UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Active Portfolio Management
-A performance evaluation of Swedish equity mutual funds

Jahangir Hashemi and Abrar Hussain

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Supervisor: Hong Wu

In dedication to our families

They are always with us in every step of our lives, supporting us and encouraging us. Everything that we are today, we owe to our families.

Title	**Active Portfolio Management: A Performance Evaluation of Swedish Equity Mutual Funds**
Author	**Jahangir Hashemi** and **Abrar Hussain**
Supervisor	**Dr. Hong Wu**
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Abstract

This thesis evaluates the performance of selected actively managed Swedish equity mutual funds. By estimating performance measurements such as Jensen's alpha and M-square we identify excess returns of the mutual funds to appropriate benchmark indices as well as managers stock selecting abilities. Additionally, since there are issues with the Jensen's measure and to enhance the robustness of the selectivity findings, we apply a model called the Henriksson-Merton model to identify stock selecting and market-timing abilities of mutual fund managers.

This thesis examines the period from 2000-2009 with three sub-periods in order to identify whether the findings are sensitive to the choice of time periods examined. The performances exhibited were sensitive, not only to the choice of time periods, but also to the benchmarks used.

The general findings of this thesis supports the earlier literature where no superior performance in actively managed mutual funds could be identified. The mutual funds examined have not shown any significant over performance, i.e. managers have not possessed any superior stock selecting skills or market timing abilities.

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1. Introduction and Background

> *This section gives an introduction of the thesis to the reader about the research problem, purpose, and background of the Swedish mutual funds industry. In addition some models used to measure performance of mutual funds are introduced.*

Fund managers and investors have always tried to find different strategies to help their investments outperform the market and hence reap maximum returns. They all have an interest in evaluating their portfolios. Several different portfolio performance evaluation studies have been carried out with special focus on mutual funds as these are considered to be very diverse portfolios.

Swedish mutual funds are in general open-end funds meaning that private investors may buy and sell shares in a mutual fund at any given time. The mutual fund manager is then supposed to invest the money of the shareholders into different securities such as stocks, bonds whatever may be the specific focus of that certain mutual fund. Swedish mutual funds are under strict policy regulations that have also been adapted to the European Union through UCITS (Undertakings for Collective Investment in Transferable Securities) which has the aim of allowing investment schemes to operate freely within the European Union.

Regulations state how mutual funds should allocate their investments. Mutual fund managers have to allocate the resources with regards to goals and investment styles that can be either large stocks or small stocks, equity funds or bond fund or mixed etc. Funds must invest no more than ten percent in one single security and the restrictions make the mutual funds invest in at least 16 different companies making mutual funds well diversified portfolios with the larger part of the non-systematic risk diversified away.

The Swedish mutual fund industry started to expand dramatically after the 1990's. Before that it was rather insignificant and there were only a few mutual funds available investing only in common stocks. In the 1980's the Swedish government took initiatives to encourage saving in mutual funds by offering tax relieves on the capitalization from investment in a certain type of mutual funds that came to be called "Allemansfonder". These mutual funds make up a large portion of the total wealth in the Swedish mutual fund industry although since 1997 there is no more tax relieves and hence these are no more different from taxation point of view as compared to other existing mutual funds (Zamaninan 1997).

Today there are numerous amounts of mutual funds in Sweden and private investors can choose from a wide range of portfolios. Not only the amount and total wealth mutual fund

portfolios has increased rapidly, but the range of investment targets has become much broader. These include: different risk classes; different investment items such as stocks, bonds, currencies, derivatives or a mixture of these etc; different stock groups according to firms size; different countries and regions and more (Zamaninan 1997).

In general the investors of mutual funds in Sweden prefer investing in equity funds. About 70% of total assets invested in the Swedish mutual fund industry are invested in equity funds. A majority of mutual funds today are actively managed meaning that the manager of the portfolio actively follows the changes of factors that affect the portfolio such as interest rate movements and accordingly adjust the portfolio composition of the mutual fund with regard to these changes so as to reap maximum returns. There also exists a much less number of funds called passive funds or index funds with the aim of following a chosen benchmark and when the composition of the market index is changed the index fund will be weighted accordingly.

When investing money in a mutual fund the investor needs to consider some range of indicators that may help explain the composition and the past performance of the mutual fund. Before buying a good one takes into account costs and benefits. The same applies to choosing investments in mutual funds; investors will consider the costs of the fund with regards to their benefits hence a correct evaluation of the funds is critical.

Evaluating performance that is based on average return alone is not very useful so returns when evaluating the performance of a portfolio the returns must be adjusted for the risk before one can compare them in an acceptable and meaningful way. The simplest and most popular way to adjust returns for portfolio risk is to compare rates of returns with those of other investment funds that display similar risk characteristics between them (Bodie *et. al.* 2009). This way of comparing performance among different managers is a first step however, these rankings may be misleading because within a certain investment style universe, some managers may concentrate on some subgroups so that the characteristics displayed by the different portfolios will not be truly comparable. Therefore, other more precise means for risk-adjustments are highly desirable.

Methods for evaluating risk-adjusted performance using mean-variance criteria came along with the introduction of the Capital Asset Pricing Model (CAPM) in the 1960s. Jack Treynor, William Sharpe and Michael Jensen identified the implications of using the CAPM for evaluating performance of portfolio managers. Several models exist today (which will be examined further on) for measure of fund's performance but the Jensen's measurement[1] has received the most acceptance and is by far the most widely used method in performance studies.

[1] More commonly known as Jensen's alpha

The different methods measure the performance relative to risk but the way in which these measure risk differ from each other (Bodie *et. al.* 2009).

These methods have been used extensively in the academic world to look at evaluation of mutual fund portfolios over the years. One certain focus of these tests has been that to compare the actively managed funds to the passively managed to assess whether one can see if a manager of a portfolio has the ability to select correct securities and thus outperform a comparable index and the index funds. The results have been mostly that the actively managed portfolios tend to underperformed. Indeed it is not difficult to find literature that suggests this along with that index fund is a better alternative to an active fund see for instance Malkiel (1995); Gruber (1996); Jensen (1968) etc. This is due to the fact that actively managed funds have higher fees both for managing and trading. Therefore, majority of the authors conclude that although these funds may sometimes outperform statistically and economically however, when all fees and costs are considered, they rarely outperform the comparable index.

This thesis will focus on that part of the research using Swedish equity funds to see whether it was possible for the actively managed funds to outperform a comparable index. It is very interesting to study whether Swedish fund managers as a group posses any market-timing ability or stock-picking skills. As some academic literature suggest there is little evidence that supports this fact. According to Malkiel (1995) these results rely on the Efficient Market Hypothesis (EMH) that capital markets will take into account all necessary information into the prices of the securities making it impossible to find miss priced securities to invest in. The EMH will be discussed later on.

Number of studies have been conducted examining the topic of mutual fund performance. According to Peterson *et. al.* (2001) the literature can be divided into three general areas. The *First* area examines whether or not fund managers as a group posses any market-timing or stock-picking skills. As mentioned earlier little evidence did support this fact. The *Second* area of academic literature examines the issues persistence in mutual fund performance (see Carhart 1997) where most conclude that there is some persistence in performance of the mutual funds. The *third* area examines whether it is possible to find predictive characteristics explaining performance such as size, age, fees etc.

1.1. Purpose of the Thesis

This thesis belongs to the *first area* of the research literature in which we will investigate actively managed Swedish mutual funds with focus on large equity funds where the main purpose is to answer three questions:

- *First* whether actively managed funds are able to outperform their comparable index i.e. do they exhibit any superior stock selecting abilities?
- *Second* would be to examine whether the managers exhibit any market-timing abilities as this would have significant implications on the performance.
- *Third* would be to check whether the performance of funds is sensitive to the selection of benchmark even if the similar indices are selected as benchmarks, along with that to test the sensitivity of performance of funds with the time period selection

1.2. Outline of the Thesis

Section one of this thesis gives an introduction of the subject and the Swedish Mutual fund industry as well as the problems of the subject under discussion and the intentions of this thesis. *Section two* presents the earlier findings in the literature related to the selected topic. *Section three* explains about the EMH (Efficient Market Hypothesis) and its forms. In *Section four* existing theories used widely to evaluate the performance of mutual funds are presented. This section also provides the basic knowledge to those readers who are not very familiar with subject of portfolio performance evaluation. The risk adjusted performance measures are explained to help readers to understand the method. *Section five* explains the methodology of the thesis and explains what measures were used along with the reasoning of using those measures. *Section six* explains the data selection along with the explanation of the selected market indices as benchmarks. In *Section seven* the empirical findings from various models used are presented. *Section eight* concludes by discussing the implication of the empirical findings.

2. Earlier Findings and Research

> *In this section a number of earlier researches on the topic of this thesis are presented along with their conclusions.*

Since 1960's a large magnitude of academic performance evaluation studies have been performed in the mutual fund industry where a dominating large proportion is focused on the US mutual fund portfolios. One of the very first was Michael Jensen's study in his 1968 thesis - the performance of mutual funds in the period 1945-1964, where he derives the today's famous and widely used risk-adjusted measure of portfolio performance (known as Jensen's Alpha) to estimate how much mutual fund manager's forecasting abilities contribute to the returns of the mutual fund portfolio. In the study Jensen found that of the mutual funds he examined that the 115 selected mutual funds showed no sign of being able to outperform a buy and hold strategy but also he found little evidence that any of those examined funds was able to do significantly better than what would be expected by mere random chance. He concludes that the managers were not successful in their trading activities and thus the transaction costs (of brokerage etc) were too high which resulted in negative performance.

In this thesis we use the conventional methodology when measuring the performance of mutual funds such as the Jensen's measure (alpha) when evaluating stock selectivity and in addition the Henriksson-Merton model for timing and selectivity ability of managers. A drawback with the Jensen's alpha however is the conclusions that are reached about the performance of the portfolio rests on the asset pricing model chosen. Earlier studies and this thesis rely on the CAPM model and are aware of the problems that are related to the choice of Benchmark. Following Roll's critique the choice of benchmark has important consequences for performance[2].

Lehman and Modest (1987) studied the performance of 130 mutual fund portfolios over the period 1968-1982 to see whether performance was sensitive to different benchmark portfolios and to different models. They show that the results in Jensen's measure differ significantly when comparing results from different benchmarks and from the Arbitrage pricing theory model. Grinblatt and Titman (1994) make use of different benchmarks as well in order to evaluate performance of mutual funds and find, like Lehman and Modest, that the Jensen's alpha differs significantly between different benchmarks.

Ippolito (1989) uses also the Jensen measure to evaluate performance 143 US mutual funds for the period 1965-1984 using S&P 500 as benchmark and he finds that of these 143

[2] More on this in a later section

funds 127 had alpha equal to zero, 12 with positive alphas and 4 with negative. The average values of alpha that Ippolito found were 0.81 net of costs. He concludes in his findings that these US mutual funds have managed to outperform passive index funds.

Elton *et. al.* (1993) focus on the results of Ippolito (1989) but use a multi-factor approach of performance measurement unlike Ippolito. They apply Jensen's measure to the study of Ippolito and conclude that when the impact of non-S&P assets are accounted for i.e. other benchmarks are used, and then the results of Ippolito become pretty much the same as Jensen's results. This makes Ippolito's results reversed and they would be consistent with the literature in the field claiming that fund managers are not able to outperform a passive buy-and hold strategy.

In general the standard performance measures depend heavily on the benchmarks ability to mimic the portfolio and hence benchmarks must be selected very carefully. Malkiel (1995) investigated the returns from all equity funds that existed in the period 1971-1991. When the returns from all funds were analyzed he found that there is an indication of mutual funds underperforming the market not just net of cost but also gross of all reported expenses. The most interesting part of his study was its analysis of the impact of survivorship bias in the studies of mutual fund performance. Normally performance studies are based on the portfolios that have survived meaning the ones that have had a good average performance. Those that did not perform well are closed or merged into other funds that are more successful. When not including all the funds that existed during a period and only do a performance evaluation of those that still exists the results are biased upwards toward over performance. But if a study considers all the funds that have existed during a test period the reverse will be true.

The general conclusion in the literature on mutual fund performance as seen is that actively managed mutual fund managers are not able to generate any excess returns after all costs for the mutual funds have been taken into consideration. However some recent studies support the value of actively managed portfolios. Also a growing number of studies analyze the ability of mutual fund managers to time the market correctly that is to say adjust the risk-level of the portfolios during different market cycles.

Treynor and Mazuy (1966) are the first to study timing ability of managers. They found that out of 57 mutual funds only for one the hypothesis of no market timing ability could be rejected. Veit and Cheney (1982) find that in general mutual funds don't change their characteristics in bull and bear markets. For those funds that they found who did change their characteristic lines timing ability was however unsuccessful.

Dahlquist *et. al.* (2000) studied the relationship between the fund performance and fund attributes of 210 Swedish Mutual funds. As a performance measurement they used the alpha on several benchmarks assets. They concluded that good performance is found in equity, low-fee and those funds that have a higher trading activity. Hence they concluded that active management is beneficial to performance of a portfolio.

Engtsröm (2004) evaluated active portfolios by forming replicate portfolios which allows the evaluation of the managers strategic and tactical decisions to be separated. He found the support for the value of active management of mutual funds and positive alphas for the average mutual fund. Dahlquist *et. al.* (2000) reported that a higher trading activity creates value. However, the tests of market timing ability of managers show a neutral result.

3. The Efficient Market Hypothesis

This section presents the theory of the Efficient Market Hypothesis.

Fama (1970) presented an efficient Market Hypothesis (EMH) with an assumption that the financial markets reflect all available information. The outcome of the EMH is that it is not possible for managers to outperform the market since the only information available to them is already reflected in the market with the price of the securities. It is common to distinguish among three versions of the EMH; the weak, semi-strong and strong form versions. They all differ in notions of what is meant by "all available information".

3.1. Weak Form

According to the weak from of EMH future prices of assets cannot be predicted by analyzing prices that are obtained from past historical data. This form of EMH thus concluded that trend analysis like technical analysis etc. is pointless and they will in no way be able to produce excess returns consistently. It holds that if past prices could give reliable signals about future performance of an asset all investors would already have learned to identify this signal and the signals would lose their value as they become widely used (Fama 1991).

3.2. Semi-strong Form

This form of EMH states that all information available to the public concerning the prospects of a firm is already reflected in the stock price. This information includes, besides that of historical prices in the weak form, fundamental data on the firms products, quality of these products, quality of management, patents held, income statements etc. Hence again if investors have information about these publicly available sources then they are already reflected in the asset price (Fama 1991).

Based on the most of the evidence, especially for event studies and mutual funds performance, markets are semi-strong efficient. Hence market should only react to the extent that new information coming to the market differs from what had been expected (Ross *et. al.* 2009).

3.3. Strong Form

The strong form EMH includes, other than the assumptions of historical prices and fundamental data, also insider information. Meaning that in this strongest form not even the company insiders are able to use their information to produce excess returns. This version is rather extreme since in the financial markets many of the actors follow the insider trading and

taking this as a signal and no one would argue with the fact that corporate officers have access to special information that is not available to the public yet (Bodie *et. al.* 2009).

If the EMH is valid, at least in its strongest form, that would mean that stock prices simply follow a random walk and one might as well pick stocks by throwing darts at a list of stocks instead of trying to rationally select the correct stock which turns out is not possible according to EMH. Good performance of mutual funds in the past could, according to the EMH, be due to pure luck rather than skills of the manager. EMH would say that instead of investing money in an actively managed mutual fund with higher fees and investor should go for a buy and hold strategy instead which has lower fees i.e. and index fund. There are disagreements here and many studies have shown that active management can create value while also other studies have shown that a passive indexing is superior to the active[3]. According to Bodie *et. al.* (2009) there is still a role for portfolio management even when the markets are efficient since investors positions will vary according to factors such as risk-aversion etc. The role of the manager in an efficient market is to tailor the portfolios to the needs of different investors rather than to beat the market.

[3] See the section on Earlier Findings and Research

4. Theoretical Framework

This section explains the theories related to performance evaluation of mutual funds that will be used in this thesis. Different models will be presented to the reader together with their respective advantages and disadvantages.

4.1. The Capital Asset Pricing Model (CAPM)

The foundation of modern portfolio theory was laid down by Harry Markowitz in 1952 with his portfolio selection model. The CAPM was developed almost 12 years later and is used to determine a prediction of the relationship and investor should observe between the risk of an asset and its expected return. This relationship serves two functions. First it gives a benchmark rate of return that is necessary for evaluating possible investments. Second it helps making an educated guess regarding the expected return on assets that have not yet been traded in the market place. The risk in the CAPM model is referred as beta and given the beta (risk) of an asset and a risk-free rate one can predict the expected risk premium for that asset

CAPM is a single index model and it implies that returns of a certain assets are linearly related to the covariance of its return with the return of the market portfolio. The return provided by the CAPM will aid the investor in determining whether he should invest or not since it provides the investor with a return that is required to sufficiently compensate him for the risk related to the investment (Bodie *et. al.* 2009).

Mathematically the CAPM model takes on the following form:

$$E(r_i) = r_f + \beta\left(E(r_m) - r_f\right) \quad \textbf{(4.1)}$$

Where:

$E(r_i)$ = the expected return on the asset

r_f = the risk-free asset

β = the sensitivity of the asset returns to market returns

$E(r_m)$ = expected market return

$E(r_m) - r_f$ = market premium or risk premium

Mathematically beta of the CAPM is determined by equation (4.2).

$$\beta = \frac{Cov\ (r_i, r_m)}{Var\ (r_m)} \quad \textbf{(4.2)}$$

Where

$Cov(r_i, r_m)$ = Covariance between security (i) and market return

$Var(r_m)$ = Variance of the market return

In CAPM the beta coefficient refers to systematic risk that accounts for all the risk in a well diversified portfolio. This beta coefficient measures how the expected stock or portfolio is correlated to the return of the market as a whole. As a risk measurement it can be described as how sensitive stock movements are to market movements (Bodie *et. al.* 2009)

The CAPM model makes a number of simplifying assumptions. The most important assumptions are the following:

- There are many investors each with some wealth that is small compared to the overall wealth that is available.
- All investors plan for one holding period
- There are no taxes or transaction costs
- Investors are solely concerned with the level and uncertainty of future wealth
- Risk free rates exist with limitless borrowing capacity and universal access.
- The information is perfectly distributed, i.e. all investors have the same information and as a result, the same expectations about security returns for any given time period.
- All investor are rational mean variance optimizers, that is, they use the Markowitz portfolio selection model.
- They all analyze securities in the same way and have the same view of the world, that is have homogenous expectations and beliefs.

It is apparent that these assumptions ignore many of the real world complexities. However the CAPM is still widely used, for the lack of a better option, in real life such as in estimating cost of capital or evaluating performance of managed portfolios, although it has received much critic.

Fama and French (2004) criticised the CAPM for not explaining stock returns. This is due to the many assumptions of the CAPM that affect the model quite heavily. The CAPM is a static model that expects stock returns to be constant. Roll (1997) criticized the CAPM due to its inability to be tested correctly as the real market portfolio cannot be observed. He argues because the tests use proxies for the market portfolio and not the true market portfolio itself, we learn nothing about the CAPM. Also he points out that beta that is calculated by using chosen market

portfolio proxy are biased relative to the true beta. Also the beta is assumed to be constant over time which is not realistic. Another major problem with the CAPM is that portfolios are formed by sorting stocks on price ratios which in turn produce a wide range of average returns which are not positively related to market betas. A critic by Fama and French (2004) was pointed toward the CAPM in the use of measuring mutual fund performance.

4.2. Arithmetic Mean vs. Geometric Mean

Arithmetic mean and geometric mean are averages that show the central tendency of a set of numbers. The arithmetic mean return for n period investment can be calculated by the equation (4.3).

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i = \frac{1}{n}(x_1 + \ldots + x_n) \quad \textbf{(4.3)}$$

Arithmetic mean is used for the future performance of the portfolio because it is an unbiased estimator of the portfolio's expected future return whereas the geometric mean constitutes a downward biased estimator of portfolio's expected return in any future time period (Bodie *et. al.* 2009).

The geometric mean return for n period investment can be calculated using equation (4.4).

$$1 + r_G = [(1 + r_1)(1 + r_2)\ldots\ldots(1 + r_n)]^{1/n} \quad \textbf{(4.4)}$$

The geometric mean methodology is preferred to evaluate the past performance of the funds since it gives a constant rate of return that we need to earn each year to match the actual performance over some past investment period (Bodie *et. al.* 2009).

4.3. Risk and Return

Normally risk is defined as the volatility of the expected return. This is the reason why investors expect higher returns with the higher volatility (Simons 1998). All the investments, like investment in securities, bonds or funds, contain different level of risk, investors have to deal with the fact the loss can also be the return instead of gain. Risk and returns are directly proportional to each other. Investors like to have high return facing less risk and most investors are more sensitive to increased risk than increased return. Along with the returns Investors also consider the level of risk that is taken to achieve that returns (Padgette 1995).

4.3.1. Systematic *vs* Unsystematic risk

The risk can be decreased if we include the less correlated assets in the portfolio and spread among large number of different assets. In simple words if we diversify the portfolio. According to Brealey and Myers (2003) the risk of investment in a portfolio can be divided into systematic risk (known as Beta) and unsystematic risk. The systematic risk belongs to the macroeconomic factors i.e. business cycle, inflation, interest rates, and exchange rates. The uncertainty with these macroeconomics factors cannot be predicted and all of them affect the rate of return. Systematic risk measures the correlation between the return on the portfolio and the return on the market portfolio. As mentioned earlier systematic risk in a well diversified portfolio is known as the beta which is the measure of the market risk. Beta as a risk measurement can be explained as the sensitivity of the market movements. According to Brealey and Myers (2003) the beta of a security represents the sensitivity of that security's return to the fluctuations in the market. If a portfolio has a beta that is 1 then that would mean that the percentage change in that portfolio follows the market change to an equal amount. A lower beta would mean that the portfolio varies to a lesser amount than the market and vice versa (Elton *et. al.* 1995).

On the other hand non-systematic risk is firm specific uncertainty that influences the rate of return and only affects the specific firm's rate of return. The macroeconomic factors uncertainty cannot be diversified away but one can reduce the risk by investing in different firms to reduce the specific firm's uncertainty as the firm specific influences varies from firm to firm. By diversifying into more securities one continues to spread out the exposure to firm specific factors, and portfolio volatility should continue to fall. Ultimately, even with a large number of stocks in the portfolio we cannot avoid risk altogether, since virtually all securities are exposed to the systematic market risk as explained above.

To measure the risk there are many ways but none of them provides exact measures. The most common is volatility or standard deviation that measures the dispersion around the mean. In simple words standard deviation tells how the portfolio returns fluctuate during a given time period in relation to the mean return of the portfolio. Low standard deviation means, small fluctuations, less risk and vice versa (Elton & Gruber 1995).

Standard deviation is the square root of variance that gives the expected value of squared deviation from the expected returns (Bodie *et. al.* 2009). According to Padgette, 1995 standard deviation is used more often as measure of risk than any other measure. This statistical measure tells that how returns are scattered around the average return. In other words this is the volatility

or uncertainty of expected return around the average return. A higher standard deviation gives higher volatility or risk of that investment and vice versa. Mathematically it can be calculated by following equation (4.5).

$$\sigma_i = \sqrt{\left(\Sigma_{i-1}\left(r_i - \bar{r}\right)^2 / \left(n-1\right)\right)} \quad \textbf{(4.5)}$$

Where

σ_i = Standard Deviation

r_i = Total returns of sample period i.

$\bar{r}$ = Average return of sample period n.

n = Sample time period

4.3.2. Return on investment

Return of the portfolio includes the income during the period and the capital gains and losses; rate of return is the ratio of that gain or loss on the investment relative to the amount of money invested. As according to Elton and Gruber the return is earnings from investing in any asset. An investor wants to earn the highest possible return at the least amount of risk.

To generate the highest return investors invest in different markets and assets. In a particular time period the return on the portfolio is equal to the income from the particular portfolio along with the change in value of the portfolio which is expressed as a fraction of the initial investment. It can be shown in the following formula;

Return on portfolio = (Income + Capital Gain) / Initial Investment

Arithmetic or logarithmic return can be calculated based on the above formula. The major difference in both returns is that arithmetic returns are periodic and non-symmetric but the logarithmic returns are symmetric as they are compounded continuously. The two returns are not equal but for smaller returns they are approximately the same and the difference between the two is large only when percentage changes are high. Researchers often used logarithmic return in their researches.

The arithmetic returns and geometric returns can be calculated by using the equation (4.6) and equation (4.7) respectively.

$$r_{arith} = \frac{\left(P_n - P_{n-1}\right)}{P_{n-1}} \quad \textbf{(4.6)}$$

$$r_{\ln} = \ln\left(\frac{P_n}{P_{n-1}}\right) \quad \textbf{(4.7)}$$

Where in above equations:

P_n = the portfolio market price of present period

P_{n-1} = the portfolio market price of previous period

According to Simons (1998) investors are not interested in investment's return in isolation but they want to compare it with other alternative investments. Normally an investment should yield to the return equal to or more than the return of a risk free asset to be considered by investors. A good example of risk free assets is treasury bills, the rates of return on them are modest and fluctuate with respect to inflation rate. For investors the return of the risk free asset is not the only relevant measure for the comparison but they also compare their investment with other random unmanaged selected portfolios which are referred to as benchmarks

4.4. The Measures of Portfolio Performance Evaluation

Evaluating performance based on an average return alone is not very useful so returns when evaluating the performance of a portfolio must be adjusted for the risk before one can compare them in an acceptable and meaningful way. The simplest and most popular way of comparison of portfolio risk is to compare rates of returns with those of other investment funds that display similar risk characteristics between them. This way of comparing performance by different managers is just a first step but these rankings may be misleading since within, a certain investment style universe, some managers may concentrate on some subgroups so that the characteristics displayed by the different portfolios will not be truly comparable. Thus some other more precise mean for risk-adjustments is desirable (Bodie *et. al.* 2009).

4.4.1. Sharpe Ratio

Sharpe ratio was developed by William Sharpe in 1966. This is used to measure the expected return of the investor according to their volatility level. Simply we can say that it calculates how much money investor should earn in relation to the risk he is willing to face. It is

used as a risk adjusted measure. It takes the total risk of funds/portfolio into account and measures the fund's excess return per unit of its total risk. (Sharpe 1966).

The higher the ratio is the better the fund is expected to perform over a longer time period. A ratio greater than 1 is considered well because it shows that fund is giving relatively high returns with relatively low risk. It can be calculated by dividing the average fund's/portfolios excess return by the standard deviation of the returns of selected time period. It measures the reward to (total) volatility trade-off.

$$\frac{\left(\bar{r}_p - \bar{r}_f\right)}{\sigma_p} \qquad \textbf{(4.8)}$$

Where

$\bar{r}_p$ = Average return of the fund/portfolio.

$\bar{r}_f$ = Average risk free rate of return.

σ_p = Standard deviation of the portfolio.

$\left(\bar{r}_p - \bar{r}_f\right)$ = Average excess return of the fund/portfolio.

4.4.2. M - Square

Modigliani squared or M^2 measure is another risk adjusted measure of portfolio performance. It resolves the problem to interpret the Sharpe ratio by translating it in percentage. The main idea behind M^2 (1997) is to use the market opportunity cost of risk and adjust all the portfolios to the level of risk in the unmanaged market benchmark (any index) hence matching the portfolio's risk to the market risk and measuring the returns of this risk matched portfolio. To match the portfolio risk with the market risk T-bills are mixed with the selected portfolio. M^2 is expressed in percentage or basis points, which investor can easily interpret and compare with different portfolios (Modigliani & Modigliani 1997).

M^2.of a portfolio over a particular period can also be compared with the average return of the market over the same particular period. The difference between them tells us by how many percent the portfolio outperformed the market (if difference is positive) or underperformed the market (if difference is negative) (Bodie *et. al.* 2009). We can measure the M-square by following equation (4.9).

$$M^2 = \frac{\sigma_M}{\sigma_P}\left(\overline{r_P} - \overline{r_f}\right) + \overline{r_f} \quad \textbf{(4.9)}$$

Where

σ_M = Standard deviation of r_M and r_f.

σ_P = Standard deviation of r_P and ε_P.

$\overline{r_P}$ = Average return of portfolio.

$\overline{r_f}$ = Short term average risk-free interest rate.

4.4.3. Sharpe Ratio *vs* M^2

Sharpe and M^2 both calculate the excess return per unit of risk and the Portfolio rankings based on the Sharpe ratio or the M^2 is always same. The M^2 does not have more or different information than the Sharpe ratio. They are both same concepts but M^2 is user friendly as compare to the Sharpe ratio because Sharpe gives us a decimal value and M^2 gives results in percentage which is easy to interprets and compare. We can also say that M^2 is the positive linear transformation of the Sharp ratio nothing more than that (Bodie *et. al.* 2009)

4.4.4. Jensen's alpha

Jensen's measure is the portfolio's alpha value. Jensen (1968) divided the concept of portfolio performance into two parts one is the prediction of future security prices and the second is ability to minimize the unique risk through efficient diversification. The first one puts emphasis on the portfolio managers' ability to predict future security prices and the excess return of the portfolio on a given level of the risk. The Jensen's measurement is the most widely used performance measure today when evaluating mutual fund performance.

Jensen's alpha is the average fund's return over and above that predicted return by the CAPM, given the portfolio's beta and the average market return hence it is the intercept from a regression of the return, in excess of the risk-free rate, of the portfolio on the return of some benchmark index. It allows us to test statically whether the return that manager earns is significantly more (or less) than that of what we would expect using the CAPM. It is also easy to get a performance measure that incorporates information from more than one time period by using Jensen's alpha. This is used to adjust the level of beta risk, due to which the more risky securities are expected to have higher returns. We can define it as the difference between the

averages realized return, by the portfolio manager with private information, and expected return of the passive strategy based upon public information with equal systematic risk (Bodie *et. al.* 2009).

If the manger successfully predicts the security prices then the alpha will be positive which means that the portfolio earned a consistently positive excess return over the benchmark. If manager earns the returns which are equal to the particular index then the alpha will be zero. Alpha can also be negative if manager perform worse than the particular index under consideration that means portfolio earns consistently negative excess return. Least square regression tells us if the positive alpha is due to by chance or due to the superior forecasting skills of the mangers.

Mathematically the Jensen's measure can be expressed as

$$\alpha_P = \overline{r_P} - \left[\bar{r}_f + \beta_P (\bar{r}_M - \bar{r}_f) \right] \quad \textbf{(4.10)}$$

Where

$\overline{r_P}$ = Average expected total portfolio return.

β_P = Estimated beta (risk level) of the portfolio based on the comparable index.

$\bar{r}_f$ = Average risk free rate of return.

$\bar{r}_M$ = Average daily returns of the comparable market index.

However; the Jensen's measure has also come under some critique since it is derived from the CAPM model and its assumptions. The *first* issue with Jensen measure is the importance of choosing the correct benchmark. This part of the critic was advanced by Roll (1979) which is a famous critic against the CAPM model in general stating it is impossible to observe the true market portfolio since this portfolio would include any asset in every market that has any marketable value. In general performance evaluation studies using the Jensen measure use a broad market index as the market portfolio to draw conclusions. But the drawbacks of using the general market index is that it does not represent true market portfolio hence even managers of passive buy and hold funds can generate superior performance to a broad market index. The *second* issue with the Jensen's measure is its assumption of constant portfolio beta. In general the high variance of the markets requires a long observation period in order to be able to determine levels of performance with any statistical significance even under the assumption of the Jensen

measurement that returns are distributed with constant mean and variance. However portfolio returns are in fact far from being constant throughout time and are constantly changing unless it is a passive buy and hold fund. Active management by definition means that return distributions should change by design from the manager's expectations and analysis. In situations such as this estimating various measurements based on models that assume constant return distribution the implications of the study might be that the conclusion contains substantial errors (Bodie *et. al.* 2009). *Third* it is known that the measure suffers from some statistical bias when a fund manager successfully times the market (Jensen 1972). This will be illustrated with the help of the Figure 4.1. In the situation of the Jensen's measure, as was mentioned before, a constant beta is assumed throughout time. This has its issue when managers are able to time the market. In the figure the manager is able to choose only between two portfolios, one with a high beta and the other with a low. These two are represented by the steep and less steep sloped solid lines in the figure. If the portfolio manager is able to detect two signals i.e. that the benchmark excess return will be RH (high return) which means that it will be above its mean or it will be RL (low return), below its mean. If he then is able to act as a market timer he will select the high beta portfolio and be at point A if he gets a signal of higher return from this or be at point B if he receives a low return signal. The estimated risk (beta) of this investment strategy would be illustrated by the dotted line connecting points A and B, exceeding the portfolio risk in either information state. It is then possible that the Jensen's measure of the portfolio, the intercept of the dotted line at C, may become negative indicating that the successful manager, timing the market correctly becomes an inferior performer with an alpha value which indicates underperformance. Thus the constant return distribution is problematic for the final conclusion. Although this issue is widely known the Jensen's measure is still by far the most widely used performance measure in academic literature (Grinblatt & Titman 1989).

Evaluating performance of mutual funds based on selectivity in terms of the Jensen's alpha is referred to as micro forecasting of security analysis where the opposite is macro forecasting which deals with the forecasting of the market as a whole. This is also called market-timing Market timing involves the process of shifting between market portfolios into safer assets or redistributing the portfolios to make it safer depending on whether the market as a whole is expected to be bullish or bearish (Christensen 2005).

If the manager of a mutual fund wants to change the riskness of the portfolio he will change its Beta (β) according to their expectations of whether the market will be bullish or

bearish. Thus β becomes a decision variable that is not constant throughout time[4]. If managers are able to time the market correctly this would have important impacts on that portfolios performance.

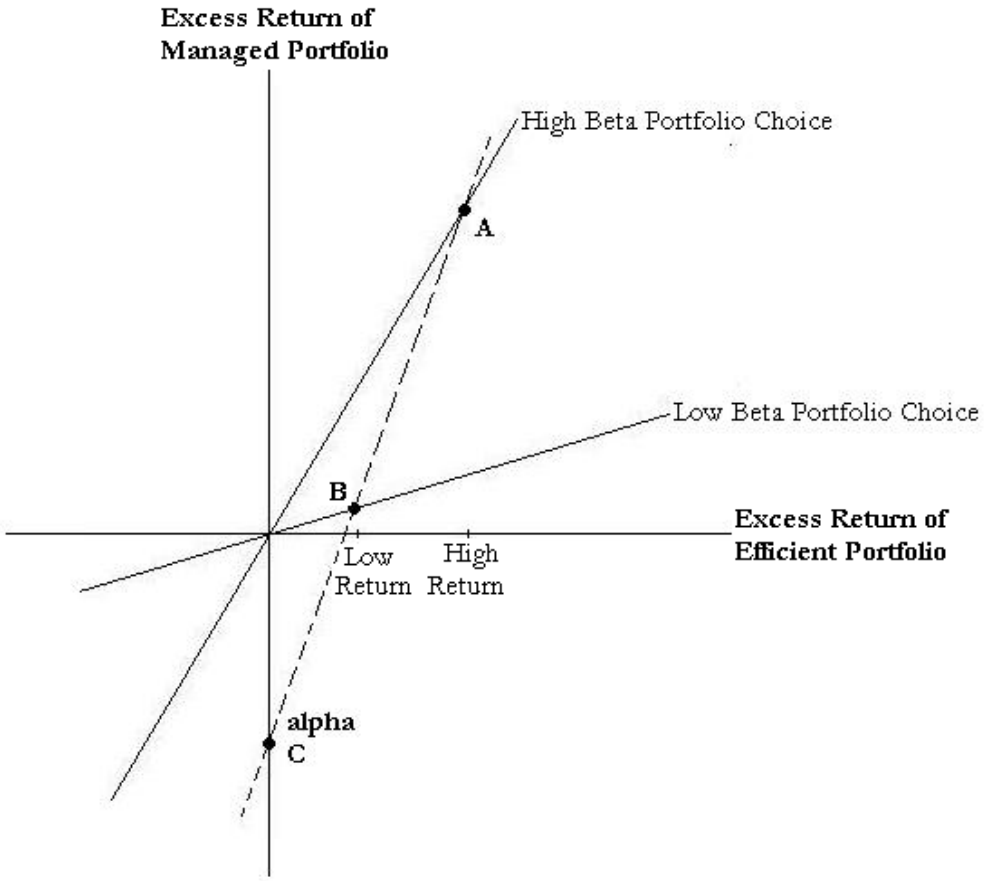

Figure 4.1: An explanation of biasness of Jensen's Alpha.

4.4.5. Henriksson-Merton Market Timing Model

Regular Swedish equity funds are not allowed to take any short positions in their assets and also not allowed to invest more than 10% into one and same asset. Thus the only hedging alternative Swedish equity funds have is to reduce the beta of the portfolios during bear markets which results in timing ability to have very important impact on the management of the fund (Christensen 2005).

A number of methods for evaluating market timing abilities of managers exist in the literature. In this study the Henriksson and Merton model (1981) will be applied in addition to the Jensen's measure to test timing ability and selection skills. This is done in addition to the

[4] Unlike the Jensen measure which does not allow for time varying betas.

Jensen's measure not only to validate the robustness of this thesis but also since the issue of constant betas can cause biased results the Jensen's measure alone we believe is not enough for a performance evaluation study. Hence a more realistic model such as the Henriksson-Merton model will be applied in addition to give more accurate results as managers are able to adjust the return distribution of the portfolios.

In the Henriksson and Merton model managers are assumed to be given a signal which can take two distinct values and based on this signal they are able to choose one of two values of their portfolio betas, either large or small. Large if the market is expected to do well and small if otherwise. This model appears in regression form as

$$r_p - r_f = \alpha + b(r_m - r_f) + c(r_m - r_f)D + e_p \quad \textbf{(4.11)}$$

Where D is a dummy variable that equals 1 for rm > rf and zero otherwise. Thus the beta of the portfolio would be b in bear markets and b + c in bull markets. A statistically significant positive value of α implies, just like in the case of Jensen's alpha, selection skills and a statistically significant c implies market timing ability.

5. Methodology

> *In this section the methodology used in the thesis is presented. The readers can find the reasoning behind the selection of models that are used for measuring the performance of mutual funds.*

To calculate the returns from the daily available prices we preferred the logarithmic returns as they are symmetric and continuously compounded and can be calculated by equation (4.7) which is as follows:

$$r_{\ln} = \ln\left(\frac{P_n}{P_{n-1}}\right)$$

This thesis calculates the average of the returns of the funds, indices and the risk free rate because the return of the funds, indices and risk free returns are not constant over the selected time period, so it's preferred to use the average.

Geometric mean is used to calculate the average as it gives the constant rate of return that we needed to earn in each year to match the actual historical performance over some past investment period and can be calculate by following equation (4.4).

$$1 + r_G = \left[(1 + r_1)(1 + r_2).....(1 + r_n)\right]^{1/n}$$

There are several risk adjusted measures to check the performance of the portfolios and funds, each measure is used for different circumstances and has different appeal.

Treynor is one of the popular risk adjusted measure but it is not preferable because it ignores the firm specific risk. When assessing historic returns, ignorance of specific risk can lead to the partial performance evaluation (Bacon 2000). The other disadvantage of the Treynor measure is that it does not offer any guidance for analyzing return differentials due to these reasons average investors, who are not familiar with capital market theory, find difficulties to interpret Treynor measure. The Treynor and Sharpe Ratios can only be used in relative performance comparisons between portfolios and between a portfolio and a benchmark. Sharpe's ratio is defined as a measure of portfolio efficiency while Treynor's ratio is a measure of performance (Zamanian 1997).

M-square or Modigliani and Modigliani (1997) uses standard deviation as relevant risk measure as Sharpe ratio does. M-square is preferred over Sharpe ratio, although they give the same performance ranking, because M-square measure makes the level of total risk of the

portfolio equal to the level of total risk of the market. M-square gives the risk adjusted return of the fund in basis points which is easy to understand for an average investor and it also allows direct comparison to the market but Sharpe ratio does not. Funds can be ranked using the Sharpe ratio but judging extent of relative performance is difficult by it. That's why it is better to use M-square since it gives risk adjusted returns as compare to Sharpe which gives risk adjusted volatilities (Bacon 2000).

Along with that this thesis also focus on the more widely used performance measures such as Jensen's alpha to observe whether manager's stock selecting ability adds any value to an actively managed mutual fund portfolio. In addition and due to the various problems associated with the Jensen's alpha measure (especially that of constant betas) this thesis enhances the findings by adding tests according to the Henriksson-Merton model to identify market timing ability as well as selectivity. Testing market timing ability makes this thesis more vigorous as it is very important in performance evaluation studies to find whether manager of actively managed fund select the securities at the right time and adjusts betas of the portfolios. This will have significant implication on the performance of the portfolio.

6. Data Selection

> *This section thoroughly explains the data selection process and the benchmarks chosen to represent the market portfolios. The reasons why certain funds are selected and others rejected is given as well as what implication this will have on the performance study.*

This thesis uses the data collected for 24 mutual funds that invest solely in domestic large-cap securities in Sweden and with currency denominated in Swedish crowns. No focus will be put on foreign equity funds since complications would arise due to differences in regulations, exchange rates and foreign risk-free rates.

The fund names were retrieved from Morningstar where the characteristics of identifying the large-cap mutual funds which was used in this thesis are also retrieved. Using Morningstar's excellent Style Box it was possible to easily identify mutual funds that operate in the same investment universe which was necessary for being able to compare these funds to an appropriate benchmark. Using the Style Box we could find the right mutual funds that invested in the largest securities solely where little or no assets were invested elsewhere besides these. Those mutual funds that were not placed on the large value part of the Morningstar Box or invested in other securities such as bonds or a mix of bonds and equities were rejected from the selection process. Also there are some equity funds available in the Swedish market with the purpose of, on yearly basis, give some of the overall wealth to charity. Since these charities are calculated in to the NAV[5] prices of the mutual funds they are excluded from the study since the results will surely be an underperformance when compared to a benchmark and hence give biased results.

For a mutual fund qualifying as equity funds, according to regulations, at least 75% of the total assets must be allocated to the stock market. The mutual funds we have identified according to Morningstar's Box invest no less than 97% of its total assets into the Swedish large cap stock market. The advantage of using these types of mutual funds is because their composition is so similar to other mutual funds investing in the large-cap segment which makes comparison of these to appropriate benchmark very reliable. This is not the case if we use blend funds were different managers will have a lot of differences in the composition of the portfolios making comparison of performance unreliable.

The empirical investigation will focus on the period 2000-01-01 to 2008-12-31 i.e. 9 years using daily (adjusted for dividends) data that was retrieved from the SIX Trust database for the Mutual funds and the benchmark indices that were used for the study. The risk-free rate,

[5] Net Asset Value is the value/price of a mutual fund

necessary for measuring the risk-adjusted performances, used for this study is the Swedish 3 month *Statskuldsväxlar* retrieved from the Swedish Central Bank.

This time period of 9 years will also be divided into 3 sub-periods (i.e. Bull and Bear markets). This is done since these shorter time periods are characterized by different market cycles and it is a very interesting aspect to see how the funds manage to perform in different market cycles and also if the evaluation of performance differs significantly between the different periods using our 3 different models.

The periods are as follows:

- 2000-2003 was characterized by a long downward period arising from the effects of the burst of the IT bubble and the attacks on world trade Center.
- 2003-2006 was characterized by a market recovering after the previous 3 years of steady downward trend
- 2006-2009 is a period that is more volatile than the other since it starts with a continuing upward movement from the previous period until the Sub-prime problems appear somewhere in mid 2007 that leads to heavy drops in the stock markets.

After having identified all the necessary conditions for the mutual funds from the Morningstar website and the necessary time period that is going to be used in this thesis, 31 equity funds were available and 6 index funds. Index funds were to be included in the study to observe the performance of the passive portfolios. However since these index funds followed different benchmarks and none of them fit as an appropriate benchmark we rejected any index fund in the study, instead referring to the benchmark itself as a passive portfolio. The price of the fund (its NAV) that were obtained from the SIX TRUST database all are adjusted for dividends meaning that any dividend paid out for the fund is reinvested into it again. Also the NAV is adjusted for all expenses of the mutual funds i.e. management fees, trading costs etc. This will have significant implications on the final performance as is observed from an investor's point of view. A mutual fund may outperform before cost but it is when all costs are accounted for when it is interesting to evaluate the portfolios since it is this result that matters to an investor not the gross where the manager may have made some profits only to leave a loss for the investor.

Out of the original 31 equity funds, which were fit to be included in the study according to the above requirements, 24 remained after 7 had to be rejected due to the fact they did not cover the entire period and that some funds did not survive the whole period and disappeared

from the list. This is a problem as the estimations will be biased in favor of those that did survive and hence overestimating the overall performance[6].

6.1. Selecting an appropriate benchmark

How much the mutual fund varies in relation to the market index is observed by the beta hence an appropriate index must be chosen when estimating the mutual fund betas. Since the mutual funds solely invest most of their capital in Swedish large cap stocks an appropriate Swedish market portfolio then must be chosen to represent the index. An appropriate benchmark in this case is a market portfolio that invests in only large cap stocks like the comparable mutual funds. For example selecting an index that has some holdings in small cap stocks or other assets will be irrelevant as a comparable index.

Mutual funds are prohibited (UCITS) from investing more than 10 percent of their total wealth into the shares of one and the same company so what could be done is to identify a market portfolio that follows the same restriction characteristics that is reflected in the mutual fund portfolio. As was mentioned earlier all the data for the mutual funds are adjusted for dividends meaning that dividends are reinvested back into each fund making it vital that the same rule applies for the chosen benchmark.

The largest producer of indices today in Scandinavia is SIX with over 500 different indices available. Two of their portfolios were chosen as the benchmarks of this study. The first is the SIX Portfolio Return Index (SIXPRX) and the second is the SIX Return Index (SIXRX) both are adjusted for dividends and both reflect only the broad stock market hence represent the average performance on the Stockholm stock exchange. What separates SIXPRX from SIXRX is the 10 percent investment limitation of the total wealth that applies to SIXPRX like the mutual funds making this index the optimal for measuring the performance of the mutual fund portfolios. SIXRX does not have this limitation but is otherwise similar to SIXPRX. We will add this benchmark to our studies as well to see if performance differs much from theses two almost identical indices.

[6] This leads to problem called Survivorship Bias where the overall results may be biased upwards since the test only includes the funds that survived and not those that were not able to perform well and were shut down or merged into the existing funds. See more on Survivorship Bias in Malkiel (1995)

7. Empirical Findings

> *This section presents all the findings from the different models applied in this thesis. The results are analyzed thoroughly and compared among the different models, selected time periods and benchmarks to see what implications these might have had.*

In this part observe that all the figures below show four bars at each point and each point symbolizes one mutual fund, first bar represents the performance evaluation of the whole chosen market period 2000-2009, the second bar represent the evaluation of the bearish market period 2000-2003, third bar represent the evaluation of period 2003-2006 and the fourth bar shows the evaluation of period 2006-2009, the line represents the beta value (average of the beta values of all four periods) of each fund at each point.

7.1. Performance evaluation findings using M-Square Measure

The performance of 24 large cap actively managed Swedish equity funds evaluated by M-square measure considering SIXPRX index and SIXRX index as a market benchmarks. We analyzed that the level of performance[7] of all the funds is sensitive with respect to the selected indices but still they performed in the same way for both hence the overall performance[8] is not sensitive for selected indices which can be easily seen in Figure 7.1 and Figure 7.2. These figures also illustrate that funds performance is also sensitive with the selection of different time period. For more details on this see Appendices A.1 - A4.

Observe in the Figures 7.1 and Figure 7.2 that in the whole selected period 2000-2009, only 3 funds show outperformance and 21 funds show underperformance whereas with respect to SIXRX bench mark 10 funds show outperformance and 14 funds show underperformance in the same period. In the bearish period 2000-2003, 13 funds, which are same for both indices, outperformed the both benchmarks and remaining 11 underperformed the both benchmarks but the level of outperformance and underperformance is varying w.r.t. different indices. In the bullish period 2003-2006, 2 same funds outperformed the both benchmarks but 1 other fund outperformed the SIXRX index and remaining funds underperformed the both benchmarks along with the different level of performance (outperformance and underperformance) for SIXPRX and SIXRX indices. In the last period 2006-2009, which is volatile throughout, 16 funds beat SIXPRX index and remaining 8 funds underperformed SIXPRX index, for the SIXRX index in the very same period funds exhibits the same results. This illustrates that performance of funds

[7] Level of performance means different return with respect to different indices.
[8] Overall performance means performance of fund w.r.t a benchmark, whether it overperformed or outperformed the selected benchmark.

is very sensitive, especially for the longer periods as compare to the shorter periods, to the selection of benchmark indices.

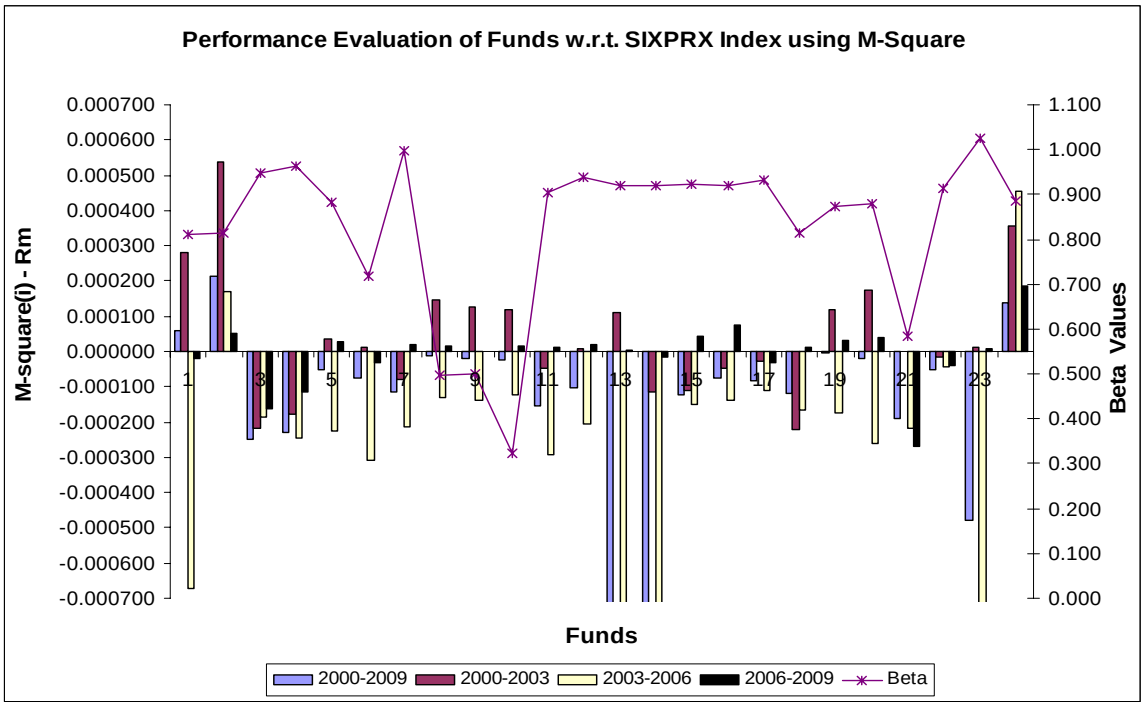

Figure 7.1: The figure shows the results of the M-square w.r.t. SIXPRX index for all the equity funds during all tested periods along with the beta of each fund.

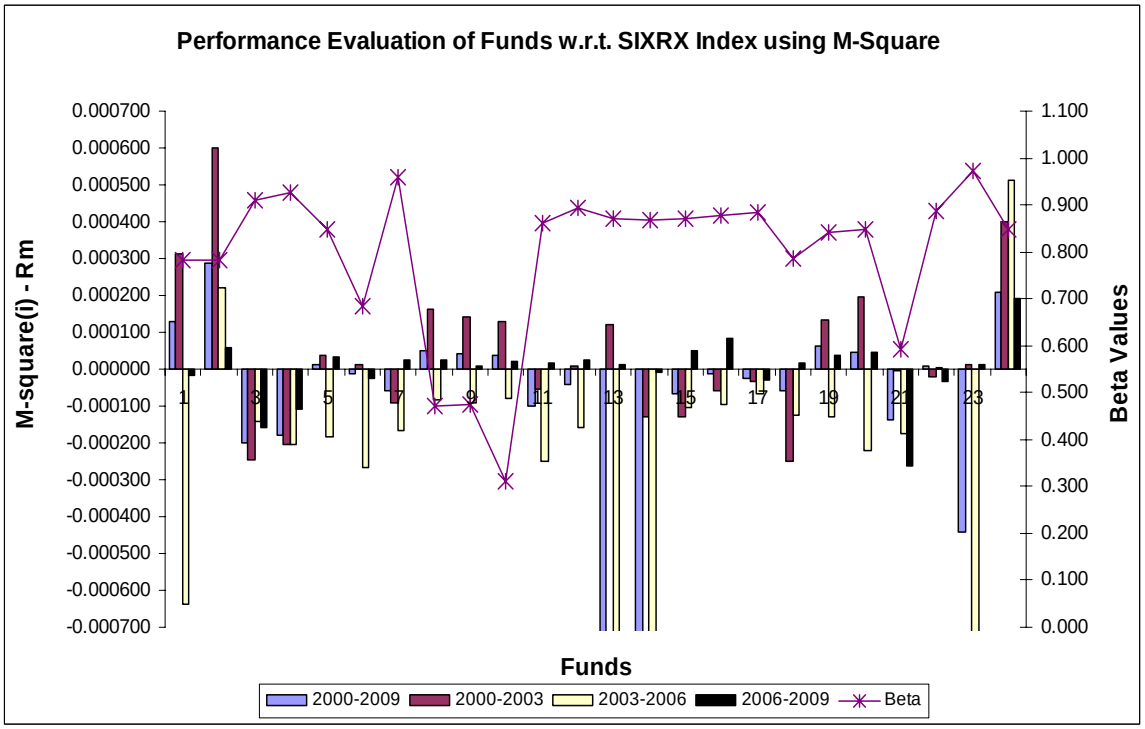

Figure 7.2: The figure shows the results of the M-square w.r.t. SIXRX index for all the equity funds during all tested periods along with the beta of each fund.

The Figures 7.1, 7.2 and the explanation illustrate that funds show different performance along with different time periods for both selected benchmarks. Most of the funds underperformed in all the four time periods. Although in the bearish (2000-2003) and bullish (2003-2006) time periods many funds beat the market and the last volatile time period (2006-2009) shows the outperformance of most of the fund even some of those funds which cannot beat the market in any other time period, they beat the market in this time period.

But if we consider the fact that the higher risk (beta) the higher the return, then the above figures gives a different picture. Figures 7.1 and 7.2 indicate that those funds that have higher beta values are producing low returns as compare to those who have less beta values. For instance Öhman Sverigefond has the highest average beta 1.025 and 0.971 for both market indices SIXPRX and SIXRX respectively but still it is generating the less returns as compared to the other funds that have less beta that counter the fact of high risk high return. This fund may gives higher gross returns as compared to other funds returns but due to higher fund management costs net returns turn out to be less than that of other funds. We mentioned earlier that the prices are adjusted for all expenses of the fund. Hence gross of fees the fund may have performed better but net it performed relatively poor and did no payoff to the investors taking a higher risk.

The overall conclusion about the performance of the selected large cap equity funds using M-square is that most of them underperformed SIXPRX index market as well as SIXRX index market, in the different time periods which are based on the market situations. It can thus be observed that the funds are sensitive to the selection of benchmark and also to the time period selection.

7.2. Performance evaluation findings using Jensen's Alpha

We estimate the Jensen's alpha based on the CAPM security market line given in equation 4.10. We run the linear regression model to obtain the Jensen's alpha which is the deviation from the benchmark model. The regression is corrected with the Newey-West corrected standard errors to correct for potential heteroskedasticity and serial autocorrelation (HAC). We have used two broad indices as presented in an earlier section

In Figure 7.3 the findings from the tests are presented along with an average beta value of the mutual funds over the whole period with respect to the SIXPRX index. Observe again that a positive alpha value indicates outperformance and vice versa. We start by examining the mutual funds returns in excess of the risk-free rate on a daily basis. We estimate the coefficients of the test using least square regression. As can be observed by examining the Appendices B1 – B8

where all the alpha results for the relevant period are presented we can observe that w.r.t. SIXPRX index, the index with the investment restriction similar to the restrictions of the mutual funds, 16 of the mutual funds underperformed during the tested 9-year period while 8 mutual funds managed to show an outperformance. The results w.r.t. SIXRX differed somewhat with 11 funds underperforming and 13 outperforming. For the period of 2000-2003 the results of the alpha intercepts is much more dramatic compared to both indices. For this period only 3 funds were able to outperform the market while the remaining 21 funds underperformed Looking at the period recovering from the latest bear market 2003-2006 fund managers did better in this period. During this period w.r.t. SIXPRX 20 mutual funds managed to show an outperformance while 4 underperformed. With respect to SIXRX 2 funds underperformed and 22 outperformed the index. For the final tested period 2006-2009 the results differ again among the benchmarks similarly with 8 funds outperforming and 16 underperforming w.r.t. SIXPRX and 10 outperforming and 14 underperforming w.r.t. to SIXRX showing in general that the choice of benchmark has indeed significant implications on performance evaluation.

The results of the Jensen's alphas are presented in the Figure 7.3 and 7.4 to provide a clear perspective of the results but the complete details of the findings are presented in the Appendices B1 - B8.

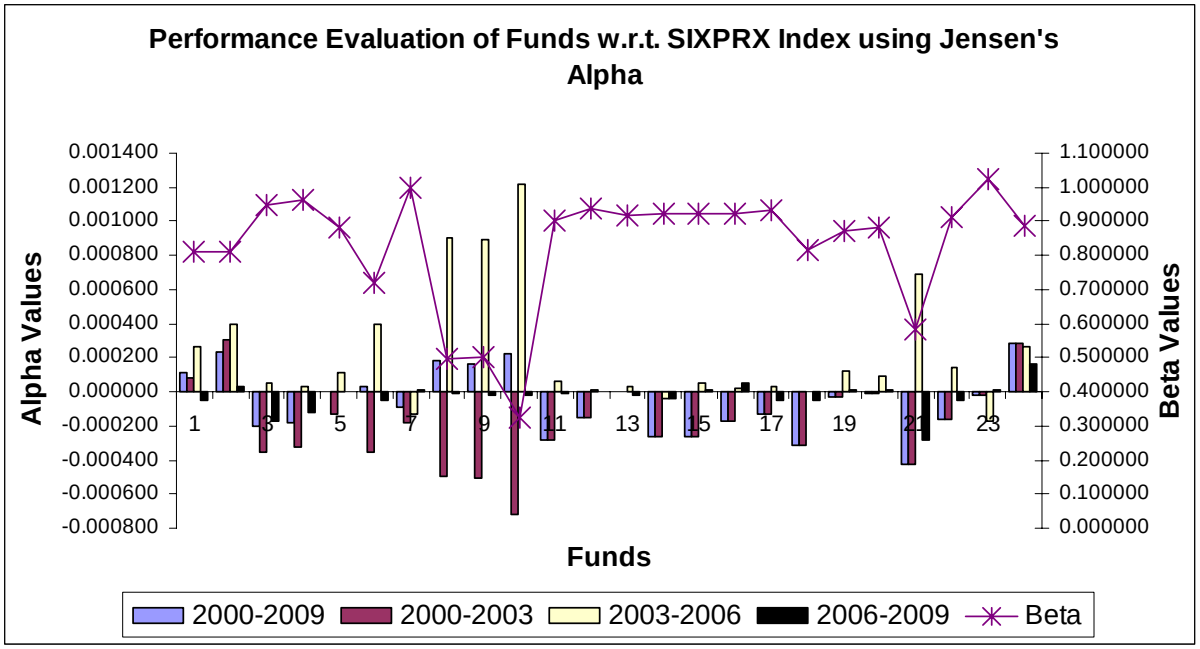

Figure 7.3: The figure shows the results of the alphas w.r.t. SIXPRX index for all the equity funds during all tested periods along with the beta of each fund

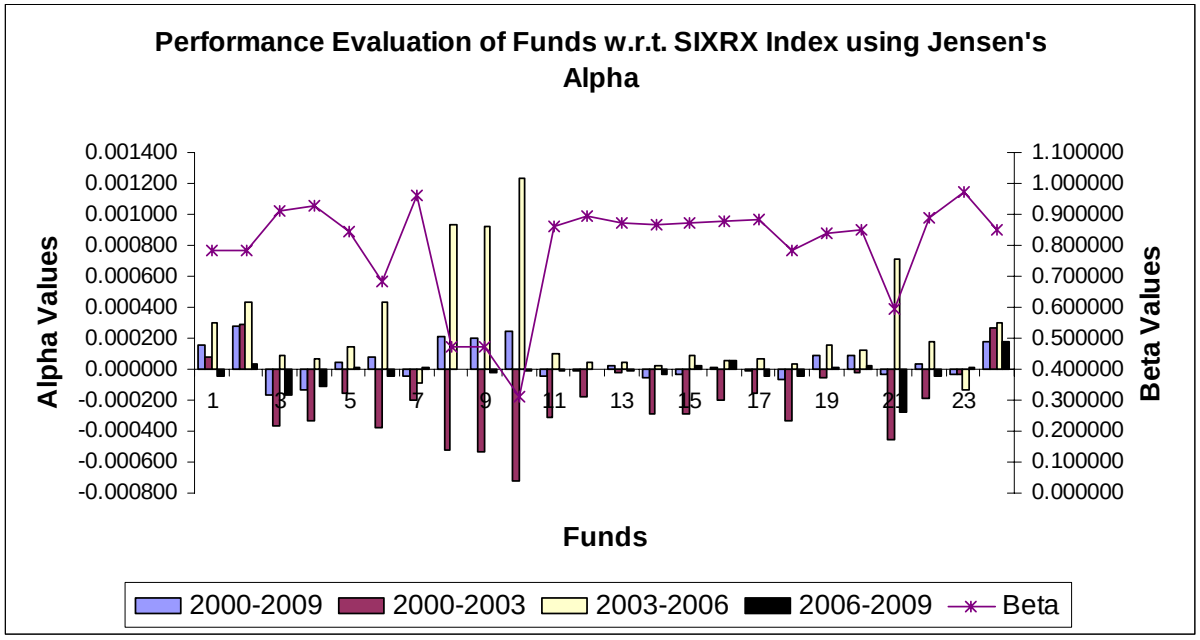

Figure 7.4: The figure shows the results of the alphas w.r.t. SIXRX index for all the equity funds during all tested periods along with the beta of each fund.

Only a small number of the alpha values, found in general, throughout all test periods were statistically significant at the conventional 5% significance level. If we start by looking at the period 2000-2009 and with respect to SIXPRX only 3 funds were significant at the 5% level and only 2 funds significant w.r.t. SIXRX. In order to find more significance that can provide proof of selectivity of managers we relax the restrictions and try to find significant funds at a 10% significance level instead. By doing this we get 1 more fund significant with respect to SIXPRX for the period and no additional fund significant w.r.t. SIXRX. For all following periods the results are the same. Relaxing the restrictions and testing for significance at the 10% level, in order to find more significant alpha values, does not change the overall conclusion that a majority of the alpha values were not statistically significant at either 5 or 10% level. These findings are in line with earlier findings such as Jensen (1968) and Elton et al (1993). According to the literature the positive alphas that were found solely due to luck and not the superior stock selecting abilities of their managers. Hence with the Jensen's alphas in most cases negative and not statistically significant at 5% or 10% level we can conclude that the mutual funds performance have been rather neutral i.e. we cannot say with certainty that the alphas are significantly different from zero. This could mean that actively managed mutual funds do not deviate much from index and hence actively managed funds do not outperform a simple buy and hold strategy that replicates the broad index.

Also looking at the beta of each mutual fund it is apparent that those that displayed the higher beta i.e. above 0,85 are the ones that underperformed while those that exhibit a lower beta are the ones that exhibited better performance. Hence the investors who have been taking on more risk have not been rewarded for it whatsoever. This result may be from the fact that, as we mentioned in an earlier section, all prices are adjusted for all expenses that are related to the funds meaning the prices retrieved are net of the total costs associated with the mutual fund not gross. There may have been profits before all the costs were deducted but after costs, which are the value that matters, profits were low or negative. This could also indicate that managers are not able to select stocks well and hence the costs erode the little profits generated. In general a fund should exhibit higher betas when the market is in a bullish state and a lower beta when the market is in a bearish state. This was not found in the study which showed beta values were rather constant in all different test periods which is in line with the assumptions of Jensen's measure. It seems that managers don't change the return distribution of their portfolios as they should to manage risk more appropriately. Since the Jensen measure does not allow for this the findings are rather weak and hence a better model is needed in addition to the Jensen's measure that allows for time varying betas. This would provide more realistic findings since it is obvious managers adjust betas continuously[9].

The samples are clearly sensitive to what time period we test and to the choice of the benchmark. This is in line with the findings of Lehman *et al* (1987) and Grinblatt and Titman (1994) who found that performance results varies among different benchmarks used. Almost every fund showed different alpha values when tested in different time periods. Bearish periods showed clearly more negative alpha values whilst the bullish period showed more positive alpha values. Few alphas were statistically significant at the 5% or 10% significance level which means accordingly that whatever outperformance we observed were not due to superior selecting skills. With a 50% chance of outperforming the broad market index the mutual funds did worse than a result that should be obtained by mere random chance alone. As other studies have found similar results (see Jensen 1968 and Malkiel 1995) the possible explanation for the worse than random chance results may be due to transaction costs and management fees as we mentioned earlier in this section. Active funds generally exhibit high costs due to heavy trading and higher management fee and these costs will have a negative impact on the performance of the fund as they are accounted for in the NAV prices. Managers seem to have more difficulties in selecting correct assets to increase the performance of the fund. Instead the heavy trading fees and

[9] This will be tested next with the Henriksson-Merton model allowing for time varying betas to give more accurate results.

management fees has an eroding effect on profits manager may have made before costs were deducted for[10].

7.3. Market timing findings

As was mentioned earlier the Jensen's alpha suffers from some statistical issues when the managers are able to time the market correctly and also it assumes constant return distributions to the portfolio which is not realistic in the context of active portfolio management. To check how these issues could have affected the results obtained from the Jensen's measure we will proceed beyond the Jensen's measure and estimate manager's stock selectivity and timing ability by using the more appropriate Henriksson-Merton model of equation 4.11. We do this since the findings of the Jensen become unreliable due to its restriction of constant betas. It is not realistic for the manager of an active portfolio to leave the return distribution constant at all times but he should be able to adjust it whenever he finds it necessary. Surprisingly with this obvious negative restriction, the Jensen's measure is still the most popular and widely used model in the academic literature.

We now move along to examine the findings from the Henriksson-Merton model where the estimation results from the model are presented in the Appendices C1 – C8. These were found by estimating least square regressions according to equation 4.11. The p-values here are based on the Newey-West corrected standard errors to correct for potential heteroskedasticity and serial autocorrelation (HAC).

Examining the performance results of Henriksson and Merton model w.r.t. SIXPRX and SIXRX for the 9 year period we found that in total 18 mutual funds had negative alpha values for this period w.r.t. SIXPRX index and 22 funds underperformed w.r.t. SIXRX index. Looking at the period 2000-2003 we see that in total 16 mutual funds underperformed in this period compared to the SIXPRX and a non flattering 21 funds underperformed the SIXRX index. For the period 2003-2006 17 funds underperformed the SIXPRX index while 11 underperformed the SIXRX. For the final period 2006-2009 a total of 20 funds underperformed the SIXPRX index. For the SIXRX 19 funds underperformed.

The results of the Henriksson and Merton alphas are presented in Figure 7.5 and 7.6 to provide a clear perspective of the results but the complete details of the findings are presented in the Appendices C1 – C8.

[10] Remember for all the NAV prices we have retrieved all costs are deducted from them so we test net prices as they are the ones that matter in the end to the investor.

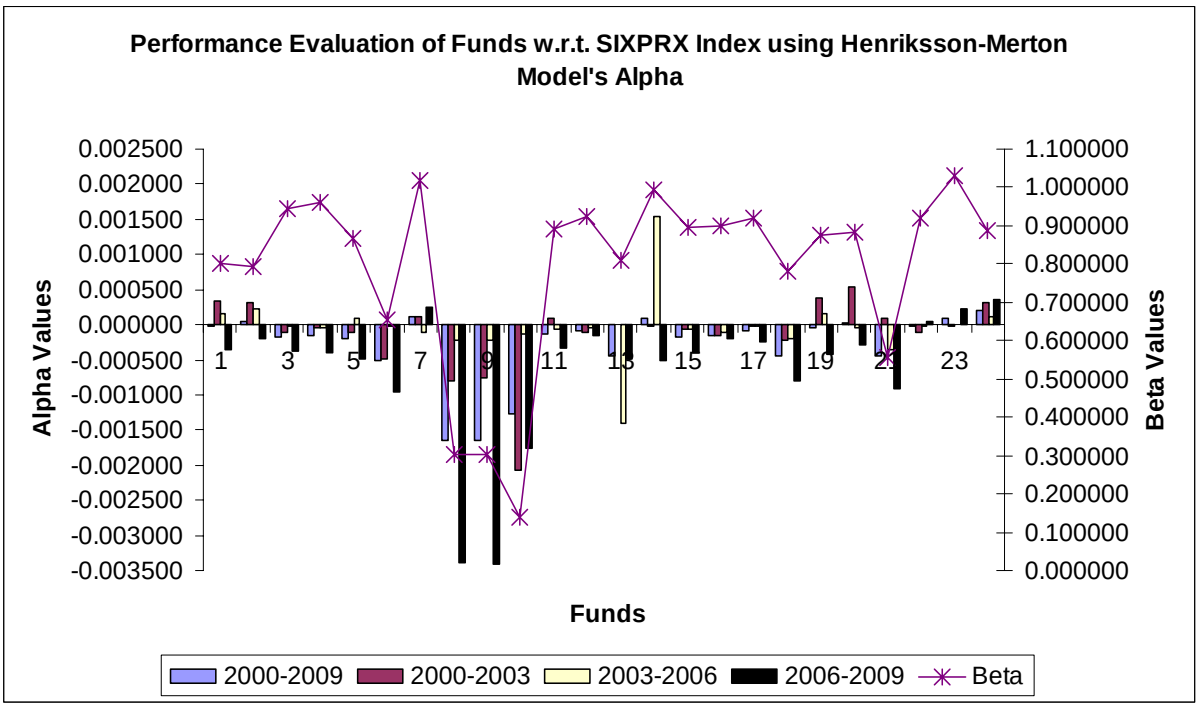

Figure 7.5: The figure shows the results of the alphas w.r.t. SIXPRX index from the HM-model for all the equity funds during all tested periods along with the beta of each fund.

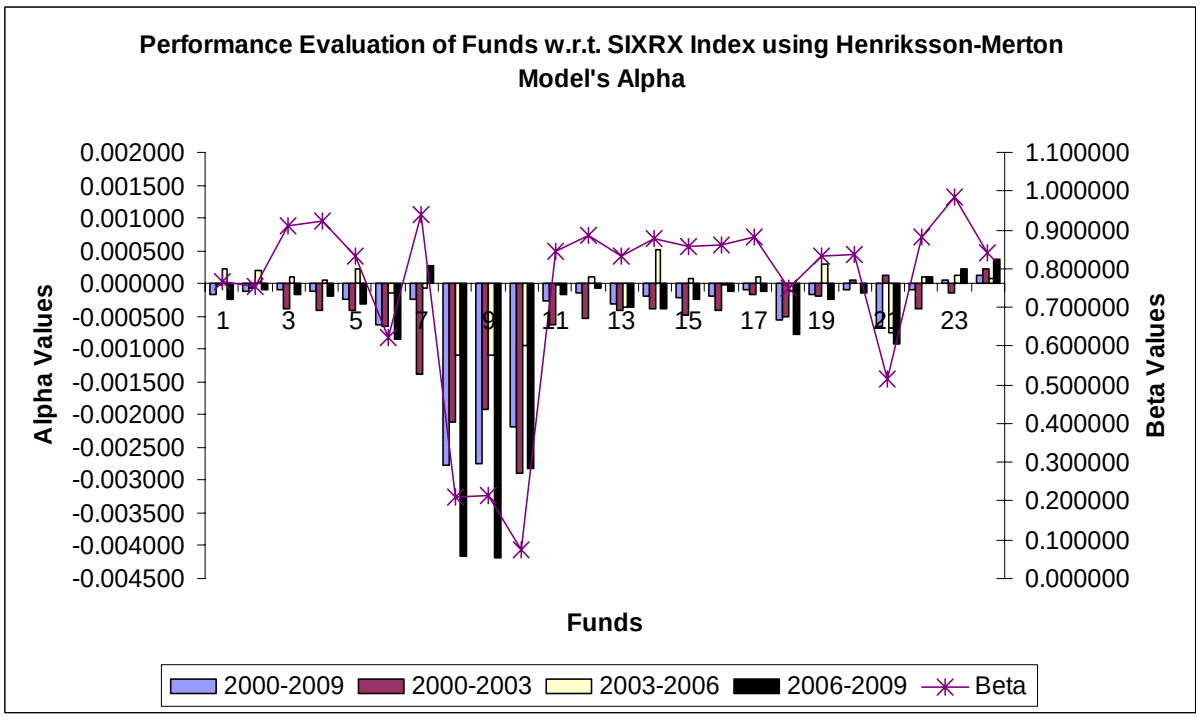

Figure 7.6: The figure shows the results of the alphas w.r.t. SIXRX index from the HM-model for all the equity funds during all tested periods along with the beta of each fund.

Comparing the resultsof Henriksson and Merton model to that obtained from the Jensen's measure to the performance of the SIXPRX and SIXRX for the period 2000-2009 did not provide much news regarding the performance of the mutual funds. We observe that more of

the estimated alphas are negative in this case and for all funds only 4 alphas are statistically significant at the 5% level and 10% level w.r.t. SIXPRX and for SIXRX the numbers are 4 and 6 respectively for each level.

In the period 2000-2003 only 1 fund displayed statistically significant alpha for both the 5 and 10% level w.r.t. to SIXPRX and it was negative. For the case of SIXRX again only 1 fund was significant at the 5% level but loosening the restrictions in order to find more significance raised the total number to 4 mutual funds only. For 2003-2006 none of the alpha values for this period were significant w.r.t. SIXPRX at 5% level nor at 10% level although w.r.t SIXRX index we found 2 funds to be significant at a 10% level only. For the final period 2006-2009 a total of 8 funds were found to be significant at the 10% level while only 4 were significant at the 5% level w.r.t. to the SIXPRX index and the numbers were 3 and 2 respectively for the SIXRX.

The overall conclusion compared to the findings from the Jensen's measure reveals no surprisingly new result and in general, again, no selectivity ability was found as the majority of the alphas were insignificant. The few that did display selectivity had different results over the different test periods hence no persistence in selectivity abilities could be identified. The few overall positive performances that were found for the tested periods seemed not to have been due to superior skills of managers.

In addition to examine the selectivity of the mutual funds the Henriksson and Merton model also allows us to take a look at managers' timing abilities and based on the overall findings we can conclude that the mutual funds in general are not able to time the market correctly either since the vast majority of them showed statistically insignificant (at 5 and 10% levels) timing ability parameters (see Appendices C1 – C8)[11]. Exceptions were found here as well but the results for all of these were again sensitive to the choice of time period and to the choice of benchmark. Thus no persistence in timing ability could be found either.

As we have seen analysing the mutual fund performances with the different models displayed similar results. Concerning the results of the selectivity they are in general identical with no evidence of any superior selecting abilities of managers. On the basis of all the findings it is our belief that Swedish equity mutual funds have performed neutrally with no selecting and timing abilities. These finding are much in line with the literature i.e. Jensen (1968), Malkiel (1995) concerning the mutual fund selectivity and the overall performance of actively managed portfolios. The finding are in contrast to the findings of Dahlquist *et. al.* (2000) and Engtsröm

[11] See Appendices C1 to C8 for complete details of the timing parameters. Remember that a positive and statistically significant timing parameter indicates timing ability.

(2004) who also studied the Swedish mutual fund industry and found that managers of Swedish mutual funds did possess stock selecting abilities. However Engtsröm (2004) also concluded, like this thesis, that there were no evidence of market timing abilities among the Swedish mutual funds. This does not mean that any of the findings are wrong but as we have shown small differences in the methods used have large impacts on the final conclusion.

8. Concluding Remarks

> *This section concludes the thesis. The overall findings will be discussed here along with their validity.*

In this thesis we have evaluated the performance of 24 actively managed Swedish equity mutual funds over the period 2000-2009 with 3 divided sub-periods as well. All selected funds have been in operation throughout the test period. We use various models, such as M-square, Jensen's alpha and the Henriksson and Merton model, to identify performance, selectivity and timing ability of managers of the mutual funds to see whether an actively managed portfolio is able to perform better than its relative benchmark which represents a simple buy and hold strategy. Originally some of the funds that would have been included in the study had to be rejected due to the fact that they did not survive the whole test period. This problem leads to an issue called survivorship bias where the performances will be biased upwards. However since we measure each mutual fund individually the overall conclusion will not be affected significantly due to survivorship bias.

The general finding of this thesis supports the earlier literature such as Jensen (1968) and Malkiel (1995) where no superior performance in actively managed mutual funds could be identified. The mutual funds examined have not shown any significant over performance in relation to the chosen market benchmark i.e., the managers of the mutual funds have not possessed any superior stock selecting skills or any timing ability. Although a few funds did show significant over performance and timing abilities, the results varied greatly across time periods and in regards to benchmarks hence no persistence in selectivity or timing could be found, that could support the value added by actively managed portfolios. Most likely in an efficient market and according to the Efficient Market Hypothesis, at least in its semi-strong form, public information seems to be already reflected in the prices of the equities in which mutual funds invest. This fact may be the reason why the analysis of the mutual fund managers seems to add no value to performance. This is not to say that managers are of no use. Since efficient markets do not allow for excess returns to be gained the manager should focus on tailoring portfolios to the needs of different investors rather than to construct portfolios that has the purpose of beating the market.

Another reason identified for the relative negative performance of actively managed fund could be related to the expenses of the fund itself. A fund that is managed actively has in general higher costs related to it, especially costs raised from re-adjusting the portfolio in order to reap higher returns from some securities which the manager may believe is undervalued. The manager

might be able to select correct securities more often than is observed. However these selections are not for free, hence their net returns do not add value to the returns of mutual fund and may erode the overall returns instead.

It is important to remember that performance is analyzed in the context of the Capital Asset Pricing Model and the issues related to it. The major issues are *first* that the real market portfolio to which results should be compared is not observable and hence the two broad market indices chosen are at best close estimation to mimicking the funds but definitely not the optimal. Hence due to this the performance findings may be inaccurate. The *second* problem is the fact that CAPM assumes beta to be constant over time. This issue we tried to address by applying, besides the CAPM based Jensen's alpha, the Henriksson-Merton model which allows for some time varying betas. By doing so we believe we have enhanced the validity of the findings and added additional robustness to the thesis conclusion regarding selectivity and timing ability. However since we couldn't find any significant evidence of timing ability, the conclusion is in line with that of Jensen's alpha.

8.1. Suggestion for Further studies

As we have seen this thesis is limited to Swedish mutual funds only and hence the findings can only be related to the Swedish equity funds tested. An interesting aspect for a future study is too examine not only domestic, which is the most widely used method, but also to extend the sample to include funds from other countries as well in order to identify the performance of internationally diversified portfolios. There could be problem related to this due to different regulations. However looking at Mutual funds registered within the European Union would overcome the issues of different regulations as these apply to all EU based mutual funds. Another suggestion is to go beyond only measuring equity funds and include some blend funds within the study to examine the risk-free assets involvement and performance.

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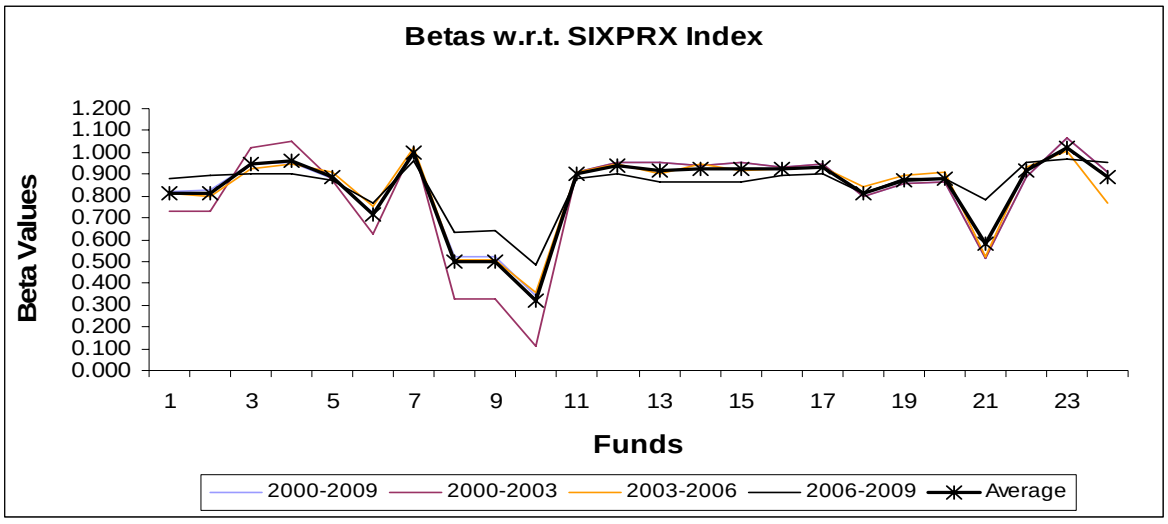
10. Appendices

Appendix A 1: Performance Evaluation by M-Square Measure of Swedish Large Cap Equity Mutual Funds for periods 2000-2009, 2000-2003, 2003-2006 and 2006-2009 tested against SIXPRX Index as benchmark.

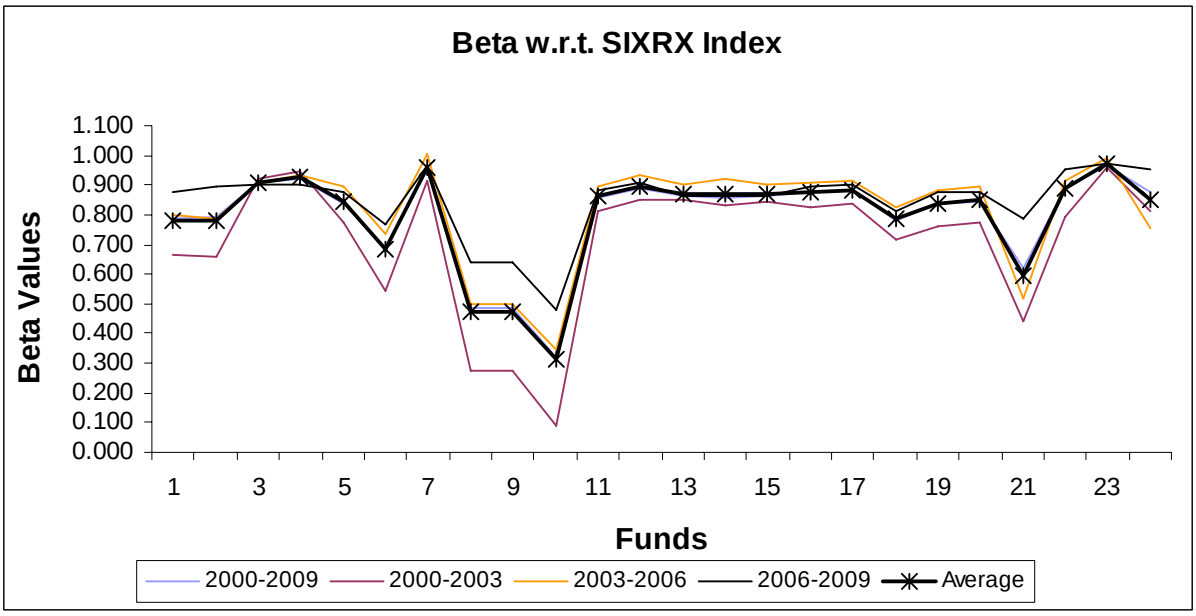
	2000-2009	2000-2003	2003-2006	2006-2009	Average Betas
Aktie-Ansvar Sverige	0.000061	0.000283	-0.000673	-0.000021	0.8102
AMF Pension Aktiefond Sverige	0.000212	0.000537	0.000172	0.000052	0.8132
Banco Etisk Sverige	-0.000248	-0.000217	-0.000185	-0.000163	0.9477
Banco Etisk Sverige Special	-0.000229	-0.000179	-0.000246	-0.000114	0.9630
Carlson Sverigefond	-0.000050	0.000035	-0.000227	0.000026	0.8835
Carlson Sweden	-0.000074	0.000012	-0.000309	-0.000033	0.7175
Carnegie Sverige	-0.000116	-0.000079	-0.000212	0.000020	0.9984
Folksam LO Sverige	-0.000011	0.000148	-0.000129	0.000018	0.4982
Folksams Aktiefond Sverige	-0.000019	0.000127	-0.000139	0.000001	0.4994
Folksams Tjänstemannafond Sverige	-0.000024	0.000119	-0.000124	0.000016	0.3235
Handelsbanken Sverigefond	-0.000155	-0.000046	-0.000292	0.000011	0.9043
Länsförsäkringar Sverigefond	-0.000102	0.000010	-0.000204	0.000020	0.9395
Nordea Etiskt Urval	-0.762743	0.000111	-0.298111	0.000005	0.9186
Nordea Sweden Fund	-0.601861	-0.000114	-0.229303	-0.000016	0.9212
Nordea Sverigefond	-0.000122	-0.000111	-0.000150	0.000042	0.9223
SEB Etisk Sverigefond - Lux utd	-0.000074	-0.000049	-0.000140	0.000076	0.9212
SEB Sverigefond	-0.000085	-0.000026	-0.000111	-0.000033	0.9314
SEB aktiesparfond	-0.000117	-0.000221	-0.000168	0.000011	0.8137
Skandia Aktiefond Sverige	-0.000003	0.000120	-0.000174	0.000032	0.8739
SPP Aktiefond Sverige	-0.000018	0.000175	-0.000262	0.000040	0.8798
Swedbank Robur Ethica Miljö Sverige	-0.000189	-0.000001	-0.000219	-0.000268	0.5850
Swedbank Robur Sverigefond	-0.000051	-0.000014	-0.000042	-0.000040	0.9142
Öhman Sverigefond	-0.000479	0.000012	-0.001963	0.000007	**1.0246**
HQ Sverigefond	0.000139	0.000358	0.000455	0.000185	0.8854



Appendix A 2: Estimated Beta values and their average w.r.t. SIXPRX index for all the selected periods.

Appendix A 3: Performance Evaluation by M-Square Measure of Swedish Large Cap Equity Mutual Funds for periods 2000-2009, 2000-2003, 2003-2006 and 2006-2009 tested against SIXRX Index as benchmark.

	2000-2009	2000-2003	2003-2006	2006-2009	Average Betas
Aktie-Ansvar Sverige	0.000128	0.000314	-0.000637	-0.000015	0.7819
AMF Pension Aktiefond Sverige	0.000287	0.000600	0.000223	0.000058	0.7822
Banco Etisk Sverige	-0.000198	-0.000246	-0.000140	-0.000156	0.9092
Banco Etisk Sverige Special	-0.000178	-0.000204	-0.000202	-0.000108	0.9257
Carlson Sverigefond	0.000011	0.000036	-0.000183	0.000032	0.8464
Carlson Sweden	-0.000014	0.000010	-0.000267	-0.000027	0.6832
Carnegie Sverige	-0.000059	-0.000092	-0.000168	0.000026	0.9589
Folksam LO Sverige	0.000052	0.000163	-0.000083	0.000024	0.4724
Folksams Aktiefond Sverige	0.000043	0.000140	-0.000094	0.000007	0.4735
Folksams Tjänstemannafond Sverige	0.000038	0.000130	-0.000079	0.000022	0.3111
Handelsbanken Sverigefond	-0.000100	-0.000055	-0.000250	0.000017	0.8618
Länsförsäkringar Sverigefond	-0.000044	0.000008	-0.000160	0.000026	0.8941
Nordea Etiskt Urval	-0.804369	0.000122	-0.303466	0.000011	0.8698
Nordea Sweden Fund	-0.634694	-0.000131	-0.233411	-0.000010	0.8691
Nordea Sverigefond	-0.000065	-0.000127	-0.000105	0.000048	0.8696
SEB Etisk Sverigefond - Lux utd	-0.000014	-0.000058	-0.000095	0.000082	0.8774
SEB Sverigefond	-0.000026	-0.000033	-0.000065	-0.000027	0.8844
SEB aktiesparfond	-0.000060	-0.000251	-0.000123	0.000017	0.7843
Skandia Aktiefond Sverige	0.000061	0.000131	-0.000129	0.000038	0.8398
SPP Aktiefond Sverige	0.000044	0.000194	-0.000219	0.000046	0.8477
Swedbank Robur Ethica Miljö Sverige	-0.000136	-0.000004	-0.000175	-0.000262	0.5919
Swedbank Robur Sverigefond	0.000009	-0.000019	0.000005	-0.000034	0.8862
Öhman Sverigefond	-0.000442	0.000011	-0.001951	0.000013	**0.9714**
HQ Sverigefond	0.000210	0.000399	0.000511	0.000191	0.8485



Appendix A 4: Estimated Beta values and their average w.r.t. SIXRX index for all the selected periods.

Appendix B 1: Performance Evaluation by Jensen's Alpha of Swedish Large Cap Equity Mutual Funds for period 2000-2009 (Whole Period) tested against SIXPRX Index as benchmark.

	Alpha	***Beta***	***R-squared***
Aktie-Ansvar Sverige	0.000117	0.820142	0.693524
	(0.2641)[12]	(0.0000)	
AMF Pension Aktiefond Sverige	0.000239	0.827637	0.743487
	(0.0166)	(0.0000)	
Banco Etisk Sverige	-0.000206	0.944404	0.823104
	(0.0377)	(0.0000)	
Banco Etisk Sverige Special	-0.000179	0.955691	0.810558
	(0.1040)	(0.0000)	
Carlson Sverigefond	0.000004	0.878424	0.771996
	(0.9610)	(0.0000)	
Carlson Sweden	0.000036	0.721206	0.508715
	(0.8020)	(0.0000)	
Carnegie Sverige	-0.000086	0.990316	0.913767
	(0.2493)	(0.0000)	
Folksam LO Sverige	0.000180	0.519328	0.217203
	(0.4197)	(0.0000)	
Folksams Aktiefond Sverige	0.000168	0.520694	0.220118
	(0.4511)	(0.0000)	
Folksams Tjänstemannafond Sverige	0.000229	0.345123	0.100820
	(0.4467)	(0.0000)	
Handelsbanken Sverigefond	-0.000286	0.912699	0.610799
	(0.3807)	(0.0000)	
Länsförsäkringar Sverigefond	-0.000155	0.954119	0.710570
	(0.5333)	(0.0000)	
Nordea Etiskt Urval	-0.000003	0.955109	0.766889
	(0.9550)	(0.0000)	
Nordea Sweden Fund	-0.000267	0.937431	0.744912
	(0.7825)	(0.0000)	
Nordea Sverigefond	-0.000258	0.954349	0.758089
	(0.4135)	(0.0000)	
SEB Etisk Sverigefond - Lux utd	-0.000174	0.931852	0.777686
	(0.6410)	(0.0000)	
SEB Sverigefond	-0.000128	0.947852	0.819744
	(0.3979)	(0.0000)	
SEB aktiesparfond	-0.000318	0.800550	0.753294
	(0.2803)	(0.0000)	
Skandia Aktiefond Sverige	-0.000034	0.859934	0.699237
	(0.6133)	(0.0000)	
SPP Aktiefond Sverige	-0.000011	0.866050	0.631195
	(0.6463)	(0.0000)	
Swedbank Robur Ethica Miljö Sverige	-0.000429	0.515336	0.272369
	(0.7121)	(0.0000)	
Swedbank Robur Sverigefond	-0.000163	0.888050	0.734604
	(0.8350)	(0.0000)	
Öhman Sverigefond	-0.000021	1.062545	0.932752
	(0.7741)	(0.0000)	
HQ Sverigefond	0.000285	0.910170	0.881732
	(0.0946)	(0.0000)	

[12] P-Values are in Parenthesis

Appendix B 2: Performance Evaluation by Jensen's Alpha of Swedish Large Cap Equity Mutual Funds for period 2000-2009 (Whole Period) tested against SIXRX Index as benchmark.

	Alpha	***Beta***	***R-squared***
Aktie-Ansvar Sverige	0.000155	0.787206	0.687072
	(0.1600)[13]	(0.0000)	
AMF Pension Aktiefond Sverige	0.000278	0.791311	0.730851
	(0.0117)	(0.0000)	
Banco Etisk Sverige	-0.000162	0.908931	0.819868
	(0.1142)	(0.0000)	
Banco Etisk Sverige Special	-0.000136	0.922270	0.811729
	(0.2174)	(0.0000)	
Carlson Sverigefond	0.000046	0.840326	0.759703
	(0.6431)	(0.0000)	
Carlson Sweden	0.000074	0.681625	0.488625
	(0.6385)	(0.0000)	
Carnegie Sverige	-0.000040	0.951448	0.906988
	(0.5945)	(0.0000)	
Folksam LO Sverige	0.000209	0.483885	0.202744
	(0.3721)	(0.0000)	
Folksams Aktiefond Sverige	0.000197	0.485217	0.205515
	(0.4001)	(0.0000)	
Folksams Tjänstemannafond Sverige	0.000248	0.321502	0.094054
	(0.4211)	(0.0000)	
Handelsbanken Sverigefond	-0.000043	0.857341	0.728032
	(0.6848)	(0.0000)	
Länsförsäkringar Sverigefond	-0.000006	0.888668	0.796791
	(0.9491)	(0.0000)	
Nordea Etiskt Urval	0.000026	0.863739	0.159882
	(0.9281)	(0.0000)	
Nordea Sweden Fund	-0.000056	0.859992	0.099994
	(0.8767)	(0.0000)	
Nordea Sverigefond	-0.000032	0.863902	0.789093
	(0.7505)	(0.0000)	
SEB Etisk Sverigefond - Lux utd	0.000007	0.873440	0.814798
	(0.9375)	(0.0000)	
SEB Sverigefond	-0.000013	0.880517	0.841341
	(0.8698)	(0.0000)	
SEB aktiesparfond	-0.000068	0.779309	0.786213
	(0.5221)	(0.0000)	
Skandia Aktiefond Sverige	0.000084	0.835158	0.767610
	(0.3811)	(0.0000)	
SPP Aktiefond Sverige	0.000084	0.841817	0.744296
	(0.4035)	(0.0000)	
Swedbank Robur Ethica Miljö Sverige	-0.000031	0.623268	0.426266
	(0.8693)	(0.0000)	
Swedbank Robur Sverigefond	0.000030	0.886578	0.834028
	(0.7151)	(0.0000)	
Öhman Sverigefond	-0.000032	0.967943	0.325955
	(0.9063)	(0.0000)	
HQ Sverigefond	0.000176	0.874528	0.887476
	(0.0430)	(0.0000)	

[13] P-Values are in Parenthesis

Appendix B 3: Performance Evaluation by Jensen's Alpha of Swedish Large Cap Equity Mutual Funds for period 2000-2003 (Bearish Period) tested against SIXPRX Index as benchmark.

	Alpha	***Beta***	***R-squared***
Aktie-Ansvar Sverige	0.000087	0.730523	0.648250
	(0.6637)[14]	(0.0000)	
AMF Pension Aktiefond Sverige	0.000303	0.733651	0.587766
	(0.1482)	(0.0000)	
Banco Etisk Sverige	-0.000354	1.023598	0.812530
	(0.0857)	(0.0000)	
Banco Etisk Sverige Special	-0.000324	1.047874	0.792197
	(0.1805)	(0.0000)	
Carlson Sverigefond	-0.000135	0.874734	0.693979
	(0.4626)	(0.0000)	
Carlson Sweden	-0.000352	0.628878	0.368064
	(0.2546)	(0.0000)	
Carnegie Sverige	-0.000180	1.018596	0.847664
	(0.3572)	(0.0000)	
Folksam LO Sverige	-0.000495	0.328839	0.089265
	(0.2791)	(0.0000)	
Folksams Aktiefond Sverige	-0.000503	0.331218	0.093960
	(0.2651)	(0.0000)	
Folksams Tjänstemannafond Sverige	-0.000717	0.111419	0.009415
	(0.2102)	(0.0000)	
Handelsbanken Sverigefond	-0.000286	0.912699	0.610799
	(0.2054)	(0.0000)	
Länsförsäkringar Sverigefond	-0.000155	0.954119	0.710570
	(0.3817)	(0.0000)	
Nordea Etiskt Urval	-0.000003	0.955109	0.766889
	(0.9866)	(0.0000)	
Nordea Sweden Fund	-0.000267	0.937431	0.744912
	(0.1816)	(0.0000)	
Nordea Sverigefond	-0.000258	0.954349	0.758089
	(0.1822)	(0.0000)	
SEB Etisk Sverigefond - Lux utd	-0.000174	0.931852	0.777686
	(0.2865)	(0.0000)	
SEB Sverigefond	-0.000128	0.947852	0.819744
	(0.3538)	(0.0000)	
SEB aktiesparfond	-0.000318	0.800550	0.753294
	(0.0774)	(0.0000)	
Skandia Aktiefond Sverige	-0.000034	0.859934	0.699237
	(0.8362)	(0.0000)	
SPP Aktiefond Sverige	-0.000011	0.866050	0.631195
	(0.9584)	(0.0000)	
Swedbank Robur Ethica Miljö Sverige	-0.000429	0.515336	0.272369
	(0.2704)	(0.0000)	
Swedbank Robur Sverigefond	-0.000163	0.888050	0.734604
	(0.3288)	(0.0000)	
Öhman Sverigefond	-0.000021	1.062545	0.932752
	(0.8819)	(0.0000)	
HQ Sverigefond	0.000285	0.910170	0.881732
	(0.0298)	(0.0000)	

[14] P-Values are in Parenthesis

Appendix B 4: Performance Evaluation by Jensen's Alpha of Swedish Large Cap Equity Mutual Funds for period 2000-2003 (Bearish Period) tested against SIXRX Index as benchmark.

	Alpha	***Beta***	***R-squared***
Aktie-Ansvar Sverige	0.000082	0.662363	0.650876
	(0.6868)[15]	(0.0000)	
AMF Pension Aktiefond Sverige	0.000290	0.656833	0.575362
	(0.2041)	(0.0000)	
Banco Etisk Sverige	-0.000371	0.918219	0.798525
	(0.1016)	(0.0000)	
Banco Etisk Sverige Special	-0.000336	0.945654	0.787957
	(0.1812)	(0.0000)	
Carlson Sverigefond	-0.000157	0.776634	0.668070
	(0.4688)	(0.0000)	
Carlson Sweden	-0.000383	0.543021	0.335041
	(0.2528)	(0.0000)	
Carnegie Sverige	-0.000197	0.912985	0.831690
	(0.3537)	(0.0000)	
Folksam LO Sverige	-0.000523	0.272038	0.074391
	(0.2700)	(0.0000)	
Folksams Aktiefond Sverige	-0.000531	0.274159	0.078404
	(0.2570)	(0.0000)	
Folksams Tjänstemannafond Sverige	-0.000726	0.092182	0.007652
	(0.2077)	(0.0000)	
Handelsbanken Sverigefond	-0.000309	0.811325	0.589421
	(0.2262)	(0.0000)	
Länsförsäkringar Sverigefond	-0.000175	0.851465	0.691099
	(0.4005)	(0.0000)	
Nordea Etiskt Urval	-0.000023	0.852963	0.746955
	(0.9174)	(0.0000)	
Nordea Sweden Fund	-0.000290	0.832810	0.717988
	(0.2198)	(0.0000)	
Nordea Sverigefond	-0.000284	0.846395	0.728195
	(0.2267)	(0.0000)	
SEB Etisk Sverigefond - Lux utd	-0.000197	0.827673	0.749252
	(0.3251)	(0.0000)	
SEB Sverigefond	-0.000154	0.839234	0.784801
	(0.4080)	(0.0000)	
SEB aktiesparfond	-0.000333	0.716539	0.737018
	(0.0966)	(0.0000)	
Skandia Aktiefond Sverige	-0.000059	0.760215	0.667351
	(0.7666)	(0.0000)	
SPP Aktiefond Sverige	-0.000027	0.774601	0.616651
	(0.9023)	(0.0000)	
Swedbank Robur Ethica Miljö Sverige	-0.000457	0.442287	0.244891
	(0.2617)	(0.0000)	
Swedbank Robur Sverigefond	-0.000184	0.789846	0.709681
	(0.3670)	(0.0000)	
Öhman Sverigefond	-0.000035	0.956470	0.923071
	(0.8028)	(0.0000)	
HQ Sverigefond	0.000266	0.812036	0.857139
	(0.0781)	(0.0000)	

[15] P-Values are in Parenthesis

Appendix B 5: Performance Evaluation by Jensen's Alpha of Swedish Large Cap Equity Mutual Funds for period 2003-2006 (Bullish Period) tested against SIXPRX Index as benchmark.

	Alpha	***Beta***	***R-squared***
Aktie-Ansvar Sverige	0.000268	0.812838	0.402500
	(0.1143)[16]	(0.0000)	
AMF Pension Aktiefond Sverige	0.000399	0.797464	0.705018
	(0.0009)	(0.0000)	
Banco Etisk Sverige	0.000051	0.921203	0.815695
	(0.5674)	(0.0000)	
Banco Etisk Sverige Special	0.000032	0.947236	0.805067
	(0.7458)	(0.0000)	
Carlson Sverigefond	0.000110	0.907432	0.752769
	(0.2912)	(0.0000)	
Carlson Sweden	0.000396	0.750958	0.472569
	(0.0121)	(0.0000)	
Carnegie Sverige	-0.000127	1.019618	0.944112
	(0.0456)	(0.0000)	
Folksam LO Sverige	0.000908	0.508227	0.224522
	(0.0004)	(0.0000)	
Folksams Aktiefond Sverige	0.000897	0.508236	0.224522
	(0.0004)	(0.0000)	
Folksams Tjänstemannafond Sverige	0.001218	0.355590	0.119421
	(0.0005)	(0.0000)	
Handelsbanken Sverigefond	0.000059	0.910583	0.740949
	(0.5785)	(0.0000)	
Länsförsäkringar Sverigefond	0.000010	0.944820	0.840481
	(0.9060)	(0.0000)	
Nordea Etiskt Urval	0.000031	0.902378	0.025424
	(0.9741)	(0.0000)	
Nordea Sweden Fund	-0.000043	0.946423	0.015931
	(0.9720)	(0.0000)	
Nordea Sverigefond	0.000051	0.914585	0.827574
	(0.5664)	(0.0000)	
SEB Etisk Sverigefond - Lux utd	0.000023	0.923249	0.843211
	(0.7762)	(0.0000)	
SEB Sverigefond	0.000035	0.928199	0.859726
	(0.6505)	(0.0000)	
SEB aktiesparfond	-0.000003	0.840795	0.803294
	(0.9800)	(0.0000)	
Skandia Aktiefond Sverige	0.000125	0.897383	0.770971
	(0.2027)	(0.0000)	
SPP Aktiefond Sverige	0.000087	0.908608	0.742139
	(0.4087)	(0.0000)	
Swedbank Robur Ethica Miljö Sverige	0.000689	0.523295	0.271359
	(0.0124)	(0.0000)	
Swedbank Robur Sverigefond	0.000146	0.930204	0.832762
	(0.0629)	(0.0000)	
Öhman Sverigefond	-0.000170	1.003254	0.062239
	(0.8399)	(0.0000)	
HQ Sverigefond	0.000265	0.766583	0.823001
	(0.0376)	(0.0000)	

[16] P-Values are in Parenthesis

Appendix B 6: Performance Evaluation by Jensen's Alpha of Swedish Large Cap Equity Mutual Funds for period 2003-2006 (Bullish Period) tested against SIXRX Index as benchmark.

	Alpha	***Beta***	***R-squared***
Aktie-Ansvar Sverige	0.000302	0.799937	0.399595
	(0.0771)[17]	(0.0000)	
AMF Pension Aktiefond Sverige	0.000430	0.785965	0.702007
	(0.0004)	(0.0000)	
Banco Etisk Sverige	0.000087	0.907615	0.811666
	(0.3372)	(0.0000)	
Banco Etisk Sverige Special	0.000070	0.933135	0.800870
	(0.4909)	(0.0000)	
Carlson Sverigefond	0.000145	0.894671	0.750098
	(0.1690)	(0.0000)	
Carlson Sweden	0.000428	0.738623	0.468630
	(0.0071)	(0.0000)	
Carnegie Sverige	-0.000089	1.005447	0.941077
	(0.1802)	(0.0000)	
Folksam LO Sverige	0.000936	0.496730	0.219832
	(0.0003)	(0.0000)	
Folksams Aktiefond Sverige	0.000925	0.496734	0.219827
	(0.0003)	(0.0000)	
Folksams Tjänstemannafond Sverige	0.001237	0.348079	0.117277
	(0.0004)	(0.0000)	
Handelsbanken Sverigefond	0.000096	0.897090	0.737188
	(0.3805)	(0.0000)	
Länsförsäkringar Sverigefond	0.000047	0.931021	0.836579
	(0.5836)	(0.0000)	
Nordea Etiskt Urval	0.000044	0.900088	0.025956
	(0.9629)	(0.0000)	
Nordea Sweden Fund	0.000020	0.919470	0.015370
	(0.9869)	(0.0000)	
Nordea Sverigefond	0.000086	0.901670	0.824542
	(0.3428)	(0.0000)	
SEB Etisk Sverigefond - Lux utd	0.000059	0.910207	0.840112
	(0.4758)	(0.0000)	
SEB Sverigefond	0.000070	0.915351	0.857061
	(0.3668)	(0.0000)	
SEB aktiesparfond	0.000031	0.827696	0.797980
	(0.8105)	(0.0000)	
Skandia Aktiefond Sverige	0.000159	0.884936	0.768536
	(0.1061)	(0.0000)	
SPP Aktiefond Sverige	0.000123	0.895179	0.738430
	(0.2525)	(0.0000)	
Swedbank Robur Ethica Miljö Sverige	0.000710	0.515536	0.269971
	(0.0097)	(0.0000)	
Swedbank Robur Sverigefond	0.000181	0.917351	0.830222
	(0.0240)	(0.0000)	
Öhman Sverigefond	-0.000135	0.990529	0.062191
	(0.8721)	(0.0000)	
HQ Sverigefond	0.000301	0.752375	0.812647
	(0.0229)	(0.0000)	

[17] P-Values are in Parenthesis

Appendix B 7: Performance Evaluation by Jensen's Alpha of Swedish Large Cap Equity Mutual Funds for period 2006-2009 (Volatile Period) tested against SIXPRX Index as benchmark.

	Alpha	***Beta***	***R-squared***
Aktie-Ansvar Sverige	-0.000047	0.877365	0.862246
	(0.7851)[18]	(0.0000)	
AMF Pension Aktiefond Sverige	0.000028	0.894164	0.856994
	(0.8685)	(0.0000)	
Banco Etisk Sverige	-0.000169	0.901590	0.839125
	(0.3866)	(0.0000)	
Banco Etisk Sverige Special	-0.000121	0.901117	0.835801
	(0.5463)	(0.0000)	
Carlson Sverigefond	0.000003	0.873446	0.834669
	(0.9861)	(0.0000)	
Carlson Sweden	-0.000054	0.769025	0.622083
	(0.8509)	(0.0000)	
Carnegie Sverige	0.000010	0.965191	0.956530
	(0.9129)	(0.0000)	
Folksam LO Sverige	-0.000006	0.636478	0.311562
	(0.9903)	(0.0000)	
Folksams Aktiefond Sverige	-0.000021	0.637586	0.310869
	(0.9640)	(0.0000)	
Folksams Tjänstemannafond Sverige	-0.000017	0.482005	0.188395
	(0.9792)	(0.0000)	
Handelsbanken Sverigefond	-0.000014	0.881068	0.854704
	(0.9377)	(0.0000)	
Länsförsäkringar Sverigefond	-0.000002	0.904792	0.874347
	(0.9879)	(0.0000)	
Nordea Etiskt Urval	-0.000021	0.861772	0.822170
	(0.9097)	(0.0000)	
Nordea Sweden Fund	-0.000039	0.863641	0.816501
	(0.8330)	(0.0000)	
Nordea Sverigefond	0.000013	0.865888	0.827319
	(0.9432)	(0.0000)	
SEB Etisk Sverigefond - Lux utd	0.000053	0.897658	0.857123
	(0.7372)	(0.0000)	
SEB Sverigefond	-0.000055	0.901856	0.879364
	(0.7071)	(0.0000)	
SEB aktiesparfond	-0.000047	0.813003	0.819236
	(0.8136)	(0.0000)	
Skandia Aktiefond Sverige	0.000008	0.878389	0.845379
	(0.9632)	(0.0000)	
SPP Aktiefond Sverige	0.000012	0.878577	0.854717
	(0.9440)	(0.0000)	
Swedbank Robur Ethica Miljö Sverige	-0.000281	0.786058	0.629998
	(0.3337)	(0.0000)	
Swedbank Robur Sverigefond	-0.000047	0.950380	0.930299
	(0.6666)	(0.0000)	
Öhman Sverigefond	0.000008	0.970096	0.931567
	(0.9350)	(0.0000)	
HQ Sverigefond	0.000168	0.954528	0.932880
	(0.2112)	(0.0000)	

[18] P-Values are in Parenthesis

Appendix B 8: Performance Evaluation by Jensen's Alpha of Swedish Large Cap Equity Mutual Funds for period 2006-2009 (Volatile Period) tested against SIXRX Index as benchmark.

	Alpha	***Beta***	***R-squared***
Aktie-Ansvar Sverige	-0.000042	0.877902	0.862108
	(0.8095)[19]	(0.0000)	
AMF Pension Aktiefond Sverige	0.000034	0.894765	0.856959
	(0.8425)	(0.0000)	
Banco Etisk Sverige	-0.000164	0.902105	0.838921
	(0.4025)	(0.0000)	
Banco Etisk Sverige Special	-0.000115	0.901660	0.835653
	(0.5649)	(0.0000)	
Carlson Sverigefond	0.000009	0.873981	0.834534
	(0.9630)	(0.0000)	
Carlson Sweden	-0.000049	0.769335	0.621723
	(0.8640)	(0.0000)	
Carnegie Sverige	0.000016	0.965820	0.956453
	(0.8629)	(0.0000)	
Folksam LO Sverige	-0.000002	0.636749	0.311395
	(0.9971)	(0.0000)	
Folksams Aktiefond Sverige	-0.000017	0.637855	0.310700
	(0.9708)	(0.0000)	
Folksams Tjänstemannafond Sverige	-0.000014	0.482604	0.188604
	(0.9830)	(0.0000)	
Handelsbanken Sverigefond	-0.000008	0.881576	0.854506
	(0.9629)	(0.0000)	
Länsförsäkringar Sverigefond	0.000003	0.905340	0.874197
	(0.9836)	(0.0000)	
Nordea Etiskt Urval	-0.000016	0.862277	0.821758
	(0.9320)	(0.0000)	
Nordea Sweden Fund	-0.000034	0.864143	0.816318
	(0.8553)	(0.0000)	
Nordea Sverigefond	0.000018	0.866385	0.827122
	(0.9198)	(0.0000)	
SEB Etisk Sverigefond - Lux utd	0.000058	0.898185	0.856942
	(0.7103)	(0.0000)	
SEB Sverigefond	-0.000049	0.902393	0.879194
	(0.7359)	(0.0000)	
SEB aktiesparfond	-0.000042	0.813465	0.819032
	(0.8330)	(0.0000)	
Skandia Aktiefond Sverige	0.000014	0.878926	0.845243
	(0.9387)	(0.0000)	
SPP Aktiefond Sverige	0.000018	0.879092	0.854535
	(0.9187)	(0.0000)	
Swedbank Robur Ethica Miljö Sverige	-0.000276	0.786456	0.629765
	(0.3419)	(0.0000)	
Swedbank Robur Sverigefond	-0.000041	0.950938	0.930102
	(0.7067)	(0.0000)	
Öhman Sverigefond	0.000014	0.970753	0.931537
	(0.8848)	(0.0000)	
HQ Sverigefond	0.000174	0.955145	0.932796
	(0.1955)	(0.0000)	

[19] P-Values are in Parenthesis

Appendix C 1: Performance Evaluation by Henriksson-Merton Model of Swedish Large Cap Equity Mutual Funds for period 2000-2009 (Whole Period) tested against SIXPRX Index as benchmark.

	Alpha	***Beta***	***Timing***	***R-squared***
Aktie-Ansvar Sverige	-0.000025	0.803940	0.028614	0.693801
	(0.9198)[20]	(0.0000)	(0.3091)	
AMF Pension Aktiefond Sverige	0.000044	0.805405	0.039262	0.743652
	(0.8417)	(0.0000)	(0.1175)	
Banco Etisk Sverige	-0.000180	0.947315	-0.005140	0.823030
	(0.3632)	(0.0000)	(0.8201)	
Banco Etisk Sverige Special	-0.000162	0.957582	-0.003339	0.810476
	(0.4369)	(0.0000)	(0.8886)	
Carlson Sverigefond	-0.000204	0.854611	0.042053	0.772190
	(0.3438)	(0.0000)	(0.0877)	
Carlson Sweden	-0.000519	0.657811	0.111957	0.510540
	(0.1047)	(0.0000)	(0.0022)	
Carnegie Sverige	0.000111	1.012860	-0.039814	0.913975
	(0.4179)	(0.0000)	(0.0112)	
Folksam LO Sverige	-0.001652	0.310110	0.369483	0.235199
	(0.0002)	(0.0000)	(0.0000)	
Folksams Aktiefond Sverige	-0.001650	0.313157	0.366515	0.237967
	(0.0002)	(0.0000)	(0.0000)	
Folksams Tjänstemannafond Sverige	-0.001267	0.174322	0.301637	0.113301
	(0.0061)	(0.0000)	(0.0000)	
Handelsbanken Sverigefond	-0.000136	0.889634	0.010148	0.738343
	(0.5731)	(0.0000)	(0.7121)	
Länsförsäkringar Sverigefond	-0.000096	0.921128	0.009491	0.805338
	(0.6408)	(0.0000)	(0.6863)	
Nordea Etiskt Urval	-0.000446	0.848794	0.086842	0.160580
	(0.6300)	(0.0000)	(0.4117)	
Nordea Sweden Fund	0.000100	0.922291	-0.040289	0.101366
	(0.9336)	(0.0000)	(0.7698)	
Nordea Sverigefond	-0.000173	0.890818	0.019655	0.799847
	(0.3976)	(0.0000)	(0.3986)	
SEB Etisk Sverigefond - Lux utd	-0.000152	0.899117	0.023326	0.826702
	(0.4207)	(0.0000)	(0.2792)	
SEB Sverigefond	-0.000097	0.915947	0.008057	0.855036
	(0.5706)	(0.0000)	(0.6804)	
SEB aktiesparfond	-0.000452	0.773300	0.069792	0.796252
	(0.0151)	(0.0000)	(0.0010)	
Skandia Aktiefond Sverige	-0.000041	0.865147	0.016668	0.782782
	(0.8457)	(0.0000)	(0.4832)	
SPP Aktiefond Sverige	0.000018	0.875294	0.004967	0.753012
	(0.9364)	(0.0000)	(0.8482)	
Swedbank Robur Ethica Miljö Sverige	-0.000448	0.617965	0.077189	0.447548
	(0.1778)	(0.0000)	(0.0421)	
Swedbank Robur Sverigefond	-0.000017	0.926923	0.000512	0.848265
	(0.9250)	(0.0000)	(0.9798)	
Öhman Sverigefond	0.000089	1.023898	-0.033540	0.326475
	(0.8916)	(0.0000)	(0.6522)	
HQ Sverigefond	0.000195	0.920499	-0.012602	0.900215
	(0.1561)	(0.0000)	(0.4219)	

[20] P-Values are in Parenthesis

Appendix C 2: Performance Evaluation by Henriksson-Merton Model of Swedish Large Cap Equity Mutual Funds for period 2000-2009 (Whole Period) tested against SIXRX Index as benchmark.

	Alpha	***Beta***	***Timing***	***R-squared***
Aktie-Ansvar Sverige	-0.000157	0.759280	0.050220	0.687300
	(0.5757)[21]	(0.0000)	(0.1039)	
AMF Pension Aktiefond Sverige	-0.000107	0.756900	0.061884	0.731319
	(0.6732)	(0.0000)	(0.0266)	
Banco Etisk Sverige	-0.000101	0.914430	-0.009890	0.819801
	(0.6553)	(0.0000)	(0.6897)	
Banco Etisk Sverige Special	-0.000110	0.924633	-0.004249	0.811647
	(0.6413)	(0.0000)	(0.8693)	
Carlson Sverigefond	-0.000235	0.815243	0.045108	0.759883
	(0.3482)	(0.0000)	(0.1006)	
Carlson Sweden	-0.000634	0.618484	0.113550	0.490179
	(0.0857)	(0.0000)	(0.0051)	
Carnegie Sverige	-0.000230	0.934493	0.030491	0.907069
	(0.1536)	(0.0000)	(0.0851)	
Folksam LO Sverige	-0.002779	0.217036	0.479888	0.228606
	(0.0000)	(0.0000)	(0.0000)	
Folksams Aktiefond Sverige	-0.002750	0.222070	0.473232	0.230862
	(0.0000)	(0.0000)	(0.0000)	
Folksams Tjänstemannafond Sverige	-0.002196	0.103231	0.392528	0.112130
	(0.0000)	(0.0067)	(0.0000)	
Handelsbanken Sverigefond	-0.000257	0.838229	0.034370	0.728065
	(0.3543)	(0.0000)	(0.2592)	
Länsförsäkringar Sverigefond	-0.000152	0.875633	0.023441	0.796774
	(0.5236)	(0.0000)	(0.3690)	
Nordea Etiskt Urval	-0.000306	0.834153	0.053206	0.159589
	(0.7703)	(0.0000)	(0.6436)	
Nordea Sweden Fund	-0.000187	0.848353	0.020932	0.099602
	(0.8912)	(0.0000)	(0.8888)	
Nordea Sverigefond	-0.000207	0.848279	0.028095	0.789109
	(0.3806)	(0.0000)	(0.2793)	
SEB Etisk Sverigefond - Lux utd	-0.000200	0.854994	0.033172	0.814870
	(0.3652)	(0.0000)	(0.1706)	
SEB Sverigefond	-0.000098	0.872946	0.013616	0.841297
	(0.6281)	(0.0000)	(0.5402)	
SEB aktiesparfond	-0.000565	0.734915	0.079836	0.787201
	(0.0085)	(0.0000)	(0.0007)	
Skandia Aktiefond Sverige	-0.000155	0.813779	0.038448	0.767721
	(0.5239)	(0.0000)	(0.1501)	
SPP Aktiefond Sverige	-0.000092	0.826100	0.028266	0.744293
	(0.7248)	(0.0000)	(0.3245)	
Swedbank Robur Ethica Miljö Sverige	-0.000659	0.567151	0.100920	0.427479
	(0.0849)	(0.0000)	(0.0163)	
Swedbank Robur Sverigefond	-0.000082	0.876571	0.017995	0.834000
	(0.6960)	(0.0000)	(0.4339)	
Öhman Sverigefond	0.000062	0.976303	-0.015034	0.325666
	(0.9331)	(0.0000)	(0.8526)	
HQ Sverigefond	0.000127	0.870173	0.007831	0.887435
	(0.4410)	(0.0000)	(0.6654)	

[21] P-Values are in Parenthesis

Appendix C 3: Performance Evaluation by Henriksson-Merton Model of Swedish Large Cap Equity Mutual Funds for period 2000-2003 (Bearish Period)) tested against SIXPRX Index as benchmark.

	Alpha	***Beta***	***Timing***	***R-squared***
Aktie-Ansvar Sverige	0.000345	0.754992	-0.047729	0.648212
	(0.4634)[22]	(0.0000)	(0.5505)	
AMF Pension Aktiefond Sverige	0.000318	0.735109	-0.002843	0.587216
	(0.5398)	(0.0000)	(0.9730)	
Banco Etisk Sverige	-0.000114	1.046312	-0.044305	0.812518
	(0.7757)	(0.0000)	(0.4941)	
Banco Etisk Sverige Special	-0.000047	1.074149	-0.051251	0.792216
	(0.9117)	(0.0000)	(0.4604)	
Carlson Sverigefond	-0.000099	0.878114	-0.006592	0.693576
	(0.8135)	(0.0000)	(0.9271)	
Carlson Sweden	-0.000489	0.615904	0.025306	0.367312
	(0.4405)	(0.0000)	(0.8094)	
Carnegie Sverige	0.000115	1.046493	-0.054415	0.847839
	(0.8021)	(0.0000)	(0.5128)	
Folksam LO Sverige	-0.000812	0.298823	0.058549	0.088495
	(0.3774)	(0.0003)	(0.6694)	
Folksams Aktiefond Sverige	-0.000756	0.307226	0.046798	0.093044
	(0.3998)	(0.0001)	(0.7281)	
Folksams Tjänstemannafond Sverige	-0.002078	-0.017668	0.251796	0.016678
	(0.0049)	(0.8332)	(0.0318)	
Handelsbanken Sverigefond	0.000082	0.947630	-0.068135	0.610811
	(0.8831)	(0.0000)	(0.4719)	
Länsförsäkringar Sverigefond	-0.000102	0.959150	-0.009813	0.710195
	(0.7900)	(0.0000)	(0.8779)	
Nordea Etiskt Urval	-0.000008	0.954670	0.000854	0.766577
	(0.9840)	(0.0000)	(0.9892)	
Nordea Sweden Fund	-0.000024	0.960386	-0.044777	0.744837
	(0.9494)	(0.0000)	(0.4893)	
Nordea Sverigefond	-0.000062	0.972933	-0.036248	0.757936
	(0.8737)	(0.0000)	(0.5860)	
SEB Etisk Sverigefond - Lux utd	-0.000146	0.934499	-0.005164	0.777393
	(0.6617)	(0.0000)	(0.9233)	
SEB Sverigefond	-0.000025	0.957600	-0.019015	0.819554
	(0.9388)	(0.0000)	(0.7185)	
SEB aktiesparfond	-0.000230	0.808905	-0.016298	0.753012
	(0.5216)	(0.0000)	(0.7785)	
Skandia Aktiefond Sverige	0.000378	0.898994	-0.076190	0.699694
	(0.4560)	(0.0000)	(0.3607)	
SPP Aktiefond Sverige	0.000543	0.918537	-0.102379	0.632084
	(0.3017)	(0.0000)	(0.2525)	
Swedbank Robur Ethica Miljö Sverige	0.000101	0.565582	-0.098009	0.272943
	(0.8809)	(0.0000)	(0.2980)	
Swedbank Robur Sverigefond	-0.000112	0.892832	-0.009328	0.734262
	(0.7622)	(0.0000)	(0.8822)	
Öhman Sverigefond	-0.000012	1.063387	-0.001642	0.932662
	(0.9553)	(0.0000)	(0.9614)	
HQ Sverigefond	0.000312	0.912678	-0.004893	0.881578
	(0.2457)	(0.0000)	(0.9112)	

[22] P-Values are in Parenthesis

Appendix C 4: Performance Evaluation by Henriksson-Merton Model of Swedish Large Cap Equity Mutual Funds for period 2000-2003 (Bearish Period) tested against SIXRX Index as benchmark.

	Alpha	***Beta***	***Timing***	***R-squared***
Aktie-Ansvar Sverige	-0.000020	0.655712	0.013292	0.650433
	(0.9737)[23]	(0.0000)	(0.8676)	
AMF Pension Aktiefond Sverige	-0.000078	0.632821	0.047990	0.575087
	(0.9041)	(0.0000)	(0.5540)	
Banco Etisk Sverige	-0.000382	0.917467	0.001503	0.798255
	(0.4343)	(0.0000)	(0.9803)	
Banco Etisk Sverige Special	-0.000408	0.940912	0.009477	0.787681
	(0.4420)	(0.0000)	(0.8883)	
Carlson Sverigefond	-0.000416	0.759724	0.033797	0.667747
	(0.4847)	(0.0000)	(0.6551)	
Carlson Sweden	-0.000657	0.525093	0.035832	0.334290
	(0.5195)	(0.0000)	(0.7814)	
Carnegie Sverige	-0.001393	0.834816	0.156227	0.833791
	(0.0949)	(0.0000)	(0.1295)	
Folksam LO Sverige	-0.002119	0.167706	0.208517	0.077397
	(0.0600)	(0.0189)	(0.1174)	
Folksams Aktiefond Sverige	-0.001917	0.183571	0.181047	0.080488
	(0.0777)	(0.0059)	(0.1614)	
Folksams Tjänstemannafond Sverige	-0.002883	-0.048762	0.281689	0.014331
	(0.0023)	(0.5334)	(0.0137)	
Handelsbanken Sverigefond	-0.000630	0.790354	0.041913	0.589021
	(0.4385)	(0.0000)	(0.6831)	
Länsförsäkringar Sverigefond	-0.000526	0.828539	0.045818	0.690876
	(0.3475)	(0.0000)	(0.5070)	
Nordea Etiskt Urval	-0.000410	0.827662	0.050565	0.746867
	(0.4751)	(0.0000)	(0.4776)	
Nordea Sweden Fund	-0.000377	0.827119	0.011375	0.717624
	(0.5219)	(0.0000)	(0.8753)	
Nordea Sverigefond	-0.000472	0.834083	0.024606	0.727890
	(0.4194)	(0.0000)	(0.7348)	
SEB Etisk Sverigefond - Lux utd	-0.000401	0.814348	0.026632	0.748990
	(0.4166)	(0.0000)	(0.6522)	
SEB Sverigefond	-0.000177	0.837765	0.002936	0.784514
	(0.6979)	(0.0000)	(0.9569)	
SEB aktiesparfond	-0.000500	0.705621	0.021821	0.736731
	(0.2912)	(0.0000)	(0.7129)	
Skandia Aktiefond Sverige	-0.000184	0.752062	0.016294	0.666935
	(0.7497)	(0.0000)	(0.8134)	
SPP Aktiefond Sverige	0.000064	0.780544	-0.011878	0.616151
	(0.9324)	(0.0000)	(0.9023)	
Swedbank Robur Ethica Miljö Sverige	0.000122	0.480120	-0.075613	0.244567
	(0.8833)	(0.0000)	(0.4209)	
Swedbank Robur Sverigefond	-0.000375	0.777351	0.024973	0.709360
	(0.5145)	(0.0000)	(0.7310)	
Öhman Sverigefond	-0.000134	0.949997	0.012937	0.922984
	(0.6751)	(0.0000)	(0.7528)	
HQ Sverigefond	0.000232	0.809795	0.004479	0.856950
	(0.4801)	(0.0000)	(0.9118)	

[23] P-Values are in Parenthesis

Appendix C 5: Performance Evaluation by Henriksson-Merton Model of Swedish Large Cap Equity Mutual Funds for period 2003-2006 (Bullish Period) tested against SIXPRX Index as benchmark.

	Alpha	***Beta***	***Timing***	***R-squared***
Aktie-Ansvar Sverige	0.000166	0.792017	0.032815	0.401803
	(0.4967)[24]	(0.0000)	(0.5271)	
AMF Pension Aktiefond Sverige	0.000216	0.760351	0.058492	0.705193
	(0.3781)	(0.0000)	(0.4405)	
Banco Etisk Sverige	-0.000021	0.906651	0.022935	0.815525
	(0.8999)	(0.0000)	(0.6372)	
Banco Etisk Sverige Special	-0.000037	0.933168	0.022171	0.804873
	(0.8434)	(0.0000)	(0.6752)	
Carlson Sverigefond	0.000097	0.904688	0.004325	0.752442
	(0.6828)	(0.0000)	(0.9458)	
Carlson Sweden	-0.000019	0.666771	0.132685	0.474075
	(0.9521)	(0.0000)	(0.1409)	
Carnegie Sverige	-0.000117	1.021590	-0.003107	0.944039
	(0.2952)	(0.0000)	(0.9206)	
Folksam LO Sverige	-0.000214	0.280798	0.358444	0.240258
	(0.6536)	(0.0001)	(0.0054)	
Folksams Aktiefond Sverige	-0.000223	0.281049	0.358062	0.240221
	(0.6396)	(0.0001)	(0.0055)	
Folksams Tjänstemannafond Sverige	-0.000136	0.080975	0.432812	0.144949
	(0.8075)	(0.3979)	(0.0044)	
Handelsbanken Sverigefond	-0.000064	0.885522	0.039498	0.740812
	(0.7725)	(0.0000)	(0.5489)	
Länsförsäkringar Sverigefond	-0.000037	0.935242	0.015095	0.840301
	(0.8160)	(0.0000)	(0.7464)	
Nordea Etiskt Urval	-0.001399	0.612508	0.456853	0.025149
	(0.4168)	(0.0360)	(0.2795)	
Nordea Sweden Fund	0.001549	1.269321	-0.508908	0.015365
	(0.4940)	(0.0010)	(0.3608)	
Nordea Sverigefond	-0.000064	0.891271	0.036744	0.827545
	(0.7158)	(0.0000)	(0.4653)	
SEB Etisk Sverigefond - Lux utd	-0.000099	0.898512	0.038988	0.843227
	(0.5314)	(0.0000)	(0.3841)	
SEB Sverigefond	-0.000019	0.917237	0.017278	0.859583
	(0.9039)	(0.0000)	(0.6840)	
SEB aktiesparfond	-0.000203	0.800298	0.063825	0.803724
	(0.2809)	(0.0000)	(0.2126)	
Skandia Aktiefond Sverige	0.000163	0.905139	-0.012224	0.770687
	(0.4938)	(0.0000)	(0.8512)	
SPP Aktiefond Sverige	-0.000043	0.882190	0.041636	0.742029
	(0.8462)	(0.0000)	(0.5290)	
Swedbank Robur Ethica Miljö Sverige	-0.000365	0.309549	0.336878	0.287256
	(0.3894)	(0.0018)	(0.0070)	
Swedbank Robur Sverigefond	-0.000011	0.898434	0.050071	0.832900
	(0.9515)	(0.0000)	(0.3247)	
Öhman Sverigefond	0.000005	1.038754	-0.055950	0.061020
	(0.9969)	(0.0000)	(0.6349)	
HQ Sverigefond	0.000122	0.737603	0.045675	0.823202
	(0.5151)	(0.0000)	(0.3687)	

[24] P-Values are in Parenthesis

Appendix C 6: Performance Evaluation by Henriksson-Merton Model of Swedish Large Cap Equity Mutual Funds for period 2003-2006 (Bullish Period)) tested against SIXRX Index as benchmark.

	Alpha	***Beta***	***Timing***	***R-squared***
Aktie-Ansvar Sverige	0.000229	0.788355	0.018622	0.398819
	(0.4982)[25]	(0.0000)	(0.7780)	
AMF Pension Aktiefond Sverige	0.000194	0.748950	0.059516	0.702042
	(0.5385)	(0.0000)	(0.4639)	
Banco Etisk Sverige	0.000097	0.909191	-0.002533	0.811416
	(0.6528)	(0.0000)	(0.9606)	
Banco Etisk Sverige Special	0.000051	0.930120	0.004848	0.800607
	(0.8315)	(0.0000)	(0.9295)	
Carlson Sverigefond	0.000212	0.905145	-0.016842	0.749793
	(0.4807)	(0.0000)	(0.8027)	
Carlson Sweden	-0.000142	0.649218	0.143754	0.469826
	(0.7534)	(0.0000)	(0.1830)	
Carnegie Sverige	-0.000073	1.007950	-0.004024	0.941000
	(0.5995)	(0.0000)	(0.9038)	
Folksam LO Sverige	-0.001093	0.178741	0.511295	0.243848
	(0.0609)	(0.0256)	(0.0002)	
Folksams Aktiefond Sverige	-0.001103	0.178816	0.511180	0.243831
	(0.0587)	(0.0254)	(0.0003)	
Folksams Tjänstemannafond Sverige	-0.000948	0.005603	0.550668	0.147842
	(0.2084)	(0.9607)	(0.0030)	
Handelsbanken Sverigefond	-0.000021	0.878892	0.029261	0.736922
	(0.9418)	(0.0000)	(0.6624)	
Länsförsäkringar Sverigefond	0.000098	0.938961	-0.012766	0.836378
	(0.6465)	(0.0000)	(0.8038)	
Nordea Etiskt Urval	-0.000366	0.835864	0.103266	0.024697
	(0.7536)	(0.0000)	(0.4088)	
Nordea Sweden Fund	0.000523	0.998305	-0.126758	0.014093
	(0.7314)	(0.0000)	(0.4293)	
Nordea Sverigefond	0.000075	0.899921	0.002811	0.824309
	(0.7444)	(0.0000)	(0.9592)	
SEB Etisk Sverigefond - Lux utd	-0.000020	0.897947	0.019713	0.839941
	(0.9271)	(0.0000)	(0.6987)	
SEB Sverigefond	0.000098	0.919622	-0.006866	0.856875
	(0.6278)	(0.0000)	(0.8812)	
SEB aktiesparfond	-0.000120	0.803908	0.038248	0.797893
	(0.6357)	(0.0000)	(0.5242)	
Skandia Aktiefond Sverige	0.000294	0.906130	-0.034078	0.768350
	(0.3278)	(0.0000)	(0.6199)	
SPP Aktiefond Sverige	-0.000003	0.875321	0.031930	0.738182
	(0.9906)	(0.0000)	(0.6344)	
Swedbank Robur Ethica Miljö Sverige	-0.000763	0.284728	0.371116	0.284032
	(0.2053)	(0.0118)	(0.0171)	
Swedbank Robur Sverigefond	0.000103	0.905175	0.019578	0.830036
	(0.6688)	(0.0000)	(0.7340)	
Öhman Sverigefond	0.000118	1.030256	-0.063877	0.060971
	(0.9399)	(0.0000)	(0.7369)	
HQ Sverigefond	0.000071	0.716336	0.057947	0.812914
	(0.7841)	(0.0000)	(0.3744)	

[25] P-Values are in Parenthesis

Appendix C 7: Performance Evaluation by Henriksson-Merton Model of Swedish Large Cap Equity Mutual Funds for period 2006-2009 (Volatile Period) tested against SIXPRX Index as benchmark.

	Alpha	***Beta***	***Timing***	***R-squared***
Aktie-Ansvar Sverige	-0.000360	0.847482	0.050583	0.862537
	(0.1721)[26]	(0.0000)	(0.2352)	
AMF Pension Aktiefond Sverige	-0.000193	0.873007	0.035811	0.857030
	(0.4583)	(0.0000)	(0.3601)	
Banco Etisk Sverige	-0.000380	0.881417	0.034147	0.839110
	(0.1734)	(0.0000)	(0.4019)	
Banco Etisk Sverige Special	-0.000394	0.875026	0.044163	0.835915
	(0.1671)	(0.0000)	(0.2952)	
Carlson Sverigefond	-0.000481	0.827188	0.078300	0.835560
	(0.0793)	(0.0000)	(0.0607)	
Carlson Sweden	-0.000957	0.682769	0.146004	0.625299
	(0.0359)	(0.0000)	(0.0542)	
Carnegie Sverige	0.000240	0.987158	-0.037183	0.956707
	(0.1242)	(0.0000)	(0.0605)	
Folksam LO Sverige	-0.003387	0.313587	0.546550	0.348835
	(0.0201)	(0.0068)	(0.0272)	
Folksams Aktiefond Sverige	-0.003412	0.313721	0.548198	0.348154
	(0.0197)	(0.0069)	(0.0273)	
Folksams Tjänstemannafond Sverige	-0.001757	0.315832	0.281277	0.198006
	(0.2768)	(0.0043)	(0.3187)	
Handelsbanken Sverigefond	-0.000330	0.850891	0.051081	0.854986
	(0.2093)	(0.0000)	(0.2160)	
Länsförsäkringar Sverigefond	-0.000164	0.889310	0.026205	0.874301
	(0.5331)	(0.0000)	(0.5089)	
Nordea Etiskt Urval	-0.000481	0.817851	0.074344	0.822709
	(0.1077)	(0.0000)	(0.1377)	
Nordea Sweden Fund	-0.000507	0.818937	0.075669	0.817295
	(0.0967)	(0.0000)	(0.1405)	
Nordea Sverigefond	-0.000390	0.827404	0.065141	0.827865
	(0.1924)	(0.0000)	(0.1996)	
SEB Etisk Sverigefond - Lux utd	-0.000200	0.873553	0.040802	0.857226
	(0.4707)	(0.0000)	(0.3735)	
SEB Sverigefond	-0.000233	0.884817	0.028842	0.879352
	(0.3840)	(0.0000)	(0.5198)	
SEB aktiesparfond	-0.000799	0.741190	0.121556	0.822031
	(0.0361)	(0.0000)	(0.0741)	
Skandia Aktiefond Sverige	-0.000426	0.836892	0.070241	0.846069
	(0.1056)	(0.0000)	(0.0890)	
SPP Aktiefond Sverige	-0.000298	0.848994	0.050074	0.854983
	(0.2559)	(0.0000)	(0.2274)	
Swedbank Robur Ethica Miljö Sverige	-0.000910	0.726004	0.101651	0.631252
	(0.0655)	(0.0000)	(0.2476)	
Swedbank Robur Sverigefond	0.000050	0.959594	-0.015595	0.930248
	(0.8020)	(0.0000)	(0.6179)	
Öhman Sverigefond	0.000228	0.991088	-0.035532	0.931682
	(0.1698)	(0.0000)	(0.1151)	
HQ Sverigefond	0.000364	0.973251	-0.031694	0.932961
	(0.0575)	(0.0000)	(0.1665)	

[26] P-Values are in Parenthesis

Appendix C 8: Performance Evaluation by Henriksson-Merton Model of Swedish Large Cap Equity Mutual Funds for period 2006-2009 (Volatile Period) tested against SIXRX Index as benchmark.

	Alpha	***Beta***	***Timing***	***R-squared***
Aktie-Ansvar Sverige	-0.000233	0.861448	0.027786	0.862051
	(0.4295)[27]	(0.0000)	(0.5381)	
AMF Pension Aktiefond Sverige	-0.000093	0.883852	0.018429	0.856822
	(0.7391)	(0.0000)	(0.6436)	
Banco Etisk Sverige	-0.000159	0.902533	-0.000724	0.838706
	(0.5835)	(0.0000)	(0.9862)	
Banco Etisk Sverige Special	-0.000181	0.896038	0.009494	0.835447
	(0.5391)	(0.0000)	(0.8249)	
Carlson Sverigefond	-0.000306	0.846865	0.045791	0.834650
	(0.2750)	(0.0000)	(0.2628)	
Carlson Sweden	-0.000839	0.701374	0.114766	0.623256
	(0.0963)	(0.0000)	(0.1475)	
Carnegie Sverige	0.000275	0.988126	-0.037667	0.956609
	(0.1037)	(0.0000)	(0.0715)	
Folksam LO Sverige	-0.004163	0.278640	0.604736	0.351938
	(0.0156)	(0.0268)	(0.0217)	
Folksams Aktiefond Sverige	-0.004190	0.278692	0.606516	0.351249
	(0.0153)	(0.0270)	(0.0218)	
Folksams Tjänstemannafond Sverige	-0.002824	0.240766	0.408391	0.207513
	(0.1159)	(0.0456)	(0.1515)	
Handelsbanken Sverigefond	-0.000175	0.867220	0.024244	0.854407
	(0.5358)	(0.0000)	(0.5701)	
Länsförsäkringar Sverigefond	-0.000065	0.899445	0.009955	0.874044
	(0.8247)	(0.0000)	(0.8166)	
Nordea Etiskt Urval	-0.000354	0.833190	0.049120	0.821913
	(0.2983)	(0.0000)	(0.3585)	
Nordea Sweden Fund	-0.000384	0.834016	0.050874	0.816489
	(0.2707)	(0.0000)	(0.3529)	
Nordea Sverigefond	-0.000247	0.843520	0.038612	0.827133
	(0.4679)	(0.0000)	(0.4758)	
SEB Etisk Sverigefond - Lux utd	-0.000127	0.882223	0.026954	0.856864
	(0.6948)	(0.0000)	(0.5878)	
SEB Sverigefond	-0.000123	0.895975	0.010839	0.879051
	(0.6911)	(0.0000)	(0.8242)	
SEB aktiesparfond	-0.000764	0.751332	0.104924	0.820796
	(0.1005)	(0.0000)	(0.1616)	
Skandia Aktiefond Sverige	-0.000251	0.856132	0.038492	0.845275
	(0.3583)	(0.0000)	(0.3506)	
SPP Aktiefond Sverige	-0.000144	0.865225	0.023417	0.854430
	(0.6112)	(0.0000)	(0.5845)	
Swedbank Robur Ethica Miljö Sverige	-0.000920	0.731056	0.093553	0.630583
	(0.1289)	(0.0000)	(0.3370)	
Swedbank Robur Sverigefond	0.000101	0.963112	-0.020558	0.930073
	(0.6266)	(0.0000)	(0.5002)	
Öhman Sverigefond	0.000223	0.988776	-0.030437	0.931581
	(0.2035)	(0.0000)	(0.1664)	
HQ Sverigefond	0.000368	0.971810	-0.028141	0.932825
	(0.0775)	(0.0000)	(0.2243)	

[27] P-Values are in Parenthesis