoretical shortcomings. Other researchers, such as Lo (2001), states that risk management based on VaR should be questioned and that VaR is incapable of capturing all the risk associated with hedge funds. Blum et al (2003) argues that VaR is the risk variable mostly used in risk management but this seems to be true with only the larger firms of our respondents since Adrigo does not use it and Sentat does not put much emphasis on it. Gupta and Liang (2005) conclude in their research that VaR is more appropriate than SD when it comes to risk management and this is something that Adrigo and Sentat should take into account in the future even though VaR is far from a perfect measure for hedge funds. In section 3.5.2.6 researchers, such as Agarwal and Naik (2004) and Giamouridis and Vrontos (2007), argues that when it comes to hedge funds ES/CVaR is preferred to use over VaR. Our analysis regarding these more elegant risk variables becomes thus limited since only the larger firms has expressed their views on them. Worth mentioning is that Dnb Nor does not put significant emphasis on ES/CVaR, which goes against the theory arguing that it does provide a more accurate picture of the risk in hedge funds. Dnb Nor also says that they have used the same risk measures the last decade, a suggestion would be to evaluate the risk measures used to see if any improvements can be made.

Thirdly we will discuss and analyse the responses from the fund managers regarding the validity of the Sharpe ratio in hedge funds. The Sharpe ratio is one of the risk variables that the smaller firms actually use. Adrigo does not put much emphasis on any risk variable; instead they make sure that their hedge fund does not have a Sharpe ratio that is too high. Sentat argues that the Sharpe ratio is good for comparing different hedge funds as it gives a hint of how well they are performing; hence it is a tool for putting hedge funds in certain risk categories. Dnb Nor only expresses that one has to be careful when striving to get a high Sharpe ratio on your hedge fund since it can take away your protection against market shocks. When using the Sharpe ratio the manager must know how the ratio operates. When analysing against the theories in section 3.5.2.7 Sentat does agree with Edwards (1999) opinion that the Sharpe ratio is a tool for comparing investments to others. Adrigo however does not receive any support for their opinions since researchers, including Lhabitant (2001) and Fung and Hsieh (2001), argues that the Sharpe ratio does not perform well when it comes to hedge funds. Dnb Nor somehow agrees on this with their opinion that having a high Sharpe ratio is nothing to rely on regarding hedge funds, the managers instead needs to have an understanding of what the ratio is. For instance they mention that one can achieve a high Sharpe ratio by selling only option contracts and thus receive a constant flow of cash inflows. While the variables will look good the consequences can be severe when the option contracts are utilized.

Lastly the interviewees’ answers concerning the validity of Beta will be analysed against the theoretical framework. All respondents except Adrigo have access and make use of Beta in their risk management. Dnb Nor expresses that they do not strive for having a too high
Beta on the hedge fund. Sentat is the firm that makes most use of the risk measure even though they know that the variable does not capture the risk in a hedge fund well. They do however check Beta on a weekly basis to understand if they as managers are doing something wrong in their management and to be able to change strategy swiftly if needed. When analysing the answers to the theories in section 3.5.2.8 Dnb Nor needs to consider Chan et al (2006) and Ackermann et al (1999) arguing that hedge fund risk is not captured well by Beta, even low Beta values should not be trusted. Sentat’s opinion regarding Beta is in accordance with the theories, such as those presented by Liang (1999), that Beta is not reliable as a risk variable in the hedge fund industry due to their dynamic trading strategies.

4.2.9 The consequent use of the variables

This question will further develop the distinction between risk management and measurement by examining how managers use the calculated risk variables and how they use them for developing a well functioning risk management system.

Empirical findings

Adrigo argues that when it comes to risk management the risk measurements are not very important and they do not speak much about them. It is more important for Adrigo to continually live with their fund every day and when you know your fund that well the risk variables are not as important. An external back-office calculates all the numbers for Adrigo and they are only considered as an indication as to how well the fund has been managed. The one thing that Adrigo does consider is if the Sharpe ratio of the portfolio is too high. Adrigo does not talk much about the different risk measurements but admits that they can make it easier for Adrigo to understand if it is anything that they need to change or do differently in the future. The risk variables are in the end mainly used to satisfy Adrigo’s different investors who desire this particular information. The investors of Adrigo are also interested in how they have performed historically.

Sentat also has a back office that calculates all the standard risk measurements. These numbers are used mainly to make sure that the hedge fund does not move from its established frames and limits. The maximum VaR Sentat wishes to have is 3 and the manager only acts when necessary. Beta is used weekly to see how the fund would act if something above the ordinary happened. VaR and Sharpe ratio is used mainly to satisfy their clients. These risk measures are calculated and sent to Sentat by their back office. The Sharpe ratio might not capture the risk very well but it puts Sentat in to a specific risk category for the investors, something which is desired. In Sentat each hedge fund manager is given a mandate to be able to manage the fund as he wants to. This includes performing and constructing the risk management of the fund.

RPM believes that risk measurements and understanding them is one of the key aspects of a well-functioning risk management system. All the variables are used and considered carefully to be able predict as much risk as possible, hence to expose their firm and clients to as little risk and uncertainty as possible. To be able to possess a successful risk management system all the variables calculated must be communicated cautiously to the right person at the right time, thus RPM believes in the risk variables. If not, the risk management system at RPM would be a lot less effective. RPM is also able to communicate a substantial amount of risk variables to their investors.

According to Dnb Nor the link between risk management and risk measurement is very important. One needs people that are excellent at calculating and understanding the risk variables but to be successful one needs great communication skills within the risk
Empirical findings & Analysis

management system. The risk management fails when the link between the people calculating and the ones using them is too long. This link must be shorter to make sure that no mistakes are made along the way. When performing risk management one cannot blindly make use of the risk measurements calculated, common sense must always be applied.

This citation makes the link between risk management and risk measurement clear:

“The risk measurements does not decide how the risk management is performed, they are instead more used to ensure that we do not do make any obvious mistakes.”

(L. Lövgren, personal communication, 2011-04-04)

With that said, all hedge funds must have good and relevant risk measures and a well-functioning risk management system. Clients and potential investors are interested in how they have performed in the past, since it gives an understanding in how well their risk management system is operating. It is important to do all the calculations and to perform the stress tests as well as watching over the counterparties and the liquidity. Risk is really important but there is not one right answer as to how to handle it. It is one thing to calculate risk measures but one also needs to understand them completely. In their hedge fund Dnb Nor breaks down the different securities in their portfolio. Then each risk is calculated individually to later be able to understand and limit the risk in the whole portfolio. Dnb Nor argues that the risk measurements also assists in ensuring that they do not add risks on top of each other. The usage of risk measures, when it comes to risk management, is that you are able to measure the risk over time. Hence, one is able to see how they change and, when common sense is applied, be able to understand the reason behind the changes. Dnb Nor further believes that one must have relevant risk measurements that suit one’s strategy and use them in a reasonable way. The usage of a 50-page long risk report can be questioned. What is most important is to measure the risk in a consistent way, have someone who understands it and can communicate it to the risk taker.

To summarize:

“There is no such thing as the Holy Grail within risk management – one needs to understand what is in the portfolio.”

(N. Lundqvist, personal communication, 2011-04-04)

Analysis

There are definitely correlations between the firms’ usage of risk measurements and how important they are in developing a risk management system, but to very a different extent. This will below be analysed to our theoretical framework.

According to Lo (2001) the correlation between risk management and risk measurement is very important. To our understanding particularly Dnb Nor and RPM embrace this theory when they argue that one must both calculate all the risk variables but most of all understand the meaning of them. Sentat also employs Lo’s (2001) theory to some extent when they believe that some risk variables are to be studied carefully to be able to make the right decisions in their risk management. Adrigo on the other hand do not seem to understand Lo’s (2001) view of how important it is to use the different risk variables to be able to create a well-functioning risk management system. Instead, they do not speak of the risk variables much at all in their firm. The views from the different interviewees are found to be correlated to the size of their firms. Dnb Nor and RPM, which are the largest firms,
do well in making use of the risk variables in their risk management. Sentat, which is much smaller than Dnb Nor but still almost twice as large as Adrigo, does calculate risk variables to some extent and lastly Adrigo, being the smallest firm, does not care much for the usage of risk variables at all.

When it comes to the theories presented by Blum et al (2003) regarding risk factors and how a firm should break down each single security in a portfolio to understand the risk, we can see that it has been applied by Dnb Nor and to some extent by Sentat. Dnb Nor takes all the different financial instruments in their hedge fund and calculates the risk individually to be able to better comprehend and limit the risk in the portfolio. RPM also makes use of all necessary risk variables to be able to understand the risks they are exposed to. Sentat does mention that they monitor Beta weekly to be able to see how the hedge fund would react if something happened, hence they are employing Blum et al’s (2003) theory using different risk factors to try to understand how sensitive their hedge fund is to certain events. This could also be seen in the light of the size of the different firms, where Adrigo being the smallest firm does not take this theory into account at all.

While discussing, the theories of survivorship bias came into mind where Lo (2001) argues that hedge fund managers tend to only include funds that have performed well in the past, i.e. only those that are included in different data bases. While interviewing Sentat we came to the understanding that this theory is somehow in accordance with their view on risk management. Sentat argues that either the fund work or it does not, in the later case it is shut down. Hence, we got the sense that old mistakes are easily forgotten and therefore potential investors will not detect faults that may have happened in the past that is in accordance with theory. Survivorship bias is also touched upon when analysing Dnb Nor and Adrigo’s views on historical data where the investors are interested in how the funds have performed in the past. According to researchers, such as Edwards (1999) and Blum et al (2003), historical data should not be trusted in the hedge fund industry since it interferes with the validity of the risk variables and numbers can also be wrongly exhibited. Hence, clients and investors to the interviewees of our thesis should not trust the historical data of different risk variables blindly.

While analysing the reasons and the importance of using risk variables the firms have different opinions. Adrigo argues that the risk variables are used mainly to satisfy the needs of their clients and investors. They are also used to be able to give Adrigo a report on how well the managers have performed in the last period of time. Sentat have a similar view arguing that the main reason for using the risk variables is to be able to satisfy their investors. They do however make use of them similar to Adrigo, as status reports of how well they have carried out their work. Dnb Nor takes the risk variables into account but is still aware that they are far from perfect in communicating the true risk picture of the fund. The variables are still demanded from the investors and therefore a lot of resources are put into this area. RPM on the other hand, in our opinion, believes more than the other firms in utilizing the risk variables. The variables are used both in the management of RPM and as a report to their clients. Analyzing the answers from our interviewees one can conclude that the smaller firms do not care as much as the larger ones about risk variables but since they are demanded by the investors, the firms do what is needed to satisfy them. This is still a high priority for the hedge funds as they need to keep their investors satisfied.

Finally most of the fund managers agree with Lhabitant’s (2001) view of that risk management today must always be complemented with human judgement and experienced fund managers. Adrigo argues that risk variables are not very important, instead the fund manager should live closely with the fund every day to be able to follow its every
Empirical findings & Analysis

movement. Sentar argues that the fund managers should be trusted to be left alone to be able manage the fund efficiently and that risk management is much more that merely numbers. Hence, it is up to the manager himself and his or hers experience and judgement to manage and perceive the risk of the fund. Dnb Nor believes that when performing risk management in a hedge fund the manager should not blindly follow the risk variables that has been calculated, instead it is most important to apply your common sense as a manager with all your experience. When it comes to RPM we believe that they might be too caught up with their numbers and variables due to their technological superiority while lacking somewhat in experience, which goes against this theory.
Conclusion

5 Conclusion

In the finishing chapter the conclusions of the thesis is presented that comes from the problem discussion, which is built upon the theoretical framework, the collected empirical findings and the analysis. The chapter starts with understanding the criteria’s for a well-functioning risk management in hedge funds, how they are best constructed with regards to risk management and the validity of risk measurements when it comes to hedge funds. The chapter is finished with suggestions for further studies.

The concluding section of the thesis will present the conclusion and state the purpose from chapter 1 to remind the reader and make it easier for him or her to be able to fully understand the conclusion.

“The purpose of this thesis is to increase the knowledge of how Swedish hedge fund managers perceive and manage different types of risk in Swedish hedge fund portfolios and how they construct their portfolios with regards to risk management. We also want to investigate how risk measurements are used when it comes to risk management and how valid they are when applied to hedge funds.”

The objective of the thesis was to respond to the purpose we stated through three different research questions. The first research question we wish to answer is:

“How do Swedish hedge fund managers perceive risk in their portfolios and how do they manage it?”

We conclude that when it comes to the definition of risk the definitions were ambiguous and differed greatly between the hedge fund managers. Distinguishable was that the hedge funds, which focused on quantifications and calculations, saw these variables as risk while the other funds saw risk as something abstract. We found that the definition of risk seems to be highly influenced by the style of management employed by the fund. Considering the subject as a whole, the manager’s individual definition of risk is of little relevance to the risk management process of the hedge fund. The risk in the hedge funds was instead managed differently depending on manager’s opinion regarding the nature and controllability of risk.

We found that all managers seemed to agree on that risk was controllable to some degree but that there are always limits within the strategies and that an uncertainty aspect will at all times be present in the portfolio. The consensus was that it is important to monitor your risk variables and to have an active risk management. It is however equally important to understand that these variables will not capture the total risk present in the portfolio. Thus it can be stated that the fund managers have to use their experience and knowledge in conjunction with an active risk management to run an efficient hedge fund.

We conclude that within the hedge fund industry, what distinguishes a successful fund from a less profitable one can, to some degree, be explained by the effectiveness of the risk management system utilized. Many of the hedge fund managers argue that controlling risk is the main purpose of a hedge fund and the reason why the industry was created. We found that all the managers interviewed agree about the importance of due diligence and rigorous analysis concerning new investments in the portfolio. We must emphasize that this is not only concerning the individual investment but also the impact these investments would have on the existing portfolio. We therefore conclude that fundamental analysis and due diligence is the foundation of efficient risk management as subsequent actions and strategies are based on the companies and, more specifically, the composition of the portfolio.
We also found that another aspect of risk management, which was thought of as very important in the hedge fund industry, is the diversification of assets. While the usefulness of diversifying across markets, industries and asset classes are agreed upon there seems to be some disagreements concerning the number of assets needed for a well-diversified portfolio. This seems to be in accordance with the theories presented by Lhabitant and Learned (2002) which states that one has to consider factors such as market conditions, transaction costs and individual characteristics of the hedge funds to determine the optimal number of positions. We also found that hedge fund managers often rely on hedging strategies to isolate and control unwanted risks in their portfolios.

Another trend found from our interviews is that more attention is focused towards the people behind the companies and the funds invested in. Some hedge fund managers even state that their biggest competitive advantage consists of their ability to make personal visits to companies and thus evaluate the people behind it. We conclude that all managers realized the importance of risk management, not only as a tool to achieve superior returns but also as an incentive for investors to choose their hedge fund over others.

The second research question is:

“How do Swedish hedge fund managers construct their portfolios with regards to risk management?”

We conclude that hedge fund managers believe that there is a need for restrictions and limits within their funds. While the limits and restrictions that were enforced differed widely between hedge funds, it could be seen that similar guidelines were applied concerning the size of individual investments, the number of positions entered and the geographical and industrial focus of the hedge fund. The fact that nearly all hedge funds had enforced limits within these areas should come as no surprise; as the importance to allocate capital and thus risk towards areas of expertise is both intuitive and supported by theoretical framework such as that presented by Ezra et al (1991). It can be argued that by enforcing and following restrictions and limits, such as the ones stated earlier, the fund has established a foundation to build its risk management and investment philosophy upon.

We found a significant difference between hedge funds controlling a big amount of capital and smaller ones with regards to the degree of freedom for its managers and the trading process implemented in the hedge fund. While the larger hedge funds relied on strict enforcement of their rules and guidelines and had a high degree of hierarchy, the managers of the smaller hedge funds seemed to have a higher degree of freedom and a less complicated investment process. The consequence of this is that the managers of smaller hedge funds are allowed to follow their opinions and trade more freely, while the structure of larger hedge funds prevents mistakes and unthoughtful investments. Both of these structures have their pros and cons and to say that one is better than the other would be merely a speculation.

We conclude that all of the interviewed hedge fund managers realized the importance of knowing how your portfolio will behave in different market conditions and emphasized the need to understand how the portfolio is constructed. While they all agreed on the importance of this knowledge they disagreed on the method to achieve it. While the smaller funds seemed to believe that the most efficient way to get to know your portfolio was to monitor its performance closely and to learn from market events and mistakes, the larger funds used a combination of both scenario analysis and stress tests to analyse the characteristics of their portfolios. There seems to be an agreement upon limitations in these stress tests and scenario analysis in that they are not able to capture market crashes or
unusual events and the interviewed managers emphasize the importance of understanding this and to thus be able to draw sound conclusions with the aid of the calculated variables.

The last research question we wish to answer is:

“How is risk measurement used when it comes to risk management and how valid are they when applied to Swedish hedge funds?”

We find that particularly the larger firms within the Swedish hedge fund industry argue that one must calculate all the risk measurements but most of all understand the meaning of them. Hence, the link between the people calculating and the ones managing has to be as short as possible to make sure that no mistakes are made. In addition common sense should also be applied to the results of all the calculated risk variables. We also find that the smaller a firm is the less enthusiasm is expressed regarding the usage of the different risk variables in their risk management and it is expressed to be more of a demand from different stakeholders. Instead more emphasis is put on that the most important thing for the fund manager is to be left alone to live with the hedge fund where he or she is able to attain the greatest understanding of the portfolio, which according to them is the greatest risk management. Hence, it is up to the manager and his or hers experience and judgement to be able to manage and perceive the risk. The risk measurements are, especially in the smaller firms, used to be able to see how well the managers has performed in the last period of time and, in all firms, to satisfy the demands of the clients and investors. We conclude that these views on the risk variables are in accordance with Lhabitant (2001) since he argues that risk management must be complemented with judgement and experience from the fund manager.

We conclude that even though the risk measurements are used mostly in the larger firms they are still aware that these are not able to capture all of the risks, hence their validity is questioned. We find that the validity in the risk variables, when it comes to hedge funds, is highly questioned by the smaller firms since they do not notably believe in any of the risk variables. The larger firms have a more positive picture when they argue that if one puts many risk variables together they can give a picture of the risk. However it is still far from valid since there is always an unpredictable dimension, which neither of the risk variables can capture because of the dynamic trading strategies of hedge funds. The results of the variables must be taken with a pinch of salt and is only an indication of what will happen in the future, nothing more. We conclude that this is somehow in accordance with the researchers, such as Lo (2001) and Chan et al (2006), since they argue that there is no correct way of measuring risk in hedge funds.

5.1 Further studies

Throughout the writing of the thesis we have found ideas that could be used as suggestions for further research in the areas of risk management and risk measurement within hedge funds.

Our study has been performed with a limited number of firms. It would be interesting to include more hedge fund managers in a new research to receive an even deeper understanding of their view on risk management in hedge funds. Since the limitations, restrictions, tools and techniques utilized in the hedge fund industry are continually evolving we suggest that a new study could be made in a few years time to detect if there are any major differences from the result of this thesis.
Conclusion

Most of the hedge fund managers interviewed in this thesis did frequently mention that the most important thing is to live with the hedge fund, apply common sense to the risk variables and that personal experience is of great value. It would be interesting to further examine how the hedge fund managers, to be able to manage the risk, actually apply this knowledge. This could perhaps be done through following a hedge fund manager more closely for some time to fully be able to comprehend how he or she uses their knowledge and experience to manage the risk. This is because there might exist differences between what a manager says during an interview and what they actually do in real life.

Most hedge fund managers and researchers are arguing that the risk variables used in the hedge fund industry are not appropriate. It would be interesting, if resources and knowledge were available, to conduct a mathematical research where the risk variables were extensively examined. After this research has been conducted one can, to some extent, understand how valid the different risk variables actually are, hence decide their appropriateness for the hedge fund industry.
6 References


References


References


References


References


7 Interviews

- **Adrigo Asset Management.** Personal communication with Håkan Filipson (2011-04-04). (Adrigo, 2011)

- **Dnb Nor.** Personal communication with Lars Löngren & Niklas Lundquist (2011-04-04). (Carlson Investment Management, 2011)

- **Finansinspektionen.** Questionnaire correspondence with Per Nordkvist (2011-04-12). (Finansinspektionen, 2011a)


Appendix

Appendix 1

Questions used during the four interviews conducted

Introduction

1. Describe yourself.
2. Describe the hedge fund you manage.

How do Swedish hedge fund managers perceive risk in their portfolio and how do they manage it?

3. How do you define risk?
4. Is it possible to control risk?
5. What do you think of risk management, is it important? Why?
6. How do you manage the different risk in your hedge fund?
7. Does risk management add value to the hedge fund?
8. What is the difference between risk management and risk measurement?

How do Swedish hedge fund managers construct their portfolio with regards to risk management?

9. How was the hedge fund created when it comes to risk management? Do you have to follow certain given guidelines?
10. Have you executed scenario analyses/stresstests on the portfolio? Do you have written plans for possible future events?

How is risk measurements used when it comes to risk management and how valid are they when applied to Swedish hedge funds?

11. What risk measurements do you use in the hedge fund and how well do you think they capture the real risk in the portfolio? Do you use risk measurements such as VAR, ES/CVAR, Beta, Sharpe ratio?
12. How do you use the risk measurements calculated?
13. What is your opinion regarding standard deviation, monthly return and concentration risk, the risk measurements that FI demands? Are they enough to give an adequate picture of the risk in hedge funds?
14. The strategies used for risk management and risk measurement by hedge fund managers are the same used in mutual funds. How valid do you think these risk strategies and risk measurements are when considering that hedge funds access more financial instruments and the dynamic character of hedge funds investments strategies?

Other questions

15. How do you believe that risk management within the hedge fund industry will develop in the future? Is it possible to develop a reliable risk measurement especially made for hedge funds?
16. Is more research needed within the Swedish hedge fund industry?
Appendix 2

Questions used in the questioner sent to FI

Introduction

1. Describe yourself.
2. Describe Finansinspektionen’s function when it comes to the hedge fund industry.
3. What are the risk restrictions in hedge funds and how are they controlled?

How do Swedish hedge fund managers perceive risk in their portfolio and how do they manage it?

4. How do you define risk?
5. Is it possible to control risk?
6. What does FI think of risk management, is it important? Why?
7. What is the difference between risk management and risk measurements?

How is risk measurements used when it comes to risk management and how valid are they when applied to Swedish hedge funds?

8. What is your opinion regarding standard deviation, monthly return and concentration risk, the risk measurements that FI demands? Why are these risk measurements chosen? Are they enough to give an adequate picture of the risk in hedge funds?
9. Why does FI not demand risk measurements such as VAR, Beta, Sharpe or other popular risk measures from the fund managers in the end of every month?
10. Do you use other risk measurements to carry out the function of FI in the Swedish hedge fund industry?
11. The strategies used for risk management and risk measurement by hedge fund managers are the same used in mutual funds. How valid do you think these risk strategies and risk measurements are when considering that hedge funds access more financial instruments and the dynamic character of hedge funds investments strategies?

Other questions

12. How do you believe that risk management within the hedge fund industry will develop in the future? Is it possible to develop a reliable risk measurement especially made for hedge funds?
13. How do you think that FI will develop in the future when it comes to the control of the hedge fund industry?
14. Is more research needed within the Swedish hedge fund industry?