



MÄLARDALEN UNIVERSITY
SWEDEN

MEASURING AND HANDLING RISK

How different financial institutions face the same problem

Mälardalen University
School of Sustainable Development of Society and Technology
Bachelor Thesis in Business Administration, 15 ECTS
June 4th, 2010

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Abstract

Title: Measuring and handling risk - How different financial institutions face the same problem

Seminar date: 4th of June, 2010

Level: Bachelor thesis in Business Administration, Basic level 300, 15 ECTS

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Subject terms: Risk variables, Risk measurement, Risk management, Modern Portfolio Theory, Diversification, Beta

Target group: Everyone who has basic knowledge of financial theories and risk principles but lacks the understanding of how they can be used in risk management.

Purpose: To understand the different Swedish financial institutions' way of handling and reducing risk in portfolio investing using financial theories.

Theoretical framework: The theoretical framework is based on relevant literature about financial theories and risk management, including critical articles.

Method: A multi-case study has been conducted, built upon empirical data collected through semi-structured interviews at three different financial institutions.

Empiricism: The study is based on interviews with Per Lundqvist, private banker at Carnegie Investment Bank AB; Erik Dagne, head of risk management department and Joachim Spetz, head of asset management at Erik Penser Bankaktiebolag; and David Lindström, asset manager at Strand Kapitalförvaltning AB.

Conclusion: There is a practical implementation of the theoretical models chosen for this research. The numbers the financial models generate do not tell one the entire truth about the total risk, therefore the models are used differently at each study object. For a model to hold it has to be transparent, and take each model's assumptions into account. It all comes down to interpreting the models in an appropriate way.

PREFACE

We would like to thank our supervisor Angelina Sundström, who has been very helpful supporting us with valuable tips and advice during the progress of the study. Additionally, responses from each of the opposition groups have been appreciated. The authors of this research paper also want to express gratitude to the respondents at Carnegie Investment Bank, Erik Penser Bankaktiebolag and Strand Kapitalförvaltning who took their time to contribute to the empirical content.

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Västerås, June 4, 2010

Table of content

1 INTRODUCTION.....	1
1.1 Background	1
1.2 Problem discussion.....	1
1.3 Research question.....	2
1.4 Purpose	2
1.5 Perspective	2
1.6 Outline	2
2 THEORETICAL FRAMEWORK.....	3
2.1 Introduction to Risk Management and Portfolio Theory.....	3
2.2 Risk and return	3
2.2.1 The efficient frontier and the Capital Market Line.....	4
2.2.2 Risk taking	5
2.2.3 Sharpe ratio	6
2.3 Beta.....	6
2.3.1 Treynor ratio.....	7
2.3.2 The Capital Asset Pricing Model	7
2.3.3 The Security Market Line	8
2.3.4 Criticism against the CAPM & Beta	9
2.4 Alternatives to beta.....	10
2.4.1 Arbitrage Pricing Theory	10
2.4.2 Value at Risk	10
2.4.3 Tracking error.....	11
2.5 Market stock anomalies	11
2.6 Risk Management.....	12
2.6.1 Hedging.....	12
2.6.2 Diversification	12
3 METHOD	14
3.1 Choice of topic	14
3.2 Research strategy.....	14
3.3 Choice of organization.....	15
3.4 Choice of respondents	15
3.5 Choice of theories.....	16

3.6 Data collection techniques	16
3.7 Analysis of collected data	17
3.8 Credibility of research findings	18
3.9 Method critique	20
4 EMPIRICAL FINDINGS	21
4.1 Carnegie Investment Bank	21
4.2 Erik Penser Bankaktiebolag	22
4.3 Strand Kapitalförvaltning	23
5 ANALYSIS.....	26
5.1 Risk.....	26
5.2 Risk and return	26
5.3 Beta.....	26
5.4 Market stock anomalies and alternatives to beta.....	27
5.5 Risk management	28
5.6 Faults of the theories	28
6 DISCUSSION.....	29
7 CONCLUSION.....	30
7.1 Suggestions for further research.....	31
List of references	
Appendix A - Interview requests sent by e-mail to companies	
Appendix B - E-mail sent to confirmed interview participants	
Appendix C - Prepared interview questions	

LIST OF FIGURES

Figure 1 - Probability returns.....	4
Figure 2 - Capital Market Line	5
Figure 3 - Security Market Line	9

LIST OF FORMULAS

Formula 1 - Capital Market Line	4
Formula 2 - Sharpe ratio.....	6
Formula 3 - Treynor ratio	7
Formula 4 - Capital Asset Pricing Model.....	7
Formula 5 - Security Market Line	8

LIST OF TABLES

Table 1 - Overview of theoretical implementations.....	31
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List of abbreviations

This list will be of help to the reader as abbreviations occur extensively;

APT Arbitrage Pricing Theory

CAPM Capital Asset Pricing Model

CML Capital Market Line

DCF Discounted Cash Flow

MPT Modern Portfolio Theory

P/E Price per Earnings

SML Security Market Line

VaR Value at Risk

1 INTRODUCTION

1.1 Background

People use the word risk on a daily basis referring to situations with an uncertain future. The lottery is an example of a short-term investment with a high risk level since the probability of winning is extremely small. Still, people take that high risk in the hope of winning the jackpot. (Hamberg, 2004, p.110)

Risk is defined as the effect of uncertainty of events, whether positive or negative. According to Sjögren in Engström (1994, p.575), risk in the economic sense is when the expected return is dependent on uncertain factors such as a currency fluctuation or interest risk, and thus cannot guarantee a positive outcome. Every day people take risks by investing their liquid assets on an uncertain future, hoping for profit. For example, in Sweden more money is invested in mutual funds today than ever before (Avanza, 2010). In situations where individual investors are unfamiliar with financial matters they tend to become highly confused when facing different investment options (Dodds, 1983). Therefore they seek advice and help from qualified experts (Diacon, 2004).

Investing in treasury bills is considered a risk-free investment; consequently it will not provide a high return. Investing in mutual funds or company stocks is considered riskier, and thus yields a higher return over time (Levy & Post, 2005, p.208). The greater the potential reward is, the greater the risk an investor has to take (Jordan, Ross, Westerfield, 2008, p.208). Harry Markowitz (1959) proposed in his publication, *Portfolio selection*, that investors taking a higher level of risk should be compensated in additional amounts. This publication is today recognized as the foundation of Modern Portfolio Theory, MPT.

1.2 Problem discussion

The concept of risk management and its theories are presently more questioned than ever, mainly due to new concepts and innovations in risk measurement (Lakshman, 1995). The financial crisis of 2008 has given proof to that the theories according to MPT are not always valid. This has raised more questions on how to look at risk management. More and more people argue that factors such as firm size, dividend yield, book-to-market equity ratio and earnings-price-ratio can be regarded as extra market risk factors (Fama and French, 1992). A well-known investor, Warren Buffet, is concentrating on those stock market anomalies when investing his money and he has shown to be more than successful with this approach (Cf. Hagstrom, 2005). Risk concepts and risk measurement are in a state of evolution, changing the actions of institutional investors as it evolves (Lakshman, 1995). The different risk approaches at the financial institutions Carnegie Investment Bank, Erik Penser Bankaktiebolag and Strand Kapitalförvaltning are analyzed to become familiar with the practical implementations of financial theories.

1.3 Research question

Which financial theories are used to manage risk at Carnegie Investment Bank, Erik Penser Bankaktiebolag and Strand Kapitalförvaltning AB?

1.4 Purpose

The objective of this research paper is to understand how different financial institutions handle and attempt to reduce risk in order to optimize portfolio returns for their clients, as well as highlight contrasts.

1.5 Perspective

The result of this thesis is of interest to prospective investors with the intention of understanding how financial institutions perceive risk and to gain a better understanding of risk management. The result will also give students and private investors who have a general interest in finance a better insight into the usage of the theories taught in academic studies.

1.6 Outline

This research paper is divided into seven chapters. The first chapter introduces the reader to the topic and the problem formulation. The second chapter makes the reader familiar with the theories used during the research. The third chapter describes the method used to gather information for the research. Chapter four contains the empirical data gathered from interviews. These empirical findings are further analyzed in chapter five in relation to the theoretical framework. Chapter six discusses the problems with financial investors taking too high risk when investing clients' money. The last chapter presents the conclusions drawn from the analysis in chapter five, and ends with proposals for further research.

2 THEORETICAL FRAMEWORK

This part presents the theories and models which were used in this research.

2.1 Introduction to Risk Management and Portfolio Theory

Every business involves risk, which can never be eliminated completely, but the risk can be managed to a certain extent. To manage risk, it is crucial to understand and recognize a company's exposure to risk, in other words the risk has to be measured. Once a company has identified and measured the risk they are facing, the company can take actions to minimize the risk, hence, manage it. (Neale & Pike, 1996, pp.349-350)

The theory of trying to minimize the risk and maximize the return of an investment is called the Modern Portfolio Theory, MPT. Harry Markowitz was the one who formulated these early thoughts in a mathematical way and introduced MPT in 1952 in his article "*Portfolio Selection*".

2.2 Risk and return

Risk, as section 1.1 states, is when positive returns cannot be guaranteed. In the area of finance the concept of risk also concerns how much returns vary over time. An investment, such as treasury bills, where the rate of return is known under a certain period of time is considered a risk-free investment since the expected return is predetermined. An investment which fluctuates daily over a time period is referred to as volatile, i.e. an asset with high volatility. Since the return is not known for sure in the end of that time period, it makes the investment riskier. (De Ridder, 2003, p.65)

Risk is also associated with the dispersion of possible returns based on historical outcomes which can be illustrated in normal distribution curves. The probability of an outcome is placed on the vertical axis and the percentage return on the horizontal axis as shown in figure 1. Risk is related to the uncertainty due to dispersion of the possible returns of a stock which deviate from the mean return. This well-used risk measure is called standard deviation. (Higgins, 2007, p.285)

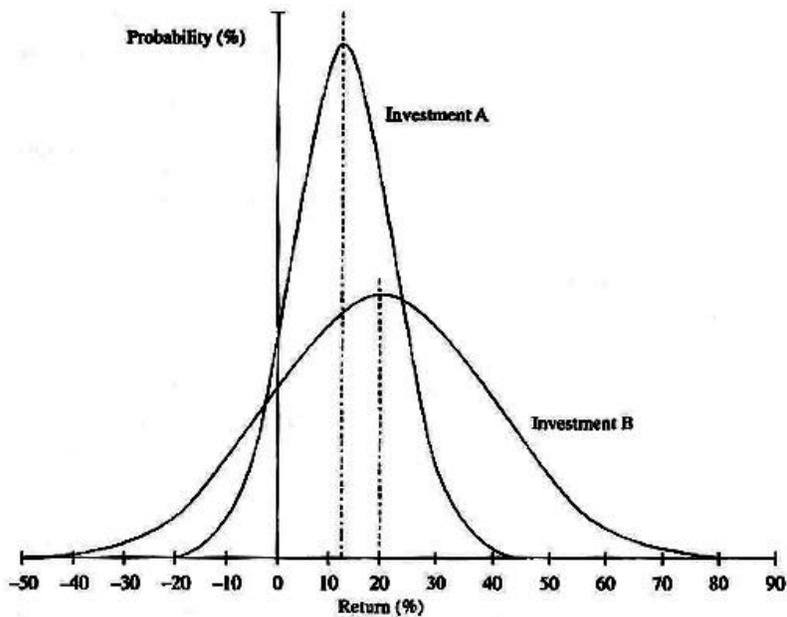


Figure 1 - Probability returns (Higgins, 2007, p.286)

In figure 1, investment A is considered less risky as the historical returns are not widely spread, hence the standard deviation is smaller. Investment B on the other hand has a broader dispersion, i.e. greater standard deviation, and is therefore riskier. This shows that if an investor accepts a higher standard deviation he or she takes a higher risk and is given the chance of yielding a higher return. (Higgins, 2007, p. 285-286) Risk and return is according to Lundblad (2007) proven to have a positive relation using standard deviation as a risk measure.

2.2.1 The efficient frontier and the Capital Market Line

Graphing return and risk measured by standard deviation of different assets provides a curve, an efficient frontier (see figure 2). These curves represent investments that are efficient, that is, give a high return to the lowest risk possible. Along each of these frontiers it is possible to invest in the market. (De Ridder, 2003, p.103-104)

$$E(R_p) = R_f + \sigma_p \left[\frac{E(R_m) - R_f}{\sigma_m} \right]$$

Formula 1 - Capital Market Line (Levy & Post, 2007 p.297)

Where:

$E(R_p)$ = Expected return of portfolio

R_f = Risk free rate

σ_p = Standard deviation of portfolio

$E(R_m)$ = Expected return on the market

σ_m = Standard deviation of the market

At the point where the combination of all the different assets is tangent to the straight line, the CML, the market portfolio is in its optimal state. At this spot investors are given the highest utility they can achieve when risk-free rates are available. The CML shows a linear relationship in a market portfolio between the returns obtained from taking extra risk, when investors also have the opportunity to make a risk-free investment. (Levy & Post, 2005, pp.296-297)

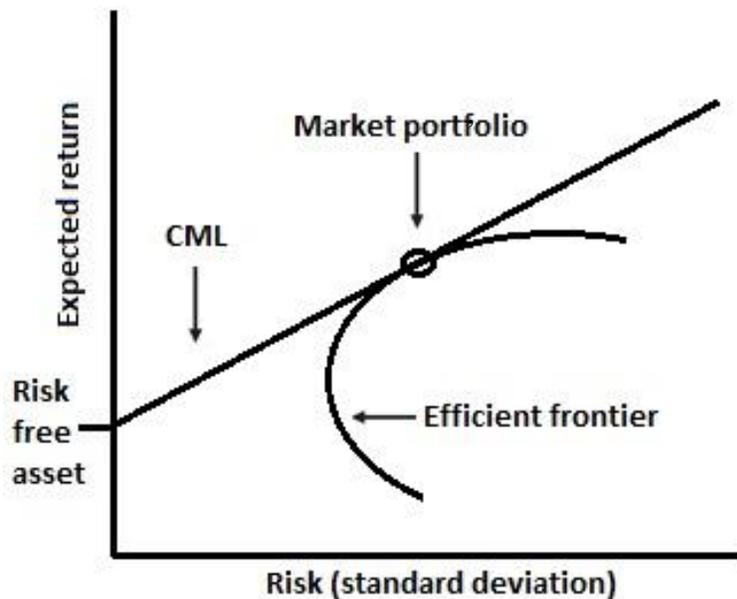


Figure 2 - Capital Market Line (inspired by Levy & Post, 2007 p.297)

2.2.2 Risk taking

An investor who likes taking high risks is considered a risk-lover. An investor who dislikes risk is a risk-avertter and prefers the less risky stock over a riskier stock as long as the expected returns of the two investments are equal. Moreover, the risk averter will not choose a risky investment unless there is a further gain from taking that extra risk. The total risk of an investment consists of two parts, the systematic risk and the unsystematic risk. The systematic risk is the risk associated with overall market returns, also called market risk. The unsystematic risk, which is unique to a specific security, is not related to the market. Therefore the unsystematic risk is irrelevant for investment decisions, since it can be eliminated by investing in

many different securities. Consequently investors need to be compensated by a risk premium for bearing additional systematic risk. (Levy & Post, 2005, p.229)

“Better a steady dime than a rare dollar” – Anonymous (Gibson, 1996, p.115)

2.2.3 Sharpe ratio

To measure portfolio performance with standard deviation as a risk measure, the Sharpe ratio is commonly used. This measure was presented by William Sharpe during the 1960’s but was at that time known as the reward-to-variability ratio. This ratio illustrates to what degree investors will be compensated for holding a risky asset. In other words, it measures the excess return of a portfolio in contrast to investing in a risk-free asset, compared to the total risk of a portfolio when the risk is measured by its standard deviation. (Amenc & Le Sourd, 2003, p.109)

The ratio is defined as:

$$S_p = \frac{E(R_p) - R_f}{\sigma(R_p)}$$

Formula 2 - Sharpe ratio (Amenc & Le Sourd, 2003, p.109)

The equation simply shows that the difference between the expected return of the portfolio $[E(R_p)]$, which is derived from historical average returns, and the risk-free rate $[R_f]$ is divided by the standard deviation $[\sigma]$ of the portfolio $[R_p]$. When selecting stocks, investors choose the ones with a high Sharpe ratio, which indicates higher returns with lower risk (standard deviation). The ratio is actually the slope of the market line, which means that if the portfolio is diversified its Sharpe ratio will be close to similar to the market’s Sharpe ratio. By comparing these two ratios managers can see if their expected portfolio return is satisfactory. (Amenc & Le Sourd, 2003, p.109)

2.3 Beta

Beta is most commonly used to measure the systematic risk of an asset relative to the risk of the market portfolio, which has a beta of one (Galagedera, 2006). The symbol for systematic risk measure comes from the Greek letter β . Beta tells us how much systematic risk a particular asset has relative to the market asset average. (Jordan et. al, 2008, p.351).

To compute the beta of a stock, historical returns for a period are used in a statistical technique called regression analysis, where a linear equation is generated. The beta in the world of finance

is the regression coefficient explaining how much a change in the market affects the change in the particular assets price. (Andersson, Jorner, Ågren, 2009)

The larger the beta, the higher is the sensitivity to the market and the riskier the asset to investors who hold the market portfolio (Levy & Post, 2005, p.300). If the beta is equal to one, the price of the individual asset fluctuates along with the average market price. Therefore, it yields the same rates and returns and has the same risk level. If the beta is larger than one, the asset is more aggressive and is expected to give a higher return, hence possesses a higher risk level. If the beta is less than one, the asset's returns, as well as risk tend to be lower than the market risk. (Levy & Post, 2005, p.304)

2.3.1 Treynor ratio

This measure shows the relation between the portfolio return in excess of the risk-free rate and the systematic risk, the beta.

$$T = \frac{R_p - R_f}{R_{\beta}}$$

Formula 3 - Treynor ratio (Amenc & Le Sourd, 2003, p.108)

The ratio provides the return of a portfolio (R_p) less the risk-free rate (R_f), further divided with the portfolio risk (B_p) in terms of beta (Levy & Post, 2005, pp.774-775).

By comparing the Treynor ratio of a particular portfolio with the ratio of the market investors see if the portfolio risk is adequately rewarded. The Treynor ratio is an appropriate measurement when using beta as a systematic risk (Amenc & Le Sourd, 2003, p.108)

2.3.2 The Capital Asset Pricing Model

The Capital Asset Pricing Model, CAPM, describes the relationship between risk in terms of beta and estimated return for pricing individual securities or portfolios. The model was first introduced by the financial economists Sharpe (1964), Litner (1965), and Mossin (1966), who independently built their work on the portfolio theory developed by Markowitz (Amnec, 2003, p.95 & Hamberg, 2004, p.185).

The equation of the CAPM is as follows:

$$E(R_i) = R_f + \beta_i [E(R_m) - R_f]$$

Formula 4 - Capital Asset Pricing Model (Jordan et.al, 2007, p.360)

Where:

R_f = risk free rate

β_i = beta of the security

$E(R_m)$ = expected market return

$[E(R_m) - R_f]$ = equity market premium

A set of assumptions needed to be introduced in order for the model to hold. The basic assumption is that all investors are risk averse and seek to maximize wealth. When investors choose their portfolio they only consider the expected return and risk for one investment period, and that period is the same for everyone. Further, the markets are perfect, in other words, there are no taxes or transaction costs and the same information is available simultaneously to all investors. Investors also have a limitless capacity to borrow or lend at the risk-free rate. (Amenc, 2003, p. 98-99)

Many of these assumptions are considered unrealistic and have been scaled down in later versions of the CAPM (Amenc, 2003, p.98). This paper focuses on the basic CAPM-model which excludes variables such as taxes and transaction costs.

2.3.3 The Security Market Line

Under the conditions of the CAPM, a linear relationship of risk and return can be presented by a graphical illustration called the Security Market Line, SML. It shows the expected return an investor requires on a specific asset, consisting of both the risk-free rate and a risk premium. (Levy & Post, 2005, p.303)

The relationship holds:

$$E(R_i) = r_i + \beta_i * [E(R_m) - r_i]$$

Formula 5 - Security Market Line (Levy & Post, 2005, p.303)

The expected return of an asset 'i' $E(R_i)$ is equal to the risk-free rate (r_i), plus the asset's beta (β_i) multiplied with the market risk premium, $E(R_m) - r_i$. The horizontal axis represents the betas, or the systematic risk for an asset, and the vertical axis indicates the rates of return. The return of the risk-free asset has no systematic risk and thus its beta is zero. The SML therefore starts at the risk-free rate on the vertical axis. The market risk premium, $E(R_m) - r_i$, equals the slope of the SML. From this the linear relationship shows the expected return in relation to the beta of the asset.

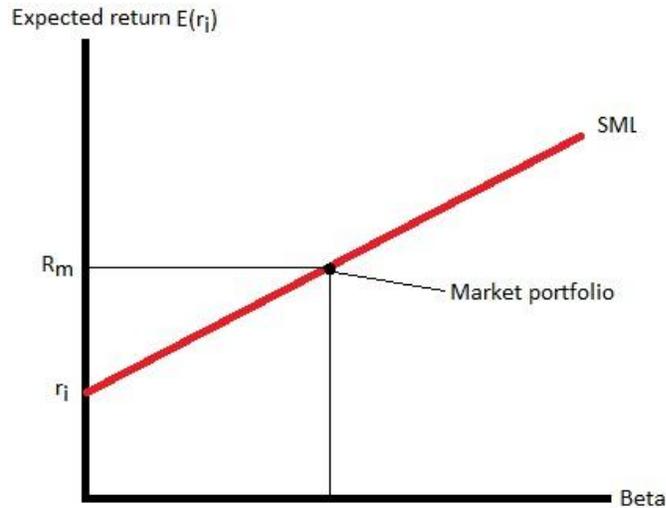


Figure 3 - Security Market Line. (inspired by Levy & Post, 2005, p.304)

2.3.4 Criticism against the CAPM & Beta

Professors Eugene Fama and Kenneth French (1992) looked at share returns on the New York Stock Exchange, the American Stock Exchange and NASDAQ between 1963 and 1990 and found that differences in betas over that time period did not describe the actual performance of different stocks. The linear relationship between beta and specific stock returns does not hold over shorter periods of time. These outcomes suggest that the CAPM may be unreliable. The validity of the CAPM has been extensively tested in literature (Theobald, 1979). Empirical testing has provided evidence that approximations have to be used to measure the market portfolio and unless it is possible to identify the exact market portfolio, the CAPM can neither be accepted nor rejected (Galagedera, 2007). Since the CAPM depends on beta, which is estimated using historical betas, many have criticized the model. For example, stock's betas have fallen from 2.5 during the 1940s to -0.5 by the end of 2001 (Ang, 2006). Even though some studies raise doubts about the validity of the model it is still widely used in practice. Lakshman (1995) highlighted several factors besides market beta as having the power to explain stock returns.

2.4 Alternatives to beta

Many financial investors prefer more dynamic risk measures. Therefore commonly used alternatives to beta as a risk measure can be used. (Li & Wu, 2009)

2.4.1 Arbitrage Pricing Theory

Arbitrage Pricing Theory, APT, is an equilibrium pricing model developed by Ross in 1976. There is a linear relationship between return and risk because there are no arbitrage opportunities. Arbitrage is when the possibility of yielding positive returns without an initial investment exists, for example, if the same asset is trading on two different markets for different prices. A profit can thereby be made by buying the asset on the market with the lower price and simultaneously selling the same asset on the market with the higher price, hence no actual investment was used. As long as these opportunities exist, investors will exploit them, and as they do the price of the assets will change until they reach equilibrium again. By then, there are no more positive returns between the same assets and the possibility of profiting from arbitrage is gone. (Levy & Post, 2005, p.351)

2.4.2 Value at Risk

Value at Risk, VaR, is the central statistical technique used by banks, security firms and companies to estimate the probability of portfolio losses based on the statistical analysis of historical price trends and volatilities (Sollis, 2009). Therefore the VaR has a confidence level attached. According to the regulatory authorities for financial establishments the confidence level is 99%, which means that only one out of a hundred portfolios will experience a loss greater than the estimated VaR. The VaR measures the greatest loss a portfolio can resist over a future time-period (e.g. one-day, one-month) and with a fixed probability in the event of the markets moving unfavorably. The VaR is a short-term measure and corresponds to the average market reversal period of ten days. (Amenc, 2003, p.57)

The current financial crisis has seriously questioned the validity of VaR as a measure of risk. Indeed, some even blame VaR entirely for the financial crisis. VaR can be calculated assuming that portfolio returns are normally distributed, but also assuming returns are not normally distributed. In fact, there is no formal regulatory restriction on the type of probability distribution that has to be used to calculate VaR. Further, VaR is calculated using historical data and only holds when the future will be similar to the relevant historical period. This is rarely the case for assets held over long periods. However, much of what has been discussed in the media (e.g. newspapers, magazines or television) could be unclear, since VaR is a statistical technique and most of the reporters/authors are not statisticians. (Sollis, 2009)

2.4.3 Tracking error

The tracking error tells an investor how closely a portfolio follows the index to which it is compared to. A low tracking error means that the portfolio has followed the index very closely and a large tracking error means that the returns have deviated a lot from the index. This gives financial managers an indication of how their stocks have been performing in the past in relation to comparable indexes, which investors want to beat. (Levy & Post, 2005, p.481)

2.5 Market stock anomalies

Common factors used in risk management apart from beta are referred to as market anomalies. These are used as complementary risk measures when evaluating and valuing potential firms. (Chen et.al, 2005)

Fama & French (1992) found that firms with a low market capitalisation (small business size) appear to earn positive abnormal average returns compared to large capitalisation firms which seem to earn abnormal negative returns. Small firms tend to have higher betas, because size and beta correlate negatively and therefore outdo larger firms (Levy & Post, 2005, p.319). Basu (1983) found that value stocks seem to earn abnormal high average returns while growth stocks earn abnormal negative returns. Value stocks have a low market value relative to firm fundamentals, meaning a low P/E-ratio.

The P/E ratio, where P is the price of the stock and E the earnings per stock share, measures the price an investor has to pay for a share in contrast to the company's earnings and profits (Levy & Post, 2005, p.397). The P/E ratio is connected to the present chances of a company's opportunity to grow. A company with growth opportunities should sell at a higher price. (Jaffe, Ross & Westerfield, 2005, p. 125) Growth stocks have a high market value relative to firm fundamentals, as well as a high P/E ratio (Levy & Post, 2005, p.320).

Fama & French (1996) found that abnormal returns can be forecasted from historical returns. For periods up to a year it tends to be the case that losers in the past continue to lose and winners continue to win. But this effect is the opposite for periods of multiple years. According to DeBondt and Thaler (1985) stocks which do badly for a long time come back and do well later on. For that reason it is rather difficult to actually predict future returns based on historical occurrences.

The Discount Cash Flow model, DCF, can be used to determine future returns by looking at the value of a company. This model calculates a future value based on future cash flow to determine the intrinsic value of the company at the moment. The rate of return can be freely selected depending on investors' preferences regarding returns (French & Gabrielli, 2003). If the

company is considered to have a high probability of reaching the required returns in the future based on the cash flow discounting, the company's stock has potentials. By not being too aggressive and calculating with reasonable rates of returns the possibility of unsuspected losses is minimized. (Jordan et.al, 2008, pp.114-115)

2.6 Risk Management

The area of risk management has increased in the last three decades. Risk management is the technique of recognizing and measuring risk and to evaluate possible procedures to reduce exposure to the negative effects. Risk management helps make educated decisions about the trade-offs between risk and return. It must be a continuous process, because all factors which affect stock prices change over time. There are several strategies when attempting to manage risk. (Levy & Post, 2005, p.728).

2.6.1 Hedging

Hedging is a risk management strategy which is used when investors have no control over future prices, and is used to minimize the exposure to risk which comes from price fluctuations. Investors use financial instruments to secure the opportunity to buy or sell stocks at a particular price. This gives the investor an insurance against eventual losses as stock prices are volatile. (Hamberg, 2004, pp.136-137)

2.6.2 Diversification

Let every man divide his money into three parts, and invest a third in land, a third in business, and a third let him keep in reserve. - Talmud, 1200 B.C.-500 A.D. (Gibson, 1996, p. II)

Diversification in simple terms is the avoidance of "putting all eggs in one basket" (Gibson, 1996, p.115). It is the practice of spreading an investment across several different asset classes, sectors and regions (Levy & Post, 2005, p.753). In other words, investing in different Swedish technology stocks is not considered diversified since the money is placed in the same sector, country and asset class (Levy & Post, 2005, p. 754).

Consider for example an ice-cream store and an umbrella shop. The weather news forecasting a rainy day will mean bad business for the ice-cream store but good business for the umbrella shop. In this example the businesses only do good one at the time, they are considered negatively correlated. When investing in stocks or other securities, portfolio diversification benefits are greatest when asset returns have a negative correlation (Melicher & Norton, 2007, p.339). If two assets are perfectly negatively correlated the returns of the assets move in different directions.

Correlation is the strength and direction of two variables, in this case returns. The correlation is measured by an interval between -1 and +1, which is called the correlation coefficient. If one stock has a high return at the same time as the other stock, the correlation is positive, hence if one stock price goes up and the other stock price goes down they have a negative correlation with a coefficient of less than zero. (De Ridder, 2003, pp.78-79)

When a portfolio is well diversified, all assets included are perfectly correlated and compensate the returns of one another, as in the example with the ice-cream and umbrella business above. (Cf. Gibson, 1996, pp.115-166) It is an important aspect for investors what optimal number of stocks to hold in a portfolio. There are many different studies on this topic and formulas to calculate the optimal number of securities, which also depends on transaction costs and holding periods. But typically a portfolio of 8-20 stocks is considered enough to get the full benefits of diversification (Domian, 2003). Solnik provided evidence in 1947 that combining stocks from the USA and EU countries generates portfolios that are half as risky as domestically well-diversified ones (Daigler & Leyuan, 2009).

3 METHOD

This chapter explains how the information presented in this research was collected. The reliability and validity of the sources are also discussed.

3.1 Choice of topic

The global finance crisis of 2008 has led to people giving financial theories a critical eye. This inspired to investigate the implementations of risk management theories at financial institutions. A general interest in finance and investments was another incentive for conducting research in this area. As the theoretical aspects taught in academic studies do not involve practice it was interesting to become familiar with perspectives on which theories are used to manage risk at financial institutions in Sweden, and why.

3.2 Research strategy

This research started with a literature review of books and journal articles to become familiar with the research area. Theories were selected according to what was considered most appropriate for this study, i.e., theories which were linkable to investment risk management. These theories were then examined in real-life context at three different financial institutions. The opposite would have been to develop a theory as a result of observations. This approach was however not executed, since theories were first selected, and from there, the study had the intention to signify the usage of financial theories which have been used in practice for decades.

In order to understand which, and particularly why, specific theories and models are used; the study needed a research strategy which could bring deeper insight to the empirical evidence collected from real-life context. Only knowing which theories the study objects use for their business activities would not answer the research question thoroughly. Following up *why* these particular theories are used gave incentives to understand the companies' choices behind their risk management approaches. (Cf. Yin, 1993, p.1)

Studying three different organizations gave the potential to explore the possible differences and similarities in each of the financial institution's way of handling risk. As the three companies are of similar type but different size, the most interesting aspect of conducting a multi-case study was the fact that each study object separately provided relevant information for the empirical evidence but from different perspectives. These different views of risk management were brought together as a whole and thus were considered more prevailing than if only one study object would have been used in this research (Cf. Yin, 1993, p.45).

3.3 Choice of organization

The criteria taken into consideration when choosing the organizations were that all three study objects conduct the same kind of business. Making the research different from previous research, common Swedish banks such as SEB and Nordea were not chosen as study objects. Therefore the following organizations were selected.

Erik Penser Bankaktiebolag's and Strand Kapitalförvaltning's only offices are located in Stockholm, Sweden. Carnegie Investment Bank's main office is situated in Stockholm as well. Carnegie Investment Bank, the biggest and oldest among the three study objects, was chosen due to its long history and its exceptional establishment in the private banking sector (Carnegie, 2010). Erik Penser Bankaktiebolag is a privately owned bank founded in 1994 and today has 160 employees, a quarter of Carnegie Investment Bank's size. The bank offers a wide selection of financial services to private as well as corporate investors and wants to stay a small, personal bank and has no plans to expand. Erik Penser Bankaktiebolag is considered a prestigious bank in the Swedish financial industry and was therefore a good study object for the research. (Penser, 2010) Strand Kapitalförvaltning is the smallest study object with only nine employees. Since the foundation in 2004 they have been providing customized discretionary investment management for wealthy investors. (Strandkapital, 2010). Each of the study objects is from here on referred to in shorter terms, Carnegie, Penser and Strandkapital.

3.4 Choice of respondents

The requirements the authors took into consideration when choosing the respondents were the respondents' knowledge regarding risk management principles and financial theory at each organization. The authors used their judgment when selecting the interviewees which were considered to contribute with essential information. Further, it brought depth into the study and made it possible to explore the research question. (Cf. Lewis et.al, 2009, p.237)

- **Carnegie:** Per Lundqvist works at Carnegie Private Banking Department. He has many years of work experience in different departments in the financial sector and was therefore considered the best suited candidate.
- **Penser:** Erik Dagne is the head of a team of four risk managers at Penser. Dagne has broad knowledge regarding risk principles at Penser. Dagne does not manage portfolios and has no contact with clients and could therefore not answer portfolio specific questions. For this reason some questions needed another respondent. Joachim Spetz is the head of asset management at Penser, with a team of six subordinates. He has an extensive insight in portfolio management and financial theories. Spetz complemented with answers from the portfolio management point of view. These

two respondents together were considered most appropriate at Penser to answer the interview questions.

- **Strandkapital:** David Lindström is a licensed financial adviser and has extensive knowledge in financial theory and risk principles and is one out of three asset managers at Strandkapital. He is responsible for model portfolios which are used as a foundation for Strandkapital's investments.

3.5 Choice of theories

To understand how financial theories are used in risk management it is vital to choose the relevant theories. The MPT has been used widely in practice for several decades and is a central frame when teaching finance at universities. In extent to MPT, several financial measures are included in the theoretical framework as they are commonly used in order to evaluate firms, and are stated in annual reports (e.g. Clas Ohlson, 2010). These financial measures provide essential information regarding a firm's future potential and are taken into account when investing.

3.6 Data collection techniques

To gain a deeper insight and understanding of how the concepts of risk management are interpreted and implemented at the study objects, data was collected by conducting interviews. By cautiously selecting only three study objects to acquire significant information this research concentrates on non-numerical data and cannot be used to generalize the results for the entire financial industry (Cf. Lewis et. al, 2009, p.151). As the purpose of the study was to gain a deeper understanding, surveys were not considered an adequate technique to collect relevant information, since surveys solely provide numerical data (Cf. Lewis et. al, 2009, p.482).

To retrieve as much useful information as possible, two-way conversational interviews were conducted, i.e. semi-structured interviews (see Appendix C) (Cf. Lewis et. al, 2009, p.320). This provided depth into the information acquired. According to Yin (1993, p.84) interviews are considered the most important source of evidence and essential information when conducting a case-study.

E-mails (see Appendix A) were sent to the chosen organizations' risk and asset management departments. Contact was established at Carnegie, Penser, and Strandkapital with Per Lundqvist, Erik Dagne & Joachim Spetz, and David Lindström respectively accepting to participate in interviews. The respondents were then provided with a document (see Appendix B) explaining the purpose of the research as well as the areas the interviews would be covering.

The face-to-face interview with Erik Dagne took place on the 21st of April 2010 from 10.30 to 11.30 am at Penser's head office in Stockholm. David Lindström was interviewed on the 22nd of April from 10 to 11 am at Strandkapital's main office in Stockholm. The meeting with Per Lundqvist was on the 22nd of April from 2 to 4 pm at Carnegie's main office in Stockholm. Joachim Spetz was due to his limited availability, interviewed by telephone on the 26th of May 2010 from 4.15 to 5.00 pm.

All interviews were conducted in Swedish to make the respondents feel comfortable during the interview process. The interviewees were able to express themselves freely, which minimized the loss of information that otherwise could have occurred in a Swedish to English translation. Notes were taken during all interviews and the three face-to-face interviews were recorded using a laptop voice recorder function, which insured that no information was lost. (Cf. Bryman & Bell, 2007, pp.220-221)

As the semi-structured interviews conducted were informal and the questions open, a dialogue between the investigators and the respondent was encouraged (Cf. Lewis et. al, 2009, p.320). Hence, in addition to the key questions prepared in advance the authors were aiming for a discussion to obtain significant empirical information. By having a checklist of key topics (see Appendix C) to be covered as a reminder, the risk of not attaining essential information was reduced. Meanwhile it gave the interviewees the opportunity of answering the questions in their own way. (Cf. Fisher, 2007, p.159) During the interviews, discussions emerged that were useful because they provided vital information for the research.

3.7 Analysis of collected data

To obtain a better overview of the empirical findings used for the analysis process, the originally prepared interview questions were derived from several different topic areas. These areas are subcategories to the main research question. The subcategories found further down made the analysis process less complicated, as parallels were easy to draw between the companies. (Cf. Fisher, 2009 p.181)

- **Risk** – Each company has their own view and definition of risk. In order to further understand how the institutions work with risk it is of interest to be familiar with the companies' key concepts.
- **Risk and return** – In the attempt to review how much the three financial institutions believe in a strong relation between risk and return, and how this affects the approach towards investment strategies.

- **Beta** – To connect the companies view on risk to the central model within portfolio theory, the CAPM, it is important to understand how essential beta is as a risk measure.
- **Other variables** – To be able to fully understand the companies' risk measures, it is important to know which variables they use in their daily work and why. This allowed connecting the variables in theory to the variables used in practice.
- **Risk management** – An important aspect when talking about risk is the attempt to handle and control risk. It is therefore crucial to understand how the companies manage risk and which tools are used.
- **Faults of the theories regarding risk measurement** – Especially after the financial crisis of 2008 it is of interest to find out if the companies found flaws in their own risk management approaches and the theories related to these.

To answer the research question, the qualitative information was analyzed. The data was gathered through non-standardized methods that were summarized and grouped to get a better overview of the material and stress which information was relevant for this research and which was not (Huberman & Miles, 1994, p.69). As each study object was reviewed independently, it was easier to spot distinctions as the empirical facts were not combined in one single text. (Cf. Lewis et al., 2009, p.482)

Throughout the analysis process relationships to the theories were discovered which gave the incentives to reflect on different risk approaches among the three study objects and connect the empirical findings to the theoretical framework. (Cf. Lewis et al., 2009, p.492)

3.8 Credibility of research findings

An important aspect of a research study is the trustworthiness of the information presented. (Bryman & Bell, 2007, p.411)

“The principle is to allow an external observer, in this situation the reader of the case study, to follow the derivation of any evidence, ranging from initial research to ultimate case study conclusions.” (Yin, 2003, p.105).

The articles and books used in this study were obtained from Mälardalen University's databases *ELIN@Mälardalen* and *Emerald* and the university library respectively. The most frequently used search words in the databases were *risk*, *risk management*, *modern portfolio theory*, *CAPM*, and *beta*. These sources insured a high level of reliability since the articles have been reviewed

several times before being published, and the books are commonly used in academic learning. Several articles were critical to the theories selected for this research which provided the research with several angles to the theories. Using numerous sources to confirm that the information gathered was correct brings trust to the theoretical framework.

The strength of interviews as a source of evidence is that they are very insightful and enable access to the most relevant information at each institution (Cf. Yin, 1993, p.80). The interviews did not have the intention to generalize the risk approach for all asset managers, nor for every division at the two larger institutions Carnegie and Penser. The intention was to review the financial theories in relation to risk management approaches providing different insights. Each respondent proofread the empirical findings to verify that the information from the interviews had been interpreted correctly. This eliminated possible errors and misinterpretations which could have occurred during the interview processes; furthermore it made the empirical information reliable.

Two interviewees accessible at Penser strengthened the source of evidence from this particular institution. The fact that the two respondents could complement each other in terms of providing answers to all of our questions reinforced the credibility further.

The study is built upon interviews with respondents in well placed and relevant positions who possess great competence within the research area. The respondents also have significant overall responsibilities which helped to gain a broader overview of the organization's view of risk as each respondent represents a major part of their departments, hence the empirical information provided should be regarded as trustworthy.

Reviewing the respondents, the chosen theories as well as the derived interview questions brought forward the strengths of the study. The study was enhanced as the empirical evidence was triangulated with original financial theories as well as with critical views derived from previous research (Cf. Yin, 1993, p.80). Further, the areas covered during the interviews provided satisfactory information for answering the research question. For these reasons, the methods conducted throughout this research made the authentic considerations of the paper decent. Therefore this research is considered to be repeatable yielding equal results if conducted in the future.

3.9 Method critique

The research method in this study could be criticized to the extent that having interviews as a source of evidence may result in response bias, meaning that the interviewees might have answered the questions according to what the researchers wanted to hear. (Cf. Yin, 1993, p.80) The respondents pointed out at several occasions that the information they provided was no secret and that if any question during the interview came across a more sensitive area of the company's way of conducting business the interviewees did not answer. Therefore the possibility of not retrieving the truth in each question was rather low.

The possibility of misjudgment when selecting the respondents for this research might have resulted in not interviewing the most appropriate persons. The lack of extensive knowledge of conducting interviews should be taken into consideration. However, at each company respectively there were no other persons considered more appropriate due to their positions and extensive knowledge in the research area.

Even though literature in this matter was reviewed, it would have been best to do a test run of the interview questions in advance to the actual interviews. The test run could have prevented the researchers from asking irrelevant questions, as well as notice missing areas to cover. (Ghuri & Gronhaug, 2005, p.134) It should also be taken into consideration that the interviews were conducted in Swedish and therefore needed to be translated into English. Information may therefore have been lost in the translation process (Cf. Bryman & Bell, 2007, p.496). Although, the fact that the respondents reviewed the texts derived from the interviews, indicated that there were no losses of vital information.

4 EMPIRICAL FINDINGS

This chapter presents the empirical information of the study objects, provided from the interviews conducted at each of the organizations.

4.1 Carnegie Investment Bank

Risk at Carnegie Private Banking is defined as not being able to provide the highest returns possible for their clients. Even though Carnegie is risk averse in its investment approach, the client's risk profile plays an important role in investment decisions. Carnegie uses the client's risk profile as a starting point on how to balance security and risk composition. Lundqvist at Carnegie Private Banking sees a strong positive correlation between risk and return and thinks a tradeoff between risk and return exists. Therefore Lundqvist believes that higher returns could trigger asset managers to choose a higher risk level than agreed. Lundqvist further pointed out that Carnegie has to be careful when not managing a client's portfolio and only giving advice, so called advisory service. In those cases the client only seeks advice from Carnegie but manages their own portfolios themselves. In case of high returns on the investments, Carnegie as an adviser looks good, but in the cases where the returns turn negative Carnegie might be blamed.

At Carnegie, beta as a risk measure is important in the pre-analysis of an investment and is used on a daily, weekly, and monthly basis. Carnegie does however not primarily look at beta as an ultimate risk measurement. If Carnegie predicts the stock market to rise, adjustments in the portfolio are made and stocks with higher betas are added. By doing so, the portfolio is expected to yield higher returns as the stocks in the portfolio follow the market in the positive direction. The opposite is done in reverse situations where the market is expected to decline. Carnegie Asset Management, the awarded investment management arm of the Group, traditionally invests in stocks with lower betas. For Carnegie to understand if the beta is consistent, they look at 200 days historical beta and compare the average beta of a stock with the present beta to identify possible changes over time.

Carnegie Private Banking does not consider VaR as a sustainable and reliable risk measure. Lundqvist argued that the model does not work in times of crisis and they do not have any benefit from such a measurement.

“When a credit crisis is a fact and no asset is sellable, all assets decrease in value. When I really need the VaR it does not hold since the model only works as long as the financial market works.

What I want from the VaR is to know what problems I have the day the crisis is here. At that point the portfolio correlations must still work, but they fail.”

(P.Lundqvist, personal communication, April 22, 2010)

Lundqvist explained that the financial markets today are globally integrated with the possibility of investing in companies all over the world. Therefore a common frame of reference is necessary to allow all investors to understand the same financial data. Carnegie therefore uses stock anomalies, especially the P/E ratio and the DCF, to determine the intrinsic value of a company.

Carnegie looks at the ratios from 3-5 years back and compares these with how the company performs today. This allows Carnegie to draw conclusions about how well a company performs and if they anticipate the company stock to grow or not. At Carnegie it is agreed that small capitalization firms tend to outperform large firms concerning growth and return on stock. In the post-analysis of an investment, Carnegie compares the Sharpe and the Treynor ratio to an index to evaluate how successful investments actually were. Lundqvist further described that a Sharpe ratio of 0.7 is better than a ratio of 0.4, but the actual number does not tell an investor anything. If all investors had the same investment goal regarding return, these ratios could be compared. Yet this is far from reality, hence it is crucial to interpret results properly.

Carnegie diversifies their investments across several different asset classes, sectors, and regions in order to reduce portfolio risk. According to Lundqvist however, the correlation of stocks in a portfolio does not reduce risk significantly and is therefore not examined in detail. Lundqvist reasoned that the market risk of an investment can be eliminated by hedging and is for this reason not regarded as a major risk factor.

4.2 Erik Penser Bankaktiebolag

Penser is not a high risk profile bank and takes only reasonable risk in their investment approach; risk they have under control and can justify. Dagne, head of risk management, sees risk as the actual fact of not being in control of things. The point is that it is not the controlled, well-known risk-taking that is dangerous, but the risk that an investor does not have full control of the positions (risks) held. Market risk is not an influencing risk since if the market risk becomes large, hedging is used to control it, Dagne stated. Penser devotes time to all risk types; where market risk is important, but is easy to monitor and control. According to Spetz, head of asset management, hedging is however not implemented in portfolio risk management.

Spetz highlighted that the portfolio risk is based on the client's preferred risk level. Spetz categorized Penser as neither risk-averse nor risk-lover. Spetz believes in a strong risk-return relationship and stated that this connection is the base for portfolio theory. Dagne also recognizes a positive relation between risk and return, but argued that there is not always a strong correlation. For example, in high-frequency trading where arbitrage possibilities arise, an investor can yield high returns without actually taking risks. Therefore, the risk return relationship depends on the nature of the trade, in other words which investment strategies are

used. Dagne agrees that the possibility of high returns could trigger asset managers in general to take higher risks, indicating the belief in a positive risk-return relationship.

Beta is used in the portfolio management at Penser to correlate and rank stocks in a portfolio. Expected betas as well as five-year historical betas are used to modify the portfolios if changes need to be made in relation to the market or a particular industry. Beta, according to Spetz, provides a good indication on how stocks and portfolios move over time. However, Spetz pointed out that historical data should not be trusted to the fullest, but historical data is the only information available. In excess to beta, standard deviation is applied as a vital risk measurement tool that is also used when evaluating portfolio performances in relation to a specific index, i.e. tracking error. Spetz also regards stock anomalies, especially the P/E-ratio and the DCF-model, as important measures to find stocks that are performing well in relation to the industry and the market.

According to Dagne, VaR is an appropriate variable to measure risk. It is the type of risk measure that incorporates the most information about risk considering the volatilities, correlations, and nonlinear properties of the positions simultaneously. Daily computations of their VaR provide Penser their risk exposure and with a fast signal that indicates possible profit or loss situations. However, Dagne argued that the VaR number means absolutely nothing in terms of the absolute level of risk, because the assumptions are so uncertain. Trusting the real number can be the actual risk. But VaR has a practical implementation; it helps Dagne to monitor what happens in a portfolio from one time to another. The important factor is to interpret the VaR in the most suitable sense tailored to the type of investments made.

Dagne thinks it is obvious that diversification reduces risk and thinks that it is one of the theories that actually work in practice. Spetz said that a standard portfolio at Penser contains 15 to 20 company stocks. The diversified portfolio has the intention to optimize the stock correlations without losing returns. Dagne does not see faults in financial theories in an absolute sense, but he clearly points out that it is vital to have an adequate interpretation of the theories. Dagne further thinks that the longer the time horizon of an investment is, the riskier a model gets.

4.3 Strand Kapitalförvaltning

Strandkapital makes investment decisions for the investors which are considered to be most appropriate within certain frames of an agreement signed between the investor and Strandkapital. Each client at Strandkapital has individual requirements regarding rate of returns as well as individual risk levels. Since Strandkapital does not operate trading of their own, their main focus concerning risk is their customers' risks. In other words, the risk of losing money and therefore not being able to achieve the returns the investors expect. The company's ambition is to keep their clients for generations, thus their time horizon for their investment strategy is long-term.

Lindström associates market risk as the biggest risk factor Strandkapital faces. Lindström, classifies the company as more risk averse, even though the actual risk level varies among clients. Strandkapital's job is to reach as high returns as possible given the investment criteria of the investor. The asset managers handle the client's money with an optimistic attitude, given the risk level of the client. Situations do exist where the asset managers at Strandkapital come across occasions where a higher risk could be appropriate. At that point a discussion with the client will take place, and if the asset manager gets the suggestion approved the considered investment is executed.

Lindström supports that there is a correlation between risk and return, but the connection is not as clear as theory tells us. However, over time, a higher risk should provide higher return, Lindström said. He believes that there are quite large deviations in this matter. A skilled asset manager can have a higher return with less risk than what is normal to that level of return. Opposite, a lower return could be the result of taking higher risk.

Lindström tries to forecast the future as accurately as he can using historical data, in other words beta. But he strongly argues that beta is insignificant when looking at a single company's beta. A single beta has too low degree of explanation and thus is not a reliable source for future return prediction. The reason for this according to Lindström is that beta does not accurately measure risk for a single stock. A high beta stock can have low risk, and vice versa. Therefore, Strandkapital uses all betas from the stocks in a portfolio combined to get a more significant measure.

"The historical data is the best we can get. Unfortunately I cannot foresee the future but I try my best. I have to use the tools I can find to measure my risk."

(D.Lindström, personal communication, April 22, 2010)

The long-term (two years) beta does not say anything about the market situation at present time. As history does not to 100 percent represent the future, using long-term and short-term (three months) beta enables asset managers at Strandkapital to compare if the portfolio beta has changed over time. If both betas from the particular times measured lie relatively close to each other, Lindström said it means the past three months have been rather similar in relation to the market the past 24 months. This means beta has not changed much over time, and thus a stock is more predictable.

Beyond looking at beta, Strandkapital spends half of their time valuating companies. By using DCF calculus with a time range of seven to eight years ahead, a residual value is generated based on a moderate growth. Lindström considers the DCF model to be a good prediction measurement in long-term perspectives, as long as the model is cautiously used. By underestimating future growth and overestimating future rates of return, Lindström filters out stocks which from this perspective have the potentials of yielding expected returns in relation to the risk taken.

Standard deviation is used as the major risk measure at Strandkapital. By analyzing standard deviations 500 days as well as three months back, they get a longer time perspective. At the same time the asset managers get a view of the standard deviation at the present market situation. A high standard deviation at the market place would tell the asset managers to be cautious since the deviation indicates a risk in the market. By using standard deviation as a risk measure Lindström feels that his relation to the market is rather secure, although he can never be completely sure of the standard deviation the market will have in the future. Extreme situations like volcano eruptions are not taken into account and do not exist in the standard deviations Strandkapital normally uses. As history does not predict the future, by knowing what standard deviations are reachable for a portfolio, the asset managers know approximately what risk they are taking. In extent to the standard deviation, Strandkapital looks at expected VaR of portfolios with data from two years as well as three months back. This gives the asset managers an indication of how many percent could possibly be lost in one day when the market becomes volatile.

Strandkapital aims to yield high returns, therefore the asset managers are not afraid of having tracking errors around 11-12 percent. Lindström said that in general asset managers are scared of deviating from two percent tracking errors. But if Strandkapital's investment philosophy had the same intentions, they might as well invest in index funds. According to Lindström, asset managers at Strandkapital have 15 to 20 stocks in their portfolios. Having a larger amount of stocks, the portfolio would become close to the market. Lindström further explained that Strandkapital sees this number of stocks to be an ultimate combination in order to yield a return that stands out. By diversifying with the amount of stocks described, they seek to find stocks with negative correlation but also stocks with no correlation at all. The asset managers do not attempt to systematically find a way to end up on the optimal position on the efficient frontier, but try in a relatively systematic way to approach it, since the efficient frontier is based on the market being efficient. Lindström stated that diversification works, but to a certain extent. The market risk always exists, and the financial crisis in 2008 showed that diversification did not hold completely, Lindström said.

“You cannot diversify risk completely but you can reduce risk to some extent.”

(D.Lindström, personal communication, April 22, 2010)

Lindström further explained that Strandkapital does not use hedging as a risk tool in their investment strategies at present time. If they would consider hedging strategies, they would invest in external hedge funds. Lindström does not particularly prefer the usage of CAPM since the model requires an efficient market, in which Strandkapital does not believe in to a full extent. While beta is used, however, it can be looked at to get an overview of how the portfolio is moving in relation to the market. In order for the asset managers to actually review their performances they use the Sharpe ratio as an evaluating measurement as the standard deviation is used as a vital risk measure.

5 ANALYSIS

In the following chapter the empirical findings from the three study objects are reviewed and analyzed in relation to the theoretical framework.

5.1 Risk

All interview participants could define risk without hesitancy and responded in different ways. The definitions of risk received were not distinctly the same, although the answers in the end led to the same meaning; losing money when uncertainty affects returns negatively. De Ridder (2003) claimed that an investment is riskier when the return is uncertain in the end of an investment period, which conforms to the interviewees risk definitions. The study objects regard their client's preferred risk level as an important factor when deciding the risk level for an investment. As every client requires individual returns on their investments, the preferred risk level varies among the clients. Still, all interviewees consider their investment approach as rather risk averse. Therefore the companies prefer less risky stocks over risky stocks as long as equal returns can be expected. According to Levy & Post (2007) the study objects would therefore only consider higher risk levels if they would be compensated for the additional risk.

5.2 Risk and return

All respondents agreed that the risk and return relation exists. However, there are disputes regarding this theoretical connection. Not all respondents considered the relationship to be linear, which is recognized when investments yield higher returns for a lower amount of risk. Depending on the kind of trade that is conducted, an investor could achieve different returns for the same certain risk level or no risk at all as when arbitrage opportunities occur. This supports that the connection between risk and return is not crystal clear in each and every case, and thus is not seen as linear as the CML illustrated by Levy & Post (2005). Although from a general aspect the risk and return relationship is considered noticeable over time, which Lundblad (2007) concluded, but does not signify a specific amount of return for a particular level of risk.

5.3 Beta

Fama and French (1992) findings that beta did not specifically explain actual stock performances were supported by the asset managers. Beta in a risk management approach was not considered significantly useful when used in short-term day trading. The beta had to be looked at for *at least* 200 days back to be useful as a risk measure. This confirms Fama and French's (1992) findings that the relationship between beta and a stock does not hold over shorter time periods. Time periods further back are used to measure the changes of beta over time, but do not tell much

about the market at present time. Therefore the 200 day and the three month betas are looked back on to be more up to date where investments stand in the market at the moment. It is believed that a high beta stock can have low returns and vice versa. This is another indicator of why the risk and return relation does not always hold and therefore contradicts Levy & Post (2005) where high beta stocks are considered to yield high returns. Consequently, trusting a single beta is considered a risky approach as it does not explain a stocks actual risk level. Reviewing a portfolio beta is believed to give a better indication of risk.

As doubt occurs amongst the respondents that beta is not a definitive measure to rely on to a full extent, it makes the CAPM less consistent. This is supported by Galagedera (2007) who argued that the CAPM can neither be accepted nor rejected when approximations are used to measure market portfolios. As the risk-return relationship is not considered linear at this point, Markowitz's SML is difficult to interpret as an ideal risk and return relationship with beta as a risk measure. Still, the SML is used in practice to get a premonition of what their expected return for the risk taken as Levy & Post (2005) exemplified. The Treynor-ratio was not used a lot by the majority of study objects. This is reasonable as they do not rely on beta in the extent it would be useful to look at Treynor to evaluate portfolio performances. Beta is rather used in the pre-analysis of stocks and portfolios.

5.4 Market stock anomalies and alternatives to beta

None of the study objects used the most theoretical reviewed risk measure, beta, exclusively. A commonly used risk measure at the companies, apart from beta, was the standard deviation, which is believed to give a good explanation between risk and return. Lundblad's research from 2007 concurs. The other frequently used risk measure, used at two of the financial institutions was the VaR. Sollis (2009) pointed out that the validity of VaR has been questioned due to the recent finance crisis. At that point Carnegie considers investors to act irrationally and therefore the VaR becomes useless as the financial markets are inefficient. When this happens, the future data will not be the same as the historical and thus according to Sollis (2009) makes the VaR inconsistent. This does, however, not seem to cause any doubt about the usage of VaR at Penser. There were rather big differences in the opinion of the VaR measure. Many models have failed in extreme market conditions, thus VaR is not the only one. Strandkapital looked at long-term historical VaR data, both three months and two years, which contradicts with Amenc (2003) who found that VaR is a short-term measure and is most useful when examining only up to ten days of market average.

All research objects additionally look at stock anomalies to evaluate firms in which they plan to invest in. Most common are the firms' size, the P/E ratio, and the DCF as they are considered global frames of reference and used world-wide. All asset manager respondents agree with Chen et. al (2005) that these measures sufficiently complement the historical data by providing

institutional investors a prospective view into the future. As the rate of return can according to French & Gabrielli (2003) be selected individually when using the DCF-model, investors can minimize unsuspected losses by calculating with rates the asset managers find reasonable. Further, all interviewees agreed with Fama and French's (1992) findings that firms with a low market capitalisation appear to earn positive abnormal average returns compared to large capitalisation firms which seem to earn abnormal negative returns. These stock anomalies are therefore considered as important additional tools in portfolio risk management.

5.5 Risk management

Since smaller firms outperform larger firms due to their higher beta, a portfolio would be considered riskier if the portfolio only contained low market capitalization firms; hence portfolios are constructed with risk management taken into consideration. All participants concurred with Melicher & Norton (2007) that diversification is an important risk measurement tool and is commonly used at the three financial institutions. Diversification is believed to lower the total risk of an investment; because the firm's specific risk can be eliminated by investing in negatively correlated assets, i.e. Gibson's (1996) "not putting all eggs in one basket". An appropriate number of stocks in a portfolio to achieve the full benefits of diversification are considered to be 15-20 stocks. It is believed to be the most sufficient amount, as Domian (2003) also argued that a portfolio should not include more than 20 stocks to achieve the full advantage of diversification. The technique of hedging was not commonly used by the three financial institutions. Hedging is related to the kind of trades that are performed. A long-term investor does not find hedging a technique to help him or her prevent eventual losses, which was the case at the asset management departments. Meanwhile, short-term trading where stocks fluctuate daily needs to be secured to the exposure of for example market risk, would according to Hamberg (2004) be the case of using hedging more often in order to minimize that risk.

5.6 Faults of the theories

All respondents highlighted the importance of transparency in theoretical models used to manage risk, which has been reviewed throughout this chapter. The financial theories are not considered flawed in an absolute sense, it is however essential to interpret the theory appropriately and not solely believe in numbers. Most models come with a list of assumptions that investors should keep in mind when using financial models. Nonetheless, the existing models are considered to provide the best available information financial investors can get, even if several of them are built on historical data. Historical data was not considered to give true predictions of the future by any of the respondents. This reflects Fama & French (1996) findings that historical positive outcomes in periods longer than one year do not guarantee positive outcomes in the future.

6 DISCUSSION

The researchers came across the fact that the possibility of asset managers taking higher risk than necessary exists. As a positive risk-return relationship provides incentives for taking that additional risk, asset managers can be tempted to do so.

Financial investors can be attracted to take higher risks when investing as they will not be personally affected to the same extent as the actual money owner. This can be seen as the paradox curse of this particular industry. The question is which method could hinder financial managers most efficiently from taking too high risks?

Many people, especially institutional portfolio managers have experienced great declines, as securities suffered large losses in late 2008 and could not be sold quickly enough in the market. Many models did not reflect the true level of risk and thus market participants failed to accurately measure risk. As financial theory has presently been questioned more than ever before, an interesting aspect to debate is whether the crisis of 2008 has influenced companies' actions regarding risk taking and risk management.

One additional point is that personal preferences among portfolio managers may play a role in the risk management approaches. Therefore, regulations in the future might exist, as clients have to rebuild trust in financial institutions. Regulations might influence trading activities at big banks, which further could affect the banks negatively, hence the question; how can these regulations be structured in order for all parts to agree on the conditions? Is it reasonable for politicians to control salary and bonus payouts which today are determined by the board of a company?

Rewarding managers with company stocks, which would be locked for at least five years, ties employees of financial institutions become privately to the company. If a financial investor takes a higher risk when investing, his or her own risk level rises as well. This might be an approach to rebuild the damaged trust in financial institutions due to the latest financial crisis. The question is, to what degree devotion has been delegated to risk management today. In what way have companies changed their approaches and become more careful when constructing portfolios, given that they want to be able to trade assets quickly. One could also ponder whether financial theories will ever hold in future extreme market conditions.

7 CONCLUSION

This part presents the conclusions drawn from the analysis. The section ends with suggestions for further research, which are considered appealing within the research area.

All theoretical models used in financial activities should not be trusted to full extent, thus it becomes rather impossible to determine a total risk level of an investment. The analysis of the empirical data has shown that in the world of finance there is no universal definition of risk. However, not being aware of all relevant factors in a risk management approach would jeopardize the returns. The financial institutions generally are risk averse, since losing money and repeatedly yielding negative results would make clients leave the company. At the same time the institutions have to take a certain level of risk to generate client's expected returns. Concluding that there is a relationship between risk and return it does not have to be linear or positive for all investments.

The study showed that beta, as a major variable in the financial world, is not used solely. The doubt about beta telling the whole story hinders the three institutions to fully rely on what beta tells them. The reason is primarily that historical numbers cannot be used to predict the future prospects of investments to a hundred percent. Beta helps the asset managers to identify changes over time. Although, the respondents did not believe that a high beta necessarily will provide high returns. This is clearly stated in theory, which brings suspicion to the CAPM. For that reason the financial managers do not stare blindly at the CAPM. Therefore more contemporary measures, the DCF and P/E-ratio, are used to complement the historical data to obtain a better understanding of the risk associated with an investment.

Ultimately, for a model to hold in practice it should be transparent and not too complicated, yet it should take all risks into account. Investors should not be blinded by theory and believe in a dodgy model since it might not explain the ultimate truth about the actual and total risk. An interesting aspect that was discovered is the different opinions and relations the respondents had about the financial theories. Some models, for example the VaR, were entirely rejected by one respondent but loved by another, i.e. a disagreement exists whether the VaR can actually be trusted as a major risk measure. The only theory which was considered to actually work in practice without any unrealistic assumptions was diversification. Even in extreme situations where the global market fails, an investor can by diversifying investments reduce losses. Investing in two companies is basically better than in just one, meaning, even if prices of two stocks in a portfolio are positively correlated and are both falling, one stock might decrease less than the other. This is considered a better scenario than having all money only in the company which decreased the most.

Answering the research question, all the financial models chosen in the theoretical framework of this research were implemented by Carnegie, Penser and Strandkapital. However, the analysis has highlighted that each company uses different theories in different ways, because the level of trust in the models explaining risk varies among the institutions. In other words, which models are used and why depends on the philosophy of the firm. The usage is illustrated in the following table (table 1).

Theory	Carnegie	Penser	Strandkapital
Risk-return relationship	X	X	X
CML	X	X	X
Beta	X	X	X
Treynor ratio	X		
Standard deviation	X	X	X
CAPM	X	X	X
SML	X	X	X
Sharpe ratio	X		X
Stock anomalies	X	X	X
APT		X	
Tracking error	X	X	X
VaR		X	X
Hedging			
Diversification	X	X	X

Table 1 - Overview of theoretical implementations (Rörden & Wille, 2010)

Since financial models are built on the idea that investors act rationally, many of the models do not hold in times of crisis when humans act irrationally. Most theories have assumptions which are not realistic and should always be kept in mind and taken into consideration while interpreting the obtained data. All investors have the same models and the same data available when making investment decisions. It is a matter of interpreting and using the data in the most adequate way to succeed with minimizing risks and maximizing returns.

7.1 Suggestions for further research

We propose the following topics within the area of risk management for further research:

- What personal characteristics make a risk manager successful?
- How do financial institutions implement the client's risk levels?
- What cultural differences in regard to risk management and portfolio construction exist?

We further suggest conducting a broader research with European financial institutions to discover additional approaches in risk management. It might also be of interest to examine the risk handling of a European company operating in countries outside of Europe.

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Appendix A - Interview requests sent by e-mail to companies

Hej _____!

Vi är två studenter vid Mälardalens högskolas program International Business Management som just nu skriver vår examensuppsats inom finans. Uppsatsen berör synen på risk och risk hantering vid investeringar och portföljoptimering.

Vi har kontaktat er eftersom vi gärna vill genomföra en intervju hos er för att insamla information till vår studie, med syfte att undersöka hur finansiella institutioner hanterar risk och implementerar teorier i praktiken.

Vi hoppas ni kan hjälpa oss och ta er tid med detta. Enligt vår tidsplan vore vecka __ lämpligast, men självklart är vi öppna för förslag kring datum och tid.

I hopp om ett positivt svar!

Sarah Rörden & Kristofer Wille

Dear _____!

We are two students at Mälardalen University program "International Business Management", currently writing our thesis in finance. The essay concerns the perception of risk and risk management in investments and portfolio optimization.

We have contacted you because we are keen to conduct an interview with you in order to gather material to our research, with the purpose to examine how financial institutions manage risk and implement theory into practice.

We hope you can help us and take your time with this. According to our schedule week __ would be suitable.. We are open for suggestions regarding date and time.

In hope of a positive response,
Sarah Rörden & Kristofer Wille

Appendix B - E-mail sent to confirmed interview participants

Hej _____!

Vi vill som tidigare nämnts ge er lite mer info inför vårt besök nästa vecka. Vår uppsats fokuserar som sagt på hur ni som finansiell institution hanterar risk och eventuella implementeringar av de teorier som finns för att generera hög avkastning.

Några exempel på vad våra frågor kommer beröra är er syn på risk, vilka variabler ni använder er av till exempel beta, riskhanteringstekniker och kopplingen mellan risk och avkastning. Samt eventuella fel vid användningen av teorier.

Om ni har några funderingar innan vårt möte, maila eller ring gärna!

Vi vill återigen tacka för att du tar emot oss!

Vänliga hälsningar,
Kristofer och Sarah

Dear _____!

As mentioned earlier we want to give you some more info about our visit next week. Our study focuses how financial institution as yours manages risk and implements existing theories to generate high returns.

Some examples of what our questions will cover are your view of risk, the variables you use, for example beta, risk management techniques and the link between risk and return. Also possible errors when using the theories.

If you have any questions before our meeting, feel free to contact us by phone or email!

We again thank you for receiving us!

Sincerely,
Kristofer and Sarah

Appendix C - Prepared interview questions

*** Risk**

How do you define risk?

Why would you consider yourself (and company) as risk lover/averse?

What is the biggest risk factor when you invest?

What factors are considered when deciding the risk level of an investment?

*** Risk and return**

Would you say the relation between risk and return is strong? Why/why not?

Why does the possibility of higher returns make you take higher risks?

What are the company/your objective; minimizing risk or maximizing high returns? How do you combine this?

*** Beta**

How relevant is Beta as a risk measure? Why? Why not?

To what extent do you rely on Beta since it looks on historical numbers only?

*** Which variables**

What variables do you use to measure risk?

Always the same ones or does it depend on industry/company/time horizon?

*** Risk management**

How do you reduce risk? Diversification, hedging?

To what extent do you consider diversification work?

Did the crisis of 2008 change your view on risk and your strategies/risk levels?

*** Faults of the theories regarding risk measurement?**

Due to for example the financial crisis of 2008, have you been questioning your own risk measuring strategies?

What did you discover in your risk management approach?

Do you have a different risk approach now? What have you changed and if so what variables are considered more important now than before the crisis?