



LUNDS UNIVERSITET  
Ekonomihögskolan

## Investment strategies and their performance

Do Hedge and Quant funds, as well as funds using Fundamental analysis, have different risk adjusted returns? Can any of them beat the market?

BOBBY LARSSON

*Lund University School of Economics and Management  
The Department of Economics  
Bachelor Thesis  
Tutor: Erik Norrman  
January 23, 2014*

### Abstract

This thesis investigates the performance of Hedge and Quant funds, as well as funds with a Fundamental approach (here called Value funds). The funds are also compared with a world index. Weekly data over a two year period (2011-2013), from about 25 funds out of every class, is used. The results show no statistical difference between Quant and Value funds, while Hedge funds have a lower risk adjusted return. Also, equally weighted portfolios, of all the funds using a certain investment strategy, was constructed to in order to compare with a world index. Here the results show no statistical difference between the portfolios themselves, or the portfolios and the index, supporting the Efficient Market Hypothesis, that markets are efficient. However, the samples are small and the method of picking the samples is somewhat subjective, making the risk of sample error bigger. But on the other hand: my results are in line with earlier research, making my findings more plausible.

**Key words:** Hedge fund, Fundamental fund, Quant fund, strategy, value

# Foreword

I want to thank people working at the Department of Economics at Lund University School of Economics and Management. Without these persons's work I wouldn't have been able to write this thesis. A special thanks to Erik Norrman, whose instructions and tuition have enriched my perception of economics and portfolio investment in particular.

# Index

- INTRODUCTION..... 5**
  - THE SUBMARINERS AND THE ENGINEERS..... 5
  - THE PATH..... 6
  - THE PROBLEM ..... 6
  - THE PURPOSE ..... 7
  - THE LIMITATIONS..... 7
- METHOD ..... 8**
  - THE QUANTITATIVE METHOD..... 8
  - THE PERSPECTIVE = SEK ..... 9
  - THE SELECTION OF INVESTMENT CLASSES AND TIME PERIOD ..... 9
  - DEFINITION OF HEDGE, QUANT AND VALUE FUNDS..... 10
  - THE FUND SELECTION PROCESS..... 11
  - POSSIBLE PROBLEMS WITH THIS METHOD..... 13
  - WHAT GLOBAL INDEX TO USE?..... 14
- THEORY ..... 16**
  - (MODERN) PORTFOLIO THEORY..... 16
  - EFFICIENT MARKET HYPOTHESIS..... 16
  - BEHAVIORAL FINANCE..... 17
  - ADAPTIVE MARKET HYPOTHESIS..... 17
  - SURVIVORSHIP BIASES ..... 18
  - STATISTICAL TESTS AND ECONOMIC CONCEPTS/VARIABLES..... 18
- EARLIER RESEARCH AND BRIEF HISTORY OF THE STRATEGIES ..... 20**
  - HISTORY OF THE INVESTMENT STYLES ..... 20
  - RESEARCH COMPARING THE INVESTMENT STYLES ..... 22
  - RESEARCH ON ACTIVE VS. PASSIVE FUNDS ..... 23
- THE EMPIRICAL DATA..... 26**
  - THE CLASS-AVERAGE MODEL..... 26
  - THE PORTFOLIO MODEL..... 31

<b>THE HYPOTHESIS TESTS .....</b>	<b>34</b>
THE CLASS-AVERAGE MODEL.....	34
THE PORTFOLIO MODEL.....	37
<b>ANALYSIS .....</b>	<b>39</b>
THE CLASS-AVERAGE MODEL.....	39
THE PORTFOLIO MODEL.....	41
FURTHER ANALYSIS .....	42
FURTHER RESEARCH .....	43
CONCLUSION.....	44
<b>BIBLIOGRAPHY .....</b>	<b>45</b>
APPENDIX .....	49
APPENDIX 1: THE FUNDS .....	49
<i>Hedge funds</i> .....	49
<i>Quant funds</i> .....	50
<i>Value funds</i> .....	51

# Introduction

## The Submariners and the Engineers

Do different investment strategies perform differently? In academic theory we basically learn what one of my first-year lecturers said - *the best thing to do is to buy an index fund and go out and play golf!* If this were true, how come there are thousands of books describing different investment strategies? And how come there are many books talking about "investing like the masters" or people claiming they've "solved" the Wall Street conundrum, i.e. Richard Dennis and his "Turtles" (see Coval, 2009). Is it all just a part of the learn-how-to industry trying to make money of the less fortunate or are there some valuable insights into the world of finance in these claims?

In my personal opinion there seem to be a cross road dividing people with interest in investing. On the one hand we have the academics that don't really "get their hands dirty", and on the other we have the professionals who are working daily with investments. The first group seems to think there is no point in trying to beat the market, while the other group - in my experience, overviewing various financial news - seems to think it is possible. It makes me think of the brilliant movie *Das Boot*<sup>1</sup> about a submarine and its crew during World War II. There is a scene where the submarine is under attack and seems to have no chance of surviving. According to the manufacturer the submarine can only reach a certain depth without imploding. But the captain gives the order to go deeper than that. He gives the order not because he wants to kill the crew, but because his many years of experience tell him that there is a possibility that the submarine might make it - and it does!

There is a division of thought and experience in the world of investing, and there are studies suggesting both sides have right. But there is also a division among the practitioners as to which strategy is the best. In the case of the submarine, the captain could also have ordered going faster, or to surface and surrender, or anything else. In this bachelor thesis I will focus, first and foremost, on the different strategies that people who work with investing apply, and

---

<sup>1</sup> Das Boot (1981). Director/Writer: Wolfgang Petersen. Bavaria film, PSO International

if there is any difference between them. Secondly there is the question if these strategies can beat the market.

## **The path**

To find empirical evidence of the performance of different strategies one has to find investors who claim to solely follow a certain strategy. There are hundreds of investment strategies, and many managers use a combination of those. The way to move forward is to find managers or managed instruments using only one of the many strategies.

I chose to look at funds because they are very available to the public. There are some funds that use one strategy i.e. "only follow insiders", "technical analysis" or "momentum strategies". Of course, two "momentum funds" doesn't operate in the same way, but they probably have more in common with each other than with a Hedge fund trying to find positive alphas.

In my search for specific funds I found three types of funds that could have enough material to be somewhat statistically relevant: Hedge funds, Quant funds and Value funds (using Fundamental analysis). More on them later in this thesis.

## **The problem**

The main problem of this bachelor thesis is:

*"Does the choice of investment strategy affect the performance of the investments?"*

To try and answer this wide question I was forced to ask a two more concrete question. The first being:

*"Is there a difference between Hedge, Quant and Value funds with regard to returns, risk and Sharpe ratio?"*

And secondly:

*"Do any of the strategies described in this thesis show a higher risk adjusted return than a global world index?"*

## **The purpose**

The main purpose is to give a little taste (only a taste because this is merely a bachelor thesis) of the performance potentials of differently profiled funds, with regard to single strategies.

## **The limitations**

In the ideal situation, I would have wanted to look at many different fund managers who each use a specific investment strategy, and then group those with the same philosophy together. I would then have a lot of these groups, with many samples in each. In the perfect situation I would also have records going back many decades.

In reality I am naturally limited. There are survivorship biases on the market, which led me to only be able to look at the past two years. Many of the specific funds I'm interested in are quite new. The bias situation is well known. Managers simply shut down funds if they don't perform well, leading to a fake situation where funds seem to perform better on average.

Most funds differ in what they invest in: some focus on a country or region, others on a specific sector or branch, still others in large or small companies. But, according to my research, most of them follow the strategy of using Fundamental analysis, which is a strategy I call Value investment. This made it a challenge to find "alternative" funds.

Maybe in the future there will be a bigger interest in different strategies and thus longer time series and more classes of strategies to investigate. But for now I had to settle with weekly data stretching over 100 weeks (during 2011-2013), and 3 more or less well-defined classes each containing approximately 25 funds.

# Method

## The Quantitative method

In order to examine the performance of financial data a quantitative method is best suited. On the other hand a qualitative method could have been interesting because one could for example have interviewed fund managers and maybe gotten more in-depth information about strategies, but perhaps not so much if it is better than other strategies or the market in general. Thus I've chosen the quantitative method. This method is shallower than a qualitative method, but can give a more general picture.

**On the face of it, there would seem to be little to the quantitative/qualitative distinction other than the fact that quantitative researchers employ measurement and qualitative researchers do not. (Bryman & Bell, 2007, p. 28)**

Bryman & Bell (2007) go on pointing out that one of the core differences between the methods is that the quantitative method tests a theory, while the qualitative method generates a theory.

I've chosen two models to process my questions:

### The class-average model

In order to test the risk adjusted returns for the different investment strategies my goal was to find 20-25 funds for every class of investment style. I looked at their returns over a period of 100 weeks (December 21, 2011 to November 20, 2013). From this data I could get mean weekly return, weekly risk and weekly risk adjusted return for every individual fund. Then it was easy to calculate the average weekly return, risk and Sharpe ratio of each of the three investment classes and then test and look for differences.

Some of the Hedge funds only report their results on a monthly basis, and this could affect the results. Therefore I had to repeat the above mentioned test but the second time exclude those Hedge funds.



## **The portfolio model**

In order to test if any of the investment strategies could out-perform the market I constructed an equally-weighted portfolio for every investment style, made up of each individual fund in every investment class. These portfolios were then compared with a world index.

In this model I will not exclude the funds only reporting once a month since in this model their impact is negligible.

## **The perspective = SEK**

Since I live in Sweden and most of the people reading this thesis will be swedes, I chose to look at the results from a Swedish perspective. This only means that all fund results were stated in SEK. Since the funds use different currencies (mainly EUR, USD and SEK) I had to choose one currency, and the SEK seemed like as good a choice as any.

Also, I choose not to look at transaction costs, taxes etc. while these are different in different countries.

## **The selection of investment classes and time period**

In the beginning, before I had an idea of what investment styles to compare, I simply collected strategies from a purely theoretical perspective. I searched the internet, journals and books. I even mailed many academics: in Lund, in Sweden, and from all over the world - but unfortunately, very few had time to answer or help me.

When I had a long list of different strategies, I started grouping them together. I ended up with about six big groups. I will not get into details of these groups or what they contained, because there was too little available fund data out there to research every interesting investment strategy. I ended up with 3 classes of funds that differed enough to be interesting. These were: Hedge, Quant and Value (Fundamental) funds.

I was more or less forced to choose the time period of about two years (100 weeks) because most of the interesting funds were quite new (or possibly hadn't performed all that well, and thus been having to close down).

## Definition of Hedge, Quant and Value funds

Before we continue with the selection process a definition of the investment classes chosen is appropriate.

### Hedge funds

My definition of Hedge funds came from the class I started out calling *academic strategies*. This means investment strategies using well-established academic terms and theories like alpha, beta, CAPM and such. When I looked for Hedge funds, I chose the ones that were described as aiming for absolute return, which is what I associated with Hedge funds.

There are many Hedge funds that simply hedge one or more risks, for example currency risk. These Hedge funds were not interesting to me. I was more interested in Hedge funds that sought an absolute return. Most non-Hedge funds compare themselves to a benchmark and they seek relative return. They try to beat the market. A Hedge fund looking for absolute return tries to generate a positive return no matter the direction and fluctuation of capital markets. To achieve this Hedge funds have looser sets of regulations. They are freer, and can for example take short positions to a much higher extent than mutual funds.

### Value funds

This is the most common of all types of funds. This class uses Fundamental analysis. There are analysts who make judgments based on relevant public information, and fund managers who acts based on these judgments. There is usually some kind of focus, i.e. a region, a country, large companies etc. But the strategy being used is (from my theoretical perspective) similar in all Value funds.

I chose to call this investment class: *Value* investments (rather than *Fundamental* investments), because some people actually uses this definition, and because it says a lot about what is being done: looking at values in yearly reports etc.

Examples of Value technics are Shareholder Value Analysis (SVA), top down, bottom-up etc.

### Quant funds

This class is the most variable. It is actually a mix of three of my early groups.

The strategies in this class should follow some kind of set quantitative rules - i.e. using computerized models, technical analysis, momentum strategies, follow insiders, use purely statistical methods so as not to allow any human "errors".

**Fabozzi, Focardi, and Jonas (2008) identify an investment process as “fundamental” if it is performed by human asset managers using information and judgment, while a “Quantitative” process is one in which the Value-added decisions are based on Quantitative outputs generated by computer-driven models using fixed rules. (Gregory-Allen, Shawky & Stangl, 2009, p.3)**

This is pretty close to my definitions.

## **The fund selection process**

Once I had hammered out a method/model and a definition of what I wanted to look at, I needed to find funds that fit my criteria. I used what Bryman & Bell (2007, p. 182) calls a non-probability sample. It means that I'm not using a traditional random selection, and consequently the risk of sampling error increases (the risk of my data not being representative for the population being observed). The reason I use this type of selection is because I couldn't find a database containing funds structured in a way that fits this investigation. I had to go out in the world and look for samples manually. It is obvious that my subjective decisions will interfere with the randomness of this survey. This borderlines to a qualitative investigation, and in some ways I'm using a sort of snowball sampling (see Bryman et al, 2007, p. 458). But even though I've chosen a quantitative method to check my hypothesis, it is hard to generate quantitative randomness in scarce conditions. From what I could find out only two funds in the whole world uses technical analysis as their sole investment strategy. How do you randomize that? This left me with a subjective selection, border lining qualitative research. There *is* some randomness to it, or rather a chance element. So to conclude, I'm using a quantitative strategy to test my data, that is clear, but the sampling process is somewhat ambiguous.

Also, I'm not really interested in a specific country or region of the world, only the strategy being applied. But, in my experience, it is hard to find information about funds outside of the US/EU-market (even though it is easy to find funds focusing their investments on other regions).

## **How funds were selected**

Before I could include a fund, I needed to know, at some level, what its investment strategies were. I started out searching the Morningstar web site. Morningstar has different web sites adapted for different countries. Since I needed qualitative facts about the funds, it turned out that the Swedish Morningstar version was the best. For almost every fund there is a little text saying what the fund does. It was based on this text that I did most of my choices. If it said that a fund aimed for absolute returns, I put it in the Hedge fund class, etc. Naturally, this method has some subjective elements to it.

Since a fund managing company might have similar recommendations from its analysts I chose not to include more than one fund from every manager, unless two of their funds use different investment strategies. When a fund management company had many funds belonging to a certain investment style class it was totally arbitrary how I chose which one to pick. Usually I picked the first fund in alphabetical order.

However, the Swedish Morningstar web site wasn't enough, I only got about 75% of my funds from there. I started looking at fund managers' web pages. But I didn't get much helpful information there. Usually they write standard things like "achieve capital growth", "unique picking process" and such. Usually they are very specific with how they diversify, but not how they actually make investment choices. I then started mailing fund managers -mainly ones operating (or represented) in the Nordic region - and asked them about their strategies. Most of them said that all of their funds used Fundamental analysis as their main tool of decision making. But there were some managers that had an interestingly styled fund. A few managers were also very helpful and pointed out one or two potential funds I could use.

After that I also checked the US and the UK versions of the Morningstar web site. Very few funds had the little text that the Swedish version has, but I did find a couple of more funds that I could use, now reaching my quota.

Because I picked a majority of the funds out of a Swedish site, or via Nordic based managers, there could be biases towards Swedish/European markets in my data. But on the other hand: markets worldwide tend to converge, so it's hard to say how big of a problem this is. I am investigating investment styles, not regional differences.

Once I had chosen my funds I got all the weekly data from DataStream. I chose to look at all the time series' in SEK, which DataStream conveniently transforms for you.

All funds chosen can be found in Appendix 1. A note on the Hedge fund *QQM Equity Hedge*, included in the class Quant funds. Even though its name implies differently, its clear momentum strategy outshines the fact that the fund is called "Hedge".

## **Possible problems with this method**

The main concern of this report was to find different strategies and categorize them. To get a statistically satisfying result you need many funds that share an investment philosophy. For certain classes of funds this is not a problem. But there are many strategies that aren't used, and there are many funds using multiple strategies, making it hard to analyze just one kind.

Another concern is that there are web sites that can give you more in-depth information about funds, but you need to subscribe to them. Since this is only a report on a very low level, with no funding, subscribing is out of the question. Which makes the results and the analysis in this report more of a hint, a pointer in a certain direction. And it is up to others to make bigger and more accurate research.

It would be preferable to be able to find some sort of database where one could look for funds based on exactly what strategies they use. But I failed to find one, if it even exists.

**What all of these studies have in common is that they use their own interpretation of the prospectuses to stratify funds into either Quantitative or Fundamental, ignoring the subtleties of some of these managers being Bottom Up or Top Down. Further, this stratification also obscures the potential for a particular manager being able to use a secondary technique. For example, while a given manager might be primarily Quantitative, and uses a Top Down approach, they might also have in their stock selection model some Fundamental ratios, meaning that they use a combination of Quantitative, Top-Down, and Fundamental approaches. (Gregory-Allen, Shawky & Stangl, 2009, p. 4)**

When choosing funds the way I have, without actually working with the fund manager, knowing what is going on at a deeper level, there is no way we can be certain that a fund actually uses only *one* strategy. A Hedge fund trying to create absolute return, might very well use Fundamental analysis. We have to see the results in this thesis as results related to how the fund managers have chosen to be associated with their funds, or how the fund

managers have chosen to brand themselves, or even how they have chosen to present themselves to the public. On the other hand one could even say that whoever wrote the text on the Morningstar web site is the person being investigated in this thesis. For now, however, I chose to assume that the information, ever so shallow, that was presented before my eyes are correct, conclusive and accurate.

Another aspect is that the Morningstar data may be biased towards private investors, and so the full spectrum of funds might not be represented.

There is bound to be survivorship biases in this thesis. But since I'm only looking at a short period, I don't think it affects the results all that much. As stated in Ekelund & Tengberg (2011, p. 19) mutual funds have a disappearance rate of 3,6 % per year, and it is higher for Hedge funds. It would make a difference to have unbiased data, but I think it is only relevant if it turns out that any of my investment style classes have outperformed the MSCI, or similarly, if the Hedge fund class would have outperformed the other two classes (since the biased Hedge funds should show a higher return rate than the unbiased data).

There once was a good web page called PSN Enterprise database where you could get data free from survivorship biases. It was acquired by Informa PLC in 1998, and as far as I can tell Informa now offers the same services. It is however something you have to pay for, so unfortunately I can't use that information in this study.

The time period chosen for this report is of course not optimal. Markets in general have been mainly positive during this time period, and that could affect the results of the funds that are being observed. For example Hedge funds might seem to have performed worse than the other funds, because they focus on absolute return. In a bear market Hedge funds are supposed to give positive return and thus performing better than normal going-long funds.

Because I have all my data transformed into SEK, I am looking from a Swedish investor's perspective. This perspective is different than if I had chosen to look from another perspective, but in essence it is not necessarily a bad one.

## **What Global Index to use?**

I chose the Morgan Stanley Capital International All Country World Index (MSCI) to be a generalized world index. It is being used in many of the reports I've read, and is somewhat of

a standard when it comes to world indices. The data for the index comes from the Morgan Stanley home page.

# Theory

## (Modern) Portfolio Theory

Markowitz introduced his theory in 1952, and called it Portfolio Theory or Portfolio Selection (Markowitz, 1952). Today we know it as Modern Portfolio Theory. It is basically about the merits of diversification. The right mix of assets can give the investor an ultimate portfolio with the highest possible expected returns to a certain risk. Risk is defined as the standard deviation of the returns (and presumes normal distribution of returns). The "free lunch" of diversification (lower risk without more cost) is only available if the assets are not perfectly correlated.

When you find the highest expected returns with the lowest possible risk for different levels of returns and risks you can start plotting the *efficient frontier*. Investments on this line outshine other investments with, for example, the same expected return but higher risk, or the opposite.

When introducing a (close to) risk-free asset (variance close to zero), for example treasury bills, we can find the Capital Allocation Line (CAL). It is the line, starting from the T-bill in a Mean Variance diagram, with the highest Sharpe ratio, still touching the efficient frontier (in the point called the *tangency portfolio* or the *optimal portfolio*). We can use this theory to construct the optimal mix of risk-free assets and risky assets with regard to the investor's level of risk aversion. (Bodie, Kane & Marcus, 2011)

## Mean Variance Diagram

It is common to show the expected return and risk of different assets in a Mean Variance Diagram. The y-axis gives you the expected return and the x-axis shows the risk (standard deviation = root of the variance).

## Efficient Market Hypothesis

According to this hypothesis markets are efficient. This means that the prices in the market adjust instantly to new information. There is no way anybody can make better profits than the



market average when looking at the risk adjusted returns. That's the bottom line. The theory was first developed by Eugene Fama (1970).

Later it was discovered that there could be grades of efficiency on the market. According to Fama, who adjusted his hypothesis, there are weak, semi-strong and strong efficiency. If a weak efficiency is in place, then you cannot make profits from historical data, i.e. technical analysis wouldn't work, but the market doesn't react immediately when new public information is being released, and therefore profits can be made. The hypothesis is based on the assumption that all investors are rational, which critics show some skepticism about. (Bodie et al., 2011)

## **Behavioral finance**

**Definition of behavioral finance: A field of finance that proposes psychology-based theories to explain stock market anomalies. Within behavioral finance, it is assumed that the information structure and the characteristics of market participants systematically influence individuals' investment decisions as well as market outcomes. (Behavioral finance, 2013, Investopedia)**

**By contrast, the main thought behind behavioral finance is that investment behavior exists, that differs from what the traditional finance paradigm assumes, and that this behavior influences financial markets. (Baltussen, 2008, p.32)**

Behavioral finance is a quite new field of study, using findings from psychology. Typically, it focuses on market inefficiencies, and related miss-pricings. I will not get into details, but the theory includes reasons for these “anomalies”, including: forecasting errors, overconfidence, conservatism, sample size neglect, framing, mental accounting, regret avoidance etc. See Bodie et al. (2011).

## **Adaptive Market Hypothesis**

The Adaptive Market Hypothesis was suggested by Lo (2004) as a way to combine the EMH with behavioral finance. Lo uses concepts from biology and Darwinism to explain his hypothesis. For example, he talks about species (groups of investors), and the ecology of the market. Efficiency in the market is dependent on the context. There has to be a large competition over scarce resources in order to have strong market efficiency. Lo explains that different strategies (for example the ones investigated in this thesis) will perform differently

in different ecologies. What drives the market is not profit but rather survival. And the way to achieve survival is by being innovational, which means that investors who can adapt to changing market conditions will have the most stable returns.

## **Survivorship biases**

Survivorship bias is the fact that funds that doesn't perform well get shut down, or get merged into other funds to conceal poor performance of a fund management firm. This leads to a skewness towards higher performance among funds. See Bodin et al., (2011, p. 461).

## **Statistical tests and economic concepts/variables**

In this thesis I will perform hypothesis tests to see if there is a significant difference between the three classes of funds. I will also test for difference with regard to the MSCI.

### **Hypothesis test**

In this thesis I use standard t-tests, which assumes that the test statistics follow a normal distribution (which is a reasonable assumption looking at financial data). To test standard deviation (actually: variation, the square of the standard deviation) I use a standard F-test. (See Körner, 2010 - formula (3.2.5.), p. 51 and formula (3.7.15), p. 58).

### **Return and risk**

It is of course interesting to measure a portfolio's past performance by looking at its risk and return. These are the most basic types of information that anybody would be looking for first, when making investment choices. In themselves these variables don't say very much, but combined, for example in the Sharpe ratio, they give us valuable information.

I'm using standard ways of calculating returns over certain holding periods. This data is then used to generate expected returns as well as standard deviations. (See Bodie et al., 2011, p. 150-153 and p. 156-157).

### **Sharpe ratio and Treasury bills**

The Sharpe ratio measures the reward-to-volatility ratio. To see how much the risk premium or the excess return is, one usually subtracts a return with the proper T-bill rate (Bodie et al.,

2011, p. 161). In this thesis I've used the Swedish 30-day T-bill rate, since I've chosen a Swedish perspective.

### **Performance measurement**

I use the Sharpe ratio as the main performance measurement. Modern Portfolio Theory tells us that's a good idea. One needs to look at the risk adjusted return. To look at only returns is not wise, but is unfortunately a common thing to do. Managers take on huge risks to end up in the "best performing fund" column in financial magazines, and thus attracting many new investors.

In my opinion the Sharpe ratio is the best measurement for my study. It uses variables that are workable. When looking at Hedge funds, that usually aim at zero-Beta composure, it can be hard to use other measurements, e.g. Treynors ratio.

The Sortino ratio compares the return with a specific target, which we aren't interested in here.

I could have used the M2 (Modigliane squared) measurement, but since it is basically the same as the Sharpe ratio, only a bit more intuitive (results in %), I chose not to include it in favor of readability. Also, the Sharpe ratio is more famous, and I guess more widely used. Personally, being an academic myself right now, I have no trouble understanding the Sharpe ratio.

The returns, though, are not unimportant and we will look at those as well as risks.

# Earlier research and brief history of the strategies

In this section the "history" of the three investment styles chosen will be presented, to give a feeling of their relevance today. I will also present research in the field of comparing different strategies, relevant to my thesis.

## History of the investment styles

### Value investing

It all started after the big depression in 1929. Benjamin Graham and David Dodd wrote the book *Security Analysis* in 1934, introducing what is now called Fundamental analysis, with focus on buying underpriced securities. (Graham & Dodd, 2006, 5th edition)

Since then value investing has developed, and has also become the most common form of investment strategy. Since it is so well known I will not linger on this matter.

### The Quant method

**A quantitative fund or quant is an investment fund in which investment decisions are determined by numerical methods rather than by human judgment. (Dempster, Mitra & Pflug, 2008)**

It is hard to come up with a history of Quant funds. It all depends on how you define them. Contrary to how I first perceived Quant funds, they have actually a lot to do with the academic world, (but maybe more with physics or mathematics than economics). My definition of Quant funds is a bit off. Technical analysis isn't actually a part of the Quant fund universe, as defined by the financial market. But I think they should be. To be able to write this short history of what I've defined as Quant funds I need to construct two separate histories. One for academic Quants and one for Technical Analysis. Since this is just a small part of this thesis I will not include references to books and persons in the following brief history. I presume that the persons are rather well known for everybody reading.

## 1. *The academic version of Quantitative funds*

It started in 1900 by the mathematician Louis Bachelier and his *Theory of Speculation*, where stochastic mathematics was introduced to the world of finance - being able to make calculations involving randomness. It really took off with Markovitz in the 50's (see the *Theory* part of this thesis). In the 60's the quantitative methods got enriched by the likes of Paul Samuelson and Robert Merton, with more mathematics, i.e. continuous-time calculations etc. But the greatest impact was made by Fischer Black and Myron Scholes, with Merton's help: - the famous Black-Scholes formula. Since then it has just continued, with algorithmic trading (especially the now well known High Frequency Trading), continued research in econometrics etc.

## 2. *The history of Technical Analysis*

It started in Holland in the 17th century with the spanish-portuguese merchant Joseph de la Vega, who started looking into processes of a stock exchange. This is my interpretation, but one reason why technical analysis has gotten kind of a bad reputation in the 20th century could have something to do with the kind of mysticism present in Vega's work (which is typical for the time, to mix science and religion). He sees, for example, the continuous growth in stock prices as a metaphor for religious striving and, in the end, the coming of a new Messiah. One can say a lot about the "alchemy of Technical Analysis", but there is an air of mysticism surrounding this craft, and it always has. Even today, there is serious research with sort of astrological themes. The Lunar Effect, for example, found by Yuan, Zheng & Zhu (2006). According to their research it turns out that world markets perform about 4% better during new moon, than half a moon cycle later - during the full moon! (This kind of research has its roots in the Behavioral economics, looking at psychological factors etc.)

In 18th century Japan, the candlestick techniques of technical analysis were born, being used to this day. And in 19th century America, the Dow Theory was introduced by Charles Dow, using concepts like *trends*, *phases* and *averages*. After that most of the progress was made by Americans, culminating in 1948 with the influential book *Technical analysis of stock trends* by Robert D. Edwards & John Magee. Technical analysis has never been totally accepted, but in the last fifteen years it has grown in popularity mainly because of the success of

momentum models - even among academics. Now some people even refer to technical analysis as "momentum strategies".

## **Hedge funds**

**The term “Hedge fund” was actually coined by Carol Loomis in a 1966 *Fortune* magazine article to describe the investment philosophy of one Alfred Winslow Jones. His fund had two general characteristics. It was “market neutral” to the extent that long positions in securities he determined were undervalued were funded in part by taking short positions in overvalued securities. This was the “Hedge”, and the net effect was to leverage the investment so as to make very large bets with limited investment resources. (Brown & Goetzmann, 2001, p. 2)**

Brown et al (2001) goes on informing us that today Hedge funds are a much broader concept - and should rather be defined as *having freedom from many regulatory controls* (for example the Investment Company Act of 1940 in the US). In conclusion one might say that Hedge funds have the possibility to take on huge risks, and only in some cases actually hedge that risk. There are many styles, approaches and specialties among the Hedge funds. We know very little about what Hedge funds do because they are not obliged to make public reports and it is in the Hedge funds interest to appear "enigmatic players in the global capital markets." (Brown et al, 2001, p. 19). The authors conclude that the common perception that Hedge funds use a market-neutral style of investing is false. There is in fact a wide variety of styles.

## **Research comparing the investment styles**

The famous William F. Sharpe claimed back in 1988 that he could tell what investment style a fund manager was having by simply looking at the returns. But what he meant by "style" is a bit different from my definition. It has more to do with asset allocation, for example big-small companies, international-national etc. There is a lot of research around this, and Sharpe's original definition of it has changed. The method is now commonly known as Return-Based Style-Analysis (RBSA). It is very interesting but it's not exactly what I'm doing in this thesis. However, the focus it has gotten is enormous, and sites like Morningstar use the "Sharpe-styles" to classify their mutual funds. And since I used the Morningstar web page, looking for "styles" these findings are definitely worth noting here. See Sharpe (1988), Lucas & Riepe (1996) and Kaplan (2003).

## **Quantitative vs. Fundamental funds**

Gregory-Allen, Shawky & Stangl (2009) give us an overview of the field of Quantitative vs. fundamental analysis. They look at four studies that are relevant for this thesis:

- Zhao (2006) shows that there is no difference between the performance of Quant funds and Fundamental (which I define as Value) funds - but she takes into account transactions costs and such - which I don't.

- Wermers, Yao & Zhao (2007) investigate the same thing, and find no difference between funds using a Quantitative or a Fundamental approach. The Quant funds investigated uses methods to take advantage of market anomalies.

- Casey & Quark (2004) as well as Ahmad & Nanda (2005) find that Quantitative funds outperform the fundamental ones. But both reports uses relatively small samples and Gregory-Allen et al. tells us to exercise care in generalizing these findings.

Gregory-Allen et al. (2009) finds in their own report that only fundamental analysis adds Value. The authors suggest that maybe Fundamental methods works best in times of turmoil, while Quantitative methods might perform better in times of economic stability - but leaves it up to other researchers to investigate that.

## **Hedge funds vs. other funds**

Amin & Kat (2003) prove that Hedge funds do not give a better risk-return tradeoff than other funds, during the period 1990-2000.

Ackermann, McEnally & Ravenscraft (1999) find that Hedge funds outperform mutual funds during 1988-1995, but do not outperform market indices. However, Hedge funds are more volatile than both mutual funds and market indices.

## **Research on active vs. passive funds**

First, let's clarify what is meant by active and passive. What is commonly considered to be an active fund is all of the 3 classes that I have included in this thesis. It simply means that if you have any kind of strategy you're an active fund. And what is commonly meant by passive funds, are funds trying to copy indices. I'm a bit skeptical to the differentiation of active Quant funds and passive Index funds. An Index fund is actually a sort of Quant fund,

following the strategy of copying an index. But in the research below and as a general rule Index funds are passive, and Quant funds are active.

**./.../a mutual fund whose performance was in the top quartile of all domestic mutual funds in September of 2010, there's a 90% chance that by September of 2012 the fund's performance was somewhere among the bottom three quartiles Similarly, if you picked a mutual fund whose performance was in the top quartile of all domestic mutual funds in September of 2008, there's 99,82% chance that the fund's performance would be somewhere among the bottom three quartiles by September of 2012./.../ The numbers underlying this assertion come from the so-called SPIVA analysis, where SPIVA stands for S&P Dow Jones Indices versus Active. (Pursche, 2013, p.1)**

This quote tells us that it is both possible to beat the market, but that it is almost impossible to do it consistently over a longer time (even though "the bottom three quartiles" possibly sounds worse than it is - it's not very specific...). Let's have a quick glance at some of the research in the field.

There are many studies showing that on average active funds cannot beat the market, thus proving the EMH to be correct. See Elton, Gruber, Das, and Hlavka (1993), Carhart (1997), Malkiel (2003) and many more. But there are academics who have found loopholes in the EMH...

Kremnitzer (2012) contributes to the debate of active versus passive strategy, and investigates all US funds dedicated to emerging markets. He finds that actively managed funds receive an average 3 year return of 2,87% more than passively managed funds. This would suggest that even though matured markets might be close to efficient, there could be anomalies in the less developed markets, that could be exploited.

Otten & Bams (2002) claim that funds in the European market show positive alphas and thus perform better than an index fund would. The authors point out that this report differs from American studies, that show no such overperformance.

Zack (2011) has compiled a book containing many of the anomalies that multifactor models could exploit in order to beat the market. It is based on academic research, for example Sloan



(1996) and Lev & Nissim (2006) - accrual anomaly, Rouwenhorst (1998) - momentum anomaly, Piotroski (2000) - book-to-market effect, and many more.

Gregory-Allen et al. (2009) list five other reports in favor of active management.

As we can see, there are both robust findings saying that you can't beat the market, but also some serious results proving the contrary. I do not pretend to have found every article or fact in this matter, I might even have missed some important discussions, but it seems as the theory about EMH is correct, but that there are conditions, even in mature markets, when we can't observe a strong efficiency. And this would imply that it could be worthwhile to investigate these weaker conditions further.

# The empirical data

## The class-average model

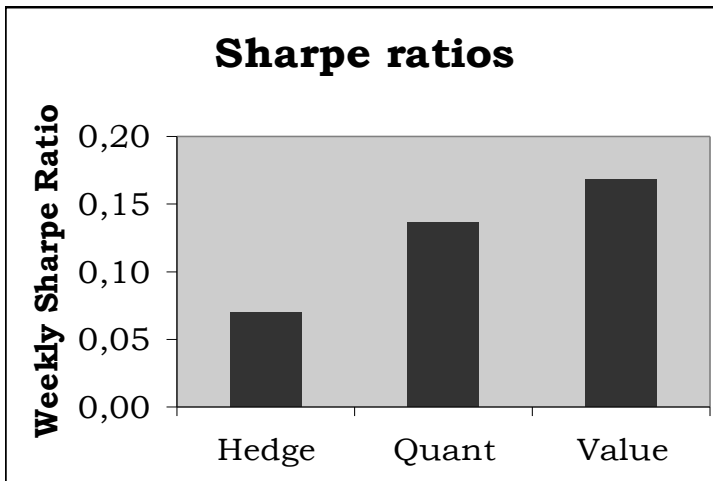
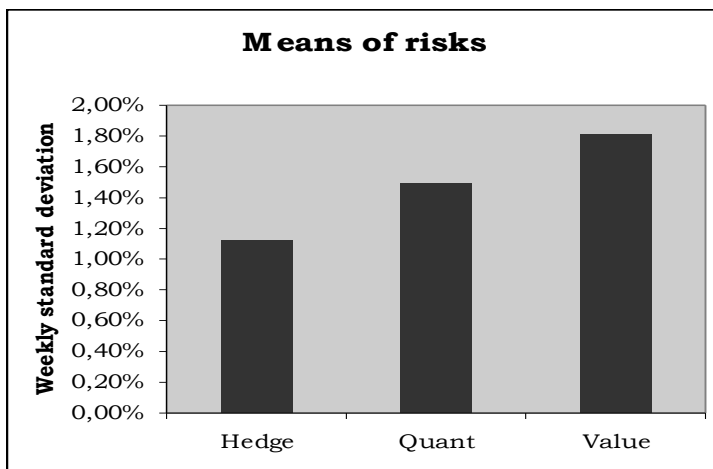
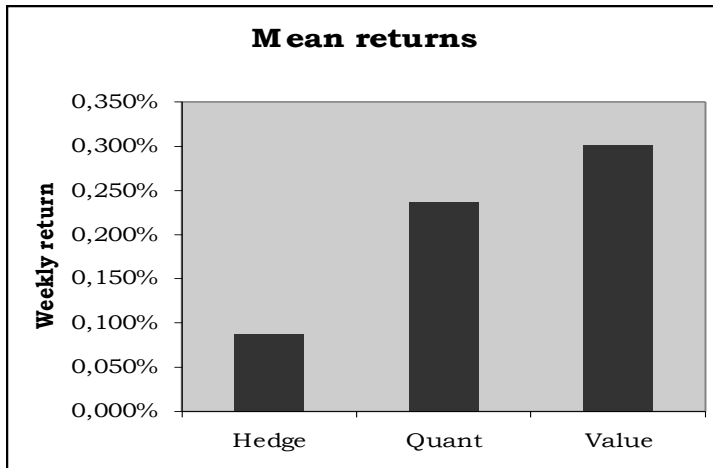
Each fund, that has been picked, has a time series with weekly returns over 100 weeks starting December 21, 2011 and ending November 20, 2013. I calculated the mean (expected) return over this period, as well as standard deviation (risk), for each fund. I also calculated the mean weekly interest rate of Swedish 30-day treasury bills, during the same period (which is 0,0235%/week). Since I'm looking at the funds from a Swedish perspective, this is the right "risk-free" interest rate to use in the Sharpe ratio formula. I then calculated the Sharpe ratios for each fund. I then calculated the mean weekly return, mean weekly risk and mean weekly Sharpe ratio of each investment style class. First I will give you the results of the complete data, and then I will make some exceptions.

### Means of investment style classes

This is the means of the classes. It is the average of all funds in each class.

<b>Means of investment style classes, (all funds)</b>			
(weekly)	<b>Hedge funds, n=27</b>	<b>Quant funds, n=24</b>	<b>Value funds, n=25</b>
<b>Return</b>	0,087%	0,237%	0,302%
<b>Risk</b>	1,123%	1,492%	1,807%
<b>Sharpe ratio</b>	0,070	0,136	0,168

*The Value funds had the highest values for all parameters, and the Quant funds had the second highest values for all parameters. That fact that the Hedge funds had the lowest return and risk was expected. But one would have thought their Sharpe ratio would be higher than it is.*



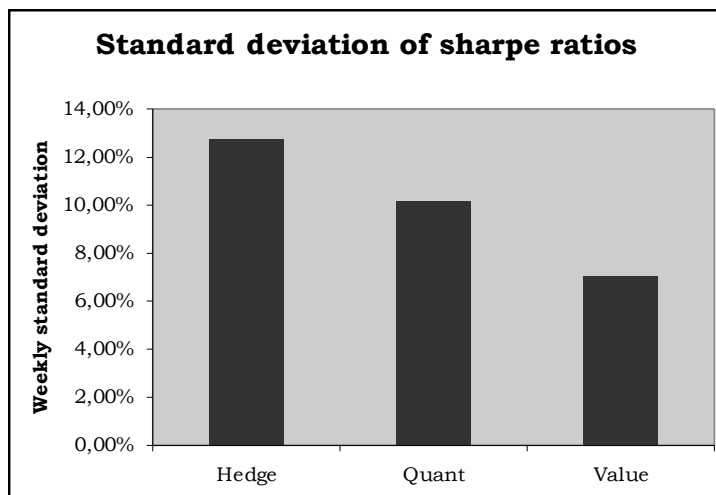
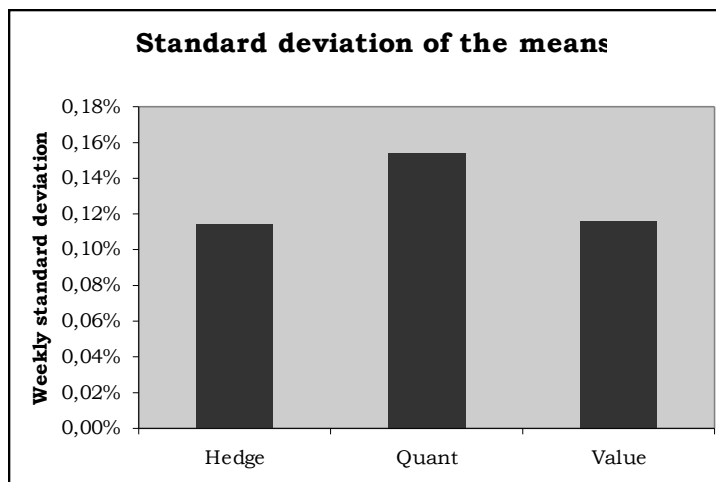
**Standard deviations of the means**

For the hypothesis tests I will use the standard deviation of the returns and Sharpe ratios in each investment style class. This is the standard deviations of all individual funds' mean returns or mean Sharpe ratio within a class.

## Standard deviations of return and Sharpe ratio in each class, (all funds)

(weekly)	Hedge funds, n=27	Quant funds, n=24	Value funds, n=25
<b>Return</b>	0,114%	0,154%	0,116%
<b>Sharpe ratio</b>	12,76%	10,16%	7,03%

*It is interesting to note that the Quant funds had a higher deviation than the other classes for return. Hedge funds have the highest variation with respect to Sharpe ratio, and Value funds the least.*

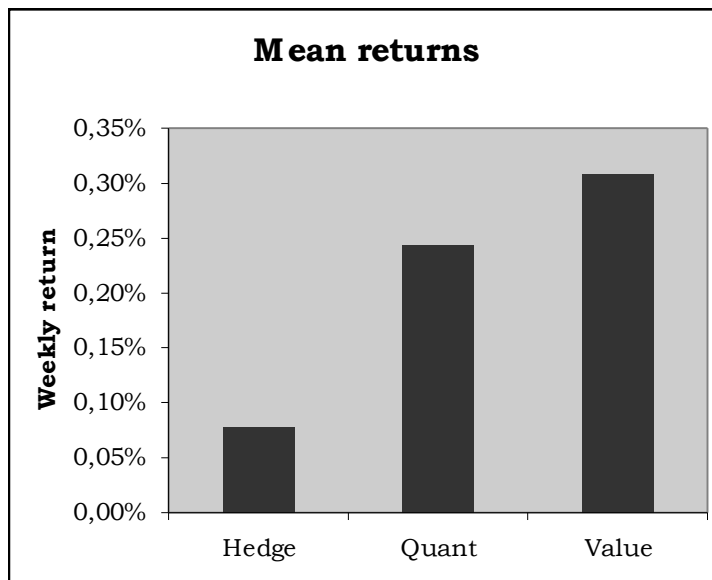


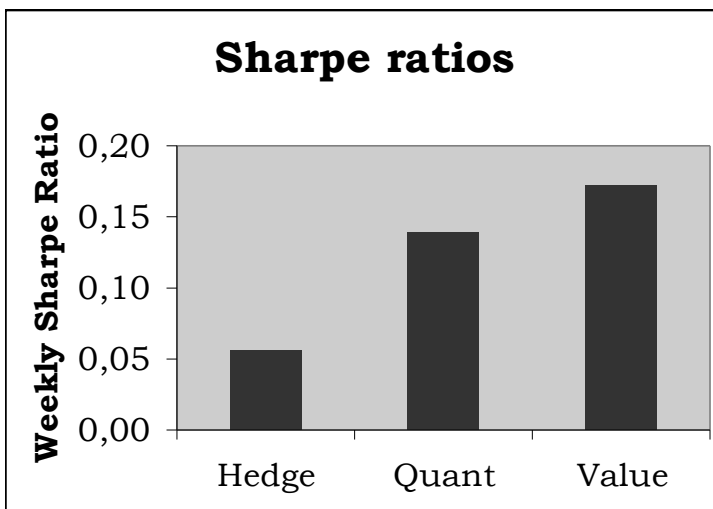
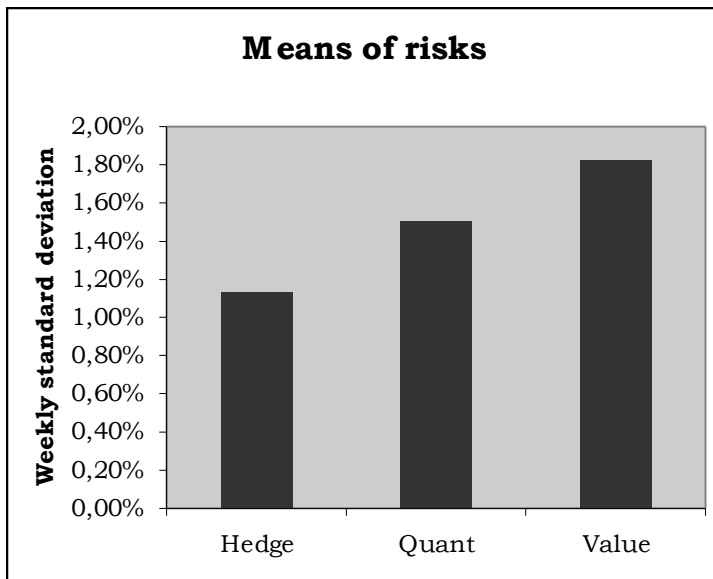
### Sorting out the monthly reported funds

Since some of the funds - mainly the Hedge funds - only report their results on a monthly basis, there's a risk that some of the statistics are misleading. I therefore did the same thing as above but excluded funds that only has monthly reports.

<b>Means of investment style classes, (only funds with weekly data)</b>			
(weekly)	<b>Hedge funds, n=21</b>	<b>Quant funds, n=23</b>	<b>Value funds, n=24</b>
<b>Return</b>	0,078%	0,244%	0,309%
<b>Risk</b>	1,134%	1,503%	1,825%
<b>Sharpe ratio</b>	0,056	0,139	0,172

*Now the Hedge funds got an even worse result. The Quant funds are not greatly affected, but the Value funds improved and got a higher Sharpe ratio.*

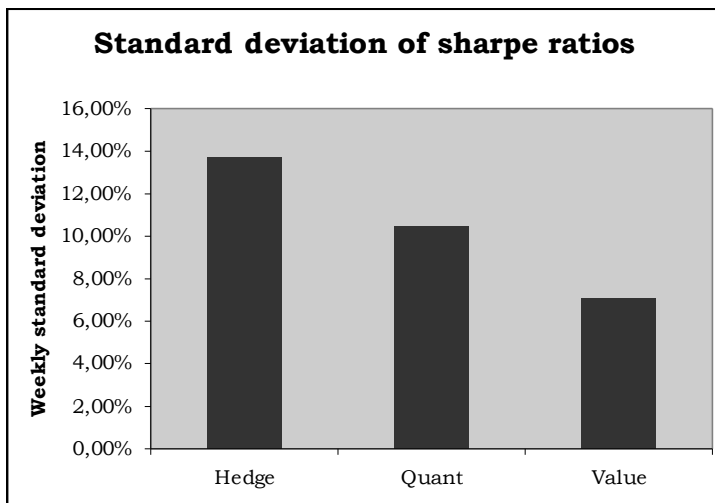
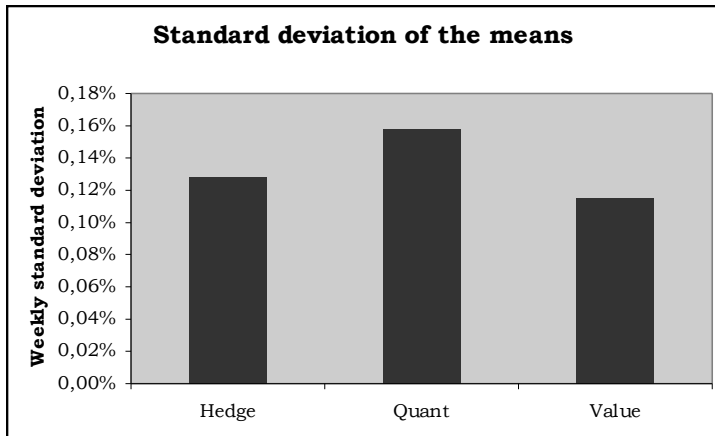




Again, for the hypothesis tests, I was in need of the standard deviations of the returns and Sharpe ratios:

<b>Standard deviations of return and Sharpe ratio in each class, (only funds with weekly data)</b>			
(weekly)	<b>Hedge funds, n=21</b>	<b>Quant funds, n=23</b>	<b>Value funds, n=24</b>
<b>Return</b>	0,128%	0,158%	0,115%
<b>Sharpe ratio</b>	13,70%	10,47%	7,09%

*These Values follow the same pattern as the ones including all funds.*



## The portfolio model

I wanted to compare my investment style classes with an index. I used the MSCI and thus had a series with 100 observations (same dates as for the funds and T-Bills).

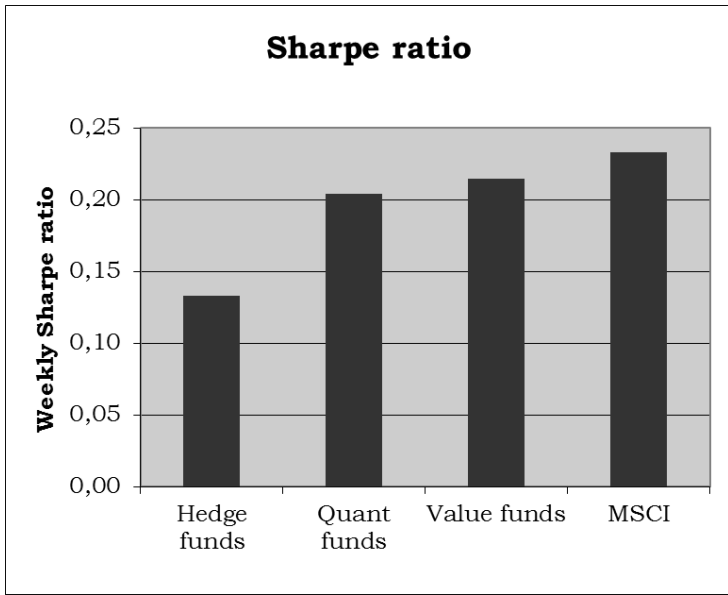
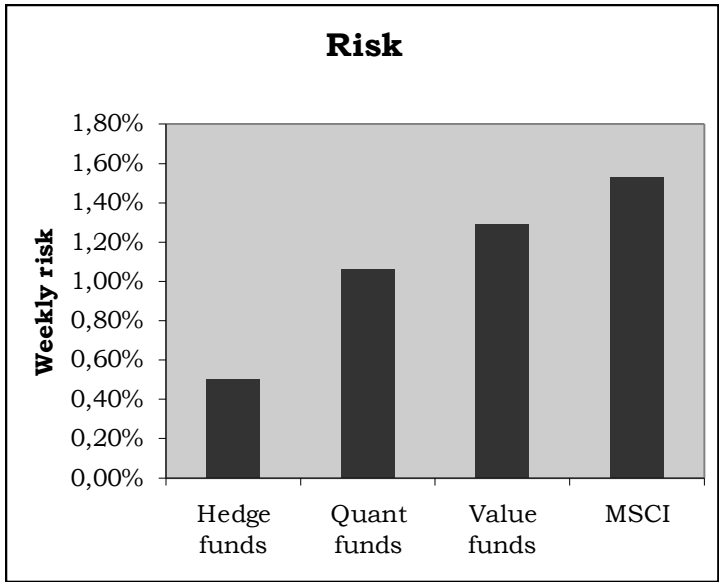
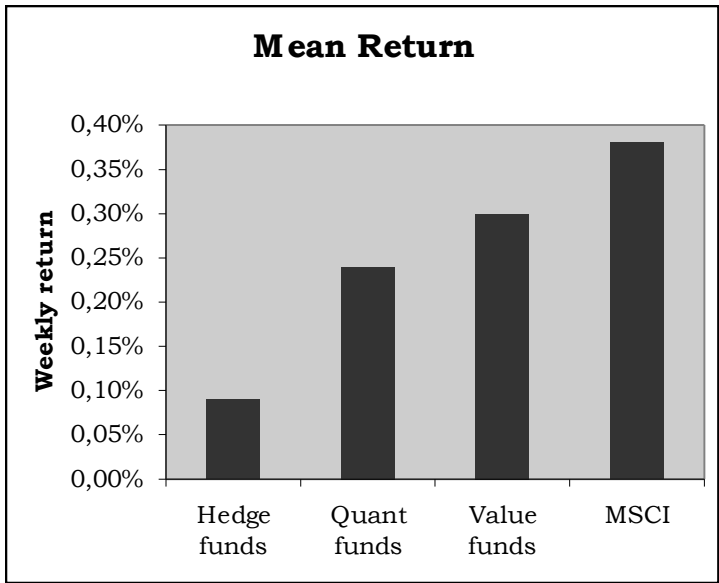
To be able to make a comparison with the MSCI I constructed a time series for each investment style class, consisting of an equally weighted portfolio made out of the funds in each class.

<b>Statistics in the Portfolio Model</b>				
(weekly, n=100)	<b>Hedge funds</b>	<b>Quant funds</b>	<b>Value funds</b>	<b>MSCI</b>
<b>Return</b>	0,09%	0,24%	0,30%	0,38%
<b>Risk</b>	0,50%	1,06%	1,29%	1,53%
<b>Sharpe ratio</b>	0,13	0,20	0,21	0,23

*We see that the world index has higher weekly return and risk, as well as higher Sharpe ratio than all of the other portfolios.*

Note that the risks of the strategy portfolios are in fact their standard deviations. Compared to the standard deviations of the means, noted above in the class-average model, the portfolios have a much bigger spread around its means. This will affect the hypothesis tests.





# The hypothesis tests

Here I will use the standard null hypothesis stating there is no difference between the tested variables. I'm using a standard two-tailed test with a significance level of 5%. That is, if I observe p-Values under the level of 5% I must reject the null hypothesis. In that case there is a statistically significant difference between two variables. Throughout the tests I use the denotation "df" instead of writing "degrees of freedom".

## The class-average model

### Tests including all of the funds

<b>Hypothesis tests of returns (all funds)</b>			
	<b>Quant and Hedge funds</b>	<b>Value and Hedge funds</b>	<b>Value and Quant funds</b>
<b>t-value</b>	3,99	6,76	1,67
<b>critical value</b>	2,01	2,01	2,01
<b>p-value</b>	0,02%	>0,01%	10,20%
<b>df</b>	49	50	47
<b>reject H0?</b>	Yes	Yes	No

*We can't say that there is a difference between Value and Quant funds, when it comes to returns.*

With great statistical significance (p-Values of less than 0,05%) we can say that there is a difference between the return of Quant and Hedge funds, as well as between Value and Hedge funds - in both cases the return of the Hedge funds is lower. This comes as no surprise, while Hedge funds states that they are not trying to maximize returns, but rather lower risks, or secure a certain (relatively low) level of continuous return.

<b>Hypothesis tests of risk (all funds)</b>			
	<b>Quant and Hedge funds</b>	<b>Value and Hedge funds</b>	<b>Value and Quant funds</b>
<b>F-value</b>	1,76	2,59	1,47
<b>critical value</b>	2,01	2,01	2,01
<b>p-value</b>	8,23%	0,99%	17,96%
<b>df(1)</b>	23	24	24
<b>df(2)</b>	26	26	23
<b>reject H0?</b>	No	Yes	No

*There is a difference in risk between Value and Hedge funds.*

When we look at risks we use a one-sided F-test with a significance level of 5% to test the null hypothesis that there is no difference in variance between two classes. We see that there is a statistically significant difference between the risk in Value and Hedge funds. It is clear that the Hedge funds have the lower risk, and the Value funds the higher risk.

<b>Hypothesis tests of Sharpe ratios (all funds)</b>			
	<b>Quant and Hedge funds</b>	<b>Value and Hedge funds</b>	<b>Value and Quant funds</b>
<b>t-value</b>	2,00	3,29	1,31
<b>critical value</b>	2,01	2,01	2,01
<b>p-value</b>	5,1%	0,18%	19,50%
<b>df</b>	49	50	47
<b>reject H0?</b>	No	Yes	No

*We find no difference between Quant and Value funds. It is a close call for Quant and Hedge funds, but strictly speaking there is no difference at the 5%-level.*

There is a statistically significant difference between the Sharpe ratio of Value and Hedge funds, where Value funds have a higher ratio. The result is border lining to a difference

between Quant and Hedge funds. We need p-values of 5% to see a difference, the actual value is 5,1%...

### Tests including only funds with weekly reports

<b>Hypothesis tests of return (only funds with weekly data)</b>			
	Quant and Hedge funds	Value and Hedge funds	Value and Quant funds
<b>t-value</b>	3,86	6,38	1,63
<b>critical value</b>	2,01	2,01	2,01
<b>p-value</b>	0,04%	>0,01%	11,04%
<b>df</b>	42	43	45
<b>reject H0?</b>	Yes	Yes	No

*We see no difference when it comes to rejecting the null hypothesis, compared to including all funds.*

<b>Hypothesis tests of risk (only funds with weekly data)</b>			
	Quant and Hedge funds	Value and Hedge funds	Value and Quant funds
<b>t-value</b>	2,90	4,45	2,47
<b>F-value</b>	1,76	2,59	1,47
<b>critical value</b>	2,01	2,01	2,01
<b>p-value</b>	8,23%	0,99%	17,96%
<b>df(1)</b>	23	24	24
<b>df(2)</b>	26	26	23
<b>reject H0?</b>	No	Yes	No

*We see no difference compared to including all funds.*

<b>Hypothesis tests of Sharpe ratio (only funds with weekly data)</b>			
	<b>Quant and Hedge funds</b>	<b>Value and Hedge funds</b>	<b>Value and Quant funds</b>
<b>t-value</b>	2,29	3,62	1,27
<b>critical value</b>	2,01	2,01	2,01
<b>p-value</b>	2,74%	0,08%	21,23%
<b>df</b>	42	43	45
<b>reject H0?</b>	Yes	Yes	No

*We do see a difference between Quant and Hedge funds when including only funds with weekly reports.*

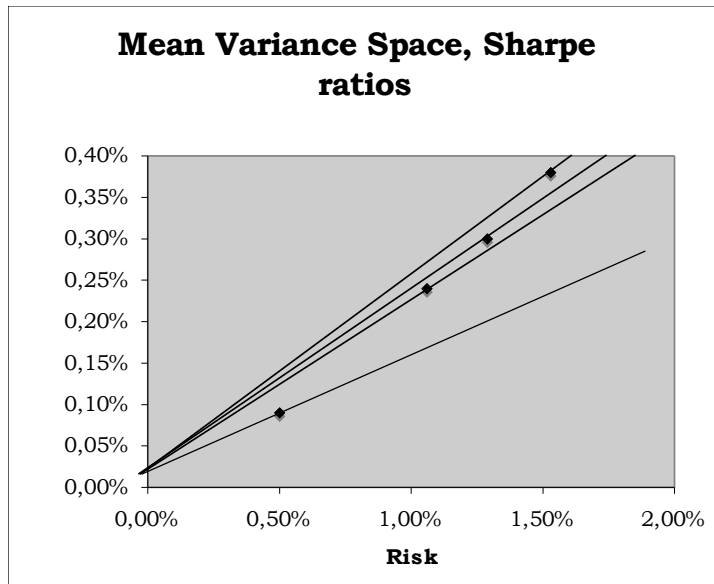
There is a statistically significant difference between Hedge funds and both of the other two classes, when it comes to the Sharpe ratio. However, just as before, we find no difference between Value and Quant funds. Compared to including all funds, the new thing is that the p-Value of Quant and Hedge funds is suddenly well below the 5%-level.

### **The portfolio model**

<b>Hypothesis tests of the portfolios' returns</b>						
	<b>Quant and Hedge funds</b>	<b>Value and Hedge funds</b>	<b>Value and Hedge funds</b>	<b>Index and Hedge funds</b>	<b>Index and Quant funds</b>	<b>Index and Value funds</b>
<b>t-value</b>	1,29	1,55	0,39	1,82	0,77	0,39
<b>critical value</b>	1,97	1,97	1,97	1,97	1,97	1,97
<b>p-value</b>	19,97%	12,21%	69,90%	6,97%	44,36%	69,74%
<b>df</b>	198	198	198	198	198	198
<b>reject H0?</b>	No	No	No	No	No	No

*There seems to be no difference between any of the portfolios.*

Since the risks (standard deviations) are higher for these series than when you take the standard deviations of the means of classes of funds, we can see no statistically significant difference among the different types of investment styles. The closest to show significant results is the Index compared to Hedge funds, which are significant at the 93%-level.



*However, if we include the T-bills, we see that the world index has the superior risk adjusted return. But we don't know if it is statistically significant.*

# Analysis

## The class-average model

It is the difference in generating the variables, and in particular the standard deviation, that creates the discrepancy in results between the two models. Thus I will be analyzing the two models (class-average and portfolio) separately.

I will analyze the two variations of the class-average model at the same time. If we apply a significance level of 5,1% instead of 5% the one difference between the hypothesis tests of the two variations disappear.

The one difference was the Sharpe ratio, including all funds, between Quant and Hedge funds. I think it is safe to assume a 5,1% level, since including Hedge fund data with only monthly data will distort the risk value (making it lower). When excluding these types of data, we have a difference between Quant and Hedge funds' Sharpe ratio at the 3%-level. To conclude I will analyze the two variations at the same time.

## Analyzing the tests

To summarize there is no statistical difference between:

- *Quant and Value funds*

But there is a statistical difference (at the significance level of 5,1%) between:

- *Value and Hedge funds*
- *Quant and Hedge funds*

(Value and Quant funds have a higher return and risk, but perform better since they have higher risk adjusted return as well.)

We see that Hedge funds have lower return and risk, but at the same time a lower *risk adjusted* return. This would suggest that one shouldn't invest in Hedge funds. In a Mean-Variance space you could get a higher expected return at the same risk level, using Value

funds and T-bills. This is in line with research done by Amin & Kat (2003) proving that hedge funds don't perform better than other types of funds.

***Why do Hedge funds perform worse?*** During the time period investigated there has been some turmoil in the world markets, with the euro crisis and mixed signals about the recovery from the financial crisis. The positive signals from the US market, with lower unemployment rates and easing of the Feds support program, came after my investigation ended. Perhaps it has been difficult to make decisions during this time about how to make correct hedges? Will the market crash or will it recover? The Hedge fund managers have perhaps used caution – the low risk shows that. This would then mean that the Value and Quant managers have seen in their methods that things were getting a bit brighter. Maybe Hedge funds have become more conservative, and careful in later years. Another way of seeing it could be that the financial crisis hit the Hedge funds hardest. I haven't checked it up but there have been a lot of new regulations the last couple of years affecting the financial markets, and since the Hedge funds historically have been the ones with the highest degree of freedom, maybe they were the ones that got affected the most, thus showing a lower risk adjusted return now. To use concepts from Lo's Adaptive Market Hypothesis (Lo, 2004) and behavioral finance, maybe the Hedge fund managers haven't adapted to the new investment climate. Perhaps they are now an endangered species struggling to survive (to continue making healthy risk adjusted returns).

On the other hand, the time period investigated is relatively short, and during the two years of observations we have seen a bull market, which could favor both Quant and Value investing. Hedge funds may differ because they have different targets, but also because their goals lay in the long run, and their strengths possibly lay in bear market scenarios, or in a mix of bear and bull markets.

***Why is there no difference in the performance of Quant and Value funds?*** One obvious reason could be that according to Modern Portfolio Theory investors should in the end get the same signals about what securities to put their money on, thus ending up with similar portfolios – at least when it comes to the risk adjusted return. Behavioral finance also points out psychological reasons. For example that managers don't want to separate themselves from the crowd, hence making their portfolios similar. This could, however, be disputed since the fundamentals of Quant funds aren't the human psyche, but rather mathematical or statistical models. The answer could then be found in that these models perhaps show the Quant fund



managers similar information as the methods Value fund managers apply. These results are in line with many of the earlier researchers' results, i.e. Zhao (2006), Wermers, Yao & Zhao (2007).

## **The portfolio model**

In the case of making equally weighted portfolios of the classes to compare with the MSCI, the results show that we can see no statistically significant difference between any of the investment styles' performance. There's no difference when comparing the classes to the world index. From the viewpoint of Modern Portfolio Theory one might have expected the index to have performed better. If you look at the figures from a layman perspective, it seems as the index indeed was better - having a higher mean than any of the classes. But since the risk, or the variation around the mean, is relatively large as well, it is clear from a statistical viewpoint that the real index mean could indeed be just as low as the Hedge funds mean. (The "real mean" is what we are looking for, but all we can measure are approximations.)

Another way of putting it is looking from a mean-variance perspective. It seems that if you take an equally weighted portfolio of any of the fund classes you end up with the same risk-return ratio as the world index. This gives fuel to the idea that all you need to do is decide what proportions of a world index fund and T-bills you want to have. If you want the same risk-return ratio as the Quant fund portfolio, you simply buy X% of the MSCI and (1-X)% of the T-bills.

If we take my results for true that would mean that no matter what strategy an investor chooses to use the performance wouldn't have anything to do with that choice. It would rather be other factors deciding how well a fund would perform, i.e. region/branch chosen; macro and political factors; the market as a whole, what analysts think of the future... etc.

***Why didn't any of the investment styles perform better than the index?*** According to the Efficient Market Hypothesis you can't beat the index. Not seeing any of the investment styles beating the index could be an indication of the market being efficient. But we also have to think about management costs. These could affect the funds' performance, making the cheap index fund more lucrative.

These results are in line with earlier research, i.e. Elton, Gruber, Das & Hlavka (1993), Carhart (1997), Malkiel (2003), Pursche (2013), just to mention a few. Only under specific circumstances do we see deviations from these results (that you can't beat the market).

### **About the Sharpe ratio**

I was uncertain about including the Sharpe ratio for the portfolio model in this thesis, since it is hard to test its significance. But I think it is interesting to include it.

That the world index has the highest risk adjusted return goes hand in hand with Modern Portfolio Theory. Using a certain strategy to invest limits your possibilities to diversify, hence giving you a lower Sharpe ratio.

### **Further analysis**

In the case of the portfolio model, there is also no difference between the classes themselves - which was the case in the class-average model. In that model the means of the means were compared, thus making the standard deviation of the mean lower - which increases the chances of observing statistically significant differences. This opens up to the possibility that if some other measuring method had been used, maybe we would see different results for the index.

The results in this thesis don't say anything about individual managers or their firms. There are indeed quite a few of the funds observed over the time period that beat the market and has an edge over other styles of investing. But that doesn't mean anything in this context. We can't say if they have sustained it over time or if it is just a result made by chance. It certainly doesn't say anything about the style of investing being used. A good example of this is the two funds in the Quant fund group using only technical analysis. One has return over the two year period of 46% and the other of -11%. There's no way we can say much about the investment style. We need of course more funds and longer periods of observations.

Since I've only investigated a relatively short period of time there is a minimum of survivorship bias. But that bias is surely present in the past, and that is possibly why I had such a hard time finding data over a longer time period. However, if there is to exist a big

survivorship bias over the time period I've investigated this should then contribute in favor of the three classes. Since they couldn't beat the index, even with the supposed bias, I think further discussion is irrelevant. Also, it is well known that especially Hedge funds suffer from survivorship bias, and since the Hedge funds was the class with the worst results, it is equally irrelevant to discuss *that* matter any further.

As I've said many times, this is just a small investigation, and there could be problems with the number of funds chosen. The results would be more solid if I had chosen a bigger number of funds. But one also has to be aware of the randomness in which the funds were selected. They were selected from a subjective perspective, based on both official information on manager's web pages and on Morningstar's database, but also sometimes on what managers told me they were doing via mail. I suppose they are telling the truth, but there could have been misunderstandings in the communications. Maybe Morningstar comments aren't the best source, and so on and so forth. I believe I got a good representation of the Hedge and Value funds, but with the Quant funds I am aware of the problems. It is not a very coherent group of funds, ranging from technical analysis to insider followers. Still the results show us that this group is relatively equal to the Value group. So, I don't expect there to be much of an overestimation here. On the other hand, it would be possible that some of the Quant fund subgroups could have showed a better result if they had formed their own group. This is something that could be investigated further in the future.

The reason we don't see many "alternative" funds on the market could be psychological reasons. It feels perhaps better to put one's money in a Value fund, rather than in a HFT-fund – even though they were to produce the same results. Maybe the market would collapse if we didn't have a majority of Value funds, making rational decisions. If everybody were to follow a momentum strategy or the signals in technical analysis it would perhaps be totally arbitrary what stocks would increase in value. I'm not going to go deeper into this type of argument, I'm just raising the question.

## **Further research**

It would be interesting to do a much more thorough investigation, looking at longer periods, and/or more funds. It would be equally interesting to use a more randomized method of selecting samples. Ideally one would have a database with information about investment styles.

It would also be interesting to look at strategies from a more theoretical perspective. Putting together simulations of what an investor of a certain strategy would have done historically, and then test that. This would give us a better estimation of many of the subgroups that aren't very well represented in reality.

As partly described in earlier research, it would be a more realistic investigation to research on multiple investment strategies or pairs of investment strategies, instead of single strategies as I have tried. Most managers use not only one strategy. One common pair is that managers use fundamental analysis to choose stocks and then use technical analysis to decide the best time to buy them. But I would imagine that it is even more common with multiple strategies.

## **Conclusion**

We can't prove a difference between Value and Quant funds, suggesting that it makes no difference which one you chose. Also, these two forms of investments show a higher risk adjusted return compared with Hedge funds. We conclude that Value and Quant funds perform better than Hedge funds.

We see no difference between the investment styles and simply investing in a world index.

The time period investigated here is short. The samples are small and the method of picking the samples is somewhat subjective. But my conclusions are in line with other studies, thus making my results plausible.

# Bibliography

Ackermann, C., McEnally, R. and Ravenscraft, D. (1999). The Performance of Hedge Funds: Risk, Return, and Incentives. *The Journal of Finance*, 54, [833–874]

Amin, G. S., & Kat, H. M. (2003). Hedge Fund Performance 1990–2000: Do the “Money Machines” Really Add Value?. *Journal of Financial and Quantitative Analysis*, 38, [251-274]

Behavioral finance (2013). Investopedia.

<http://www.investopedia.com/terms/b/behavioralfinance.asp> > Accessed: 2014-01-02

Bodie, Z., Kane, A., & Marcus, A. J. (2011). *Investments and Portfolio Management*. NY: McGraw-Hill

Brown, S. J., & Goetzmann, W. N. (2001). Hedge funds with style. Working paper. Available at: < <http://www.nber.org/papers/w8173.pdf> > Accessed: 2013-12-18

Bryman, A., & Bell, E. (2007). *Business research methods*. Hampshire: Oxford University Press

Carhart, M. (1997). On Persistence in Mutual Fund Performance, *Journal of Finance*, Vol.52, No. 1 [57-82]

Covel, M., W. (2009). *The Complete Turtle Trader*. NY: HarperCollins

Dempster, M., A., H., Mitra, G., & Pflug, G. (2008) *Quantitative fund management*. USA: Chapman&Hall/CRC

Ekelund, F., & Tengberg, J. (2011). *Prestationsavgift i onödan? En studie i avgiftsstrukturens påverkan på den riskjusterade avkastningen*, Lund: Ekonomihögskolan i Lund, Nationalekonomiska institutionen

- Elton E.J., Gruber M.J., Das S. and Hlavka M. (1993). Efficiency with costly information: a reinterpretation of evidence from managed portfolios, *Review of Financial Studies*, Vol. 6, [1-22]
- Fabozzi, J. F., Focardi, S. M., & Jonas, C. (2008). Challenges in Quantitative Equity Management, *Research Foundation of CFA Institute Publications* [1-110]
- Fama, E. (1970) Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance*, vol 25, no 2, [383-417]
- Graham, B., & Dodd, D. (2006). *Security analysis*. 5th edition. Indiana: McGraw-Hill Book Company
- Gregory-Allen, R. B., Shawky, H. A., & Stangl, J. Scott. (2009) Quantitative vs. Fundamental Analysis in Institutional Money Management: Where's the Beef?. *The Journal of Investing*, vol. 18, no4, [42-52]
- Kaplan, P. D. (2003) Holdings-Based and Returns-Based Style Models. Available at: <[http://corporate.morningstar.com/es/documents/MethodologyDocuments/ResearchPapers/Holdings-basedAndReturns-basedStyleModels\\_PK.pdf](http://corporate.morningstar.com/es/documents/MethodologyDocuments/ResearchPapers/Holdings-basedAndReturns-basedStyleModels_PK.pdf)> Accessed: 2013-12-18
- Körner, S. (2010). *Tabeller och formler för statistiska beräkningar*, Lund: Studentlitteratur
- Lev, B., & Nissim, D. (2006). The Persistence of the Accruals Anomaly. *Contemporary Accounting Research*, vol. 23, no 1, [1-34]
- Lo, A. (2004). *The Adaptive Market Hypothesis: Market Efficiency from an Evolutionary Perspective*. *The Journal of Portfolio Management*, Vol. 30, No. 5: [15-29]
- Lucas, L., & Riepe, M. W. (1996) The Role of Returns-Based Style Analysis: Understanding, Implementing, and Interpreting the Technique. Available at: <<http://corporate.morningstar.com/cf/documents/MethodologyDocuments/IBBAssociates/ReturnsBasedAnalysis.pdf>> Accessed: 2013-12-18

- Malkiel, B. G. (2003). Passive Investment Strategies and Efficient Markets. *European Financial Management*, 9, [1–10]
- Markovitz, H., M. (1952). Portfolio Selection. *The Journal of Finance* vol 7, no 1, [77-91]
- Otten, R. and Bams, D. (2002). European Mutual Fund Performance. *European Financial Management*, 8, [75–101]
- Piotroski, J. D. (2000). Value Investing: The Use of Historical Financial Statement Information to Separate Winners from Losers. *Journal of Accounting Research*, Vol 38, Supplement
- Pursche, Oliver (2013). Finally an answer to the active versus passive strategy debate. *Forbes*, january 31, 2013. < <http://www.forbes.com/sites/investor/2013/01/31/finally-an-answer-to-the-active-versus-passive-strategy-debate/> > Accessed: 2013-12-16
- Rouwenhorst, K. G. (1998). International Momentum Strategies. *The Journal of Finance*, vol 53, no 1, [267-284]
- Sharpe, W. F. (1988) Determining a Fund's Effective Asset Mix. *Investment Management Review*, November/December, [59-69]
- Sloan, R. G. (1996). Do Stock Prices Fully Reflect Information in Accruals and Cash Flows About Future Earnings? *The Accounting Review*, vol 71, no 3, [289-315]
- Wermers, R. T. Yao, and J Zhao. (2007). The Investment Value of Mutual Fund Portfolio disclosure, Working Paper, University of Maryland. Available at: <<http://fic.wharton.upenn.edu/fic/papers/11/11-15.pdf>>
- Yuan, K., L. Zheng and Q. Zhu (2006). Are investors moonstruck? Lunar phases and stock returns. *Journal of Empirical Finance* **13**(1), [1-23]

Zhao, J. (2006) Quant Jocks and Tire Kickers: Does the Stock Selection Process Matter?

Working Paper, Available at:

<<http://finance.eller.arizona.edu/documents/doctoral/JZhao.JobMarketPaper.pdf>>

Accessed: 2013-12-16



## Appendix

### Appendix 1: the funds (using DataStream codes)

Underlined=only monthly reports

#### Hedge funds

FRANK.TMPLTN.INV.FUNDS MUTUAL GLB.DSY.A AC.EUR

SCIENTIA FUND MANAGEMENT AB HEDGE

DRIEHAUS EMRG.MKTS.GW.FD

HANDELSBANKEN EUROPA HEDGE SELEKTIV

PRIOR NILSSON YIELD

AKTIE-ANSVAR GRAAL AKTIEHEDGE

ADAPTO NORDIC 100 A

CB HEDGE EUROPE RC CAP

MAX MITTEREGGER GLADIATOR

LIONTRUST EUROPEAN ABSOLUTE RETURN I

PLURIMA EUROPEAN ABSOLUTE RETURN EURIM ARGONAUT EUROPEAN  
ABSOLUTE RETURN IAC

BNY MELON ASSET MAN. ABST. RETURN EQ.R

ENNISMORE SMALLER COS PLC EURPN HEDGE

BLACKROCK HEDGE UK EMRG

UBS ETFS PLC

CATELLA HEDGE

BARING HEDGE SELECT A

ADRIGO ASSET MANAGEMENT AB HEDGE

ATLANT EXPORA

JYSKE INVEST HEDGE MARKEDSNEUTRAL - AKTIER

DNB GLOBAL HEDGE

APPLETON GLB. HEDGE USD

QQM EQUITY HEDGE

IKOS EQUITY HEDGE FUND USD

SKANDIA FONDER GLOBAL HEDGE

SEB GLOBAL HEDGE I SEK CAP

**Quant funds**

GAM FD.MAN.STAR KEYNES QUANT STRAT INT SEK AC

SCHRODER GLB.QNT.CORE EQ.X AC

UBS LUX EQUITY SICAV USA QUANTITATIVE B

JHAN.FUND.II TCHIN.OPS.FD.CL.A (technical analysis)

HNTGTN.FUND.TCHN.OPPS.FD.CL.INV.A (technical analysis)

STOREBRAND GLOBAL VERDI

INVESCO US STRUCTURED EQUITY FUND LUX A

QQM EQUITY HEDGE (earnings momentum/earnings surprise)

SCIENTIA FUND MANAGEMENT AB SVERIGE

SIMPLICITY AB NORDEN FD

DEXIA QUANT EQUITIES EU.CLC.C CAP

ADENIUM QUANT EUROPE 20 A EUR

HERMES QUANT GLOBAL EX.EUR. R ACC

PATRIMOINE QUANT C

SWISSQUOTE QUANT EUR.EQUITIES EUR A B

THEAM QUANT EQUITY EURO COVERED A

ODDO FUNDS QUANT EUROPE I EUR CAP

PRECIENT EQUITY QUANT A2

PRO PERF QUANTL/S WLD EQTY EXPOSURE B

SISF GL QUANT AV A EUR HEDGE CAP C

ALFRED BERG GLOBAL QUANT NOK

CARLSON INVESTMENT MAN. QUANT GLOBAL

FUND QUEST INTERNATIONAL QUANT 30 USD

THREADNEEDLE (LUX)-EURPN QUANT EQ AE USD

**Value funds**

BGF EUROPEAN VALUE D2

ALLIANCE BERNSTEIN LX.ERZ.STGC.VALUE A EUR

AXA ROSENBERG PAN EURO EQ ALPHA A USD

FIDELITY FUNDS - EUROPEAN VALUE A-ACC-EUR

FRNK.TMPLTN.INV.FUNDS MUTUAL EUROPEAN A DS

NORDEA 1 GLOBAL VALUE FUND AP EUR

SKAGEN GLOBAL FUND

VALUEINVEST ASSET MAN.LX.JAPAN C2 EUR

AMUNI EQUITY US RELATIVE VALUE AU CAP C

EATON VANCE EV EMERALD US VALUE A2 EUR

MFS MERIDIAN FUNDS US VALUE I 1 USD

ZENIT

FMG INDIA OPPORTUNITY A 09 EUR

LANNEBO FONDER SVERIGE

CARNEGIE NORDIC TOTAL CAP

TUNDRA RYSSLANDSFOND

DIDNER & GERGE GLOBAL

EAST CAPITAL RUSSIA SEK

ODIN FORVALTNING AS NORDEN NOK

SSGA FUNDAMENTAL EQUITY GLOBAL SPOTLIGHT B

INVESCO UK PENSIONS GLOBAL VALUE EQ.1A PN

VONTOBEL FUND MAN.SA GLOBAL VALUE EQUITY HI

WELLINGTON GLOBAL VALUE EQUITY PORTFOLIO SO

GLOBAL VALUE EQUITY A1

DELAWARE INVS.GLBFUNDS GLOBAL VALUE EQUITY F