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PERFORMANCE OF ACTIVE PORTFOLIO MANAGEMENT AND THE EFFECT OF STOCK MARKET TREND

Master´s Thesis
in Accounting and Finance

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1 INTRODUCTION

1.1 Challenges of active portfolio management

A controversial question in the financial world is whether to manage your equity investments passively or actively. Investing passively and trying to mimic a market portfolio will provide you an average return on the market. The other option is to actively pursue an above average return by selecting stocks with higher expected return or by adjusting risk level according to forecasts on market changes. The higher return is, however, uncertain and whether the passive management is outperformed can only be observed afterwards.

In the mutual funds industry, at least in the point of view of the investors, the question of active versus passive is especially interesting. Active portfolio management is namely costly as it requires a portfolio manager, information gathering, investment analysis, administrative functions, and so on. Whether these costs can add value, has been in the interest of academic researchers as well.

Market efficiency, in the sense that prices reflect all available information, implies that active management is doomed to lose against the passive one. The costs that active management incurs pull the performance of an active portfolio below the performance of a passive portfolio. On average active management should lose by the amount of the management costs. Possible excess returns over the passive management are due to mere luck. (Fama, 1970.) This standpoint does not really give much of a chance for the active managers. However, let us consider markets efficient and accept the notion that prices represent all available information. As a consequence only passive market portfolios are held. Should this basis hold for a longer time, where would the prices of securities be derived from? No investment analysis made by anyone would eventually lead into a situation where prices deviate from their intrinsic value. Moreover, this deviation would eventually be large enough that even costly analysis would prove lucrative. (Grossman 1976.)

The performance of active portfolio management, relative both to passive management and to risk, has been studied extensively in the financial literature since the 1960s. Major developments in modern portfolio theory and asset pricing gave the needed tools and concepts for performance measurement (see e.g. Markowitz 1952 and Sharpe 1964). A kick-off for the fund performance research was given by Sharpe (1966). He calculated reward-to-volatility ratios for a sample of funds and found that in average the ratio was below the ratio of the Dow Jones Industrial Average -index. Based on his findings and the theoretical developments, Sharpe argued that actively managed funds have little chance of creating return that would offset the management expenses. Jensen

(1968) confirmed Sharpe´s conclusions and stated that the underperformance holds even gross of management fees. Although several later studies[1] showed contradictory results and suggested that active portfolio managers actually are able to deliver extra returns, the conclusions of Sharpe and Jensen were accepted almost as a general view and as a strong confirmation of market efficiency. Ippolito (1993) criticized the wide acceptance and argued that the contradictory results have not gained a stature they would have merited. In addition, Ippolito stated that researchers have been reluctant to reject the efficient market theory, although their results would have suggested so.

Jensen (1968, 415) in his conclusions pointed out that his results should not be interpreted as an indication of the mutual funds being bad service for investors. The funds had been namely effective in diversifying the unsystematic risk. Active portfolio management certainly does not seem like a bad service considering its popularity. Winfield and Fortune (2011) reported that in 2010 active portfolio managers received 93 % of all the recorded new equity management mandates in the US. They note that there seems to be no downturn for active portfolio management despite the demands for cheaper investment management and criticism against low performance.

Nielsen, Fachinotti and Xiaowei (2011) claim that active and passive management should not be considered mutually exclusive. Instead, they find the two investment policies more as complementary because of different kinds of possibilities inherent. Similar arguments are presented by O´Toole and Steiny (2005) who stress the importance of distinguishing between the requirements of successful portfolio management in different kinds of market conditions. According to O´Toole and Steiny, active portfolio management should be driven at during bear market conditions, whereas during a bull market it does not pay off to be active.

Ahmed and Lockwood (1998) have found that the compensation for risk varies in different market conditions. In addition, the compensation for different sources of risk depends on the market state. Thus the claims of managing a portfolio differently in different market conditions might be justified. After all, portfolio management is essentially exposing the portfolio to desired kinds of risks with the right proportions.

Another point of view is brought up by behavioral finance. It questions the concept of rational investors or at least presents investor behavior in a way that deviates from the assumptions of traditional finance. Investors are found to be overconfident and overestimate the accuracy of their private information; it is found that the willingness of taking risk depends on whether investor experiences loss or profit; decision making seems to depend on past market developments. For example, it is easy to imagine that during a bull market overconfident investors make more optimistic forecasts than during

[1] See e.g. Friend, Blume and Crockett (1970); Kon and Jen (1979); Ippolito (1989).

a bear market. Kim and Nofsinger (2007) found that Japanese individual investors actually held riskier portfolios in a bear market than in a bull market, even though the opposite would have been rational.

Portfolio managers of mutual funds can be considered investment professionals. Are the professionals able to overcome the behavioral biases and exploit the possibilities of different market states? Do different market conditions affect the performance of active portfolio management? If the hypothesis of efficient markets is accepted and the investors are considered rational, different market states have no effect on the relative performance. Few empirical studies on the subject exist, even though recent developments of finance would make it an interesting one.

Since 2005 bull and bear markets have been changing in relatively frequent periods. Major stock market indices reached peaks in the middle of 2007 and in the beginning of 2011. Both peaks were preceded by rallying stock market prices. After the peaks the markets came down in as fast a manner as they had climbed up. The changing market conditions certainly have been a challenge for portfolio management and different investment strategies. At the same time, the shifting market cycles have created possibilities to outperform the market, as O´Toole and Steiny (2005) note. Whether active portfolio management is able to outperform passive one and whether the performance depends on market conditions, the last couple of years should provide a good basis for observation.

1.2 Objective and structure of the study

The objective of this study is to evaluate performance of active portfolio management with measures that are grounded in modern portfolio theory. The study distinguishes between different market conditions and tries to find out whether there are differences in the performance of active portfolio management depending on market conditions. Mutual funds that invest in Finnish equities and are actively managed will be used as data for the study. Time period of 2005–2011 will be covered.

The evaluation will be done with selected measures for portfolio performance. Risk-adjusted performance (Modigliani & Modigliani 1997) derived from the Sharpe ratio will be used to evaluate the risk-adjusted return of active portfolio management. Jensen´s alpha (Jensen 1968) will be used to observe excess returns over the capital asset pricing model. In addition Merton-Henriksson model (Henriksson & Merton 1981) will be applied to determine whether portfolio managers possess market timing abilities. Differences in these measures during different market conditions will be assessed.

This study contributes to earlier research by using the most recent data and thus gives a current view of the performance of active portfolio management in the Finnish equity market. The study should reveal possible differences in the performance of active portfolio management during different market conditions. For investors this study should provide information on whether actively managed funds are worth the costs they generate and on whether the decision of holding active funds depends on market conditions.

Chapter two will go through the theoretical background of portfolio performance and the selected performance measures. Chapter three will define and analyze active portfolio management more thoroughly, present mutual funds as a form of active portfolio, and review earlier studies that have evaluated the performance of active funds. Chapter four will define the data set for this study and the used methodology. Results will be presented in chapter five together with discussion that relates the earlier studies and the theoretical background together. In addition, conclusions are drawn and the results will be evaluated. Chapter six will sum up the study.

2 THEORETICAL BACKGROUND

2.1 Efficiency of the stock market

Portfolio managers that actively pursue an above market return implicitly argue being better informed than the average investor. Active portfolio management in practice means continuous search of securities whose price does not reflect the intrinsic value. This contradicts the efficient market hypothesis, EMH, developed by Fama (1970).

Market efficiency in this case means that prices of securities represent all available information. In order to understand and to study the efficiency of markets, price formation process needs to be understood. Major theoretical models of price formation prior to EMH were the expected return or “fair game” models, the submartingale model, and the random walk model. The argument posed by the EMH is too general to have any direct testable implication, but by studying the price formation process we will indirectly study the efficiency of markets. (Fama 1970, 384–387.) Cootner (1962, 25) demonstrates the connection between information and price changes. He states that as a whole the market prices reflect the best information available to traders. If the price would be considered too low by a substantial group of traders, they would bid the price up. Reverse applies for too high prices. Cootner argues that conditional on today´s price the expected price for tomorrow´s price is today´s price. In such a world, the only source for a price change is new information. New information should appear randomly and thus make price changes of a security random and statistically independent.

The EMH by Fama (1970) has three levels: weak, semi-strong, and strong form. The levels differ in notion of what is meant by “all available information”. The weak form assumes that all historical prices are reflected in the prices of securities. By studying historical prices, one can make no assumptions about future prices. The semi-strong form tests whether all publicly available information, for example announcements of annual earnings, is reflected in the prices. Any kind of usage or analysis of public information cannot be productive. The strong form tests whether certain groups or investors have monopolistic access to any kind of information relevant to price formation; in other words it assumes that even inside information is reflected by current prices.

Fama (1970, 409–410) notes that the strong form of the hypothesis is not to be taken as an exact description of reality but as a benchmark to compare against. It is known that for example market makers can use their information on trade books for making profits. Interesting is how much further along the financial specialist the monopolistic information goes. For example, mutual fund managers definitely can be considered as financial specialists. The performance of mutual funds therefore makes an interesting test of the strong form. However, Fama reminds that if mutual fund performance is used as a test, two problems arise. Possible higher return of a fund can be caused by monopolistic access to specific information or it could also be caused by a deeper insight into the implications of publicly available information than implied by the market prices. Fund performance evaluation is thus not a pure test of the strong form. Secondly, a norm to compare with has to be defined. This norm should represent the assumption that prices reflect all available information and it should also represent a risk level that corresponds with the fund in question.

Fama reviews Jensen´s (1968) study of mutual fund performance as a test of the strong form. Jensen used the expected return of capital asset pricing model that should meet the requirements of a comparable norm. Jensen´s study finds no evidence of superior performance by funds in average nor finds it any individual fund that could persistently earn higher returns. Jensen, as well as Fama, interprets this as a strong support for the efficient markets.

A critical point of view in the discussion about market efficiency is brought by Grossman and Stiglitz (1980, 405) who state that "there is a fundamental conflict between the efficiency with which markets spread information and the incentives to acquire information". Grossman (1976) presents a model in which traders have different pieces of information. He shows that the stock markets aggregate information and create a price that reflects all the different pieces of information. An uninformed investor does not have any information about a security but knows that the price of the security reflects the information possessed by the informed investors. Even the uninformed investor can observe the price and, as a consequence, benefit from the information possessed by the informed investors. This being the case, the informed investors have spent money gathering information and are worse off than the uninformed ones. Grossman (1976, 584–585) argues that in the stock markets "only an imperfect information equilibrium can be an equilibrium in an economy where information is costly". As a conclusion, the prices need to be noisy enough so that traders are able to hide the information they have gathered. Otherwise there exists no incentive to gather information and generate expenses. When the prices are noisy enough, some traders want to know why prices are, for example, unusually high. In other words, observing prices is not enough and thus the prices do not fully represent all available information.

2.2 The linkage between risk and return

2.2.1 Reward-to-variability

If we are to discuss the performance of a portfolio, we need to get an idea of risk. Risk taken is namely an essential part of assessing performance. A rational investor considering two optional investments with equal levels of expected return will choose the one with lower level of risk. What is risk and how should the rational investor quantify it, in order to enable a comparison with the two investments? The investor only can estimate an expected return. The risk inherent translates as uncertainty of getting the expected level of return. In other words, risk means a possible deviation of a certain target level of return. This concept of risk is also quantifiable as standard deviation of return that is widely used in the theory of finance. The general form of standard deviation:

$$\sigma = \sqrt{E[(X-\mu)^2]}\,,$$

where σ (sigma) is the standard deviation and μ (mu) is mean value of the random variable X. (see e.g. Steiner & Uhlir 2001, 130–131.)

The linkage between risk and return is crucial when considering investments. For example, the fundamental concept of efficient portfolio maximizes expected return at a certain level of risk (Markowitz 1952). Intuitively this is the same idea as the above presented choice of two optional investments.

If markets are assumed to be efficient, at any point all investors share a common view of the future performance of securities and portfolios as well. The future performance is described by expected return and risk as standard deviation of return. Additionally, investors are assumed to have the possibility to invest and borrow at the risk free rate. On these preconditions all efficient portfolios will be located on a straight line in the form of:

$$E[r_i] = r_f + b\sigma_i$$

where $E[r_i]$ is the expected return, r_f is risk free rate of return and b is risk premium. Since investors are assumed risk averse, b will be positive. (Sharpe 1966, 121–122.)

A rational investor will allocate his assets between a risky portfolio and a risk free asset, with proportions that are determined by his risk aversion. The investor is able to attain any point with desired risk level on the line:

$$E(r) = r_f + \left(\frac{E(r_i) - r_f}{\sigma_i}\right)\sigma$$

The equation represents a linear relationship between expected return E(r) and standard deviation σ. Best portfolio is the one that generates the highest value for the slope of $\left(E(r_i) - r_f\right)/\sigma_i$. Best in this case equals efficient; portfolio that maximizes return at a certain risk level. Should there be more than one efficient portfolio, they will all fall along the line presented above and give identical values for the slope. Major implication is simply that a higher value of expected return is associated with a higher value of standard deviation on a straight line. (Sharpe 1966, 122.)

The ratio representing the slope is perhaps best known as the Sharpe ratio according to the original author. The Sharpe ratio:

$$S_i = \frac{E[R_i] - R_f}{\sigma_i}$$

Sharpe (1966, 123) himself calls the ratio as reward-to-variability ratio because of its interpretation. The numerator shows the reward of investing in a risky asset as an excess expected return over the risk free rate. Standard deviation being the denominator makes the ratio “reward per unit of variability”.

Sharpe ratio provides a ranking for portfolios; portfolio with the highest Sharpe ratio ranks first. The ratio ranks the performances of portfolios on a risk-adjusted basis, and the first portfolio has the best relationship of risk and return. Because risk in financial world is an essential element, Sharpe ratio is one of the most popular measures, for example, of mutual fund performance. For example, the organization of Finnish mutual fund companies has recommended that all of its member companies regularly report the Sharpe ratio for their mutual funds. (Suomen sijoitusrahastoyhdistys ry 2005.) However, in this study the Sharpe ratio itself is not used. Instead, an extension of it proposed by Modigliani and Modigliani (1997) will be used because of easier interpretation of the results. The section 2.3.1 will give an insight into the measure by Modigliani and Modigliani.

2.2.2 Mean-variance efficiency

It is intuitive to assume that an investor tries to maximize expected return when choosing between alternative securities. From two securities with equal expected return the investor will choose the one with lower risk. If we consider the process of building a portfolio of securities, the simple comparison of expected return and expected risk becomes inadequate. Additional dimension that has to be taken into consideration is the covariance of securities. Securities that are not perfectly correlated offer a possibility to reduce the effective risk born by the portfolio. As the price of one security goes down, the price of another might go up – or down as well but to a different amount. Thus the co-effect on the risk of the portfolio is smoother than the price movement of either security individually. (Steiner & Uhlir 2001, 137.)

Expected return of a portfolio is the arithmetic mean of the returns of the individual securities. The return for a portfolio consisting of N securities, each with a weight of w and return of r:

$$r_P = \sum_{i=1}^{N} w_i r_i = w^T r$$

The expected variance of a portfolio, however, cannot be calculated as simple arithmetic mean of the individual securities´ variance. The covariance between each security has to be included in the calculation. Portfolio variance is given by:

$$\sigma_P^2 = \sum_{i=1}^{N} \sum_{j=1}^{N} w_i w_j \sigma_{ij},$$

where σ_{ij} denotes covariance and is defined as:

$$\sigma_{ij} = E\left[\left(r_i - E(r_i)\right) \times \left(r_j - E(r_j)\right)\right]$$

The portfolio variance is conventionally presented in matrix form:

$$\sigma_P^2 = w^T \times \boldsymbol{K} \times w = [w_1 \quad \cdots \quad w_N] \times \begin{bmatrix} \sigma_{11} & \cdots & \sigma_{1N} \\ \vdots & \ddots & \vdots \\ \sigma_{N1} & \cdots & \sigma_{NN} \end{bmatrix} \times \begin{bmatrix} w_1 \\ \vdots \\ w_N \end{bmatrix},$$

where w represents the weights of the portfolio holdings and **K** represents the symmetrical variance-covariance matrix. (Steiner & Uhlir 2001, 137–138.)

Now we have the two major components of portfolio performance that we want to study. Investor is, by assumption, interested in return and variance of his portfolio. The major contribution of Markowitz (1952) was to give the tools to optimize portfolio holdings with respect either to the return or to the variance. In other words, the variance of the portfolio can be minimized at a certain level of expected return. Alternatively, expected return can be maximized at a certain level of variance. Portfolio that is optimized accordingly is called efficient.

The problem of creating an efficient portfolio is formulated as:

$$\begin{cases} r_P \to max \\ \sigma_P^2 \to min \end{cases}; \quad \sum_{i=1}^{N} w_i = 1$$

The weights of the portfolio holdings must sum up to one, while the return is to be maximized or the variance is to be minimized. One has to notice that the return maximization and variance minimization cannot be done simultaneously as a certain level of return implies a certain minimum level of variance and vice versa. (Steiner & Uhlir 2001, 145–147.)

Any possible portfolio combination of risky assets and a risk free asset can be plotted on a return–risk space. On this space the solutions to the above presented portfolio optimization problem form a so called efficient frontier. In Figure 1 the efficient frontier is illustrated. The gray area inside the curve represents all possible portfolio combinations. MVP denotes minimum variance portfolio and shows the portfolio with lowest possible level of variance. Efficient portfolios are located on the outer line of the curve. Naturally, only portfolios above the MVP point can be considered rational. All portfolios under the MVP point have a corresponding portfolio with the same level of variance but a higher return. (Steiner & Uhlir 2001, 145, 156.)

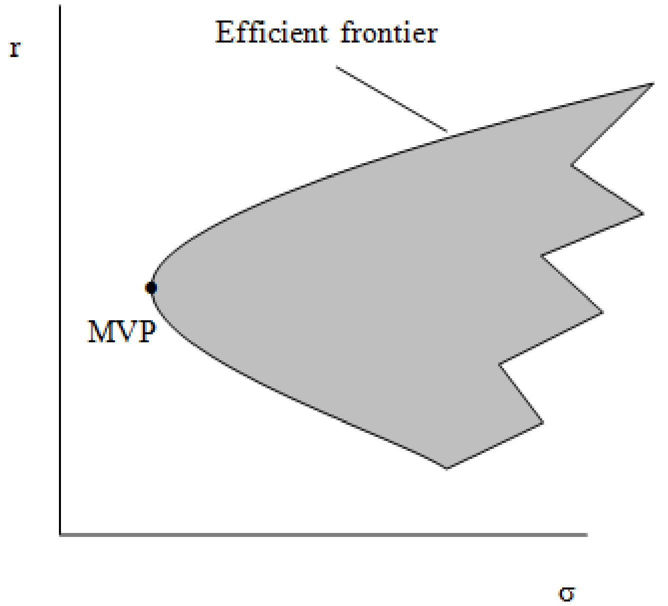

Figure 1 Possible portfolio combinations in a risk and return space (Steiner & Uhlir 2001, 145, 156)

After Markowitz´s portfolio theory, a capital asset pricing model was developed that is generally known by its acronym CAPM. The ideas of CAPM will be analyzed in more detail in next section. CAPM and Markowitz´s portfolio theory are, however, closely related despite their different point of views; asset pricing and portfolio optimization. To get an idea of the connection between these two theories we can introduce risk free rate to the analysis. CAPM shows that an investor will allocate his wealth into a risk free asset and a risky portfolio which for all investors is the market portfolio. Investor´s risk aversion determines the relative shares of the risk free asset and the risky portfolio. Possible rational investment decisions form a straight line that is illustrated in Figure 2. In the figure r (f) denotes the rate of risk free return. P^* denotes the tangency portfolio that lies in the intersection of the tangent line starting from r (f) and the efficient frontier curve. The dashed line represents available investment allocations that can be achieved by combining the risk free rate and the tangency portfolio. All investors will invest in a combination of the tangency portfolio and the risk free rate, because that is the way to optimize variance and return. Any other point on the efficient frontier would offer a lower level of return at a certain level of variance compared to the dashed line. Tangency portfolio by assumption has to be the market portfolio as explained in the following section. (Steiner & Uhlir 2001, 155–156.)

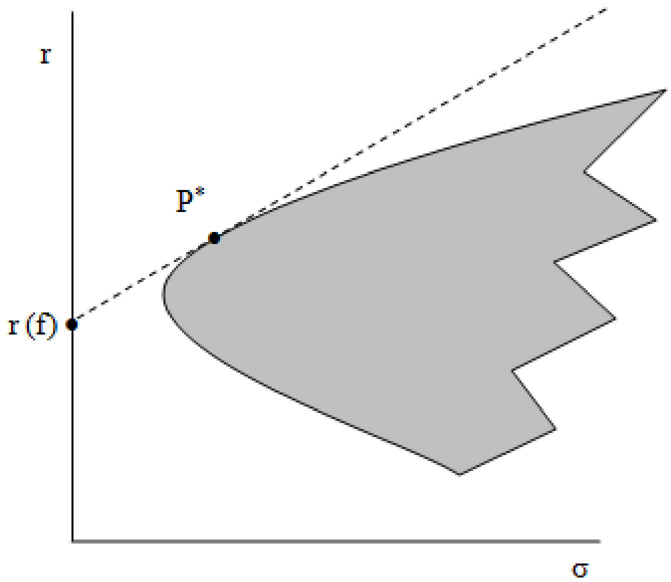

Figure 2 Tangency portfolio on the efficient frontier and the investment opportunity line (Steiner & Uhlir 2001, 156)

Theoretically, a portfolio manager will try to construct a portfolio that lies on the efficient frontier because such a portfolio optimizes the relationship between risk and return. In practice, various problems can arise when implementing the model. The model assumes unrestricted short sales of assets which is not always the case. The weights for portfolio holdings are rather unstable and frequent rebalancing can get costly; the model does not take account of transaction costs. There are ways to ease the implementation and one of them is to perform the optimization with asset classes instead of individual assets. (Fabozzi, Gupta & Markowitz 2002.)

2.2.3 Return according to the capital asset pricing model

After Markowitz´s (1952) breakthrough in portfolio selection theory the linkage between risk, asset prices, and portfolio selection was still vaguely understood. Sharpe (1964), Lintner (1965), and Mossin (1966) all individually dealt with the problem and laid down the basic ideas of a capital asset pricing model.

Risk related to the return of an asset can be divided in two pieces. First piece of the risk is diversifiable or unsystematic. It means that owning multiple assets reduces the effective unsystematic risk for a portfolio of assets. The other piece of the risk is non-diversifiable or systematic. The number of assets does not affect the systematic risk a portfolio bears. If we take a portfolio of a single security, the portfolio is affected by the whole diversifiable risk of that one security. Adding in another security reduces the diversifiable risk of the portfolio, taken that the securities are not perfectly correlated. Adding in more securities diminishes the diversifiable risk further and further until the portfolio becomes “well-diversified”. A “well-diversified” portfolio minimizes the effect of the first piece of the risk. The remaining piece, systematic risk, still persists and even a well diversified portfolio has to bear it. If we consider prices of risky assets, the assessment of risk is essential when determining a fair price. CAPM assumes that an investor already possesses a well diversified portfolio and thus the systematic risk is the only part of risk that has an effect on the price of an asset. (Sharpe 1964, 436–442.)

Systematic risk can be interpreted as fluctuations in economic activity and the exposure to those fluctuations cannot be avoided by diversification. As a consequence, only the sensitivity of a security´s return to economic activity is essential when assessing the risk of a security. The return of a highly sensitive security reacts strongly with changes in economic activity and vice versa. Prices of securities will adjust until there is a linear relationship between the sensitivity and expected return. (Sharpe 1964, 442.) An investor will receive no return for bearing the unsystematic risk.

CAPM offers a formula to calculate an appropriate expected return for an asset with respect to its sensitivity to the systematic risk. Risk free return and expected market return are needed for the calculation. The most commonly presented formula of CAPM (see e.g. Fama & French 2004, 29):

$$E(R_i) = R_f + \beta_i(E(R_M) - R_f),$$

where $E(R_i)$ is the expected return of an asset, R_f is the risk free rate, and $E(R_M)$ is the expected market return. Beta, β_i, denotes the sensitivity of the assets return to the systematic risk. Mathematically, the sensitivity is interpreted as the covariance of a single asset´s return with the market return divided with variance of market return:

$$\beta_i = \frac{Cov(R_i, R_M)}{Var(R_M)}$$

If we take the part of the CAPM equation that is inside the brackets after β,

$$E(R_M) - R_f,$$

we have the market risk premium. $E(R_i)$ is linearly proportional to the market risk premium with beta being the slope coefficient. Market risk premium is to be interpreted as the systematic risk or as the exposure to the economic fluctuations. If the CAPM model is reformulated slightly, we get the risk premium for the security in question:

$$E(R_i) - R_f = \beta_i(E(R_M) - R_f)$$

CAPM is a theoretical model that simplifies the real world complexities. The world is assumed to be a frictionless environment for investing, and all investors are supposed to behave alike. The investors can, however, have a different level of initial wealth and risk aversion. Bodie, Kane, and Marcus (2009, 280) list the required assumptions for CAPM to hold:

- Several investors exist and they have an initial wealth that is small relative to the whole wealth owned by all the investors. The investors are price takers in that their own trades have no effect on the price of securities.
- All investors make plans for one, identically long holding period.
- There are no taxes and transaction costs.
- All investors are rational mean-variance optimizers, meaning that they use the Markowitz portfolio selection model.
- All investors have identical information, and they analyze the securities in the same way. They all have the same view of the future and estimates of expected cash flows.
- A risk free rate exists, and the investors have access to unlimited borrowing and lending at the risk free rate.

In consequence of the assumptions there will be equilibrium in security markets. The prices of all securities have adjusted until the expected return equals the CAPM. Investors have divided their wealth in a stake in risky securities and a stake in risk free rate according to their risk aversion. The stake in risky securities for all investors is actually the market portfolio which is a market value-weighted portfolio including all securities. As all investors try to optimize their portfolios with the same information and similar estimations of expected returns they end up having the same relative value for each individual security. (Bodie et al. 2009, 280–282.)

The applications of CAPM in real world have been accused to be somewhat problematic. For example, it is not clear which capital assets should be included in the market portfolio and which assets can be excluded. Usually large equity stock indices like S&P500 are used as proxy for the market portfolio. However, a broader view of capital assets would also include non-listed assets. Roll (1977) states that the lack of a valid market portfolio makes the applications of CAPM questionable.

Empirical studies have challenged the assumption of CAPM that beta alone explains the expected returns. For example Banz (1981) finds evidence that the size of companies measured as market value has an effect on expected returns that is not explained by the beta coefficient. Also other factors have been found to explain expected returns beyond beta. Fama and French (1992, 440–441) find that book value to market value ratio is one such factor. As an answer to the shortcomings of beta as the sole explanatory factor, Fama and French (1993, 19–26) have suggested a three factor model. The model includes the CAPM beta as the sensitivity to market risk, but it also includes the size factor and the book-to-market factor. Fama and French (2004, 39) claim that the three factor model is superior to CAPM in explaining asset returns. The basic version of CAPM has evoked also other extended or modified versions to overcome its restrictions. One of those is the intertemporal capital asset pricing model, ICAPM, by Merton (1973). ICAPM generalizes the restriction of CAPM that investors only plan for one period by allowing trades to take place continually in time.

Despite the critique on CAPM, it is theoretically appealing and the concept is relatively easy to understand. In practice CAPM has widespread applications for calculating a required return. For example, firms can estimate a required return for available projects or officials can determine a reasonable return for state monopolies (see e.g. Saajo 2011). The required return by CAPM can also be applied for a portfolio of assets instead of only a single asset. This offers a possibility to compare the performance of a portfolio to the return CAPM suggests. Especially in the mutual fund performance evaluation, the concept of CAPM is extensively used.

2.3 Performance of a portfolio

2.3.1 Risk-adjusted performance

The basic idea of risk-adjusted performance is to adjust the risk level of a portfolio to that of a relevant unmanaged portfolio. When the risk level is adjusted, also the return is adjusted accordingly and a risk-adjusted return is gained. Adjustment done for several portfolios enables a comparison among these portfolios and against the unmanaged portfolio. As the risk levels are matched, the comparison of performances is made valid; risk-adjusted performance “allows us to compare apples to apples”. (Modigliani & Modigliani 1997, 46, 53.)

Risk-adjustment by the Modigliani measure is made by leveraging or unleveraging. Given a portfolio with any level of expected return and dispersion of returns, it is possible to reach any desired level of risk by leveraging. The leveraging is done by borrowing, and unleveraging is done by lending at the risk free rate of return. If a share of d% of a portfolio is sold and invested in a risk free asset, the level of dispersion of the returns of the portfolio reduces by d%. That is because d% of the portfolio is changed riskless; d% of the return has been made constant. At the same time, however, also the excess return over risk free rate has reduced by d%. (Modigliani & Modigliani 1997, 47.)

When calculating risk-adjusted performance, RAP, the portfolio risk level should be adjusted until the risk level of a relevant unmanaged portfolio is reached. We will suppose the market portfolio to represent the unmanaged portfolio. D_i is defined as the leverage required making a portfolio risk equivalent to the market portfolio. That is to match the sigma of the portfolio to that of the market portfolio. The d_i can be inferred from this definition (Modigliani & Modigliani 1997, 47):

$$\sigma_M = (1 + d_i)\sigma_i$$

which implies:

$$d_i = \frac{\sigma_M}{\sigma_i} - 1$$

Taking into account the interest on d_i, we find that RAP is equivalent to:

$$RAP_i = (1 + d_i)r_i - d_i r_f$$

By substituting d_i RAP can be rewritten as:

$$RAP_i = \frac{\sigma_M}{\sigma_i} r_i - \left(\frac{\sigma_M}{\sigma_i} - 1\right) r_f$$

The definition of RAP can also be rewritten in a way that clearly shows its connection to the Sharpe ratio (Edwards & Samant 2003, 54).

$$RAP_i = S_i\sigma_M + R_f = \frac{R_i - R_f}{\sigma_i}\sigma_M + R_f,$$

where S_i denotes the Sharpe ratio.

Figure 3 illustrates the analysis of RAP. The y-axis represents r as return and x-axis represents sigma as standard deviation. On this two-dimensional surface any portfolio can be represented as a point $P_i(\sigma_i ; r_i)$.

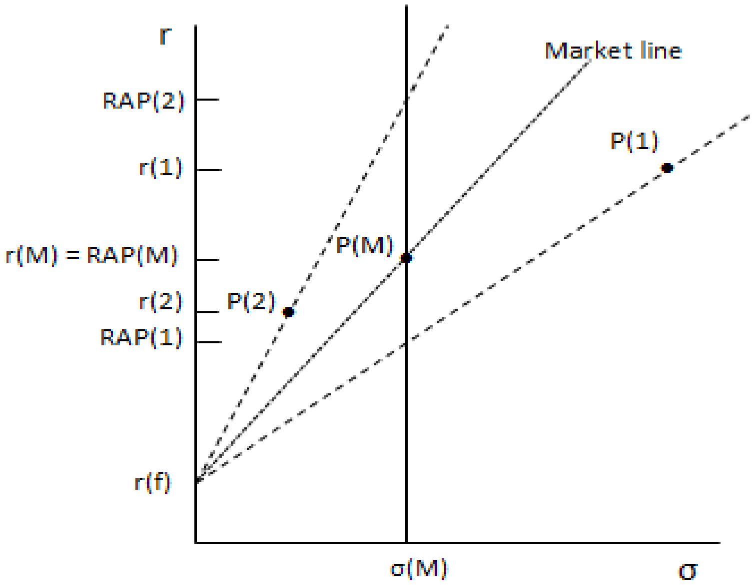

Figure 3 Total and risk-adjusted return (Modigliani & Modigliani 1997, 49)

Point P(1), for example, determines the return and the standard deviation for the portfolio 1. That is, by investing in portfolio 1, expected return is r(1) and standard deviation of the return is σ(1). The dash line starting from r(f) and going through P(1) represents leverage-opportunities for portfolio 1. Any point on the dash line can be reached by combining an investment in portfolio 1 and an investment in a risk free asset. The slope of the dash line for all the portfolios; P(1), P(2), and P(M); equals the Sharpe ratio of the portfolio. It is easy to see from the steepness of the dash line which portfolio offers the best return for a certain level of risk. (Modigliani & Modigliani 1997, 49.)

P(M) in Figure 3 represents the market portfolio, an unmanaged benchmark portfolio. The standard deviation of market return is represented by σ(M). The market return r(M) equals also the RAP for the market portfolio, by definition. In order to determine the RAP for other portfolios their risk levels are to be matched with the market portfolio. In the figure the RAP values for portfolios 1 and 2 are easily observable. They are determined by the intersection of the leverage-opportunity line and the vertical line representing σ(M). Interesting in the figure is to notice the difference in rankings based on total return and on risk-adjusted return. Portfolio 2 ranks last on a total basis, but first on risk-adjusted basis. The opposite applies for portfolio 1. Portfolio 2 is actually the best portfolio on any risk level. The leverage-opportunity line of portfolio 2 shows that it can produce the highest return at any risk level. This is the main result of the risk-adjusted performance analysis. The portfolio that generates highest risk-adjusted return is the best portfolio for any risk level. Remaining question is how much to leverage. The choice of a portfolio and the choice of risk level are thus separated. (Modigliani & Modigliani 1997, 49–50.)

A clear advantage for RAP over the Sharpe ratio is easier interpretation of results. The Sharpe ratio is an absolute value, reward-to-variability. The difference between the Sharpe ratios of two funds, say 0,5 and 0,7, show that the latter fund performs better. How much better does it perform, would be a tricky question at least for an average investor. The RAP value is presented as a percentage figure that should be understood by even a lay investor. If a fund produces risk-adjusted return of 13%, and the market has produced 11%, it is easy to evaluate the difference. Therefore this study will use the RAP as a measure for the risk-adjusted return for a fund.

2.3.2 Excess return over the CAPM

Jensen (1968) divides the concept of portfolio performance in two dimensions: the portfolio manager´s ability to forecast future security prices and the ability to reduce the diversifiable risk born by the portfolio by diversifying efficiently. Based on the CAPM Jensen develops a performance measure for the first dimension. Known as Jensen´s alpha, it measures whether a portfolio can choose securities with higher expected return than suggested by the CAPM.

The basic presentation of CAPM should be allowed for an error term e_i when the model is used statistically to explain returns. The error term represents arbitrary deviations from the forecasted return.

$$R_i = R_f + \beta_i(R_M - R_f) + \varepsilon_i$$

The expected value of the error term is zero, because the deviations are identically distributed below and above the forecast of the model. (Jensen 1968, 393.)

Presented this way, the model offers no opportunity for a return that would be “better” than another return. For a portfolio this would mean that the return is always at the rate its risk level, or beta, lets us expect. The risk premium of the portfolio is a straight line going through origin, as explained in the CAPM section, 2.2.3.

$$R_i - R_f = \beta_i(R_M - R_f) + \varepsilon_i$$

The only deviations of this straight line are caused by the error term with the expected value of $E(e_i) = 0$. If we are to assess the performance of portfolios, we must make a slight modification to the model in order to give a chance to perform better (or worse).

Let us consider a portfolio manager with extensive information gathering and superior security analysis. The manager can make use of his analyses and is able to make predictions of security prices. Accordingly he will be able to choose securities that offer an expected return above the usual risk premium. As a result, his portfolio will constantly reach a return that is above the expected return by the CAPM. Deviations of the model are included in the error term and the successful portfolio management would imply that the error term has a constant, positive part of it. A presumption of the error term is, however, that its expected value is zero. This contradiction can be removed by introducing to the model an additional constant, alpha or α_J.

$$R_i - R_f = \alpha_J + \beta_i(R_M - R_f) + \varepsilon_i$$

Alpha gives room for the skills of a portfolio manager. In the case of the successful portfolio manager, alpha will have a positive value and the error term has again expected value of zero. (Jensen 1968, 393–394.) The formula can also be reformulated to emphasize the fact that alpha is equal to the portfolio´s abnormal return over CAPM:

$$\alpha_J = R_i - \{R_f + \beta_i(R_M - R_f) + \varepsilon_i\}$$

A well managed portfolio will produce positive alpha as mentioned. The positive alpha value measures exactly the additional rate of return that is due to the manager's ability to forecast future prices. A non-managed arbitrary portfolio will have expected alpha value of zero. If a portfolio is managed poorly, also a negative value of alpha is possible. The reason why a managed portfolio could do worse than a non-managed random portfolio lies in the costs of management. If costly analysis is practiced, but it cannot be turned into successful forecasting, a negative value of alpha will result. (Jensen 1968, 394.)

The use of Jensen´s alpha is exposed to the criticism of CAPM. As the model is based on the CAPM, it has the same weaknesses. A proxy has to be used as the market portfolio, and the explanatory power of the model in empirical studies has been disputed. For example Elton, Gruber, Sanjiv, and Hlavka (1993, 5–6) found that even unmanaged portfolios can produce non-zero alphas. However, Jensen´s alpha still seems to be one of the most widely and frequently used measures of portfolio performance – in both academic studies and in the mutual fund industry.[2]

[2] See e.g. Dahlquist, Engström & Söderling 2000; Stotz 2007; Chang 2010; Nordea 2012.

2.3.3 Market timing

As presented in previous section, Jensen (1968) divides portfolio performance in two dimensions: portfolio manager´s ability to predict future security prices and the ability to reduce the diversifiable risk. Jensen´s alpha was presented to measure the first dimension. However, Jensen´s alpha does not take into account of a more sophisticated view of future price prediction. Fama (1972) distinguishes between manager´s ability to select individual securities and the ability to make forecasts on general market price movements. These can also be called as security analysis and market timing. If Jensen´s alpha is strictly examined, it only allows for the measurement of individual security selection. If the portfolio manager possesses market timing ability, Jensen´s alpha will be biased. (Jensen 1968, 395–396.)

Fama (1972, 566, 559-560) defines extra return from security selection as the "difference between the return on the managed portfolio and the return on a naively selected portfolio with the same level of market risk". Market timing is defined as the difference between the risk level of the manager´s portfolio and the target risk level of that portfolio. More specifically, the target risk level is determined by the investor, owner of the invested money, and the deviations of the target level are made by the manager of the investment portfolio. The target risk level can be also understood as an average risk level of a longer time period and market timing as purposely deviating from this average risk level. By risk level is meant the portfolio´s exposure on the market return.

In the CAPM, risk level is described by the beta coefficient. The model implicitly assumes a constant level of beta which can be considered quite unrealistic. The beta can be expected to vary in time randomly; it may change along with market conditions, or the portfolio manager might alter it purposely. (Bodie et al. 2009, 300.) If the portfolio manager forecasts a downward trend of market prices, he will certainly want to reduce his risk exposure, in other words, to lower the beta of his portfolio. If the portfolio manager predicts market prices to rise, he would benefit of a higher beta.

A model by Henriksson and Merton (1981, 527–531) extends the CAPM or the Jensen model in the way that market timing is allowed for, and the portfolio manager can alter the beta of his portfolio. The model measures both security selection and market timing. Basic idea of the model is that the portfolio manager can choose between two values of beta, according to his forecasts of the general price movements. Simply put, he can choose between "down-market beta" and "up-market beta". The model includes the alpha and beta terms from the Jensen model and an additional timing factor:

$$R_i - R_f = \alpha_i + \beta_i(R_M - R_f) + \gamma_i * \text{Max}(0, R_f - R_M) + \varepsilon_i,$$

where the gamma term, γ, represents timing ability. If the term is significantly positive, timing ability exists. More formally, the model can be understood as a partial hedging strategy with put options. Portfolio manager obtains free put options on the market portfolio with strike price at the rate of market return. If the forecast on market price movement is successful, the return of $Max(0, R_f - R_M)$ will be received.

Goetzmann, Ingersoll, and Ivkovic (2000) point out an error potential when measuring market timing. The problem arises as trading decisions can be made on a constant basis, but return observations for measurement are taken on a selected interval. The portfolio manager can try to time the market each day; he can trade assets back and forth even within a day. Most studies of portfolio performance have used monthly or even quarterly data which means that the portfolio manager can trade several times between the dates of return observations. Goetzmann et al. (2000, 261) note that the problem becomes worse when the difference between the return observations and the timing decisions grows. From the Henriksson-Merton model we see that a successful market timer receives the value of the put option on market return, represented as $Max(0, R_f - R_M)$. If there is a bull market, the way to create excess return is to maximize risk level. A successful market timer then gains from the "timing option" the value of zero. Thus the effect of market timing on the abnormal return is impossible to identify. This leads to underestimation of the effect of market timing. In this study weekly returns are used which should reduce the problem to an acceptable level. It should be realistic to assume that market timing is usually considered for a longer period than a week.

The model by Henriksson and Merton will be used to assess whether portfolio managers show market timing abilities. On the other hand, the measure is used also alongside with Jensen´s alpha in order to control the potential bias caused by market timing.

2.4 The effect of stock market trend

2.4.1 Non-optimal investor behavior

Most models of asset pricing or optimal portfolio construction, for example those presented in section 2.2, assume that investors make rational trading decisions. This assumption, however, may not always be realistic. Recent developments in behavioral finance have identified several psychological biases that cause non-optimal behavior patterns for investors.

Daniel, Hirshleifer, and Subrahmanyam (1998) present a theory on investors´ behavior that is based on two main biases. *Overconfidence* is defined as overestimating the precision of private information signals while the precision of public information signals that are perceived by all are underestimated. *Biased self-attribution* is caused by variations in confidence. New information that affirms investors´ earlier decisions is attributed to high ability, whereas contrary information is considered external noise or overlooked.

Overconfident investors place more weight on their private information relative to public information. Accordingly markets tend to overreact to private information signals and underreact to public information signals. Overreaction to private information is explained by investors´ and analysts´ involvement to the information they have created themselves. Underreaction is frequently observed when new public information is given, for example, when a firm announces a corporate action. Almost all event studies show that the announcement day return is of the same sign as the average post-event abnormal returns. If the importance of the public announcement would not be undervalued, the post-event abnormal returns would be independent of the announcement day return. (Daniel et al. 1998, 1841.)

Biased self-attribution causes an investor to respond to public information differently depending on his earlier actions. Good news raises the confidence of the investor but bad news is considered meaningless or it lowers the investor´s confidence only slightly. This leads to a situation where new public information in average confirms the validity of investor´s trading decisions. A purchase of shares is considered a good decision even if there would be an equal share of news for and against the price development of the share. This kind of behavior bias potentially causes momentum effect in security prices. For example, a predicted upward trend can easily be "confirmed" by new public information when the information is interpreted by investors who are betting on rising prices. Negative information is disregarded and positive signs are overvalued. Eventually the momentum will cease and prices will be corrected as enough new information is published and the fundamental value becomes obvious enough. (Daniel et al. 1998, 1841.)

Another identified behavioral bias is disposition effect which simply put means that investors sell past winners and hold past losers. The disposition effect is explained by the concepts of mental accounting and prospect theory. Mental accounting means that investors compare the current price of a security to a historical benchmark price level. The benchmark level determines whether investor experiences a gain or loss. The acquisition price of the security might be the benchmark but it can as well be any historical price level. As for the prospect theory, it suggests that an investor has an s-shaped utility function, which is divided in two by the benchmark price level. (Grinblatt & Han 2005, 312.) This is illustrated in figure below.

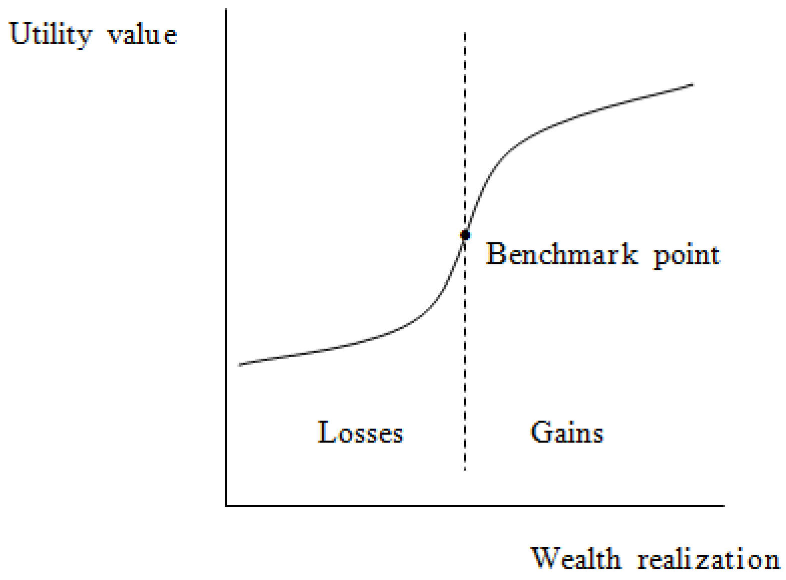

Figure 4 S-shaped utility function of the prospect theory (Grinblatt & Han 2005, 313)

Figure 4 shows that the curve of the utility function is convex below the benchmark point and concave above. In other words, investor is assumed to be risk-averse when he is winning and risk-loving when he is losing, relative to the benchmark price level. If a security has gained in price recently, investors are prone to sell it and thus realize a potential profit. If a security has suffered a decline in price, investors tend to hold it longer and avoid accepting a loss. Compared to rational investment decisions, the disposition effect causes investors to hold their losing stocks too long and selling winning stocks too early. (Grinblatt & Han 2005, 313.)

These patterns of investment behavior have been confirmed by several studies[3]. The study by Grinblatt and Keloharju (2001) is especially interesting for this study as they had a large data set of Finnish investors. The non-optimal behavior biases were also observed in Finland. For example, Finish households were found to be contrarian investors which means that they were eager to sell past winners and to buy past losers. The authors interpreted this to be a part of the disposition effect. Grinblatt and Keloharju (2001, 66), however, note that the behavior of sophisticated investors, such as finance

[3] See e.g. Ferris, Haugen & Makhija 1988, Hirshleifer, Subrahmanyam & Titman 1994, Grinblatt & Keloharju 2001.

and insurance companies, appeared to pursue momentum strategies in contrast to the households´ behavior. The sophisticated investors also showed a higher performance.

Kim and Nofsinger (2007, 138) argue that most studies about the behavioral biases suffer a limitation as most of them have data of only rising markets. For example, the study by Grinblatt and Keloharju (2001) had data of the period from December 1994 to January 1997. Kim and Nofsinger (2007) contrast the behavior of Japanese individual investors during a bull market to their behavior in a bear market. For example, overconfidence has been confirmed in rising markets, which is intuitively quite reasonable. The situation is rather different in a bear market when investors are losing money.

The main finding of Kim and Nofsinger (2007, 152) was that the investment behavior differs in bull and bear markets. Their results show that Japanese investors actually hold riskier stocks during a bear market than during a bull market. This is in contradiction with the overconfidence theory but instead it might be explained by the prospect theory. In average, investors are likely to experience a loss during a bear market and based on prospect theory they would then be risk loving. Another finding was that investors tended to exhibit more positive feedback trading during bull markets which conforms to the overconfidence and biased self-attribution theories.

The consequence of the behavioral biases is non-rational investment decisions. Rational in this case means that the value of an investment is determined by the expected return. In addition, the investment behavior seems to be dependent on past market developments. Depending on past market developments, decisions are made in a different manner and based on similar information signals, different kinds of decisions are made.

2.4.2 Differences between market states

In addition to behavioral biases there are also other potential factors that separate investment decision making in different market states. McQueen and Vance (1993) for example find that stock markets respond to news of macroeconomic information differently depending on the market conditions. For example, news of higher than expected real activity results in lower stock prices if the economy already has experienced a strong phase whereas in a weak phase similar news would cause stock prices to rise. This can, however, be considered fully rational as news of rising economy in an already strong phase can be a sign of overheating. The growth in expected cash flows would not be able to offset the negative effect of the rising discount factors.

Ahmed and Lockwood (1998) find that securities´ exposure on risk and compensation for risk exposure vary during different market conditions. Depending on the phase of the market trend, different risk factors can show either statistical significance or insignificance. For example, industrial production and change in expected inflation were measured to have significant risk premiums during bull markets. During bear markets, instead, none of them were found significant. Ahmed and Lockwood (1998, 167) claim that managers of asset allocation portfolios can benefit by forecasting how varying risk factors contribute to the return of the portfolio. On the other hand, portfolio managers should be cautious if their primary target is to match their holdings according to a desired exposure to relevant macroeconomic factors. The risk premium for such factors can change dramatically depending on the state of the stock market and the stage of the business cycle.

Similar asymmetries with risk and expected return are also found by others. Perez-Quiros and Timmermann (2000) find that changes of interest rates have greater impact on volatility of stock returns and expected returns during recession periods. This applies both for small and large firms but for small firms the effect is stronger. Perez-Quiros and Timmerman (2000, 1259–1260) conclude that accounting for this kind of regime switches is likely to be important to portfolio performance. The momentum effect which can result from the behavioral biases introduced in last section, was confirmed first by Jegadeesh and Titman (1993) in the US market. Cooper, Gutierrez, and Hameed (2004) argue that the performance of momentum strategies critically depends on the market state. According to their results a “momentum portfolio” is profitable only after a period of market rise.

The non-optimal behavior patterns together with the above presented differences between market states create a challenge for investment performance. Active portfolio managers need to be aware of the different possibilities and risks in different market conditions. The fact that investment decisions are potentially dependent on past market developments emphasizes the effect of market trend. This also violates the assumption of a rational investor but should be observable as inferior performance.

3 ACTIVE FUNDS AND THEIR PERFORMANCE

3.1 Active portfolio management

Active portfolio management tries to produce returns above a predetermined benchmark index. Passive portfolio management settles for the returns of the benchmark index and tries to mimic its return behavior. Fox (2002, 73) defines active portfolio management as "--any process by which an investment manager seeks to add incremental returns relative to a market index. The process can take many forms: quantitative, chartist, fundamental, market timing, sector rotation or even inspirational." Fox continues that although various forms of active management exist, they all share the element of forecasting future security prices. The forecasts are then transformed into a portfolio composition which determines the subsequent performance.

The success of active management is dependent on the accuracy of the forecasts and the size of the positions in securities. If a security is forecasted to perform well, it suggests a positive holding in the security. Accurate forecasts create potential for superior returns, but the forecasts have to be accompanied with matching allocations. Correctly forecasted good performance and a large position together produce a substantial return. (Fox 2002, 74.)

Starting point of the active management process is the selection of investment universe. Investment universe determines which investments are considered relevant and from which the portfolio will be constructed. Portfolio manager might of course have a say when the investment universe is defined, but other substantial limitations exist. For example, in the case of mutual funds, local legislation has to be considered. Usually much deeper specifications and clear boundaries for possible investments are set by the investment rules of the fund itself.

Portfolio manager´s task is to apply a strategy in order to construct a performing asset composition from the investment universe. Traditionally the means of an investment strategy can be divided into security selection and market timing (see e.g. Fama 1972). Security selection is aimed at picking the stocks that are expected to perform better than average. Market timing means that the exposure of the portfolio to the movements of general market prices is adjusted according to forecasts. Keel (2006, 116–117) states that the portfolio´s exposure to assets with return $r_i \geq 0$ should be equal or larger than the benchmark´s exposure. Exposure to assets with return $r_i < 0$ should be less than the benchmark´s exposure. This may include both long and short positions in assets. From a mathematical point of view, security selection and market timing are thus one and the same. If the mean of residual returns is positive, portfolio manager has succeeded in his task.

It is easy to see that above description of active portfolio management is in contradiction with the hypothesis of efficient markets[4]. In case of efficient markets, active portfolio managers are able to outperform the market only by luck. The motivation of active portfolio management might have its foundations in the arguments of Grossman (1976) and Grossman and Stiglitz (1980) who stated that no such market efficiency can exist. Keel (2006, 115) notes that the most important reason for active portfolio management is non-stationary market behavior coupled with investors that are constrained by their liabilities and consumption. In other words, the behavior of markets varies over time and investors have needs that affect their investments. Keel continues that especially from the point of view of risk management, investors want to control their portfolios better. However, no matter what are the reasons, active portfolio managers implicitly argue that the market portfolio is not the optimal portfolio.

3.2 Mutual funds as active portfolio managers

A usual form of an active portfolio is a mutual fund. A fund is an investment portfolio of which shares are sold to the public. Thus a diversified portfolio is easily achieved by an individual. The fund is judicially owned by the investors, each with the invested share. A management company runs the administrative activities of the fund, and the investment decisions are made by a portfolio manager. The investors of the fund receive no information of the investment decisions in advance. Investment policy and rules of the fund are used for marketing and they are the sole source of information on how the investments are done. Investors can only observe realized returns. The largest holdings of the fund are usually published afterwards, for example on a monthly basis. (Sijoitusrahasto-opas 2012, 5–6.)

The net asset value, NAV, is calculated by the management company as the net value of all owned assets. It is the price for selling and purchase. Thus the price of the fund itself is not affected by supply and demand. The NAV is calculated usually on a daily basis but depending on the rules of the fund another frequency can be used. (Sijoitusrahasto-opas 2012, 5–6.)

Funds charge various fees from the investors. Usually funds have load fees that are charged directly from the investor upon a purchase or a sale of the fund. In addition, funds have a management fee that is being charged continuously. The management fee is subtracted from the assets of the fund, and the reported NAV is net of the management fee. The investor does not have to pay for the management fee, but the returns of

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[4] See section 2.1 for further discussion on the efficient markets hypothesis.

the fund are lower to the amount of the management fee. Some funds, especially hedge funds, can have additional fees that are performance dependent. (Sijoitusrahasto-opas 2012, 15–16.)

Funds are regulated by local legislation and in the European Union additionally by common directives. The Undertakings for Collective Investment in Transferable Securities (UCITS) is the set of directives that are applied for funds within the EU. A fund can be a UCITS-fund or a non-UCITS-fund, depending on whether it complies with the set of directives or not. The UCITS define several restrictions for the investment policy of the funds. Most of the restrictions are meant to ensure an adequate level of diversification. For example, a fund can invest at the most 10 % in the securities of one issuer. The amount of securities that exceed 5 % of the fund´s NAV can amount to 40 % maximum of the fund´s NAV. A non-UCITS-fund instead can deviate from these restrictions and is able to use, for example, derivatives more freely. However, all funds have to publish rules that include their investment policy and restrictions. (Sijoitusrahasto-opas 2012, 27–28, Act on Common Funds 41, 68, 73 and 87 §.) The purpose of local legislation and the UCITS is to mitigate the potential conflict of interests between the portfolio manager and the investors. UCITS-funds are highly appreciated and very popular also outside the EU because of the investor protection they offer (European Commission 2012).

The regulators are trying to control the risks that portfolio managers undertake with the money of investors. However, there is another kind of conflict of interests as well. Fund managers have been accused of so called “closet indexing”. Funds that claim to be active are, as a matter of fact, close to a passive index fund. For example, Cremers and Petäjistö (2009) reveal that a part of funds show little evidence of active investment decisions. From the point of view of the portfolio manager, a relatively passive investment strategy can be reasonable. Deviating from the benchmark index exposes to the risk of underperformance and underperforming portfolio managers are at risk of being out of work. From the point of view of fund investors, “closet indexers” are charging management fees but offer no opportunity for superior returns.

A challenge for mutual funds is continuous offering of liquidity for investors. Most funds are redeemable every day. In practice this means that funds are forced to maintain a cash position always. If the market is expected to go up, a high market exposure is constrained by the cash position. For example Stotz (2007) explains a lower market risk of the funds by the liquidity restriction.

Mutual fund management companies have been found to employ a practice in which several small funds are initiated. The initiated funds have different fund managers and they are assigned slightly different investment policies. During the couple of first years, some of the funds will perform better than the rest. Those are the funds that will be forcefully advertised to the public and their successful track record will be presented.

The rest of the funds will be quietly taken down or perhaps merged into the successful ones. A subsequent fund performance study should be cautious of so called survivorship bias. The ceased and merged funds are easily forgotten, and if only the survived funds are included, the results of the study might be biased and overweight the performance of the survived funds.[5]

3.3 Earlier studies on fund performance

3.3.1 Risk adjusted return, stock selection and market timing abilities

The evaluation of portfolio performance has been in the interest of the academic studies at least for several decades already. The management fees imply that higher expected performance is being sold to the investors; otherwise the fees would not be justified. One of the earliest and perhaps still one of the most renowned studies was carried out by Sharpe (1966). He evaluated the performance of 34 open-end mutual funds during the period of 1954–1963.

Sharpe presented reward-to-variability ratio as a measurement of portfolio performance. It took account of the return but also the risk undertaken. Later the measure has been known as the Sharpe ratio. It is the portfolios excess return over the risk free return divided with the portfolio return´s standard deviation: $(E(R_i) - R_i)/\sigma_i$, as discussed in section 2.2.1. Sharpe concluded that if the assumptions of CAPM hold, all funds should give an equal value of the ratio. Thus they would all fall along a line in a two-dimensional standard deviation–return space. Should there be funds that allocate too many costs in research or administration, they will persistently give inferior values of the ratio.

Sharpe found that the linear relationship of return and standard deviation is clearly evident and statistically significant. However, as one might expect, all funds did not perform equally well. According to the ratio the funds can be ranked on a risk-adjusted basis. Some of the studied funds were even dominated by others, meaning that with the same level of standard deviation a better return was given by another fund.

The average value of the reward-to-variability ratio of the active funds was 0,633. For the same period, the Dow Jones Industrial Average -index showed a value of 0,667 which meant that an average fund lost considerably against the index. Sharpe´s conclu-

[5] The effect of survivorship bias was discussed for example by Malkiel (1995), see section 3.3.1.

sion was that an average fund is able to construct a portfolio that performs as well as the index, but after costs the performance falls short of the index.

Sharpe also studied if there is persistence in the risk-adjusted performance of the funds. Sharpe found that performance can be predicted based on fund´s earlier performance but imperfectly. A former winner was likely to be also a future winner. Sharpe reported that expense ratio and size of the funds were found to have slight predictive power on funds´ performance and explain partly the persistence.

The evaluation of fund performance was continued by another seminal work by Jensen (1968). He extended the CAPM formula in a way that it could be used to measure the performance of portfolios. Adding a constant alpha in the formula gave room for abnormal returns, as explained in section 2.3.2. The constant alpha represents the portfolio´s excess rate of return over the CAPM. Jensen estimated the model for a wide data set, 115 open-end mutual funds, for a ten year period of 1955–1964. The average value of alpha, calculated *net* of all management costs, was -0,011 indicating that on average funds did 1,1 % worse than their level of systematic risk would have suggested. 76 of the funds had $\alpha < 0$ and 39 of the funds had $\alpha > 0$. Jensen reminded that a random buy and hold investment policy should produce $\alpha = 0$. To evaluate the investment decisions of the portfolio managers without considering the costs, Jensen estimated the model also *gross* of all management costs. In this case the average alpha was -0,004, or -0,4 %. Jensen concluded that the funds in average were not very successful in their forecasting activities. This is highlighted by the fact that the funds lost to their benchmark even gross of management fees. Jensen argues that as a whole the fund management industry has not been able to do any successful forecasting of security prices. Neither was there hardly any evidence that any individual fund would possess such ability.

The two major studies of Sharpe (1966) and Jensen (1968) gave little room for the success of active portfolio management. Their clear statement was that the mutual funds are unable to make enough successful investment decisions in order to beat the index after costs, or even before costs. This also remained as the general view among the academics which was also commented by Ippolito (1989, 2): "This has left the impression given by the first generation of papers that mutual funds do not earn rates of return sufficient to offset the costs of their operation."

Ippolito (1989) criticized the earlier studies for putting too much weight on the performance of individual funds. Ippolito posed the question of fund performance otherwise. He was primarily interested in the efficiency of the mutual fund industry as a whole, whereas the earlier studies had mainly concentrated in answering the question whether there are individual funds that are able to produce positive alpha and outperform the market. Ippolito studied the performance of 143 mutual funds covering the period of 1965–1984. He estimated Jensen´s alpha for the funds as the risk-adjusted return. Ippolito argued that as a whole the mutual fund industry is able to offset the expenses that are created by the investment activities. He reported that as a whole the fund industry was able to produce significant positive alpha. Actually, he also found individual funds that produced positive alphas more than expected with 95 % confidence level.

Ippolito stated that his results suggest rejection of the efficient market hypothesis. Ippolito argued the impossibility of such market efficiency where prices represent all available information. Instead he concluded that the notion of efficient markets should be understood as Grossman (1976) and Grossman and Stiglitz (1980) presented it. Information gathering is costly but it provides better return. The costs and better return neutralize each other and thus the overall result is the same as with passive index investment. The main conclusion of Ippolito, contrary to earlier studies, was that mutual fund industry is indeed able to offset the costs of active portfolio management.

Malkiel (1995) studied a unique data set that included all US equity funds existing each year between 1971 and 1991. Malkiel criticized that usually studies have used data which include only currently existing funds. Funds that have existed during the period of the data set but have been ceased or integrated into another fund are excluded. Malkiel argues that using such a data set exposes a study to survivorship bias and that the effect of the bias is considerable. For the period of 1982 to 1994 the average total return for funds that existed in 1994 was 17,09 %. However, for all funds that existed at least a whole year during that period the average was substantially lower 15,69 %. The differences of the survivorship bias were also found statistically significant.

Malkiel used Jensen´s alpha to determine the performance of a fund. His results showed that *net* of management fees the average alpha was negative and positive *gross* of management fees. However, neither of these figures was significantly different from zero. Malkiel concluded that funds in average were not able to offset their costs and the funds tended to underperform the market. If the conclusions of Malkiel (1995) are contrasted to the conclusions of Ippolito (1989), a clear contradiction can be seen. The effect of survivorship bias cannot be used to explain the difference because Ippolito also took account of it. The solution of Ippolito was to consider the merged funds as continuations of the original funds, so the return series of the original funds were not lost.

Malkiel notes that several studies have documented performance persistence in mutual fund returns and that investment strategies exploiting the persistence have been suggested. He argues that survivorship bias can explain most of the persistence. Malkiel also reports persistence in fund performance in the 1970s but he notes that during the 1980s the persistence practically vanishes. He found no reasonable strategy based on performance persistence that would have generated extraordinary returns during the 1980s.

Already Jensen (1968) noted that estimation of the alpha constant is exposed to a bias if the portfolio manager possesses market timing abilities. That is, if the portfolio manager is able to alter the beta of the portfolio according to the changing market conditions. During an upward trend of prices portfolio manager wants the portfolio to bear a higher beta than during a downward trend. The means to measure market timing was given by Henriksson and Merton (1981), as discussed in section 2.3.3.

Chang and Lewellen (1984) assessed the performance of 67 US mutual funds during the period of 1971–1979. They distinguished between manager´s security selection and market timing abilities. They applied the model by Henriksson and Merton (1981), which allows the beta of the portfolio to vary. The model used by Chang and Lewellen was a linear transformation of the model that is used in this study:

$$R_{p,t} - R_{f,t} = \alpha + \beta_1 X_{1,\mathrm{t}} + \beta_2 X_{2,\mathrm{t}} + \varepsilon_{p,t},$$

where α is the expected excess rate of return on the portfolio due to the manager´s security selection ability, $X_{1,t} = Min(0, X_t)$, $X_{2,t} = Max(0, X_t)$ and X_t is the excess return of the market portfolio over the risk free return. The parameters β_1 and β_2 can be interpreted as the down-market beta and the up-market beta. Testing for market-timing ability in the model means testing whether $\beta_1 = \beta_2$.

The results of Chang and Lewellen showed no evidence of any ability to foresee market changes nor was there any evidence on security selection skills. As a matter of fact, Chang and Lewellen reported the down-market beta to be slightly higher than the up-market beta which indicates a reversed market timing “skill”. There were several funds for which the model indicated both market-timing and security selecting phenomena to be present at the same time, but in opposite directions. As the opposite effects on return can reverse each other, the traditional one factor model based on CAPM could not detect the phenomena at all.

Henriksson (1984) also applied the method by Henriksson and Merton (1981). The results of Henriksson were very much similar to those of Chang and Lewellen (1984); little evidence of market timing was found. There were more funds that exhibited significant negative than positive market timing. Henriksson reasoned that the portfolio managers might be able to predict large changes in the value of the market portfolio better than smaller changes. He split the data in two by the magnitude of the change and repeated the estimation. Yet was there little evidence of market timing skills.

Later several fund performance studies have been conducted on various markets. The mutual fund industry seems to have had universal strong growth since the 1990s in the developed economies. Thus the fees of active management have maintained the interest of academic researchers. Dahlquist, Engström, and Söderling (2000) studied the characteristics and performance of Swedish fund industry. They found that Swedish equity funds, excluding funds in a public savings program, outperformed the market. The average alpha value was 0,5%. However, only 10 % of the individual funds had a statistically significant positive value of alpha. Dahlquist et al. argue that still the investment activities of the funds can be considered successful as the return figures were net of management fees.

Lhabitant (2001) argued that the Swiss equity market offered a potential environment for successful active portfolio managers. The ten largest companies by market capitalization accounted for about 70 % of the total market capitalization. The remaining medium and small capitalization shares were often neglected by analysts and thus offer opportunities for portfolio managers with superior information. Lhabitant used several measures of portfolio performance; among those were Jensen´s alpha and the market timing model of Henriksson and Merton. Lhabitant reported most alphas of the Jensen model to be negative with an average of -1,7 %. The timing coefficient of the Henriksson and Merton model was insignificant for most of the funds. However, four out of seven of the significant timing coefficients were positive. Conclusion of Lhabitant was that in spite of the potential market environment the Swiss equity funds were not able to offset the costs nor did they possess timing skills.

Christensen (2005) reports similar findings. The Danish equity funds during 1996–2003 exhibited negative Jensen´s alpha. In addition, the market timing models by Henriksson and Merton and by Treynor and Mazuy[6] showed no evidence of successful timing. However, Christensen´s data included only nine Danish equity funds, which can be considered a relatively small sample. Christensen does discuss the effect of survivorship bias but concludes that for his data set there is no effect or it is minor.

Stotz (2007) continues to report negative results of active fund management. His data included 129 active German equity funds. The study period was 1990–2005 and the funds had to have at least 24 months of data to be included in the study. He aggregated the performance of the funds by creating a portfolio of funds that included each of the funds with an equal share, and this portfolio was used in the calculations. The portfolio exhibited negative Jensen´s alpha. Stotz argued that the underperformance is partly due to the liquidity that is continuously offered to fund investors. On the other hand, the negative alpha does imply that portfolio managers were not successful in stock selection. Neither found Stotz any evidence that the funds would have pursued a market timing strategy or the funds were not successful in practicing it.

Majority of the studies seem to report negative risk adjusted returns for the funds. General conclusion of these studies is that active equity funds are not able to offset their management fees. Exceptions are the studies by Ippolito (1989) and Dahlquist et al. (2000) which report the opposite. As for market timing, there appears to be hardly any exceptions. All above mentioned studies have concluded that active funds possess no market timing ability. Noteworthy is that all the studies that measured market timing,

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[6] See Treynor and Mazuy (1966) for their model of market timing.

Chang and Lewellen (1984), Henriksson (1984), Lhabitant (2001), Christensen (2005) and Stotz (2007), used monthly return observations. This exposes them all to the error potential that was brought up by Goetzman et al. (2000). Market timing decisions might be done much more frequently than on a monthly basis.[7]

Bollen and Busse (2001) address to the problem and studied the effect of using more frequent data. The finding of Bolle and Busse was that funds exhibit more significant market timing ability when using a daily return series instead of a monthly series. They studied the timing abilities of 230 funds during the period of 1985–1995. Using the Henriksson and Merton method and *daily* observations, 38,2 % of the funds exhibited significant positive timing abilities. 18,4 % of the funds exhibited significant negative timing. With *monthly* observations, 25,6 % of the funds exhibited significant positive timing abilities and 3,5 % significant negative. For the data set of Bollen and Busse, funds exhibited positive timing abilities using both daily and monthly data. However, the difference in the amount of funds exhibiting significant positive timing is considerable. Bollen and Busse argue that the difference is statistically robust, and they conclude that daily observations should be used in order to gain accurate results.

3.3.2 Effect of stock market trend on fund performance

The effect of stock market trend on fund performance has gained little interest in academic studies, yet there might be reason to study it. For example, developments in behavioral finance have shown that investor´s actual behavior should not be considered independent of past market prices. Li (2004, 26–27) characterized bull and bear market phases to be far from similar. During a bull market “optimism prevails over the whole market --“ and “the true values of stocks are often overestimated”. During a bear market “-- pessimism invades the whole market. Survival instead of growth becomes the main purpose of firms and financial agents.”

Li (2004) studied the determinants of fund performance and whether they are affected by different market states. He found that the performance determinants differ considerably between bull and bear markets. In bull markets Li found strong short-term performance persistence but during bear markets the persistence vanishes completely. The finding of performance persistence in bull markets is in line with the overconfidence theory discussed in section 2.4.1. A positive relationship between fund risk and return was found in bear markets but in bull markets, interestingly, the relationship appeared to

[7] See section 2.3.3 for further discussion.

be the opposite. Li argued that this indicates a higher level of efficiency during the bear markets.

Li states that there are mixed findings on the relation between fund characteristics and fund returns. One reason for the different findings Li gives is that the market conditions may have not been taken into account adequately. It is quite reasonable that the trading and investment strategies selected by the asset manager might be more suitable to certain kinds of market conditions. According to Li, the effect of market state should be studied because of the differences.

Results of Wilcox (2003) question the effect of market state on fund performance. He studied the performance of mutual funds versus S&P 500 index during the period of 1993–2002. Ten largest mutual funds based on net asset value in 1992 were selected. He used Sharpe and Treynor[8] ratios and Jensen´s alpha as performance measures. In order to capture the effect of stock market trend, he divided the time period into two sub periods: bull market period of January 1997 to December 1999 and bear market period of January 2000 to December 2002. Wilcox found no statistically significant differences in the performance measures between the sub periods. Wilcox concluded that the funds´ performance relative to the market does not depend on the stock market trend.

Costa, Keith, and Porter (2006) studied the relationship of managerial experience and fund performance. Contrary to prior studies and a popular belief, their study did not support a positive relationship between managerial experience and fund´s risk-adjusted returns. The study defined risk-adjusted return as the excess return of the four factor model by Carhart (1997). Their results, however, indicated that stock market trend is a major factor in explaining fund´s risk-adjusted performance. During the period of the study, 1990–2001, funds exhibited positive risk-adjusted returns during bear market phases. During bull market phases the funds were reported to produce negative values of alpha. Costa et al. concluded that market trend should be considered more decisive on risk-adjusted returns than managerial experience. Their results suggested that active portfolio management performs better in bear markets.

The literature on the effect of stock market trend on active portfolio management is quite limited. In addition, the studies by Wilcox (2003) and Costa et al. (2006) seem to document contradictory results which gives reason for additional research.

[8] See Treynor (1965) for the Treynor ratio.

4 DATA AND METHODOLOGY

4.1 Selection of data

The Act on Common Funds in Finland was first enacted in 1987. This was relatively late in comparison for example with other developed European countries. Finnish mutual fund industry has been growing strongly since the 1990s. The size of the mutual fund industry reached one billion Euros in 1995. In the beginning of the period of this study, 2005, the industry had grown to 31,1 billion Euros. At the end of the period, 2011, the size was 55,4 billion Euros. (Rahastoraportti 1/2005, 1/2012.) As a comparison, the size of the Swedish mutual fund industry in the end of 2011 was 156,1 billion Euros (Fondbolagens förening 2012).

In 2010 Finnish households owned 37,4 % of all the fund assets. Rest of the assets was owned by corporations and foundations. 35,5 % of the funds invested in equities; 49,7 % in bonds and 12,4 % were balanced funds. Remaining 2,4 % were hedge funds. (Sijoitusrahastotutkimus 2010, 4.)

Finnish mutual fund industry is considerably clustered as 75 % of the assets are managed by five largest companies. In addition, four out of the five largest fund management companies are owned by regular banks. It seems that an important and effective way of marketing the funds are the branch networks of the banks. Korpela and Puttonen (2006) argue that an existing customer relationship is more important in fund marketing than for example expense ratio or investment activity of the fund.

This study focuses on funds that invest in the overall Finnish equity market. Funds that actively try to produce a higher return than the OMX Helsinki cap GI –index are selected. Investment policies published by the funds are used as selection criteria. Based on the investment policies, some limitations are made to get a homogeneous selection of funds that can be compared to each other. In order to find all potential funds, the Morningstar (2011) selection of Finnish equity funds was reviewed.

There are funds that specify their investment strategy in a more specific way, for example, some are focusing on value shares or growth shares and some funds try to enhance their performance by using derivatives. Funds that focus on value shares are included in the study. The definition for value investing most funds gave was somewhat the same: they pursue for buying a stock when it is cheap and for selling the share when it is expensive. This kind of definition does not create significant limitations that would distract results of the study. Instead, funds that only invest in small growth stocks are excluded because they do not invest in the overall Finnish equity market. Funds that state derivatives to be an essential part of their investment strategies are excluded as well. Part of the funds allowed investments also in foreign equities. Two such funds were included in the study because the magnitude of foreign investments was not considered distractive. The allowed percentages for ownership in foreign equities for the two funds were 5 % and 10 %. All the included funds comply with the UCITS directives. As a result 16 funds were selected to the study and they are listed in Table 1.

Table 1 Finnish equity funds included in the study (Morningstar 2011; websites of the mutual fund companies)

Fund:	ISIN-code:
Aktia Capital	FI0008801071
Alfred Berg Finland B	FI0008803564
Aventum HR Suomi	FI0008807334
Danske Arvo Finland Value	FI0008809876
Danske Invest Finland	FI0008806898
Danske Invest Suomi Osake	FI0008803101
Evli Select	FI0008800107
FIM Fenno	FI0008800339
Fondita Equity Spice	FI0008802855
Handelsbanken Suomi	FI0008800271
Nordea Pro Suomi kasvu	FI0008800362
Nordea Suomi Kasvu	FI0008800016
ODIN Finland	NO0008000163
OP-Delta	FI0008802293
OP-Suomi Arvo	FI0008800206
SEB Gyllenberg Finlandia	FI0008802558

This study will cover the time period from 1.1.2005 to 31.12.2011. The length of the period is thus seven years and should provide information on the performance of funds in a longer run. All the funds in this study recommend a several years´ investment in the fund. They all name a recommended minimum investment period in order to overcome risks inherent in short investments. The longest minimum investment period recommended by a fund was seven years. On the other hand, the funds also state that they aim for an above average return in the mid-long run or in the long run. The funds naturally give no explicit period of time during which they claim to beat the market. However, one can reasonably suppose that the recommended investment period should be a good measure whether the target has been reached.

The length of the period was not the only reason to choose 2005 to be the first year of data in this study. If we were to study merely long-run return, even further data might be justified, but this study is also interested in the effect of stock market trend. The couple of years before 2005 showed mixed market trend with shorter phases of bull and bear markets. At the turn of the year 2005, however, the start of a strong bull market became evident. From 2005 until present, there are two major stock market peaks taking place around June 2007 and April 2011. The peaks divide the whole period in four sub-periods: two bear markets and bull markets respectively. Figure 5 shows the total return graph for OMX Helsinki Cap GI -index during that period of time.

Figure 5 OMX Helsinki Cap GI -index from 1.1.2005 to 31.12.2011 (Nasdaq OMX Helsinki Oy)

For the purpose of trying to capture the effect of stock market trend on the funds´ performance, the time period will be divided into sub periods. The time period will be divided as follows:

- Bullmarkets: 1/2005–7/2007 and 3/2009–4/2011
- Bearmarkets: 7/2007–3/2009 and 4/2011–12/2011

The two time series of corresponding market trends will be put together. For the two bull market periods this means that the first time series of 1/05–7/07 will be followed by the time series of 3/09–4/11. The two bear market time series will be treated likewise. Thus two separate time series will be created: one for bull and one for bear market conditions. This allows the comparison of the different market conditions.

A benchmark and a concept of a market return are needed for the funds´ performance evaluation. Generally in financial studies the benchmark should be constructed of all possible investment targets, each with a market weighting. In this study the funds are allowed to invest only in Finnish equities so a general index representing the Finnish equity market will be used. The stock exchange OMX Helsinki offers two potential ones: OMX Helsinki benchmark CAP GI -index and OMX Helsinki CAP GI -index. Both indices have the market weight of a single equity limited to 10 % as do all the funds in the study. The choice between the two indices is not a decisive one as the correlation coefficient between them is as high as 0,995 for the time period of 22.8.2005–

31.12.2011. Only OMX Helsinki CAP GI -index, later referred to as OMXCap, is available for the whole period of this study so it is chosen.

Daily price data for the funds and the benchmark index was first collected and then transferred into weekly price data in order to get a continuous time series. Finally weekly returns were calculated for the purposes of the study. For the bull market period, the number of observations (n) is 238. For the bear market period, n = 126. For the whole period, n = 364. The number of observations for the bull market period is substantially larger than for the bear market period. This is natural in the way that historically bear markets are usually shorter in time than bull markets. The different amount of observations should not be a significant error potential for the comparison as the both periods do have a relatively large number of observations.

The three month Euro interbank offered rate (Euribor) will be used as a risk free rate for the study. In fund performance studies a three month rate is often used. For example, Edwards and Samant (2003, 53) used average yield on 90 day US treasury bills as the surrogate for risk free rate. Also the organization of Finnish mutual fund companies recommends the three month Euribor to be used as risk free rate when calculating risk key ratios. (Suomen sijoitusrahastoyhdistys ry 2005, 5.) All the time series data for the study – including the price data for the funds, index values for the benchmark index and the Euribor 3 month interest rates – was collected from the Bloomberg L.P. database.

4.2 Estimating the evaluation measures

This section will go through the statistical procedures to estimate the evaluation measures for the funds´ performance. Each measure will be calculated three times for each fund. The calculation will be done separately for the bull market period, for the bear market period and for the whole seven year period of the study.

4.2.1 Risk-adjusted performance

The risk-adjusted performance figures will be calculated in a similar way as Edwards and Samant (2003) did. A difference to the calculations by Edwards and Samant is that they had quarterly returns as their data. In this study weekly returns are used so the calculations are adjusted accordingly.

First mean returns are calculated for the funds by averaging the weekly returns. Arithmetic average is used. Mean excess return is calculated by subtracting risk free rate from the mean return. Risk free rate is the average of the three month Euribor during the period in question. In the mutual fund industry, it is a standard to present return as a geometric average (see e.g. Nordea 2012, OP 2012). Arithmetic average is always higher than geometric average, and they measure a different quantity. Arithmetic average assumes that the initial investment is held constant whereas geometric average assumes the initial investment to grow steadily. Both averages can be considered meaningful though. The calculations for the risk-adjusted return deviate from the industry standards, but the common practice for calculating Sharpe ratio is to use arithmetic average. In addition, using geometric averages would bring in needless complexity and difficulty of interpretation. (Modigliani & Modigliani 1997, 51–52.)

The Sharpe measure is calculated by dividing the mean excess return by the total risk, estimated as the standard deviation of the fund. The RAP measure is then calculated by multiplying the Sharpe measure by the standard deviation of the market portfolio added with the average risk free rate.

$$RAP_i = S_i \sigma_M + R_f = \frac{R_i - R_f}{\sigma_i} \sigma_M + R_f$$

As a result, weekly RAP measure is gained. In order to better enable comparison and make the figure more understandable, it is annualized and presented in percentage form. The RAP calculations are executed by using Excel spreadsheets.

4.2.2 Jensen´s alpha

Whether a fund can produce a positive alpha, is the question whether it returns more than the CAPM lets us expect. The estimation of alpha implies a time-series regression, where alpha is defined as the intercept term of the regression. Alpha will be estimated from regression model of the form:

$$ERF_t = \alpha_J + \beta \times ERM_t + \varepsilon_t,$$

where ERF_t is the fund´s return at time t in excess of the risk free rate. ERM_t is the market return at time t in excess of the risk free return. Statistically significant positive value of alpha implies portfolio manager´s ability to select stocks that outperform the market.

For the calculations of alpha, logarithmic returns of weekly observations are used. Log returns are defined as the natural logarithm of the simple return:

$$r^{log} = \ln(1 + R_t) = ln \frac{P_t}{P_{t-1}} = p_t - p_{t-1},$$

where R_t is the simple return, defined as:

$$R_t = \frac{P_t - P_{t-1}}{P_{t-1}}$$

and p_t is $\ln(P_t)$. Log returns are used because of easier statistical properties. (Tsay 2010, 3, 5.) Risk free return for week i is gained by:

$$r_f^{log} = \ln\left(1 + \frac{\text{Euribor3m}_\text{i}}{100}\right)/52$$

For example, the ERF, fund´s return in excess of the risk free return, is gained by:

$$ERF = r_{fund}^{log} - r_f^{log}$$

The data was collected as daily price observations and thus the use of daily return series would have been also possible. Scholes and Williams (1977, 310–314) describe a problem that is caused by non-synchronous trading and that skews regression estimates. The problem is especially severe with daily data. In order to avoid resulting complications, a weekly return series is used.

The regression will be run using ordinary least squares (OLS) method. However, the data used in the calculations is a time series data and therefore the consistency of the regression model is at risk due to potential serial correlation and heteroscedasticity. In order to maintain consistency the t-statistics are corrected with the method by Newey and West (Tsay 2010, 90–99.) Estimation will be run using the EViews-program. All reported alpha values will be annualized by multiplying the estimated alpha by 52.

4.2.3 Market timing

Market timing will be measured using the Henriksson-Merton model. The model will simultaneously measure stock selection as it also includes the alpha constant. Market timing measure is the γ-coefficient, gamma, of the regression:

$$ERF_t = \alpha + \beta \times ERM_t + \gamma \times Max(0, -ERM_t) + \varepsilon_t,$$

where ERF_t is the fund´s return at time t in excess of the risk free rate. ERM_t is the market return at time t in excess of the risk free return. Statistically significant positive value of gamma implies portfolio manager´s ability to forecast market movements. Statistically significant positive value of alpha implies portfolio manager´s security selection skills.

Log values of weekly returns are used. The t-statistics are corrected using the Newey and West method. All reported alpha values will be annualized by multiplying the estimated alpha by 52.

5 EMPIRICAL FINDINGS

5.1 Performance of the funds

Basic idea of the risk-adjusted performance by Modigliani and Modigliani (1997) is to adjust the risk level of a portfolio to that of a relevant benchmark portfolio, in this case OMXCap. As a result, a percentage figure of risk-adjusted performance is gained that can be compared between different portfolios and to the return of the benchmark portfolio. The unadjusted and risk-adjusted returns of the funds are shown in Table 2. A more detailed representation of the results can be found in Appendix 1.

In Table 2 the funds are ranked by the RAP measure, the risk-adjusted return. One can rather fast make the observation that the funds rank approximately similarly with or without risk-adjustment. For example, Fondita Equity Spice ranks first both ways and Aventum HR Suomi and Alfred Berg Finland rank second and third, only changing rank with each other if adjustment is done. The benchmark portfolio, OMXCap, ranks seventh without adjustment and eighth, when risk-adjustment is done.

Table 2 Annualized unadjusted and risk-adjusted mean returns 2005–2011

Mutual fund	Annualized risk-adjusted mean return	Risk-adjusted rank	Annualized unadjusted mean return	Unadjusted rank
Fondita Equity Spice	9,7 %	1	10,6 %	1
Aventum HR Suomi	9,3 %	2	9,3 %	3
Alfred Berg Finland	9,0 %	3	9,5 %	2
Aktia Capital	8,4 %	4	8,2 %	5
Handelsbanken Suomi	8,2 %	5	8,5 %	4
Nordea Pro Suomi kasvu	8,0 %	6	8,1 %	6
OMXCap	***7,8 %***	***7***	***7,8 %***	***8***
ODIN Finland	7,7 %	8	7,7 %	9
Danske Invest Finland	7,6 %	9	7,8 %	7
Evli Select	7,4 %	10	7,5 %	10
Danske Invest Suomi Osake	7,4 %	11	7,5 %	11
Nordea Suomi Kasvu	6,6 %	12	6,8 %	12
OP-Suomi Arvo	5,8 %	13	5,9 %	14
OP-Delta	5,8 %	14	6,0 %	13
FIM Fenno	5,0 %	15	5,4 %	15
SEB Gyllenberg Finlandia	4,5 %	16	4,7 %	16
Danske Arvo Finland Value	4,4 %	17	4,3 %	17

One can also notice that the return figures hardly change if they are risk-adjusted. The biggest change caused by the adjustment falls for the best returning fund Fondita

Equity Spice. Unadjusted it returns 10,6 %, but after risk-adjustment the return figure decreases to 9,7 %. The similarity of the unadjusted and risk-adjusted return figures implies that funds have maintained approximately the same risk level as the OMXCap. However, if this is the case, as a whole the funds in the study have not been very successful trying to produce return over the benchmark portfolio. Namely less than half the funds can beat the OMXCap-index. This result would support the efficient market hypothesis in the way that in average the funds are not able to beat their benchmark. The results are also in line with the early claims, for example, by Jensen (1968, 415) that funds in average lose by the amount of their management costs.

The choice of a fund, however, is far from meaningless. If the return figures, either unadjusted or risk-adjusted, are considered, it is noticeable that investing in one of the best performing funds would have given a return almost twice as high as investing in one of the weakest ones. Questionable is how the weakest performing funds have managed their investment decisions when even risk-adjustment does not lighten their performance.

Jensen´s alpha is the abnormal return of the CAPM. A positive value of alpha indicates outperformance relative to the CAPM and negative underperformance. By definition, the alpha value of a relevant market portfolio, in this case the OMXCap-index, is zero. Table 3 on page 50 presents the estimation results of Jensen´s alpha for 2005–2011. Eight funds are able to produce positive alpha values whereas eight produced negative values. The average alpha value remains negative. The results are very similar to those of the RAP measure; about half of the funds show outperformance while the other half underperforms. In addition, the four funds that have produced the highest alpha were also the four best performing funds according to the RAP. However, none of the alphas are statistically different from zero at the 5% significance level.

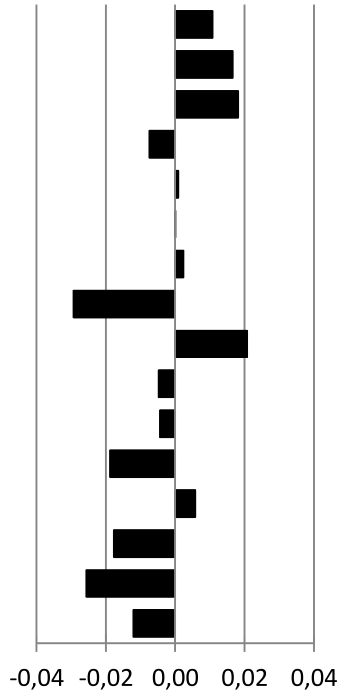
All the estimated betas are relatively low which would suggest a low market exposure for the funds. This can be partly explained by the cash position all funds are obliged to hold. It would be unrealistic to assume, though, that the cash position would explain the low betas fully. Not one of the betas exceeds one, which would equal the systematic risk of the market portfolio, as the highest beta is 0,883 for Fondita Equity Spice. More likely the low betas are related to the relatively low values of the coefficients of determination, R^2. The CAPM model is not able to explain all of the variation of the funds´ return. The low betas are in line with the findings of for example Stotz (2007, 59) but Stotz reports substantially higher values of R^2. This might indicate that the Finnish equity funds have deviated from the market portfolio´s composition and pursued an active strategy whereas the German equity funds have done more index mimicking.

Table 3 Estimation of Jensen´s alpha 2005–2011

Mutual fund	α	β	R^2
Aktia Capital	0,0108	0,7769*	0,6599
Alfred Berg Finland	0,0166	0,7577*	0,5044
Aventum HR Suomi	0,0181	0,8295*	0,7083
Danske Arvo Finland Value	-0,0074	0,7102*	0,6230
Danske Invest Finland	0,0009	0,8559*	0,6787
Danske Invest Suomi Osake	0,0001	0,8384*	0,6930
Evli Select	0,0024	0,7391*	0,5405
FIM Fenno	-0,0293	0,8672*	0,5682
Fondita Equity Spice	0,0207	0,8830*	0,6224
Handelsbanken Suomi	-0,0047	0,8603*	0,6839
Nordea Pro Suomi kasvu	-0,0044	0,8041*	0,6311
Nordea Suomi Kasvu	-0,0188	0,8089*	0,6121
ODIN Finland	0,0058	0,7064*	0,5022
OP-Delta	-0,0177	0,8569*	0,6508
OP-Suomi Arvo	-0,0256	0,8066*	0,6348
SEB Gyllenberg Finlandia	-0,0120	0,8657*	0,6891
Average	-0,0028		

**denotes significance at the 5 % level*

α-values illustrated



The average alpha value remains negative which is in line with most of the earlier studies; funds are unable to produce positive abnormal returns for investors. However, the value of alpha implies an annual underperformance of -0,28 %, which can be considered relatively low underperformance. Management costs of the funds in the end of 2011 averaged 1,6 % per year (Rahastoraportti 12/2011) and the return figures of the funds are *net* of management fees. If the return figures would be *gross* of management fees, the funds would have produced a positive average value of alpha. This implies that the funds actually are able to exploit active stock selection strategies. Due to the successful investments they are able to charge management fees and the investors of the funds have to settle for a slightly negative alpha. Ippolito (1989) concluded likewise. Funds are able to offset their expenses and the concept of efficient markets should be understood in the way that investment analysis is costly but offers higher return.

Market timing model by Henriksson and Merton measures whether the portfolio´s exposure on market portfolio is of different size during a rise and a fall of market prices. Estimation results of the model for the whole period are presented in Table 4. All except two of the market timing coefficients, the gammas, are positive. Strong conclusions can hardly be done as none of the values are statistically significant. The positive values do suggest that portfolio managers possess market timing skills. This contradicts all of the earlier studies[9], except for Bollen and Busse (2001) who reported positive market timing skills. Noteworthy is that only Bollen and Busse used daily return data and all the others used monthly return observations. They discussed the error potential if too rare observations are used and showed that more frequent data more likely brings out positive market timing. In this study weekly return data was used, which is substantially more frequent than monthly and according to the arguments of Bollen and Busse should thus offer more accurate results.

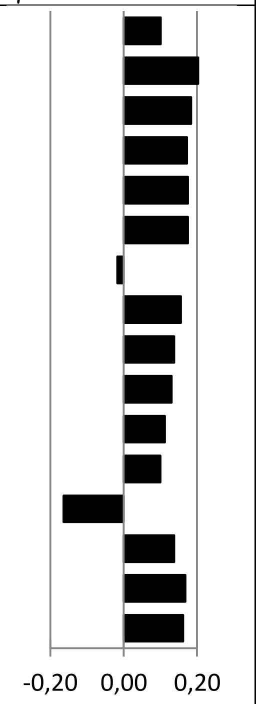
The beta coefficients are again relatively low because none of the betas exceeds one. Compared to the betas of the Jensen model, the betas are higher for all funds except for those two whose gamma value was negative.

Table 4 Estimation results of the Henriksson-Merton market timing model 2005–2011

Mutual fund	γ	α	β	R^2
Aktia Capital	0,1013	-0,05	0,84*	0,66
Alfred Berg Finland	0,2033	-0,11	0,88*	0,51
Aventum HR Suomi	0,1843	-0,10	0,94*	0,71
Danske Arvo Finland Value	0,1727	-0,12	0,81*	0,63
Danske Invest Finland	0,1758	-0,11	0,96*	0,68
Danske Invest Suomi Osake	0,1756	-0,11	0,94*	0,70
Evli Select	-0,0171	0,01	0,73*	0,54
FIM Fenno	0,1564	-0,13	0,96*	0,57
Fondita Equity Spice	0,1384	-0,07	0,97*	0,62
Handelsbanken Suomi	0,1315	-0,09	0,94*	0,69
Nordea Pro Suomi kasvu	0,1131	-0,08	0,87*	0,63
Nordea Suomi Kasvu	0,1003	-0,08	0,87*	0,61
ODIN Finland	-0,1638	0,11	0,61*	0,51
OP-Delta	0,1380	-0,11	0,94*	0,65
OP-Suomi Arvo	0,1688	-0,13	0,91*	0,64
SEB Gyllenberg Finlandia	0,1621	-0,12	0,96*	0,69

*denotes significance at the 5 % level

γ-values illustrated



The market timing model was used also in connection with the Jensen model in order to control possible biases that market timing or alteration of the beta coefficient might cause. The alpha values of Henriksson-Merton model are all negative except for those funds whose gamma value was negative. There is actually strong and significant negative relationship between the gamma-coefficient and the alpha value. This was observed

[9] See the reviewed studies in section 3.3.

by running an ordinary least-squares regression and regressing the gamma-coefficient on the alpha. The regression is illustrated in Figure 6.

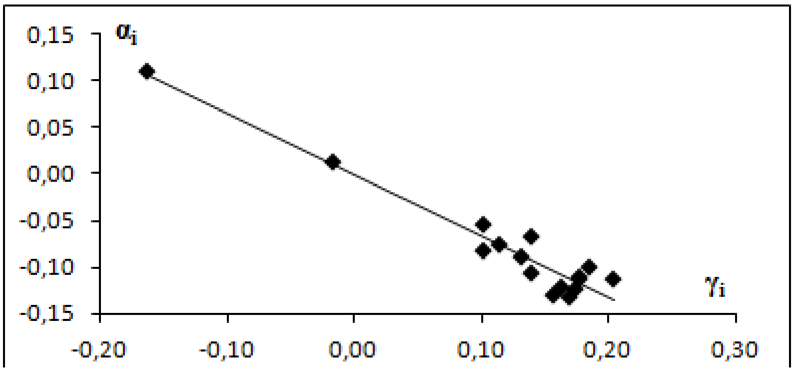


Figure 6 Gamma values vs. alpha values of the Henriksson-Merton model

Lhabitant (2001, 165) and also Henriksson (1984, 85–86) find a similar negative relationship between market timing and stock selection. Henriksson argues that a possible reason is misspecification of the market portfolio. The used market proxy, in this study the OMXCap, may not fully represent the characteristics of a true market portfolio. Other possible reason is that the model omits relevant factors relating to the return generating process. In the Henriksson-Merton model the fund return is assumed to depend only on the return of the market portfolio and on the changing levels of exposure on the market portfolio. Neither Henriksson nor Lhabitant find a definite solution or explanation for the negative relationship, and it remains a cause for concern.

5.2 The effect of market trend

Trends can be observed in the stock markets depending on the general direction of the prices. Bull and bear markets are different in their characteristics and this study is interested in if the market trend has an effect on the performance of portfolio management. In this section the effect of market trend is assessed by comparing the results of the performance measures separately for the constructed bull and bear market periods.

Calculation results of the RAP measure; the annualized risk-adjusted and unadjusted mean returns are presented in Table 5 and Table 6. Table 5 shows the results for the bull market period and Table 6 shows the results for the bear market period. The results of the bull market period are very different from the whole period. Unlike during the whole period, the risk-adjustment has changed the return figures for most of the funds clearly. For example, Fondita Equity Spice ranks first unadjusted with a mean return of 51,3 %. However, adjusting for risk the return figure decreases to 43,4 % and rank drops down to fourth. On the other hand ODIN Finland seems to have managed the rising market prices more successfully as it ranks sixth without adjustment but first after risk-adjustment.

Table 5 Annualized unadjusted and risk-adjusted mean returns of the bull market period

Mutual fund	Annualized risk-adjusted mean return	Risk-adjusted rank	Annualized un-adjusted mean return	Unadjusted rank
ODIN Finland	44,2 %	1	43,9 %	6
Aventum HR Suomi	43,6 %	2	45,7 %	2
OMXCap	***43,4 %***	***3***	***43,4 %***	***7***
Fondita Equity Spice	43,4 %	4	51,3 %	1
Aktia Capital	42,8 %	5	41,3 %	13
Evli Select	42,1 %	6	41,9 %	12
Handelsbanken Suomi	41,3 %	7	45,2 %	3
Nordea Pro Suomi kasvu	40,7 %	8	42,2 %	11
Alfred Berg Finland	39,3 %	9	43,2 %	8
Nordea Suomi Kasvu	38,9 %	10	40,4 %	14
SEB Gyllenberg Finlandia	38,6 %	11	44,3 %	4
Danske Invest Finland	38,4 %	12	43,1 %	9
Danske Invest Suomi Osake	38,3 %	13	42,2 %	10
OP-Suomi Arvo	37,8 %	14	38,9 %	16
FIM Fenno	37,0 %	15	44,2 %	5
Danske Arvo Finland Value	36,7 %	16	38,3 %	17
OP-Delta	36,2 %	17	39,3 %	15

Interesting is that OMXCap places seventh without risk-adjustment but third after adjustment. The unadjusted rank is in line with the results of the whole period – little over half of the funds lose against their benchmark. When risk-adjustment is considered, the funds are performing rather poorly as only two out of 16 funds can beat the benchmark. It seems that the fund managers are not able to fully take advantage of the rising markets. Only three of the funds have the adjusted return higher than the unadjusted, which certainly does not speak for active portfolio management during bull market. Most of the funds could have been beaten just by mimicking the OMXCap.

The results of the bear market period are similar to those of the bull market period in the way that risk-adjustment changes the return figures substantially for many of the funds. If we consider for example Danske Arvo Finland Value, it ranks first unadjusted with a mean return of -31,9 %. Risk-adjusted it returns -36,3 % and ranks as low as tenth. OP-Delta on the other hand ranks 11th unadjusted but third after adjustment. A difference to the results of the bull market period is that during bear market conditions the risk-adjustment increases the return for most of the funds. This is analogous with the observation that during the bear market period most of the funds are able to beat the benchmark. As a matter of fact, OMXCap is performing poorly independent of risk adjustment. It ranks 13th unadjusted and 14th risk-adjusted, which is a clear merit for the active portfolio management.

Table 6 Annualized unadjusted and risk-adjusted mean returns of the bear market period

Mutual fund	Annualized risk-adjusted mean return	Risk-adjusted rank	Annualized un-adjusted mean return	Unadjusted rank
Alfred Berg Finland	-31,9 %	1	-34,3 %	2
SEB Gyllenberg Finlandia	-34,2 %	2	-35,5 %	4
OP-Delta	-34,5 %	3	-37,0 %	11
Nordea Suomi Kasvu	-35,4 %	4	-36,6 %	7
Nordea Pro Suomi kasvu	-35,5 %	5	-35,8 %	5
Fondita Equity Spice	-35,8 %	6	-39,1 %	16
Evli Select	-35,8 %	7	-36,6 %	6
OP-Suomi Arvo	-36,2 %	8	-36,8 %	9
Aktia Capital	-36,2 %	9	-35,0 %	3
Danske Arvo Finland Value	-36,3 %	10	-31,9 %	1
Danske Invest Finland	-36,8 %	11	-37,1 %	12
Handelsbanken Suomi	-37,1 %	12	-37,7 %	14
FIM Fenno	-37,3 %	13	-42,0 %	17
OMXCap	***-37,4 %***	***14***	***-37,4 %***	***13***
Aventum HR Suomi	-37,8 %	15	-36,7 %	8
Danske Invest Suomi Osake	-37,9 %	16	-36,9 %	10
ODIN Finland	-37,9 %	17	-37,9 %	15

If we take a look at the risk-adjusted rankings for OMXCap, ODIN Finland and Aventum HR Suomi, we notice that during bull market period they rank at the top of the list. During the bear market period they rank quite the opposite – at the bottom of the list. If this was the case for the unadjusted return, possible explanation would be that the three portfolios have had an above average risk level. During the bull market period higher risk is rewarded with higher returns and the opposite applies for bear market. However, the funds were ranked according to their risk-adjusted return. In other words, the risk levels of the funds have been made even. Explanation for the adverse rankings should be found somewhere else.

There is a remarkable difference between the success of active portfolio management in bull and bear market conditions. The difference is especially high if the risk-adjusted return is considered, but it holds also with unadjusted returns. According to O´Toole and Steiny (2005) active portfolio management is not paying off during a bull market. Instead during a bear market, active portfolio management is a way to create extra return by taking advantage of the rapidly changing market prices. The results of the risk-adjusted return seem to support O´Toole`s and Steiny`s claims and they are in line with the findings of Costa et al. (2006). Grinblatt and Keloharju (2001, 66) found that the sophisticated investors in Finland pursue more often so called momentum strategies. This is contrary to the non-optimal investor behavior called the disposition effect. The sophisticated investors also showed higher performance in the study. Based on the RAP measure, it seems that during bear markets portfolio managers of the funds are better able to avoid the traps of the non-optimal behavior patterns and exploit investment opportunities.

From the point of view of efficient markets, this is especially interesting. The results can also be interpreted as showing a variance in market efficiency. During the bull market period a higher level of efficiency prevents the funds of performing better than the market. The bear markets on the other hand might be less efficient and thus offer the funds a chance to outperform the market portfolio.

Table 7 Estimation of Jensen´s alpha for the bull market period

Mutual fund	α	β	R^2
Aktia Capital	0,0611	0,7706*	0,6351
Alfred Berg Finland	0,0609	0,7998*	0,5482
Aventum HR Suomi	0,0660	0,8416*	0,6645
Danske Arvo Finland Value	0,0349	0,7511*	0,6101
Danske Invest Finland	0,0269	0,8995*	0,6630
Danske Invest Suomi Osake	0,0261	0,8856*	0,6662
Evli Select	0,0782	0,7267*	0,5335
FIM Fenno	0,0223	0,9294*	0,6265
Fondita Equity Spice	0,0935*	0,8610*	0,5592
Handelsbanken Suomi	0,0525	0,8685*	0,6490
Nordea Pro Suomi kasvu	0,0590	0,7894*	0,5922
Nordea Suomi Kasvu	0,0491	0,7811*	0,5758
ODIN Finland	0,1125*	0,6645*	0,4494
OP-Delta	0,0128	0,8642*	0,6519
OP-Suomi Arvo	0,0319	0,8015*	0,6208
SEB Gyllenberg Finlandia	0,0387	0,8559*	0,6578
Average	0,0443		

**denotes significance at the 5 % level*

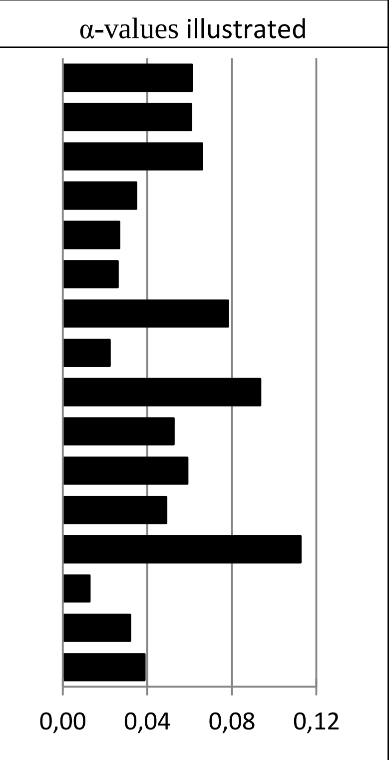


Table 7 presents the estimation results of Jensen´s alpha for the bull market period. First observation is that alpha is positive for all funds. Two largest values of alpha are also statistically significant and the average is considerable large, 4,4 % per annum. Alpha values indicate strong positive abnormal returns and suggest that in bull markets portfolio managers are able to choose the most successful companies. Difference to the results of the whole period is quite a notable one as only half of the funds were able to show positive alphas. Compared to the results of the RAP measure, the alpha values seem to indicate quite the opposite kind of performance during a bull market.

Table 8 Estimation of Jensen´s alpha for the bear market period

Mutual fund	α	β	R^2
Aktia Capital	-0,0868	0,7654*	0,6463
Alfred Berg Finland	-0,1166	0,7147*	0,4464
Aventum HR Suomi	-0,0925	0,8061*	0,7116
Danske Arvo Finland Value	-0,1134	0,6738*	0,6051
Danske Invest Finland	-0,0960	0,8176*	0,6643
Danske Invest Suomi Osake	-0,1005	0,7976*	0,6881
Evli Select	-0,1414	0,7239*	0,5093
FIM Fenno	-0,1977	0,8080*	0,5018
Fondita Equity Spice	-0,1077	0,8752*	0,6310
Handelsbanken Suomi	-0,1340	0,8367*	0,6804
Nordea Pro Suomi kasvu	-0,1237	0,7947*	0,6260
Nordea Suomi Kasvu	-0,1345	0,8072*	0,6042
ODIN Finland	-0,1725*	0,7018*	0,4939
OP-Delta	-0,0877	0,8423*	0,6240
OP-Suomi Arvo	-0,1422	0,7923*	0,6146
SEB Gyllenberg Finlandia	-0,0888	0,8592*	0,6835
Average	-0,1176		

**denotes significance at the 5 % level*

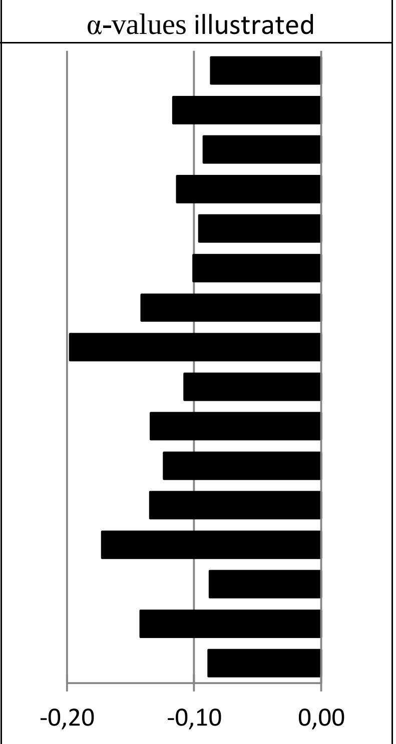


Table 8 presents the estimation results of Jensen´s alpha for the bear market period. The results differ again strongly from the results of the whole period and they differ even more from the results of the bull market period. Alpha values for all funds are negative, but only one of them is statistically significant. The results suggest quite poor performance for the portfolio managers. Actually the results are so poor that if they indeed would give a realistic description of the funds´ performance, the portfolio managers would be out of work in no time. The average value of the alphas suggests -11,8 % annual underperformance, which can be considered unrealistic and strong doubt has to be put on the reliability of the results.

Likely reasons for the large negative values are the relatively low values of the beta-coefficients. During bear markets the market portfolio exhibited strong negative return figures. The low values of the beta-coefficients would imply respectively lower negative return figures for the funds. However, the funds unadjusted mean returns were roughly the same size as the market portfolio´s as can be seen from Appendix 1. The beta-coefficients were low also for the whole period and for the bull market period. In all cases the beta-coefficients have been statistically significant. It is difficult to say why the lower beta-coefficients do not result in correspondingly lower return figures. In comparison with earlier studies[10] the R^2-values are substantially lower, which indicates that the model does not capture all the factors that affect the return generating process of the funds. It is possible that with the Finish data this has a stronger effect and might explain the contradictory beta and return figures.

Evident is that Jensen´s alpha is strongly dependent on the stock market trend. Difference between the average alpha values for bull and bear markets, 4,4 % and -11,7 %, is considerably large. The difference applies systematically for all funds. Question remains whether these figures can be used to evaluate the performance of portfolio managers when keeping in mind that the RAP measure implied opposite conclusions. Assuming that portfolio manager maintains his investment strategy and the costs of the fund unchanged in all market conditions, Jensen´s alpha should also remain unchanged in all market conditions. That applies if the assumptions of CAPM hold. If the investment strategy or the costs are changed, Jensen´s alpha might also change. The costs of the funds are kept constant independent of market trend. The results clearly show that Jensen´s alpha depends on market conditions, but do they show that portfolio managers change their strategy? Possible is that the difference in the alpha values indeed tells something about the changing success of active portfolio management. However, more likely is that the model is biased in a way that makes it very sensitive to the market trend.

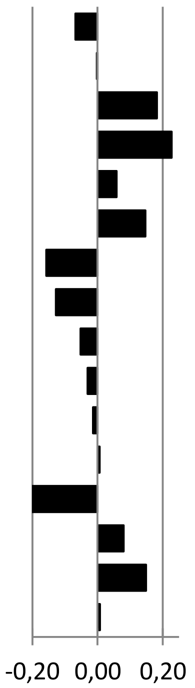
From this observation one can conclude that the studies that have used Jensen´s alpha as an evaluation criterion should be critically considered by the sample data period they have used. The relative shares of bull and bear market phases within the data period might have a determining effect on the results and following conclusions. As can be seen from the results of the whole period, the effects of bull and bear markets cancel each other out to some extent. Yet it remains questionable whether this makes the results more reliable.

Table 9 presents estimation results of the Henriksson-Merton market timing model for the bull market period. Half of the funds show a positive gamma value whereas the other half shows a negative value. None of the gammas is statistically significant. In comparison with the results of the whole period there are more negative gamma values. This would indicate that during bull markets the forecasting of market changes becomes more challenging. The beta values and the R^2-values are consistent with the other estimation results of market timing and also with the estimations of Jensen´s alpha. Five funds had a negative value of alpha whereas 11 funds had a positive value. The average

[10] See e.g. Stotz (2007, 59), Christensen (2005, 27), Dahlquist et al. (2000, 415)

alpha value was 4,8 %, which is roughly the same as the alpha of the Jensen model. Both models seem to suggest positive stock selection abilities during a bull market.

Table 9 Estimation of the Henriksson-Merton market timing model for the bull market period

Mutual fund	γ	α	β	R^2	γ-values illustrated
Aktia Capital	-0,0682	0,09	0,74*	0,64	
Alfred Berg Finland	-0,0025	0,06	0,80*	0,55	
Aventum HR Suomi	0,1818	-0,02	0,93*	0,67	
Danske Arvo Finland Value	0,2270	-0,08	0,86*	0,62	
Danske Invest Finland	0,0583	0,00	0,93*	0,66	
Danske Invest Suomi Osake	0,1474	-0,05	0,95*	0,67	
Evli Select	-0,1574	0,15	0,65*	0,54	
FIM Fenno	-0,1283	0,08	0,87*	0,63	
Fondita Equity Spice	-0,0519	0,12	0,84*	0,56	
Handelsbanken Suomi	-0,0306	0,07	0,85*	0,65	
Nordea Pro Suomi kasvu	-0,0144	0,07	0,78*	0,59	
Nordea Suomi Kasvu	0,0062	0,05	0,78*	0,58	
ODIN Finland	-0,3016	0,26*	0,52*	0,46	
OP-Delta	0,0800	-0,03	0,90*	0,65	
OP-Suomi Arvo	0,1494	-0,04	0,87*	0,62	
SEB Gyllenberg Finlandia	0,0075	0,03	0,86*	0,66	

**denotes significance at the 5 % level*

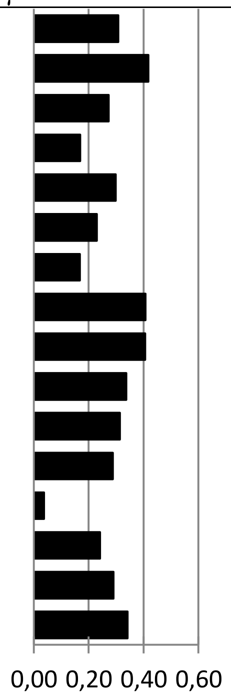
Table 10 presents the estimation results of the Henriksson-Merton model for the bear market period. All the gammas are positive but none of them is statistically significant. The gamma values suggest positive market timing skills like the results of the whole period did. For the bear market period the positive values are larger though. Noteworthy is that this time the beta values are about the size one might expect. The betas range from 0,73 to 1,14 which means that depending on the portfolio manager´s selected risk level the fund is either slightly riskier or less risky than market portfolio.

All the alpha values are negative during the bear market period, which was also the case for the whole period, except for two funds. Also the alphas of the Jensen model were all negative for the bear market period. The alphas of the Henriksson-Merton model and those of the Jensen model thus give similar conclusions on the stock selection skills both in bull and bear market conditions.

Portfolio managers seem to have been able to time the market better during a bear market. Considering the other measures, this is in line with the RAP that also indicated better performance during a bear market. The results do show that also the market timing coefficient is dependent on market trend. The difference between the gamma values for bull and bear markets is obvious. Strong conclusions based on the results are, however, problematic. The results of the Henriksson-Merton model suffer from similar kinds of shortcomings as the Jensen model results. The values of R^2 are low and it appears that there exists a trade-off between market timing and stock selection. The negative relationship between the gamma and alpha values that was found in the Henriksson-Merton model for the whole period persists also during both bull and bear market periods.

Table 10 Estimation of the Henriksson-Merton market timing model for the bear market period

Mutual fund	γ	α	β	R^2	γ-values illustrated
Aktia Capital	0,3086	-0,34	0,97*	0,66	
Alfred Berg Finland	0,4177	-0,45	0,99*	0,46	
Aventum HR Suomi	0,2734	-0,31	0,98*	0,72	
Danske Arvo Finland Value	0,1701	-0,25	0,78*	0,61	
Danske Invest Finland	0,2984	-0,34	1,01*	0,67	
Danske Invest Suomi Osake	0,2298	-0,29	0,95*	0,69	
Evli Select	0,1688	-0,28	0,83*	0,51	
FIM Fenno	0,4070	-0,53	1,07*	0,51	
Fondita Equity Spice	0,4067	-0,44	1,14*	0,64	
Handelsbanken Suomi	0,3375	-0,41	1,06*	0,69	
Nordea Pro Suomi kasvu	0,3142	-0,38	1,00*	0,64	
Nordea Suomi Kasvu	0,2889	-0,37	0,99*	0,61	
ODIN Finland	0,0375	-0,20	0,73*	0,49	
OP-Delta	0,2418	-0,28	1,00*	0,63	
OP-Suomi Arvo	0,2910	-0,38	0,98*	0,62	
SEB Gyllenberg Finlandia	0,3417	-0,37	1,08*	0,69	



*denotes significance at the 5 % level

5.3 Evaluation of the results

There are limitations that should be borne in mind when the results of the study and the drawn conclusions are considered. The data set of the study consisted of 16 Finnish equity funds. The amount of funds is relatively low and it limits the generalization of the results. The data set does cover the Finnish active funds relatively extensively, but wide generalizations on the performance of active portfolio management cannot be done. The small number of funds should, however, set the largest limitation. All the funds, that were included in the study, comply with the UCITS-directives. The UCITS are used within the whole EU, and all UCITS-funds should be comparable with each other. Regulation should thus not restrict the use of the results, but comparing with non-UCITS-funds should be done with caution. The Finnish equity market is classified as a developed market (see e.g. MSCI Developed Markets Index 2012), and the results should be applicable also in other developed markets.

The data set suffers of survivorship bias to some extent. The used list of funds excludes some funds that were either ceased or merged into another fund during the sample time period. Afterwards was conducted an evaluation of the amount of excluded funds based on Mutual Fund Reports (Rahastoraportti 12/2005–12/2011). The evaluation showed that the maximum number of funds, that would have been included with the conditions defined in the data section, is three. Due to the time lag more specific information about the ceased funds was not available. The effect of survivorship bias is that it overweighs the performance of the survived funds and the results are biased upwards. In this case, the amount of excluded funds is quite limited and the results should not be significantly biased. The results concerning the effect of market trend should be even less biased, because there is no reason to believe that the effect of market trend for the ceased funds would deviate from the survived funds.

The results of the RAP measure and Jensen´s alpha for the whole period were in line with earlier studies; they suggested that about half of the funds lost to the market portfolio. The results of the Henriksson-Merton model instead contradicted most of the earlier studies. The results of Jensen´s alpha and Henriksson-Merton model are flawed by the relatively low values of R^2. The results of the Henriksson-Merton model are additionally restricted by the negative relationship of the market timing coefficients and the alpha values. These restrictions of the results have to be considered when conclusions are drawn.

The results of all the used measures indicated considerable dependence on the market trend. The RAP measure showed that funds ranked relatively better in bear markets in comparison with the market portfolio. The alpha values of the Jensen model were substantially higher during the bull market; as a matter of fact, all the alphas were positive for the bull market period and all the alphas were negative for the bear market period. Market timing coefficients of the Henriksson-Merton model were higher during the bear market period for all funds except for one.

There are two possible alternatives for explaining the differences in the measures. Firstly, the differences might show that the performance of portfolio managers actually is dependent on market trend. In other words, portfolio managers are able to make more successful investment decisions either during a bull or a bear market. The second option is that the measures are biased in a way that makes them sensitive to the market trend. In this case conclusions on the effects of market condition can hardly be drawn.

The calculation results of the RAP measure for the bull and bear market periods showed that funds ranked substantially better during the bull market; only three funds out of sixteen lost to the market portfolio. The advantage of the RAP measure is its simplicity. If an investment is allocated into a fund and into the risk free return with the right proportions, a rate of return that equals the RAP measure is received. The best possible relationship of risk and return is achieved with the fund that ranks first according to RAP. Because of the simplicity also the reliability of the measure can be considered relatively high. The differences of the RAP values between the funds and between the different periods are realistic and plausible. In the results of the RAP measure there appears to be nothing contradictory or anything that would question the results. It can be concluded that RAP is unlikely biased and that the results suggest that portfolio managers are able to perform better during a bear market.

The estimation results of Jensen´s alpha showed quite a dramatic difference between the bull and bear market period; during the bull market all alphas are positive whereas during the bear market all alphas are negative. The estimation results for both periods are flawed by relatively low values of beta-coefficients and of R^2s. Both of these give reason to believe that the model does not capture all factors that are related with the funds´ expected return. This can be seen when the estimated alpha values are analyzed. The average alpha value for the bull market period was 4,4 % and for the bear market -11,8 %. As already discussed with the results, both of them are large and unrealistic. The results of Jensen´s alpha thus cannot be considered reliable. It seems that Jensen´s alpha is biased and therefore dependent on market trend.

The estimation results of the Henriksson-Merton model showed that during the bear market period all gammas were positive, but during the bull market period only half of the gammas were positive. The R^2-values of the estimation results were relatively low for both periods which reduces the explanatory power of the model. An additional shortcoming of the results is that there was a clear negative relationship between market timing and stock selection skills. This does not have to be automatically a flaw of the model; instead it could be also a description of reality. Market timing and stock selection might have the kind of characters that require choosing either one. However, since the trade-off was found statistically significant and present for all the periods, it is more likely that the trade-off is caused by the model itself. The Henriksson-Merton model was used also in order to control the biases that possible positive market timing would cause on Jensen´s model. The alpha values of Henriksson-Merton model indicated similar conclusions on stock selection as the alphas of the Jensen model. Because of the shortcomings of the model, the reliability of the results is not satisfactory. Like in the case of the Jensen model, it is concluded that the dependence on market trend is likely caused by biases of the model.

The estimation results of both the Jensen model and of the Henriksson-Merton model seem to be biased. Reasons for the biases can stem from the models themselves; the models may not fully capture all the relevant factors that are related to the expected return of a fund. Another possibility is the composition of the bull and bear market periods. Two bull periods and two bear periods were artificially put together in order to create one period for each market trend. This setting might be problematic from the point of view of the models. This is not, however, considered very likely as the beta-coefficients and the R^2 values did not deviate essentially from the results of the whole period. A possibility is that this is only due to the specific data set and period. Other studies that have used data from different market areas and for a different time period reported for example higher values of R^2.

6 SUMMARY

The performance of 16 Finnish equity funds was evaluated based on risk-adjusted performance by Modigliani and Modigliani (1997), excess return over CAPM by Jensen (1968) and market timing by Henriksson and Merton (1981). The study covered a seven year period of 2005–2011. In addition, two sub periods were constructed by joining together the bull market phases and the bear market phases of the whole period. This allowed for studying the effect of market trend on the performance of active portfolio management.

The possibilities of active portfolio management to create positive abnormal returns have been actively disputed. The results of this study were in line with the majority of earlier research as for the fact that little over half of the funds lost to their benchmark, the market portfolio. This conclusion was the same for the RAP measure and Jensen´s alpha; 10 out of 16 funds ranked below the market portfolio according to the RAP, and the average value of alpha was negative. These results support the view that active portfolio management is unable to deliver extra returns. On the other hand, the negative average value of alpha was substantially lower than the management costs in average. As Ippolito (1993) concludes, the investment analysis and information gathering are costly but offer a higher return. It seems that the portfolio managers of the funds are able to create extra returns to the amount that the business of selling actively managed investment funds is justified. The management costs offset the extra return and the investors of the funds have to settle for a slight underperformance. The choice of a fund is critical though, as there are substantial differences between the performances of the funds. The results are far from a clear investment advice as the finance literature shows mixed findings on performance persistence. One common finding in several studies[11] is, however, the persistence of underperformance and perhaps it can be applied in the results of this study as well.

Results of the Henriksson-Merton model suggested that portfolio managers possess market timing skills. This contradicted most of the earlier studies but may be due to the use of more frequent and thus more accurate data. The market timing was, however, statistically insignificant and a negative relationship was found between the market timing and stock selection.

The study revealed substantial market trend dependence. The estimation results for the bull and bear market periods deviated essentially for all of the used measures. As for Jensen´s alpha and the Henriksson-Merton model, the differences were striking despite the fact that few statistically significant alphas or market timing coefficients were

[11] See e.g. Hendricks, Jayendu, and Zeckhauser (1993) and Brown and Goetzmann (1995).

found. There were several factors indicating that the dependence was due to biases of the models and no reliable conclusions on the effect of market trend on the performance of active portfolio management could be drawn. As a consequence the findings of earlier research using these measures should be critically studied with respect to the sample data period. The relative shares of bull market phases and bear market phases might determine the results of the measures. The results of the RAP measure, instead, were found reliable and they suggested that funds are able to beat the market portfolio during bear markets but not during bull markets. Should this be the case, the results have interesting implications from the point of view of market efficiency. Testing whether funds are able to outperform the market portfolio is simultaneously a test of market efficiency. The results of the RAP measure suggest that the level of efficiency is not constant and that during a bear market there are inefficiencies or price distortions to be exploited.

It is clear that market state strongly affects the results of the used performance measures. However, only limited amount of reliable information about the actual effect on the performance of active portfolio management was gained. The RAP measure suggested that during bear markets active portfolio management can outperform the market. The general acceptance of efficient markets and the view that active management cannot create extra return is, however, strong. More research is needed to see whether these findings apply elsewhere and independent of time period. In addition to the RAP, more measures are needed to verify the conclusions. There are several extensions of CAPM that have been argued to explain returns better. Those could offer possible solutions to the problematic results of Jensen´s alpha and the Henriksson-Merton model.

REFERENCES

Act on Common Funds (Sijoitusrahastolaki) 48/1999.

Ahmed, Parvez – Lockwood, Larry J. (1998) Changes in factor betas and risk premiums over varying market conditions. *The Financial Review*, Vol. 33 (3), 149–168.

Banz, Rolf W. (1981) The relationship between return and market value of common stocks. *Journal of financial economics*, Vol 9 (1), 3–18.

Bloomberg L.P. database (2012)

Bodie, Zvi – Kane, Alex – Marcus, Alan J. (2009) *Investments* 8. ed. McGraw-Hill/Irwin, New York.

Bollen, Nicolas P.B. – Busse, Jeffrey A. (2001) On the timing ability of mutual fund managers. *The Journal of Finance*, Vol. 56 (3), 1075–1094.

Brown, Stephen J. – Goetzmann, William N. (1995) Performance persistence. *The Journal of Finance*, Vol. 50 (2), 679–698.

Carhart, Mark M. (1997) On persistence in mutual fund performance. *The Journal of Finance*, Vol. 52 (1), 57–82.

Chang, Eric C. – Lewellen, Wilbur G. (1984) Market timing and mutual fund investment performance. *Journal of Business*, Vol. 57 (1), 57–72.

Christensen, Michael (2005) *Danish mutual fund performance. Selectivity, market timing and persistence.* Aarhus school of business: Finance Research Group Working Paper No. F-2005-1, Aarhus.

Cooper, Michael J. – Gutierrez, Roberto C. – Hameed, Allaudeen (2004) Market states and momentum. *The Journal of Finance*, Vol. 59 (3), 1345–1365.

Cootner, Paul (1962) Stock prices: random vs. systematic changes. *Industrial Management Review*, Vol. 3 (2), 24–45.

Costa, Bruce A. – Keith, Jakob – Porter, Gary E. (2006) Mutual fund performance and changing market trends 1990-2001: Does manager experience matter? *Journal of Investing*, Vol. 15 (2), 79–86.

Cremers, K. J. Martijn – Petäjistö, Antti (2009) How active is your fund manager? A new measure that predicts performance. *The Review of financial studies*, Vol. 22 (9), 3329–3365.

Dahlquist, Magnus – Engström Stefan – Söderling, Paul (2000) Performance and characteristics of Swedish mutual funds. *Journal of financial and quantitative analysis*, Vol. 35 (3), 409–423.

Daniel, Kent – Hirshleifer, David – Subrahmanyam, Avanidhar (1998) Investor psychology and security market under- and overreactions. *The Journal of Finance*, Vol. 53 (6), 1839–1885.

Edwards, Ed – Samant, Ajay (2003) Investing with a conscience: an evaluation of the risk-adjusted performance of socially responsible mutual funds. *American Journal of Business*, Vol. 18 (1), 51–60.

Elton, Edwin J. – Gruber, Martin J. – Das, Sanjiv – Hlavka, Matthew (1993) Efficiency with costly information: a reinterpretation of evidence from managed portfolios. *The Review of financial studies*, Vol. 6 (1), 1–22.

European Commission (2012) Investment funds. <http://ec.europa.eu/internal_market/investment/index_en.htm>, retrieved 29.8.2012.

Fabozzi, Frank J. – Gupta, Francis – Markowitz, Harry M. (2002) The Legacy of modern portfolio theory. *Journal of Investing*, Vol. 11 (3) 7–23.

Fama, Eugene F. (1970) Efficient capital markets: a review of theory and empirical work. *The Journal of Finance*, Vol. 25 (2), 383–417.

Fama, Eugene F. (1972) Components of investment performance. *The Journal of Finance*, Vol. 27 (3), 551–567.

Fama, Eugene F. – French, Kenneth R. (1992) The cross-section of expected stock returns. *The Journal of Finance*, Vol 47 (2), 427 – 465.

Fama, Eugene F. – French, Kenneth R. (1993) Common risk factors in the returns on stocks and bonds. *Journal of financial economics*, Vol. 33 (1), 3–56.

Fama, Eugene F. – French, Kenneth R. (2004) The capital asset pricing model: theory and evidence. *Journal of economic perspectives*, Vol. 18 (3), 25–46.

Ferris, Stephen P. – Haugen, Robert A. – Makhija, Anil K. (1988) Predicting contemporary volume with historic volume at differential price levels: evidence supporting the disposition effect. *The Journal of Finance*, Vol. 43 (3), 677–699.

Fondbolagens förening (2012) Fondförmögenhet <http://fondbolagen.se/sv/Statistik--index/Fondformogenhet/>, retrieved 4.9.2012.

Fox, Steven M. (2002) Simulating skilled active management. *Journal of Asset Management*, Vol. 3 (1), 73–89.

Friend, Irwin – Blume, Marshall – Crockett, Jean (1970) *Mutual funds and other institutional investors: a new perspective*. McGraw-Hill, New York.

Goetzmann, William N. – Ingersoll, Jonathan – Ivkovic, Zoran (2000) Monthly measurement of daily timers. *Journal of financial and quantitative analysis*, Vol. 35 (3), 257–290.

Grinblatt, Mark – Keloharju, Matti (2001) What makes investors trade? *The Journal of Finance*, Vol. 56 (2), 589–616.

Grinblatt, Mark – Han, Bing (2005) Prospect theory, mental accounting, and momentum. *Journal of Financial Economics,* Vol. 78 (2), 311–339.

Grossman, Sanford J. (1976) On the efficiency of competitive stock markets where trades have diverse information. *The Journal of Finance*, Vol. 31 (2), 573–585.

Grossman, Sanford J. – Stiglitz, Joseph E. (1980) On the impossibility of informationally efficient markets. *The American Economic Review*, Vol. 70 (3), 393–408.

Hendricks, Darryll – Jayendu, Patel – Zeckhauser, Richard (1993) Hot hands in mutual funds: short-run persistence of relative performance, 1974–1988. *The Journal of Finance*, Vol. 48 (1), 93–130.

Henriksson, Roy D. – Merton, Robert C. (1981) On market timing and investment performance. II. Statistical procedures for evaluating forecasting skills. *Journal of Business*, Vol. 54 (4), 513–533.

Henriksson, Roy D. (1984) Market timing and mutual fund performance: an empirical investigation. *Journal of Business*, Vol. 57 (1), 73–96.

Hirshleifer, David – Subrahmanyam, Avanidhar – Titman, Sheridan (1994) Security analysis and trading patterns when some investors receive information before others. *The Journal of Finance*, Vol. 49 (5), 1665–1698.

Ippolito, Richard A. (1989) Efficiency with costly information: a study of mutual fund performance, 1965–1984. The Quarterly Journal of Economics, Vol. 104 (1), 1–23.

Ippolito, Richard A. (1993) On studies of mutual fund performance, 1962–1991. *Financial Analysts Journal*, Vol. 49 (1), 42–50.

Jegadeesh, Narashiman – Titman, Sheridan (1993) Returns to buying winners and selling losers. *The Journal of Finance*, Vol. 48 (1), 65–91.

Jensen, Michael C. (1968) The performance of mutual funds in the period 1945–1964. *The Journal of Finance,* Vol. 23 (2), 389–416.

Keel, Simon Theodor (2006) *Optimal portfolio construction and active portfolio management including alternative investments.* IMRT Press, c/o Measurement and Control Laboratory, ETH Zentrum ML, Zürich.

Kim, Kenneth A. – Nofsinger, John R. (2007) The behaviour of Japanese individual investors during bull and bear markets. *The Journal of Behavioral Finance*, Vol. 8 (3), 138–153.

Korpela, Mari – Puttonen, Vesa (2006) Mutual fund expenses: evidence on the effect of distribution channels. *Journal of financial services marketing*, Vol 11 (1), 17–29.

Kon, Stanley J. – Jen, Frank C. (1979) The investment performance of mutual funds: an empirical investigation of timing, selectivity, and market efficiency. *Journal of Business*, Vol. 52 (2), 263–289.

Lhabitant, Francois-Serge (2001) On Swiss timing and selectivity: in the quest of alpha. *Financial markets and portfolio management*, Vol. 15 (2), 154–172.

Li, Yaqiang (2004) *Essays in financial economics*. ProQuest Dissertations and Theses.

Lintner, John (1965) The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. *The Review of Economics and Statistics*, Vol. 47 (1), 13–37.

Malkiel, Burton G. (1995) Retruns from investing in equity mutual funds 1971 to 1991. *The Journal of Finance*, Vol. 50 (2), 549–572.

Markowitz, Harry (1952) Portfolio selection. *The Journal of Finance*, Vol. 7 (1), 77–91.

McQueen, Grant – Roley, V. Vance (1993) Stock prices, news, and business conditions. *The review of financial studies*, Vol. 6 (3), 683–707.

Merton, Robert C. (1973) An intertemporal capital asset pricing model. *Econometrica*, Vol. 41 (5), 867–887.

Modigliani, Franco – Modigliani, Leah (1997) Risk-adjusted performance. *Journal of portfolio management*, Vol. 23 (2), 45–54.

Morningstar (2011) funds by category: Finnish equities (in Finnish: "Suomi osakkeet") <http://www.morningstar.fi/fi/fundquickrank/default.aspx>, retrieved 20.10.2011.

Mossin, Jan (1966) Equilibrium in a capital asset market. *Econometrica*, Vol. 34 (4), 768–783.

MSCI Developed Markets Index (2012), MSCI Inc. <http://www.msci.com/products/indices/country_and_regional/dm/>, retrieved 12.11.2012

Nasdaq OMX Helsinki Oy, OMX Helsinki Cap GI -index, <http://www.nasdaqomxnordic.com/indeksit/>, retrieved 9.1.2012.

Nielsen, Frank – Fachinotti, Giacomo – Kang, Xiaowei (2011) Combining active and passive management. *Finweek* 17.3.2011 Supplement, 16–20.

Nordea (2012) <funds.nordea.com>

OP (2012) <https://www.op.fi/op/henkiloasiakkaat/saastot-ja-sijoitukset/kurssit-ja-markkinat/markkinat?valilehti=true&id=32403&srcpl=3>

O'Toole, Brian R. – Steiny, Richard E. (2005) Rain or Shine: Your ability to react to shifting market cycles will set you apart. *Financial Planning*, April 1, 109–110.

Perez-Quiros, Gabriel – Timmermann, Allan (2000) Firm size and cyclical variations in stock returns. *The Journal of Finance*, Vol. 55 (3), 1229–1262.

Rahastoraportti, 12/2005–12/2011 (a monthly report), Suomen sijoitustutkimus Oy. <http://www.sijoitustutkimus.fi/palvelut/instituutiosijoittajille/rahastoraportti/rahastoraporttiarkisto/>, retrieved 3.9.2012.

Roll, Richard (1977) A critique of the asset pricing theory´s tests. Part I: On past and potential testability of the theory. *Journal of financial economics*, Vol. 4 (2), 129–176.

Saajo, Veli-Pekka (2011) *Kohtuullinen tuottoaste ja kohtuullisen tuoton laskenta*, The Energy market authority (of Finland), a seminar presentation, presented 30.11.2011 and 8.12.2011. <http://www.energiamarkkinavirasto.fi/files/Veli-Pekka Saajo_Kohtuullinen tuottoaste.pdf>, retrieved 3.7.2012.

Scholes, Myron – Williams, Joseph (1977) Estimating betas from nonsynchronous data. *Journal of Financial Economics*, Vol.5 (3), 309–327.

Suomen Sijoitusrahastoyhdistys ry (2005) *Suositus eräiden tunnuslukujen säännöllisestä raportoinnista*. <http://www.fkl.fi/materiaalipankki/ohjeet/Dokumentit/Suositus_eraiden_tunnuslukujen_raportoinnista.dot>, retrieved 19.10.2011.

Sharpe, William F. (1964) Capital asset prices: a theory of market equilibrium under conditions of risk. *The Journal of Finance*, Vol. 19 (3), 425–442.

Sharpe, William F. (1966) Mutual fund performance. *The Journal of Business*, Vol. 39 (1), 119–138.

Sijoitusrahastotutkimus (2010) Finanssialan keskusliitto, Helsinki.

Sijoitusrahasto-opas (2012) Pörssisäätiö, Helsinki. <http://www.porssisaatio.fi/blog/books/sijoitusrahasto-opas/>, retrieved 29.8.2012.

Steiner, Peter – Uhlir, Helmut (2001) *Wertpapieranalyse*. 4. rev. ed. Physica-Verlag, Heidelberg.

Stotz, Olaf (2007) Selection, market timing and style timing of equity mutual funds – evidence from Germany. *Zeitschrift für Betriebswirtschaft*, Vol. 77 (1), 51–73.

Treynor, Jack L. (1965) How to rate management of investment funds. *Harvard business review*, Vol. 43 (1), 63–75.

Treynor, Jack L. – Mazuy, Kay K. (1966) Can mutual funds outguess the market. *Harvard business review*, Vol. 44 (4), 131–136.

Tsay, Ruey S. (2010) *Analysis of financial time series*. 3. ed. John Wiley & Sons, Inc., Hoboken, New Jersey.

Wilcox, Paul A. (2003) *Mutual fund performance against the S&P 500 Index in the most recent bull and bear markets (1997-2002).* ProQuest Dissertations and Theses.

Winfield, Carl – Fortune, Mark (2011) Active equity mandates hold despite criticism. *Money management letter* 10.1.2011, 3.

APPENDIX 1 CALCULATION RESULTS OF THE RISK-ADJUSTED PERFORMANCE

	1.1.2005 - 31.12.2011				The bull market period				The bear market period			
	Annualized mean return	Volatility (annualized st.deviation)	Sharpe ratio	Annualized risk-adjusted return	Annualized mean return	Volatility (annualized st.deviation)	Sharpe ratio	Annualized risk-adjusted return	Annualized mean return	Volatility (annualized st.deviation)	Sharpe ratio	Annualized risk-adjusted return
Aktia Capital	8,2 %	23,0 %	0,032	8,4 %	41,3 %	17,3 %	0,263	42,8 %	-35,0 %	30,0 %	-0,214	-36,2 %
Alfred Berg Finland	9,5 %	25,8 %	0,035	9,0 %	43,2 %	19,4 %	0,243	39,3 %	-34,3 %	33,9 %	-0,185	-31,9 %
Aventum HR Suomi	9,3 %	23,9 %	0,037	9,3 %	45,7 %	18,6 %	0,267	43,6 %	-36,7 %	30,2 %	-0,225	-37,8 %
Danske Arvo Finland Value	4,3 %	22,8 %	0,010	4,4 %	38,3 %	18,5 %	0,228	36,7 %	-31,9 %	26,9 %	-0,215	-36,3 %
Danske Invest Finland	7,8 %	25,1 %	0,028	7,6 %	43,1 %	19,8 %	0,238	38,4 %	-37,1 %	31,6 %	-0,218	-36,8 %
Danske Invest Suomi Osake	7,5 %	24,3 %	0,027	7,4 %	42,2 %	19,5 %	0,237	38,3 %	-36,9 %	30,3 %	-0,226	-37,9 %
Evli Select	7,5 %	24,2 %	0,027	7,4 %	41,9 %	17,7 %	0,258	42,1 %	-36,6 %	32,0 %	-0,211	-35,8 %
FIM Fenno	5,4 %	27,7 %	0,014	5,0 %	44,2 %	20,9 %	0,230	37,0 %	-42,0 %	36,0 %	-0,222	-37,3 %
Fondita Equity Spice	10,6 %	27,0 %	0,039	9,7 %	51,3 %	20,6 %	0,266	43,4 %	-39,1 %	34,7 %	-0,211	-35,8 %
Handelsbanken Suomi	8,5 %	25,0 %	0,031	8,2 %	45,2 %	19,3 %	0,255	41,3 %	-37,7 %	31,8 %	-0,220	-37,1 %
Nordea Pro Suomi kasvu	8,1 %	24,3 %	0,030	8,0 %	42,2 %	18,4 %	0,251	40,7 %	-35,8 %	31,5 %	-0,209	-35,5 %
Nordea Suomi Kasvu	6,8 %	24,8 %	0,022	6,6 %	40,4 %	18,4 %	0,241	38,9 %	-36,6 %	32,5 %	-0,208	-35,4 %
ODIN Finland	7,7 %	23,9 %	0,029	7,7 %	43,9 %	17,7 %	0,270	44,2 %	-37,9 %	31,2 %	-0,226	-37,9 %
OP-Delta	6,0 %	25,8 %	0,018	5,8 %	39,3 %	19,2 %	0,226	36,2 %	-37,0 %	33,9 %	-0,202	-34,5 %
OP-Suomi Arvo	5,9 %	24,4 %	0,018	5,8 %	38,9 %	18,3 %	0,234	37,8 %	-36,8 %	31,9 %	-0,214	-36,2 %
SEB Gyllenberg Finlandia	4,7 %	26,4 %	0,011	4,5 %	44,3 %	20,2 %	0,239	38,6 %	-35,5 %	32,6 %	-0,201	-34,2 %
OMXCap	7,8 %	23,9 %	0,029	7,8 %	43,4 %	17,8 %	0,266	43,4 %	-37,4 %	31,2 %	-0,222	-37,4 %
EURIBOR3M	2,6 %				2,0 %				3,5 %			

The table above presents the annualized mean return, volatility, Sharpe ratio, and annualized risk-adjusted return for the funds. Figures are calculated from weekly return data. The figures are presented for the whole period, for the bull period and for the bear market period respectively. Calculation procedures are shown in section 4.3.1. Volatility is gained by multiplying standard deviation of the weekly return data with the square root of 52 (the amount of weeks in a year).