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The Performance of Actively Managed Equity Mutual Funds

A Study of the Swedish Market

Master's thesis within Economics

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Abstract

The purpose of the thesis is to investigate actively managed equity mutual funds ability to outperform the market as well as examine if any relation can be observed between management fees and the performance for funds investing on the Swedish stock market. The sample consists of 88 actively managed equity mutual funds which are risk-adjusted by the Sharpe ratio for a time period of 36 months. The risk-adjusted return showed that on average, actively managed equity mutual funds are not successful at outperforming the market index when compared to the OMXS30GI. Rather, the funds underperformed the index by 9%. Based on this finding, actively managed equity mutual funds cannot be regarded as an efficient investment vehicle as a higher return could have been achieved by investing in the market portfolio. A regression model was conducted in order to examine the effect the management fee has on performance. The management fee showed to have no statistically significant impact on performance, suggesting that there is no justification of why some funds charge higher fees than others. The message is that investors should be more price conscious when choosing a fund to invest in. 10 out of 88 funds did outperform the market index. The thesis finds no support that this might be due to management skill or fund attributes, but rather suggests that this might be due to luck. This further emphasise actively managed equity mutual funds as inappropriate investment vehicles. Hence, when investing in stock markets proven to be efficient, an alternative should be considered, such as index investing.

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1. Introduction

"There are good reasons to the large interest mutual funds have gained. When you buy shares in a mutual fund you become part-owner in the total value of the fund. You will receive risk diversification from the first 100 SEK invested, professional management which supervise the fund, buy, sell and exchange the stocks. The diversification and expertise is of much great advantage to you."

Björn Wilke (2009, p.123)

During recent years, the fund market has developed dramatically in Sweden with net savings in 2009, reaching 115 Billion SEK, outperforming all records since statistics of this sort firstly were published in 1985 (SCB, 2010a). Out of this, 70 Billion SEK was invested in equity mutual funds, which at the end of 2009 represented more than 50% out of the total fund market value (SCB, 2010a).

Equity mutual funds must invest at least 75% of its value in various public firms (Swedish Financial Supervisory Authority's body of Law, 2008:11). Buying shares in the fund makes the investor indirect owner to all the investments the fund holds, offering advantages such as low cost diversification and professional management. Equity mutual funds can either be passively[1] or actively managed. The aim with the active management is to generate a return superior to the market index by the aid of forecasting and search for undervalued stocks (Elton, Gruber, Brown & Goetzmann, 2007). Nothing, however, comes with a free lunch and in turn the investor has to pay a yearly management fee to cover for the costs the active management entails. The management fee varies amongst the different funds but as long as the fund offers a return, net of the fee, better than that of the market index, the fund's manager has delivered what the investor has paid for.

The ability to outperform the market, however, is in contrast to the efficient market theory. The theory states that stock markets are efficient, implying that all available information already is incorporated in the stock price (Malkiel, 1999). Consequently, money spent on research and analysis when trying to find underpriced stocks are, accordingly to the theory, considered a meaningless task which cannot compensate the investor for the resources spent on doing so (Malkiel, 1999).

Nevertheless, the equity mutual fund market is today a Billion SEK industry with its popularity only increasing with time. At the same time as the competition has grown stronger and the IT-efficiency has grown bigger, a report by Moneymate shows that the yearly management fee has increased and that more expensive funds have been launched (Finansportalen, 2007). Does the increased supply of expensive funds imply that the efficient market theory does not hold? Consequently, do fund managers, when given the resources needed, deliver a result better than that of the market index? Or is it simply the investors which do not require what they are paying for? The thesis investigates whether a relationship between the management fee and the fund's performance can be observed. In addition, it analyses equity mutual funds' ability to outguess the market, as a way of determining if the efficient market theory holds.

A study made by The Swedish Investment Fund Association (2008) shows that 98% of all people between the ages 18 to 74 saves in funds, being it for the pension or for direct savings. At the same time, approximately only a third evaluates the fund's performance against a market index (The Swedish Investment Fund Association, 2008). The equity

[1] Funds designed to follow a specific market index such as index funds.

mutual fund industry has become a popular way for many individuals to participate in the capital markets without having to engage in the complex stock markets themselves, leaving the task for the manager of the fund. Consequently, with the mutual fund business never been bigger, concerning the vast majority of the entire population, the need for evaluating its performance might never have been stronger.

1.1. Previous Research

The studies conducted within the subject of mutual fund performance and their ability to outperform the market has been numerous since their first appearance around the 1960's (Chen, Cheng, Rahman & Chan; 1992). The most influential studies were those conducted by Sharpe in 1966 and by Jensen in 1967. In the two studies, they both developed risk-adjusted techniques in order to measure portfolio performance across mutual funds constituting of different risks. Those techniques are by today widely used measures when evaluating portfolio performance (Elton et al., 2007). Sharpe (1966) found that only 11 out of 34 funds did better than the Dow Jones Industrial Average, used as the benchmark in the study. His conclusion was that on average, mutual funds underperformed the Dow Jones portfolio. In addition, better results were obtained by funds with smaller expense ratios. Similarly, Jensen (1967) found, using a sample of 115 mutual funds that, on average, mutual funds were not successful at outperforming the market; both when measured net and gross of management expenses. Together, those studies contributed to a paradigm which for long dominated the literature with the message that the extra expenditure the active management implied could not add value above index investing. Hence, active management was considered a waste of money. The view was consistent with the original version of the efficient market theory, stating that security prices already reflect all available information. Money spent on research in finding undervalued stocks was thus considered a wasteful task which did not successfully regain the resources spent on doing so (Ippolito, 1993).

Ippolito (1989), on the other hand, found no evidence that mutual funds underperform the index; rather, he argued, mutual fund managers are efficient when investing their money. Ippolito (1989) conducted a study containing of 143 risk-adjusted mutual funds net of all expenses and fees apart from load charges. The result showed that mutual funds outperformed the index. In addition, funds with higher expenses, fees and turnover rates gained a return sufficient to cover for their higher expenses. Ippolito (1989) admits the result was in contrast to the first generation studies conducted within the area, but argued that the result was consistent with efficient markets when information is costly. Consequently, the article received much attention due to its strong support to the modified market hypothesis developed by Grossman and Stiglitz in 1980[2] (Elton, Grubler Das & Hlavka; 1993).

Elton et al. (1993) found that Ippolito (1989) was not correct when stating that his findings supported the modified version of the market efficiency. Rather, Elton et al. (1993) argued that Ippolito did not appropriately account for the performance of certain assets in his study. When reconstructing his work, Elton et al. (1993) found that the performances of the funds were inferior to that of the passive portfolios. In addition, higher fees and turnover rates generated a lower performance, indicating that managers do not invest their money efficiently enough to justify for the costs they raise. Consequently, when having

[2] See section 4.4.1.

reconstructing his work, Elton et al. (1993) found that the result was consistent with previous studies.

Malkiel (1995) conducted a study where he had a sample of funds free of survivorship bias which indicates that the sample contained all funds which existed during the time period investigated and not only those funds which still were operating at the end of the period. The study was a remark on the findings of recent other studies which had emerged showing that equity mutual funds did outperform the market as well as had found evidence of persistence in funds' performance. Malkiel (1995) found that on average, the funds had a performance which was inferior to the benchmark portfolio. This was true both net and gross of expenses. The foundlings showed that survivorship bias were more important than previous studies had estimated when concluding on mutual funds' aggregate performance. In addition, whilst performance persistence showed to be evident in the 1970's, no consistency could be found in the returns during the 1980's. The management fee was neither found to have had a positive impact on the performance and the conclusion made was such that managers of actively managed mutual funds are not successful at providing excess returns. Hence, a low expense index fund would probably be the best choice for most investors. The result is in line with a study conducted by Carhart (1997) who also uses a data set free of survivorship bias. His founding's were such that although a few mutual funds regained their investment expenses, the majority of the funds underperformed the market by the amount of their charges. The article summarizes its findings by stating three rules-of-thumbs when choosing a fund; firstly, do not buy funds which has a record of persistently bad performance; secondly, funds which did well last year most likely will perform better than average next year, but not in subsequent years; thirdly, avoid high cost funds since turnover costs, load fees and expense ratios all affect performance negatively.

In a study by Dahlquist, Engström and Söderlind (2000), the relationship between fund performance and fund attributes of Swedish mutual funds were studied. Their findings were such that equity funds, net of expenses, did not outperform the market. Fees were also found to have a negative impact on performance. On the other hand, small equity funds, funds with high trading activity and for some circumstances, funds with a good past record, were all characteristics of funds with good performance.

1.2. Problem and Purpose

The previous literature within this area has found various results regarding equity mutual funds ability to outperform the market. Most of the studies which have been conducted within the subject have concerned US funds (Dahlquist et al., 2000). Within this study the focus will be on Swedish mutual funds with the purpose of investigating actively equity mutual funds ability to outperform the market as well as examine if any relation can be observed between management fees and performance. Being an increasingly popular form of investment, concerning the vast majority of the entire population, there is a strong need to evaluate the performance of actively managed equity mutual funds in order to determine whether they can be considered as an efficient investment vehicle. In addition, to determine if managers of actively managed equity mutual funds can add value above index investing. The averages investor's inability to correctly evaluate equity mutual funds performance, as suggested by a study made by The Swedish Investment Fund Association (2008) which claims that approximately only a third evaluates the performance against a market index, further stresses the need for this study. Following this, the study is conducted in two parts with the problems outlined as follow:

Firstly;

- *Are actively managed equity mutual funds an efficient investment vehicle as determined by their ability to outperform the market?*

Secondly;

- *Are there any relationship between funds' yearly management fees and their performance which could justify the differences regarding the fees that they charge?*

In addition to this, the thesis looks upon some additional fund characterises to determine whether they are associated to superior performance or not. Those are; the size and the age of the fund; the turnover rate of the fund; if the fund invests in firms with small and middle market values; if the fund belongs to the PPM system; if the fund charge a performance fee and if the fund charge a buy & sell charge.

1.3. Limitations

There are four limitations to this study. Firstly, the study only concerns actively managed equity mutual funds and not index funds. Secondly, the study only concerns equity mutual funds which have their investment focus on the Swedish market. Thirdly, there is a selection of the funds within the previous category based on data availability. In calculating the returns of the funds, the study uses data received from Navcenter. Navcenter did not have complete data for all the funds within that category which restricted the funds used in the sample[3]. In addition, there is a natural exclusion of funds since certain funds have not existed long enough to be accounted for in the study. Lastly, the yearly management fee is considered as opposed to the funds total costs; the percentage measure of the total costs taken out of the fund value for a specific year (TKA). An exact definition of TKA is given in section 2.4. A fund's TKA varies from year to year which makes the accessibility for this data constrained. Consequently, the fund sample would decrease significantly if this variable was to be used instead. Additionally, TKA varies from year to year due to being dependent on the funds trading activities whereas the yearly management fee is a fixed charge, considered as the price the investor has to pay for investing in the fund. The investor can choose a fund with a high or low fee due to individual preferences. However, the investor cannot choose a fund based on last year's TKA and expect it to be the same next year as it is beyond the investor's own control. Hence, TKA has not been used as a predictor of fund performance by reasons of a low TKA one year does not guarantee a low TKA next year.

1.4. Disposition

The thesis starts with an introduction of the topic together with the thesis's purpose and limitation. It continues with the background section to provide information on the topic discussed. The background section is followed by the theory section which is split up into two parts. The first section provides a deeper understanding of mutual funds as an investment vehicle whereas the second section outlines and states hypothesis to be examined in the empirical section. The major findings of the thesis can be found in the last section together with suggestion for future research.

[3] Out of funds which have existed long enough, 22 were excluded.

2. Swedish Equity Mutual Funds

The section provides a history of the Swedish mutual fund market and its development to its current state. In addition, it provides useful facts regarding equity mutual funds in order to provide a deeper understanding of the topic discussed in the thesis.

2.1. The Swedish Mutual Fund Market

The first mutual funds in Sweden were launched in the 1950's. The inspiration to this way of saving came from the United States, where saving in funds had grown rapidly during the 1940's. The development of the fund market in Sweden had a slow start and it wasn't until the government in 1978 introduced a tax-deductable saving policy for investments in funds, together with rising stock markets in the 1980's, that people got interested in this way of investing (The Swedish Investment Fund Association, 2009). The tax benefit policy went through some changes along the way, to completely being abolished in 1997. The years of the policy, however, had given the Swedish people the experience of investing in funds and the interest has only grown bigger with the years. In 2009, savings in funds breached all records since statistics of this sort firstly were published in the 1950's (SCB, 2010a).

Along with this development, the supply of funds on the Swedish market during the 21st century has increased substantially; being about 1500 funds at the start of the new millennium to approximately 4000 in 2008 (The Swedish Investment Fund Association, 2009). The increased supply of funds is largely due to the development of investment companies from abroad offering funds on the Swedish market. Funds registered abroad can be sold and advertised in Sweden, although the legal rules regarding the information about the fund is subject to the rules prevailing in the country the fund is registered within. At the end of 2009, 759 active funds registered in Sweden existed on the market of which 339 were mutual equity funds (SCB, 2010b).

In 1994 a new pension system (PPM) was introduced in Sweden. The system implies, amongst others, that 2.5% of each a person's salary goes to that person's retirement savings, where the investor chooses a selection of funds to place the money in. If no active choice is made, the money is placed in a specific mutual equity fund. In the year 2000, the first selection of funds to the PPM system was made. Today, savings for the retirement constitute about 60% out of the total fund market value in Sweden (The Swedish Investment Fund Association, 2009).

2.2. Active Management

Active management entails taking a bet against the market by constructing a portfolio consisting of assets different from what would be held in a passive portfolio, or a market index, based on the manager's predictions regarding the future (Elton et al., 2007). The aim is to generate a return superior to the market index by the aid of forecasting and search for undervalued stocks. This is done by the use of either technical or fundamental analysis. Technical analysts try to anticipate the future movement of a stock price by studying the stock's past prices and the volumes the stock is traded in (Malkiel, 1999). Technical analysts believe that prices move in trends and uses stock charts to analyse the movements of the price as to detect a positive or negative trend. This will give predictions of when to buy or sell a specific stock.

Fundamental analysts, on the other hand, are little concerned about past movements in the stock price. Rather, they are interested in an assets true worth. By the use of studying relevant information of a specific firm, such as accounting details and growth prospects,

the analysts arrive at of what they believe is the security's true worth (Malkiel, 1999). Fundamental analysts trust that the market eventually always will reflect an assets true value and consequently, if the analysis gave a value which are above the market price, the security is considered mispriced and hence a good deal to invest in. Thorough analysis of various industry details will hopefully give a good insight of the future prospect of the firm which is not yet reflected in the market price (Malkiel, 1999).

2.3. Costs Associated with Active Management

The costs associated with the active management are not something the investor need to pay to the investment institution, but rather are taken out from the funds value (SEB, 2010).

The *management fee* is a yearly charge to cover for the costs associated with the various forecasts and analysis the active management entails. The fee is stated in percentage terms and is taken out of the funds value on either a daily basis or on all trading days occurring during the year, which approximately sums up to 250 days per year. A common yearly management fee for actively managed funds is 1.5 percent. If taken out of the fund on a daily basis it will daily depress the investor's fund value with 0.00411 percent (Wilke, 2009). Below, in Table 2-1, is an example of the effect the yearly management fee has on the return for the investor.

Table 2-1 The effects of the yearly management fee on a 1000 SEK investment over a 30 year period (Made by author based on the example of Wilke, 2005).

Yearly management fee	Return for the investor	Total expenses	Expenses/return
1.5%	10 558	5 891	56%
1%	12 268	4 181	34%
0.75%	13 211	3237	25%
0.5%	14 220	2 229	16%
0.25%	15 298	1 151	8%
No fee	16 449	0	0

As can be seen from the table, depending on the yearly management fee, the return for the investor varies. A 1000 SEK investment has during 30 years, with a yearly return of 10 percent, given a total return of 16 449 SEK. A mutual fund with a higher fee, however, provides a lower return, net of the fee, than a fund with a lower fee, given that both of the funds provide the same actual return over the same time period (Wilke, 2005). In addition, the higher the fee, the more money provided to the investment institution. There are no legal regulations regarding the level of the yearly management fee the fund is allowed to charge (Swedish Financial Supervisory Authority, 2010).

Less Swedish, but more foreign registered funds, charge a fee when it comes to *buying or selling* shares in the funds. The fee is taken as a percentage share of the withdrawn or set in amount. *Performance fee* is a charge which additionally not is commonly used amongst the majority of the funds. Nevertheless, the charge exists on a few funds and is stated in percentage terms.

When the manager trade assets in the fund, *transaction costs* arises which are taken out of the fund's value. How big the transactions costs become are dependent on how active the management is which differ from year to year. Consequently, transaction costs vary over time and cannot be stated in advanced in the same way as the yearly management fee. The funds turnover rate, the share of the fund's value which is being bought and sold each year, is directly associated with the transaction costs (Wilke, 2005). Hence, a more active fund, with high *turnover rates*, also implies higher transaction costs. TKA is a percentage measure of the total costs taken out of the fund value for a specific year. It includes the yearly management fee, the performance fee, transaction costs, taxes and administrative charges (SEB, 2010). TKA varies from year to year and need to be stated in the funds yearly report (Wilke, 2009).

All the costs included in TKA are taken out of the fund value which depresses the return for the investor. Actively managed funds have larger costs associated with its management as opposed to passively managed funds both when it comes to the yearly management fee and the transactions costs. Consequently, actively managed funds have larger costs to overcome in order to generate a return equal or superior to the market index. The higher the fee, the better the fund need to perform in order to generate superior returns.

3. Portfolio Theory

Efficient investments are of a central aspect within this study. The section introduces modern portfolio theory in order to provide an understanding of equity mutual funds as an investment vehicle. In addition, it outlines the criteria of what constitute an efficient portfolio, a crucial aspect in order to evaluate fund performance.

3.1. Return

Mutual funds are traded with its Net Asset Values (NAV). A return on a portfolio is the portfolio's capital gain or losses during a specific time horizon as well as the portfolios income during that time, such as dividend and interest payments. A mutual fund's NAV is set by taking the market value of the individual assets the fund holds and divide it equally with the number of shares in the fund. The NAV assumes reinvestments of both income and capital gains. By calculating a mutual fund's monthly return, the change in the fund's NAV during the two months are taken and divided with the original value:

$$R_{t+1} = \frac{NAV_{t+1} + DIST_{t+1} - NAV_t}{NAV_t} \qquad (3-1)$$

where R_{t+1} is the return in month t+1, NAV_{t+1} is the net asset value of the fund on the last trading day of the month t+1, $DIST_{t+1}$ being the distribution in month t+1 and NAV_t is the net asset value for the fund the last trading day at month t (Simons, 1998).

When calculating an average of monthly returns, two types of means can be used; the arithmetic mean or the geometric mean. The arithmetic mean is found by adding each month's return and divide it with the number of months. The arithmetic measure, however, does not take into account the concept of compounding which is the advantage of the geometric mean. The geometric mean has become the standard measurement to use within the investment industry (Modigliani and Modigliani, 1997). The averaged compounded monthly return can be calculated by the use of the following formula:

$$R = \sqrt[n]{\prod_{i=1}^{n}(1 + R_i)} \qquad (3-2)$$

where R is the average compounded monthly return, n is the number of months in the sample and R_i is the return at each month i (Damodara, 2002).

3.2. Risk

Important when analyzing any type of investment is to look at the investment's risk. The risk regarding a financial investment is the probability of receiving a return different from the investment's expected return (Damodaran, 2002). Most investors dislike risk and in order for an investor to be indifferent in bearing extra risk, the investor must be offered expected additional wealth (Eichberger and Harper, 1997). An asset's total risk can be measured by its variability of return; the assets volatility. This is done by measuring the assets standard deviation demonstrated in equation (3-3):

$$\sigma = \sqrt{\frac{\sum_{i=1}^{n}(R_i - \bar{R})^2}{n-1}} \qquad (3-3)$$

where σ is the standard deviation, n being the number of observations in the sample, R_i is the return at point i and $\bar{R}$ being the arithmetic mean (Damodaran, 2002). The greater the standard deviation, the more risky the investment is said to be. When measuring the risk on a mutual fund, equation (3-3) can be used in order to measure the standard deviation of monthly returns, with R_i being the return at each month and σ being the measure of how the monthly returns have deviated from the average return for the time period investigated (Simons, 1998).

3.3. The Efficient Portfolio

The total risk of a portfolio, measured by the portfolio's standard deviation, can be reduced by diversifying the investments the portfolio contains. This is done by adding assets to the portfolio that has a low correlation coefficient, measured by ϱ, in regards to the other assets in the portfolio. A low correlation coefficient between two assets implies that the returns on the assets do not move together in regards to various market occurrences (Damodaran, 2002). An investor often has the freedom to choose from a variety of different stocks when diversifying his or her portfolio. Figure 3-1, below, demonstrates an invented scenario. The figure shows the expected return and standard deviation of 10 individual stocks; the black points in the figure. By investing in a mixture of these stocks, a wider selection of risk and return can be achieved. This is represented by the shaded area in Figure 3-2 with four potential portfolios mapped out as A, B, C and D.

An investor is interested in maximizing its return for each given level of risk. Hence, portfolio C is superior to portfolio B. In fact, all the portfolios lying on the black solid line are those which offer the highest return for each given level of risk and together they form the efficient portfolio frontier. All other portfolios lying below the line can be ignored.

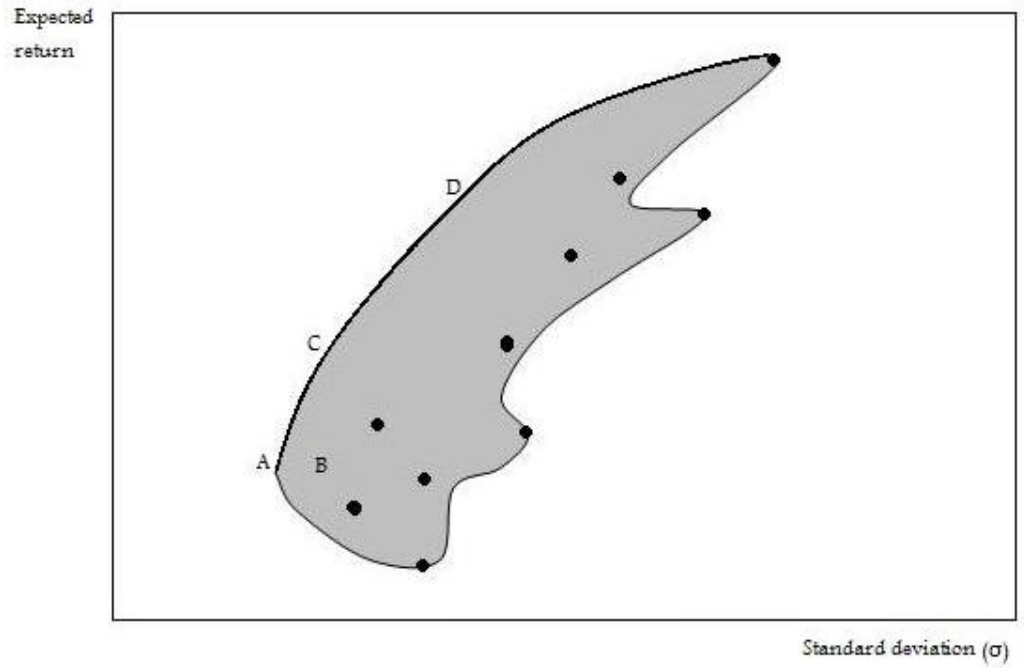

Figure 3-1 Combinations of risk and return with four potential portfolios. (Made by author based on Brealy et al., 2006).

By introducing the option of borrowing and lending at the risk-free rate, the possible combinations of risk and return that can be achieved by the investor increases. Lending would be the same as investing in a risk-free asset such as a Treasury bill. The characteristic of such asset is that its return is certain and therefore has a standard deviation of zero. In Figure 3-3 below, the risk-free asset is shown as R_F. By investing some of the capital in the risk-free asset and some in portfolio A, any combination of risk and return can be achieved along the line connecting R_F and portfolio A. However, instead of lending money, the investor can choose to place all its money in portfolio A. In addition, the investor can leverage the portfolio by borrowing at the risk-free rate and place all the additional funds in portfolio A. This would allow the investor to move further along the line, achieving combinations of risk and return to the right of portfolio A.

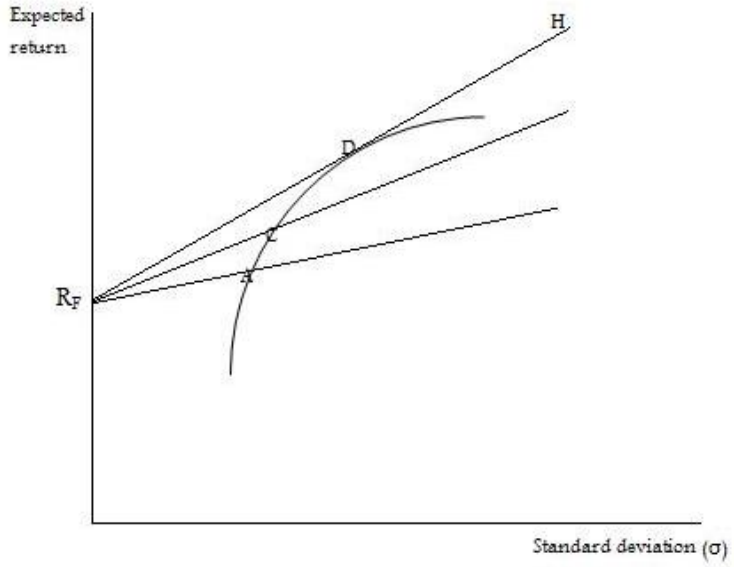

Figure 3-2 Combinations of risk and return with the option of risk-free lending and borrowing. (Made by author based on Elton et al., 2007)

As shown in Figure 3-3, combinations of risk-free lending and borrowing lie along a straight line for any portfolio. As can be seen, however, combinations of R_F and portfolio C is superior to any combinations of R_F and portfolio A. The furthest the line can rotate and still being tangent with the efficient portfolio frontier line shows the optimal portfolio, being portfolio D in Figure 3-3. Hence, with the aid of riskless lending and borrowing, an investor can combine its investment so that it lies anywhere along the line connecting R_F - D - H to suit the investors own preferences of risk.

The above model assumes that the investor can borrow and lend at the risk free rate. If this is not the case, an investor would be restricted to only be able to hold one of the portfolios present on the efficient frontier line. An investor being more tolerant to risk would choose a portfolio towards the right on the line, whereas more risk conservative investors would choose a portfolio towards the left of the line.

3.4. Risk-adjusted Performance

An important part when evaluating an investment is to see if it gave an adequate return for the level of risk it implied. As can be seen in Figure 3-2, a higher return often comes with a

higher risk. When looking upon the performance of a mutual fund, an investor should not look at the fund's performance in isolation, but rather in comparison to how other portfolios have performed (Elton et al., 2007). Looking at Figure 3-2, an efficient portfolio can be defined as the portfolio which offers the highest return for each given level of risk. Mutual funds, however, often come with various levels of risk, making it difficult for the investor to know which fund that performs best; i.e. is efficient, given the level of risk. Risk and return are positively related, thus, funds that take on larger risks should have a greater return than funds that take on smaller risks. Consequently, in order to compare the performance of a sample of mutual funds, they must be adjusted so that they represent the same level of risk. This can be done by using various risk-adjusted techniques. In doing so, either the funds total risk can be used; their standard deviation, or the funds nondiversifiable risk; their betas. Below is a presentation of both.

3.4.1. Sharpe ratio

The Sharpe ratio has long being viewed as the most common risk-adjusted measure when evaluating portfolio performance (Simons, 1998). It was developed by Sharpe when he studied the performance of a set of mutual funds in the period 1954-63 (Sharpe, 1966). The ratio measures the excess return to variability; i.e. the extra return for each unit of risk and is often called the reward-to-variability ratio. It is estimated by the use of the following formula:

$$Sharpe\ ratio = \frac{(R_p - R_F)}{\sigma_p} \qquad (3-4)$$

with R_p being the return on the portfolio, R_F being the return on a risk-free asset such as a 90 day Treasury bill and σ_p being the variability of annual returns (Sharpe, 1966). The measure allows direct comparison between any mutual funds no matter their risks or correlations with a specific benchmark. The best portfolio is the portfolio for which the Sharpe ratio is the greatest; it would be the one which offers the highest rate of return given the level of volatility. This is depicted in Figure 3-3:

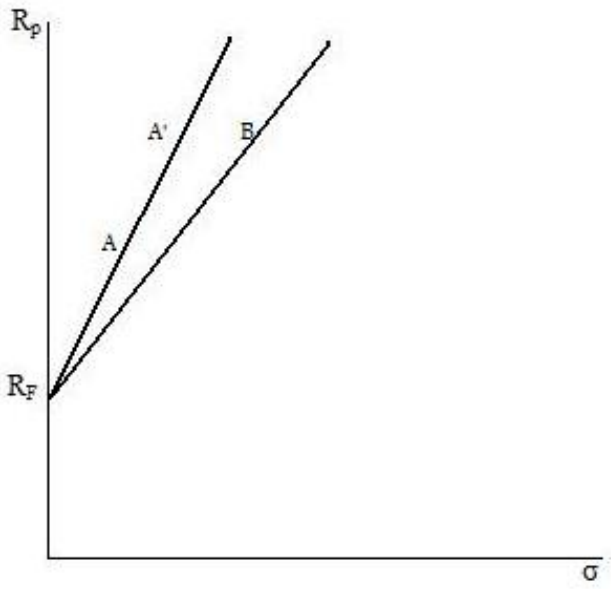

Figure 3-3 The efficient portfolio. (Made by author based on Elton et al., 2007)

The Sharpe ratio builds upon the efficient portfolio theory presented in section 3.3 and assumes that the investor can borrow and lend at the same risk-free rate. The slope of each line is given by the Sharpe ratio, equation (3-4). In Figure 3-3, fund B earns a higher return than fund A, although fund A has a higher Sharpe ratio which translates into a steeper line. Instead of investing in fund B, the investor can borrow additional capital at the risk-free rate and invest the money in fund A. This would move the investor to A', giving the investor a return equal to that of fund B, albeit to a lower risk. By the use of lending and borrowing at the risk-free rate, the investor can achieve any level of risk and return with fund A. Hence, the fund with the highest Sharpe ratio is always the superior choice.

3.4.2. Additional Risk-adjusting Techniques

An additional risk-adjusting technique which also uses the portfolio's standard deviation when adjusting for risk is the risk-adjusted performance (RAP) measure developed by Modigliani and Modigliani in 1997. The Modigliani measure shows the fund's return, having it had the same risk as a benchmark portfolio; i.e. the market index. Although the measure is relatively new, it has quickly gained recognition, much due to being easier to understand for the average investor and is by today a widely accepted theory (Scholz and Wilkens, 2005). Both the Sharpe and the Modigliani measure are subject to the limitation that it assumes that the investor can borrow and lend at the risk-free rate. Additionally, they both use the portfolio's total risk when adjusting its performance. If the same benchmark is used in the evaluation of the mutual funds, the ranking of the funds would be identical, independently if the Sharpe or the Modigliani measure was used (Modigliani and Modigliani, 1997).

Two other well known risk-adjusted techniques are the Treynor measure and the Jensen measure (Elton et al., 2007). These measures use the portfolio's market risk, their betas, instead of their total risk, their standard deviations. The market risk is relevant using when the analyzed mutual fund is part of a portfolio containing other assets as well. If so, the unique risk of the mutual fund can be neglected due to the portfolio being diversified, leaving only the market risk needed to adjust for. In contrast, the standard deviation is only a relevant measure when the mutual fund represents the investor's entire savings (Scholz and Wilkens, 2005; Simons, 1998). As the thesis will look upon the performance of each single fund in isolation and not as part of a wider portfolio of investments, only the risk-adjusted measure which uses the portfolio's total risk will be relevant in the study. In addition, Gallagher (1988) found that the Sharpe index and Treynor index tend to rank portfolios similarly.

4. Market Efficiency Theory

The section provides the underlying theory essential to the discussion of actively managed equity mutual funds ability to outperform the market as well as discusses the effects of expenses on mutual equity fund performance.

4.1. Efficient Markets and the Random Walk Defined

In the early 1950's, a British statistician named Maurice Kendall conducted a research with the aim to study the behaviour of commodities and stock prices (Fama, 1970). Kendall found that the price development showed no consistent regular behaviour, rather, he suggested, they seemed to follow a random walk. With the contribution of several of additional studies regarding stocks' price behaviour, the theory of the random walk evolved (Fama, 1965). In the 1960's, Eugene Fama, described as the founder of the research conducted within markets ability to reflect information, introduced the concept market efficiency. Fama (1965) defined an "efficient" market as one which consists of a large number of actively competing participants where no one enjoys price setting power. All the participants act rationally with the aim to fully maximize their profits. Each participant's task consists of predicting individual securities true worth, in a setting where essential information is, to a great extent, freely available to all competing participants (Fama, 1965). Consequentially, the competition among the participants would entail that the actual price of each security always fully will reflect all the available information existing in the market. "*In other words, in an efficient market at any point in time the actual price of a security will be a good estimate of its intrinsic value"* (Fama, 1965, p.56)

Prices will, however, change across time due to two reasons. Firstly, intrinsic values cannot be set exactly due to various disagreements among the participants regarding an assets true worth. With markets being efficient, however, this would cause the price to randomly change around its true worth. If any systematic pattern would occur regarding assets actual prices and their intrinsic values, it would quickly be exploited by the participants and hence the systematic behaviour would disappear (Fama, 1965). Secondly, prices will change due to the asset's intrinsic value itself will change across time. This is due to new information being released which will affect the assets true worth in either a positive or negative way. Again, however, Fama (1965) states, that in an efficient market, the new information affecting the assets true worth, will instantaneously be reflected in the actual price of the asset. As a result of this, price changes will have no dependencies regarding upon their previous historical prices. This is what Fama (1965) classifies as a random walk. In essence; "*stock price changes has no memory – the past history of the series cannot be used to predict the future in any meaningful way"* (Fama, 1965, p.56). Consequently, a simple policy of when to buy and sell a security will be just as good as any complicated mechanical study for the same purpose (Fama, 1965).

4.1.1. Implications to the Mutual Fund Analysts

Fama (1965) realized that the theories, as well as the voluminous studies which supported the hypothesis, were in no favour for the technical and fundamental analysts. If stock prices follow a random walk in the way that past prices cannot be used to predict future prices, there is no real value in the work of the technical analysts (Fama. 1965). For the fundamental analysts, however, the hypothesis becomes more complicated. Fama (1965) states that if the random walk theory is applicable and if markets are "efficient", stock prices, at any time, will reflect their true worth. Hence, the work of the fundamental analysts is of no value unless he or she possesses information which not yet has been available to the market. If not, a security chosen by an analyst will not produce a return

better than that of a randomly selected security; were they in the same level of riskiness. The task for the analysts hence become to show that their work is value adding by demonstrating that they can generate a return better than the random selection. Due to the possibility of luck, the superior return needs to be consistent in order for the work to be defended as better than a simple buy and sell strategy. This is due to that for any given time, there is 50% chance of producing better than the random selection (Fama, 1965). Although the techniques must be proven to consistently hold, the superior performance must be true after that resources and time spent on the more complicated procedure has been withdrawn. This leads to the discussion of mutual funds ability to outperform the market. Fama (1965) states that mutual funds appeals to the public due to two basic claims; firstly, mutual funds consists of the resources of many individual investors. Hence, a mutual fund can diversify more effectively the investments than a single investor would be able to do. Secondly, due to that the manager of the fund more closely will be able to observe the market, the manager will be better at spotting the good and bad buys.

Fama (1965) concludes that the first statement most often is true, but casts its doubts over the second claim. He presents the result of the study where the foundlings where such that if the initial loading fee of the mutual funds were ignored, the funds did about as well as a randomly selected portfolio. If the initial loading were taken into account, however, the funds' performances were inferior to that of the random selection. The results were in line with similar studies and the belief by the random walk theorists conformed to such that financial institutions and investment advisors probably cannot perform better than a simple buy and hold strategy (Fama, 1970).

4.1.2. The Three Forms

Fama realized that the definition of an efficient market was too general to be tested empirically (1970). Consequently, in his paper "Efficient Capital Markets; a Review of Theory and Empirical Work" from 1970, Fama further developed the hypothesis by classifying the market efficiency into three different categories, with each category reflecting a certain degree of information within the market price. Fama (1970) found that the support for the efficient market theory was large and that the contradictory studies were rare.

The *weak* form of market efficiency states that all historical information already is incorporated in the current price. Consequently, analysis of historical prices will not be helpful in order to predict the current price as the market already successfully has incorporated that information (De Ridder, 2002). The weak form of market efficiency rejects the work of the technical analyst as being able to bring value to the investment (Malkiel, 1999). Fama (1970) found that the tests conducted were in strong support of the weak form of market efficiency, in addition, the tests for this form of efficiency was also the most voluminous conducted amongst the researchers.

The *semi* strong form of market efficiency states that prices fully reflect not only information in past prices, but also all publicly available information (Fama, 1970). Markets will thus immediately adjust to various announcements concerning a firm. Analysis of public information such as a company's financial statements can hence not consistently bring superior returns. The semi strong form of market efficiency rejects the work of the market analyst as being able to bring value to the investment (Malkiel, 1999). Fama (1970) found that tests conducted supported the semi strong form of market efficiency. Mutual fund managers' ability to generate a risk-adjusted return superior to the market is said to be a test of whether the market is efficient in the semi strong form or not (Hägg, 1988)

The *strong* form of market efficiency assumes that prices fully reflect all existing information. Under such efficiency, not even "inside information", possessed by managers within firms could help determine if a stock is under or overvalued (De Ridder, 2002). The strong form of efficiency is considered the most difficult to test for empirically. De Ridder (2002) suggests that the strong form of efficiency can be tested for by, again, looking at mutual funds ability to generate superior returns. Mutual funds' analysts frequently meet representatives from various firms and by that hope to get access to unique information. De Ridder (2002) states that the studies conducted have shown that mutual fund managers have not been able to generate consistent superior returns which could suggest that the market is efficient in the strong form.

Claesson (1987) conducted a study with the purpose to give an indication of the efficiency of the Swedish stock market. An efficient stock markets was defined as one where prices always fully reflect all available information. Claesson's (1987) study concerned the weak and semi strong form of market efficiency. Her findings were such that the Swedish stock market have not been completely efficient at all times, but the variations were not big enough for investors to not regard the Swedish stock market as being other than efficient. Hence, the best investment strategy was considered that of a simple buy and hold strategy by a diversified portfolio.

4.2. Contradictory Results

The efficient market hypothesis state that mutual fund manager cannot consistently by the use of either technical or fundamental analysis generate superior returns to that of a randomly selected portfolio. Consequently, in a market where the strong form of efficiency is proven to hold, the best investment is considered that of a market index (Brealy et al., 2006). The early research conducted on the efficient market hypothesis showed that the theory was a good description of how the capital market functioned and any contradictory results were regarded with great suspicion (Brealy et al., 2006). Uninformed investors could, from a simple buy and sell strategy, perform just as well as the informed experts (Malkiel, 1995) At the beginning of the 1980's, however, studies emerged which suggested that the markets may not were as efficient after all (Malkiel, 1993).

4.2.1. The Modified Market Hypothesis

In a famous paper by Grossman and Stiglitz, attempts were made to redefine the efficient market hypothesis. Grossman and Stiglitz (1980) showed that when information is costly to obtain, the efficient market hypothesis in its original form becomes unsustainable. Under Fama's definition of market efficiency, stock prices at all time reflect all available information. For the theory to hold, costless information was a sufficient condition. Grossman and Stiglitz (1980), however, recognized that costless information was not only a sufficient condition; rather, it was a necessary condition. If information is not free to collect and if trade occur at prices that incorporate all information, informed traders cannot expect to earn a superior return on the information he or she possess. Consequently, the traders would not get compensated from becoming informed. Traders could hence stop paying for information and still do as well as those that did. As a result, no one would want to pay for information and everyone would trade uninformed. Grossman and Stiglitz hence argued that an economic incentive would thus arise to collect information to be used in the trading process before others found out. According to the theory, informed traders can hence do better than others due to skills in gathering information (Elton et al., 2006). If so, the superior performance could be attributed to a fund managers expertise rather than luck when picking mispriced securities. In addition, the superior performance should be expected to be persistent over time. The modified market hypothesis speaks in favour for

actively managed equity mutual funds and claims that fund managers can add value above index investing. The theory implies that the return of the actively managed funds and the passive portfolio would be equal after expenses have been withdrawn (Ippolito, 1993). Contrary, under the original version of the market hypothesis, managers should not be able to add value above index investing and the performance, after expenses have been withdrawn, should be inferior to the passive management (Ippolito, 1993).

4.2.2. Market Anomalies

An additional argument why incentives exist to gather information which might could lead to superior performance is due to market anomalies. An anomaly is a documented departure from the efficient market hypothesis which opens up the possibility of investing in assets which are not correctly priced by the market (De Ridder, 2002). As time go, new anomalies are detected whereas old get questioned. Nilsson and Torssell (2007) argue that all efficient stock markets around the world function in the same way. Hence, studies conducted regarding anomalies on the American stock market can be adaptable to the Swedish stock market. Well known anomalies are seasonal effects. Seasonal effects state that the return on stocks tend to be higher in January than in other months of the year. In addition, the returns also tend to be lower on a Monday compared to other weekdays as well as higher either on the start or the end of the day (Brealy et al., 2006). An additional common anomaly is the small firm effect. The small firm effect is one of the aspects this study looks upon and a thorough outline of its implication will be given in section 5.1. It is unclear, however, whether the profits which arise from anomalies still are superior after various costs have been withdrawn from detecting and trading on them (De Ridder, 2002). If anomalies offer easy returns, investors would try to exploit the benefits they provide. Consequently, if a mispricing is documented, it would soon be eliminated by the active traders (Brealy et al., 2006). Having said that, when a new anomaly is presented, it hence has a tendency to disappear (Nilsson and Torssell, 2008). Nilsson and Torssell (2008) argue that profitable anomalies generally come and go on the stock market.

5. Empirical Section

The section applies the theoretical framework on real world data. This is done in order to draw conclusions regarding the discussed effects made in the previous section regarding mutual equity fund performance and their expenses. In addition, it examines the effect of various additional fund characteristics. The section is split up such that it presents the result of two studies; firstly, how the funds have performed in comparison to their benchmark indices; secondly, the results of how various characteristics have affected fund performance.

5.1. Presentation of Model and Variables

Below are the models presented for the regressions performed in the study. Two regressions are conducted due to lack of available data for the variable turnover rate. This was done in order to not lose observations for the initially intended regression; equation (5-1). The initially contemplated regression where thus split into two cross-sectional regressions:

$$\text{sharpe ratio} = \alpha + \beta_1 \text{yearly management fee} + \beta_2 ln\text{size} + \beta_3 \text{age} + \beta_4 \text{PPM} + \beta_5 \text{performance fee} + \beta_6 \text{buy\&}sell + \beta_7 \text{small cap} + \varepsilon_i \quad (5-1)$$

$$\text{sharpe ratio} = \alpha + \beta_1 \text{turnover rate} + \varepsilon_i \quad (5-2)$$

Taking the natural logarithm out of the size variable was considered useful due to its non normal distribution.

Sharpe ratio

The dependent variable is the risk-adjusted return for each fund in the sample based on a time period of 36 months from 2006-12-31 to 2009-01-04. The data for the variable was received from Navcenter and was calculated in several steps. The monthly return is calculated according to equation (3-1) in section 3.1. Equation (3-2), in section 3.1 is used when finding each funds geometric average monthly return. The funds are risk adjusted by the use of the Sharp ratio, equation (3-4) in section 3.4.1. The standard deviation for each fund is calculated according to equation (3-3) in section 3.2. The risk-free rate of return used when calculating the Sharpe ratio is the monthly geometric average return for a 90 day Treasury bill based on the same time period as for the funds in the sample. The data for the 90 day Treasury bill have been received from the Swedish Central Bank.

Yearly management fee

The data for the variable is received from Morningstar. The fee is a percentage of the fund's total value. In the regression, however, the fee is treated as a non percentage value such that a fee of 1.5% is treated as a value of 1.5. If the efficient market hypothesis holds true in its original form, equity mutual fund managers should not consistently be able to outperform the market. Hence, a negative relationship would then be expected to be observed between higher fees and fund performance due to managers' inability to increase performance to cover for the fee they charge (Lijleblom and Löflund, 2000). In contrast, Grossman and Stiglitz argue that management skills do exists due to different abilities to gather information which can be used in the trading process to increase the return of the fund (Elton et al., 2006). This is true when information is costly (Grossman and Stiglitz, 1980). More resources devoted to collecting information, such as higher management fees, would enable the fund manager to get access to more resources which could be used in the trading process. One such possibility would be to exploit market anomalies. A positive

relationship would then be expected to be observed between mutual fund performance and the yearly management fee.

Size
The data for the variable is received from Morningstar and constitute of each fund's total value in millions of SEK as of 2009-02-28. Funds with a high market value have less flexibility in their trading activities than funds with smaller market values due to having a larger amount of capital to invest for each percentage share of the fund's total value. This reduces the investment possibilities for the fund due to the accessibility of firms with high market values being restrained. This is believed to have a negative impact on the performance of the fund. In addition, the fund's market transactions might also cause disruptions to the market. If so, the fund could risk buying and selling stocks to a price which were not to the intended, negatively affecting the return on the investment (Wilke, 2005). In contrast to this, a larger fund can take advantage of economies of scale which would imply that a smaller percentage share of the funds vale can be used to obtain the same analysis as a smaller fund. Alternatively, if the same percentage share was used the fund can obtain more and higher qualitative analysis (Sharpe, 1966). This would only be relevant if mangers can add value above index investing. If the fund is big, however, more analysis might be needed than for a smaller fund (Sharpe, 1966). No clear hypothesis can be made of how the size of the fund should be associated with performance. A study by Gallagher (1988) found that the performance between large and small mutual funds did not differ much when looked upon from a risk-adjusted basis. Elton et al. (2006) found no relationship between fund size and performance whereas Dahlquist et al. (2000) found that smaller equity funds did perform better than larger equity funds.

Age
The launch date for each fund is collected from Morningstar and the variable is found by taking the number of months from the start date until the last month of 2009. The sample in the study consists of a wide age mix which makes it interesting to examine if age is related to any type of performance. In a study by Kreander, Gray, Power & Sinclair (2005), a positive relationship was found between age and performance, although the result was not found to be statistically significant. No clear hypothesis can be made regarding this variable.

PPM
The variable is a dummy with a number of 1 assigned to those funds which belongs to the PPM system. The information regarding this variable is received from Morningstar. Due to the sample consisting of funds which belong to the PPM system, interesting to examine is if those funds are associated to superior performance or not. No clear hypothesis can be made regarding how this variable should affect performance.

Performance fee
The variable is dummy with a number of 1 assigned to those funds having a performance fee. The information regarding this variable is received from Morningstar. A fund having a performance fee increases the incentives for the fund managers to generate superior returns. At the same time, however, more money is withdrawn from the fund which depresses the return for the investor. No clear hypothesis can be made regarding how this variable should affect performance.

Buy&Sell
The variable is a dummy with a number of 1 assigned to those funds having a buy- and or sell charge. The information for this variable is received from Morningstar. A buy & sell

charge is used in order to compensate the long term investors of the fund for the costs the short term investors causes when purchasing and selling shares of the fund. Consequently, funds with buy & sell charges would attract more long term investors. In both cases, the charges incur extra costs for the investor. No clear hypothesis can be made regarding this variable. Elton et al. (2006) found that funds which have a buy charge had a performance inferior to those funds which did not.

SmallCap
The variable is a dummy with a number of 1 assigned to those funds which only invest in firms with small and medium market values. The information for this variable is received from Morningstar. The small firm effect is a market anomaly which has been well discussed in the financial literature (Brealy et al., 2006). It stems from the fact that firms with small market values tend to generate a return higher than what can be motivated in regards to the risk they imply (Nilsson and Torssell, 2008). Brealy et al. (2006) argue that the small firm effect disappeared shortly after it firstly was documented in 1981. De Ridder (2002), however, presents a study conducted on all listed Swedish firms between the years 1965 to 1988. The result shows that firms with low market values generally had a greater return than firms with higher market values. The sample within this study contains of certain funds only investing in firms with small and middle market values. If the small firm market anomaly is persistent, the SmallCap funds should have a performance superior to the other funds in the sample.

Turnover rate
The variable contains turnover rates from the year 2008 and is collected from each fund's yearly report. The year 2008 is used due to being the year when the availability for this variable was the highest. A notation was made when collecting the variable that the turnover rate did fluctuate much between the years for the funds in the sample. The turnover rate indicates the share of the fund's total value which have been bought and sold over the year (Wilke, 2005). A fund with a higher turnover rate indicates a more active management than a fund with a lower turnover rate. Purchases and sales of stocks imply turnover cost which depresses the net return to the investor. Whether funds with high turnover rates have superior performance or not depends on the ability of the manager of the fund to create value added from the transactions to compensate for the costs that arises. If not, a negative relationship can be expected to be observed between fund performance and turnover rates. The discussion of this variable is closely related to fund managers' ability to add value above index investing. If managers are not successful at outperforming the market, the hypothesized effect would be negative in relation to fund performance. Otherwise, the opposite should be true. Elton et al. (2006) found that funds with low turnover rates have superior performance compared to funds with high turnover rates. In contrast, Dahlquist et al. (2000) found a positive relationship between trading activity and performance.

Error term (ε)
The error term is added to the model in order to capture effects from omitted variables and possible misspecifications.

5.2. Additional Assumptions

The funds in the sample are chosen based on Morningstar's definition of equity mutual funds belonging to the subcategory Sweden and Sweden; small and medium sized firms. All the index funds within this category have been removed.

The sample is not free of survivorship bias due to that data could not be obtained for those funds that no longer are of existence. Consequently, the sample used in the study only consists of funds which existed at the end of the time period whereas funds which have ceased operation due to taking on a high level of risk are not represented. This will overstate the aggregated performance of the mutual funds (Elton et al., 2006).

The data received for the study was not complete due to only containing total end of the month NAV for 31 funds used in the study. The end of the month NAV is adjusted for each specific day's closing value on the Stockholm stock exchange. In order to be consistent when calculating the funds' returns, the daily NAV, as opposed to the NAV adjusted for the closing value, is used for all of the funds in the sample. The benchmark indices, however, are calculated by the use of each day's closing value of the Stockholm stock exchange. A sample of nine funds, of which complete end of the month NAV existed, have been taken of which the return was recalculated. The individual performance of six of those funds changed. Five fell in performance and one rose in performance. The changes in performance were not large and it is not assumed that this will affect the aggregated performance of the funds when compared to the benchmark indices.

The returns of the funds are gross of the sell&buy charge for those funds having this fee. These charges are not withdrawn on a regular basis due to only being a single payment. Hence, the effect of the charge is difficult to estimate. If only investing in the fund for a shorter time period, the effect of this charge would be greater than if investing in the fund for a longer time period.

5.3. The result of the Risk-adjusted Return

Below, in table 5-1, a presentation of the risk-adjusted return for the funds used in the study can be found. A complete list of the funds' Sharpe ratio can be found in appendix 1. The descriptive statistics is only based on the funds in the sample and does not include the result of the benchmarks indices. As can be seen, two benchmarks indices have been used; OMXS30GI for all the funds in the sample and OMXSSmallCAPGI[4] for the funds only investing in small and medium market value firms. Both the benchmarks are reinvested indices. As can be seen, the average return for the sample period studied is negative. This is in line with what one could expect given the global financial crisis which negatively affected stock markets around the world. Looking at the individual performance of the funds, a great majority of all the funds had a performance inferior to the market index with only 11.4% of the funds generating a return higher than the OMXS30GI index. The result is lower than what Sharpe found in his study from 1966. The maximum performing fund obtained a return 25% greater than the index, whereas the minimum performing fund obtained a return which was 39% below the market index. The median was rather close to the mean of the sample indicating an even spread of the fund performance. Out of the funds which outperformed the market index, 60% were funds investing in firms with small and middle market values. In contrast, however, when looking at the OMXSSmallCapGI, one can see that the SmallCap index did substantially worse. Consequentially, 84.4% of the funds investing in firms with small and middle market values outperformed this benchmark index. The findings give a mixed view concerning the small firm market anomaly. The variable is further studied in the section 5.5.1.

[4] Information regarding how the indices have been calculated can be found in Appendix 1.

Table 5-1 The result of the risk-adjusted returns of the funds used in the study.

	Sharpe ratio
Mean	-0.45
Median	-0.442
Maximum	-0.309
Minimum	-0.575
Std. Dev.	0.045
OMXS30GI	-0.412
OMXSSmallCAPGI	-0.490
Underperformance of the funds	9%
No. of Funds with a Performance above the OMXS30GI	11.4%
No. of Funds with a Performance above the OMXSSmallCAPGI	84.4%
N	88

Note: the confidence interval for the mean value of the funds received an upper bound of -0.44 and a lower bound of -0.46.

On average, when looking at the mean, the funds did not on a risk-adjusted basis outperform the overall market index; the OMXS30GI. On the contrary, the funds had a mean performance which was about 9% below the market index. When conducting a 95% confidence interval in order to determine if the difference is statistically significant the lower and upper bound received values of -0.44 and -0.46. The value of OMXS30GI is not included within these values which confirm that the underperformance by the funds is statistically significant. One should keep in mind that the sample is subject to survivorship bias which indicates that the result obtained might be overstated; the funds could have underperformed the index with more than 9%. The result, nevertheless, is in line with the findings of Sharpe (1966), Jensen (1967), Malkiel (1995), Carhart (1997), Dahlquist et al. (2000) and Elton et al. (1993) and supports the efficient market hypothesis; the performance, net of expenses, measured over a longer time period is inferior to the market index. Mutual funds inability to outperform the market gives support to the Swedish stock market being efficient in at least the semi strong form. De Ridder (2002), suggests that this gives support to the strong form of market efficiency as well. As a consequence of this finding, a negative relationship should be expected to be observed between fund performance and fees as well as for turnover rates.

When looking at the individual performance of the funds, 11.4% did, nevertheless, have a performance superior to the market index. Section 5.5 examines if the superior performance of those funds are associated to any type of fund attribute.

5.4. Descriptive Statistics of the Model Variables

Looking at Table 5-2, below, the average yearly management fee for the funds in the sample was found to be 1.297%, with the maximum fee being 2% and the minimum 0.4%. The median obtained was a little bit higher than the mean, suggesting the relatively low fee funds being rather close to the minimum value. The variable size is not shown in its logged form, but rather in its original value. This is done due to the original values providing more meaning when interpreting the figures. There are large difference in the values between the funds. The smallest fund has a value of 9.6 million SEK and the largest a value of 15948.45 million SEK. The mean is larger than the median by an fairly great amount, suggesting that the majority of the funds are relatively small. The funds' age show large variations as well. The youngest fund in the sample is 38 months old whereas the oldest fund is 511 months old, dating back to the 1960's. In comparison to that, the mean is rather low, being a value of approximately 165 months indicating that the majority of the funds are rather young, dating back to the 1990's.

Table 5-2 Descriptive statistics of the model variables.

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
Yearly management fee	1.3	1.435	2.000	0.400	0.406	88
Size	2338.071	843.798	15948.45	9.60	3393.273	88
Age	166.33	157.5	511	38	86.385	88
SmallCap	0.36	0	1	0	0.483	88
Sell&Buy	0.08	0	1	0	0.272	88
Performance fee	0.068	0	1	0	0.253	88
PPM	0.522	1	1	0	0.502	88
Turnover rate	1.16	0.8	6.36	0.21	1.04	75

Looking at the variables which are assigned with dummies, we can see that 51.7% of the funds belong to the PPM system. Only 6.7% charges a performance fee whereas 7.9% have a sell&buy charge. In addition, 36% of the funds only invest in firms with small and medium market values.

The turnover rate shows a mean and median closer to the minimum rather than the maximum, indicating a sample with the majority of the funds having a turnover rate being relatively low.

5.5. Output of the Regression Model

The regression output was computed using the ordinary least square method (OLS). No heteroscedasticity was detected in neither of the regressions as tested by the White's cross-term test and the model variables showed no sign of multicollinearity as indicated by VIF-values no larger than 1.6[5]. In addition, no presence of outliers could be detected for the variables included in regression equation (5-1), indicating robustness of the variables (Gujarati, 2003). Complete output regression results can be found in appendix 2 and 3.

5.5.1. Regression Equation (5-1)

The yearly management fee received a coefficient which was negative. This is in line with the conclusions drawn in section 5.3, although the variable was not found to be statistically significant. The variable can hence not be concluded to have had any impact on the performance of the funds.

Table 5-3 Output result from regression equation (5-1).

Variable	B	t-statistics
Constant	-0.472***	-17.212
Yeraly management fee	-0.007	-0.496
***Ln*size**	0.009***	3.091
Age	-7.393E-5	-1.225
PPM	-0.017	-1.583
Performance fee	-0.08***	-3.353
Buy&Sell	0.002	0.177
SmallCap	-0.003	-0.303
R^2	0.222	
N	88	

Notes: *** significant on the 1% level ** significant on the 5% level and * significant on the 10% level.

The size variable, on the other hand, came out positive and significant on the 1% level with a coefficient of 0.009. The result implies that a 1% increase of the size of the fund would lead to a marginal increase of 0.009 units on the fund's risk-adjusted performance. The natural logarithm was taken out of this variable due to not being normally distributed .The result obtained when this variable was run in its original form can be found in appendix 2. Taken the natural logarithm gave the variable a stronger positive effect on the dependent variable as well as increased the significance level from the 10% level to the 1% level of significance. The transformation of this variable had only marginal effects on the additional variables and did not contribute to any changes of the conclusions drawn from those.

The age variable had a negative coefficient, albeit very small and statistically insignificant. The conclusion drawn must be that age has had no impact on performance. The same

[5] See Appendix 2.

conclusion can be drawn for the Buy&Sell, PPM and SmallCap variables which also showed to be statistically insignificant. On the contrary, the performance fee variable was found to have had a negative impact with a coefficient of -0.08, significant on the 1% level of significance. As a result, funds with a performance fee lower the risk-adjusted return by the amount of 0.08 units.

The model gave a R^2 value of 0.222. The value is low and indicates that the model was not very successful at explaining performance which is further suggested by the low amount of variables statistically significant in the model. The constant in the model is significant on the 1% level of significance but does not have a meaningful interpretation within this model.

5.5.2. Regression Equation (5-2)

As can be seen from Table 5-4, below, the turnover variable has a negative coefficient, indicating that a more active fund would have a negative impact on the risk-adjusted return. This is in line with the suggestion made in section 5.3. The variable, however, is not statistically significant, rejecting any conclusion drawn regarding the impact this variable has on the dependent variable.

Table 5-4 Output result from regression equation (5-2).

Variable	B	t-statistics
Constant	-0.445***	-55.391
Turnover 2008	-0.006	-1.157
R^2	0.018	
N	75	

Notes: *** significant on the 1% level. ** significant on the 5% level and * significant on the 10% level.

When removing two observations which had values different from the other observations[6], the result became such, as can be seen in Table 5-5, below, that although the value of the coefficient changed marginally, the variable became statistically significant on the 10% level of significance.

[6] The two observations had values of 5.99 and 6.36 as compared to the closest value of 2.66 of the additional funds in the sample. This can be seen in Appendix 4.

Table 5-5 Output result from regression equation (5-2), excluding outliers.

Variable	B	t-statistics
Constant	-0.437***	-45.257
Turnover 2008	-0.014*	-1.756
R^2	0.042	
N	73	

Notes: *** significant on the 1% level. ** significant on the 5% level and * significant on the 10% level.

The constant in both of the regressions are significant on the 1% level of significance. Similar, however, as in regression equation (5-1), the constant does not provide any meaningful interpretation for the model. In both of the regressions the R^2 value is low, indicating that the model is not successful at explaining performance.

Since the size variable showed to have a positive impact on performance, in addition, since a larger fund is believed to have less flexibility, interesting to look upon would be how size and turnover are correlated. Turnover was shown to have a negative impact on performance, excluding the outliers. Consequently, if a larger fund performs better, in addition, if a lower turnover performs better, size and turnover should be negatively related in order for the result found for size to hold. Size and turnover was fund to have a negative correlation of -0.212, significant on the 10 percent level of significance. This can be seen in appendix 3.

5.6. Analysis

The aim with the active management is to generate a return superior to the market index. This is done by constructing a portfolio containing of assets different from what would be held in a passive portfolio, or a market index, based on the manager's predictions regarding the future (Brealy et al., 2007). From the empirical result, it becomes clear that actively managed equity mutual funds, on average, net of expenses, are not successful at outperforming the market index (OMXS30GI). Hence, they are not successful at fulfilling their aim with their management. The result is in line with the original version of the efficient market hypothesis, claiming that prices already contain all available information. The result confirms that the Swedish stock market is efficient in at least the semi strong form (Hägg, 1988). This is in line with the conclusion made by Cleasson (1987). Consequently, resources spent in finding mispriced securities are a wasteful task as the resources spent cannot be invested sufficiently enough to justify for the costs that the active management entails. The study, however, only concerns three years, which could be considered as a fairly short time period as far as equity investments are concerned. Nevertheless, the result is in line with previous studies (Malkiel, 1995; Carhart, 1997; Dahlquist, 2000; Elton et al., 1993) and confirms the belief firstly conformed by Sharpe (1966) and Jensen (1967) in the 1960's that fund managers are not successful at adding value above index investing. Due to these findings, considering the large interest this form of investment has by the Swedish population, the validity of using this type of investment needs to be raised. Based on the findings within this study, actively managed equity mutual funds cannot be regarded as efficient investment portfolios as determined by their average performance. This is due to that a higher return could have been achieved by investing in the market, for example index investing. This is not to say that this would concern all type

of stock markets. The study regards the Swedish stock market, however, due to all efficient markets functioning in the same way (Nilsson and Torssel, 2007), this conclusion can be drawn for all stock markets proven to be efficient. What need to be mentioned in regards to this conclusion is that the study has not looked into how well an index fund manage to replicate the index it is designed to follow, however, the option should not be ruled out.

One might have observed that the findings of the SmallCap funds provide a flaw to the previous conclusion. If the Swedish stock market is efficient in its strong form, 84% of the SmallCap funds should not have been able to outperform the SmallCap index. The finding, however, suggests that SmallCap firms might be less researched. An information advantage would hence lead to superior performance by the active management. If one considers only investing in SmallCap firms, an active investment strategy should be preferred as opposed to index investing. What is important to consider, however, is that on average, the market index (OMXS30GI) did outperform both the SmallCap funds and the non SmallCap funds. Hence, the Swedish stock market can be considered being efficient in at least the semi strong form. Consequently, managers are not, on an average, successful at adding value above index investing.

Due to fund managers' inability to add value above index investing, one would expect a negative relationship between fund performance and the yearly management fee. The yearly management fee was found to have had no statistically significant impact on fund performance. This leads to the issue of whether there can be a justification of the differences in the fees funds charge. A higher fee provides more resources for the fund manager to conduct various analyses. As the active management have been proven not to be able to add value above index investing, the thesis cannot find any justification of the differences in the fees between the funds. A fund with a higher fee does not guarantee a better performance, nor does a fund with a lower fee. Whilst a high expense fund was not proven to perform better, a high expense fund will guarantee that more money is withdrawn from the fund's value, depressing the return for the investor. If performance happens by chance rather than management skills, a safer strategy would be to go for a low expense fund rather than a high expense fund. Although the thesis has not looked into how the money collected by the management fee is distributed within the investment institution, one should keep in mind that a higher fee does provide more money to all parts involved in distributing and managing the fund. A message to convey would thus be that investors should be more price conscious when choosing a fund.

On average, actively managed equity mutual funds have not been found to be efficient investments. Looking at the individual performance of those funds, however, 11.4% did outperform the market index. Important to analyze is if whether the superior performance of those funds are associated to any type of characteristics.

Turnover was found to have had a negative impact on performance when removing the outliers. This is in contrast to Dahlquist et al. (2000) but in line with Elton et al. (2006). A higher turnover indicates more costs. If the active management is unable to add value above index investing as previously concluded, more costs should further depress the performance. Hence, the result for this variable is in line with the study's previous conclusion. Important to note, however, is that the data for this variable only concerns 12 out of 36 months of which performance is based upon. This could make the conclusion of this variable questionable. In addition, a high turnover one year does not indicate a high turnover next year. Hence, from the point of view of the investor, the result provides little help when choosing between two funds.

The SmallCap index did substantially worse than the OMXS30GI index. On the other hand, 60% out of those funds which did outperform the market index were funds investing in firms with small and medium market values. This gives a mixed view upon the small firm market anomaly. Looking at the SmallCap variable, the thesis finds no support for that funds investing in firms with small and medium market values generate a relatively higher return. This is in contrast to De Ridder's (2002) findings from 1988. Even though the study does not support this anomaly, one cannot rule out that the anomaly never has been profitable or that it never will be in the future. Rather, the two studies seem to give support to Nilsson's and Torssel's (2008) argument that profitable anomalies generally come and go on the stock market. Nevertheless, when having the option of choosing between a SmallCap fund and a non SmallCap fund, the study has found no support that a SmallCap fund should be the one chosen.

Similar results were found when looking upon the funds age; if the fund had a buy&sell charge or if the fund belonged to the PPM system. The variables were found to have no statistically significant impact on performance. The returns, however, are gross of the buy&sell charge. If this charge is withdrawn, it would depress the return obtained for the investor. As the fund managers seem to be unable to compensate the investor for the extra cost the buy&sell charge impose, one would probably be better off choosing a fund which does not have a buy&sell charge. On the other hand, performance fee was found to have a negative impact on the performance. Hence, one should not consider a fund which has a performance fee.

The size of the fund was the only variable found to have had a positive impact on performance. The result is in contrast to the result found by Dahlquist et al. (2000), Elton et al. (2006) and Gallagher (1988). The result suggests that the loss in flexibility a bigger fund suffers might not be as effective on the fund's overall performance. In addition, the positive impact could suggest that economies of scale might play a part. That is, the same percentage share of the funds value can be used to obtain more and higher qualitative analyses as opposed to the same percentage share of a smaller fund used for the same purpose. The argument would only be relevant if fund managers can add value above index investing by the use of their analyses. The thesis previously concluded that so was not the case. Hence, the result for this variable is not in line with previous conclusions. Since turnover and size was negatively correlated, it confirms the fact that a larger fund has less flexibility. Since turnover, however, was found to have had a negative impact on performance, the loss in flexibility might not be such a big loss after all.

Summarizing the findings for the fund characteristics studied within the thesis, the following conclusion can be made; the larger the fund, the better the performance; the lower the turnover rate, the better the performance. In addition, funds that do not have a performance fee, the better the performance. In contrast, the yearly management fee, if a fund invests in firms with small and medium market values, if the fund belongs to the PPM system and if the fund has a buy&sells charge was found to have no statistically significant impact on performance. When looking upon the top 10 funds, in appendix 4, one can see the funds which all had a performance superior to the market index. Interesting to note is that there is a high variety between all the characteristics between these funds, not at least when it comes to turnover and size. Having said that, one cannot rule out the possibility of chance. Even though the performance is measured over a period of 36 months, there is still a possibility that the superior performance achieved by those funds might be due to luck

rather than skills or any type of fund attribute[7]. This would explain the high amount of variables statistically insignificant, in addition, the low goodness of fit of the regression model, as indicated by the low R^2 value. Taking this into account, together with the findings of the funds' inability, on average, to outperform the market index, it is difficult to give credit to Wilke's (2005) statement that there are good reasons for the large interest mutual funds have gained when considering actively managed equity mutual funds. This is not say that there are no advantages with the active management. The investment strategy allows for low cost diversification as well as it allows for many to participate in the capital markets without having to engage in the, often believed, complex stock markets themselves, leaving the task to the manager of the fund. An investment strategy, however, is difficult to defend if its ability to fulfil its aim happens by chance. This further gives support to actively managed equity mutual funds inability as efficient investment vehicles. In addition, the benefits regarding the active management can often be obtained with the passive management as well. The conclusion made for the study is such that when investing in stock markets proven to be efficient an alternative should be considered, such as index investing, as opposed to active management investing.

[7] One should keep in mind that additional fund attributes exist that might affect performance that have not been looked upon within this study. The subsequent reasoning will only concern the fund attributes which have been examined within this thesis.

6. Conclusion

The purpose of the thesis was to determine whether actively managed equity mutual funds can be considered being efficient investment vehicle as determined by their ability to outperform the market index. In addition, to determine whether there could be a justification for the different fees funds charge by examine if the fee is associated to performance. With the mutual fund business never been bigger in Sweden, additionally, the average investors inability to correctly evaluate fund performance, there is a strong need for mutual fund evaluation.

The thesis did not find that actively managed equity mutual funds, when looking upon their average performance, were successful at outperforming the market index. Rather, the funds underperformed the market index by the amount of 9%. The finding supports that the Swedish stock market is efficient in at least the semi strong form and the conclusion made is such that fund managers are unable to add value above index investing. Actively managed equity mutual funds can hence not be considered being an efficient investment vehicle as a higher return could have been achieved by investing in the market, i.e. index investing. The conclusion can be applicable for all stock markets proven to be efficient. The finding is in line with previous studies made by Sharpe (1966), Jensen (1967), Malkiel (1995), Carhart (1997), Dahlquist et al. (2000) and Elton et al. (1993). In addition, the management fee was found to have had no statistically significant impact on performance. A higher fee, however, will guarantee that more money is taken out of the fund value, in addition, that more money is distributed within the investment institution. If performance happens by chance, there is no justification for the differences in the fee funds charge. A message is such that investors should be more price conscious when choosing a fund.

In addition to this, the thesis looks at various fund attributes in order to determine whether they are associated to any type of fund performance. The thesis finds no support for the small firm anomaly. Funds having a performance fee were found to have lowered the performance. The same result was found for the funds turnover rate. A high turnover rate did not seem to have been justified by a higher return. Age was found to be no predictor of performance, whereas size showed to have a positive impact. This suggesting that the loss in flexibility a larger fund suffer might not be as effective on performance after all. Funds having a buy & sell charge and funds belonging to the PPM system showed to have no impact on performance.

10 out of 88 funds did outperform the market index. The thesis finds little support that the superior performance of those funds are due to any specific fund attribute, rather the possibility of chance cannot be ruled out. Due to this finding, in addition, to fund managers' inability to add value above index investing when looking upon their average performance, actively managed equity mutual funds cannot be regarded as an efficient investment vehicle. Rather, when investing in stock markets proven to be efficient, an alternative should be considered, such as index investing.

A suggestion for future research would be to examine the persistence in fund's performance. This would enable one to more accurately determine whether the superior performance, obtained by few of the funds, have been due to chance or skill. In addition, to look at more fund attributes, such as if the fund invests ethically or not, in order to determine how additional fund attributes affect performance.

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Appendix 1

The result of the risk-adjusted return for the funds used in the sample.

Rank	Equity Mutual Fund	Geometric mean	Standard deviation	Sharpe Ratio	Riskfree rate
1	SEB Swedish Focus Fund	0.001	0.08	-0.309	0.026
2	Robur Exportfond*	-0.004	0.082	-0.371	
3	Danske Invest Sverige Fokus	-0.004	0.079	-0.375	
4	Didner & Gerge Aktiefond Sv.*	-0.002	0.074	-0.376	
5	Danske Invest Sverige	-0.005	0.080	-0.385	
6	Robur Svensk Aktieportfölj*	-0.006	0.082	-0.389	
7	SKF Allemansfond	-0.004	0.076	-0.397	
8	ODIN Sverige*	-0.004	0.075	-0.399	
9	HQ Strategy Fund*	0.001	0.063	-0.408	
10	AMF Aktiefond Småbolag*	-0.007	0.081	-0.41	
11	**OMXS30GI**	**-0.002**	**0.069**	**-0.412**	
12	Ålandsbanken Swedish Small Cap*	-0.009	0.085	-0.413	
13	HQ Swedish Equity Fund A*	-0.002	0.069	-0.414	
14	Robur Sverigefond MEGA	-0.005	0.076	-0.414	
15	Sweden Fund	-0.003	0.07	-0.416	
16	Cicero MÖ Sverige*	-0.009	0.083	-0.416	
17	Etiskt Urval Sverige	-0.004	0.073	-0.417	
18	Handelsbanken Svenska Småbolag*	-0.006	0.078	-0.417	
19	Carlson Sverige Koncis	-0.003	0.069	-0.418	
20	Aktiefond Sverige	-0.005	0.075	-0.419	
21	Robur Vasaloppsfond	-0.006	0.076	-0.424	
22	Folksam LO Västfonden	-0.005	0.074	-0.425	
23	Skandia Småbolag Sverige*	-0.007	0.078	-0.425	
24	Robur Ethica Sverige MEGA	-0.007	0.077	-0.428	
25	Robur Sverigefond	-0.007	0.077	-0.429	
26	AMF Aktiefond Sverige	-0.006	0.076	-0.429	

27	Robur Ethica Miljö Sverige	-0.007	0.078	-0.43
28	Enter Select Pro*	-0.003	0.067	-0.43
29	Robur Hockeyfond	-0.007	0.077	-0.433
30	Länsförsäkringar småbolagsfond*	-0.007	0.077	-0.433
31	Selekta Sverige	-0.007	0.075	-0.433
32	Robur Småbolagsfond Sverige*	-0.008	0.078	-0.434
33	Carlson Swe Micro*	-0.005	0.071	-0.436
34	Handelsbanken Sverige Selektiv*	-0.002	0.064	-0.436
35	Världsnaturfonden	-0.006	0.073	-0.437
36	Banco Humanfond	-0.007	0.076	-0.438
37	Banco Samaritfond	-0.007	0.076	-0.438
38	Carlson småbolagsfond*	-0.006	0.073	-0.438
39	Nordea Sverigefonden	-0.006	0.073	-0.438
40	Handelsbanken Sverigefond	-0.006	0.073	-0.439
41	Skandia Cancerfonden	-0.006	0.072	-0.44
42	Enter Sverige	-0.004	0.069	-0.44
43	Catella Reavinstfond	-0.008	0.077	-0.44
44	Folksams Tj.mannafond Sverige	-0.007	0.074	-0.441
45	Lannebo Småbolag*	-0.003	0.066	-0.442
46	Folksam LO Sverige	-0.007	0.074	-0.442
47	HQ Sverige	-0.004	0.068	-0.443
48	Banco Etisk Sverige Special	-0.008	0.076	-0.443
49	Carlson sverigefond	-0.005	0.07	-0.444
50	Lannebo Sverige*	-0.006	0.071	-0.447
51	Folksams Aktiefond Sverige	-0.007	0.075	-0.447
52	Skandia Aktiefond Sverige	-0.007	0.073	-0.448
53	Privat Banking Svenska Portf	-0.009	0.079	-0.451
54	Banco Kultur	-0.008	0.076	-0.451
55	SEB Sverigefond Chans/Risk	-0.006	0.071	-0.451
56	Öhman Fonder Sverige	-0.008	0.075	-0.451
57	Banco Etisk Sverige	-0.008	0.076	-0.452
58	Banco Hjälp	-0.008	0.076	-0.453

59	Erik Penser Sverigefond	-0.005	0.07	-0.454
60	Banco Ideell Miljö	-0.007	0.072	-0.457
61	SEB Sverigefond	-0.007	0.072	-0.458
62	SEB Sverige Småbol Chans/Risk*	-0.008	0.074	-0.458
63	Banco Svensk Miljö	-0.007	0.072	-0.459
64	SEB Sverige Småbolagsfond*	-0.008	0.074	-0.462
65	Robur Stella Småbolag*	-0.010	0.077	-0.465
66	SEB Sverigefond Stora Bolag	-0.006	0.069	-0.467
67	Banco Sverige	-0.009	0.075	-0.467
68	HQ Strategi*	-0.003	0.063	-0.467
69	Länsförsäkringar sverigefond	-0.006	0.069	-0.47
70	Eldsjäl Gåvofond	-0.006	0.069	-0.472
71	HQ Svea Aktiefond*	-0.007	0.07	-0.479
72	Alfred Berg Sverige Referens	-0.018	0.091	-0.482
73	Gustavia Sverige*	-0.007	0.068	-0.485
74	Guide Aktiefond Sverige*	-0.009	0.072	-0.486
75	Eldsjäl Sverigefond	-0.006	0.066	-0.486
76	Banco Småbolag*	-0.008	0.07	-0.488
77	**OMXSMALLCAPGI**	**-0.007**	**0.067**	**-0.49**
78	Cicero Sverige	-0.011	0.076	-0.491
79	Enter Sverige Fokus	-0.005	0.063	-0.492
80	Eldsjäl Biståndsfond	-0.005	0.062	-0.498
81	Västernorrlandsfonden AB	-0.005	0.063	-0.499
82	Aktie-Ansvar Sverige	-0.008	0.068	-0.508
83	Catella Inst. Relativ	-0.007	0.064	-0.523
84	Team Catella Tennisfond	-0.008	0.064	-0.525
85	Awake Swedish Equity Fund*	-0.013	0.073	-0.535
86	AstraZeneca Allemansfond	-0.002	0.052	-0.541
87	Spiltan Aktiefond Stabil*	-0.001	0.049	-0.549
88	Catella Trygghetsfond*	-0.004	0.053	-0.572
89	Catella Instit. Absolut Aktier*	-0.009	0.0	-0.573
90	Spiltan Aktiefond Sverige*	-0.01	0.062	-0.575

Each fund assigned with * indicates a fund only investing in firms with a small- and middle market value. The data for the indices OMXS30GI and OMXSSmallCapGI were received from NASDAQOMX and were risk adjusted on the same basis as the funds in the sample, for the time period 2006-12-31 to 2009-01-04.

Appendix 2

Complete result from regression equation (5-1) with logged variable.

Variable	B	Std. Error	T	Sig.	VIF
Constant	-0.472	0.027	-17.212	0.000	
Yearly management fee	-0.007	0.014	-0.496	0.621	1.699
***Ln*size**	0.009	0.003	3.091	0.003	1.450
Age	-7.393E-5	0.000	-1.225	0.224	1.394
PPM	-0.017	0.011	-1.583	0.117	1.461
Performance fee	-0.08	0.024	-3.353	0.001	1.857
Buy&Sell	0.002	0.016	0.117	0.907	1.024
SmallCap	-0.003	0.010	-0.303	0.762	1.221
R^2	0.222				
Adjusted R^2	0.154				
F	3.258			0.004	
N	88				

Complete result from regression equation (5-1) without logged variable.

Variable	B	Std. Error	T	Sig.	VIF
Constant	-0.434	0.024	-17.979	0.000	
Yearly management fee	-0.005	0.015	-0.317	0.752	1.860
Size	3.036E-6	0.000	1.860	0.067	1.469
Age	-4.412E-5	0.000	-0.708	0.481	1.387
PPM	-0.009	0.011	-0.873	0.385	1.333
Performance fee	-0.068	0.025	-2.752	0.007	1.896
Buy&Sell	0.004	0.017	0.224	0.824	1.036
SmallCap	0.000	0.010	0.01	0.992	1.2
R^2	0.165				

Adjusted R^2	0.092		
F	2.258		0.038
N	88		

Appendix 3

Complete result from regression equation (5-2) with outliers.

Variable	B	Std. Error	T	Sig.
Constant	-0.445	0.008	-55.391	0.000
Turnover 2008	0.006	0.005	-1.157	0.251
R^2	0.018			
N	75			

Complete result from regression equation (5-2) without outliers

Variable	B	Std. Error	T	Sig.
Constant	-0.437	0.010	-45.257	0.000
Turnover 2008	-0.014	0.008	-1.756	0.083
R^2	0.042			
N	73			

Correlations between Size and Turnover

		Size	Turnover 2008
Size	Pearson Correlation	1	-0.212
	Sig. (2-tailed)		0.072
	N	88	73
Turnover 2008	Pearson Correlation	-0.212	1
	Sig. (2-tailed)	0.072	
	N	73	73

Appendix 4

Data for the independent model variables.

Rank	Equity Mutual Fund	Yearly Management Fee	Size[5]	Age[6]	Turnover 2008
1	SEB Swedish Focus Fund	1.5	923	38	1.46
2	Robur Exportfond[1;4]	1.4	5 047	263	0.3
3	Dankse Invest Sverige Fokus[1]	1.5	2 157	52	5.66
4	Didner & Gerge Aktiefond Sv.[1;4]	1.22	11 006	182	0.51
5	Danske Invest Sverige[1]	1.3	2 275	143	1.89
6	Robur Svensk Aktieportfölj[4]	1.6	478	68	1
7	SKF Allemansfond	1	93	309	0.98
8	ODIN Sverige[4]	2	3 600	182	
9	HQ Strategy Fund[4]	1.3	298	238	1.27
10	AMF Aktiefond Småbolag[1;4]	0.6	1 604	67	
12	Ålandsbanken Swedish Small Cap[1;4]	1.4	170	188	
13	HQ Swedish Equity Fund A[1;4]	0.8	102	132	1.13
14	Robur Sverigefond MEGA[1]	0.5	12 077	169	0.8
15	Nordea Sweden Fund[3]	1.5	219	240	
16	Cicero MÖ Sverige[4]	1.7	14	120	2.5
17	Nordea Etiskt Urval Sverige[1]	1.5	412	122	
18	Handelsbanken Svenska Småbolag[1;4]	1.5	3 924	181	0.7
19	Carlson Sverige Koncis[3]	1.5	3 685	110	0.8
20	SPP Aktiefond Sverige[1]	0.7	1 826	168	0.8
21	Robur Vasaloppsfond	1.4	18	99	0.8
22	Folksam LO Västfonden[1]	0.4	1 155	129	0.4
23	Skandia Småbolag Sverige[1;4]	1.4	1 976	133	0.45
24	Robur Ethica Sverige MEGA[1]	0.7	2 082	83	0.6
25	Robur Sverigefond	1.4	9 143	511	0.8
26	AMF Aktiefond Sverige[1]	0.4	15 948	132	
27	Robur Ethica Miljö Sverige[1]	1.4	1 714	167	0.4

28	Enter Select Pro[2;4]	0.5	551	71	1.32
29	Robur Hockeyfond	1.4	10	99	0.8
30	Länsförsäkringar Småbolagsfond[4]	1.6	2 184	148	
31	Nordea Selekta Sverige	1.6	1 163	116	
32	Robur Småbolagsfond Sverige[1;4]	1.4	4 995	170	0.5
33	Carlson Swe Micro[1;3;4]	1.5	134	151	0.21
34	Handelsbanken Sverige Selektiv[4]	1.85	706	55	1.3
35	Skandia Världsnaturfonden	1.7	350	259	0.51
36	Banco Humanfond	1.7	1 401	234	1.1
37	Banco Samaritfond	1.7	367	190	1.1
38	CarlsonSmåbolagsfond[1;3;4]	1.5	1 205	219	0.52
39	Nordea Sverigefonden[1]	1.42	5 825	384	
40	Handelsbanken Sverigefond[1]	1.5	7 058	260	0.5
41	Skandia Cancerfonden	1.7	282	259	0.53
42	Enter Sverige[1]	1.7	262	121	1.44
43	Catella Reavinstfond[1]	1.5	4 759	142	2.43
44	Folksams Tj.mannafond Sverige[1]	0.4	1 250	120	0.5
45	Lannebo Småbolag[1;4]	1.6	8 516	113	0.9
46	Folksam LO Sverige[1]	0.4	13 258	129	0.4
47	HQ Sverige[1]	1.4	6 713	276	0.98
48	Banco Etisk Sverige Special	1.1	200	126	0.8
49	CarlsonSverigefond[1;3]	1.25	1 081	209	0.76
50	Lannebo Sverige[1;4]	1.6	2 394	113	1.5
51	Folksams Aktiefond Sverige[1]	0.7	3 872	184	0.5
52	Skandia Aktiefond Sverige[1]	1.4	3 695	226	0.65
53	Nordea Privat Banking Svenska Portf	1	72	97	
54	Banco Kultur	1.7	50	160	1.1
55	SEB Sverigefond Chans/Risk	1.3	1 338	176	1.5
56	Öhman Fonder Sverige[1]	1.2	222	165	0.68
57	Banco Etisk Sverige[1]	1.7	2 781	267	1.1
58	Banco Hjälp	1.7	112	171	1.1

59	Erik Penser Sverigefond[1]	1.4	24	162	0.5
60	Banco Ideell Miljö	1.7	257	240	0.5
61	SEB Sverigefond	1.3	11 603	300	0.63
62	SEB Sverige Småbol Chans/Risk[4]	1.5	2 722	176	0.99
63	Banco Svensk Miljö[1]	1.7	140	183	0.5
64	SEB Sverige Småbolagsfond[4]	1.5	4 259	267	0.39
65	Robur Stella Småbolag[1;4]	1.7	765	158	2.6
66	SEB Sverigefond Stora Bolag[1]	1.3	7 929	434	0.67
67	Banco Sverige	1.6	64	189	1.2
68	HQ Strategi[1;4]	1.5	6 289	257	0.83
69	Länsförsäkringar Sverigefond[1]	1.3	5 396	229	2.4
70	Eldsjäl Gåvofond	1.6	56	157	2.3
71	HQ Svea Aktiefond[3;4]	1.45	596	49	0.72
72	Alfred Berg Sverige Referens[3]	0.8	43	115	
73	Gustavia Sverige[1;4]	1.5	210	75	
74	Indecap Guide Aktiefond Sverige[2;4]	0.5	358	74	0.39
75	Eldsjäl Sverigefond	1.6	55	157	2.3
76	Banco Småbolag[4]	1.7	318	250	0.4
78	Cicero Sverige[1]	1.2	26	110	1.6
79	Enter Sverige Fokus[2]	0.5	1 025	121	0.88
80	Eldsjäl Biståndsfond	1.5	39	168	2.3
81	Västernorrlandsfonden AB[1]	1.5	310	75	0.69
82	Aktie-Ansvar Sverige[1]	1.4	1 423	216	
83	Catella Inst. Relativ[2]	0.5	1 281	60	2.66
84	Team Catella Tennisfond	1.5	42	53	6.36
85	Awake Swedish Equity Fund[2;4]	0.8	393	45	0.572
86	AstraZeneca Allemansfond	0.9	230	309	0.7
87	Spiltan Aktiefond Stabil[1;4]	1.5	139	85	0.4
88	Catella Trygghetsfond[1;4]	1.5	628	142	2.49
89	Catella Instit. Absolut Aktier[2;4]	0.5	204	60	2.54
90	Spiltan Aktiefond Sverige[1;4]	1.5	170	85	0.56

[1] PPM; [2] Perfromance fee; [3] Sell & Buy charge; [4] SmallCap;

[5] Millions of SEK; [6] Number of months since the start date.

Appendix