Finding the Winners
among Swedish mutual equity funds

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Abstract

During the last decades, there has been an on-going investment trend in mutual funds in Sweden. As of 2010, 82% of the Swedish population between the age of 18 and 74 own at least one mutual fund and if one should include the pension fund, the ratio would rise to an impressive 99%. About one quarter of this capital is put into Swedish mutual equity funds, which means that these mutual funds have a huge impact on ordinary investors.

After reviewing literature on this subject, the authors found that for an ordinary investor, investment decisions often rely on vague arguments or an intuitive feeling on how the market will evolve. So the purpose with this study is to see whether any of the available and easy accessible information of Swedish mutual funds should be used as a purchasing decision for an ordinary investor.

Can an ordinary investor yield a better than average risk adjusted return using Morningstar Rating, Morningstar Style box, a fund’s size, a fund’s management fee or a fund’s historical performance when purchasing Swedish mutual equity funds?

The paper had two major findings. Firstly, both Morningstar Rating and past performance could, even though the relation was weak, be used as an investment tool when screening the market for Swedish mutual equity funds that have better than average risk adjusted return. The authors found statistical evidence that higher star ranked mutual funds have better than average risk adjusted return than lower star ranked mutual funds, and that mutual funds with higher past performance have better than average risk adjusted return than mutual funds with lower past performance. However, the authors would not recommend ordinary investor to focus too much on these findings since the relation was weak. Secondly, no evidence could be found concerning a fund’s size and a fund’s management fee in respect of finding Swedish mutual equity funds that have better than average risk adjusted return. Also, some minor conclusions could be drawn regarding Morningstar Style Box, such as that high risk categorized mutual funds performed better than their low risk counterpart and that mutual funds that invested mostly in large companies underperform the mid and small size companies-investing funds.
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Introduction

Morningstar, the world’s largest independent investment research company, has since 1985 been rating mutual funds using the Morningstar Rating system (Morningstar, Independent. Insightful. Trusted., 2010). The rating system is ranking every mutual and from one to five stars depending on a number of variables, e.g. past performance and risk exposure (Morningstar’s homepage, Morningstar Rating, 2010). This system can thus be seen as a tool for investors to easy evaluate the performance since the investors only need to look at the number of stars each mutual fund has been given. Morningstar themselves claims that the star rating should only be used to evaluate past performance and not be seen as a predictor of the future (Morningstar, Fondtyper 4: Sverigefonder, 2010). However, according to both Sirri, et al. (1998) and Goetzmann, et al. (1997) mutual funds with a high Morningstar Rating do experience a higher positive flow of new capital than low rated ones, i.e. investors are attracted to high rated funds. A study published in Wall Street Journal by Damato (1996) showed that 97% of the new capital put into mutual funds, between January and August in 1995, was put into four or five star rated funds. In the same period, funds with less than three stars experienced a negative flow of capital. Furthermore, according to Blake, et al. (2000), it is common for mutual fund companies to use Morningstar Rating in their marketing, having the knowledge of the investors’ weakness for Morningstar Rating in mind. Thus, Morningstar has a huge impact on investors trying to pick the “right” mutual fund.

According to the Swedish investment fund association Sweden holds the “world record” in mutual fund saving - in relation to its population; 82% of the Swedish population between the age of 18 and 74 own at least one mutual fund. If one should include the pension fund, the ratio would rise to an incredible 99% (Fondbolagens förening, Nytt världsrekord i fondsparande, 2010). To invest in mutual funds has been a strong ongoing trend since the 90’s (Avanza, Här är Sveriges fondhistoria, 2010), as shown in Figure 1.
How come so many Swedish people invest in mutual funds and what kind of mutual funds get all this capital? According to Morningstar, one quarter of all this capital is placed in Swedish mutual funds while another quarter is placed in mutual funds that greatly invest in Swedish stocks (Morningstar, *Fondtyper 4: Sverigefonder*, 2010). However, as far as the authors of this study are concerned, there has been very little research done on the Swedish mutual funds and the impact a big company, such as Morningstar, has on Swedish investors. For example - could Morningstar Rating be a good investment tool for the people to use when investing in Swedish mutual funds? In their article "*Morningstar Ratings and Mutual Fund Performance*", Blake, et al. (2000) found evidence that Morningstar Rating somewhat could predict future performance but that other, and more naïve methods, also could predict future performance almost as good as Morningstar Rating. These naïve methods were all used by ordinary investors when screening the market for mutual funds with the highest risk adjusted return, and since almost every person in Sweden owns mutual funds, the naïve screening methods greatly affect where the capital will be allocated. Based on the type of information that is available and easy accessible for an ordinary investor, such as:

- a fund’s size
- a fund’s management fee
- a fund’s historical performance
- different Morningstar ranking systems
the authors of this study wish to examine if any of the above mentioned characteristics should be used as an investment tool for an ordinary investor. Information that is “available and easy accessible” can be found on almost every market where mutual funds are bought and sold, e.g. banks and brokers.

Since there is an on-going investment trend in mutual funds in general and about a quarter of the total capital is placed in Swedish mutual funds in particular, the authors’ purpose with this study is to see whether any of the available and easy accessible information of Swedish mutual funds should be used by ordinary investors when looking for funds to buy. When reviewing literature on this subject (which will be presented further on) the authors found that some research had been made on the market in general, but very little only regarding Swedish mutual funds.

In all, the authors’ intent with this study can be summarized into the following research question:

*Can an ordinary investor yield a better than average risk adjusted return using Morningstar Rating, Morningstar Style box, a fund’s size, a fund’s management fee or a fund’s historical performance when purchasing Swedish mutual equity funds?*

It is of great importance to understand that a “better than average risk adjusted return” is only relating to the studied Swedish mutual equity funds and not to a certain index nor to other categorizes of mutual funds. Also, this study does not benchmark one of the alternatives with another (e.g. Morningstar Rating vs. a fund’s size) since the authors only deal with them separately. By ordinary investor the authors refer to people who invest their own savings without any expert knowledge of the mutual fund market.
Theory

In this chapter the authors discuss the theoretical framework the research is based upon. The aim is to make the reader aware of important concepts that are necessary for the reader to understand.

Mutual Fund

A mutual fund is an investment portfolio consisting of different securities. There are different kinds of mutual funds, depending on what kind of securities the mutual fund invests in. For example, mutual funds can invest in stocks, bonds, money market instruments, etc. Mutual funds are called mutual equity funds when investing heavily in stocks. (Investopedia, Mutual Fund, 2010) From here on, when writing “mutual fund” or only “fund”, the authors refer to mutual equity funds.

Since mutual funds can invest in any type of stocks, there are different kinds of mutual funds - all which are surrounded by a set of policies. For example, Swedish mutual funds need to invest at least 75% in Swedish equities. Moreover, a mutual fund’s size is calculated from the total value of the underlying stocks, in its portfolio. (Morningstar, Classifications, 2010)

Mutual funds can either be active or passive in their management. Active managed mutual funds are run by fund managers and analysts that actively try to beat the market by choosing and picking which stocks to invest in. Passive managed mutual funds are on the other hand not actively managed. They are often called index funds because they try to mimic an investment behavior which follows a certain index. Passive mutual funds are usually less expensive and have lower unique risk. (Wikipedia, Mutual Fund, 2010)

Morningstar

Morningstar is the world’s largest independent investment research company, founded 1984 and has its headquarters in Chicago, Illinois (Morningstar, Independent. Insightful. Trusted., 2010). The company operates in 19 different countries and provides data on over 300,000 investment offerings (Wikipedia, Morningstar, Inc., 2010). The company also develops and sells computer software relating to investment-specific topics. One of Morningstar’s core business is evaluating mutual funds and they have ever since 1985 been rating mutual funds using the Morningstar Rating, also known as “The Star Rating”.

Morningstar
Another well-known product is the Morningstar Style Box and both Morningstar Rating and Morningstar Style Box are provided for free to the public on their website. (Morningstar, Independent. Insightful. Trusted., 2010).

**Morningstar Rating**

Morningstar Rating uses a scale from one to five stars (thereby known as the “star rating”) to rate mutual funds, based on the mutual funds’ historical performance. I.e. the rating system can be seen as a tool for investors to easily evaluate the historical performance of different mutual funds for a time span of 3, 5 and 10 years. Morningstar categorize the mutual funds based on similarities of the underlying security paper, i.e. that they share similar risks and similar investment strategies. Morningstar believes this will help investors make better investment decisions and make it easier to evaluate different actors within the same business area. This rating system was introduced in the U.S. in 1985 and it was not until 2001 that the Europeans got their own Morningstar Rating. (Morningstar, Morningstar Rating for Funds, 2010)

**How Morningstar Rating Works**

Morningstar Rating is based on the mutual funds excess return under the last 36, 60 and 120 months, which takes accounts for the fund’s historical volatility (i.e. the risk) and fees (such as management fees and brokerage). (Morningstar, Morningstar Rating for Funds, 2010)

The rating is calculated using the Morningstar Risk-Adjusted Return formula (MRAR),

\[
\left[ \frac{1}{T} \sum_{t=1}^{T} (1 + r_t)^{-\gamma} \right]^{-\frac{12}{\gamma}} - 1 \times 100
\]

where \(\gamma\) is a constant risk tolerance parameter and \(r_t\) is the monthly excess return.

Analysts at Morningstar have concluded that \(\gamma = 2\) results in a mutual fund ranking that is consistent with the risk tolerance of a typical investors. The MRAR is then calculated for \(t = 36, 60, \) and 120 months, depending on what kind of history that is available for the certain mutual fund. If the fund is younger than 36 months, Morningstar will not rate it. After evaluating every mutual fund, Morningstar will then rate each mutual fund within a specific category in accordance with a bell curve. (Morningstar, Classifications, 2010)
The percentage in Figure 2 shows how many mutual funds out of a specific category that will get the given rating. This means that even if all mutual funds within a certain category underperform, 10% of the mutual funds will still have five stars and 10% will have one star. This is due to the fact that Morningstar believes that the rating will not be as affected by the market itself but rather by the fund manager managing the mutual fund. An unskilled fund manager will thus get fewer stars than a better one, since both are more or less affected by the same market risk. Morningstar also weight the given data on a time-specific scale, in order to give a more accurate rating:

<table>
<thead>
<tr>
<th>Age of fund</th>
<th>Overall rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least three years, but less than five</td>
<td>100% three-year rating</td>
</tr>
<tr>
<td>At least five years, but less than 10</td>
<td>60% five-year rating; 40% three-year rating</td>
</tr>
<tr>
<td>At least 10 years</td>
<td>50% 10-year rating; 30% five-year rating; 20% three-year rating</td>
</tr>
</tbody>
</table>

Morningstar claims the most important aspects of their rating system are the categories, the risk-adjusted return rate and the fees, which the Morningstar Rating all accounts for. Morningstar is also aware that this rating is not an exact science and they state on their web page that this rating should only be used as a first screening process for investors, and not to predict a fund’s future performance. (Morningstar, Classifications, 2010)
**Morningstar Style Box**

The Morningstar Style Box was introduced in 1992 as a tool for investors to make investment styles more easily comprehensive. Where the funds are placed in the Style Box funds depends on what type of stocks the mutual funds mostly consist of. The stocks are evaluated on different key figures, such as price-to-sales, dividends yield etc., and then given a score from -100 to +100. A low value will place the mutual fund in the Value-column and a high positive value will place it in the Growth-column. A value in between will result in a Blend-column placement. Morningstar also evaluates the mutual funds in relation to the size of the companies that they mostly invest in. In order to place them in the right row one must first look at the underlying stocks of the mutual fund. Morningstar defines large cap stocks as the least number of stocks that have 70% of the total market value of the specific stock market, mid-cap stocks as the next 20% and small cap stocks as the last 10%. A mutual fund will then be weighted on the total value of each underlying stock and then placed in the row. (Morningstar, Fact sheet: *The New Morningstar Style Box Methodology, 2010*)

![Morningstar Style Box](image)

*Figure 4 - Morningstar Style Box*
Literature review

In this chapter relevant research is reviewed. The aim is to give the reader a clear picture of where the research is today. Also, based on the existing literature findings, the authors will present their hypotheses.

Morningstar Rating

Blake, et al. (2000) studied Morningstar Rating’s ability to predict future performance. The two authors looked at U.S. domestic equity mutual funds in their way of answering the question: Do the star rating actually predict future performance? In order to answer this question they altered a number of different variables, such as: time span, period, fund investment style and the funds’ age. In addition – they also compared Morningstar Rating with four alternative methods: a “naïve method” – the average monthly return -, Jensen’s single-index alpha, Jensen’s four-index alpha and the Sharpe ratio. In order to study the future performance of the rating and the alternative predictors the authors used two methods, namely: dummy variable regression analysis and the non-parametric Spearman-Rho rank correlation test. All their data was free from survivorship bias and adjusted for fees.

Blake’s, et al. (2000) article had three major findings. The first was that Morningstar Rating is somewhat accurate and correct on low-rated funds, that is – funds with one or two stars tend to underperform in regards to similar prospects. This result is solid over the different variables stated above. The second finding was that there is only weak statistical evidence that five-star rated funds outperform three or four-rated peers. The last main finding is that the Morningstar Rating, at best, only to a very little extent is better than alternative methods in finding future winners.

The authors drew the conclusion that the there may be other better predictors than the Morningstar Rating and the four other alternative predictors. Also, the authors state that it is easy to point out underperforming mutual funds but not to spot the better ones. (Blake, et al., 2000)

On the contrary, Russel (2006) drew the opposite conclusion. Russel examined the efficiency of the Morningstar Rating, based on approximately 2000 domestic mutual funds in America, from the four different quarters in 2003. The result was that even
after three months, few funds were able to maintain their return relative to their rating. Thus, Russel (2006) concluded that investors should not expect superior return by higher rated mutual funds.

“The stars do not really foretell the future and may indeed foster a false sense of confidence among naïve investors.”

Six years after Blake’s, et al. (2000) article, one of the co-writers, Morey, published yet another article regarding the Morningstar Rating. Since Morningstar changed their rating system in 2002 (in order to correspond better with the European Morningstar Rating), Morey, et al. (2006) wanted to examine whether the new system could predict future performance better than the old system. All domestic mutual funds that were rated by the new system, approximately 1900 mutual funds, were chosen and then studied over the next three years, July 2002 to June 2005. The data were then adjusted for loads and survivor bias and the authors used four different performance measure methods; single-index alpha, 4-index alpha, Sharpe ratio, and conditional alpha. The result and conclusion is that Morningstar’s new rating system can better predict the future performance, at least up to three years in advance, and that a higher rated mutual fund is more likely to have superior return than a low rated mutual fund; both in the low star segment (1-2 stars) as well as in the median/high star segment (3-5 stars). (Morey, et al. 2006) This finding slightly contradicts the old finding of Blake, et al. (2000) (whom concluded that there was a difference in the low rated stars but no difference in the median/high rated star segment).

Only a few Swedish studies have been made concerning the performance of Morningstar Rating. Almblad, et al. (2005) examined whether one could find a relation between Morningstar Rating and future performance in three different investment options; interest fund, mixed funds and East European mutual funds. Their finding showed that there was no or little relation between the different funds and Morningstar Rating and thus drew the conclusion that investors should not pay attention to the rating system. Bengtsson, et al. (2006) did a similar research when they examined if there were any relation between Morningstar Rating and future performance in Swedish domiciled mutual funds. They, on the other hand, got the result that there is a relation between
Morningstar Rating and the future performance of the mutual funds and thus recommended investors to pay attention to the rating system.

Overall there seems to be, both in American and Swedish studies, different opinions on whether it is good that investors build their mutual funds purchase decision on Morningstar Rating. But since the majority of the articles were in favor of such a relation, the formulation of the hypothesis is as follows:

**H1**

- Funds with a higher Morningstar Rating experience higher risk adjusted return than lower rated funds

**Management fee**

According to Dahlquist, et al. (2000), research regarding management fee and future performance have been made several times, most of them showing a negative relation between future performance and higher management fees. In their own study, Dahlquist, et al. (2000) could draw the same conclusions regarding the Swedish market. However, they found in some cases that high fee funds performed better than the low fee funds, but only before risk adjusting the return. Dahlquist, et al. (2000) conclude that their result suggests that mutual funds with high fees may perform well - but not good enough to cover the management fee.

Since the literature suggests a negative relation between high management fee and high risk adjusted return, the hypothesis will be formulated in the same way.

**H2**

- Funds with lower management fees experience higher risk adjusted return than funds with higher management fees

**Style Box**

Schadler, et al. (2001) examined whether it is possible to build a portfolio of funds that have the same degree of risk as the investor is willing to take and at the same time earn an acceptable risk-adjusted return. By using a large number of funds and then fitting them into one of the nine cells in the Morningstar Style Box, the authors managed to show that the funds with the best performance, both risk-adjusted and non risk adjusted performance, are the three cells in the upper left corner with lowest risk (Large value, Large blend and Mid value). Schadler, et al. (2001) are themselves surprised since this result is the contrary of what one may believe, bearing in mind the financial theory that
higher risk should generate a higher return. All the data was tested for 16 years. However, Chen, et al. (2000) on the other hand found that value investing generates superior return and thus is the best investment option. The difference in these results may be due to the reason that little research, to our knowledge, has been done in this area.

Unfortunately, no literature could be found dealing specifically with investment size in Morningstar Style Box (Large, Mid, Small) nor could any literature be found dealing with all the nine cells themselves. Therefore, only one hypothesis will be formulated regarding the Style Box, in agreement with Schadler’s, et al. (2001). However, an analyze of the other three topics – style, size and cell by cell – will also be performed in order to contribute with new findings to this field of research.

**H3**

*Funds that are categorized as low risk in Morningstar Style Box experience higher risk adjusted return than medium and high risk categorized funds*

**Size**

Chen, et al. (2004) studied if and how the performance of a mutual fund depends on its size. By doing extensive empirical and statistical research they found strong statistical evidence that fund size deteriorate performance. The authors found two underlying reasons of this supposed deterioration; the different organization style for small vs. bigger funds and the pronounced role liquidity plays on small cap stocks.

Another finding in the same area is an article by Indro, et al. (1999) which deals with almost the same topic. What these authors found was that mutual funds need to attain a certain minimum size so that they can get enough returns to cover the costs for trading and acquiring information. The authors came up with a number of reasons why size matters, for example that big sized funds need to handle a large influx of capital which puts pressure on the administration; they need to be able to overlook all of their stock portfolios, hire new people to accommodate the growth, have an efficient internal coordination etc. Also, big funds lack the ability to trade without signaling the manager’s intention and thus making it easier for small sized funds to examine the big funds’ next move.
Dahlquist, et al. (2000) did extensive research on the Swedish market concerning mutual funds and their future performance. After relating future performance of mutual funds with fund-specific characteristics, such as size, they found evidence that the future performance is negatively influenced by its own size.

Overall, the current state of the literature advocates that the size is negative related with risk adjusted return. With this reviewed literature in mind, the hypothesis is formulated as follows:

**H4**

• Smaller funds experience higher risk adjusted return than larger funds

**Past performance**

Carhart (1997), Hendricks, et al. (1993) and Dahlquist, et al. (2000) all found evidence for persisting performance. In his conclusion, Carhart (1997) gives the rules-of-thumb that “funds with high return last year have higher-than-average expected returns next year, but not in years thereafter”. Hendricks, et al. (1993) tried to explain this phenomenon with the “hot-hands effect”. Mutual funds that are performing good (or bad) draw (or scare) investors and thus making the mutual funds’ performance persist a couple of years. Chen, et al. (2000) on the other hand only found a weak relation between high past performance and future high performance in mutual funds.

Since the literature advocates that there is a relation between past performance and risk adjusted performance, the formulation of hypothesis will be as follows:

**H5**

• Funds with a higher past performance experience higher risk adjusted return than funds with lower past performance
Methodology

This chapter contains information on how this research was carried out and what type of data this paper rely on.

Method of choice

In order to find out if an ordinary investor can get a better than average risk adjusted return using some of the five different investment ideas (presented in the previous chapter), the authors are going to study each of them separately. A buy and hold strategy will be applied and will start at the end of March 2005 and end five years later, in March 2010. The authors hope to find evidence that some of these methods of choosing funds will yield a higher risk adjusted return.

In addition to the risk adjusted return, the authors will also study the non-risk adjusted return, in order to add another dimension to the study. By taking the non-risk adjusted performance in consideration one will be able to get a perspective on the risk taken. The non-risk adjusted return is simply calculated as the funds’ performance from March 2005 to March 2010 minus management fees whereas the risk adjusted return is the Sharpe ratio over the same period, the reader will find more information on the Sharpe ratio further on.

Since the gathered data is of a quantitative character, Holme, et. al (1991) recommend a statistical method for the study. The five previous presented hypotheses will thus statistically be tested to verify whether they are correct or not. According to Holme, et. al (1991) a regression analysis is the most common used tool for such studies. The level of significance has been chosen to five percent, which means that there is a five percent chance for a type I error to occur (Wikipedia, Error of the first kind, 2010).

Data and sample

The data is based on information we have received from Morningstar and Jakob Wallgren (2010) in particular. The data was delivered in raw excel-data and included:

- Morningstar Rating of the funds, monthly, (2003-2010)
- Morningstar Style Box categorization of the funds, monthly, (2003-2010)
• Total market value of the funds, monthly, (2003-2010)

In addition, the data also included some key figures, namely: Alpha, Beta and Sharpe ratio, all presented in three, five, ten and fifteen-year span. The funds' different management fees were also included.

In all, the data received from Morningstar permitted the authors to study the market from the end of March 2005 to the end of March 2010. The authors believe that a five-year time span is sufficiently long to capture fluctuations that a market can experience. Notice that the period between 2005 and 2010 consist of two bull markets and one violent bear market (Nasdaq OMX, 2010).

The raw data contains information on 166 Swedish mutual funds. However, some of the mutual funds did not exist in 2005 and some funds were listed multiple times due to listing in different currencies. Those mutual funds that did not exist in 2005 was excluded from the research and if the multiple-listed funds bore different SecID number but shared the same ISIN and CUSIP number, all but one were excluded from the research. Therefore, the different studies conducted in this paper consist of 80 to 100 funds, depending on the studied variable. The non-risk adjusted performance was calculated using Microsoft Excel with the time-series from Morningstar. For the risk adjusted performance calculating – please see risk adjusted performance, below. Notice that all the data is adjusted for loads, i.e. management fees are continuously subtracted from the return.

One could argue that gathering the data by oneself would be the best way to avoid a biased study. However, the effort to collect data in other ways, than receiving it from Morningstar, was unsuccessful. Datastream did not have data on Swedish mutual funds and Uppsala University did no longer have access to SIX Trust. Finansinspektionen, Fondbolagens förening, different investment magazines and other source neither had the relevant data. In any case, the authors of this study do believe the data received from Morningstar is trustworthy and unbiased. A number of data comparisons have been conducted (mainly total market value and time-series comparisons which can manually be found on site of Finansinspektionen), all which strengthen the view that the received data is correct and unbiased.
The choice to only study Swedish mutual funds is due to the high exposure these funds have on the Swedish citizens and the fact that very little research, to our knowledge, have been done from this viewpoint. The two other Swedish studies, reviewed in the previous chapter, used different methods and had other data samples.

One problem encountered in this study was that some of the studied mutual funds are index funds, which could interfere and alter the results. Depending on what data that was looked upon, the number of index funds varied from four to seven. The choice not to exclude the index funds are due to three reasons:

1. Morningstar themselves include the index funds in their category of Swedish mutual funds.
2. The Swedish index funds’ portfolios have the same type of investment as their non-index counterparts. That is, Swedish index funds are a plausible investment alternative for the investor whom wishes to invest in the Swedish market.
3. The lower unique risk in an index funds is managed by a risk adjusted return on investment measurement - Sharpe ratio.

Another problem that could arise is due to a phenomenon called “Survivorship bias”. Survivorship bias is when a test only focuses on the data that survived during the test period. Survivorship bias can occur in more areas than finance but when it happens in finance it is usually failed companies that are excluded from the analyzed data. Thus, if all the failures were excluded from the test, it is very easy to get over optimistic result (Wikipedia, Survivorship bias, 2010). The authors solved this problem by calculating the total return on their last known data on all funds that ceased to exist and thereafter used that number, a method in line with the buy and hold strategy used in this paper. However, in this study only a couple of funds were subjected to survivorship bias and they were all terminated only a short period before the last studied date.

Risk adjusted return
For some ordinary investors the absolute value of the return on investment might be equivalent to the overall success of a portfolio. Whereas in some cases this might be a correct philosophical approach to investment, this way of thinking could easily lead to risk-taking well beyond what is suitable for an ordinary investor. It is therefore
imperative to study the risk taken in order to state if a particular investment was successful or not.

The authors will however study both the risk adjusted and non-risk adjusted return but due to the argumentation above, the focus will be on the risk adjusted return.

There are a number of different methods of studying risk adjusted return. However, three frequently used functions are: Treynor-measure, Jensen’s alpha and Sharpe ratio. They all accommodate for the portfolio’s excess return and the risk free rate but differ in how the risk is portrayed. Treynor-measure, as well as Jensen’s alpha, uses the Beta-value to illustrate the volatility of the portfolio. Sharpe ratio, on the other hand, uses the standard deviation of the asset to indicate the riskiness of the investment. The different functions fill the similar purpose of showing the risk adjusted return of an investment; however the definition of risk varies between them. The Sharpe ratio accommodates not only for the systematic risk (as in the case of Jensen’s and Treynor’s use of Beta) but also for how well diversified the portfolio is, since its use of standard deviation. (Parento, 2009)

Since the authors of this paper cannot guarantee that the studied funds have the same market exposure, even though they are all Swedish mutual funds, they believe that Sharpe ratio is the most appropriate method of studying risk adjusted return. The reader must bear in mind that this might have an effect on the data, presented in this paper. However, the authors are confident that any general conclusion that might be drawn in this study will not be strongly affected by the choice of risk adjusted return measure.

**Sharpe ratio**

Sharpe ratio is a measurement of the excess return by unit of risk in an investment and is defined as:

\[
S = \frac{R - R_f}{\sigma}
\]

Where \(R\) is the return of the asset, \(R_f\) is the risk free return of a benchmark asset, such as the Treasury bill, and \(\sigma\) is the standard deviation of the asset. (Sharpe, 1994)
The Sharpe ratio presented in this study was given in the data from Morningstar. They used 60 months' historical data (from the end of March 2005 to the end of March 2010) and calculated the ratio by subtracting the rolling three month Swedish Treasury bill from the return of the fund and divided it by the annualized standard deviation of the return. (Morningstar, 2010) The authors will in this study use this ratio in order to compare the different funds risk adjusted return, over the studied period.

It is vital to understand that the Sharpe ratio, in an absolute sense, is of no or very little usage. The ratio fills a purpose only when used in a comparison with other similar investments, as in the case of this study. For example, if one out of two different but comparable funds has a higher Sharpe ratio it also has a better risk adjusted return. (Registeredrep, *No pain no gain*, 2009)

**Regression analysis**

The data analyzed in this paper consist of scattered point in a two-dimensional plane. In order to find any relation between the two studied variables the authors of this study will use the least square method, which will give the linear function that best describe the data fed into the method. The method will be fed with a number of two-dimensional vectors:

\[(x_1, y_1), (x_2, y_2), \ldots, (x_n, y_n)\]  \[x, y = 1, 2, \ldots, n\]

Then, the least square method will find the best fitting solution and the output will, in this case, be a linear function that looks as follows:

\[y = k \times x + m\]

Where \(y\) is the dependent variable, \(x\) is the independent variable, \(k\) is the coefficient of the slope and \(m\) is a constant.

To get an understanding on how well this function represents the data sample, the coefficient of determination \(R^2\) will be used. A \(R^2\)-value of 0.4 means that 40% of the variation of \(y\) can be described in changes of \(x\). In contrast, it means that 60% of the variation in \(y\) cannot be explained by changes in \(x\).

The regression analysis was conducted by Excel's built in least square method. The Excel macro computes the two arrays of data and plot the dependent and independent
variables as well as the least square function on a graph. It also provides the coefficient of determination - $R^2$. This value will be of interest to the research since the least square method always will come up with an equation, even though the data is too scattered for the equation to really mean anything. In order to determine the significance of the regression analysis the *regression* function in Excel’s tool pack *Data Analysis* was used. The tool pack provided, among other variables, the T-ratio and the P-value. Considering the number of funds studied in the different tests a T-ratio above 2 and a P-value below 5% is desirable, in order show a significant result. These variables will be studied in detail when analyzing the data.

**Test of H1 – Morningstar Rating**

In order to study the relation between Morningstar Rating and risk/non-risk adjusted return, 80 out of the 166 mutual funds were chosen. The other 86 mutual funds were excluded from the test due to the reason that they were either duplicates or did not have sufficient information during the studied five year period. To test hypothesis 1, the authors used a regression analysis were the number of stars, one to five, in Morningstar Rating at the end of March 2005 was chosen to be the independent variable ($x$), and whereas the following five years’ risk adjusted return ratio was the dependent variable ($y$). By using the least square method the linear regression was calculated for the whole sample. The coefficient of slope, $k$, shows the relation between Morningstar Rating and future return. A positive/negative $k$ indicates a positive/negative relation between the variables. Thus, one can define the hypothesis test as,

$$
\begin{align*}
  \text{H}_0 & : k \leq 0 \\
  \text{H}_1 & : k > 0
\end{align*}
$$

where $\text{H}_0$ is the null hypothesis, presented in the chapter *Literature review*.

In addition, a regression analysis will also be performed on the one and five star rated funds as well as the three to five star rated funds, which is in line with the reviewed literature of Blake's, et al. (2000) article.

**Test of H2 – Management fee**

When testing hypothesis number 2, 67 mutual funds were excluded on the same reasons as in the test of hypothesis 1. Thus, 99 mutual funds were tested - risk/non-risk adjusted future return vs. the management fees of the funds – where the management fee in
March 2010 was chosen as the independent variable (x) and the prior five years risk and non-risk adjusted return ratio as the dependent variable (y). Again, the linear regression was calculated by using the least square method and the coefficient of slope, $k$, shows the relation between the management fee and the future return.

Unfortunately the historical management fees, from March 2005, could not be collected. Instead the management fees five year ago was approximated with the management fees of today. However, considering that changes in management fees are rare and that changes that do occur are not grand, the authors are confident that the study is reasonable despite this blunt approximation.

One could argue that if the management is paid well for their job, they should outperform the market, i.e. they should deliver superior results. But when reviewing the literature, that argument was refuted. So, if there is such a relation between a fund's return and its management fee, the regression analysis would show a function where $k$ is negative. The hypothesis test therefore takes the following form,

\[ \begin{align*}
H_{02} & : k \geq 0 \\
H_{21} & : k < 0
\end{align*} \]

where $H_{02}$ is the null hypothesis.

**Test of H3 – Morningstar Style Box**

The test of hypothesis 3 will be a bit different from the other tests due to the nature of Morningstar Style Box. Since there is no independent variable the authors will instead calculate the mean risk/non-risk adjusted return over the five years and then compare it with the other cells as well as comparing it to what the literature suggested. In all, 82 different mutual funds were studied.

Unfortunately, two major problems were encountered. Firstly, Morningstar Style Box categorization changes over time - 50% of the studied mutual funds had their categorization changed between 2005 and 2010. Nevertheless, since the buy and hold strategy will be used; no regards to this fact will be taken in this study. Secondly, there is a huge variation in how many funds there is in each of the nine cells in Morningstar Style Box. For example, in one Style Box cell [large value] there is no fund at all and, at the same time, another cell [large blend] has more than half of the total number of funds.
This could lead to a biased study, but the authors attempted to compensate for this by adding cells together in different risk groups as well as column by column and row by row. By performing these three additional tests, which will have no hypothesis since there is no reviewed literature, the authors hope to contribute to the research with new findings that can help investors to purchase funds.

In order to structure this analysis, with regard to the reviewed literature, the hypothesis test looks like this,

\[ \begin{align*}
H_{30} & : \text{Low risk groups have a lower risk adjusted return than other groups} \\
H_{31} & : \text{Low risk groups have a higher risk adjusted return than other groups}
\end{align*} \]

where \( H_{30} \) is the null hypothesis.

**Test of H4 – Mutual fund’s size**

In order to examine the relation between a fund’s size and its risk/non-risk adjusted future return, 91 mutual funds were chosen and studied. The mutual fund’s size (market value) at the end of March 2005 was chosen as the independent variable (\( x \)) and the following five years risk and non-risk adjusted return ratio as the dependent variable (\( y \)).

If the raw data did not give the exact market value in March 2005, the nearest know size in time was used. However, if the nearest data was more than six months away, the fund was excluded from this particular study.

If the hypothesis, as presented earlier, is valid - \( k \) should be negative. The hypothesis test thus looks like this,

\[ \begin{align*}
H_{40} & : k \geq 0 \\
H_{41} & : k < 0
\end{align*} \]

where \( H_{40} \) is the null hypothesis.

**Test of H5 – Past performance**

A potential relation between past high performance and future performance is probably the most common intuitive perception among conventional investors. In this test 89 different mutual funds were studied. A two year non-risk adjusted return prior to March 2005 was chosen as the independent variable (\( x \)) and the following five years risk as
well as non-risk adjusted return ratio as the dependent variable \((y)\). As always, the linear regression was calculated by using the least square method and the coefficient of slope, \(k\), shows the relation between the studied variables.

The past performance of each fund was calculated between the period of March 2003 and March 2005. The choice of only looking at two years prior is due to limitation of the data sample. If the hypothesis were to be correct the slope of the function should be positive, that is, \(k\) should be greater than zero,

\[
\begin{cases} 
H_{50}: k \leq 0 \\
H_{51}: k > 0 
\end{cases}
\]

where \(H_{50}\) is the null hypothesis.
Results and Analysis

In this chapter the results of the study is presented as well as the analysis of the data, all in order of the hypothesis.

H1 – Morningstar Rating

Figure 5 - Morningstar rating [1 to 5 stars] vs. risk-adjusted return ratio [Sharpe ratio].

<table>
<thead>
<tr>
<th>Morningstar Rating</th>
<th>( y = )</th>
<th>( R^2 )</th>
<th>T-ratio</th>
<th>P-value</th>
<th>Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk adjusted</td>
<td>0.0326x + 0.3069</td>
<td>0.1961</td>
<td>4.362427</td>
<td>3.89E-05</td>
<td>80</td>
</tr>
<tr>
<td>Non-risk adjusted</td>
<td>0.0469x + 0.4838</td>
<td>0.1621</td>
<td>3.884352</td>
<td>0.000214</td>
<td>80</td>
</tr>
</tbody>
</table>

Table 1 – Morningstar rating [1 to 5 stars] vs. risk [Sharpe ratio] and non-risk [%] adjusted return ratio.

Table 1 shows a positive relation between the two studied variables. The slope of the function, \( k \), is positive and signals that higher rating will give a higher return on investment, with and without a risk adjusted perspective. This means that the hypothesis \( H_1 : k > 0 \) is fulfilled. Also, we see that the T-ratio is sufficiently high and the P-value is sufficiently low to state that the result is significant. Therefore, we can reject the \( H_{10} \) and say that there is a significant positive relation between Morningstar Rating and future return, a finding that goes well in line with Morey’s, et al. (2006) result.
Blake, et al. (2000) found significantly strong evidence that there were no difference between 3 and 5 stars rated funds and following five year return. As one can see in Table 2 there is almost no inclination in the function, which goes in line with Blake’s, et al. (2000) finding. However, the R²-value is very small and the P-value and the T-ratio is not sufficient enough. In other words, we did not find any significant evidence that there is a relation between 3, 4 and 5 stars rated funds and future return.
When comparing the 1 star rated funds with the 5 star rated funds we found clear and strong evidence that the 5 star rated funds outperform the 1 star rated ones. The T-ratio is sufficiently high to be able to state that the relation is significant, and if we look at the R²-value we can see that the explanation factor is over 50 %. This finding goes well in line with Blake’s, et al. (2000).
**H2 – MANAGEMENT FEE**

![Graph](image)

Figure 8 - Management fee [%/year] vs. risk adjusted return ratio [Sharpe ratio].

<table>
<thead>
<tr>
<th>Management fee</th>
<th>y=</th>
<th>R²</th>
<th>T-ratio</th>
<th>P-value</th>
<th>Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk adjusted</td>
<td>-0,0152x + 0,4324</td>
<td>0,0079</td>
<td>-0,88001</td>
<td>0,381028</td>
<td>98</td>
</tr>
<tr>
<td>Non-risk adjusted</td>
<td>-0,0379x + 0,6881</td>
<td>0,0176</td>
<td>-1,30981</td>
<td>0,193387</td>
<td>98</td>
</tr>
</tbody>
</table>

Table 4 – Management fee [%/year] vs. risk [Sharpe ratio] and non-risk [%] adjusted return ratio.

The reviewed literature suggested that the relation is negative between management fee and future return, i.e. the test H2: k < 0. As showed in Table 4 k is less than zero, and therefore the hypothesis, at a first glance, is correct. However, the T-ratio for both risk and non-risk adjusted return is not pleasingly high, which makes this test not significant. However, the authors believe that there is still some philosophical wisdom to be drawn from the negative inclination.
When excluding the index funds, which often have low management fees due to its passive management, the $R^2$-value increases and both the $T$-ratio and $P$-value approaches the set up boundaries. However, it is still insufficient and no solid conclusion could be drawn from the test.
H3 – Style Box
We will analyze Morningstar Style Box in four different ways: Schadler’s risk groups, investment style groups, size groups and each cell by themselves.

<table>
<thead>
<tr>
<th>Non-risk adjusted performance</th>
<th>Value</th>
<th>Blend</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large</td>
<td>0,59  (45)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid</td>
<td></td>
<td>0,64  (18)</td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td></td>
<td></td>
<td>0,73  (19)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk adjusted return ratio</th>
<th>Value</th>
<th>Blend</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large</td>
<td>0,38  (45)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid</td>
<td></td>
<td>0,41  (18)</td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td></td>
<td></td>
<td>0,47  (19)</td>
</tr>
</tbody>
</table>

Figure 10 – Non-risk [%] and risk [Sharpe ratio] adjusted return ratio and Schadler’s risk groups, (number of funds)

Hypothesis H3$_1$ is based on Schadler’s observation that the low risk group (consisting of large value, large blend and mid value) will outperform the high risk group (consisting of small bland, small growth and mid growth), when compared on a non-risk as well as a risk adjusted basis. According to our study this view is incorrect, which suggests that the non-risk adjusted return differs, from 59% on low risk to 73% on high risk and the risk adjusted performance differs from 0,38 to 0,47. A reasonable reflection is that a bull market is normally good for a high risk fund, and there have been two of those since 2005. On the other hand, there has been a powerful bear market during the period as well.

The hypothesis H3$_1$ test presented in the Method chapter had the form: Low risk groups have a lower risk adjusted return than other groups. The null hypothesis H3$_0$ had the form: Low risk groups have a higher risk adjusted return than other groups. Our data suggest that H3$_1$ does not correspond with the Swedish mutual funds during the studied period and that the null hypothesis H3$_0$ is accurate.
The reviewed literature describes a world where scholars are divided on the matter whereas growth or value-oriented funds are best to put one's money in. We find little statistical evidence that there is such a difference at all. The non-risk adjusted performance study shows no difference between the two separate groups and the risk adjusted study shows only a small difference.

In this sub-study we did find some interesting and substantial differences. In the non-risk adjusted test the large group rose by 50% during the studied period whereas the mid and small groups rose 73% and 70% respectively. In the risk adjusted test the groups had the Sharpe ratio of: 0.37, 0.47 and 0.47, in the same order. The dissimilarity
is striking between the large group and the two smaller groups. However, this result might depend on risks that small companies are effected by and which do not show in ordinary measurements of risk.

<table>
<thead>
<tr>
<th>Non-risk adjusted performance</th>
<th>Value</th>
<th>Blend</th>
<th>Growth</th>
<th>Risk adjusted return ratio</th>
<th>Value</th>
<th>Blend</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large</td>
<td>-</td>
<td>59% (44)</td>
<td>49% (5)</td>
<td>Large</td>
<td>-</td>
<td>0,38 (44)</td>
<td>0,32 (5)</td>
</tr>
<tr>
<td>Mid</td>
<td>73% (1)</td>
<td>71% (11)</td>
<td>79% (4)</td>
<td>Mid</td>
<td>0,51 (1)</td>
<td>0,46 (11)</td>
<td>0,48 (4)</td>
</tr>
<tr>
<td>Small</td>
<td>63% (2)</td>
<td>71% (12)</td>
<td>72% (3)</td>
<td>Small</td>
<td>0,40 (2)</td>
<td>0,46 (12)</td>
<td>0,52 (3)</td>
</tr>
</tbody>
</table>

Figure 13 – Non-risk [%] and risk [Sharpe ratio] adjusted performance and separate cells, (number of funds)

It is a questionable inquiry to analyze every cell by itself, considering the great difference in numbers of funds in each one of them. But, if we for a second “forget” about this problem, one could observe an interesting detail. In the non-risk adjusted study the mid growth group has the highest return on investment. But in the risk adjusted study we find that the small growth and mid value was the “best buy”. This example shows in a clear way the importance of displaying both the non-risk and risk adjusted performance.
**H4 - Size**

Figure 14 - Size [million SKR] vs. risk adjusted return ratio [Sharpe ratio].

![Graph showing Size vs. risk adjusted return ratio](image)

Table 6 – Size [million SKR] vs. risk [Sharpe ratio] and non-risk [%] adjusted return ratio.

<table>
<thead>
<tr>
<th>Size</th>
<th>( y = )</th>
<th>( R^2 )</th>
<th>T-ratio</th>
<th>P-value</th>
<th>Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk adjusted</td>
<td>2E-06x + 0.4118</td>
<td>0.0025</td>
<td>0.474689</td>
<td>0.636171</td>
<td>91</td>
</tr>
<tr>
<td>Non-risk adjusted</td>
<td>4E-06x + 0.6388</td>
<td>0.0037</td>
<td>0.5743</td>
<td>0.567213</td>
<td>91</td>
</tr>
</tbody>
</table>

The majority of the studied funds have less than 2 billion SEK in total market value, in March 2005. The reviewed literature proposed that size has a negative impact on return -the hypothesis H4 was based on that idea. But in Table 6 one can see that there in not a convincing negative relation, in fact – it is not even negative at all. Coefficient \( k \) is small but positive which rejects H4. Considering the low \( R^2 \)-value, the low T-ratio and the high P-value it is not viable to make any conclusion at all from this test.

In order to get the best information out of the data as possible we also tried to eliminate extreme values. Unfortunately that did not affect the significance of the test.
H5 - Past performance

Figure 15 - Past two-year performance [%] vs. risk adjusted return ratio [Sharpe ratio].

<table>
<thead>
<tr>
<th>Past performance</th>
<th>y=</th>
<th>R²</th>
<th>T-ratio</th>
<th>P-value</th>
<th>Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk adjusted</td>
<td>0,0971x + 0,332</td>
<td>0,0735</td>
<td>2,626434</td>
<td>0,010195</td>
<td>89</td>
</tr>
<tr>
<td>Non-risk adjusted</td>
<td>0,1674x + 0,4981</td>
<td>0,0891</td>
<td>2,917624</td>
<td>0,004487</td>
<td>89</td>
</tr>
</tbody>
</table>

Table 7 – Past two-year performance [%] vs. risk [Sharpe ratio] and non-risk [%] adjusted performance.

The study of two-year past performance and return on the following five years is showed in Table 7. Hypothesis H5₁ stated that: there is a positive relation between a higher past return on investment and a superior future return. Table 7 do indeed show a positive relation, in the sense that k is positive. Thereby the hypothesis test H5₁: k > 0 is fulfilled. The T-ratio and P-value indicates that the result is significant. Nevertheless, the R²-value is low and therefore the relation can be questioned. The R²-value in this test varies from about 7 to 9 %, which is, in our minds, insufficient in order to make a solid conclusion about the relation between past and future return. However, the hypothesis is in this test is statistically proven to be true.
Conclusion

This chapter features a summary of the results and analysis that has been drawn throughout this paper. Also, limitations of this paper’s results are discussed.

We found a significant relation between Morningstar Rating and the studied five years risk adjusted return ratio. Concerning three to five stars rated funds; we did not find any significant evidence that they share the same characteristics. However, no evidence that suggest that there is a difference between them was found, neither. In contrast, we did find strong evidence that five stars rated funds in general outperform their one star equivalent. We can thus draw the conclusion that Blake’s, et al. (2000) article’s result were more in line with our result than the article written by Morey, et al. (2006), even though this study and Morey’s, et al. (2006) research was built upon the new system of Morningstar Rating.

Considering the management fee and its implications on the following five years risk adjusted return we found no evidence of such a relation. Even when excluding index funds no strong relation occurred. Even though no relation were to be found in this test it is interesting and hopefully of useful knowledge to the reader that higher fees do not correspond with higher returns on investment, despite some fund managers claiming it to be so.

When analyzing the Style Box we found that high risk categorized funds performed better than their low risk counterpart, even though we compare the risk adjusted returns. One should be aware that implied risks in these funds are quite difficult to study and that this paper only took the funds’ performance risk into consideration. We found no evidence that there is any difference in the return between growth and value investing funds. In addition, we found that funds that invested mostly in large companies underperform the mid and small size companies-investing funds, during the studied period.

We found no evidence that size erodes funds’ risk adjusted return. In other words, we could not find any statistical proof that bigger funds underperform smaller ones. Even when eliminating extreme values – no relation was found.
Finally, the result of hypothesis five indicates that there is significant evidence that past performance has a positive influence on coming five years risk adjusted return on the investment.

**Improvements**

The tests performed throughout this paper were solely based on the risk adjusted return ratio from 2005 to 2010 and on the information that was available in March 2005, except some already discussed approximations. In other word – the study is based on one specific occasion and in one specific time span. It is crucial to bear in mind that general conclusions about how funds act, in other environments and in other time periods, are impossible to draw solely based on this study. Clearly, this research would have given a more solid result if the time span was longer and more funds were included. It would have been interesting to test the different hypotheses in another environment and over multiple time spans. Also, with the method chosen for this study, one could only tell if there is a relation but not why there is a relation and nor how the different studied variables relate to each other.

One obvious flaw in this research is the disregard of changes in measurements over time. Even though we consequently used the buy and hold strategy and therefore cannot regard shifts in different key figure, it would have been interesting to study the effect of changes. For example; the effect on future returns due to changes in Morningstar Rating.

The usage of Sharpe ratio as the only measurement for risk adjustment has probably given us results which we wouldn't have gotten if another method was chosen. However, we do believe that the difference would have been small and not effected the overall conclusions.

**End notes**

Concerning the research question that was formulated at the beginning of this paper:

*Can an ordinary investor yield a better than average risk adjusted return using Morningstar Rating, Morningstar Style box, a fund’s size, a fund’s management fee or a fund’s historical performance when purchasing Swedish mutual equity funds?*

It seems that an investor could yield some better risk adjusted return by not buying low star rated funds. But bearing in mind that investors are normally looking for the top
performing mutual funds we cannot say that Morningstar Rating, or the other methods of choosing funds, are good tools for getting better than average risk adjusted return.

Our summarizing reflection, on this paper, is that one should probably not focus too much on the described methods of picking mutual funds. But a moderate approach to management fees, healthy risk awareness and a good record of past performance are factors that we will take into account when making fund investments in the future. And - probably not invest in one-star rated funds!
References


https://www.avanza.se/aza/press/press_article.jsp?article=87003


http://www.fondbolagen.se/Pressrum/Pressmeddelanden/100511%20Nytt%20v%C3%A4rldsrekord%20i%20fondsparande.aspx


Investopedia, 2010. Mutual Fund
Available 2010-07-18
http://www.investopedia.com/terms/m/mutualfund.asp


Available 2010-05-22

Morningstar's homepage, 2010. Morningstar Rating
Available 2010-05-22
http://www.morningstar.se/Article.aspx?title=rating

Morningstar's homepage, 2010. Fondtyper 4: Sverigefonder
Available 2010-05-22
http://www.morningstar.se/Articles/Analysis.aspx?title=fondtyper-4-sverigefonder-tips
Morningstar homepage, 2010. Fact sheet: *The New Morningstar Style Box Methodology*
Available 2010-05-22
http://news.morningstar.com/pdfs/FactSheet_Style Box_Final.pdf

Available 2010-05-22
http://corporate.morningstar.com/cf/documents/MethodologyDocuments/FactSheets/MorningstarRatingForFunds_FactSheet.pdf

Morningstar homepage, 2010. Fact sheet: *Classification*
Available 2010-05-22

Nasdaq OMX homepage, 2010, Index.
Available 2010-08-06
http://www.nasdaqomxnordic.com/

Available 2010-07-27
http://www.investopedia.com/articles/08/performance-measure.asp


Available 2010-08-06
http://registeredrep.com/advisorland/career/no_pain_no/


http://en.wikipedia.org/wiki/Error_of_the_first_kind

http://en.wikipedia.org/wiki/Morningstar,_Inc

http://en.wikipedia.org/wiki/Mutual_fund

http://en.wikipedia.org/wiki/Survivorship_bias