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Mutual fund performance

Explaining the performance of Swedish domestic equity mutual funds by using different fund characteristics

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ABSTRACT

Title: Mutual fund performance - Explaining the performance of Swedish domestic equity mutual funds using different fund characteristics.

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Background: In Sweden mutual funds alone account for SEK 1 trillion as of today. This is a doubling in wealth in only 7 years. For decades people have tried to come up with successful trading strategies enabling them to beat the market. Since mutual funds have become popular the research has also started to include ways of finding the right mutual funds. Academics continuously try to find characteristics influencing mutual fund return. Choosing the right mutual funds can have considerable effects on investors' ending wealth; one percent each year in 30 years can imply a huge amount. Since the influence on accumulated wealth is enormous it would be preferable if fund investors could evaluate managers based on known characteristics influencing return.

Purpose: The aim of this thesis is to investigate whether an investor can find fund attributes influencing return, which can give him indications about future performance.

Definition: When mutual funds or funds are used in this thesis only equity mutual funds are considered; accordingly fixed income funds, mixed funds or other special funds are not considered.

Methodology: Extensive research exists in our subject of interest; however academics have attained divergent results. In our study hypotheses are defined regarding those attributes most frequently used by finance academics. The hypotheses are being tested by performing several regression analyses, both simple and multiple. By accepting or rejecting the hypotheses we find out if earlier studies, mainly from the U.S., are applicable on Swedish mutual funds. Our empirical data exists of secondary sources mainly collected from each mutual fund's annual report. Data is also collected from the Six Trust Database and by e-mailing different mutual fund companies. The study covers the period 2000-01-03 – 2004-12-31 and only includes mutual funds invested in domestic securities.

Data: A huge body of financial articles concerning the subject of mutual fund performance have been studied before performing the study. These articles are mainly derived from the U.S. and financial professionals diverge in their results concerning which attributes that influence return.

Result: Our study shows that the attributes having some impact on mutual fund return are risk, size, age and mutual fund tenure. Risk was shown to have the greatest influence on return as expected.

Key words: Mutual funds, fund characteristics/attributes, mutual fund performance

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1 INTRODUCTION

Should investors choose mutual funds based on different characteristics? This study explores the relationship between fund performance and fund characteristics. Concurrently with the increased deposits into mutual funds it is important to find ways of evaluating them.

The first chapter starts off with a background description concerning the history of mutual funds and their increased importance in Sweden to get an understanding for the choice of subject. Further on, it continues with a problem discussion to create knowledge about the relevance of the thesis. The background and the problem discussion lead to a problem definition and a purpose.

1.1 Background

Why do academics spend so much time and effort studying mutual funds? A big part of the answer lies in their popularity. In the U.S. alone they accounted for $7 trillion in assets under management as of the end of 1999, which made them the largest financial intermediary. Besides, the growth in assets under management for the funds is phenomenal, exceeding 25% per year in the U.S. between 1994 and 1999 (Gruber, 2001).

In Sweden mutual funds is one of the fastest growing financial intermediaries where they have developed dramatically from a wealth of approximately SEK 300 million in the beginning of 1970 to SEK 1 trillion as of today. Around 60 percent of that amount is invested in equity mutual funds[1]. According to statistics the wealth in mutual funds has more than doubled in only 7 years. The role of mutual funds for individuals and the society as a whole has increased significantly; as a share of households' financial assets they account for approximately 30 percent. This is a considerable increase from 1980, when they only accounted for four per mill of households' financial assets[2]. Last year 72 percent of the people between 18-74 years in Sweden held mutual funds and when including premium pension the figure was 94 percent. Accordingly, the supply of funds has grown quickly, from 350 in 1994 to approximately 2600 as of today, of which two thirds are held by foreign management companies. (Dagens Industri, 2004-06-17).

The history of mutual funds in Sweden has its roots in the 1950's. However, people opened their eyes for this investment tool first when the favourable "skattespar[3]" was introduced in 1978. At the same time the stock-exchange rate started to rise in

[1] This thesis focuses on equity mutual funds that invest, directly or indirectly, in equities. From here on they are called only funds or mutual funds. In reported statistics fixed income and mixed funds are also included.
[2] www.scb.se, www.fondbolagen.se
[3] Tax-subsidized savings in mutual funds.

Sweden, which was the beginning of an expansion for mutual fund and share investing. In 1984 "skattespar" was replaced by "allemansspar[4]", an investment where earnings were entirely tax-free, which made a name for mutual funds among individual investors and fund savings became possible for the wide public. The tax subvention was removed in 1997[5].

For several years mutual funds invested exclusively in stocks listed in Sweden. When the foreign exchange market was deregulated in 1989, it became possible for Swedish investors to invest in foreign securities as well. Normally a huge amount is required for investments directly into these stocks and lack of information is common. Therefore, mutual funds became the cheapest and prime choice for the broad mass of people who wanted to invest abroad. In recent years a huge amount of special funds, with different geographical directions, has been introduced[6].

A new law[7] was enacted last year stating how mutual fund investments must be allocated. Mutual fund managers should allocate their holdings with regards to diversification goals and investment style. Funds are restricted not to invest more than ten percent of in a single security and investments exceeding five percent is allowed to sum up to 40 percent of the total fund wealth. This forces a mutual fund to be invested in at least 16 companies, making them somewhat diversified. An index fund[8] does not have the same restrictions; it is allowed to invest 20 percent of its holdings in a single security. Moreover, there are limitations implying that fund companies are not allowed to hold more than ten percent of the voting rights in a single company.

In 1994 IPS[9] was introduced, forcing citizens to influence their own pension savings. This product gives investors the opportunity to invest in either mutual funds or stocks or by doing deposits into savings accounts. In 2000 the Swedish pension system was reformed and 4.4 million Swedes were forced to invest some of their national pensions into mutual funds by themselves through the premium pension. Moreover, a couple of years later it became possible for private and public employees to invest their occupational pension in mutual funds[10].

[4] The deposits into "allemansspar" were limited to a certain amount per month.
[5] www.fondbolagen.se
[6] www.fondbolagen.se
[7] Lag (2004:46) om investeringsfonder 4 kap. 15§
[8] A passively invested mutual fund aiming to replicate the performance of a certain index.
[9] A tax deductible investment opportunity for individuals to start saving for future retirement.
[10] www.fondbolagen.se

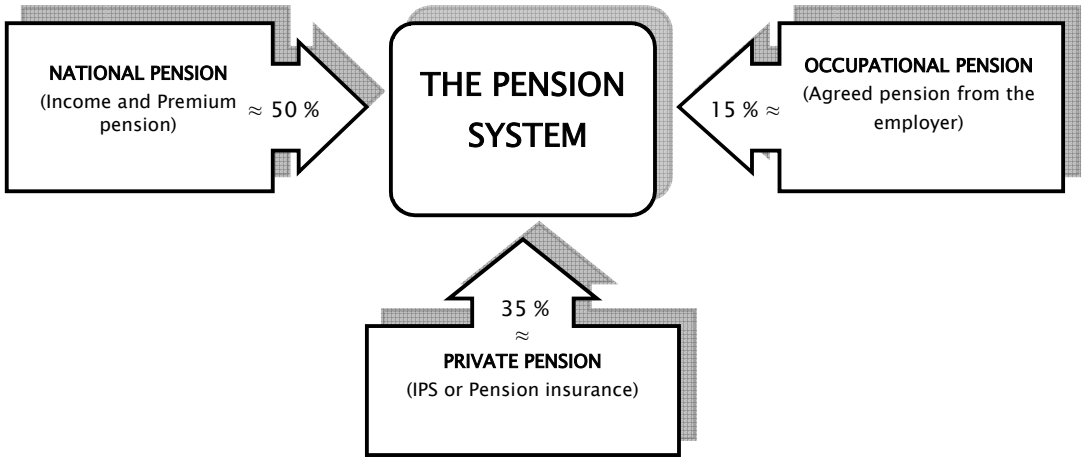

Figure 1.1 The Swedish pension system

Figure 1.1 illustrates the Swedish pension system made up of national pension, occupational pension and private pension. In the national pension, income and premium pension are included, which are based on the working life salary. Income pension is also influenced by such things as the general salary trends and the state of the Swedish economy. When the first payment is due inflation and growth are considered and included in the amount. Furthermore, for those who would not otherwise achieve a pension of approximately SEK 7 000 per month a guaranteed pension exists[11].

Almost every employee, except self-employers, also receives occupational pension. Money is allocated by the employer for future pension but the employee has an option to influence where to invest the money. When the employee reaches retirement age the national and occupational pension together amounts to approximately 65 percent of the final salary. For the majority of people this implies a considerable decrease in income when retired. Consequently, the new pension system enforces employees to consider supplement investments, where individuals can take responsibility for more than 50 percent of their final salary[12].

When the opportunity to invest premium pensions arose two out of three chose mutual funds actively. Since then the interest in making an active choice has been very modest and the majority of new pension savers have refrained from doing so. By choosing funds individually it is possible to acquire an investment that corresponds to individual preferences regarding to orientation and risk level[13]. Numbers of articles are written about the reasons of holding mutual funds. The list includes, but is not limited to (Gruber, 1996):

- Customer services – including record keeping and the ability to move money around among funds
- Low transaction costs
- Diversification

[11] These figures are based on the basic amounts geared to the price index in 2004.
[12] www.robur.se, www.kpa.se
[13] www.fondbolagen.se

- Professional management – security selection

The first three reasons for holding mutual funds are provided by both active funds and index funds. What distinguishes an active mutual fund is the fourth reason; professional management. Unlike passive index funds, which aim to replicate a benchmark index, the objective of an active fund is to outperform the index (Frino & Gallagher, 2002).

It is easy to find literature showing that active mutual funds do not outperform their benchmark indices, suggesting that passive index funds represent an appropriate alternative (See Frino & Gallagher, 2002, Malkiel, 2003, and Elton et al, 1996 etc). The first index fund was launched in the U.S. in 1976 by the Vanguard Group Inc. In Sweden the first index fund was established in 1996. The major advantages with index funds are the lower fees and less uncertainty in returns in relation to the benchmark (Woolley & Bird, 2003). Only two percent of the Swedish mutual funds invested in domestic securities beat their indices in 2004. The major mutual funds managed by the big banks will automatically be defeated by their indices by 2 percent since they invest very close to their benchmarks, says the CEO of Investment AB Spiltan. At the same time they charge fees as if they are active. He thinks that in the future there will only be actively or passively managed mutual funds, since investors are losing their trust for the business (Privata affärer, 2005-02-23).

1.2 Problem discussion

A huge quantity of academic literature addresses the topic of mutual fund performance. According to Peterson et al (2001) the literature can be separated into three general areas. The first area of academic interest is whether fund managers as a group possess any market-timing or stock-picking skills. Little evidence supports the notion that they exhibit such skills. A second group of academics test the issue of persistence of performance. This literature generally concludes that fund returns are persistent. Evidence also shows that the returns of mutual funds that performed particularly poorly in the past persist more than the returns of the funds that performed particularly well in the past. The third area of academic interest is whether it is possible to find predictive characteristics explaining performance. A much smaller body of literature attempts to identify the predictive power of fund characteristics.

For decades people have been trying to come up with successful trading strategies enabling them to beat the market. In a market, supposed to be efficient, these strategies will not work. Because of investor learning these disappear in the moment they get public. Such trading strategies are impossible to apply to mutual funds since their prices are set by the underlying securities. Some trading strategies are only the fruit of data mining; the practice of finding forecasting models by searching through databases for correlations, patterns and trading rules. Simply by chance a person will find statistically significant patterns when searching through enough variables. (McQueen & Thorley, 1999). Basically, this means that by digging deep enough a

statistically significant relationship without any adequate relationship could be found. Such inadequate relationship could be the correlation between mutual fund return and rice production in China.

Recent finance literature has found fund characteristics which have power in explaining return. The conventional wisdom among financial academics is that fund performance is negatively correlated with fund wealth, expense ratios and turnover (Droms & Walker, 1996). There is a large body of literature where academics claim that different mutual fund characteristics are useful devices in selecting either the top-performing funds or eliminating the worst. According to Peterson et al (2001) the most frequently used attributes are:

Risk – Academics have agreed upon the fact that investors who take on higher risk are rewarded in the long run. However, they have not come to an agreement on how to measure risk.

Style – Managers can follow many different styles; passive/active, aggressive/value, market timing or stock picking etc. Different styles may influence returns.

Expenses – There is a claim that fund managers charging higher fees are more skilled and recoup charges by providing higher investment returns. On the other hand studies show that low fee index funds provide investors with superior return.

Turnover – The turnover ratio is a proxy for how often a manager trades. Turnover is costly because of brokerage costs and bid-ask spreads. Some states that these costs can be offset by trading profits.

Fund size – A widely held belief is that mutual funds with substantial assets under management have a harder time providing superior returns. However, smaller funds experience no economies of scale.

Cash flow – It is believed that cash inflows and outflows can be a performance drag because of associated portfolio management problems which forces managers to trade more.

Management tenure – Management tenure is the number of years the current manager has been in place. The number of years in charge can imply greater experiences but also that a fund is run from long-accustomed habit.

Management structure – A mutual fund can be run by a single manager or by a team. Different structures may influence returns

Fund age – Young mutual funds could be more alert but there is also a claim that they experience teething troubles.

The issue is if the above factors can tell anything about future performance and be used as indicators in the selection of mutual funds.

Mutual fund companies are forced to publish information about risks and expenses associated with investments, according to law[14]. Accordingly, the Swedish Investment Fund Association established recommendations concerning additional characteristics that mutual fund companies ought to publish to make evaluation easier. Amongst others these are mutual fund wealth, turnover ratio, return, benchmark index and dividend[15]. The question is whether the legislator and the interest organization know which characteristics that have an impact on returns and thereby needed to anticipate the return. Up to this date academics have not been able to agree upon which characteristics that impact returns or in what directions.

Choosing the right mutual funds has considerable effects; the choice is more relevant than ever for individual investors since more and more rely on funds to accumulate wealth. In a rational market all consumers desire investments which have the highest probability of maximizing return for a given level of risk. However, as shown earlier there is strong evidence in academic research indicating that active funds provide lower return, usually by margins exceeding a full percentage point. Some academics also claim that mutual funds possessing some unique attributes perform better than others. The implication for a margin of hundred basis points is very large. Assume two investors investing 10 000 SEK for retirement and hold it for a period of 10/20/30/40 years. One of the investors has an accumulated return of eleven percent per year and the other one has a return of ten percent. The difference between wealth accumulations is approximately SEK 2 500/13 300/54 400/197 400 respectively. For many individuals, the amount earmarked for retirement will exceed SEK 10 000 significantly and sometimes it will be held for a period longer than 40 years. Consequently, the welfare implications for individuals might be harsher than illustrated (Lichtenstein et al, 1999).

Articles are frequently published about the importance of being active in the premium pension system; that it pays off to be active. An investigation shows that investors that have been active so far and switched funds have had a return of approximately five percent, while those who chose funds in the beginning and then stayed passive have experienced a negative return of approximately four percent, a difference of nearly ten percent in five years. If this difference stands an active pension saver receives 40 percent higher premium pension in 20 years than its passive peers (Dagens Industri 2005-05-27).

Because of this enormous influence on accumulated wealth it would be preferable if mutual fund investors could evaluate the managers based on known characteristics influencing return.

[14] Lag (2004:46) om investeringsfonder
[15] www.fondbolagen.se

1.3 Problem definition

In the background and problem discussion the mutual fund history and its increased importance for individuals is depicted. The enormous efforts academics put into the finding of trading strategies, both for stock and mutual fund trading is also highlighted. As within all other financial areas, research about mutual funds is much more extensive in North America than elsewhere. This thesis aims to find if some of the relationships in these studies, which are presented in the frame of references, also are present in Sweden. The main question to be answered is:

- Is it possible to find mutual fund characteristics influencing Swedish mutual fund returns?

Based on this question hypotheses will be formulated, which are tested using regressions.

1.4 Purpose

The purpose of the thesis is to investigate whether an investor can find fund attributes influencing return and give him indications about future performance.

2 METHODOLOGY

In this chapter the mode of procedure and methods of evaluation chosen to answer the problem are presented. The aim is to simplify the understanding of each step taken to complete the study. Furthermore, it will clarify the intentions of the thesis and its reliability and validity.

2.1 Preface

The main source of inspiration for this thesis comes from Abraham I. Brodt, a professor in portfolio management at John Molson School of Business at Concordia University in Montreal, Canada. In North America a huge quantity of academic literature addressing the topic of mutual fund performance is written. In Sweden, however, the academic research is less extensive. The interest grew by the fact that it is soon time for us to start saving for retirement and of course we have the intentions to find the best investments.

This thesis is written from an investor's perspective and aims to illustrate attributes regarding the choice of the right mutual fund. Figure 2.1 illustrates the research work process.

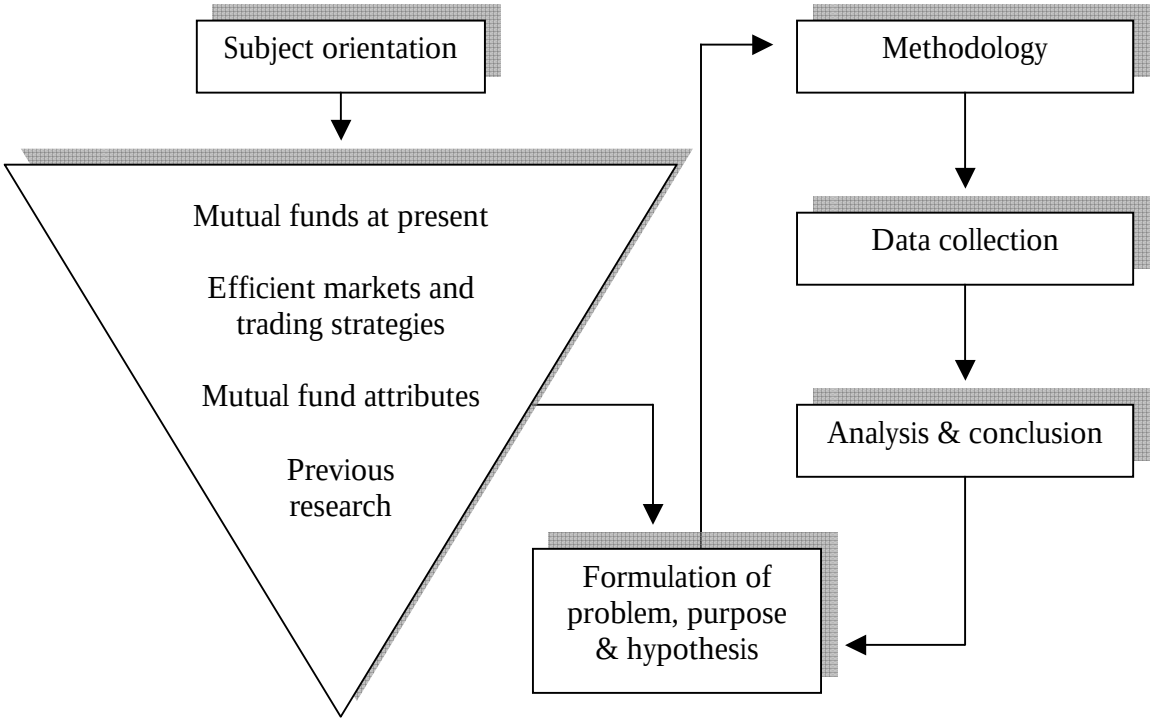

Figure 2.1 An outline of the research process

2.2 Objectivity

The scholar Thomas Kuhn states that researchers hardly ever do what they are believed to; collect a huge amount of facts used to put a theory together. Before starting, we have a huge amount of preconceived ideas, a pre-understanding within the subject area in question. Almost everything we experience, see, hear, think and feel is based on pre-understanding. Accordingly, we never meet the world as an unknown quantity; instead, we take certain things for granted (Thurén, 1996). This signifies that our point of departure is coloured by earlier prejudices and pre-understanding; the apprehension about a phenomenon acquired by experiences, education or other scientific works. Subjective frames of references are impossible to get rid of in both everyday situations and research. Therefore the pre-understanding based on the researcher's educational background is not entirely free from subjectiveness (Holme & Solvang, 1997). Naturally, the impressions of this thesis will be influenced by our earlier pre-understanding, therefore reflections and conclusions will be under subjective influences.

In a research report it is important to endeavour objectivity to the outmost possible extent implying that a thesis like this should not leave out information or contain biases. Complete objectivity is impossible to attain; however, the highest possible objectivity ought to be strived for and our intentions are to endeavour matter-of-factness and neutrality. It is of major importance to make clear that this thesis is not fully objective and that we distinctively account for our attitude and motivate our choices. In this manner some form of objectivity is achieved, according to Gunnar Myrdal (Lundahl & Skärvad, 1999).

2.3 Mode of procedure

The methodology is the tool used to attend the purpose of an investigation; a way of solving problems and creating knowledge. The methodology is usually divided into qualitative and quantitative methods, which are distinguished in the way they analyze and treat information (Holme & Solvang, 1997). Quantitative research should be measurable; the measures are used to describe and explain and aim to generate validity. Qualitative research is characterized by investigators trying to understand how people experience themselves, their existence and environment (Lundahl & Skärvad, 1999).

Our study is of quantitative nature; we collect a huge amount of data, which we process in an attempt to find a relationship. This process is formalized and can be structured and directed by ourselves. As researchers we are not reliant on comprehension of interview respondents, where the formalization level usually is low. In a quantitative method information is translated into figures and quantities from which statistical analyses are made. This method only forces us to understand the figures and the statistical tools; we are not forced to understand someone's emotions or feelings. The advantage with quantitative methods is its efficiency; it is easier to process a large quantity of figures compared to a large quantity of words (Holme & Solvang, 1997).

Several research techniques can be selected when performing a research paper. When the area of interest is not yet fully covered an explorative study can be used. If there already exists considerable research within the area of interest and the purpose of the study is to explain or describe some parts of the subject, a descriptive research technique is used. In cases when extensive information is available for the subject in mind and theories and models have already been formulated, the study is said to be hypothesis verifying. This technique concentrates on tests of given assumptions to examine their accuracy (Davidsson & Patel, 2003).

Extensive research exists in the area of our subject of interest, but academics have attained divergent results. Our study is based on defining hypotheses of those attributes most frequently used, which are tested using a quantitative method. By testing the hypotheses, following in the next chapter, we want to see if earlier studies, mainly from the U.S., are applicable on Swedish mutual funds.

2.4 Subject orientation and literature study

Extensive literature searching has been done before and during the work process, mainly in databases such as JSTOR, EBSCO and Affärsdata as point of departure. When Internet has been used for literature searching Google has been the main search engine. Collected data is the basis of the opening chapters. The most frequently used searching words have been; mutual funds, performance, fund size, turnover ratio, expenses, implications for performance, efficient markets, investment strategy and mutual fund characteristics/attributes. When finding interesting articles, additional material has sometimes been found using their bibliography as a source. The search for suitable information has been time-consuming since the quality of the information varies and the hits have been numerous. Therefore, an important part of the work of finding information has been to separate essential information from unessential.

References mainly consist of scientific articles with the U.S. as the most frequent origin. Newspaper articles along with different statistic sources have also been used; these appear almost exclusively in the introduction chapter. Since the research regarding Swedish mutual funds is not sufficiently extensive newspaper articles have served as a supplement to international research papers. In this chapter course literature is used to explain different methods for evaluation of fund performance as well as it is used to decide the mode of procedure.

The literature in this thesis is considered to fulfil the requirements of high reliability. This judgement is based on the fact that the course literature and the scientific articles have been exposed to cautious criticism before being produced for use on university level or directly by experts and specialists (Davidsson & Patel, 2003). We are restricted in the use of old sources, but when failing to find updates, we decide to include these sources anyway if they are considered important. Some unpublished sources have also been used, but since these are written by professors within the area of subject we consider them reliable. We are aware of the fact that articles taken

directly from newspapers could be angled and include personal opinions. Consequently, we are careful when using these sources and they are mainly used as sources of inspiration when defining our problem. Information and statistics from the Swedish Investment Fund Association have also been used, which is believed to be correct. Yet, the association is an organization consisting of the fund companies themselves and therefore this information could be criticized for being biased.

2.5 The selection process

This study employs daily returns, after management expenses, and characteristics for a total sample of 44 Swedish mutual funds between January 2000 and December 2004. Appendix 1 provides the total sample. The daily returns of the funds were obtained from the Six Trust database[16]. Other variables are mainly collected from annual reports of the fund companies. The funds included in the sample invest in Swedish securities, where we considered the most appropriate benchmark to be the SIX Portfolio Return Index.

2.5.1 Selection of mutual funds

To be included in the sample, a mutual fund has to be invested in Swedish securities up to a percentage of minimum 90 percent. The reason why this percentage does not have to sum up to 100 percent is owing to the fact that we want the sample to be as big as possible. On the other hand it is of outmost importance that the study is performed on a homogenous group of mutual funds, which is the reason why we choose funds almost solely invested in Swedish securities. This group of mutual funds has the longest history in Sweden and is also the group including most funds. The decision to include funds only invested up to 90 percent in Sweden was a question of pros and cons. Some mutual funds are permitted to invest internationally up to an amount of ten percent but this fact is not considered to influence their performance to the extent that it deviates too much from the sample. Therefore, they are not excluded. Besides, these mutual funds compare themselves with the same Swedish benchmarks as the ones exclusively invested in domestic securities.

The reason why a homogenous group is preferable is the fact that the funds are invested in the same market meaning that they have had the same opportunity to invest in all available securities on that delimited market. Moreover, it is easier to find a suitable benchmark if all funds are invested in the same market and the funds invested in foreign countries have different risk exposures than those invested solely in Sweden.

To find the Swedish mutual funds exclusively invested in domestic securities, Sparöversikt's[17] list of funds in the category Sweden has been used.

[16] Scandinavian Information Exchange Trust.
[17] www.sparoversikt.nu

Mutual funds with deposit claims above SEK 10 000 are excluded from the sample, since it should be possible for a normal investor to easily buy shares in the fund. To give full expression to the limitation of a homogenous group, mutual funds with directions on certain lines of businesses such as exports and raw materials are excluded. Moreover, funds restricted to invest solely in securities fulfilling certain environmental and ethical criteria are included, since it is believed that most of Sweden's big corporations fulfill these criteria. Some companies offer mutual funds donating some of the management fees every year to devoted charity. These are not included since they incur higher management fees than needed and give biased returns.

In the list of mutual funds in the Sparöversikt Sweden universe some funds are only available to investors investing in capital-sum insurances; in that case they are excluded. Further on, mutual funds consisting of other funds, so called fund-of-funds, are left out. Finally, funds launched after January 2000 are excluded; they would make the study biased since their data do not cover the period required.

The sample is gathered based on the criteria stated above. All mutual funds fulfilling these are included; therewith, a total survey is performed. Below is a summary of the filters employed to arrive at the total data set used in this study:

- 123 mutual funds in Sparöversikt's category Sweden as of March 31, 2005;
- 109 mutual funds after excluding funds with more than 10% invested in foreign stocks;
- 91 mutual funds after keeping only those with deposit claims below SEK 10 000;
- 87 mutual funds after excluding funds with certain lines of business;
- 80 mutual funds after excluding funds with donations to devoted charity;
- 65 mutual funds after excluding funds only available for investors investing in capital-sum insurances;
- 64 mutual funds after excluding fund-in-funds;
- 44 mutual funds after excluding funds launched after January 2000.

2.5.2 Data collection

Data sources can be divided into primary sources; information collected by the investigator, and secondary sources; information collected by someone else for some other purpose. The advantage with a primary source is its uniqueness and the fact that it has not been collected before. Secondary sources are not being produced for the purpose of our research implying that we are forced to have a critical attitude towards it. (Lundahl & Skärvad, 1999).

Our thesis is entirely based on secondary data supplied by the SIX Trust database, annual reports and the mutual fund companies' websites. Since the annual reports are regulated most of them provide the necessary information. However, in some annual reports the information was missing and in some cases the annual reports for 2004

were not yet published. In some cases we were unable to find necessary information why we contacted Morningstar Sweden for assistance. A reporter called Jonas Lindmark was very helpful and provided us with the additional information needed to complete our database. In the collection process we have also been assisted by some of the fund companies themselves. However, some of the companies have shown more interest in helping us than others. Figures not found in any of the above mode of procedures were completed using PPM's website[18].

2.5.3 Processing the data

A number of attributes are used as explanatory variables when trying to explain performance. Most of these variables are reported on a yearly basis. These attributes were collected for each of the five years after which an average was calculated, which is used in the regressions. For some variables the difference between the minimum and the maximum value can be huge; to enhance the use of these the logarithm is used. Betas and standard deviations are calculated using daily returns.

2.5.4 Selection of an appropriate benchmark

How much a mutual fund moves in relation to the market is measured by the beta. The market is defined by an index. Hence, an appropriate index must be selected when calculating the beta of a mutual fund. Since this study exclusively includes funds invested in Swedish securities we will choose a Swedish index.

The use of a benchmark index is of vital importance for fund managers when illustrating performance; such graphical illustration is often the only way for investors to form an opinion of the fund result. This fact could result in an incentive for mutual fund managers to choose a low performance benchmark which is not appropriate from an investor point of view. An appropriate benchmark has the same investment structure as the compared fund.

Since mutual funds are not permitted to invest more than ten percent of the total wealth in a single security it is preferable to find an index with the same limitations. Furthermore, dividend payouts are almost always reinvested into the funds instead of being paid out to the investors. Therefore, it is of great importance to include dividends in the index to avoid biased results when comparing mutual funds with the market. Many managers included in this study do compare their performance with an index including dividend payouts, which make their performance look superior to the market. As a result, we will not necessarily use the benchmark used by the managers.

Plenty of indices are available for evaluation of performance. SIX is today the largest producer of stock indices in Scandinavia, computing approximately 500 indices mainly on commission for customer use. One of their indices is the SIXPRX[19],

[18] www.ppm.nu
[19] Six Portfolio Return Index

which is adjusted for both dividend payouts and the 10 percent investment limitation[20]. We find this index the most appropriate for our study.

2.6 Statistic methodology

By using fund data from the period 2000 to 2004, we use both simple and multiple regressions to see whether fund performance depends on the defined attributes. The regression analyses are performed in Microsoft Excel.

2.6.1 Regression analysis

The general purpose of a regression is to learn about the relationship between several independent or predictor variables and a dependent or criterion variable. In this thesis mutual fund performance is the dependent variable. In a regression it is important to choose a representative dependent variable to be able to generalize the results. However, it is important to be aware of the limitations of a regression technique; a found relationship is only an approximation. On one hand it is usually based on a random sample and on the other hand other variables influencing the dependent variable can exist. A regression can only discover relationships, but never promise for sure the underlying causal mechanism. Yet, a regression is a good mean of assistance for future prognosis and estimates (Andersson et al, 1986).

In a simple regression the relationship between one predictor variable x and the dependent variable y is studied, which is illustrated by the formula below.

$$y = a + \beta_1 x_1 + \varepsilon$$

The y variable can be expressed in terms of a constant a and a slope β_1 times the x_1 variable. The constant is also referred to as the intercept, and the slope as the regression coefficient or beta coefficient. The constant a expresses where y crosses the x-axis when x is zero and the regression coefficient explains how much y changes when x_1 increases with one. The variable ε is a unit of disturbance and is the change in y that cannot be explained by the equation, which is due to the fact that all variables influencing the dependent variable were not considered in the regression (Andersson et al, 1986).

In a multiple regression more than one predictor variable is used to explain changes in the dependent variable y. The formula above is then extended to:

$$y = a + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n + \varepsilon$$

The formula now consists of more than one regression coefficient. β_1 explains how much y increases when x_1 increases with one and β_2 explains how much y increases when x_2 increases with one and so on. The regression line expresses the best prediction of the dependent variable y, given the predictor variables x. However,

[20] www.six.se

nature is hardly ever perfectly predictable, and usually there is substantial variation of the observed points around the fitted regression line. The departure of a particular point from the regression line is called the residual value $(y-\hat{y})$. The smaller the variability of the residual values around the regression line relative to the overall variability, the better the prediction (Andersson et al, 1986).

R-square or the coefficient of determination is a measure of the regression's explanatory level which is how much of variability in y that can be explained by the regression equation. R-square is the ratio between the variation in the dependent variable explained by the regression and the total variation in the dependent variable. The measure falls between zero and one and is usually expressed in percentages. If R-square equals one the equation has explained 100% of the variability in the dependent variable y. In the simple regression R-square equals the squared correlation between x and y (Andersson et al, 1986).

In a multiple regression it is important not to include too many predictor variables because of resulting effects. First, R-square increases for every newly added variable unless the new variable is perfectly correlated with variables already included. Second, as the number of variables increases the significance level of individual variables is likely to decrease, which is more obvious if the new variable is highly correlated with other included variables. The phenomenon that two or more predictor variables are highly correlated is called multicollinearity. When this problem occur at least one of the predictor variables is completely redundant with other predictors. This problem can be avoided by measuring the correlation between the included predictors. If this correlation is close to +1 or -1 one of the variables ought to be excluded from the regression (Andersson et al, 1986). We have not been able to find sources that agree upon when to exclude variables that are highly correlated. Gujarati (2002) suggests that when the multicollinearity exceeds 0.5 between two predictor variables one should be excluded whereas Lind et al (2004) mean that multicollinearity constitutes a problem first when correlation between two predictors exceeds 0.7. Naturally, we want to include as many predictor variables as possible; however, we also want the study to be as valid as possible. Therefore, we will have these guidelines in mind when performing the study and take them into consideration if necessary.

2.6.2 Statistical tests

Hypotheses are statements characterized by guesses or assumptions. Normally a hypothesis say much more than we can cover, therefore we want to test it. A hypothesis can never be regarded as definitely proved or true. However, there are reasons for having higher confidence for a hypothesis subjected to rigid tests, which all have given positive results, than to a hypothesis never being tested. Popper stated that human knowledge is never definitive or absolute true. "Scientific truths" are only guesses or preliminary hypotheses which have to be subject for rational criticism and rigorous tests. Yet, Popper meant that there are objective truths and meant that we can only be wrong if there is something to be wrong about. A hypothesis can only be

false if there is an objective truth from which it diverges. On the other hand we can, strictly speaking, never know if we have reached the truth. A theory is only scientific if it is possible to falsify (Gilje & Grimen, 1992).

Upon all statistical tests a null hypothesis (H_0) as well as an alternative for this (H_1) is constructed. Statistical tests result in the null hypothesis being either rejected or not rejected. A null hypothesis usually implies that nothing is changed; null means no change. The alternative hypothesis implies that a change has taken place. Generally a one-sided alternative hypothesis is used, meaning that it only includes one of two alternatives – an increase or a decrease (Körner & Wahlgren, 2000).

The boundary mark for rejecting the null hypothesis is set by the significance level, which is the risk of rejecting the null hypothesis when it is true. This risk shall be as minute as possible. Usually the significance level in statistic tests is set to one or five percent. These values, also called confidence level, are the ones used in this thesis (Körner & Wahlgren, 2000).

In Microsoft Excel or similar software the significance value of the regression coefficients is delivered by the program. The program performs a statistical test showing if the null hypothesis is zero. With this, as point of departure, the null hypothesis is either rejected or not rejected. Microsoft Excel delivers two measures. The first measure is the t-value. To understand this measure and finding the significance level a table of normal distribution is used. If the amount of observations is less than 30 a table of t-distribution is used. The second value delivered is the p-value of the null hypothesis. If the significance level is set to be five percent the p-value should be less than 0.05 to be able to reject the null hypothesis (Körner & Wahlgren 2000).

2.7 The validity and reliability of the study

Sources of errors which may influence the conclusions of a research report will always exist. It is important to be aware of these errors to be able to minimize their impact on the result.

2.7.1 Validity

A research report with high validity has no systematic errors of measurement. Validity is the capacity of the method of measurement to measure what it should. In addition, it is the method of measurement's most important characteristic. If an instrument does not measure what it should, it makes no difference if the performance of the measurement is impeccable (Eriksson & Wiedersheim, 1999).

In a quantitative empirical study long observation periods are preferred. Thus, it is also preferable to include as many funds as possible to increase the validity of the study. Therefore, deciding the length of this study was a question of pros and cons. As mentioned earlier there has been a huge explosion of new funds in Sweden. If we

had chosen an observation period of ten years we have had to exclude a huge amount of mutual funds. On the other side an observation period of only five years could be considered to lack in validity. By studying earlier research papers covering fund performance we found that the most common observation period is ten years. However, there are studies covering returns over a five year period; for instance we found a Swedish academic study that did. This paper is referred to in many other international academic studies implying that professionals accept it and hold it as valid. This makes us confident in our decision and by choosing this length we have also considered the pros with more mutual funds against the cons with a shorter observation period and obtained a fair selection of funds.

Observations can be performed in several ways; on daily, monthly or yearly basis. In order to achieve reliable results a wide selection of observations is preferable, something that would be in favour of daily observations. Monthly returns, on the other hand, would solve the problem of random errors that can appear when a selection consists of a huge amount of observations. Employing monthly observations compared to daily ones could influence measurements like standard deviations, correlations and betas. Since we have decided upon a period of five years the amount of observations is already limited, leaving us with the only reasonable decision; to choose observations on a daily basis.

By doing random inspections we found that the figures from PPM sometimes depart from those reported by the fund companies themselves, mostly due to rounding. Consequently, the figures collected from PPM could sometimes be incorrect. Therefore, before using the PPM figures we tried to contact the companies by e-mail, when they did not respond we decided to rely on PPM. Moreover, in some cases we have not been able to find TKA for each year, but since TKA does not usually diverge dramatically year by year it is not considered to impact the study appreciably.

In the selection section in this chapter we state the requirements that the funds have to fulfil to be included in the study. After removing the ones not fulfilling these requirements a total survey was performed which increases the validity of the study. In the light of these facts we are of the opinion that the study achieves the necessary validity.

2.7.2 Reliability

A study characterized by high reliability has no random errors of measurement and is not affected by the performer or under what circumstances it was carried through. Hence, someone else should be able to perform the same study reaching the same results. By guaranteeing that the study is performed in a precise way, the probability that chance influences the calculations is avoided (Lundahl & Skärvad, 1999).

Processing huge figure series always entails the risk that values are transferred incorrect due to the human factor. Since we rely on secondary sources it is not only our own human factors that can affect the result but also the possible mistakes made

by those producing them. Using secondary sources implies heavy demands on the investigator; a critical attitude is hold against these sources throughout the whole process. First and foremost secondary sources derived from annual reports are used. The contents in these sources are regulated according to law[21] and are therefore considered reliable. The reliability concerning statistics from SIX Trust database must be considered as reliable since it should be in the company's best interest to hold it truthful.

To avoid the problems involved in processing huge figure series we choose to transfer data between different applications automatically. Continuously we also make sure that collected data is trustworthy.

2.8 Closing words

This thesis is not aimed to find general conclusions concerning the whole Swedish mutual fund market. Instead the objective is to uncover patterns in mutual funds invested in Swedish securities, which can be used when continuing to investigate other fund groups. Finally, our point of departure is that the used attributes should be easy to find for the investors themselves.

[21] Lagen om investeringsfonder

3 FRAME OF REFERENCES

In this chapter facts considered important for the relevance of the thesis are presented. The chapter sets off with an introduction to efficient markets. Further, a thorough introduction regarding the fundamental mutual fund characteristics as well as results from research works are presented from which hypotheses are assessed.

3.1 Efficient markets and portfolio management

There is a story about two economists walking down the street, they spot a $20 bill on the sidewalk. One stops to pick it up, but the other says, "Don't bother; if the bill was real someone would have picked it up already". The moral with this story is that if a market is efficient containing well-informed investors, no information or analysis can be expected to result in out-performance since the information will be reflected in the security price immediately (Malkiel, 2003).

The paradox of the efficient market hypothesis is that if all investors believe in the hypothesis the market would not be efficient since no one would bother analysing securities (Woolley & Bird, 2002). Lorie and Hamilton (1973) were the first to shed light on the link between index investing and market efficiency. They meant that the intense competition between active managers is a very important element in making markets efficient. An environment where indexing represents an attractive investment option and where it grows significantly will reduce the competitiveness within markets and could introduce the possibility for active managers to outperform index by exploiting inefficiencies. According to the authors this puzzle has an important implication; the net flow of deposits into index investing fluctuates through time. In times when active managers underperform, the net flow into index funds will be strongly positive, which will give rise to market inefficiencies. These inefficiencies will provide active managers with the opportunity to outperform index funds, which eventually will cause a reallocation of funds from passive index funds back to actively managed ones. Thus, the theory of efficient markets depends on the participants who believe in inefficiencies and thereby trade securities in an attempt to beat the market.

Academics have different opinions concerning market efficiency. Proponents of standard finance mean that there is no systematic way of beating the market since security prices reflect all information. Conversely, academics of behavioural finance mean that security prices are rational, reflecting only fundamental characteristics, such as risk, but not psychological characteristics, such as emotions (Statman, 1999).

A number of anomalies have been isolated by researchers and a number of predictable patterns appear to exist, including some evidence of under- or overreaction to news events. However, none of this evidence persuades Malkiel

(2003) that the efficient market hypothesis ought to be abandoned. Anomalies are generally very small relative to the transaction costs required to exploit them and many predictable patterns seem to disappear soon after they are discovered. Moreover, some patterns may simply reflect better proxies for measuring risk rather than inefficiencies, see Fama and French (1992). The debate concerning efficient markets dates back to the 1960's and is not yet ended. Portfolio managers mean that active portfolio management still has a significant role in financial markets whereas academics hold opposing views. As long as stock markets exist, the collective judgment of investors will sometimes make mistakes. Undoubtedly, some market participants are demonstrably less then rational. As a result, pricing irregularities and predictable patterns in stock returns can appear over time and persist for short periods. Moreover, the market cannot be perfectly efficient; then there would be no incentives for professionals to uncover information that gets quickly reflected in market prices (Malkiel, 2003).

Proponents of the efficient market hypothesis, like Malkiel (2003), argue that active portfolio management does not justify the expenses incurred and is therefore seen as a wasted effort. Instead, he recommends passive portfolio management characterized by a buy-and-hold-strategy. Index funds have grown significantly in recent years in most of the world's developed markets (Woolley & Bird, 2003). The economist and Nobel laureate Paul Samuelson thinks that indexing will play a larger role in ten years. Moreover, he thinks that indexing will be a minority mode of investing since a lot of people have a bit of a gambling instinct. Today more money is lost in the stock market than in legal and illegal casino gambling combined (Hebner, 2004).

3.2 Fund characteristics influencing performance

3.2.1 Risk

It is impossible to avoid risk when investing in mutual funds. Academics believe that equity investors are rewarded for taking on risks in the long run (Peterson et al, 2001). The most common ways of measuring risk in a mutual fund is to calculate its beta or standard deviation. Beta is a measure of the systematic risk of a company or a portfolio where the individual asset or portfolio is compared to the market. A higher beta than 1 implies a higher level of risk than the market (Bodie et al, 2003).

$$\beta_i = \frac{COV(R_i, R_m)}{VAR(R_m)}$$

Where: $COV(R_i, R_m)$ = the covariance between the return of asset i and the market m.
$VAR(R_m)$ = the market variance.
β_i = the estimated systematic risk of asset i.

The standard deviation of a fund measures the risk by measuring the degree to which the fund fluctuates in relation to its mean return; the average return of a fund over a period of time and includes both systematic and unsystematic risk (Bodie et al, 2003).

$$\sigma \, per \, annum = \sigma\sqrt{T}$$

Where: σ = the daily standard deviation
T = the number trading days per annum

The most appropriate measure depends on the investment assumption. If the mutual fund represents the entire investment for an individual investor the standard deviation is a more complete measure. Contrary, if the investor invests in many different funds the beta measure is preferable. Nonsystematic risk can in theory be diversified away. If an investor only invests in one mutual fund it can imply that he is not fully diversified and therefore is exposed to both systematic and unsystematic risk. As a consequence, a risk measure which includes the total risk is the best measure in this scenario (Bodie et al, 2003). Hence, we include both measures in the regressions.

3.2.2 Style

In the U.S. mutual funds characterized by different investment styles, such as aggressive growth, growth and growth/income are common. Morningstar in the U.S.[22] has divided funds into nine style categories; large value/blend/growth, midcap value/blend/growth and small value/blend/growth. Most of these styles rely upon investor preferences and results from research papers telling that a particular style is the best way of accumulating wealth. Fama & French (1992) emphasize the fact that small firm stocks consistently outperform stocks of large firms. They also argue that stocks of firms with high book to market outperform the market. Other studies show that stocks which outperform the market this year tend to outperform the market next year as well (Chevalier & Ellison, 1999).

Fund companies in Sweden simply do not design mutual funds based on style, maybe due to the lack of stocks in the Swedish market. Consequently, it is not of any use to include this characteristic in the study.

3.2.3 Expenses

The measure that mirrors all the costs associated within a mutual fund is in Sweden called TKA.

$$TKA = \frac{Total \; costs}{Average \, mutual \; fund \, wealth}$$

Where: *Total costs* = management, administration, securities deposit, courtage, taxes and other transaction costs.
Av. wealth = the annual average mutual fund wealth

[22] www.morningstar.com

These costs are included in the price of the mutual fund, meaning that the investor never notices them directly. A high TKA does not necessarily imply poorer performance[23]. However, literature asserts that expense differences between mutual funds seem to be associated with performance differences. A potential explanation for this could, according to Chevalier & Ellison (1999), be the systematic differences in the jobs held by different managers, resulting in different expense ratios. As a result, high management fees could imply that investors are paying to have a lot of research done. Besides, much research signifies that high turnover ratios involve higher expenses. For a higher turnover ratio to be rewarded it takes a good fund manager making the "right" decisions.

3.2.4 Turnover

After Jensen published a study in 1968 academics have debated whether fund managers who actively trade add value. Nevertheless, still some controversy exists (Wermers, 2000). The turnover ratio is a measure of how active a fund manager is. It measures how many times the investment portfolio of the mutual fund is turned over annually; a proxy for how often a manager trades. The turnover ratio is calculated as the minimum of purchased securities or disposed securities divided by the average fund wealth[24]:

$$Turnover\ ratio = \frac{A\ if\ A < B\ or\ B\ if\ B < A}{C}$$

Where: A = The amount of purchased securities during the period.
B = The amount of disposed securities during the period.
C = The average mutual fund wealth during the period.

Fund managers who trade frequently are sometimes believed to be more successful, meaning that adjusting the fund to follow ups and downs on the market would give superior returns. On the other hand, turnover is costly because of brokerage fees and bid-ask spreads, although trading profits may offset these costs (Elton et al, 1993). There also exists a strong relationship between turnover and fund wealth. When a fund is small managers tend to invest more aggressively since they have less to lose. However, over time the risk aversion appears to increase (Christopherson et al, 2002).

Which mutual fund an investor should choose based on the turnover ratio, is decided by the motive to invest in funds. If the reason is to receive a long-term investment cheap and easy on a certain market, the investor should choose a low turnover fund. On the other hand, a high turnover fund is more appropriate if he believes that a certain manager is particularly skilled[25].

[23] www.ap7.se
[24] www.fondbolagen.se
[25] www.morningstar.se

3.2.5 Fund size

Studies show that managers who outperform the market usually draw significant new money from investors who want to profit from the manager's added-value strategies, resulting in the fund growing bigger (Beckers & Vaughan, 2001).

Large mutual funds have several advantages over small ones. First, big funds are able to spread fixed overhead expenses over a larger asset base. Further, managers of big funds can gain positions in beneficial investment opportunities not available to smaller market participants (Ciccotello & Gant, 1996). For example Smith (1994) suggests that big fund companies routinely are allocated shares in oversubscribed IPOs. Among others, Glosten and Harris (1988), found that large funds are able to accomplish trades at more favourable spreads, given their market positions and large trading volumes. Advantage to scale can also include more resources for research. All together, these institutional and cost advantages should lead to large funds outperforming small ones. However, being big also presents management challenges (Chen et al, 2003).

As a big mutual fund keeps on growing it has to continue to find worthwhile investment opportunities. Big funds sometimes have to take on larger positions per stock than optimal whereas small funds can put all the money in their best ideas. Liquidity means that a big fund needs to find more stock ideas than its small peers. Presumably, a large fund can afford to hire additional managers and thereby cover more stocks and generate additional good ideas; meaning that large mutual funds can take small positions in lots of stocks. Chen et al (2003) calculated statistics on mutual fund holdings and found that the median fund in the smallest size quintile held about 16 stocks while the median fund in the largest size quintile held 66 stocks, even though the largest funds are many times more than 4 times bigger than their smallest counterparts. This shows that big funds on average do not scale up the number of stocks significantly.

Large managers lose the ability to move quickly in and out of positions as they grow without attaining a great deal of attraction (Ciccotello and Grant, 1996). Small block trades can be executed pretty anonymously, while large block trades are typically negotiated with intermediaries. The size of the fund makes it an obvious target for attention. Outsiders carefully examine the manager's information and stock selection. As a consequence, the manager's ability to trade without signalling his or her intentions is generally curtailed (Indro et al, 1999).

With raised trade sizes transaction costs and trade difficulties increase. Given that transaction costs are directly related to trade size, larger trades imply higher explicit costs, i.e. brokerage commissions, and higher implicit costs, i.e. market or price impact and opportunity costs. Even with electronic trading networks it is difficult to trade quickly or inexpensively when the amount to be traded becomes large. Opportunity costs are incurred when the size of the trade cannot be filled entirely, when there is a delay in the total order. These costs arise because active managers trading on new information will only have this advantage for a limited period before

other participants are able to acquire the same information (Gallagher & Martin, 2005). The size effect implies that managers must either be willing to accept greater price concessions in transactions or to transact over a longer period. The downside of the former is straightforward; higher costs (Christopherson et al, 2002). Ciccotello and Grant (1996) suggest that these challenges overcome the advantages of being big and denote that funds can grow too big leaving small funds as the best investment alternative.

The size effect has probably even higher impact on funds exclusively invested in small-caps. As assets grow, so does the need for liquidity. If a fund does not invest in increasingly liquid stocks or own a growing number of holdings, its transaction costs will inevitably rise. In addition, over time these funds tend to drift upward in terms of the capitalization of the companies in which they invest. These upward drift forces managers to reduce their exposure to the smallest and generally least efficiently priced segment of the market, and push them towards more liquid and efficiently priced mid-caps (Christopherson et al, 2002).

Even though small mutual funds can move more quickly many small funds are less diversified implying that luck plays a greater role in the performance rankings. Often small funds turn out to be at the top of the rankings as well as at the bottom. Black (1971) says that small mutual funds at the top are there because the few stocks they own just happened to do well, and those at the bottom are there because the few stocks they own just happened to do badly. Thus, those at the top are just as likely to be at the bottom as at the top the next year.

Jonas Lindmark at Morningstar Sweden means that mutual funds owned by banks are restricted by investment rules limiting the risks but making them following the market. The smaller fund companies do not have these restrictions (Svenska Dagbladet, 2004-12-22). Mats Wester, editor in chief of Sparöversikt means that the big banks are getting worse and worse in active management. He thinks that their organizations are not optimal for fund management since they are too big and heavy to row (Dagens Industri, 2004-12-17).

3.2.6 Cashflow

Cash inflows and outflows are widely believed to be a performance drag because of associated portfolio management problems (Peterson, 2001). A large inflow of capital can cause administration stress. Perhaps, the organization has to hire new people to accommodate growth from which the portfolio management process may suffer. This administration stress can also take place when the mutual fund experiences large cash outflows (Indro et al, 1999).

New cash inflows into mutual funds can cause managers to invest in stocks in which they might not otherwise invest. Besides, the cash inflow can cause managers to make sub-optimal investment decisions, where relatively poor decisions can represent a performance drag. The reason is that if managers receive large injections

of cash, they might spend less time on research for each stock they decide to invest in, resulting in a low information decision (Chan et al, 2005).

Measuring a mutual fund's cash inflows and outflows is time consuming and it is fairly hard to find this information. Consequently, this attribute will not be examined in the study.

3.2.7 Management tenure

Manager tenure is the number of years the current manager has managed the fund. Some suggests that investors ought to rely on management tenure as a criterion for fund selection, since those with longer tenure possess greater experience. Management tenure could also affect management fees, because experienced managers might be more efficient in analyzing information, allowing them to charge lower fees (Filbeck & Tompkins, 2004).

Others maintain the opposite view; that new managers have more incentives to perform well. There are also studies showing that departing managers on average underperform two years prior to departure and that they have higher portfolio turnover and management fees (Peterson et al 2001).

3.2.8 Management structure

Chen et al (2003), suggest that being big can include organizational diseconomies. Whereas a small fund can be run by a single manager, a large fund normally needs more than one. One type of organizational diseconomies is known as hierarchy costs. The idea is that a mutual fund with a senior manager at the top managing juniors undercuts the decisions of those at the bottom resulting in them not investing time in certain types of research.

Many decisions regarding security selection and asset allocation are not made by individual managers, but by groups or teams of managers. Yet, little research is conducted addressing the similarities and differences in performance outcomes when the fund is managed by a team of decision makers rather than by an individual decision maker (Prather et al, 2001).

Some scholars argue that decision makers are knowledgeable, self-interested and rational with access to all information necessary to make valid decisions. Therefore, differing alternatives to the same problem should lead to the same choice no matter by whom the decision is made; an individual or a group. Other scholars have a different point of view, suggesting that individuals operating in a group decision-making environment may be subject to the group polarization (Prather et al, 2001).
In contrast, other studies have found that groups recall and recognize relevant information better than individuals. These findings suggest that teams of decision-makers have a greater number of resources than individual decision-makers, resulting in a greater number of alternatives to specific decisions. A shared belief or opinion

may help to decrease uncertainty, resulting in reduced error biases. The discussion of the behavioural decision-making literature implies that the performance of a fund managed by a team will be significantly greater than the one managed by an individual manager (Prather et al, 2001). In addition, there are problems with coordinating groups such as hierarchy costs, which intensify when a fund grows and the number of managers increases that can eliminate the advantages of being a group (Indro et al, 1999).

3.2.9 Fund age

Age of a mutual fund could play a role in deciding performance since younger funds may face significant higher costs in their start up period. This is due to marketing costs but also that the initial cash flows will place a greater burden on the fund's transaction costs. There is also evidence showing that return of new mutual funds may be affected by an investment learning period (Gregory et al, 1997). One of the reasons for underperformance of younger funds according to Bauer et al (2002) is their exposure to higher market risk since they are invested in fewer stocks.

There is a relationship between fund age and fund size; young funds tend to be smaller than older ones, which make the young funds' returns and ratings more vulnerable for manipulation. The smaller the fund, the more a handful of fortunate stock picks can buoy the performance of the entire fund. Moreover, because young mutual funds are typically smaller, fund families may be able to afford to waive some of the expenses (Adkisson & Fraser, 2003).

3.3 Results from research addressing the mutual fund topic

3.3.1 Early research papers

Investors have always been interested in evaluating the performance of their mutual funds. Formerly their performance was evaluated almost entirely based on the rate of return. Investors were aware of the concept of risk but did not know how to quantify and measure it. In 1952 Markowitz showed that investors should require greater expected returns for exposing themselves to greater risk and that over time these risks should be rewarded.

> *H_1: Funds including high risk generate higher return than funds including low risk.*

The first tests of fund performance are dated back to the 1960's, since then the performance is studied in a number of reports. Friend et al (1962) offered the first empirical analysis of performance. Treynor (1965), Sharpe (1966) and Jensen (1968) were the first to evaluate fund performance in relation to risk and developed standards to measure risk-adjusted returns. Sharpe (1966) studied the performance of 34 mutual funds during the years 1954-1963 to test why some of them performed better than others and if they could beat the market. He concluded that there are differences among funds and that these to a major extent could be explained by differences in expense ratios, skill and past performance. Jensen (1968) performed a

similar study during the years 1955-1964, but included more mutual funds, 115. His study revealed that the beta values of funds on average were below 1, which implies that they on average took on a lower risk compared to the market. The study also shows that the funds returned worse when adjusted for systematic risk.

3.3.2 Recent research papers

27 years after the first research paper concerning fund performance was published, Ippolito (1989) performed a study to test whether investors investing in funds with high expense ratio and turnover were compensated with a higher rate of return. In his test he included 143 mutual funds during the period 1965-1984 and he found a significantly positive relation between management fees, turnover ratios and returns. Mutual funds with higher management fees and turnover ratios were shown to perform better. Therefore, he concluded that it paid off for uninformed investors to pay managers to invest their money.

A lot of research is done regarding mutual fund size; if there is any payoff to choose mutual funds based on their wealth. Grinblatt and Titman (1989) studied fund performance over the period 1975-1984 where they were ranked by asset size and divided into quintiles. Some evidence for superior performance was discovered in the smallest quintile. Net of expenses, however, the returns were not significantly different from the return of funds in larger quintiles. Chang (2004) used a model consisting of three variables; beta, standard deviation and size to find out which of these that creates high return. The conclusion in his study is that small funds with low beta and low standard deviation provide investors with higher return. Accordingly, funds with low risk were shown to give higher returns, despite the fact that the study period was characterized by an increase in economic activity.

In 1996 Droms and Walker made a study aimed to investigate whether return could be explained by such variables as fund wealth, turnover ratio and management fees. They included 151 funds in their study which revealed a significantly positive relationship between the return of the funds and their fees. However, they did not find any relationship between return, size and turnover ratio. When Droms and Walker (1994) made the same study on international mutual funds no relationship was found.

The two studies mentioned above showed that asset size is no good predictor of future performance but since then other studies have shown the opposite. Ciccotello and Grant (1996) based a study on earlier findings showing that yesterday's best performing mutual funds tend to become today's largest mutual funds as investors are likely to invest heavily in these funds in response to past success. They examined if funds could continue to outperform their peers as they continued to grow. Mutual funds were divided into three categories; aggressive growth, long-term growth and growth/income, and four quartiles based on size. Larger funds were believed to have greater historical return and small funds were believed to have greater future returns. In consistency with earlier studies they found that successful funds tended to grow more rapidly than poorly performing ones. Evidence of superior performance for

small mutual funds was found in two out of three categories, aggressive growth and long-term growth. Unlike Grinblatt and Titman (1989) these significant differences were net of expenses. To summarize; Ciccotello and Grant found some evidence suggesting that current size offers some insight about future returns. Besides, when using rebalanced portfolios they revealed that an investor who in the beginning of a ten year period (1982-1992) invests in the smallest quartile and after five years rebalances his portfolio, to still only include mutual funds in the smallest quartile, will perform superior to an investor in the larger quartiles.

Dahlquist et al (2000) performed a study on Swedish mutual funds invested in Swedish securities in the years 1993-1997 and found the same evidence as Ciccotello and Grant (1996). The study was also focused on whether fund size, management fees and turnover ratio were related to performance. A fourth variable was included in their regression; past performance. According to the study bigger mutual funds on average tend to perform worse than smaller funds. Besides, the study showed that funds with higher turnover ratios performed better than those with lower turnover. Furthermore, there existed no correlation between high fees and high return, rather the opposite. Gallagher & Martin (2005) performed a similar study on the Australian market. They examined the performance of actively managed mutual funds during 1991-2000 and to what extent fund size and manager size is related to risk-adjusted return. Their study did not support the hypothesis that mutual fund performance is disadvantaged in terms of asset size. They could not find any significant difference in performance between big and small funds.

Indro et al (1999) considered the question whether size matters by studying if fund wealth erodes performance. Their research argues that as mutual funds become larger there are diminishing marginal returns beyond the optimum fund size. These diseconomies arise due to the fact that active managers are unable to successfully exploit information in a timely manner. Besides, their work highlights the fact that larger managers capture an increased level of attention, and their relative ability to trade without signalling to the market becomes increasingly constrained as asset size increases. They argue that as mutual funds grow, they must invest in more stocks, which inevitably become less consistent with the investment style.

Chen et al (2003) also investigated whether performance depends on size. Their study covers the period 1962-1999. They found strong evidence that fund size erodes performance and that this relationship was not driven by heterogeneity in fund style. Instead they found that the impact of fund size is most pronounced for funds buying small cap stocks, suggesting that liquidity is an important reason why size erodes performance. They also found evidence arguing that organizational diseconomies related to hierarchy costs could play a role in addition to liquidity. Moreover, findings revealed that mutual funds belonging to large fund companies performed better than others.

In terms of fund size related to investments made by funds across smaller capitalisation stocks research is limited. A recent study in the U.S. made by

Christopherson et al (2002) examined the relationship between small-cap fund performance and fund wealth. Using a sample of 219 U.S. small-cap mutual funds their work showed an inverse relationship between fund size and performance.

H_2: Big funds perform worse than small ones.

H_3: Funds with high expenses generate higher return than low expense funds.

A study made by Carhart (1997) showed that the more a manager trades, the lower the return compared to the benchmark. Also Israelsen (1998) performed a study showing that a high turnover ratio corresponded with lower returns and higher expenses. This does not provide a promising picture of active fund management; instead, the studies conclude that investors are better off, on average, buying lower-expense index funds.

A study on all American registered mutual funds invested in American securities during the period 1975-1994 was made in 2000 by Wermers. He studied if, without regard to fund size, funds in the U.S. with higher turnover ratios earned superior risk-adjusted returns compared to lower turnover funds. He found that this relationship holds and that superior managers have a higher propensity to turnover their portfolios.

H_4: Mutual fund turnover impacts return.

A study performed by Prather et al (2001) suggests that there is no significant difference in performance between funds managed by teams and those managed by individuals.

Information regarding management structure is not published by Swedish fund companies. Besides, it is not well studied, which could imply that academics hold this attribute irrelevant. Mainly due to lack of information this attribute will not be included in the regression analysis.

According to a study made my Gregory et al (1997), there is evidence showing that mature funds perform better than younger ones. A study made by Otten and Bams in 2001 showed a conversed relationship between fund age and performance; younger funds did better than mature ones (Bauer et al, 2002). Finally, in a study made by Peterson et al (2001) no relationship was found between performance and fund age.

H_5: Fund age has impact on performance.

According to Peterson et al (2001) earlier tests made by some academics show that there is no relationship between management tenure and performance. Chevalier and Ellison (1999) is one example. They found no significant relationship between

management tenure and return. Peterson et al (2001) performed an additional study to finally find out. The study reveals that there is an average return premium associated with manager tenure that is negative and not significant at the five percent level. However, it was significantly negative at the less stringent ten percent level. Accordingly, different studies give completely different results. Peterson et al refers that the negative relationship could be influenced by the fact that some poor-performing managers have been entrenched. They also state that it is not economically meaningful to include management tenure as a screen when choosing funds because the relationship is not significantly strong and the coefficient is very small. Conversely, Filbeck's and Tompkins' (2004) study of fund returns in the period 1999-2001 found a significant relationship between return and management tenure; longer-tenure managers performed better than the mediate- or short-term managers.

H_6: Management tenure impacts return.

4 EMPIRICAL RESULTS

This chapter introduces the reader to the results from the regression analyses. After each regression the results are summarized to be analysed in the next chapter.

4.1 Descriptive statistics

The mutual funds included in the study along with their characteristics are shown in Appendix 1.

Table 4.1 Research period 2000-01-03 – 2004-12-31

	N	Mean	Median	Min value	Max value
Return	44	-2.76%	-4.05%	-10.06%	18.03%
STDEV	44	0.25	0.24	0.14	0.56
Beta	44	0.72	0.77	-0.06	0.97
Size	44	1953.15	886.76	33.80	9560.75
Turnover	44	0.76	0.68	0.06	1.90
Fund age	44	12.66	10.00	5.00	40.00
Mgmt tenure	44	5.14	5.00	1.00	14.00
TKA	44	1.47%	1.56%	0.32%	18.03%

To control if any great deviations from the mean value exist we compare the median value with the mean value for each attribute, see Table 4.1. For all attributes, except size, the median and the mean value are relatively close to each other, due to the fact that a few of the mutual funds are much bigger than the others. Mutual fund wealth is also widely distributed among all funds. As a result, their logarithms will be used from here on.

Some fund attributes might be correlated with each other; for instance, expenses may be measuring whether a fund is active or passive which may be captured by the turnover. To eliminate the occurrence of this we have calculated the correlation between each attribute. This is done in order to avoid multicollinearity. The results from these regressions are shown in Table 4.2.

Table 4.2 Correlation between predictor variables

	STDEV	Beta	Size(ln)	Turnover	Fund age	M tenure	TKA
STDEV							
Beta	-0.58						
Size (ln)	-0.10	0.24					
Turnover	0.07	-0.34	-0.16				
Fund age	-0.10	0.24	0.44	-0.06			
M tenure	-0.05	0.07	-0.03	-0.31	0.05		
TKA	-0.15	-0.02	-0.10	0.50	0.16	-0.08	

Before calculating the correlations we anticipated that beta and standard deviation should be highly positively correlated since both of them measure risk. As seen in Table 4.2 they have the highest correlation in the sample, but not as high as assumed. Still, the correlation is high enough to exclude one variable[26]. However, we are still interested in which risk measure that can be used in predicting return the most. Instead of excluding one variable we therefore perform two regressions; one with standard deviation as risk measure and one with beta.

Other anticipated correlation patterns were the ones between fund size – fund age and turnover – TKA. The correlation between size and age is high as predicted; large mutual funds tend to be the oldest ones. On the other hand, this correlation is not high enough to force us to exclude one of the variables. Turnover and TKA are also positively correlated; naturally, funds with high turnover experience higher TKA. Nevertheless, this correlation was assumed to be stronger and we are not required to exclude one of them.

Turnover and management tenure are shown to be highly negatively correlated implying that managers in charge for a longer period tend to trade less frequently. Neither does this correlation exceed the level set for exclusion of a variable.

Before performing the regression analyses we sought to make sure that a relationship actually existed between return and the predictor variables. In order to do that we completed a preliminary analysis, see scatter-plots in Appendix 2. All scatter-plots indicate some kind of linear relationship, making us motivated to continue exploring these relationships. On the other hand extreme values may influence the coefficients; either by making the relationships stronger or eliminating it. In addition we have decided to perform regressions without the extremes. When studying the scatter-plots in Appendix 2 we found three extreme beta values and one extreme standard deviation value. These are considered extreme values since they significantly deviate from the other mutual funds in the sample. Since one of the funds includes extremes for both of the attributes we only exclude three mutual funds in the regressions without extremes. The reason for excluding these is that mutual funds do not normally have betas around zero or standard deviations around 0.6. However, we cannot ignore these funds totally since they are a part of the sample.

4.2 Simple regressions

A simple regression is performed to examine how the attributes influence the independent variable return individually. The results from the regressions are shown in Table 4.3 and 4.4 below.

[26] See discussion in chapter 2.6.1 Regression analysis

Table 4.3 Full sample – simple regressions

	Coefficient	t-value	p-value	R^2
STDEV	-0.196	-1.48	0.15	4.9%
Beta	0.041	1.07	0.29	2.7%
Size(ln)	0.003	0.60	0.55	0.8%
TKA	1.842	1.25	0.22	3.6%
Turnover	-0.004	-0.20	0.84	0.1%
Fund age	-0.001	-1.10	0.28	2.8%
Mgmt tenure	0.007**	2.88	0.01	16.5%

** Significant at the 1 percent level

Table 4.3 shows that the only significant attribute when performing simple regressions on the full sample is management tenure. This is also the attribute with highest explanatory level; 16.5 percent of the return can be explained by this attribute. Accordingly, a fund manager who has been in charge for a longer period seems to deliver higher returns, but the coefficient is small.

Table 4.4 Simple regressions without *extreme values*

	Coefficient	t-value	p-value	R^2
STDEV	-1.316**	-8.41	0.00	64.5%
Beta	0.284**	3.52	0.00	24.1%
Size(ln)	0.004	0.69	0.49	1.2%
TKA	1.825	1.18	0.25	3.4%
Turnover	-0.001	-0.06	0.95	0.0%
Fund age	-0.001	-1.08	0.29	2.9%
Mgmt tenure	0.007**	2.58	0.01	14.6%

** Significant at the 1 percent level

When excluding the extreme values the explanatory level increases considerably for some attributes. Now standard deviation and beta are significant at the 1 percent level meaning that these two accompanied by management tenure separately can explain the return to some extent. As seen in column 4 the explanatory level increases considerably after excluding the extremes. Standard deviation can independently explain 64.5 percent of a mutual fund's return in this regression. Standard deviation is also the variable with highest coefficient. Consequently, a mutual fund with low standard deviation has provided the investor with superior return.

4.3 Multiple regressions

Multiple regressions is performed to see how much of the return that the fund characteristics could explain together. Since beta and standard deviation are highly correlated we perform two regressions where beta is excluded, in one of these the extreme values are excluded and two regressions where standard deviation are excluded, where the extremes are excluded in one of them.

Table 4.5 Full sample multiple regression – with *beta*

	Coefficient	t-value	p-value	R^2
Beta	0.047	1.28	0.21	36.4%
Size(ln)	0.010	1.81	0.08	
TKA	2.885	1.86	0.07	
Turnover	0.006	0.27	0.79	
Fund age	-0.002**	-2.63	0.01	
Mgmt tenure	0.008**	3.30	0.00	

** Significant at the 1 percent level

When excluding standard deviation from the multiple regression the only significant predictor variables are fund age and management tenure. However, the coefficients are very small and the regression only explains 36.4 percent of the funds' return.

Table 4.6 Full sample multiple regression – with *standard deviation*

	Coefficient	t-value	p-value	R^2
STDEV	-0.146	-1.22	0.23	36.2%
Size(ln)	0.010	1.87	0.07	
TKA	-1.614	1.79	0.08	
Turnover	0.000	-0.02	0.99	
Fund age	-0.002*	-2.49	0.02	
Mgmt tenure	0.008**	3.20	0.00	

* Significant at the 5 percent level
** Significant at the 1 percent level

The multiple regression reveals, when excluding beta, the same outcome as the one excluding standard deviation. Fund age and management tenure are significantly different from zero and the explanatory level is 36.2 percent.

Table 4.7 Multiple regression witout *extremes* – with *beta*

	Coefficient	t-value	p-value	R^2
Beta	0.272**	3.79	0.00	51.9%
Size (ln)	0.010*	2.09	0.04	
TKA	2.651	1.78	0.09	
Turnover	0.000	0.02	0.99	
Fund age	-0.003**	-3.33	0.00	
Mgmt tenure	0.006**	2.59	0.01	

* Significant at the 5 percent level
** Significant at the 1 percent level

When the extreme values are excluded from the sample the explanatory level at once increases considerably from 36.4 percent to 51.9 percent. The only attributes which are not significantly different from zero are now turnover and TKA.

Table 4.8 Multiple regression without *extremes* – with *standard deviation*

	Coefficient	t-value	p-value	R^2
STDEV	-1.404**	-8.26	0.00	77.2%
Size (ln)	0.010**	2.90	0.01	
TKA	-1.614	-1.38	0.18	
Turnover	0.015	1.09	0.28	
Fund age	-0.002**	-3.17	0.00	
Mgmt tenure	0.002	0.97	0.34	

** Significant at the 1 percent level

In the fourth multiple regression the explanatory level increases a lot; from 36.2 to 77.2 percent. When excluding the extremes standard deviation, size and fund age are significantly different from zero using a 99 percent confidence interval.

Since index funds sometimes are said to provide investors with higher returns than actively managed funds we perform a regression without these as well. The reason is that index funds are characterized by low TKA and low turnover ratios. We want to know if the relationship changes when removing these funds. Table 4.9 and 4.10 present the results from these regressions.

Table 4.9 Multiple regression without *extremes* and *index funds* – with *beta*

	Coefficient	t-value	p-value	R^2
Beta	0.322**	3.97	0.00	55.9%
Size (ln)	0.008	1.52	0.14	
TKA	1.876	0.91	0.37	
Turnover	-0.002	-0.09	0.93	
Fund age	-0.003**	-3.37	0.00	
Mgmt tenure	0.007**	2.72	0.01	

** Significant at the 1 percent level

Before removing the index funds turnover ratio and TKA were not significantly different from zero in any of the regressions. Still, after excluding them they turned out not to be significantly different from zero. Three attributes; beta, fund age and management tenure are shown to be significant using a 99 percent confidence interval. However, the only considerable coefficient is the one for beta.

Table 4.10 Multiple regression without *extremes* and *index funds* – with *standard deviation*

	Coefficient	t-value	p-value	R^2
STDEV	-1.558**	-8.56	0.00	80.9%
Size (ln)	0.013**	3.48	0.00	
TKA	-0.643	-0.46	0.65	
Turnover	0.024	1.71	0.10	
Fund age	-0.002**	-2.92	0.01	
Mgmt tenure	0.002	1.07	0.29	

** Significant at the 1 percent level

TKA and turnover did not turn out to be significant as expected. Nevertheless, the explanatory level of the regression increased to 80.9 percent; meaning that standard deviation, size and age can explain a big part of a mutual fund's return.

5 ANALYSIS

This, the fifth, chapter initiate the reader into the analysis which is based upon the results presented in the previous chapter. To simplify the reading the results from the previous chapter are summarized into the table shown below.

5.1 Summary of the previous chapter

Table 5.1 delivers a summary of the regressions presented in the empirical chapter from which the analysis is given.

Table 5.1 A summary of the regressions

	STDEV	Beta	(Ln) Size	TKA	Turn-over	Fund age	Mgmt tenure	R^2
Single regression R^2	-0.196 (-1.48) 4.9%	0.041 (1.07) 2.7%	0.003 (0.60) 0.8%	1.842 (1.25) 3.6%	-0.004 (-0.20) 0.1%	-0.001 (-1.10) 2.8%	0.007** (2.88) 16.5%	
Single regression# R^2	-1.316** (-8.41) 64.5%	0.284** (3.52) 24.1%	0.004 (0.69) 1.2%	1.825 (1.18) 3.4%	-0.001 (-0.06) 0.0%	-0.001 (-1.08) 2.9%	0.007** (2.58) 14.6%	
Multiple regression – β		0.047 (1.28)	0.010 (1.81)	2.885 (1.86)	0.006 (0.27)	-0.002** (-2.63)	0.008** (3.30)	36.4%
Multiple regression – σ	- 0.146 (-1.22)		0.010 (1.87)	-1.614 (1.79)	0.000 (-0.02)	-0.002* (-2.49)	0.008** (3.20)	36.2%
Multiple regression# – β		0.272** (3.79)	0.010* (2.09)	2.651 (1.78)	0.000 (0.02)	-0.003** (-3.33)	0.006** (2.59)	51.9%
Multiple regression# – σ	-1.404** (-8.26)		0.010** (2.90)	-1.614 (-1.38)	0.015 (1.09)	-0.002** (-3.17)	0.002 (0.97)	77.2%
Multiple regression#▲ – β		0.322** (3.97)	0.008 (1.52)	1.876 (0.91)	-0.002 (-0.09)	-0.003** (-3.37)	0.007** (2.72)	55.9%
Multiple regression#▲ – σ	-1.558** (-8.56)		0.013** (3.48)	-0.643 (-0.46)	0.024 (1.71)	-0.002** (-2.92)	0.002 (1.07)	80.9%

Without extremes
▲ Without index funds
* Significant at the 5 percent level
** Significant at the 1 percent level

5.2 The influence of risk

H_1: Funds including high risk generate higher return than funds including low risk.

H_0: Risk does not influence return.

In the single and the multiple regressions on the full sample neither the coefficient for standard deviation nor beta are significant. Besides, the coefficients are very small and the explanatory level in the regressions is very low. After removing the extreme values the regressions show a completely different relationship. Standard deviation is negatively correlated with return, i.e. according to the regressions funds with low standard deviation are shown to give the highest return. This is not striking since our study period includes a couple of years of recession, see Figure 5.1. According to theory a fund or stock including high risk in a recession period should give lower returns than a fund including low risk.

Chang's (2004) study shows that low risk provide investors with higher return, which is in accordance with our study when looking at the standard deviation. Standard deviation is also the attribute having the highest coefficient, which is significant using a 99 percent confidence interval in all the regressions when excluding the extremes. However, this is not surprising; we already knew that risk influences return, but we did not think that this relationship should be so strongly negative. The study is composed of a strong recession period but also a recovery period, however, the stock market does not recover entirely during this period, see Appendix 3. We thought that the negative correlation between risk and return should proceed into a less negative correlation since the market started to recover. Standard deviation is also shown to be the characteristic explaining most of the regression when the extreme values are removed in the simple regression, which is in line with our expectations; that risk is the best attribute in explaining return.

The coefficients for beta when removing the extremes are, on the contrary, shown to be positive implying that a high beta value provides investors with higher returns. These are also shown to be significant at the 1 percent level for all of the regressions when excluding the extremes. This is somewhat remarkable since a higher beta in a recession period should make the performance of equities worse. On the other hand, in a bull market equities with high betas should perform better than those with low betas.

Maybe beta is a better risk measure than standard deviation in this study. During the recession period the returns are highly volatile whereas the returns during the recovery period show a steady rise without fluctuations worth mentioning, see Appendix 3. On the other hand, our study reveals that the explanatory level for beta is lower than the one for standard deviation. In the simple regression it is shown that beta alone has an explanatory level of 24.1 percent whereas standard deviation has an explanatory level of as much as 64.5 percent.

Risk influences fund returns; the coefficient for standard deviation as well as the one for beta is significant at the 1 percent level when removing the extremes. When including the extremes in the regressions the coefficients are not significant owing to the fact that the extremes eliminate the relationships. Moreover, usually betas of mutual funds compared to benchmarks are not zero and neither are standard deviations as high as 0.6. Naturally, the removal of these funds leads to increased explanatory level in the regressions. At last, risk influences mutual fund returns without doubt, the null-hypothesis is therefore **rejected**.

5.3 The influence of size

H_2: Big funds perform worse than small ones.
H_0: Fund size does not influence performance.

In the frame of references the advantages of being big were mentioned, however, the disadvantages outweigh the advantages considerably. This led us to formulate a hypothesis stating that small funds give investors higher returns than bigger ones. When performing a simple regression with return and fund size alone the result shows that size does not contain any explanatory level at all and neither does it when removing the extreme values. Nevertheless, in the multiple regressions, excluding the extreme values, size has a small explanatory level. The coefficients are significantly different from zero in all regressions except the one when index funds are excluded and beta is the risk measure. The impact size has on return is most significant in the regression with standard deviation as risk measure. However, the coefficient is very small; meaning that even if size has an impact on return it is small.

Our study is in line with most of the research papers presented earlier; size does have some impact on mutual fund return. Yet, our result diverges from the studies showing that small funds did better than big ones. As a matter of fact the coefficient for size is positive in our study implying that big funds performed better than small ones. Maybe this is owing to the fact that some claim that big mutual funds in Sweden perform just like their benchmarks; they pretend to be active but act as index funds. Therefore we decided to perform a regression without index funds as well, to see if the relationship would be stronger. In fact the relationship became somewhat stronger when index funds were excluded. The coefficient became larger and the significance level increased, but only in the regression using standard deviation. Finally, size turned out to have some impact on mutual fund return, but not as much as expected, and therefore the null-hypothesis is **rejected**. On the other hand, our hypothesis stating that small funds are better than big funds is not supported by our study.

5.4 The influence of TKA

H_3: Funds with high expenses generate higher return than low expense funds.
H_0: Expenses does not influence return.

Some earlier studies, for example the one made by Ippolito (1989) showed that mutual funds with high expenses give superior return compared to low expense funds; that it paid off to hire someone to handle the security selection.

When performing the multiple regressions without the extreme values the coefficient for TKA is relatively high in different directions depending on the risk measure used. The only reason we can come up with for this is the fact that TKA is more negatively correlated with standard deviation (-0.15) than beta (-0.02). However, the relationship is not significant and neither does it tend to be significant in the multiple regressions. There is no significant relationship between TKA and return, therefore the null-hypothesis is **not rejected**. Funds with high TKA does not perform statistically better.

5.5 The influence of turnover

H_4: Mutual fund turnover impacts return
H_0: Turnover has no impact on return.

Studies made by Carhart (1997) and Israelsen (1998) show that funds with high turnover corresponds with low returns whereas studies made by Ippolito (1989) and Wermers (2000) show that high turnover is associated with higher returns. In contrast to these studies our study reveals that turnover has no impact on return whatsoever. The turnover coefficient in all of the regressions is very minute and neither is it statistically significant. Therefore, the null-hypothesis is **not rejected**; turnover ratio does not influence return.

5.6 The influence of age

H_5: Fund age have an impact on performance.
H_0: Age have no impact on performance.

Earlier studies performed to explore the relationship between age and return show diverged results. Gregory et al (1997) found that mature funds did better than younger ones whereas Otten and Bams (2001) found the opposite; that younger funds were the ones investors should put their money in. On the other hand, Peterson et al (2001) found no relationship whatsoever between age and return in their study. In our study fund age seems to have no impact on performance alone whereas it influences return in the multiple regressions. The coefficient is negative meaning that younger funds perform better than older ones. However, the coefficient is very small implying that it has little impact on return, but it is significantly different from zero in all regressions. Consequently the null-hypothesis is **rejected**; age may have some impact on mutual fund return.

5.7 The influence of management tenure

H_6: Management tenure impacts return.
H_0: Management tenure has no impact on return.

The data for this coefficient is somewhat biased since the fund managers who have been in charge for a shorter period than our study covers, five years, should not be associated with the returns for the whole period. Anyway, it gives us an indication of whether management tenure influences performance or not.

Management tenure is the only characteristic having a statistically significant coefficient in the single regression on the full sample. It is also the one having highest explanatory level. All regressions without the extremes and index funds except the ones using standard deviation as risk measure also show a significant relationship between management tenure and return. This means that a manager who has ran a mutual fund for a longer period give higher returns. On the other hand the coefficient is very small in all regressions. This is entirely in line with Filbeck's and Tompkins' study from 2004 where they also found that more experienced managers perform better. Contrary, it is entirely different from the results revealed by Peterson et al (2001) showing that new managers do better. At last, the final null-hypothesis is also **rejected**; management tenure does have some impact on performance.

6 CONCLUSIONS

Finally, in this, the ending chapter, we relate the two previous chapters back to the first one. The intention is to have a discussion concerning the results and tie together the study. Finally, we leave suggestions on further research from ideas developed during the work process.

6.1 Conclusions

It is of major importance to be cautious when drawing conclusions from regressions; an established relationship between two or more variables does not imply that anything is proved concerning its direction. Here our common sense, earlier experiences and knowledge play an important role. A rejection of a null-hypothesis does not necessarily imply that a relationship is found; it can never be regarded as definitely proved or true. However, as stated earlier there are reasons for having higher confidence for a hypothesis that has been subjected to rigid tests than to one never being tested.

This thesis builds upon existing research to provide a framework for individual investors considering mutual fund attributes. The paper presents results concerning characteristics of 44 mutual funds over the period 2000-2004. The central focus of the thesis was to test whether different fund characteristics influence performance.

The study could be considered as biased since some funds are excluded; the extremes. When including the extremes in the first regressions it was shown that risk did not influence return at all, which we considered as very strange since risk in all other studies has been the major explanatory variable.

Fund size impacts performance positively; contrary to other studies this attribute shows that big mutual funds perform better than small ones. Still, this is in accordance with Chen et al (2003) who reveal that mutual funds belonging to large mutual fund companies perform better than others. This is true since all mutual funds in our study with a wealth of SEK 4 billion or more belong to big fund companies. We also found that risk, age and management tenure are significantly related to performance. Fund age seems to reduce performance implying that older funds perform worse but the impact is very small. On the other hand management tenure seems to improve performance. Consequently, the number of years in charge implies greater experiences and not that a fund is run by habit.

We found no reward for paying high expenses and turnover ratios are not related to investment performance whatsoever. These results are contrary to earlier studies showing that performance improves with high turnover ratios and expenses.

The evidence of this thesis suggests that an investor, except for risk considerations, should choose a big and young fund with a manager that has been in charge for a long time, maybe even from the beginning and avoid old mutual funds which are still considered as small with inexperienced mangers. This result could be somewhat questioned. Usually young funds are the small ones and since they are young the managers in charge have not been employed for that particular assignment for a long period. As mentioned many times in the previous chapter the coefficient for each of the three attributes; size, age and management tenure are minute implying that their impact is modest.

A number of lessons can be learned from this study. First of all, we have shown that an investor is not rewarded for choosing a fund with high expenses and turnover ratios. Second, the regressions with beta and standard deviation are shown to provide us with diverse results; high beta funds perform better than those having a low beta whereas funds with high standard deviation perform worse than those with low standard deviation. Third, the relationships with size, age and management tenure are modest and somewhat divergent from earlier studies.

The major conclusion of this thesis is not surprising; that the performance of mutual funds investing in Swedish securities is predominantly dependent on the risk level of the fund. Therefore an investor should choose funds based on his preferred risk level and since expenses do not seem to influence return he may as well choose to invest in cheap index funds. However, some funds consistently outperform the market, in this study Odin Sverige, but it is impossible to know which these are with foresight. To find the next Odin Sverige the investor needs a great portion of luck.

Unlike an earlier Swedish study performed by Dahlquist et al (2000) covering the period 1993-1997 our study shows that big funds are better than small ones and turnover does not matter whereas we reach the same result concerning expenses; they do not influence performance.

The practise of finding relationships between different variables can be extended to the end of time. Yet, before performing a regression analysis the investigator has to test the trustworthiness and common sense in the relationship, for example there is no reason to search for such irrelevant relationship as the one between mutual fund performance and number of children born in Sweden.

To verify that management tenure, size and age have an impact on return more studies need to be performed. Studies including these attributes are far from fully covered in Swedish studies.

6.2 Future research proposals

While performing our study we have studied a lot of interesting papers concerning mutual fund performance which has given us ideas for future studies. For example the study could be extended and include variables such as educational level, age and

number of years in business. Does the educational level influence performance of a mutual fund; is a manager holding a CFA or other certifications better and/or is a manager with an MBA better than one with only a bachelor degree and so on. Can the age of a manager affect return; meaning that an older manager is more experienced than a younger one? And finally, does the number of years in the same business have an impact on return? Is it good or bad to be in the same business for a longer period of time? Another proposal is to study the persistency of performance in Swedish mutual funds; is it the same funds that beat their benchmark indices every year? Finally, it would be interesting to acquaint a study about hedge funds and long run pension savings; is a hedge fund a good way of reducing risk in the pension portfolio and at the same time enhancing the value of the portfolio?

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APPENDIX 1

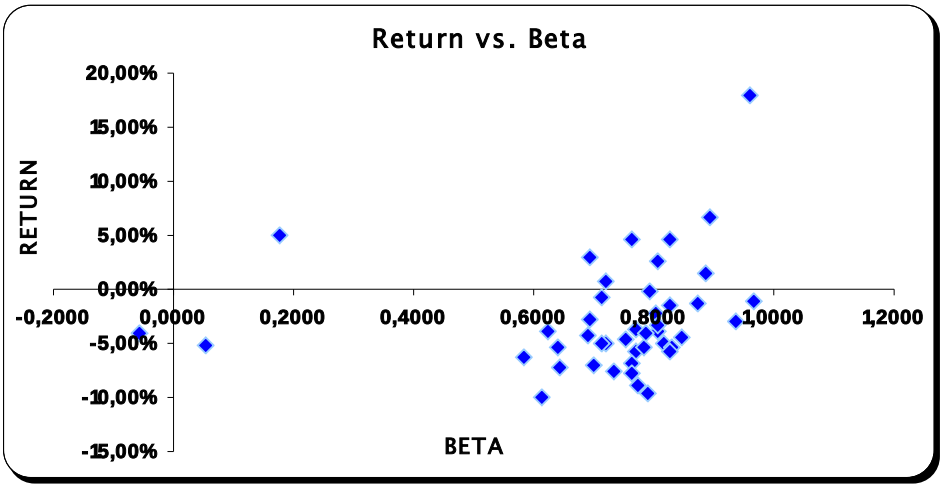
MUTUAL FUND SAMPLE

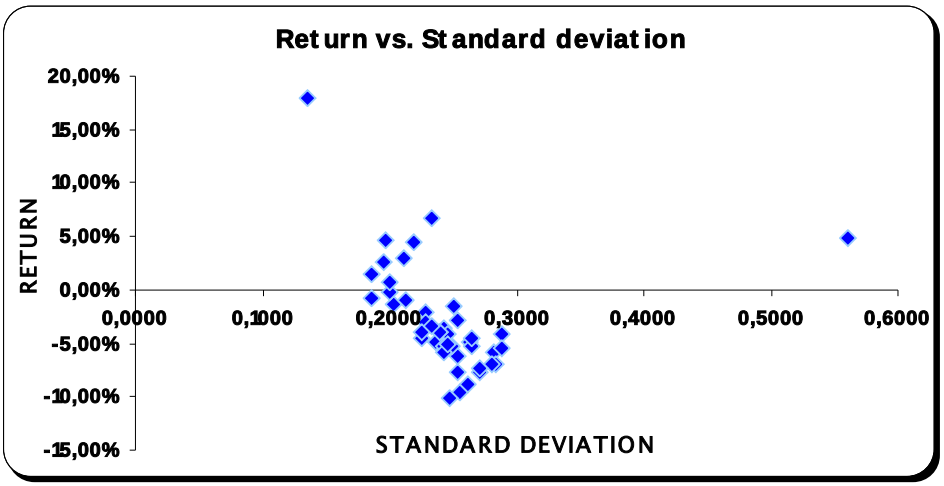
	Return*	STDEV	Beta	Turn-over*	Size* (MSEK)	Mgmt tenure	Fund age	TKA*
Aktie-Ansvar Sv.[27]	-1.28%	0.2037	0.8738	0.70	622.00	13	40	1.47%
Aktiespararna Topp Sv.	-5.75%	0.2817	0.7714	0.06	376.26	5	5	0.32%
Alfred Berg Sv.	-9.64%	0.2552	0.7890	0.86	769.86	2	11	1.88%
AMF Pension Aktiefond Sv.	4.56%	0.2189	0.7626	0.61	3636.85	6	6	0.62%
Banco Etisk Sv.	-8.84%	0.2609	0.7718	0.71	1005.68	2	25	1.87%
Banco Etisk Sv. Special	-7.64%	0.2712	0.7327	1.48	242.10	2	6	1.59%
Banco Småbolag	-6.28%	0.2530	0.5849	0.92	666.64	6	12	2.12%
Banco Svenska Miljöfond	-4.43%	0.2247	0.8458	0.68	86.24	7	11	1.95%
Carlson Småbolag	-0.21%	0.1994	0.7942	0.35	1678.94	14	13	1.59%
Carlson Sweden Micro Cap	-0.69%	0.1856	0.7140	0.11	67.07	8	8	1.55%
Carlson Sv.	-3.63%	0.2425	0.7693	0.44	885.87	4	12	1.42%
Carnegie Småbolag	-4.18%	0.2453	0.6908	1.40	887.64	2	8	2.16%
Catella Reavinst	-1.53%	0.2500	0.8282	1.05	2462.11	7	7	1.92%
Carnegie Sv.	-4.07%	0.2887	-0.0574	1.50	366.80	2	8	2.22%
Didner & Gerge Aktiefond	6.73%	0.2329	0.8918	0.68	4439.40	10	10	1.48%
Erik Penser Aktie Index Sv.	-6.88%	0.2832	0.7648	0.19	857.17	9	9	0.55%
Firstnordic Sv.	-2.16%	0.2290	0.8030	0.70	684.94	2	7	1.53%
Folksam Aktiefond Sv.	-3.96%	0.2394	0.8070	0.46	2392.63	5	10	0.83%
HQ Sv.	-1.03%	0.2125	0.9652	1.34	2202.80	4	18	1.58%
Ikano Svensk Aktiefond	-2.93%	0.2285	0.9358	0.10	284.44	6	6	0.70%
Kaupthing Bas	-4.99%	0.2368	0.8168	0.90	33.80	5	6	1.75%
Kaupthing Småbolag	-10.06%	0.2480	0.6133	1.64	49.40	1	11	1.91%
Kaupthing Sv. Index 30	-6.98%	0.2796	0.6985	0.43	126.80	5	7	0.47%
Länsförsäkr. Småbolagsfond	-3.97%	0.2252	0.6219	0.92	567.20	7	7	1.74%
Länsförsäkr. Sv. fond	-4.96%	0.2626	0.7211	0.55	4076.60	1	14	1.50%
ModernaFonder Sv. Topp 30	-5.19%	0.2643	0.0529	1.50	246.00	6	6	0.80%
Nordea Sweden	-5.36%	0.2483	0.7821	0.86	317.80	3	16	2.31%
Nordea Sv. fonden	-7.72%	0.2534	0.7633	0.80	4414.80	3	27	1.67%
Odin Sv.	18.03%	0.1354	0.9586	1.12	487.87	5	10	2.40%
Robur Småbolag Sv.	2.91%	0.2117	0.6943	0.74	2008.17	6	6	1.58%
Robur Sv. fond	-4.02%	0.2401	0.7876	0.60	4144.43	6	37	1.54%
SEB Sv. Chans/Risk	-4.54%	0.2650	0.7525	1.90	1287.68	3	10	1.30%
SEB Sv. Småbolag	1.45%	0.1865	0.8855	0.39	4373.25	6	18	1.64%
SEB Sv. Småbolag Chans/Risk	4.67%	0.1970	0.8254	1.05	1165.03	6	10	1.99%
SEB Sv. fond I	-5.35%	0.2423	0.8311	0.63	9560.75	1	21	1.40%
SEB Sv. fond II	-5.75%	0.2428	0.8271	0.68	6810.15	1	31	1.37%
SHB Aktiefond Index	-5.09%	0.2450	0.7120	0.62	7756.40	5	17	0.78%
SHB Reavinst	-7.30%	0.2716	0.6439	0.68	6354.40	7	17	1.68%
SHB Småbolagsfond	0.69%	0.2005	0.7194	0.56	2295.20	7	10	1.68%
Skandia Aktiefond Sv.	-3.34%	0.2324	0.8077	0.49	3091.69	5	14	1.52%
Skandia Småbolag Sv.	2.68%	0.1953	0.8071	0.66	201.58	6	6	1.55%
SPP Aktiefond Sv.	-2.79%	0.2543	0.6930	0.42	705.40	5	9	0.86%
SPP Aktieindex Sv.	-5.36%	0.2884	0.6388	0.20	930.40	1	6	0.46%
Öhman Sv.	4.92%	0.5609	0.1780	0.84	318.28	9	9	1.66%

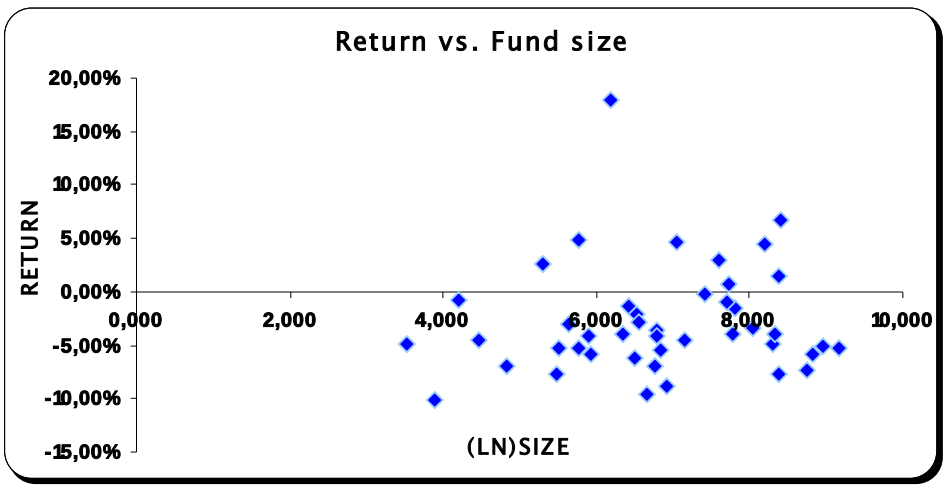
* Five year average

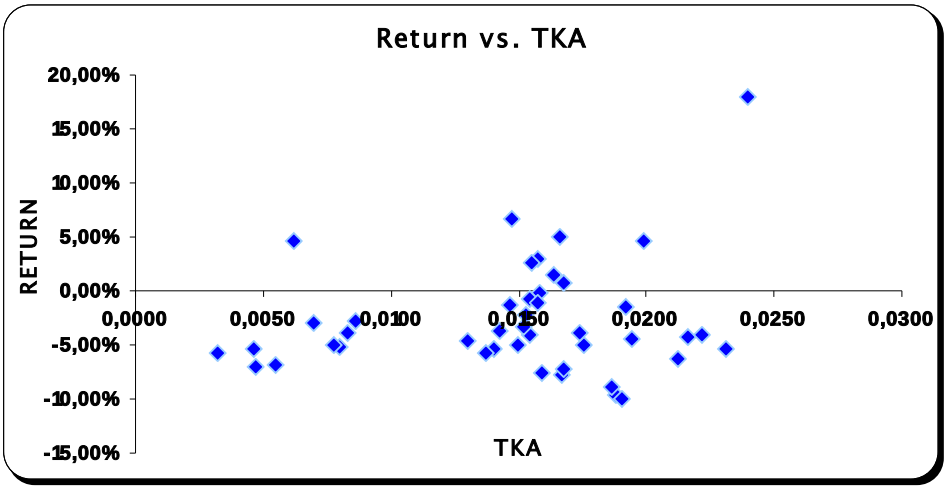
[27] Sv. stands for Sverige

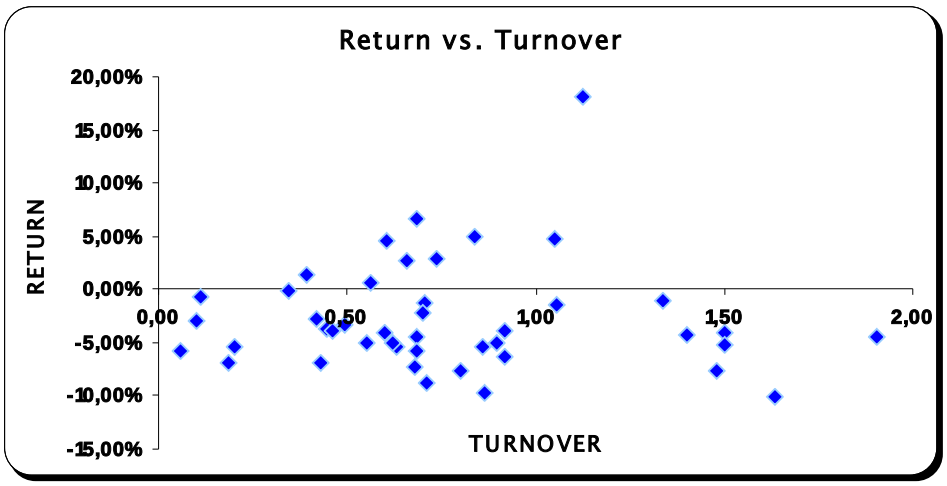
PRELIMINARY ANALYSIS

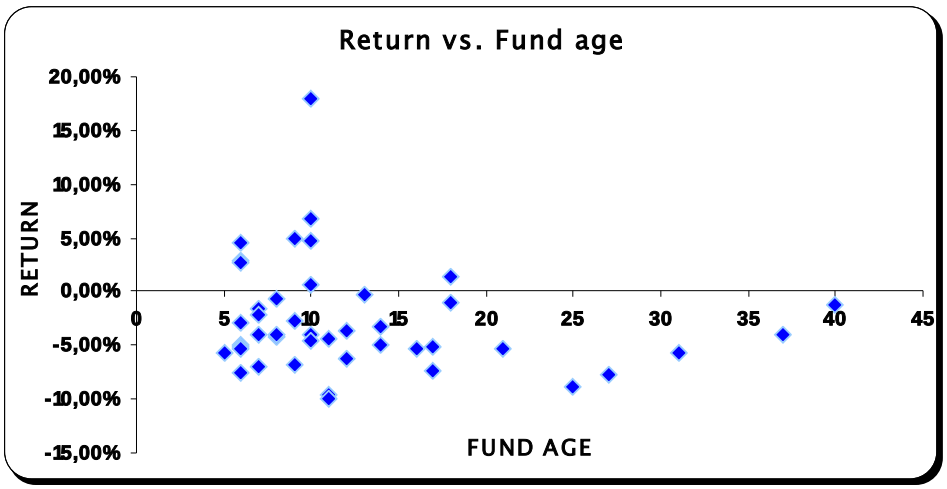




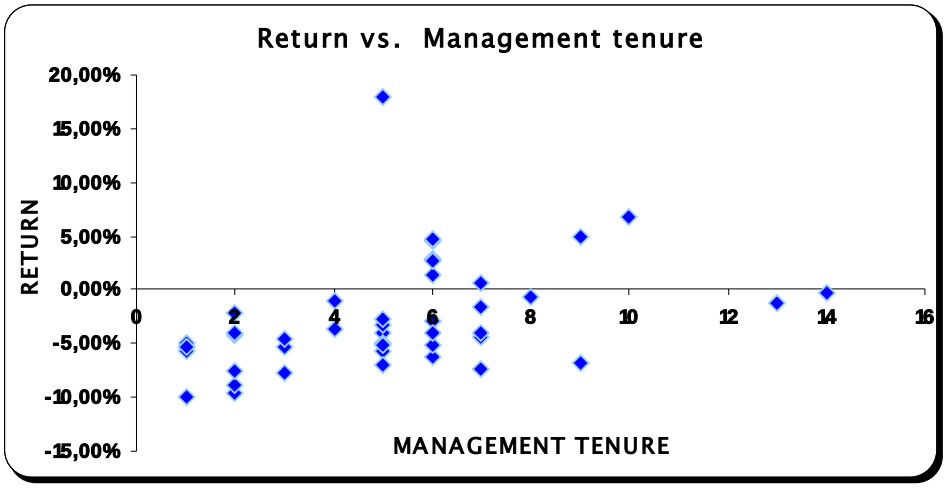



Return vs. TKA
20,00%
15,00%
10,00%
5,00%
0,00%
-5,00%
-10,00%
-15,00%
RETURN
0,0000
0,0050
0,0100
0,0150
0,0200
0,0250
0,0300
TKA


Return vs. Turnover
20,00%
15,00%
10,00%
5,00%
0,00%
-5,00%
-10,00%
-15,00%
RETURN
0,00
0,50
1,00
1,50
2,00
TURNOVER


Return vs. Fund age
20,00%
15,00%
10,00%
5,00%
0,00%
-5,00%
-10,00%
-15,00%
RETURN
0
5
10
15
20
25
30
35
40
45
FUND AGE

APPENDIX 2


Return vs. Management tenure
20,00%
15,00%
10,00%
5,00%
0,00%
-5,00%
-10,00%
-15,00%
RETURN
0
2
4
6
8
10
12
14
16
MANAGEMENT TENURE

APPENDIX 3

THE SIX PORTFOLIO RETURN INDEX (2000-01-03 - 2004-12-30)