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„Is active portfolio management able to achieve persistent outperformance?"

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Abstract

This diploma thesis investigates the persistency of active portfolio management. Persistency in the context of this thesis means that the performance of an active managed portfolio generates excess returns compared to a benchmark portfolio repeatedly. First, some basic concepts of capital markets theory are discussed, in particular the Efficient Market Hypothesis and the Capital Asset Pricing Model. An overview on the methods and tools used for measuring performance is also given. Next, the topic is treated on the basis of three aspects: the comparison of the performance of active and passive managed portfolios, the distinction between skill and luck causing performance and the possibility of repeated outperformance. For this purpose, a historical review on the major studies on performance of active portfolio management is conducted. The results from the studies covered in the thesis strongly indicate that performance persistence of active managed portfolios is not possible in the long run. Finally, the limitations of previous research are disclosed and suggestions for future research are given.

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1. Introduction

The concept of Active Portfolio Management, sometimes also referred to as Active Asset Management, is one of the most discussed and researched topics in the financial world over the last 50 years. Its importance can be explained by the fact that all players on the financial market, whether they believe in active management or not, are heavily influenced by it.

Ever since the formation of capital markets, investors wanted to outperform their competitors, the market. Still their approach was more of a try and error basis as any academic concepts or methods were lacking. Systematic research on this topic only began in the 1960s and 1970s with the development of the Efficient Market Hypothesis (EMH) by Eugene Fama and the Capital Asset Pricing Modell (CAPM) by – amongst others – William Sharpe.

Believers of an efficient market argue that it is impossible for active managers to beat the market in the long run and refer the debate to the findings of academic research that have come to the conclusion that overall active managers lack the necessary skills to consistently outperform the market.

Yet, if all of that is true, why do active portfolio managers still play a significant role in the worldwide business of asset management?
Moreover, as active portfolio management is considered to be amongst the highest paid jobs in the world, one would expect them to have a certain skill that is desired and sought after by society considering that one of the major principles of economics states that people only earn more than average when having a proficiency that is in high demand.
So maybe there are indeed plausible explanations for the demand in skilled active managers after all.

During the last decades numerous studies have dealt with the topic of active management and their focus can be separated in three different questions:

- Have active managers on average outperformed the market?
- Did those active managers outperform the market because of their skills or were the just lucky?
- Are active managers able to repeat their outperformance?

Although this diploma thesis will also cover the first two questions mentioned above, its focus lies on the last question, the search for persistence in performance in active management.

But before the answers to these questions will be explored later on, chapter two discusses some basic concepts of capital markets theory which are vital for the understanding of active management.

In chapter three the two basic styles of active management, security selection and market timing, will be explored in detail.

The next chapter will focus on the topics of performance analysis, in particular how active performance can be measured and attributed to the different styles.

Finally, by having a look at previous studies on active management, answers to the questions raised above will be delivered in chapter five.

In the end, it should be possible to determine whether active portfolio management can live up its promises and deliver the desired outcome of excess returns to investors continuously in the long run, thus giving an answer to the underlying question of this thesis: "Is active portfolio management able to achieve persistent outperformance?"

2. Foundations of Active Portfolio Management

At the first look it might seem odd to start a thesis on active portfolio management with theories on efficient markets, which in a strict sense rule out the possibility to outperform the market, so basically there would be no need to explore active portfolio management any further. However, as the world is not always just black and white, the concept of efficient capital markets is in practice not as explicit as the theory suggests so it is worth taking a look into it within the context of active management. In addition this chapter covers the Capital Asset Pricing Model and the Fundamental Law of Active Management, which was introduced by Grinold and Kahn, certainly the most high profile contribution in the development of active portfolio management theory.

2.1.   The Efficient Market Hypothesis

The efficiency of capital markets is not only one of the most controversial areas in investment research, but also has considerable real-world implications for portfolio managers and investors.

The Efficient Market Hypothesis was developed in 1970 by Eugene Fama in an attempt to formalise earlier empirical studies on market efficiency, which in turn were based on the random walk hypothesis. For Fama a market is efficient when prices always fully reflect available information.[1]

With other words:
"An efficient capital market is one in which security prices adjust rapidly to the arrival of new information and therefore, the current prices of securities reflect all information about the security."[2]

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[1] Fama (1970), p.383
[2] Reilly, Brown (2000), p.212

In his article in 1970 Fama also divided the general Efficient Market Hypothesis (EMH) and the empirical analysis of the hypothesis into three sub hypothesis depending on which degree of information is involved: the weak-form EMH, the semi strong-form EMH and the strong-form EMH.

The **weak-form hypothesis** states that current stock prices already reflect all information that can be derived from examining market-generated data, such as past prices, rates of return, trading volume, etc. If the data from the past would give reliable information about future prices and as past prices are publicly available all market participants would have the same knowledge, so no one would be better off than the others. Basically this hypothesis says that trend analysis is useless, because all investors would have learned to exploit future trends.

The **semi strong-form hypothesis** states that all information that is publicly available is reflected in the stock price. Public available information refers to fundamental data on a firm's products, management, balance sheet data, etc., in short information regarding the prospects of a company. All market information considered by the weak-form EMH is also taken into account, as this information is in any case available to the public. This hypothesis suggests that only investors who receive new information before it becomes common knowledge will produce above average returns, because once new information has become public, security prices will already reflect the news.

The **strong-form hypothesis** asserts that all information that is relevant to a firm is reflected in security prices, even such information that is only available to company insiders. This means that no investor or group of investors has any superior knowledge over others, so actually no one should be able to achieve above average performance. The view of this hypothesis is quite an extreme one; moreover it is doubtful that any company insiders would be able to gain access to information long enough before it is released to the wider public to exploit their advance when trading on the information.

In fact many countries have imposed regulations against insider trading to ensure that all market participants have access to the same information at the same time, thus trying to achieve the ideal of efficient markets.

Most of the early work on efficient capital markets was based on the random walk hypothesis, which states that changes in stock prices occur randomly. This means that the prices of a stock in a future period is the result of the price of the stock today plus a random error term:

$$p_{t+1} = p_t + \epsilon_{t+1}$$

where:

p_{t+1} = price of an asset at a future period t from today

p_t = price of an asset today

ϵ_{t+1} = random error term between today and future period t.

But which implications does the random walk hypothesis have on the theory of market efficiency?

If we assume that stock prices incorporate all available information, they only rise or fall, when new information becomes available. New information, by definition, has to be unpredictable, because if it could be predicted, it would already be incorporated in the information already known. Given that, stock prices that change because of new information available, must also move unpredictably, which is the core argument of the random walk hypothesis, namely that stock prices changes will be unpredictable and randomly. If, however, the movements of stock prices were predictable, the weak-form efficient market hypothesis would be contradicted, as this would mean, that not all available information was reflected in the stock prices, thus giving clear evidence of stock market inefficiency.[3] So with the use of the random walk hypothesis the weak-form efficient market hypothesis can be checked on its accuracy.

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[3] Bodie et al. (2005), p.371

Tests on the weak-form EMH were mostly looking for patterns in stock returns and the results of the majority of the studies supported the hypothesis.

Tests for the semi strong-form EMH either involved event studies, in which research asked whether investors could gain above-average returns when they traded on the basis of publicly available information or it was investigated whether there are opportunities to predict future returns. In either case, results for both methods were mixed. In general, studies that looked for the possibility to predict future rates of return on the basis of key figures such as P/E ratios, size, earnings and the BV/MV ratio did not support the hypothesis. However, the results from the event studies clearly are in support of the semi strong-form EMH.

Tests for the strong-form EMH concentrate on Value Line rankings and analysts' recommendations. Their results vary from time to time, but at the moment seem to be in favour of the EMH. Yet, tests for two special groups of investors (stock exchange specialists and corporate insiders) did not in support the strong-form EMH, as apparently both groups have a monopoly on important information and use it achieve above-average returns. Research on the performance of professional fund managers, which will be covered in more detail in chapter five, generally turned out to be in support of the strong-form EMH.[4]

2.2. The Capital Asset Pricing Model

The Capital Asset Pricing Model (CAPM) is based on the foundations of modern portfolio management by Markowitz and was later developed by amongst others Sharpe and is one of the models that have heavily influenced asset management, both in theory and practice.

The CAPM is a set of predictions concerning equilibrium expected returns on risky assets and determines consensus expected returns. It implies that the risk

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[4] Reilly, Brown (2000), p.246

premium on any asset or portfolio is the product of the risk premium on the market portfolio and the beta coefficient.

The most familiar expression of the CAPM is the so-called expected return-beta relationship:

$$E(R_i) = r_f + \beta_i \cdot [E(R_M) - r_f]$$

where:

$E(R_i)$ = expected return on an asset i

r_f = rate of return on a risk-free asset

β_i = slope term

$E(R_M)$ = expected return on the market portfolio.

The CAPM relates expected rates of return to risk and the expected risk premium on any asset is proportional to the expected risk premium on the market portfolio with beta as a proportionally constant.

It should be noted that under the CAPM investors are only compensated for taking necessary risks, but not for unnecessary ones.

Due to its characteristics, the CAPM is, however, impractical for the following reasons:

- as the theoretical market portfolio includes every risky asset, it is unobservable in practice
- expectations due to their nature are also unobservable.

While the CAPM is a good enough model in the theory, in practice it is empirically not observable. A useful alternative model was therefore developed with the market model that overcomes the obstacle of unobservable variables.

The underlying assumption of the market model is that the returns on a stock are directly related to the returns on a market index. The concept behind the market model states that the rate of return surprises on a stock is proportional

to the corresponding surprises on a market index[5] with a proportionally constant β.

This relationship is described with the following formula:

$$r_i - r_f = \beta_i \cdot [r_M - r_f] + \epsilon_i$$

where

r_i = rate of return on an asset

r_f = rate of return on a risk-free asset

β_i = slope term

r_M = rate of return on a market index

ϵ_i = random error term.

It should be noted, that the term on the left hand side of the equation represents the excess return that can be achieved.

The random error term (ϵ_i), also called residual, stands for the part of the security returns that cannot be explained by the market model. It can be seen as a random variable with a probability distribution where the mean is zero and a standard deviation of $\sigma_{\epsilon i}$.[6]

As beta gives the sensitivity of an asset's returns to the market index's returns, a beta greater than one means, that the asset's returns are more volatile than the returns of the market index and a beta less than one means, that the asset's returns are less volatile than the returns of the market index.

The equation of the market model as stated above can be expanded by the factor alpha, so that

$$r_i - r_f = \alpha_i + \beta_i \cdot [r_M - r_f] + \epsilon_i$$

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[5] Bodie et al. (2005), p.329
[6] Sharpe et al. (1999), p.181

where:

α_i = the difference between an asset's expected return and ist benchmark return.

If the alpha is systematically different from zero, the asset or portfolio fulfils the definition of active management.

Although the CAPM and the market model are similar, there are two major differences between them: first, the market model is a single-factor model with the market index as the only factor, and second, the market model uses a market index instead of a market portfolio unlike the CAPM.

2.3. The Fundamental Law of Active Management

The fundamental law of active management was originally introduced by Grinold in 1989 and later further developed by Grinold and Kahn. It relates the breadth and level of skill of a portfolio manager to his or her potential to produce risk-adjusted returns. [7]

The law is based on the two attributes of a strategy, skill and breadth. Breadth means the number of independent investment decisions that are made each year and skill is a measure for the quality of these decisions.

The fundamental law of active management connects breadth and skill to the information ratio, which is a measure of a manager's opportunities, through the formula[8]:

$$IR = IC \cdot \sqrt{BR}$$

Grinold and Kahn defined the parameters as follows:

- *"**BR** is the strategy's **breadth**. Breadth is defined as the number of independent forecasts of exceptional return we make per year.*

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[7] Grinold, Kahn (2011), p.18
[8] Grinold, Kahn (2000), p.148

- *IC is the manager's **information coefficient**. This measure of skill is the correlation of each forecast with the actual outcomes. We have assumed for convenience that IC is the same for all forecasts."[9]*

As with every model the fundamental law of active management is based on some assumptions, which do not quite hold in practice.

First, it is assumed that all forecast are independent from each other, because if the information sources are dependent, the overall level of skill will become lower.

Secondly, it is also assumed that every active bet has the same level of skill; however in reality managers will most likely have greater skill in one area over another.

The third and most important assumption states that a portfolio manager will always accurately appreciate the value of information he or she receives and thus build a portfolio which uses the information most optimal and efficiently. [10]

As Grinold and Kahn are eager to stress the fundamental law of active management was not designed as an operational tool, but to deliver insight into active management, which lessons can be drawn form it?

If – for example - one wants to increase one's information ration from 0.5 to 1.0, one has these options in order to achieve this goal: either by doubling the skill, by increasing the breadth by a factor of four or some combination of the previous options. Basically to be successful a portfolio manager needs to know the trade-offs between increasing the breadth of the strategy - by either covering more stocks or shortening the time horizons of the forecasts – and improving skill. As it is generally agreed on that the information ratio should be maximised by an active manager, the conclusion from the fundamental law of active management is that it is important to play often – resulting in a high BR – and to play well – causing high IC[11] - to win at the investment management game.

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[9] ibid.
[10] Grinold, Kahn (2000), p.157
[11] ibid.

One interesting feature of the fundamental law of active management is that is additive in the square information ratio as shown by the following formula[12]:

$$IR^2 = BR_1 \cdot IC_1^2 + BR_2 \cdot IC_2^2$$

where:

BR_1 = breath of asset or portfolio 1

BR_2 = breath of asset or portfolio 2

IC_1 = information coefficient of asset or portfolio 1

IC_2 = information coefficient of asset or portfolio 2

This means that the law of active management can be applied to two or more asset classes as well as to two or more portfolio managers, which is especially useful for investors who want to spread risk by investing in a fund of funds, although in this case we have to assume that the allocation across the portfolio managers is the optimum.

Despite being one of the most important contributions in the development of active portfolio management, the fundamental law of active management has a weak point: breadth. The major shortcoming with the definition used by Grinold and Kahn (2000) is that breadth is difficult to specify.

The law of active management per se describes an ex ante relationship. But while the realized IR and IC can be measured ex post, and therefore be examined as specific concepts ex ante as well, this does not apply to breadth, leading to disparity between the three terms of the equation. The problem with breadth is that the number of decisions per year is not equal to the number of portfolio holdings.[13]

In an attempt to provide more insight into breadth Grinold and Kahn (2011) refine their law in the context of a dynamic model.

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[12] Grinold, Kahn (2000), p.154
[13] Grinold, Kahn (2011), p.18

The model is based on three assumptions:

- *"The forecasting power of information decays exponentially at a known rate g. (…)*
- *The information process is in equilibrium so that old information decaying and new information arriving are in balance. (…) information arrives at the same rate g, which we call the information turnover rate.*
- *The portfolio manager understands the dynamic nature of the information process and uses that knowledge to make optimal asset return forecasts."*[14]

The new definition of breadth is given by the following equation, with g being the rate of information turnover and N assets[15]:

$$BR = g \cdot N$$

Given that the information coefficient (IC) depends on the effective skill level *k* and the information turnover rate g, the formula for the dynamic model of the fundamental law of active management states[16]:

$$IR = k \cdot \sqrt{g \cdot N}$$

The adapted formula is an attempt to better understand skill and breadth in the context of an equilibrium information process, where old information is replaced immediately by new information.

The most important finding from analysing the new concept is that when the information process is in equilibrium the rate at which information becomes out dated must equal the rate at which new information becomes available. This is called information turnover rate and can be measured for any investment

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[14] Grinold, Kahn (2011), p.19
[15] ibid.
[16] Ibid.

process. The other important step forward is that within the equilibrium dynamic model the previously vague definition of breadth is replaced by the quite specific definition of it being the number of assets times the information turnover rate.[17]

[17] Grinold, Kahn (2011), p.27

3. Active Portfolio Management Styles

Active portfolio managers do not believe that security markets are efficient and hence, do not act on that principle. They think that there are mispriced securities or groups of securities in the market from time to time. Put short, their forecasts and expectations of risk and return on securities differ from the general opinion in the market.[18]

A portfolio manager is only able to make three different decisions that are very likely to influence the returns and the performance of his portfolio into different directions, probably favourable for him, probably not. These are:

- Security selection, which means an active choice of a particular security within an asset class.
- Market timing, this is an active decision to over – or underweight a specific asset class in contrast to the "normal" (long–term) allocation.
- Investment policy, which is commonly referred to as "asset allocation"; unlike the two previous decisions this one is not optional. One has to have an asset allocation, whether knowingly or not.

A more detailed description of the different investment styles mentioned above is given in Figure 1 on the next page. It also shows how the different styles can be combined together and how they engage with each other, which will be explained in more detail in the next chapter "security selection".

Although asset allocation is an integral part of active portfolio management, this chapter will focus only on security selection and market timing as they are commonly referred to when talking about active portfolio management styles. Furthermore, the topic of asset allocation is so vast that it would exceed by far the extent of this thesis.

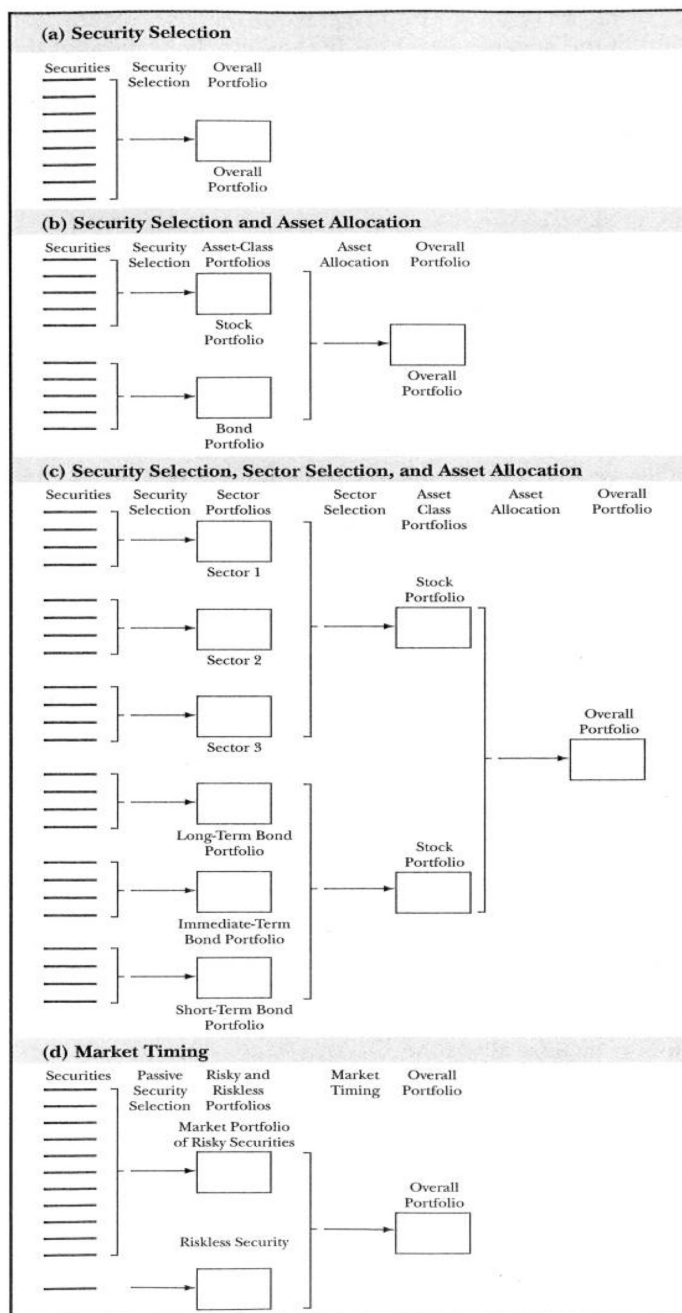[18] Sharpe et al. (1999), p.800

Figure 23.5
Investment Styles

Figure 1: Investment styles.

Source: Sharpe et al., Investments, 1999, p.802

3.1. Security Selection

In an ideal world before deciding where to invest an investment manager should make forecasts for all available securities concerning their expected returns,

standard deviations and co-variances between the securities. Afterwards an efficient set could be generated, which further in connection with the indifference curves of each client would allow the manager to invest exactly in those securities that build the optimal portfolio for the particular client.[19] This process could be seen as the most original form of security selection, because as was stated before security selection is the decision of how an asset class portfolio should be invested in each of the available securities making up the asset class.

However, in reality this has probably never been done by anyone, because although this selection would allow the manager to have the most detailed information available, it is simple not practicable as the costs for obtaining the information would be enormous and one also has to take the time constraint into account.

A more feasible approach of security selection is therefore to combine it with the process of asset allocation. Here, the manager first decides in which asset classes to invest in general. Then the parameters as mentioned before are calculated for all securities, which are to be considered in each asset class chosen before. Then the process is conducted like above. The important difference, however, is that the co-variances between the individual securities in each asset class are not taken into account when the optimal portfolio is constructed. This selection process is then described as myopic resulting in each asset class being an individual portfolio.

Afterwards the asset allocation process comes into use, which means that it is decided to invest the client's money into a certain number of asset class portfolios like the ones derived above. At this point however the manager needs to know the expected return and the standard deviation for the "portfolios" as well as the co-variances between them to allow him to choose the optimal combination of the "portfolios".

Furthermore the two – stage process of security selection and asset allocation can be extended by introducing groups or sectors within the asset classes. In

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[19] Sharpe et al. (1999), p.801

general the process is done similarly to the done described before. The major difference is that the investment manager goes further into detail by dividing each of the asset classes he has chosen before into different groups. Then he would calculate the relevant parameters for the securities within the groups, again resulting in the construction of different group "portfolios" and finally determining the appropriate combination of the groups within every asset class. The final portfolio for the client is than chosen with help of asset allocation as in the two – stage process.

Though the advantage of security selection on its own is certainly the in – depth information on every asset, the process of obtaining the information in the first place, let alone the thought that this would have to be repeated every time the client's portfolio is readjusted, makes it quite impracticable for use in real decision making outside the world of theory.

3.2. Market Timing

The only other option – besides security selection- an investment manager has to actively influence the performance of a portfolio is through market timing, which means the decision to over – or underweight certain asset classes compared to the long–run allocation. In a simple way this means, *"the only active decision concerns the appropriate allocation of funds between a surrogate market portfolio (usually consisting of either stocks or long–term bonds) and a risk free asset, such as Treasury bills."* [20] In other words, the manager changes the mix of risky and risk free assets based on forecasts concerning the expected return and the risk of "the market", i.e. usually the market portfolio, compared to the risk free rate, independently from the markets view. Reality is nonetheless more complex and complicated than that. Most commonly managers not only decided to change the weights of the risky and risk free assets within a portfolio, but over – or underweight the different asset classes of which the portfolio consist.

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[20] Sharpe et al. (1999), p.804

Perfect foresight on market timing can be seen as the equivalent of holding a call option on an equity portfolio. We know that a perfect market timer will always invest 100% in either the equity portfolio or the risk-free asset, depending on which of the two offers the higher return.

The rate of return for a perfect market timer is shown in Figure 2 by the constant black line, which looks exactly as the pay-off profile of a long call option.
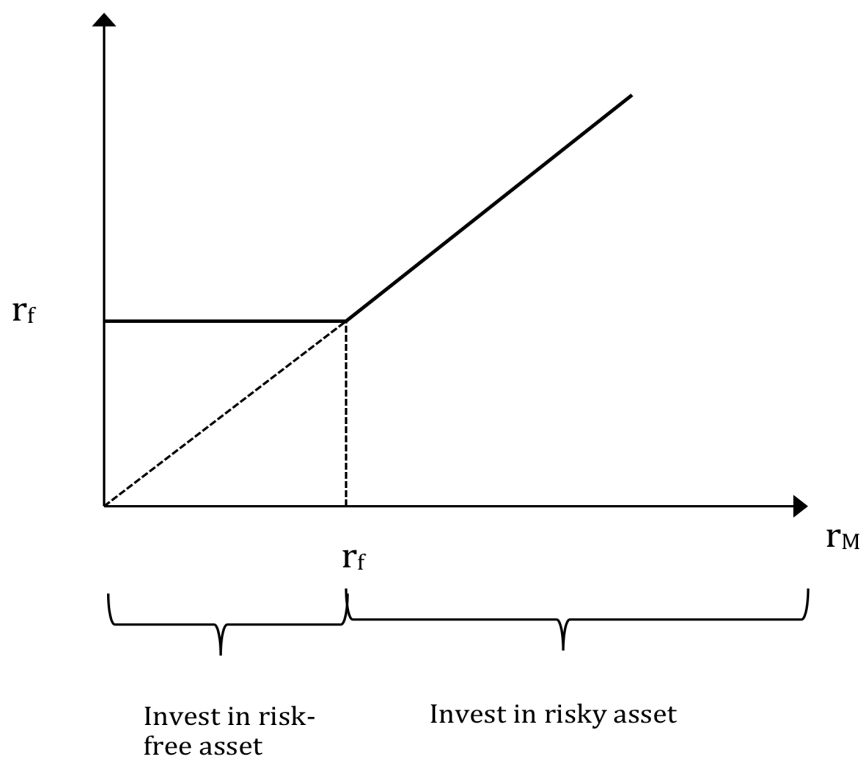
Figure 2: Rate of return of a perfect market timer.

Source: Bodie et al., Investments, 2005, p.987

To examine this phenomenon in more detail, we assume that the market index is at S_0 and there is a call option on the same index with an exercise price of X = $S_0(1+r_f)$. If the market outperforms the risk-free rate, S_T will exceed X, and vice versa if the market's performance is lower than the risk-free rate S_T will be less than X. So, if the market return is less than the risk-free rate, the perfect timer's portfolio will pay the risk-free return, as the value of the "call option" is zero. However, when the market beats the risk-free asset, the perfect timer gets the market return.[21]

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[21] Bodie et al. (2005), p.987

Hence, however the market will move, with the ability to predict whether to invest in risky assets or the risk-free rate at any given point in time, one will always at least generate the return from the risk-free rate.

4. Performance Analysis

The ultimate goal of performance analysis is to separate skilled portfolio managers from unskilled ones. For this purpose, a number of techniques were developed, which help an investor or portfolio manager gain insight, how well he or she really performed. But although performance measurement is an important part of successful active management, portfolio managers and investors are keener to know, which strategy used by the portfolio management is responsible for the performance of a portfolio.

This chapter gives an overview on the different ways on can use to measure performance as well as an introduction to performance attribution. Finally, it briefly describes the concept of style analysis.

4.1. Performance Measurement

Analysing portfolio returns is not a straightforward task, as it seems to be, as returns have to be adjusted for risk before they can be compared in a meaningful way. The easiest way to evaluate the performance of a certain portfolio is to pick portfolios with similar characteristics and rank them according to their performance, as this tells one how the portfolio in question has performed relative to its competitors. The biggest problem with these peer group comparisons though is that they do not take into account the risk taken by the portfolio manager. All in all, this is not a very sound methodology and results gained from it can be misleading.

A more sophisticated method of performance evaluation is to use a risk-adjusted performance measure based on mean-variance criteria. Today, the most used and well-known risk-adjusted performance measures are:

1. Treynor's measure
2. Sharpe's measure
3. Jensen's measure
4. Information ratio

They will be examined in more detail below. It should be noted, that for all measures the rate of return is defined as the average rate of return, not the expected rate of return.

Treynor was the first, who used a composite measure, which included a risk component while examining returns. He divided the risk into two factors: risk that is caused by market volatility and risk that is caused by the volatility from securities or the portfolio. Treynor's measure is based on the CAPM and it follows the idea that a risk-free asset combined with different portfolios creates a portfolio possibility line. In short, it compares portfolio performance to the security market line (SML). The slope of the portfolio possibility line is

$$T = \frac{(\bar{r}_p - \bar{r}_f)}{\beta_p}$$

where:

$\bar{r}_P$ = the average rate of return for a portfolio during a specified time period

$\bar{r}_f$ = the average rate of return on a risk-free asset during the same time period

β_P = the slope of the portfolio's characteristic line during that time period.

Treynor showed that risk-averse investors prefer larger slope portfolio possibility lines. While the numerator represents the risk premium for an investor, the β is a measure of risk the investor is prepared to take on. In short, Treynor's measure gives the excess return per unit of risk an investor gains and thus, risk-averse investors will want to maximize it.

The major shortcoming of Treynor's measure is its use of systematic risk instead of total risk, like the Sharpe ratio. Due to the disregard of unsystematic risk, it is advisable to use the measure only on well-diversified portfolios for which the influence of unsystematic risk can be neglected.

The risk measure invented by Sharpe is largely based on his work on the CAPM, in particular his theory on the capital market line (CML). Sharpe's

measure gives the total risk of a portfolio by including the standard deviation of the returns of the assets. As can be seen from the formula,

$$S = \frac{(\bar{r}_p - \bar{r}_f)}{\sigma_p}$$

where:

$\bar{r}_P$ = the average rate of return for a portfolio during a specified time period

$\bar{r}_f$ = the average rate of return on a risk-free asset during the same time period

σ_P = the standard deviation of the rate of return for a portfolio during the time period.

It shows the risk premium an investor earns per unit of total risk he or she takes on. The best portfolio is the one with the highest Sharpe ratio as it accounts for the highest risk-adjusted performance.

Sharpe's measure is more complex than the one from Treynor as it evaluates the influence of both, the rate of return achieved by a portfolio manager and the diversification used to accomplish the rate of return.

Although Sharpe and Treynor are quite similar in their approach of performance measurement, the major difference between the two is their view on risk. While both performance measures will produce the same results for completely diversified portfolios by delivering identical rankings of the portfolios in question, as the total variance of the diversified portfolio is its systematic variance, this does not apply for not that well diversified portfolios.[22] Given that the two performance measures will most likely offer differences in ranking portfolios according to their risk-adjusted performance, it is feasible to use them both.

The third alternative to measure performance by Jensen is also based on the CAPM and thus similar to the two methods discussed before. It is especially close to Treynor by equally including the systematic risk, represented by β.

Jensen's measure gives the alpha value of a portfolio, as can be seen from the formula:

$$\alpha_p = \bar{r}_p - [\bar{r}_f + \beta_p(\bar{r}_M - \bar{r}_f)]$$

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[22] Reilly, Brown (2000), p.1140

where:

$\bar{r}_P$ = the average rate of return for a portfolio during a specified time period

$\bar{r}_f$ = the average rate of return on a risk-free asset during the same time period

β_P = the systematic risk for a portfolio

$\bar{r}_M$ = the average rate of return for the market (benchmark) portfolio during the same time period.

The equation shows the rate of return during a given period of time as a linear function of the risk-free rate of return plus a risk premium is added. Jensen's measure tells how much of the rate of return achieved is attributable to a manager's skill to generate above-average risk-adjusted returns.

As it depends on the systematic risk, its use – like the Treynor measure – is only recommended for well-diversified portfolios. The other major disadvantage is that only a comparison to a market portfolio is possible, but not to different other portfolios, so one cannot rank portfolios with this measure.

Contrary to the others, the last performance measure, called information ratio or appraisal ratio, does not originate from the CAPM. It measures the excess average return of a portfolio compared to an accordant benchmark, mostly consisting of comparable portfolios, divided by the standard deviation of excess return, as the formula shows:

$$IR = \frac{\alpha_p}{\sigma(e_p)}$$

where:

α_P = the excess return for a portfolio over the benchmark portfolio during a specified time period

$\sigma(e_P)$ = the standard deviation of the excess return during the period.

While the numerator states a manager's ability to generate returns that are different from the benchmark, the denominator shows the unsystematic risk that occurs when looking for the excess returns. Often the information ratio is

interpreted as a benefit-to-cost-ratio. σ is sometimes also referred to a tracking error, which represents the costs of active management.

According to Grinold and Kahn the information ratio idealistically lies between 0.5 and 1.0, where an investor achieving 0.5 is considered to be very good and an information ratio of 1.0 is exceptional.[23]

As all four performance measures have their advantages and disadvantages, it is best to use at least two of them at the same time to measure a portfolio's performance, as the application of only one might not give an exact picture of the performance.

4.2.   Performance Attribution

As discussed in the previous chapter, a portfolio manager has two options to generate performance higher than the market, security selection or market timing. Hence, it is logical that he manager itself, but also any investor will want to know, to which strategy the performance can be attributed to.

With the help of attribution analysis, it is possible to determine, which factor (market timing and security selection) drives the overall performance of a portfolio.

The method compares a benchmark portfolio performance to the portfolio performance and decomposes the result into an allocation effect and a selection effect. The benchmark portfolio is called bogey (B)[24] and in mathematical term the effects are written as

$$\text{Allocation Effect} = \sum_{I} [(w_{Pi} - w_{Bi}) * r_{Bi}]$$
$$\text{Selection Effect} = \sum_{I} [(w_{Pi}) * (r_{Pi} - r_{Bi}]$$

where:

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[23] Grinold, Kahn (2000), p.118
[24] Bodie et al. (2005), p.881

w_{Bi}, w_{Pi} = the investment proportions given to the i-th market segment (e.g. asset class) in the benchmark portfolio and the manager's actual portfolio

r_{Bi}, r_{Pi} = the investment return to the i-th market segment in the benchmark portfolio and the manager's actual portfolio

The allocation effect is a measure for how successful a portfolio manager's decisions to over- or underweight a particular market segment were, on the basis of the segment's return relative to the benchmark return.

The selection effect is a measure for a manager's skill to select these market segments that produce higher returns than the corresponding segments of the benchmark, weighted by the size of the actual market segment within the portfolio.

In sum, the two factors describe the overall contribution of an asset class to the total portfolio performance.

Usually attribution studies decompose performance by starting with very broad asset allocation choices and then further narrowing it down to the security choices.

In practice, a performance attribution analysis might focus on three components: *"(1) broad asset market allocation choices across equity, fixed-income, and money markets; (2) industry (sector) choice within each market; and (3) security choice within each sector."*[25]

Brinson, Hood and Beebower (1986) addressed in their paper the question of how one could measure the performance contribution of the activities that are part of the investment management process, namely investment policy, security selection and market timing. However, the relative importance of those factors could only be measured with a relevant model, which attributes the returns to the factors. Based on historical investment data of US corporate pension plans,

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[25] Bodie et al. (2005), p.881

their goal was to establish, which investment decisions had the largest impact on the total return.

For this purpose they developed a simple, but powerful framework to analyse the portfolio returns, shown in Figure 3.

Table I A Simplified Framework for Return Accountability

	Selection	
	Actual	Passive
Timing — Actual	(IV) Actual Portfolio Return	(II) Policy and Timing Return
Timing — Passive	(III) Policy and Security Selection Return	(I) Policy Return (Passive Portfolio Benchmark)

Active Returns Due to:

Timing	II − I
Selection	III − I
Other	IV − III − II + I
Total	IV − I

Figure 3: Simplified Framework for Return Accountability

Source: Brinson et al., Determinants of Portfolio Performance, 1986, p.40

Quadrant I in this model stands for the policy which is a funds benchmark return, which is a consequence of the investment policy developed with a client. Quadrant II represents the return effects of policy and timing, whereas Quadrant III stands for the returns, which come from the policy and security selection. Finally, Quadrant IV gives the actual return of the portfolio as a

whole. It is the outcome of the actual segment returns and the segment weights.

Among the most striking findings was that on average active management costs an average portfolio 1.10% per year, although the results for individual portfolios varied greatly, ranging from – 4.17% up to + 3.99 %. Following their results they came to the conclusion that though active management is important, the bigger proportion of return comes from the investment policy. In other words, *"it is the normal asset class weights and the passive asset classes themselves that provide the bulk of return to a portfolio."*[26]

They also examined the relative amount of variance that was contributed to the total return of the portfolio by each quadrant. Of course the total performance explains itself 100%, but the surprising result was that the investment policy return explained almost 94% of the total return on average, whereas returns due to timing and policy as well as those coming from policy and security selection added only humbly (between two and four per cent). Those results altogether clearly show that that the total return of a portfolio is to a large extend dominated by the investment policy decisions, which is why an investor or manager should put a lot of emphasise on getting the right policy first, as neither security selection nor timing are able to correct possible losses that will occur due to having chosen the wrong investment policy in the first step.

However, in recent years other authors have challenged the approach and results that Brinson et al. found in their study, in particular Kritzmann and Page (2003) as well as in the paper of Kritzmann (2006). They state that it can be quite dangerous to draw any conclusion concerning the relative importance of security selection and asset allocation using the method of Brinson et al. They used a normative approach based on a bootstrap simulation to establish whether there is a hierarchy among asset allocation and security selection.

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[26] Brinson et al. (1986), pp.42

Their model is designed to split investor behaviour from investment opportunity. They therefore rather look for potential than realized portfolio returns. Generally, they conclude that security selection is the most important decision an investor can take, whereas asset allocation is the least important choice, so basically they turn the findings of Brinson et al. upside down.

4.3. Style Analysis

The concept of style analysis was first introduced by William Sharpe. The basic idea behind it was that asset allocation accounts for the majority of variability in portfolio returns. Sharpe used an asset class factor model that captures the portfolio style and hence provides a style-specific benchmark. The paper's approach was to regress fund returns on indices, with each index representing a number of asset classes. The regression coefficient on each index is used as a measure for the implication of the asset allocation on the styles. The regression coefficient has to be zero or a positive value in any case, as it is assumed that typically mutual funds cannot take short positions, and the sum of all regression coefficients has to be 100% as otherwise the asset allocation would be incomplete. The factor model uses 12 different asset class (style) portfolios and the returns on the asset classes are measured against publicly available, often used indices.

Using the monthly returns on the Fidelity Magellan Fund between 1985 and 1989, Sharpe's result showed that out of the 12 asset classes only four of them had a positive regression coefficient. He came to the conclusion that the returns of the fund thus could be explained by only those four asset classes (growth stocks, medium-cap stocks, small stocks and European stocks). Moreover, the four styles account for 97.3% of the total performance.[27]

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[27] Sharpe (1992), p.11

Sharpe's findings were further supported by a study by Brinson et al. (1991), in which the authors came to the conclusion that the different returns of the 82 funds used in their sample could by explained with 91.5% by their asset allocation.[28] Later research even suggested that as much as 97% of fund returns could be explained by the asset allocation of the funds.[29]

Style analysis as defined by Sharpe is also called return-based style analysis. It is an attempt to: *"explain the variability in the observed returns to a security portfolio in terms of the movements in the returns to a series of benchmark portfolios designed to capture the essence of a particular security characteristic."*[30]

In short, it determines the relationship between a portfolio and indices representing specific investment styles.

The goal of style analysis is to better understand what influences a portfolio's performance. It also allows classifying a portfolio's strategy when compared to other portfolios.

An alternative to Sharpe's model of style analysis is the use of a style grid as shown in Figure 4. Usually, with this model the performance of a portfolio is classified in two dimensions: value vs. growth factor and the firm size factor (small or large cap).

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[28] Brinson et al. (1991), p.54
[29] Bodie et al. (2005), p. 887
[30] Brown, Reilly (2000), p.913
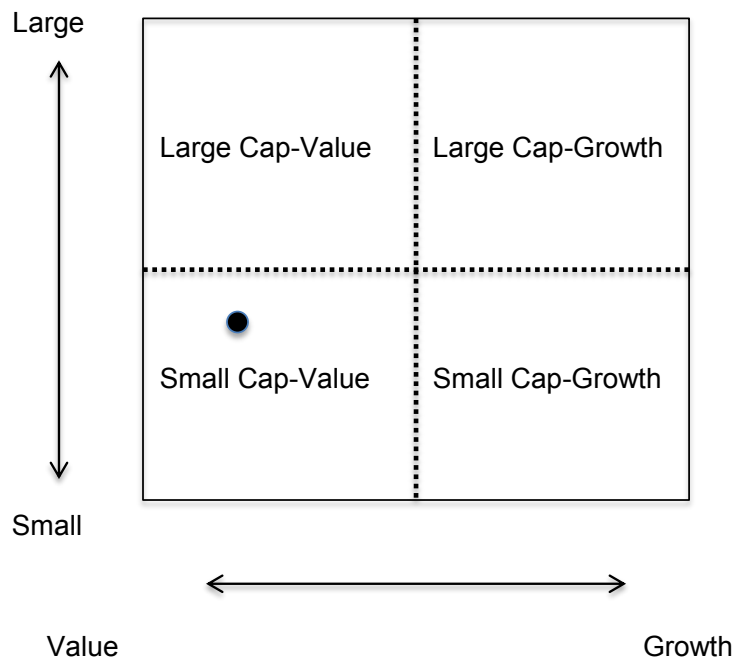
Figure 4: Example of a style grid.

Source: Fidelity Management and Research Company

For example, in the figure above the black dot in the left quadrant of the lower row represents a portfolio that produces returns that can be best reproduced by indexes representing a small-cap value style.

Though whichever method one uses for style analysis, it is important to pick the appropriate benchmark, as the used benchmark portfolio should be as consistent as possible with the style a portfolio applies, in order to obtain meaningful results from style analysis. Other criteria that should be considered when selecting a benchmark for a portfolio are:

- easy to measure
- realistic investment alternative to the active managed portfolio
- as uncorrelated as possible to other style indices[31]

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[31] Brown, Reilly (2000), p.916

Using these guidelines, in practice there are almost an unlimited number of benchmarks to choose from. The most common and widespread used approaches in creating a benchmark portfolio are the following:

Sharpe: uses portfolios of T-bills, intermediate-term government bonds, long-term government bonds, corporate bonds, mortgage-related securities, large-capitalization value stocks, large-capitalization growth stocks, medium capitalization stocks, small-capitalization stocks, non-US bonds, European stocks, Japanese stocks

Ibbotson Associates: uses portfolios based on five characteristics: cash, large capitalization growth, small-capitalization growth, large-capitalization value, small-capitalization value

BARRA: uses portfolios based on 13 characteristics: variability in markets, past firm success, firm size, trading activity, growth orientation, earnings-to-price ratio, book-to-price ratio, earnings variability, financial leverage, foreign income, labour intensity, yield, low capitalization[32]

Style analysis is not only a helpful tool to determine which type of investment behaviour a portfolio manager uses, but it also gives clues about whether the portfolio manager is able to keep the style consistent over time or whether the style changes – knowingly or not.

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[32] Brown, Reilly (2000), p.916

5. Active Management Performance: A Historical Review

For more than half a century now, numerous studies on active managers' performance have been conducted. At the very forefront of this research were the studies from Treynor (1965), Sharpe (1966) and Jensen (1986). Since then most studies have focused on the active-passive mutual fund discussion.

Over the years research on active management performance tried to find answers to the following questions:

- Have active managers on average outperformed the market?
- Did those active managers outperform the market because of their skills or were the just lucky?
- Are active managers able to repeat their outperformance?

Although the answers to these questions are very likely connected with each other, it is worth noting that even if previous research shows that active managers on average cannot beat the market, active management overall is impossible.

By looking at some studies out of the extensive academic research into the topic of active management performance, this chapter tries to answer the questions stated above.

But before we take a look at the comparison between active and passive management, we need to understand what is meant by this terms. The topic of active management and the strategies a portfolio manager can use have been discussed in detail in the previous chapter, so we will only examine the concept of passive management in this section.

With passive management, securities are held for relatively long periods with only small and infrequent changes. Portfolio managers who follow a passive strategy mainly act as if security markets are relatively efficient. In principle, two passive portfolio strategies exist, indexing or buy-and-hold approach.

As discussed in the chapter on market efficiency, lots of empirical studies have shown that the majority of managers are not able to match the risk-return performance of stock or bond indices. Thus, many investors prefer to index their portfolio, meaning the portfolio manager builds a portfolio that will exactly match a selected bond or stock market index. When analysing the performance, the manager is not judged on risk and return relative to an index, but how closely he or she can match the index by examining the tracking error, which measures the difference between the return of the portfolio and the return of the market index.[33]

The other option is to peruse a buy-and-hold strategy, which is actually the simplest portfolio strategy of all. It is used principally in bond portfolios and means that the portfolio manager picks bonds with certain features such as coupon levels, terms to maturity or durations which are based on the objectives and constraints of the client for which the portfolio is built, all the while it is its intention to hold the bonds until maturity.

5.1. The Active vs Passive Debate

Firm believers of efficient markets argue that it is impossible to outperform the market because according to the strong form of the efficient market hypothesis the market incorporates already all information available, thus no market participant has superior knowledge than the competitors. Yet, apparently some portfolio managers are able to produce better performance than others.

Among the principal papers that evaluated fund performance on a large scale are Jensen (1968), Grinblatt and Titman (1989) and Malkiel (1995)[34]. Their results are summarized in Table 1.

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[33] Reilly, Brown (2000), p.624
[34] Anderson, Ahmed (2005), p.13

Study	Sample period	Sample size	Benchmark	Annualized Alpha	T-Ratio
Jensen (1968)	1945-1964	115	S&P500	-1.10%	-0.69
Grinblatt and Titman (1989)	1974-1984	157	CRSP EW Index	-0.03%	-0.99
Malkiel (1995)	1971-1991	239	Wilshire 500	-0.93%	-1.78

Table 1: Mutual fund performance.

Source: Anderson, Ahmed, Mutual funds, 2005, p.14

As the table shows their results are consistent in showing that active managed funds do not outperform market benchmarks as the negative alphas state.

Jensen (1968) was the first paper that measured the absolute performance of mutual funds through the use of a model that statistically measured a fund's performance relative to a benchmark. His findings show that the funds on average earned 1.1% less than what one would have expected due to their level of systematic risk. He also looked at the statistical significance of alpha and found that only the performance of three funds was significantly positive at 5%, while 14 funds were negative at the 5% level. He drew the conclusion that the evidence points to the fact that funds' performance is little more than mere chance.[35]

Grinblatt and Titman (1989) shifted the focus of their research on the topic of survivorship bias and transaction costs and in contrast to previous studied they used both gross portfolio returns and actual returns when testing for abnormal returns. The most important findings of the study were that survivorship bias was about 0.5% annually and that transaction costs that were 2.5% annually are inversely connected to a fund's size. They also discovered that abnormal gross performance was inversely related to a fund's size and on average they did not discover any proof for actual returns to be positively abnormal.[36]

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[35] Jensen (1968), p.415
[36] Grinblatt, Titman (1989), p.394

In his study Malkiel (1995) examines performance, persistence of performance, survivorship bias and expenses of equity mutual funds by looking for signs that there were times in history when markets were not as efficient as they were suspected to be. By using the CAPM model to calculate the alpha of the funds, as a measure of excess performance he finds alpha to be -0.06% on average and that it differs insignificantly from zero. There is also no relationship between the total returns and the betas, meaning that investors who want higher returns will not achieve them by investing in high-beta mutual funds. In contrast to the findings of Grinblatt and Titman, in Malkiel's study the survivorship bias is distinctively higher with 15.69%; Malkiel attributes the difference in the results to the fund sample used by Grinblatt and Titman.[37]

Gruber (1996) was puzzled by the fact that actively managed mutual funds grew so fast, when earlier findings on their performance suggested that on average the performance of active managed funds was inferior to that of index funds.

Given these not so encouraging results about active management's performance, Gruber lists four reasons why investors might still choose to put their money in active managed mutual funds:[38]

- Customer service
- Low transaction costs
- Benefits from diversification
- Professional portfolio management

As the first three reasons are also provided by index funds, it is the argument of the fourth one that separates active from passive managed funds. However, considering that the most important reason for picking a portfolio manager certainly is its performance, active managed fund will only appeal to investors, if they can deliver excess returns.

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[37] Malkiel (1995), pp.554
[38] Gruber (1996), p.783

His sample consisted of 270 mutual funds and he used three ways to judge performance, returns relative to the market, risk adjusted returns from a single index model and risk-adjusted returns from a four index model.

As one can see from the results for the monthly average performance of an average mutual fund given in Table 3 in the appendix, mutual funds always underperformed the benchmark. When looking at the numbers in more detail we see in the first column that for unadjusted returns mutual funds underperformed the market by 0.16 per cent a month, which is by 1.94 per cent a year. For the single index model the risk adjusted returns (column two) are given as -0.13 per cent a month, in total -1.56 per cent a year. The results from the four-index model are slightly better, suggesting that mutual funds underperform the market by 0.054 basis points per month (column five), which is by 0.65 per cent a year.[39]

From these findings Gruber drew the conclusion – given that the expense ratio for his sample was on average 1.13 per cent and mutual funds underperformed a weighted average of indices by roughly 65 basis points per year – that although active management is likely to add value for the investor, mutual funds do charge an investor more than the added value.[40]

Although the majority of studies on mutual fund performance concluded that actively managed funds on average do not manage to outperform passively managed funds, active managed funds continue to be popular amongst investors. Based on this contradictory behaviour, Wermers (2000) asked whether mutual fund managers who actively trade stocks add value.

Wermers used a dataset that merged data from the CRSP database with data from CDA Investment Technologies in order to obtain a full record of each

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[39] Gruber (1996), p.787
[40] Gruber (1996), p.789

fund's key figures, including information on net assets under management, net returns, turnover ratio and expense ratio.[41]

Notable findings of the study include that trading activity within the funds had doubled from 1975 to 1994 and that growth funds were the most popular segment of all mutual funds. On average mutual funds stocks outperformed the market index by 130 basis points per year, although this is approximately the same amount as expenses and transaction costs combined. While the stocks within the funds on average managed to outperform corresponding benchmarks by 71 basis points per year, the average net return for the funds was 100 basis points lower than the CRSP index. Yet, when net returns were compared to the Vanguard 500 Index actively managed funds outperformed it.[42]

A popular claim by supporters of the concept of market efficiency is that it is impossible for active managed funds to outperform those which track an index passively over the long run and when adjusted for risk factors. Moreover the topic of what qualifies as a risk factor is a source of discussion within the academic environment. Still, studies of fund performance, especially by Carhart (1997) and Wermers (2000) agreed on that the alpha of an average mutual fund is negative when one adjusts the data for equity styles, which are known to be related to the cross-section of average equity returns, used by the fund.

The primary question in this debate is whether portfolio managers should be allowed to take the credit for investing in certain styles of stock such as value stocks or small-capitalization stocks, during long time periods when those styles accounted for high returns.[43]

Within active management, a topic of great interest to investors is whether excess fund return volatility is rewarded with higher average returns. One would expect that portfolios with a higher total volatility or with significant non-market volatility to outperform both, active managers with a smaller tracking error and those that simply follow an index.

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[41] Wermers (2000), p.1660
[42] Wermers (2000), p.1690
[43] Wermers (2003), p.1

Wermers (2003) addressed this question by examining the cross-sectional relation between returns and volatility of US mutual funds, especially looking at the trade-off between risk and reward that investors can expect from mutual funds. He looked at the issue *"whether the cross-sectional variation in U.S. mutual fund returns is driven by managers taking bigger portfolio bets when they have superior stockpicking skills, or whether this variation is simply a by-product of changing stock volatility or mandated investment constraints."[44]*

In the paper Wermers studies the relations between returns (both, average and S&P-adjusted ones) and risk as well as the relations between mutual fund alpha and risk. He also looked into the interactions of style-adjusted fund alpha and risk.

In general, the results show a positive correlation between the level of risk taken by mutual funds and their performance.

However, although the findings point to a significant positive correlation between risk and performance for the majority of time, there were some sub periods during which the higher risk fund did not always beat their less risky competitors. Wermers finally concludes that active management does indeed provide value for an investor, but that the value is only reflected in some funds that take high volatility bets. [45]

An interesting aspect in the debate on whether active managed funds are superior over index funds or not is the role of market cyclicality. Usually public opinion on whether an investor is better off with an active or passive managed fund depends on if at the moment the majority of actively managed funds outperformances the market or not.

However, as leadership of active or passive managed funds changes quite regularly, investors are often indecisive which alternative offers them the higher returns. Consequently, the question ensues why the leadership changes can be so dramatically?

Philips and Kinniry of the Vanguard Group explored this question in their research paper from 2009 titled "The Active-Passive Debate: Market Cyclicality

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[44] Wermers (2003), p.2
[45] Wermers (2003), p.3

and Leadership Volatility". They began by posing the question whether a time span of ten years already qualifies as a sufficient long-term investment horizon. As depicted in Figure 5 they looked at how active managers' net excess returns over the market benchmark were distributed. In the ten-year period ending with December 31, 1999, we see that only 31% of all managers outperformed the market.

However, when looking at the ten-year period ending with December 31, 2008, we discover that 69% of fund managers were able to outperform the market that is more than twice the number than in the first period. This drastic shift in the return distribution not only implies that a ten-year period is not long enough to be considered long term, but it also raises the question what caused the shift in performance leadership.[46]

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[46] Philips, Kinniry (2009), p.2

Distribution of active manager net excess returns versus market benchmark: Ten years ended December 31, 1999

Underperformed: 291 funds (69%)

← U.S. stock market return

Outperformed: 129 funds (31%)

Distribution of active manager net excess returns versus market benchmark: Ten years ended December 31, 2008

Underperformed: 427 funds (34%)

← U.S. stock market return

Outperformed: 833 funds (66%)

Source: Fund data were provided by Morningstar. The U.S. stock market is represented by the Dow Jones Wilshire 5000 Index.
Notes: We excluded sector funds, specialty funds, and real estate funds. We combined all share classes, using the class with the longest history.
For this comparison, we evaluated active funds after cost against a market benchmark that incurred no costs.

Figure 5: Performance leadership can shift over ten-year periods.

Source: Source: Philips, Kinniry, The Active-Passive Debate: Market Cyclicality and Leadership Volatility, 2009, p.2

When further examining the historic spreads between large- and small-capitalization stocks and between growth and value stocks, Philips and Kinniry noted that simultaneously to the change of funds delivering outperformance from the period ending 1999 to the period ending 2008, performance leadership shifted from growth to value stocks. As the bull market of large-cap-growth stocks of the 1990s ended, outperformance came from small-cap stocks and value stocks.

Philips and Kinniry further questioned whether the market environment was possibly having a bigger impact on the performance of a fund than the

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managers' skill. To evaluate the performance of active managers they divided the funds into segments according to the managers' strategies such as size and style.

It is assumed that an active manager following a style segment which outperforms any other segment and even the market itself, will more easily outperform the market as the outperformance of the style already accounts for a significant part of the manager's outperformance.

Ten years ended 1999				Ten years ended 2008			
	Value	**Blend**	**Growth**		**Value**	**Blend**	**Growth**
Large	5 15.60%	3 18.13%	1 20.31%	**Large**	6 1.60%	8 −1.20%	9 −4.17%
Mid	6 13.82%	4 15.92%	2 18.96%	**Mid**	2 5.70%	4 3.30%	7 −0.41%
Small	9 12.46%	8 13.40%	7 13.51%	**Small**	1 6.00%	3 4.73%	5 2.42%
		Market: 17.58%				Market: −0.61%	

Sources: MSCI indexes were created in 2003 and backfilled to 1992, so we used Russell indexes for the ten-year period ended December 31, 1999. For large-cap, we used the Russell 1000, Russell 1000 Growth, and Russell 1000 Value Indexes; for mid-cap, the Russell Midcap, Russell Midcap Growth, and Russell Midcap Value Indexes; for small-cap, the Russell 2000, Russell 2000 Growth, and Russell 2000 Value Indexes. For the ten-year period ended December 31, 2008, we used MSCI indexes. For large-cap, we used the MSCI US Prime Market 750, MSCI US Prime Market Growth, and MSCI US Prime Market Value Indexes; for mid-cap, the MSCI US Mid Cap 450, MSCI US Mid Cap Growth, and MSCI US Mid Cap Value Indexes; for small-cap, the MSCI US Small Cap 1750, MSCI US Small Cap Growth, and MSCI US Small Cap Value Indexes.
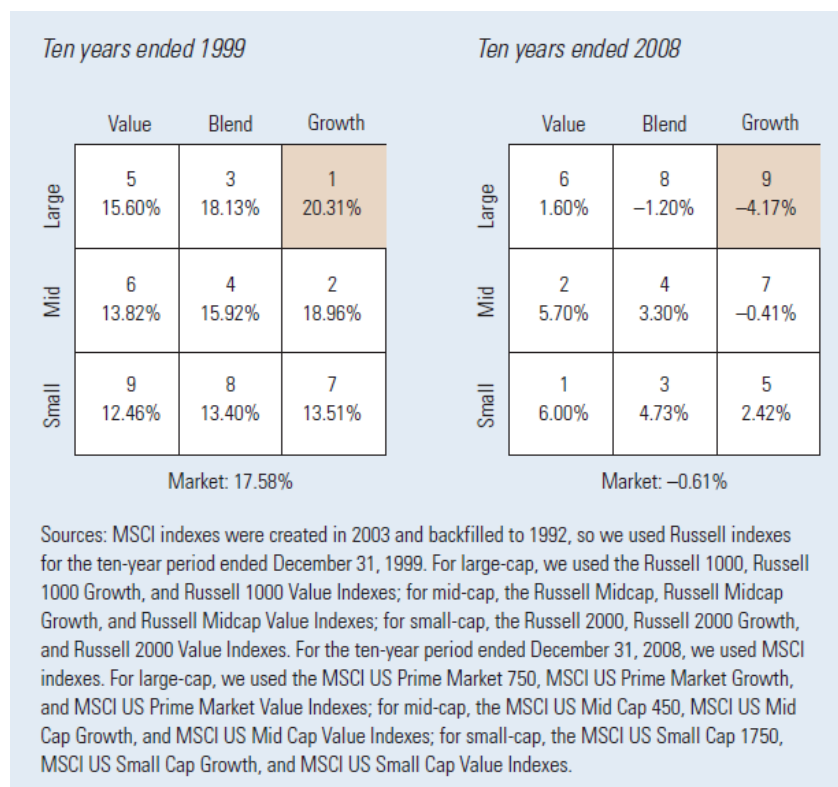
Figure 6: Relative ranking of style box total returns.

Source: Philips, Kinniry, The Active-Passive Debate: Market Cyclicality and Leadership Volatility, 2009, p.5

From the left box of Figure 6 we see that in the 1990s the performance of the large-cap growth segment by far exceed all other segments. Hence, the market itself outperformed most segments. That said, this scenario also means that the market is likely to outperform most active managers as it outperforms the segments in the first place.

By contrast, the right hand side of Figure 6 depicts a different picture of the situation in the period ending 2008. As large-cap growth style funds drastically underperformed every other style, value and small-cap funds benefited from the

fact that the poor performance of the large-cap growth segments reduced overall market returns in general.

In the end, the question for an investor whether to spend money on active management or indexing cannot be answered straight away. However, as we see from the analysis by Philips and Kinniry the difference in active managers' styles and the size characteristics of their portfolios explain a significant amount of out- or underperformance versus a benchmark. The analysis also showed that the volatility in the number of funds outperforming a benchmark is directly linked to the overall trends in the market.[47]

Consequently, investors should be aware of the differences in active management fund strategies when choosing an active managed fund as they tend to influence outperformance to a great extent.

Most studies about performance focus on equity funds. An exception is the research by Blake, Elton and Gruber (1993), which looked into the performance of mutual bond funds. Their results showed that bond funds on average underperform fixed-income indices by an amount equal to costs[48], which is consistent with the theory that bond managers operate in an efficient market.

Although the studies mentioned in this chapter only give a brief overview on the research concerning the debate whether active managed funds can and in fact do outperform the market, none of them delivers the final prove that active management does indeed provide an investor with higher returns than a benchmark. However, under certain circumstances, with certain management styles or in certain periods of time, active managed portfolios can generate higher returns than an indexing strategy.

5.2. Skill or Luck

Investing successfully is, like many things in life, a combination of skill and luck. However, for an investor it is important to be able to distinguish between the

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[47] Philips, Kinniry (2006), p.13
[48] Blake et al. (1993), p.402

two, as skill is a relative steady feature, while luck by definition is not, and when it come to the decision where to invest ones money, one does prefer an investment manager with skill, not one who has to rely on being lucky. The problem though is, when we just look at a manager's performance, we cannot tell which part was down to skill and which caused by luck, as they are not observable independently.

Although Volkman (1999) did not explicitly examine the relationship between skill and luck, he looked into fund managers' abilities concerning market-timing and security selection during the 1980s. For this purpose, he used a model, which comprised elements of Carhart's four-factor model (which will be explained in more detail in the next chapter on performance persistence) and the quadratic-timing-factor model from Bhattacharya and Pfleiderer. To measure abnormal fund performance, three methods are used: Jensen's alpha, Bhattacharya and Pfleiderer's selective measure and a time-adjusted model.

The main results from Volkman's research indicate a significant perverse timing ability of fund managers and there was no evidence for above average selectivity performance. The findings also showed a negative correlation between a fund's timing and selectivity performance, which suggests that fund managers focus – knowingly or not – on either style (market timing or security selection), while neglecting the other.

Within the study, the effect that three systematic factors (management compensation, size, desired risk exposure) have on a fund's performance was also tested. The existence or lack of incentives fees does neither influence timing performance nor selectivity performance. Although larger funds manage to generate higher returns through security selection, they do not differ from smaller funds concerning their timing abilities.[49] Generally, Volkman states that few funds managed to anticipate market movements during high volatility periods, but many funds actually outperform the market through security selection, which can be interpreted as managers' skills.

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[49] Volkman (1999), p.468

Most research on performance persistence is based on US mutual fund data, which makes the results from the paper by Cuthbertson et al. (2007) all the more interesting as their sample consists of UK equity mutual funds, although it is worth noting that earlier studies on UK mutual funds' performance gave similar results to the studies using US mutual fund data.

The data sample for the study contains open-end mutual funds in the UK during the period from 1975 to 2002, thus one would expect the data to be meaningful and less likely to be influenced by market cyclicality given the time span of almost 30 years. Rather than assessing the performance of portfolios of funds like many other research papers on this topic, the paper focuses on the ex-ante performance by individual funds.[50]

Contrary to earlier studies, which applied traditional statistical measures, the paper uses a new approach measuring performance: a cross-section bootstrap procedure. The findings by Cuthbertson et al. suggest that there is evidence of stock picking skill, but only for the small number of top-ranked mutual funds. Although the majority of funds show positive alphas, the results from the bootstrap analysis suggest - due to non-significance - that the positive alphas are caused rather by luck than skill. Yet, when analysing the results of the worst performing funds, the authors find strong evidence that negative abnormal performance is caused by insufficient skills, not bad luck. [51]

Besides testing the performance of funds for skill versus luck, the authors also briefly analyse the results for persistence. They find when ranking funds based on their past t-alphas no evidence of future "winner" funds, but instead that funds, which had been "losers" in the past will stay "losers"[52], which is in tune with the findings of Carhart (1997).

In short, it seems that although many funds deliver positive alphas, it is difficult to differentiate between the majority of funds, in which alpha is caused by luck from the handful of funds, in which the positive alpha is the result of a fund

[50] Cuthbertson et al. (2008), p.615
[51] Cuthbertson et al. (2008), p.621
[52] Cuthbertson et al. (2008), p.632

manager's ability ex-post. As a conclusion, the authors suggest that given their findings investors might be better of choosing index funds rather than active managed funds.

Barras et al. (2009) started their paper with the suggestion that the key to discover these funds that achieve persistent performance is to located these "skilled" funds in the estimated alpha distribution. However, as it is not possible to observe the alpha of every individual fund, the method use is usually to take into account just the funds that have a sufficiently high estimated alpha. The shortfall of this method though, is that for a large number of funds in question their true alpha is actually zero, thus the estimated alpha is only achieved by luck.

To avoid this bias, the authors developed a new method for measuring the skill of a portfolio manager. The goal of the "False Discovery Rate" method, as they called it, is to determine the number of funds within the overall active managed fund universe that have skill. To undermine their assumptions, they used Monte Carlo simulations to proof that the only input factor that is needed to measure accurately the proportions of skilled and unskilled funds, is the size of funds with a zero-alpha among the fund population using the p-values of estimated alphas for specific funds.[53]

The sample used in the paper consisted of more than 2000 actively managed US equity mutual funds that were available anytime between 1975 and 2006 and the main attempt of the study was to look into long-term performance, net of costs. The results showed that the overwhelming majority of funds (75.4%) had a zero-alpha, meaning that although the managers of these funds were able to generate positive returns through their stock picking skills, the fees ate up the returns. Only 0.6% of the funds were really skilled, while 24% turned out to be unskilled.[54] The results also showed that the number of skilled fund

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[53] Barras et al. (2009), p.2
[54] ibid.

managers had decreased significantly over the last 20 years incorporated in the study. While in 1990 14.4% of all funds were skilled and only 9.2% did not show characteristics of skill, the numbers were drastically reversed in 2006, with only 0.6% skilled portfolio managers, but 24% unskilled ones. Further analysis showed that this revealed that this was caused by an increasing number of funds, which charged high costs, but could not show any skill at the same time.[55]

All in all, the findings from Barras et al. show that not only the ability of managers to generate above average returns with active management has significantly decreased over the last decades, but also that there is less than one per cent of funds that has a positive alpha, thus showing true skill.

Fama and French (2010) started their research on luck versus skill with the concept of equilibrium accounting, a constraint on returns for active investment. Basically it means that when returns are measured before costs, passive investors will receive passive returns (a zero alpha relative to a passive benchmark). Thus, active management is also supposed to have an aggregated α before costs. So, if some active investors manage to achieve a positive α before costs, it has to be at the expense of other active investors.

When it comes to distinguishing skill from luck, previous studies often tested for persistence in fund returns to prove that past winners managed to repeat their success, thus obviously the portfolio manager in question must be skilled. Yet, test for performance persistence have shortfalls, as they rank funds on their short-term past performance, there is probably little evidence of persistence in the samples because the allocation into winners and losers is likely to be based on noise.

Fama and French use a different approach, they bootstrap simulations of return histories of individual fund returns to separate superior fund from inferior ones. In detail, they compare cross-sections of fund alpha estimates to the results

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[55] Barras et al. (2009), p.26

from the bootstrap simulations, but for the simulations the alpha is set to zero. From the comparison of alpha estimates, it should be possible to draw conclusions about the existence of skilled managers.[56]

Results show that for the sample funds from 1984 to 2006, aggregated realized net returns underperformed the CAPM as well as the three-factor and four-factor benchmarks used by Fama and French by roughly the same as the costs. The authors concluded if there were fund managers who are actually skilled enough to benchmark-adjusted expected returns, which are bigger than the costs, they are hidden in the aggregate results, because of the poor performance of those managers who lack the necessary skills.

To gain further insight, they also tested individual funds by comparing the distribution of alpha estimates from actual fund returns with the returns from the bootstrap simulations for which all fund's alpha was set to zero. Again, the results showed that few funds managed to have enough skill to cover the costs. However, when testing for gross fund returns - before costs -, Fama and French found stronger evidence for manager skills, although it was both positive and negative.[57]

Considering all the research on the topic whether active managers outperform the market through luck or skill, it seems that they majority of them just got lucky. Often, when a fund managed to achieve a positive alpha before costs, after the costs and fees are subtracted, the funds are left with a zero-alpha. Another interesting fact is the diminishing number of skilled managers over the years, because this makes it even harder for an investor to identify those few funds with a skilled manager amongst an ever growing number of active managed funds.

[56] Fama, French (2010), p.1916
[57] Fama, Franch (2010), pp.1941

5.3. Performance Persistence through Active Portfolio Management

Persistence in performance is an important aspect of asset management, both from practical and economic view. From an investor's point of view, performance is a helpful tool in picking these portfolio managers that offer above average returns. From the economic perspective, if future returns can be predicted from prior-period performance, this represents a major challenge of the theory on market efficiency.

As we have established in the previous chapters, there is no conclusive evidence that active portfolio management does outperform the market and even if it does, it is more likely that the active managers did not beat the market due to their skills but because they just got lucky.
Still, if we allow the possibility that there actually might be some managers who do have the ability to outperform others, are these managers able to show their skills again and again or is it just a one-off event?

There have been a number of papers that have addressed the topic of persistence of performance over the last decades. The first major paper on the topic was by Hendricks, Patel and Zeckhauser (1993), who found some evidence of persistence. The findings of some major studies on the persistence of performance are summarized in Table 2.

Study	Sample period	Sample size		Successive Period Performance	
				Winners	Losers
Goetzmann and Ibbotson (1994)	1976-1988	728	Winners	62%	38%
Brown and Goetzmann (1995)	1976-1988	2274	Losers	37%	63%
			Winners	57%	44%
Malkiel (1995)	1971-1991	1047	Losers	44%	56%
			Winners	65%	35%
Kahn and Rudd (1995)	1983-1993	150	Losers	35%	65%
			Winners	41%	59%
			Losers	59%	41%

Table 2: Do winners repeat?

Source: Anderson, Ahmed, Mutual funds, 2005, p.15

Goetzmann and Ibbotson (1994) ask in their work whether past performance can be used to predict future relative performance. From their data they found support for the hypothesis that winners are able to repeat their win in successive periods.[58]

Brown and Goetzmann (1995) built on the research from Grinblatt and Titman as well as from Hendricks, Patel and Zeckhauser that a fund manager's track record gives information about the future performance.

Their analysis of fund data showed that 1.304 past winners were repeat winners, 1.237 past losers were repeat losers and 1.936 funds changed either way. Thus, the majority of funds had persistent performance.

When further looking into the topic of why funds managed to reverse roles – from winner to loser or vice versa – Brown and Goetzmann discovered to possible explanations. First, persistence is correlated across fund managers, so it is likely that persistence is caused by a common strategy, which is not captured by risk adjustment procedures or standard stylistic categories. Secondly, not all underperforming funds are automatically eliminated from the market; though it is very likely they will disappear or merge with others. Hence,

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[58] Goetzmann, Ibbotson (1994), p.17

patterns of relative persistence are biased because of their inclusion in the samples.[59]

Given these results, persistence of performance is a useful tool for investors to know which funds to seek out and which ones to avoid.

However, they also found that persistence is not the outcome of a winning management style each year. In a bid to gain further insight into performance persistence, they redefined a winner as a fund, which beats an absolute benchmark, not a relative one. For this purpose they choose the S&P 500 as benchmark.

The results showed that absolute repeat-winners and absolute repeat-losers followed closely the patterns of relative repeat winners and losers. As can be seen from Figure 7 though, over the second half of the sample repeat-losers dominate by large. When the results are aggregated, it becomes clear that performance persistence is more likely caused by repeat-losers than by repeat-winners.[60]
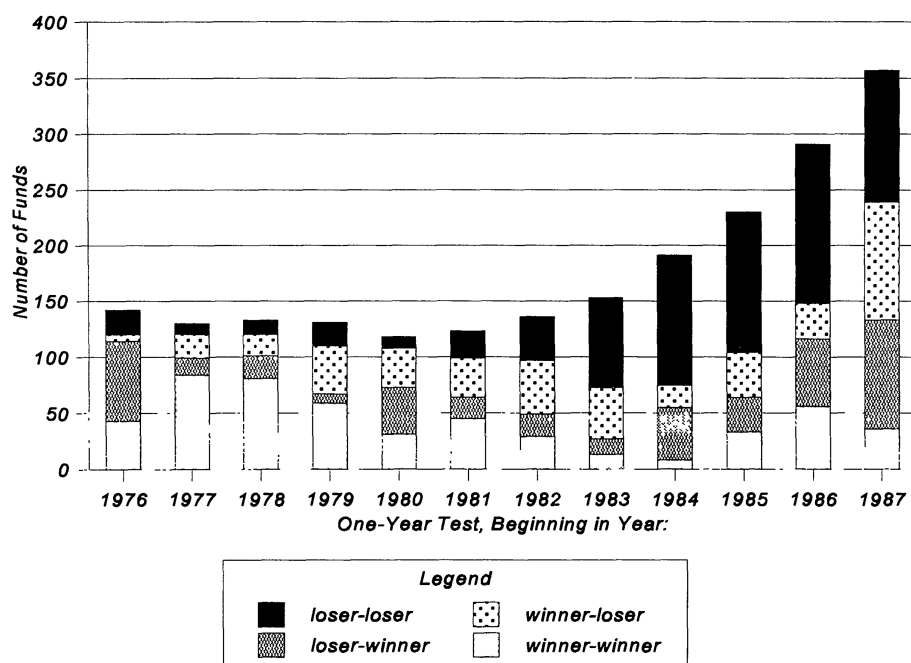

Figure 7: Frequency of Repeat Losers and Winners.

Source: Brown, Goetzmann, Performance persistence, 1995, p.693

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[59] Brown, Goetzmann (1995), p.680
[60] Brown, Goetzmann (1995), p.691

Malkiel (1995) constructed two-way tables showing successful performance over successive periods to analyse the predictability of performance (see Tables 4 and 5 in the appendix). He defined a winner as having achieved a rate of return over a year that exceeds the median fund return and a loser as one, which accomplished a rate of return below the median return. He found that there seemed to be considerable persistence of returns in the 1970s. So-called "hot hands", winning followed by winning, occurred much often than a win followed by a loss. Overall, winners tended to repeat their success almost 2/3 of the time.[61]

However, the results for the 1980s tell a different picture. The relationship between winners winning again was much weaker than a decade before. Only four years out of twelve years examined show a statistically significant persistence, for the others persistence is either negative or not significant.

It is henceforth difficult to conclude that there is predictability in mutual fund returns. Malkiel suggests that although persistence may have existed in earlier decades, it disappeared since then. Yet, his findings might be the key to the puzzle why early research on performance persistence in general found strong evidence in favour of active management performance to be persistent over time, whereas later studies did not find any strong evidence towards performance persistency of active funds. As the studies supporting the persistence theory used data from the 1970s, where active funds apparently managed to achieve performance persistence, and later research used data from later periods, it seems that the outcome of research is highly dependable on which data from which period were used.

Kahn and Rudd (1995) used style analysis to classify fund when analysing the funds' relative performance to style indices. They measured performance persistence by regressing the performance of out-of-sample periods against the in-sample performance, where a positive regression slope would indicate persistence. Although they found hints of persistence amongst fixed-income funds, the results did not show any persistence among equity funds. Hence,

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[61] Malkiel (1995), pp.559

Kahn and Rudd concluded that more information other than only historical performance figures are needed to select a fund for investment, as historical performance only is not significant enough to predict whether a fund will have performance persistency or not.

Gruber (1996) discovered some hints of persistent performance among mutual funds in his research. He concluded that at least in parts future performance could be predicted by looking at past performance. He states that *"because the price at which funds are bought and sold is equal to net asset value and does not change to reflect superior management. A group of sophisticated investors seems to recognize this, as evidenced by the fact that the flow of new money into and out of mutual funds follow the predictors of future performance."*[62]

According to Gruber, there are two groups of investors, sophisticated ones and disadvantaged investors. Disadvantaged investors consist of three groups, unsophisticated investors – they are largely influenced by advertising and advice from sales people when having to take an investment decision -, institutionally disadvantaged investors – they are restricted by certain guidelines (often by law) – and tax disadvantaged investors. Gruber concluded that the sophisticated investors are able to act on performance predictions and pick these mutual funds that offer them above average returns.

However, although the disadvantage investors might have the same information about historical performance and its implication on future performance, due to the above-mentioned restrictions they are confined with, disadvantaged investors are not able to profit from their knowledge. Thus, they are more likely to keep their money in funds, which underperform the benchmark. This means that while one would expect bad performing funds to disappear from the market, they are in fact not eliminated and are likely to distort results.

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[62] Gruber (1996), p.807

The paper by Carhart (1997), who kept up on the earlier, often contradictory works on fund performance persistence, is one of the most comprehensive studies on the topic of performance persistence in recent years.

He used a sample free of survivor bias of mutual equity funds from1962 to 1993 and tested performance measurement with two models, the CAPM and a four-factor model, developed by him. The four-factor model is based on Fama-and-French's three-factor model, but Carhart added another dimension, the one-year momentum anomaly as described by Jegadeesh and Titman (1993). The four-factor model involves excess returns on a market proxy and returns on factor-mimicking portfolios, or as Carhart describes it: *"a performance attribution model, where the coefficients and premia on the factor-mimicking portfolios indicate the proportion of mean return attributable to four elementary strategies: high versus low beta stocks, large versus small market capitalization stocks, value versus growth stocks, and one-year return momentum versus contrarian stocks."*[63]

In a first step, Carhart aggregated funds of portfolios, which are formed on lagged one-year returns and then the performance is estimated. Using reported returns, which are net of all costs, each year ten equal-weighted portfolio of mutual funds are built. The portfolios are held for a year and then regrouped. While the four-factor model explained most of the spread among portfolios, the CAPM model fails to explain it, as with the CAPM model excess returns decreased on the decile portfolios and showed an annual spread of 8% compared to 24% in the ranking year. He found that expenses and turnover are related to performance and that the tenth decile of funds had higher than average expenses and turnover.[64]

The results do confirm that there is short-term persistence in equity mutual funds, which can be explained with sensitivities to size and momentum factors.

Contrary to previous suggestions, stock-picking skills are not necessary to explain persistence over a year long period. If the skills are shown to exist, they

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[63] Carhart (1997), p.61
[64] Carhart (1997), p.63

might be the result of noise measurement. To avoid this noise in past-performance rankings, Carhart in a second step regrouped the portfolios on lagged two- to five-year returns. Then the previous analysis to examine how much of the cross-sectional variation in mean return can be explained by the four-factor model and costs is repeated. Over the longer periods, only the funds in decile one and those in decile tenth maintained their position more than it could be expected to be by random order, but while the top funds only had a probability of 17% to stay in the top segment, bottom decile funds had a probability of 46% to remain at bottom or disappear altogether.[65]

As Figure 8 shows while the four-factor model accounts for more than half the spread in return on one-year portfolios, its influence decreases for two- to four-year portfolios and does not explain any of the spread in five-year portfolios. Expense ratio has the same effect for all portfolio intervals, with roughly 1%. After the four-factor model, expense ratio and transaction costs, around 1.5% of the spread in annual excess return is caused by the spread between the ninth and tenth decile portfolio.[66]

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[65] Carhart (1997), p.78
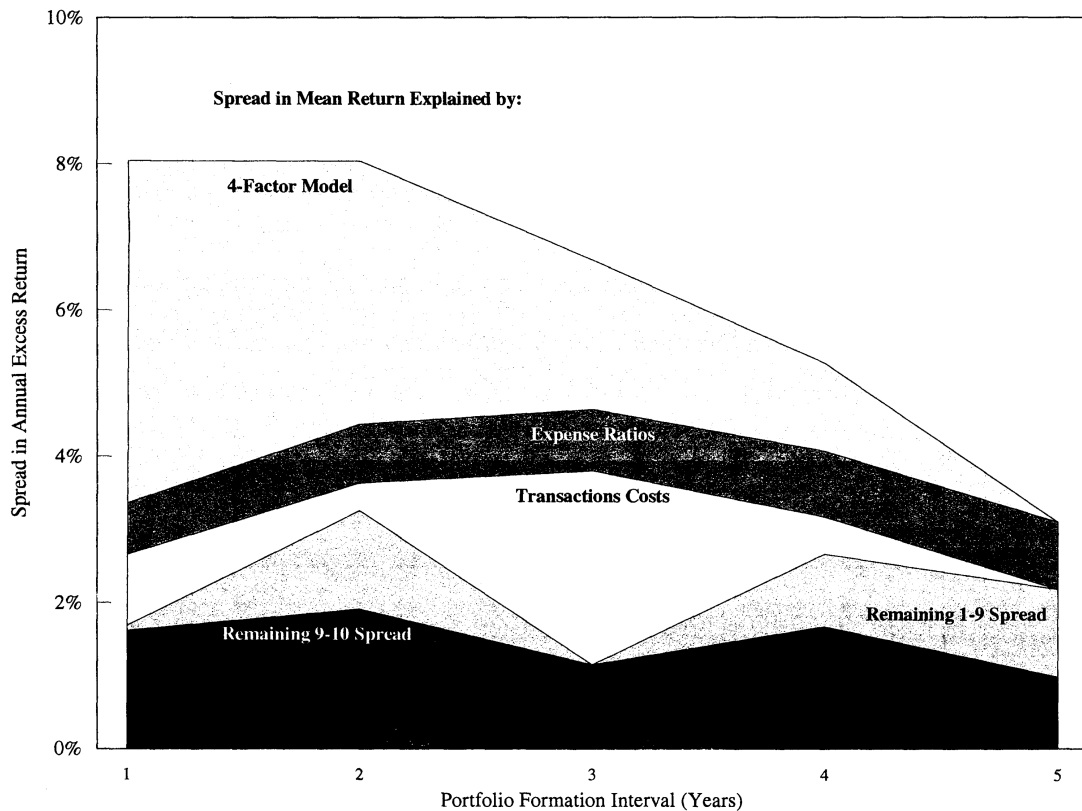[66] Carhart (1997), pp.74

Figure 8: Summary of explanations for persistence in mutual fund performance.

Source: Carhart, On Persistence in Mutual Fund Performance, 1997, p.75

Carhart therefore concluded that overall there is little evidence that mutual funds beat the market, as most of the funds underperform the market by about the same amount as their costs. He also discovered that *"expense ratios, portfolio turnover, and load fees are significantly and negatively related to performance."*[67]

Moreover, in his paper Carhart highlights a general problem when testing market efficiency on the basis of the equilibrium model of returns. It is widely accepted that funds with high alphas in the past demonstrate higher alphas and expected returns in future periods. Yet, as the same model is used to rank the funds in either period, the results gained are sensitive to model misspecifications. Thus, even when most funds underperform the market

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[67] Carhart (1997), p.80

roughly by their costs, the funds with the best past performance appear to be able to earn back their costs.[68]

Although Carhart found some evidence of persistence in performance, the results suggest that the majority of persistence is due to transaction costs and expenses rather than managerial skill. Yet it should be noted that in fully efficient markets there is the possibility of having persistent underperformers, while there are no consistently outperformers, as recurrent underperformance is not necessarily due to bad management decisions, but can be caused by a permanently high expense ratio.[69] Similar research by Hendricks, Patel and Zeckhauser (1993) also showed strong consistency among the worst performing funds.

Contradictory to earlier research, Barras, Scaillet and Wermers (2009) as well as Fama and French (2008) found little to no evidence of persistence.

A more recent study on whether investment managers generate superior risk-adjusted returns and whether this superior performance is persistent was conducted by Busse, Goyal and Wahal (2010). They consider their study to be the largest sample up to this point that is uncontaminated by survivorship bias, as earlier research often was hampered by either survivorship bias or short-time series.

In accordance with mutual fund literature, they followed the approach of assessing performance by estimating factor models cross-sectionally using times-series regression and by constructing equal- and value-weighted aggregate portfolios.[70]

Busse, Goyal and Wahal concluded that there was little evidence of superior performance, either on average or in aggregate. Still, it is possible for some

[68] Carhart (1997), p.58
[69] Carhart (1997), pp.79
[70] Busse et al. (2010), p.772

portfolio managers to deliver above-average returns over long time spans, even when the verification of aggregate superior performance is missing.

Another important finding of their work, though, is that the estimate of persistence is sensitive to the model used for research, as the three-factor models used in the study showed modest evidence of persistence, however, the four-factor models that contain the effects of stock momentum did not show persistence. Same results were gained using conditional four-factor models and seven-factor models.

The findings of Busse, Goyal and Wahal are significant for both, economic and practical aspects, as they show that in the context of efficient markets the implications of possible outperformance clearly depend on the benchmark used to compare the returns to. For an investor, the implications are also clear: if he or she is happy with the CAPM model or a three-factor model as a tool for the benchmark, he or she might conclude that investment managers deliver superior returns with persistence, however, if the investor favours a different model as benchmark, incorporating momentum into the analysis, he or she will not be contempt with the performance.[71]

In general, data on US mutual funds seem to suggest that it is quite difficult and probably even impossible for an investor to pick funds, which offer superior future performance in the long run. Exceptions are only possible if the portfolio is rebalanced often and if the timeframe for which performance is measured is shorter than a year, as numerous studies have shown (e.g. Grinblatt and Titman (1992), Carhart (1997), Wermers (2003)).

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[71] Busse et al. (2010), p.768

6. Conclusion

The aim of this diploma thesis was to answer the question, whether active portfolio management can generate performance persistence.

Research on performance persistence has so far delivered ambiguous results. At the beginning of the research is the question, whether active managed portfolios even manage to outperform their benchmark, whether active portfolios are able to beat their passive counterparts, because if there were no evidence for the superiority of active performance, there would not be any need to look into the topic of its persistence. If something is not even there, it definitively cannot be persistent.

As it was disclosed earlier, numerous studies have dealt with the topic of active versus passive portfolio management. All in all, their findings give no absolute proof that active management does indeed outperform passive managed portfolios. It seems that outperformance of a benchmark depends to a large extend on the chosen data and benchmark itself. The other issue that should not be overlooked is the problem of survivorship bias within the data that tends to distort performance results, if it is not considered properly in the data samples.

Another important aspect of the debate on active performance is, whether the performance was caused by the manager's skill or just by luck, because if the outperformance was simply due to a manager's luck, not the skill, he or she is most likely not able to repeat it. Thus an investor could not rely on any past performance of an investor to predict any future outperformance correctly as the future performance would be random and not correlated to the past. The majority of research papers included in this diploma thesis does not find any strong evidence supporting the theory that portfolio managers are actually skilled. Especially when looking at net returns – returns adjusted for costs – most funds have at best a zero-alpha, so any possible outperformance generated by a skilled manager costs an investor roughly the same amount, so

in the end an investor is no better off with an active managed fund than with a passive one.

While research so far suggests that active outperformance is down to a portfolio managers' luck, it is quite the opposite for underperforming funds. They lose money not because of bad luck, but because their managers are lacking the necessary skills.

Barras et al. discovered an interesting aspect that is worth pointing out: that the number of skilled managers diminished quite significantly over the years. This means that although an investor has probably more active managed fund to choose from today than ever before, it also means that it is harder than in previous periods to actually identify the few that are skilled.

Besides the limited existence of skill, the data of more recent studies also do not show real proof for the existence of persistence in the performance of active managed funds. At best, performance persistence was found in the very short-term, but beyond a time horizon of a year, there is no significant existence of persistent outperformance. Somewhat contrary to these recent findings are the results from the earliest studies on the topic, which found evidence that funds that have performed well in the past managed to repeat their success. Possible explanations for this contradiction might be the different benchmarks that were used to measure outperformance against, the different space of times that were covered by the studies or more refined models. Overall, current literature on the topic strongly favours the idea that performance persistence of active managed portfolios is not possible on the long run.

Given these discouraging results on the performance of active managed funds, a number of studies were puzzled, why these funds are still so popular amongst investors despite a track record that is not in their favour and investors today are offered an interesting alternative with an ever growing number of index funds. This apparent paradox was explained to some extend by legal restrictions investors have to deal with, but to a larger extend with the theory that investors might only look at performance before costs, which often does

give the impression that a fund managed to beat the market due to its manager's skill, thus leaving an investor with a distorted with of real net performance.

A common denominator of all the research so far on the performance of active managed funds is that it almost exclusively deals with equity mutual funds and the sample are even more restricted to US mutual funds. While this phenomenon could be explained by the accessibility of data, it does not quite accurately reflect everyday reality. In practice it is very unlikely that a portfolio of an individual private investor or a financial services company like an insurance company is only limited to investments into equity funds while neglecting all other asset classes. Even research into active bond portfolio management is rare.

Results into active performance persistence might also be biased due to the sample data usually consisting only of US funds. Although it is comprehensible that the majority of previous studies relied on US fund data because of their availability – especially over long-term periods – and their undoubtedly larger sample size, which certainly helps to avoid the limitations that one might encounter with a smaller sample where there is always the danger of results not being meaningful enough to state any generalisations based on the results, results might deliver a skewed view on performance persistence. Although it is legitimate to doubt that data covering other geographical regions like Europe or Asia might result in significantly different results, it would certainly help validating the US fund performance results.

Although all results so far point to the direction that active managed portfolios are not able to generate persistent performance, the final verdict on the topic is not yet delivered. Further research in the future with new or more refined models for analysis, new data samples or a longer time span might probably provide the asset management universe with a final proof that active management is persistent or not. But whatever way the discussion will take, there is definitively plenty of room for future research on the topic that might result in some astonishing findings.

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Appendix

Appendix A: Performance Data

Average Monthly Performance

The table shows the average realized monthly percentage returns net of the S&P 500 and average coefficients from a time series regression of excess percentage returns against the single index and four index models. The sample consists of 270 open end funds and 9 closed end funds. The sample period is from January 1985 to December 1994.

Single Index Model:

$$R_i - R_f = \alpha_i^1 + B_{Mi}^1(R_M - R_f) + e_i$$

Four Index Model:

$$R_i - R_f = \alpha_i^4 + B_{Mi}^4(R_M - R_f) + B_{Si}(R_S - R_L) + B_{Gi}(R_G - R_V) + B_{Bi}(R_B - R_f) + e_i$$

where

R_i = the return on fund i.

R_f = the return on a thirty day T-Bill.

R_M = the return on the S&P 500 index.

$R_S - R_L$ = the difference in return between a small cap portfolio and a large cap portfolio.

$R_G - R_V$ = the difference in return between a high growth portfolio and a high value portfolio.

$R_B - R_f$ = the excess return on a bond index which represents an estimate of aggregate corporate and government bonds.

Fund Type	$R_i - R_M$	α^1	B_M^1	ρ^2	α^4	B_M^4	B_S	B_G	B_B	ρ^2
Open end funds										
All funds	−0.162	−0.130	0.963	0.810	−0.054	0.850	0.314	0.229	0.090	0.886
No load funds	−0.164	−0.127	0.964	0.800	−0.056	0.849	0.300	0.243	0.098	0.897
Load funds	−0.162	−0.134	0.966	0.830	−0.054	0.850	0.331	0.229	0.086	0.873
Maximum capital gains	−0.125	−0.182	1.073	0.780	−0.035	0.889	0.466	0.433	0.092	0.897
Growth	−0.154	−0.131	0.978	0.810	−0.045	0.860	0.306	0.264	0.077	0.886
Growth and income	−0.213	−0.073	0.829	0.840	−0.088	0.796	0.175	−0.031	0.108	0.878
Nonsurviving funds	−0.432	−0.350	0.929	0.710	−0.229	0.781	0.391	0.290	0.095	0.801
Closed end funds										
All funds, NAV return	−0.135	−0.031	0.864	0.780	0.014	0.787	0.193	0.153	0.077	0.820

Table 3: Average Monthly Performance

Source: Gruber, Another Puzzle: The Growth in Actively Managed Mutual Funds, 1996, p.788

Tests of Persistence of Fund Performance: 1970s Data

This table presents two-way tables of ranked total returns over one-year intervals using data from the 1970s.

Initial Year	Next Year		Percentage Repeat Winners	Z-Test Repeat Winners
	Winner	Loser		
1971 Winner	68	37	64.8	3.0
Loser	39	66		
1972 Winner	55	55	50.0	0.0
Loser	56	54		
1973 Winner	72	43	62.6	2.7
Loser	41	74		
1974 Winner	61	56	52.1	0.5
Loser	55	62		
1975 Winner	87	30	74.4	5.3
Loser	30	87		
1976 Winner	80	37	68.4	4.0
Loser	38	79		
1977 Winner	85	35	70.8	4.6
Loser	37	83		
1978 Winner	85	37	69.7	4.3
Loser	39	83		
1979 Winner	89	35	71.8	4.8
Loser	36	88		
1971–1979 Winner	682	365	65.1	
Loser	371	675		

Table 4: Tests of Persistence of Fund Performance: 1970s Data.

Source: Malkiel, Returns from Investing in Equity Mutual Funds 1971-1991, 1995, p.560

Tests of Persistency of Fund Performance: 1980s Data

This table presents two-way tables of ranked total returns over one-year intervals using data from the 1980s.

Initial Year	Next Year Winner	Next Year Loser	Percent Repeat Winners	Z-Test Repeat Winners
1980 Winner	46	80	36.5	−3.0
Loser	80	46		
1981 Winner	81	49	62.3	2.8
Loser	46	84		
1982 Winner	77	59	56.6	1.5
Loser	53	83		
1983 Winner	83	65	56.1	1.5
Loser	64	85		
1984 Winner	89	76	53.9	1.0
Loser	76	89		
1985 Winner	110	75	59.5	2.6
Loser	70	115		
1986 Winner	128	84	60.4	3.0
Loser	93	119		
1987 Winner	96	148	39.3	−3.3
Loser	145	99		
1988 Winner	120	173	41.0	−3.1
Loser	176	117		
1989 Winner	190	129	59.6	3.4
Loser	121	189		
1990 Winner	169	173	49.4	−0.2
Loser	173	169		
1980–1990 Winner	1189	1111	51.7	
Loser	1087	1203		

Table 5: Tests of Persistence of Fund Performance: 1980s Data.

Source: Malkiel, Returns from Investing in Equity Mutual Funds 1971-1991, 1995, p.561

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Appendix B: Abstract in German

Die Diplomarbeit untersucht die Nachhaltigkeit von aktivem Portfoliomanagement. Unter Nachhaltigkeit ist im Kontext dieser Diplomarbeit zu verstehen, dass die Wertentwicklung eines aktiv gemanagten Portfolios wiederholt Überschussrenditen erzielt gegenüber einem Vergleichsportfolio. Zu Beginn werden einige Grundkonzepte der Kapitalmarkttheorie erläutert, vor allem die Effizienzmarkthypothese und das Capital Asset Pricing Model. Ein Überblick über die Methoden und Instruments, die zur Performancemessung verwendet werden, wird ebenfalls gegeben. Weiter wird das Thema anhand von drei Aspekten abgehandelt: Vergleich zwischen der Wertentwicklung von aktiv und passiv gemanagten Portfolien, Unterscheidung zwischen Können und Glück, auf die die Wertentwicklung zurückzuführen ist und der Möglichkeit, wiederholt eine bessere Wertentwicklung zu erzielen als der Markt. Zu diesem Zweck wird eine historische Betrachtung der wichtigsten Studien über die Wertentwicklung von aktivem Portfoliomanagement durchgeführt. Die Ergebnisse der Studien, die in der Diplomarbeit behandelt werden, weisen stark darauf hin, dass eine nachhaltige Wertentwicklung von aktiv gemanagten Portfolios langfristig nicht möglich ist. Schließlich werden noch die Einschränkungen der bisherigen Forschung aufgezeigt und Empfehlungen für zukünftige Forschungsfragen abgegeben.

CURRICULUM VITAE

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