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## Active Management - How Actively Managed Are Swedish Funds?

-Applying Tracking Error and Active Share in The Swedish Market

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Supervisor:  
Frederik Lundtofte

Authors:  
Anton Holmgren  
Oscar Sterndahlen

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# **Abstract**

**Title:** Active Management – How Actively Managed Are Swedish Funds?

**Authors:** Anton Holmgren and Oscar Sterndahlen

**Supervisor:** Frederik Lundtofte

**Purpose:** This thesis concentrates on Swedish equity funds investing in Sweden. The objective is to determine to what extent actively managed funds really are active and if there is any relationship between excess return and active management.

**Data and Methodology:** The data used in this thesis consists of 37 mutual funds and one index and stretches from 2001-2012. The fund data is collected from the Swedish Financial Supervisor Authority, Bloomberg and the Benchmark index holdings is collected from SIX-Telekurs.

The level of active management is determined by using Tracking Error and Active Share. Tracking error calculates how much the funds returns deviate from the benchmark index and Active Share measures how much fund holdings differ from the benchmark index holdings. Multiple regressions and descriptive analysis is used to achieve the results.

**Results:** Overall, Swedish mutual equity funds are proved to be quite passive in comparison to previous studies of the American market. On average, 65% of the funds assets in Sweden are invested accordingly to the benchmark index.

Tracking Error is proved statistically significant as an explanatory variable for excess return. No statistical proof can be found for Active Share in that sense. However, the descriptive analysis suggests that a higher Active Share corresponds to a higher excess return. Overall Swedish funds underperform by 1,98 % compared to the benchmark index over the investigated sample period.

**Keywords:** Active Share, Tracking Error, Active management, Portfolio management

# 1) Introduction

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*This chapter gives an introduction of the background of fund activity and performance in Sweden as well as the problem discussion and purpose of this study.*

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## 1.1) Background

Fund savings has during the latest 20 years increased dramatically in Sweden. In the beginning of 1990 almost all savings in equity funds was invested in Swedish funds. Today, the funds savings are diversified in equity across the globe to a much greater extent. The total amount invested in funds at the end of 2011 summed to 1 819 billion kronor and 52% of these was placed in equity funds and approximately 22% of these was invested in Swedish equity funds placed only in Sweden (Fondbolagen, 2012).

The increase in funds savings can be explained by tax-subsidized savings in public savings funds and by the change in the Swedish PPM-system in 2000. Now, almost every Swede owns a share in some fund and because of this they are not only affected by their own private savings but their future pension is highly affected by the investment decision in funds as well. As a result, savings and investments in mutual funds is a major concern for the Swedish people. The number of Swedes that own shares in stocks gradually decrease meanwhile people's exposure to the stock market is increasing. This is mostly due to the fact that banks and other financial players on the financial markets almost never promote direct ownership of stocks. Instead they have much bigger incentives and interest in selling a fund that generates more revenues. If the bank manages to sell a fund that is claimed to be actively managed by a fund manager, they can charge the investors up to 1,5% in commission every year. When investing in stocks the banks can only charge the investors when the transaction is done. Passive funds or index funds in fund management companies and banks have a much smaller fee due to the fact that they are passively managed, hence no fee for activity is charged.

Fund management companies usually use two different types of fund management approaches; they either use the passive- or active approach. Index funds, also known as passive funds, are attempting to replicate the performance of a benchmark index. Whereas active funds are attempting to deviate from the benchmark index to reach excess returns. For equity funds, constantly exploring the stock markets and actively changing the fund holdings in comparison to benchmark holdings achieve this. Active fund managers can either choose to apply a very active fund management policy or in some cases may be claimed to be an active

fund when in fact they are more passive than active. The latter is called “Closet Index Funds”. Funds that are claimed to be actively managed have higher administration costs and can therefore charge higher fees than passive funds. This in turn increases the expectations that actively managed funds should add higher value relative the benchmark index. Investors assume that fund managers will generate positive excess return, after including the active fund fee, by finding value adding investment opportunities.

One of the most discussed and longest holding debates regarding fund management in the academic world is if investors are better off following a passive investment strategy or if they are better off investing in an active fund. The main discussion is whether active managed funds can generate a higher return than its benchmark index. In recent years it has been shown that passive funds have given investors a higher return than actively manage funds. Thus, the following question has been raised: In actively managed funds, how active are fund managers really? So the criticism directed against the active fund management has not only focused on its performance relative to passive funds but also to what extent active funds actually are active.

Two Yale Professors, K. J. Martijn Cremers and Antti Petajisto, have refined the possibility to test how actively managed funds are by introducing a measure called Active Share. They state that this measure, in addition to tracking error, helps investors to better identify those fund managers that are capable producing a positive alpha. By analyzing funds with Active share in combination with the traditional measure tracking error, the results provided can give a more comprehensive picture of active management. The main difference between these measures is that tracking error puts significantly more weight on correlated active bets, while active share puts equal weight on all active bets regardless of diversification. Cremers & Petajisto (2009) results indicate that some strategies constantly succeed in delivering risk-adjusted excess returns. This fact has been highly recognized by fund managers and several managers seem to take this measure into account when planning portfolio strategies (Fondbranschen, 2012).

## 1.2) Problem Discussion

As a result of rapidly growing Swedish fund savings, the attention on fund management has also increased. Today, there exist some funds that are claimed to be actively managed but are nevertheless staying appallingly close to its benchmark index and yield the same returns or

sometimes less. These funds are called *closet index funds* and though they are not really active funds, fund managers charge similar fees to those funds that truly are actively managed. This means that closet index funds are very expensive in relation to the product they offer the investors. Since it is possible for only the actively managed part of the fund to provide excess return in comparison to its benchmark index it is almost impossible for the fund to outperform the index fund. This is due to the unjustified high fees of such funds and the fact that it is very difficult, in the long run, to beat the benchmark index net of expenses.

There are two main ways for fund managers to generate a positive alpha: Stock selection or by factor timing (or both, which will be explained in a later chapter). The two active management approaches contributes to very different tracking error volatility result, when measuring if funds are actively managed. Even if they could produce the same high alpha the tracking error result does not necessarily have to provide the same result. By using active share as a complement to tracking error we can find stronger results regarding active fund management in Sweden. Due to the fact that calculations of Active Share are very time consuming there have not been made any extensive research in Sweden in this area. Instead the conventional and traditional method that has been used when trying to study mutual funds is tracking error. However, for very actively managed funds it is insufficient to only apply this method since tracking error can give different results depending on what active approach the fund manager is applying which in turn can lead to misclassification of funds (Cremers & Petajisto, 2009). The fund holdings for an actively managed fund usually differ in two general ways; either with stock selection or with factor timing. Stock selection means that the fund manager picks individual stocks that are expected to outperform their peers. Factor timing involves taking bets on any systematic risk relative the benchmark index such as choosing stocks based on entire industries or sectors of the economy (Cremers & Petajisto, 2009). A fund manager uses either one of these methods or both. The stock picking approach allows for greater diversification within the fund, which in turn results in a lower tracking error than the factor timing approach. Since the factor timing approach is actively picking entire sectors or industries while passively holding a big number of stocks that are not included in the sector the fund is not as diversified as the stock picking approach. The less diversification results in a higher tracking error and maybe a wrong conclusion can be drawn about the funds activity. In order to determine a funds active share, perfect insight into the fund and index holdings is a necessity. This requires a substantial amount of work and therefore tracking error, which is a more efficient measure, has often been applied. This, in combination with that active share is

a fairly new measure is probably why it has never been applied on Swedish mutual funds. By applying Active share to the study we can compare the portfolio holdings of a fund to its benchmark index and thus eliminate making incorrect conclusions about active funds.

Our study aims at eliminating the drawbacks in earlier studies made in Sweden and thus contribute to the overall discussion about differences between actively and passively managed funds. The first and main study of Active Share, by Cemers and Petajisto (2009) called “How Active is Your Fund Manager?” is the most extensive and detailed work made so far. This is performed on American funds in the US, which has several important differences with the Swedish fund market. The American stock market is by far the most analyzed and elucidated and researchers have repeatedly shown that active funds are having trouble to exceed passive funds (index funds) returns. During the three latest years the American index funds has generated a return of 13 percent whereas active funds generated 12 percent (Strandberg, 2012). Results have also shown that passive funds are containing smaller risk than active funds while fees in active funds have devoured a portion of the return. Though active share research have not yet been applied on Swedish active equity funds it would therefore be interesting to see whether the result in this paper are consistent with Cremers and Petajistos (2009) results obtained in America.

### **1.3) Purpose**

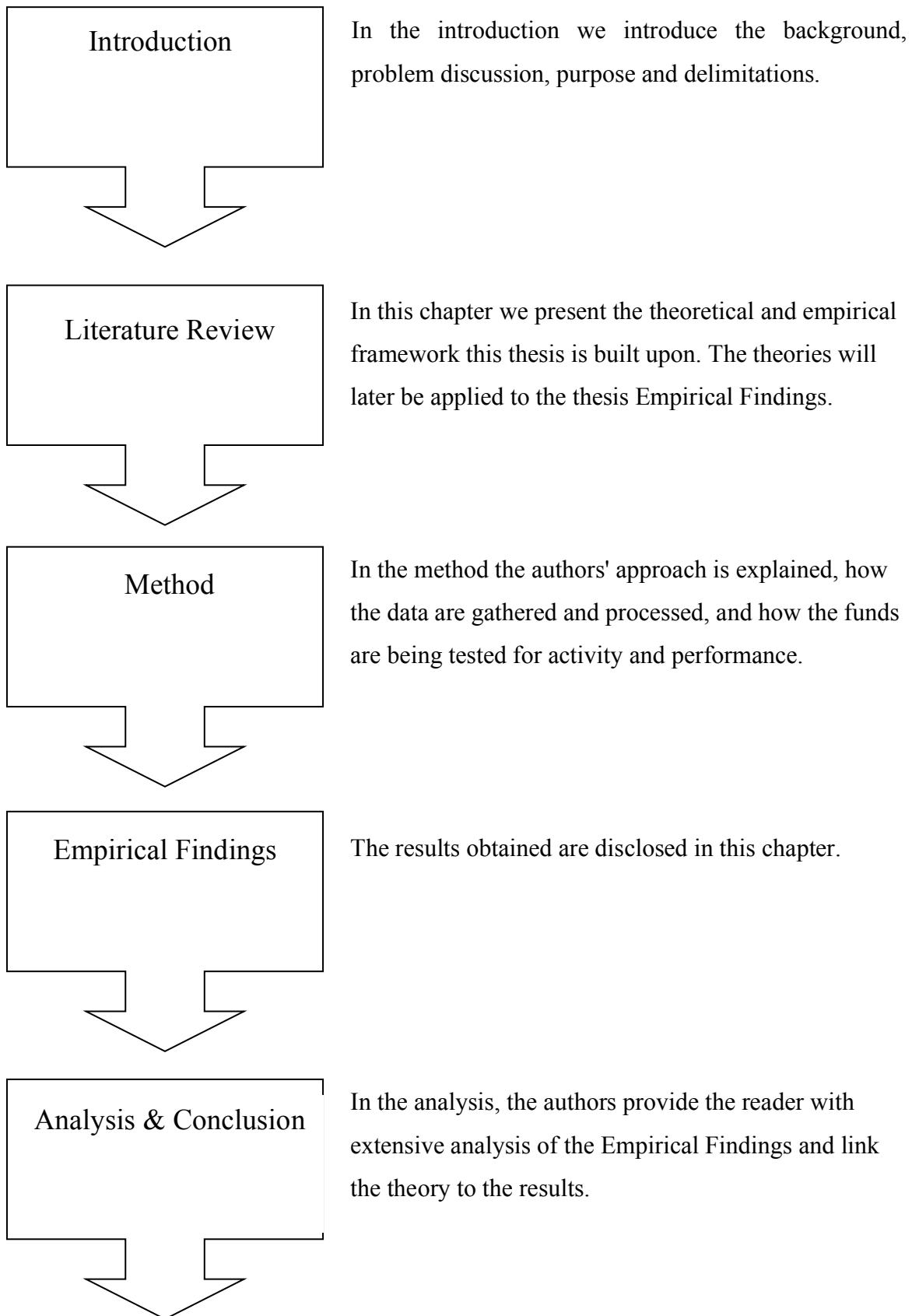
The purpose of this master thesis is to examine and establish the degree of actively managed funds that really are active with the help of tracking error and active share. As we add active share as a measure we want to demonstrate how active Swedish funds really are and provide a more refined result on large cap funds. With these results we are able to establish how and to what level fund performance is connected to different degrees of active management and if it is worthwhile investing in actively managed funds. We have formulated two questions at issue for this study:

1. Are active Swedish equity funds really actively managed?
2. Does fund activity have any relation to fund performance in Sweden?

## **1.4) Delimitations**

In this study we will focus on examining Swedish active equity funds starting with 2001 and ending 2012. A Swedish fund can only be classified as an equity fund if at least 75 percent of the total fund holdings consist of equity or equity-like instruments (Finansportalen, 2012). A further requirement for Swedish equity funds is that the Swedish stock holdings should consist of at least 90 percent of the total fund holdings. The availability of this information is limited and thus the period we have applied to this study extends over 11 years since the access to secondary data only exists from the year 2001 (Finansinspektionen, 2012). An alternative to find additional fund data from earlier years would be if we manually collected this data from the Swedish finance inspections archive. This is however not possible due to the thesis time constraints. Additionally, a big proportion of Swedish funds do not have a long life span and therefore we could only find 37 actively Swedish equity funds over this period. Despite this, the results can still be interpreted as statistically significant though the study consists of more than the required 30 observations (Westerlund, 2005).

## 1.5) Thesis Outline



## 2) Theory

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*This chapter reviews existing studies on fund activity and performance measures as well as empirical findings in these studies. The activity measures Tracking error and Active Share and the performance measures Sharpe ratio and Information ratio are also introduced. Finally, the topic of Survivorship Bias is introduced.*

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### 2.1) Literature Review

There has been a great amount of research assessing the mutual fund industry ever since the 1960's (Bodie, Kane & Marcus, 2009). However, Cremers and Petajisto (2009) points out that current mutual fund literature have done little to investigate active management per se. Instead they stress that previous studies mostly have focused on fund performance directly. Wermers (2000) investigates mutual fund performance before and after expenses and Cremes and Petajisto (2009) refined these results by dividing funds into different active management categories. A more related study concerning active management is done by Wermers (2003) where he investigates fund performance and active management but the active part only consists of the funds tracking error relative the S&P500-index. Cremers and Petajisto (2009) argues that introducing Active Share and use it as a complement to tracking error gives a more comprehensive picture of Active management. In their study from 2007 they applied the active share measure for all equity funds in the U.S. Their result showed that funds with the highest Active Share possessed some skill and outperformed their benchmark by 2, 40% per year. After transaction costs and fees this outperformance decreased to 1,13% per year. Similar results were documented for funds with the lowest active share, which had poor benchmark-adjusted returns before expenses, 0,11% and underperforming by -1,42% after expenses. These results are interesting in the sense that they show that actively managed funds are able to beat their benchmark indices by exploring the market. Then again, funds that replicate their benchmark indices generate quite similar returns as their benchmark, but after fees and transactions cost, their returns are considerably lower (Cremers and Petajisto, 2009).

#### 2.1.1) Previous studies in the US

No consensus has been reached whether fund managers has the ability to reach abnormal return, despite the vast amount of research in the American market. Jensen (1967) examined 115 funds and only one could be significantly demonstrated to generate a positive alpha, i.e. generate an abnormal return relative the market portfolio. Treyner and Mazuy (1966)

examined 57 funds and only one proved any significance regarding market timing. These results were backed up by Henriksson (1984) results when he identified that 3 out of 116 showed positive significance regarding market timing. On the other hand, Ippolito (1989) examined 143 funds and found out 12 significantly positive alphas in the period 1965 to 1984. Lee and Rahman (1990) proved some proof of micro forecasting when they examined 93 funds and 17 turned out to be positive significant regarding market timing.

The main focus of the older studies is on managerial micro and macro forecasting abilities when evaluating fund performance. In later studies, academics have also focused on the persistence of fund manager's abilities. A great amount of literature in the American market has been published regarding the "hot hands-effect" - the phenomena of outperforming the benchmark index in consecutive periods. Grinblatt and Titman (1992) proved persistence of good performers while Carhart (1997) proved that there exists persistence of bad performers as well. Malkiel (1995) found proof of persistence for both bad and good performers int this combined with Carharts (1997) findings suggests that there exists a phenomenon called "cold hands" as well.

### **2.1.2) Previous studies in Sweden**

If the American market is well explored regarding research, the Swedish market is quite the opposite. One exception though is Dahlqvist, Engström and Söderlind (2000) who investigated the relationship between certain fund attributes and fund returns for the period 1992-1997. They found significantly positive alpha for small equity funds, low fee funds and funds with high trading activity. They also found negative alphas for bond funds, money market funds and more relevant – for equity funds of the public savings program<sup>1</sup>. However, they did not find any evidence of persistence in their result. (Dahlqvist, Engström & Söderlind, 2000).

Another study of the Swedish market was done by Engström (2004) where he divided managers fund performance strategic decisions (long-term) and tactical decision (short-term). His study covered 112 Swedish mutual equity funds and he found some cases of abnormal returns, both for large-cap and small-cap equity funds (Engström, 2004).

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<sup>1</sup> In Sweden known as "Allemansfonder", a type of tax subsidized equity fund introduced in the early 80's to

As Cremers and Petajisto (2009) points out, there is not much literature about active management per se, in the American market. In Sweden, it's even less. We haven't been able to find any previous research that focus on the activity of fund management.

## **2.2) Tracking error**

The only way for a fund manager to add value is to differ from its benchmark index by using either the stock selection approach or the factor timing approach. Stock selection means that the fund manager for example only holds one stock in an industry, i.e. he is taking active bets on individual stocks. Factor timing is also called tactical asset allocation and means that the manager rebalances the percentage of assets he holds in order to try to take advantage of strong market sectors or market pricing anomalies. Tracking error measures factor timing activity.

Tracking Error is the most conventional method when calculating mutual fund performance (Chambers, 2001). It measures of how closely a portfolio follows its benchmark index. Tracking error is also called an active risk and measures the deviation from the benchmark. An index-fund is expected to have a tracking error close to zero and an actively managed portfolio is expected to have a higher tracking error (Ammann & Zimmerman, 2000). In other words, tracking error can show the closeness of historical tracker portfolio performances around the benchmark return. Important to note is that this is a statistical measure that describes the characteristics of the return differences and not the absolute measurement of the return differences (Chambers, 2001).

The typical fund manager aims at getting an expected return higher than the benchmark index while keeping the risk of underperforming its benchmark index at a low level. In other words he wants an as high return as possible with the lowest possible risk (Cremers and Petajisto, 2009).

## **2.3) Active Share**

Instead of measuring fund performance, as many other previous studies focus on, this is a measure to quantify active fund management. Active share, as a measure, was introduced 2007 by K. J. Martin Cremers and Antti Petajisto, professors at Yale University. In their research of actively managed equity funds they came up with a new measure of active portfolio management in order to try to determine value added by active managers. The basic

idea behind this measure is to determine exactly how active a fund manager are by measuring the difference between portfolio manager's holdings and the holdings in the benchmark index. The absolute difference in portfolio weights for all stocks in the active fund and index weights in its benchmark portfolio is what is defining Active Share. It is simply the manager's under-weights and over-weights in a particular stock. If short selling is not allowed the measure generates possible values between 0% and 100% were 100% defines a fund that completely deviates from the benchmark index (Cremers & Petajisto, 2009)

Cremers and Petajisto (2009) argues that there are two main reasons why Active Share is a useful method to measure active fund management. First of all, a necessary condition for outperformance relative to the benchmark index is a positive Active Share since an active manager can only beat its benchmark index by deviating from it. Thus, active share shows information about the funds potential to outperform or underperform its benchmark index. Secondly, it is an adequate independent measure and if it is combined with Tracking Error it can provide a more refined and comprehensive result of active management. Seeing that, regardless of diversification, Active Share puts equal weights on all active bets and tracking error does not, these measures can be helpfully combined to distinguish between factor timing and stock selection (Cremers & Petajisto, 2009).

## 2.4) Sharpe Ratio

Understanding the great addition of Capital Asses Pricing Model (CAPM), Jack Treyner (1966), William Sharpe (1966) and Michael C Jensen (1967) elaborated own measurements to evaluate portfolio performance. The measurement created by William Sharpe, known as the Sharpe ratio, is a measure of a portfolios excess return per unit of deviation and it is widely used in academia and practice for ranking of portfolios (Lo , 2002). The measure originated from the prospect of Markowitz (1952) mean-variance portfolio theory, were it is assumed that individual portfolio performance can be measured with the first two moments, standard deviation and mean. The strengths with this measure are that for a number of investments decisions, ex ante Sharpe ratios can provide valuable inputs. Consider choosing one fund among many to provide in a particular market sector. To pick the one with the greatest Sharpe ratio makes sense, as long as the funds correlations with other relevant classes are reasonably similar (Sharpe, 1994). Further, Sharpe argues that the ratio of expected added return per unit of added risk provides a useful way to assess any strategy involving the difference between

the return of a fund and a relevant benchmark. The Sharpe ratio is specifically designed for this purpose, and if properly used, it could improve the process of managing investments (Sharpe, 1994). However, Sharpe ratios have been subject of criticism as well. For example, Goetzmann et al (2002) shows that Sharpe Ratios are inappropriate when returns are non-normal and are not comparable when calculated for different investment horizons (Lo 2002). Additionally, the Sharpe ratio has been criticized for its dependence on standard deviation. When the stock market is very volatile the standard deviation may be skewed in either a high or low direction due to large movements. Therefore it has been questioned whether it is reliable as a stand alone measure for investors (Kidd, 2011).

The Sharpe Ratio is a common measure to use due to its simplicity to calculate and is usually computed with historical data (ex-post Sharpe Ratio) but this measure can also be used as a projective tool of fund performance (ex-ante Sharpe Ratio). It is assumed that historical values contain some projective information.

Funds with the highest SR should be preferred among investors if the following conditions hold:

- 1) All investors have the same planning horizon
- 2) There are no other sources of wealth
- 3) There exists no short-selling restrictions
- 4) Consumption goods prices are uncorrelated with asset returns (Antolin, 2008).

## 2.5) Information Ratio

The Information Ratio (IR) is often referred to as generalized version or variation of the sharp ratio. It was evolved as users of the Sharpe Ratio began substitute the risk free rate against a passive benchmark index (Kidd, 2011). The information tells an investor how much excess return is generated in comparison to the benchmark, per taken amount of risk. Just like the Sharpe Ratio, the Information Ratio is based on the Markowitz mean variance paradigm and it is applicable to all portfolios that have normally distributed expected return. The Information ratio basically says if a manager is able to outperform their benchmark on a risk-adjusted basis, however it does not say anything about how the outperformance was achieved (Kidd, 2011.)

The Information Ratio takes the funds active return divided by its tracking error, where active return is defined as the difference in return between a fund and its benchmark index. The interpretation of the measure is how well a fund manager generates excess return relative its benchmark index. The higher the Information Ratio, the higher is the active return given the amount of risk taken, and the more successful is the fund manager. Grinold and Kahn (1995) assert that an Information Ratio of 0.50 is considered as “good,” above 0.75 is “very good,” and above 1.0 is “exceptional”. Even though it is not entirely clear if these breakpoints were determined empirically they seem to have taken hold as an industry standard (Clement, 2009).

## 2.6) Survivorship Bias

A fund's historical performance is a useful way to tempt new customers and hence it is an incitement for funds to only present results for high performing funds and to merge or close down funds that underperforms (D'Amato 1997). Consequently an analysis of historical fund performance will be based on the funds that perform good enough to “survive”. For the stock year of 1986 Lipper Financial Inc reported an average mutual fund performance of 13,39% for 586 American funds. In 1996 the average performance for the same group over the same period of time was 14, 65%. The reason for this was that the group now existed of only 434 funds, and the ones that didn't survive were almost entirely underperforming ones. The new average was therefore based on the performance for the funds that survived.

Historical studies are to large extent the subject of survivorship bias according to Malkiel (1995). If non-surviving funds are systematically ignored then older studies will tend to significantly overestimate the funds return (Malkiel, 1995). On the other hand, fairly new studies by Grinblatt and Titman (1994) and Ferson and Schadt (1996) have been made and the researchers have chosen to ignore the effect of excluding non-surviving funds. Grinblatt and Titman argues that the estimated survivorship bias in their studies is as low as 0,5% per year and therefore doesn't have a significant effect on their results. Thus, opinions in the academic world differ regarding how survivorship bias affects the performance of mutual funds.

### **3) Methodology**

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*In this chapter the research approach, data and methodology are introduced. In order to get as reliable results as possible, both statistical tests and descriptive tests on fund activity and performance are applied. Furthermore, this section describes why and how this certain research approach has been applied.*

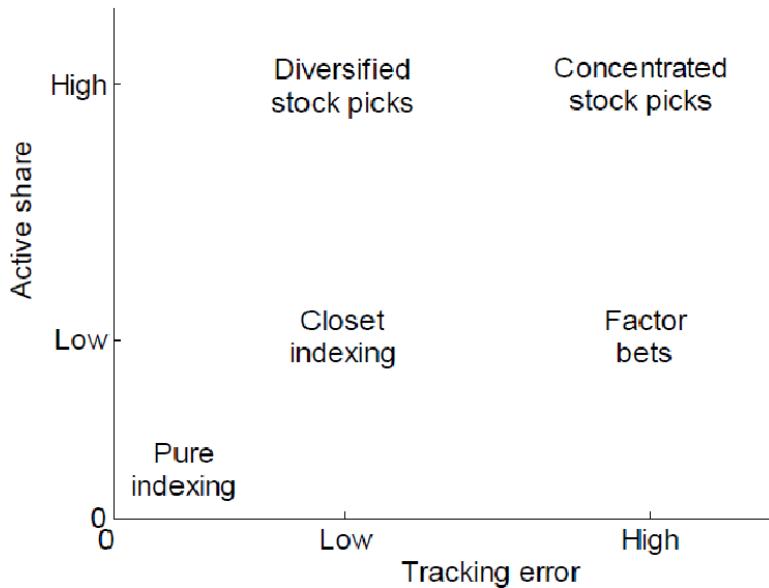
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#### **3.1) Research Approach**

In this thesis we apply a quantitative method to measure the performance and activity levels of the funds included in our sample. Existing secondary data will be processed and used to examine if there exists a statistical significant relationship between funds excess return and the two activity measures, Tracking error and Active Share. This is tested with four different regressions. In the first regression, excess return over benchmark is used as the independent variable with the independent variables Active Share, Tracking Error and Volatility. Secondly, excess return over the risk free return is used as the independent variable and finally the Information ratio and Sharpe ratio is tested.

In the second part of the research approach, descriptive tests will be applied. The funds Active Share and Tracking Error are categorize in terms of activity levels. We categorize the level of the funds activity in two different ways. Firstly we use Active Share and classify the funds into five different categories. The first category includes funds with an active share of 0-20 percent, second 20-40 percent, third 40-60 percent, fourth 60-80 percent and lastly the fifth 80-100 percent. The funds in the fifth category represent the most active funds and the one in the first category represents the most passively managed funds. Secondly we categorize funds with regards to both Active Share and Tracking Error. We apply the same categories for Active Share but introduce five new categories for Tracking Error where the boundaries are 0-3 percent, 3-6 percent, 6-9 percent, 9-12 percent and >12 percent. This is done for each year in our sample period. The interpretation of this is that the higher the Active Share and Tracking Error measures we get, the higher the active management is.

**Figure 1: Illustration of activity classes**



After the categorization we study how actively managed the funds are in our sample and if it differs over time. In addition, we also study whether the level of active management has any relation with funds performance in Sweden. The performance measure most appropriate for our study is the information ratio. These measures will later be analyzed and compared to clarify if actively managed funds are value adding. Our categorization of funds will hopefully help us answer if actively managed funds are able to outperform their benchmark indices.

To evaluate the performance of the funds we will use the excess return over the benchmark index and two risk-adjusted performance measures; Information Ratio and Sharpe Ratio, where the first one compares fund performance with its benchmark and the latter compares with the risk free rate. The information ratio discloses the level of aggressiveness an active manager takes and if he/she succeeds in generating excess return over the benchmark index. The Sharpe Ratio determines how well the active fund is compensated for the certain risk taken by the active manager. By testing these two measures in combination with Tracking Error and Active Share we can find whether an active fund are compensated for the level of activity and risk taken. The applied period used when studying these measures stretches from 2002-2012 and we will calculate yearly-annualized measures of the Sharpe and Information Ratio. Annualized results make all the funds and benchmark indices comparable and will indicate how the funds have performed on a yearly basis.

## **3.2) Data**

### **3.2.1) Holding Data**

In order to compute Active Share for mutual funds in Sweden we need the portfolio composition for the funds and relevant benchmark index. The stock holdings of the mutual funds are collected from the Swedish Financial Supervisory Authority (FI). Mandatory FI fillings and voluntary disclosures compose the database of mutual funds. The data consists of quarterly observations and stretches from September 2000 until April 2012 (Finansinspektionen, 2012).

### **3.2.2 Management Fees**

To compare expenses and fees to the actual level of activity determined by Active Share, we collect the management fees for each individual fund. The data is gathered from Morningstar and is used to examine if there is any relationship between a funds activity level and its costs.

### **3.2.3) Benchmark Index**

Choosing a benchmark index as relevant as possible for our sample of funds is an important task since this is a central part when calculating Active Share. Finding the correct index is a bit complicated due to the licenses needed to get access to different index weightings. We did get help from SIX Telekurs though and have their permission to use one of their indexes for our calculations. The Benchmark index is called SIX Portfolio Return Index (SIXPRX) and is constructed as a portfolio index where no holding can have a weight over 10 percent. Further on, the holdings that have weights over 5 percent should not together add up to more than 40 percent of the total portfolio weight (SIX Telekurs, 2012). The weight limits are corresponding with the European Union Directive *Undertakings for Collective Investment in Transferable Securities* (UCITS) that the Swedish legal framework for funds is built upon (EU, 2012).

According to our research the most widely used Swedish benchmark index for Swedish equity funds are SIXPRX and therefore we assume it is the most reliable and appropriate index to use as a benchmark. Ideally, we would like to have index weightings of each index that the funds are claiming as their benchmark but considering the time constraint of this thesis and the trouble of getting hold of these we are satisfied with using only SIXPRX. This is a broad

Swedish index with between 270 and 300 stockholdings (SIX telekurs, 2012). In comparison to American benchmark indices the amount of stock holdings is substantially smaller. As a result of using this index the Active Share result for the funds may become lower, on average, than American funds. The index data consists of quarterly observations of the index composition from 2002 to 2012.

### **3.2.4) Data Return**

The closing prices for the mutual funds are collected from Bloomberg's database and are on a monthly basis from 2001 to 2012. The prices for the SIXPRX-Index are retrieved from SIX Telekurs and include dividends. Since we use a benchmark index that includes dividends we assume that the dividends funds receive on the shares are directly reinvested in the constituents of the benchmark index. If this is not the case the funds holds more cash than required and the returns will therefore be affected (Cremers & Petajisto, 2009). The fund returns are net returns, which makes it suitable for comparison. . The data for the fund return is obtained in form of monthly prices for the funds and for the SIXPRX index. We calculate the arithmetic return by dividing this months price by last months price for all the monthly observations and subtract this by one.

$$r_t = \frac{p_{i,t}}{p_{i,t-1}} - 1$$

Where  $r_t$  is the return at time t,  $p_{i,t}$  the price at time t for fund i and  $p_{i,t-1}$  the price at time t-1 for fund i.

### **3.2.5) Sample Selection**

The data of funds composition that is available from FI starts at September 2000 and the latest observations are from December 2011. Naturally, this will be our sample period. We sort out the funds that are mainly investing in companies registered at the Stockholm OMX small cap-list. To include only Swedish equity funds we manually sort out the funds that mainly include bonds and obligations. We also require that the fund hold at least 90 percent of equity in Swedish stocks and that there is data available from at least 2002. That leaves us with 37 Swedish Large and middle-cap equity funds in the sample period of 2000-2012. For each fund, quarterly observation is accessible, but due to the time constraints we choose to use the first observations each year instead of all four observations per year. In total, that gives us 11 observations per fund.

The sample data from FI is free of survivorship bias since it is including both dead and live funds. However, we exclude funds that don't have at least 10 years of observations since this is what we require to get some kind of significance. This means that for example, a fund that exists year 2000 but is terminated 2007 will not participate in our sample. This may be a source of survivorship bias, a concept that is discussed later in the thesis.

### **3.2.6) Processing Data**

The historical fund holdings are collected from FI. The funds with a historical period of minimum 10 years were selected in the sample. The initial data consisted of more than 100 funds registered in Sweden but was reduced to 37 since to the selection criteria was not met for the rest of them. To get statistical significant results at least 30 funds should be included (Westerlund, 2005). Initially, all passive (index) funds and funds of funds were removed since these are not relevant for this study. Funds with large international equity holdings were also excluded, which is in line with Dahlquist et al (2000). This would require additional benchmark indices to control for additional risk exposure (Christiansen, 2005). The data consists of stock holdings and stock prices for all existing mutual funds in the Swedish market. The international stock prices in some of the 37 funds were defined in a foreign currency, which required a transformation into the Swedish krona in order to correctly calculate the weights in the funds. Furthermore, as mentioned earlier, only the funds that complies with the UCITS-directive was included which also are inline with Dahlquist et al (2000) fund selection strategy. According to Cesari and Panetta (2002), using homogenous groups could only do meaningful study and thus we only used large-cap funds in this study.

## **3.3) Measuring active fund management**

### **3.3.1) Calculating Tracking Error**

To measure the dimension of factor timing activity, tracking error is used. It is calculated as the root-mean-square of the difference between portfolio and index return.

$$\text{Tracking Error} = \sqrt{E |(R_p - R_i)^2|}$$

Tracking error is calculated for our sample with the help of monthly returns since in the Swedish market, monthly data provides more credible result when measuring tracking error than daily data. In order to compare the results over different funds the results are annualized

by multiplying with the square root of the number of observations, 12 in our case since monthly data is used. For the tracking error calculations we need the standard deviation for the index returns and the fund returns. The standard deviation measures the spread of values around the mean value. We calculate the standard deviation on a yearly basis with monthly returns over the time horizon used in this thesis. This test will be performed according to the definition mentioned above mainly because it will refine our results of fund activity. But our focus will not only be to measure fund performance but also measure active management, as it is perceived by the fund managers themselves.

### **3.3.2) Calculating Active share**

In order to measure the fund manager's stock-picking activity we apply Active Share. The calculations for active share are quite simple, it is defined as:

$$\text{Active Share} = 1/2 \sum_{i=1}^N |w_{\text{fund } i} - w_{\text{index } i}|$$

Where  $w_{\text{fund } i}$  is the portfolios weight of stock  $i$  in a fund and  $w_{\text{index}}$  is the weight in a benchmark index. The sum is calculated over  $N$  stocks in the fund and the index.. We take the difference between a fund's weight and the index weight for all stocks, summarizing the absolute differences and divide by 2. The dividing by 2 is necessary because it ensures that active share takes on a value between zero and 100 percent. Therefore we can interpret the measure in the following way: Active Share equals the percentage of stock holdings in a fund that differ from that in index. This means that a fund that diverges completely from its benchmark i.e. holds none of the stocks in the benchmark, will have an active share of 100 percent and can be described as 100 percent actively managed. Similarly, if a fund holds all the stocks and in equal weights as the benchmark, it will have an Active Share of 0 percent, and it will be 0 percent actively managed. For all the funds that holds some but not all stocks in the benchmark, or in different weightings, the active share value will be somewhere between 0 – 100 percent when short selling is not allowed (Cremers & Petajisto, 2009).

In order to calculate Active share, both information about each fund holding and benchmark holding at each observation is required. Every single fund was structured into files with yearly observations. To be able to obtain the fund weightings we multiply each of the funds stock holdings with every single stock price to get the market value of each stock holding for every year and for every fund. The weights in every single fund can be calculated by dividing the funds total market value with each stocks market value. This is done manually for each fund.

The reason for this is that the weights are needed for each stock in the fund to compare with the index weight, and compute every single funds active share. The active share calculations proved to be time consuming to such extent that we had no other choice than to calculate fewer observations than we intended to. Instead of 4 observations per year we decided to calculate one instead.

An example of these calculations can be found in Appendix, table 8. In this table we calculated active share for AMF Pension fund. The weights for SIXPRX are subtracted from the AMF Pension fund in absolute values, as defined in the Active Share formula above. The values under the *Difference* heading is then summed and multiplied by 0,5 to obtain the Active Share value for this specific fund.

### **3.4) Measuring Performance**

#### **3.4.1) Calculating Sharpe Ratio**

The first performance measure used is the Sharpe Ratio, which will apply the ex-post Sharpe ratio for the objective of financial performance for Swedish mutual funds. The Sharpe ratio measures the excess return (fund return minus risk-free return) per unit of risk (standard deviation) in a fund and the formula is given by:

$$SR_i = \frac{r_i - r_f}{\sigma}$$

Where,

$SR_i$  is the Sharpe Ratio for fund  $i$

$r_i$  is the return for fund  $i$

$r_f$  is the risk-free return

$\sigma$  is the average standard deviation of the funds return

Sharpe Ratio will be used to rank the performance of Swedish mutual fund managers. The Sharpe ratio is calculated yearly based on the average monthly fund returns and risk free returns, which is then annualized by multiplying with 12. The risk free rate of return that is subtracted from the fund return is the 3-month STIBOR with monthly observations. The fund volatility is the standard deviation of fund return and is calculated yearly with monthly observations, then annualized by multiplying with the square root of 12. Spurgin (2001) argues that an investor must consider the length of the time period used when calculating the

Sharpe ratio since annualized standard deviation of returns tends to give lower volatility. Daily returns have higher standard deviation than weekly returns; weekly returns have higher standard deviation than monthly and monthly have higher standard deviation than yearly. Sharpe (1994) purposed using monthly returns when measuring standard deviation because complications can arise when compounding potential serial correlation if multi-period returns are used. Both statistical tests and descriptive test is implemented in order to observe how closely the level of active management and Sharpe ratio are related for our sample period.

### **3.4.2) Calculating Information Ratio**

Due to the criticism of the Sharpe ratio as a stand alone measure the Information ratio is included as a performance measure to obtain more reliable results. This will be used to capture if there is any relation between the degree of activity in actively managed funds and performance. As mentioned above, the information ratio measures to what extent a portfolio manager succeeds in generating excess return to its benchmark index. Both statistical tests and descriptive test will be implemented in order to observe how closely the level of active management and information ratio are related for our sample period. The formula for Information Ratio is given by:

$$IR_i = \frac{R_i - R_b}{TE(p, b)}$$

Where:

$IR_i$  is the Information Ratio for fund

$R_i$  is the return for the fund

$R_b$  is the return for the benchmark index

$TE(p, b)$  is the tracking error between the fund and its benchmark

The information ratio is defined as the funds excess return over the benchmark index return divided by the tracking error of the fund. Information ratio is calculated on a yearly basis in order for the measure to be comparable with tracking error and active share. Since we already have calculated the tracking error the remaining part is to calculate the funds excess return for each portfolio on a yearly basis (funds yearly return minus benchmark index yearly return).

### 3.5) Statistical Approach

In order to analyze if Active Share and Tracking error has any effect on the performance of funds we run four separate pooling-regressions on all the observations together. The pooling-regression is a simple way to deal with and estimate panel data (Brooks, 2008). This is done with the corresponding yearly Active Share, Tracking error and volatility as explanatory variables. The dependent variables for each of the four regressions consist of excess return over benchmark, excess return over risk-free return, Sharpe ratio and Information ratio. The regressions are conducted for the total sample period in the statistical software program EViews. The four regression models applied are the following:

$$\text{Excess Return (BM)} = \alpha + \beta_1 \text{Active Share} + \beta_2 \text{Tracking error} + \beta_3 \text{Volatility} + \varepsilon_T$$

$$\text{Excess Return (RF)} = \alpha + \beta_1 \text{Active Share} + \beta_2 \text{Tracking error} + \beta_3 \text{Volatility} + \varepsilon_T$$

$$\text{Sharpe ratio} = \alpha + \beta_1 \text{Active Share} + \beta_2 \text{Tracking error} + \beta_3 \text{Volatility} + \varepsilon_T$$

$$\text{Information ratio} = \alpha + \beta_1 \text{Active Share} + \beta_2 \text{Tracking error} + \beta_3 \text{Volatility} + \varepsilon_T$$

Where volatility is calculated on monthly fund returns and transformed to yearly return. This variable is included as a control variable. A control variable is a variable, which is assumed to have an influence on the investigated relationship and are therefore necessary to include in order to eliminate effects that could have an impact on the relationship between activity and performance (Brooks, 2008).

#### 3.5.1) Dealing with Panel Data

Pooling assumes that there is no heterogeneity and no time specificity. To deal with this we used two different component models, the fixed effects-model and random-effects model. We test for fixed effects with the Redundant Fixed Effects LR to see if there is any significant heterogeneity in the pooled model. Similarly, we test for random effects with the Hausman Test to see if there is any remaining correlation in the errors after running the random effects-model. If the test is rejected the random effects model is misspecified and the fixed effects model should be used instead (Brooks, 2008). When dealing with panel data it is also necessary to test for cross section effects and/or period effects. Period effects mean that there is heterogeneity in the time dimension, meaning that the error terms observed in the same time period are correlated. To deal with this, the period random effects model should be implemented and run the Hasuman specification test.

We also need to test for heteroskedasticity, non-normality and multicollinearity. In order to test for heteroskedasticity the residuals has to be squared and than run the regression with the square residuals as the dependent variable and independent variable from the original regression. If the F-test shows any heteroskedasticity than Robust Standard Errors can be used to correct the data. To see if the data is normally distributed the normality-test is applied. Multicollinearity is tested with a correlation matrix off the independent variable. If there exists any correlation over 0,8 between the independent variable there exists multicollinearity and than variables should be removed from the regression (Brooks, 2008).

### **3.6) Methodological Discussion**

In this section we briefly discuss the appropriateness of the study in terms of reliability and validity. The reliability of the study is basically to what extent the results are consistent over time. Validity determines how well the study measures what it intended to measure and how truthful the research results are (Joppe, 2000).

#### **3.6.1) Reliability**

The reliability of this study is subject to two dimensions. Namely, the methods and the data used in this study. The collection of data is described thoroughly above. The sources of the data are FI, Bloomberg, Morningstar and DataStream, which are reliable sources. The decision to exclude funds with a lifetime less than 10 years is due to theoretical assumptions. If we have fewer years than we simply do not have enough observations to get significant results (Brooks, 2005). However, the downside with this approach is that excluding funds that has terminated may cause survivorship bias. Overall we do believe that our set of data and chosen method provides us with a high reliability.

#### **3.6.2) Validity**

The methodological framework for Active Share in this thesis is structured from professor Cremers and Petajisto (2009) research in the American market. The framework for Tracking Error is more conventional and has been used in several other studies. The methods used in this study are therefore considered reliable.

Bryman (2003) discusses the importance of external validity in a study. The interpretation of this is that the results may support a simplification that stretches beyond the actual cohesion examined. Cremers and Petajisto (2009) examines the American Fund market, which is significantly greater than the Swedish fund market. The American fund market is also obedient to a different set of regulations than the Swedish, which may suggest that the results from USA not necessarily correspond with results from Sweden.

## 4) Empirical Findings

In this section the test results concerning Swedish mutual fund activity and performance are presented. Swedish Fund activity will be measured in two stages. In the first part of this chapter, Active Share will be presented as a stand alone measure in combination with the performance measures Sharp ratio and Information ratio. In the second part Active Share will be presented in combination with Tracking Error for more refined results. To detect if there are any correlation between active fund management and fund performance in Sweden we will introduce the Sharpe ratio and Information ratio, which is based on our calculations explained in the previous chapter.

### 4.1) Active Share

In this section, Swedish fund activity is presented with Active Share as a stand alone measure. This is later combined with fund performance to establish to what extent Swedish funds are actively managed and if there exists any relation between active funds and performance.

#### 4.1.1) Distribution of funds active share

The active share distribution across time and across our earlier specified categories is presented in table 1 below:

Table 1		Active Share: Fund Categorization					
Date	0-20%	20-40%	40-60%	60-80%	80-100%	Total	
2001	4	20	11	2	0	37	
2002	4	20	11	2	0	37	
2003	6	21	9	1	0	37	
2004	1	26	8	2	0	37	
2005	2	24	9	2	0	37	
2006	1	23	9	4	0	37	
2007	4	22	9	2	0	37	
2008	3	26	5	3	0	37	
2009	4	23	8	2	0	37	
2010	3	22	9	3	0	37	
2011	3	22	9	3	0	37	
2012	2	22	10	2	1	37	
Total	37	271	107	28	1	444	
Average	3,083	22,583	8,917	2,333	0,083	37	
% of Total funds	8,33%	61,01%	24,10%	6,31%	0,23%	100%	

The average Active Share for all funds across the sample period is 35,5%, which means that, on average, around 65% of the asset invested overlap with the benchmark index. In other

words, when measuring Active Share on an aggregate level we can establish that Swedish funds has 35,5 percent potential in beating the benchmark index SIXPRX.

**Figure 2: Average Active Share based on 37 funds**

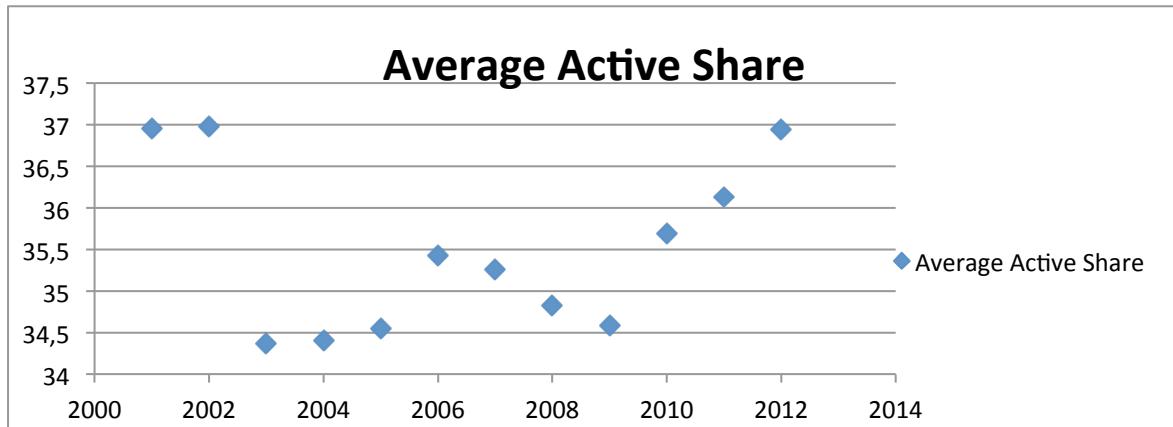


Table 1 and Graph 1 display the evolution of active share through the sample period. As presented above, the average Active Share has been on a steady level. The majority of Swedish funds included in this study have an Active Share of 20-40%. On average, in the sample period from 2001-2012, 61% of the funds in Sweden are distributed in the second lowest category. The category with the second highest active share is 40-60% with 24,10% of total funds studied, whereas the most active class with active share of 80-100% contains only 0,23%. Important to note is that only one observation was found in this category during the sample period, and therefore this category was excluded from the performance tests.

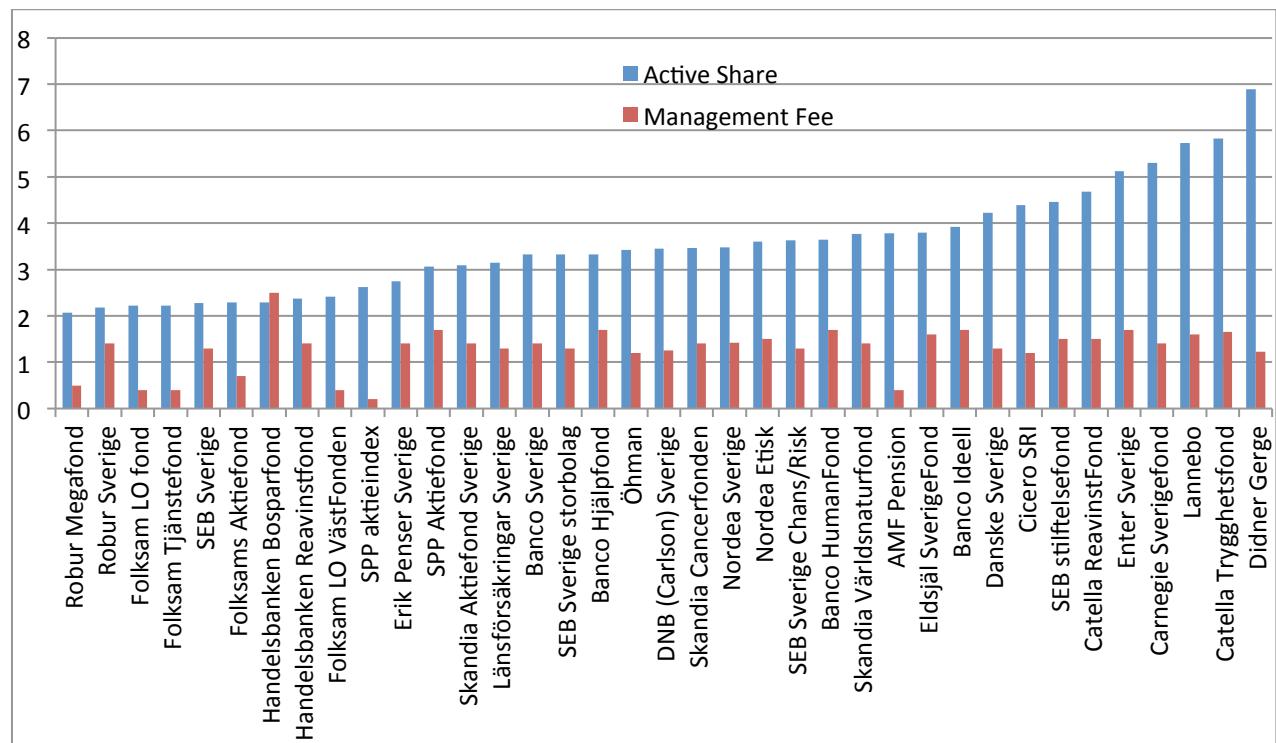
Swedish active equity funds seem to follow the benchmark index more than American funds tend to. Our study reveals that 69,3% of active funds in Sweden have an Active Share below 50% while Cremers and Petajisto (2009) found that 16,6% of their sample had an active share below 50%. However there is a reasonable explanation to this. The benchmark index often used for fund managers (SIXPRX) consist of between 270-300 stock holdings while American benchmark indices can contain up to 5000 stocks. Hence, Swedish indices can be replicated much easier and to a lower cost than the American benchmark indices, however American fund managers are provided with greater opportunities to differentiate the fund portfolio.

#### 4.1.2) Relationship between Active Share and Management Fees

Graph 2 displays the average Active Shares relation to management fees for each of the 37 Swedish equity funds through the sample period.<sup>2</sup> The Graph demonstrates graphically the development of management fees as Active Share increases. The funds invested in Sweden should according to theory base their management fees on the level of active management.

There seem to be a moderate relationship between actively managed funds and the fees investors have to pay. The funds with smallest management fees appear to have the lowest activity apart from some exceptions. The trend in this study seems to follow Cremers and Petajistos (2009) research. They detected that most of the passive funds in their sample had a lower fee and vice versa which are overall in line with the Swedish funs included in this study.

**Figure 3: Relationship between Active Share and Management fees for 37 funds**



<sup>2</sup> Active share is rescaled (divided by 10) in order to display the relation between Active Share and management fees.

#### 4.1.3) Performance Measures

**Table 2**

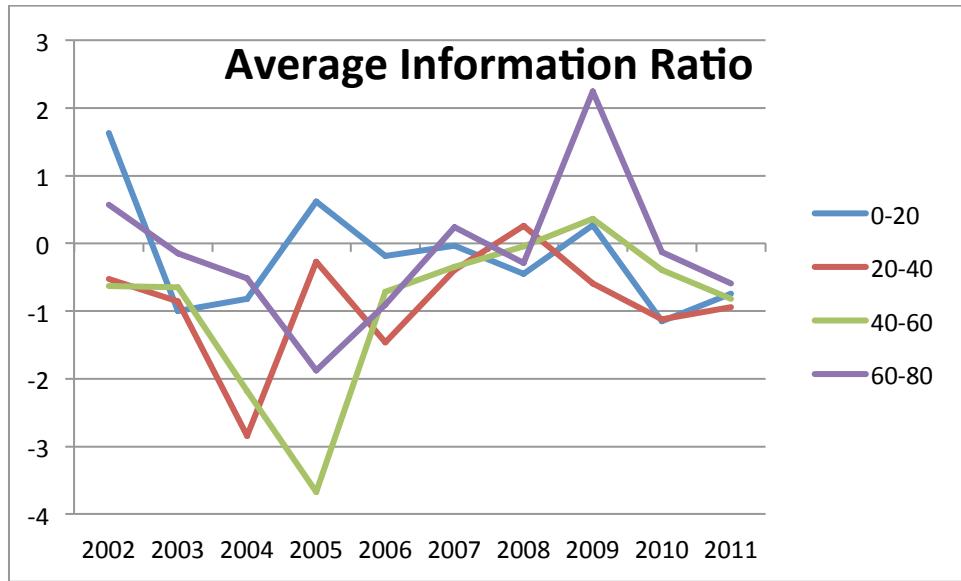
Excess return and performance measures relative A-S categories					
Category	Avg A-S	Ex.Ret. (Bm)	Ex.Ret. (Rf)	IR	SR
<b>0-20</b>	17,86	-0,01	0,06	-0,36	<b>0,70</b>
<b>20-40</b>	31,40	-0,02	0,06	-0,88	0,69
<b>40-60</b>	49,38	-0,02	0,06	-0,91	0,64
<b>60-80</b>	66,06	<b>0,02</b>	<b>0,10</b>	<b>-0,14</b>	0,66

Table 2 displays the average benchmark adjusted Excess returns, Information ratio and Sharpe ratio for different Active Share-levels. Sharpe and Information ratios are benchmark-adjusted against the risk free rate and the SIXPRX-index. The Ex. Ret. (Bm) stands for the funds excess return over SIXPRX-index and Ex Ret. (Rf) is the excess return over the risk free rate.

Table 2 reveals interesting results for the reason that the funds with the highest Active Share generate the highest excess return on average. Funds with the highest Active Share generate 2% higher return than benchmark and in the lowest category funds generate the same return as the benchmark index. For both categories in between their excess return is most negative. All funds have a positive excess return over the risk free rate. The group with the top activity based on the highest Active Share has an average excess return of 10%, followed by the other groups that in average generate an excess return of 6%.

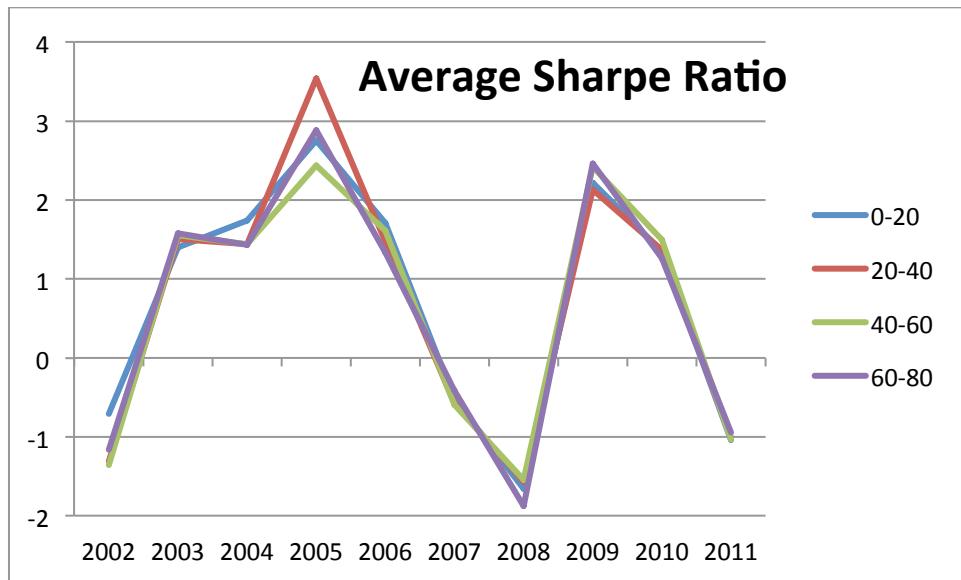
Regarding the performance measures it is perhaps more surprisingly the funds with the lowest Active Share that has the highest values for the Sharpe ratio. This can partly be explained in Graph 2 above, where, in general, the funds with the lowest level of Active Share has also the lowest fees which contributes to a higher excess return and in turn more positive or less negative performance measures. The information ratio is highest for the most active category but is on average negative for all the categories of funds, which leads to believe that all funds underperform in comparison with the benchmark index. However the funds with the lowest and highest Active Share perform better than the ones in between.

**Figure 4: Average Yearly information Ratio for different fund-categories**



The average yearly Information ratio differs quite a lot for different fund-categories over time. The category of 0-20% seems to be the most stable over time and the 60-80% reach the highest Information ratio by far for a single year. The funds in the 20-40% and 40-60% categories seldom generated a positive Information ratio.

**Figure 5: Average Yearly Sharpe Ratio for different fund-categories**



In Graph 4, the average yearly Sharpe ratio is presented for the funds in different categories. The categories are almost perfectly correlated. Obviously, it is hard to differentiate the categories with Sharp ratio suggesting that this measure is not optimal as a stand alone

performance measure over this sample period. The distance is largest for the year 2005, but overall it differs too little to draw any conclusions if some of the fund category outperforms another.

In order to show the relationship between activity and performance on the individual funds Table 3 is presented.

<b>Table 3 Average AS, TE, EX.Ret(Bm), SR &amp; IR</b>					
Fund	Active Share	Tracking Error	Ex.Ret (Bm)	Sharpe Ratio	Information ratio
Didner Gerge	68,83%	6,87%	3,10%	0,630	-0,027
Catella Trygg.	58,23%	-	-	-	-
Lannebo	56,88%	4,73%	0,66%	0,598	-0,617
Carnegie Sv.	52,95%	4,68%	-0,42%	0,744	-0,326
Enter Sv.	51,26%	3,78%	-0,26%	0,771	-0,483
Catella Rea.	46,78%	4,07%	-0,25%	0,786	-0,288
SEB stiftelse	44,65%	5,43%	-0,46%	0,625	-0,957
Cicero SRI	43,84%	3,34%	-1,81%	0,707	-0,964
Danske Sverige	42,57%	4,42%	-0,21%	0,665	-0,442
Banco Ideell	39,23%	4,28%	-3,32%	0,705	-0,819
Eldsjäl Sv.	37,98%	-	-9,05%	-	-
AMF Pension	37,78%	3,67%	1,40%	0,867	0,118
Skandia VNF	37,65%	3,12%	-2,62%	0,641	-0,926
Banco Human	36,37%	4,22%	-5,70%	0,478	-1,503
SEB Sv. Ch/R	36,35%	4,81%	-2,87%	0,738	-1,530
Nordea Etisk	36,05%	3,02%	-2,16%	0,598	-1,429
Nordea Sv.	34,72%	3,59%	-3,14%	0,707	-1,001
Skandia Cancer	34,58%	3,01%	-2,25%	0,659	-0,868
DNB Sverige	34,49%	2,56%	-1,82%	0,734	-0,948
Öhman	34,19%	4,63%	-5,85%	0,432	-1,545
Banco Hjälp	33,26%	3,91%	-5,47%	0,518	-1,514
SEB Sv. storbolag	33,24%	3,26%	-4,30%	0,612	-1,462
Banco Sverige	33,20%	-	-	-	-
LF Sv.	31,66%	3,54%	-1,93%	0,712	-0,847
Skandia Aktie Sv.	30,95%	3,06%	-0,81%	0,787	-0,934
SPP Aktie	30,64%	3,24%	-1,97%	0,684	-0,759
Erik Penser Sv.	27,50%	-	-	-	-
SPP aktieindex	26,17%	3,43%	-2,81%	0,689	-0,786
Folksam LO V.	24,18%	-	-	-	-
Handelsb. Rea.	23,77%	2,81%	-1,89%	0,682	-0,850
Handelsb. Bo.	22,94%	3,62%	-5,09%	0,444	-1,707
Folksams Aktie	22,92%	-	-	-	-
SEB Sverige	22,82%	2,85%	-3,58%	0,649	-1,345
Folksam Tjänst	22,18%	-	-	-	-
Folksam LO	22,17%	-	-	-	-
Robur Sv.	21,84%	3,13%	-2,19%	0,707	-0,488
Robur Mega	20,65%	2,59%	0,13%	0,811	0,199
Upper half	44,26%	4,19%	-0,017	68,23%	-75,38%
Lower Half	27,30%	3,28%	-0,029	65,08%	-99,89%
Correlation		75,89%	47,28%	5,35%	34,94%

Table 3 displays the Swedish equity funds sorted from highest average Active Share to lowest. The funds are divided into two groups, *upper half* and *lower half* of Active Share, where the average of each group is calculated. The funds in the upper half of Active Share have a higher average of Tracking error, excess return, Sharpe ratio and information Ratio than the lower half of Active Share. This table especially indicates that Active Share and Tracking error is related. These measures have a correlation of 0,759 out of 1, which can be regarded as a high correlation. There seems to be a very small relationship between Active Share and the Sharpe ratio, which raise some doubt about fund managers stock picking ability. However, it may be due to the fact that Sharpe ratios penalize standard deviations equally. It has an inability to differentiate between whether a high standard deviation is due to large upside deviations or downside deviations (Kidd, 2011).

## 4.2) Tracking Error & Active Share

Cremers and Petajisto (2009) suggest that in order to find more refined results; Active share should be combined with Tracking error.

### 4.2.1) Distribution of funds Tracking error

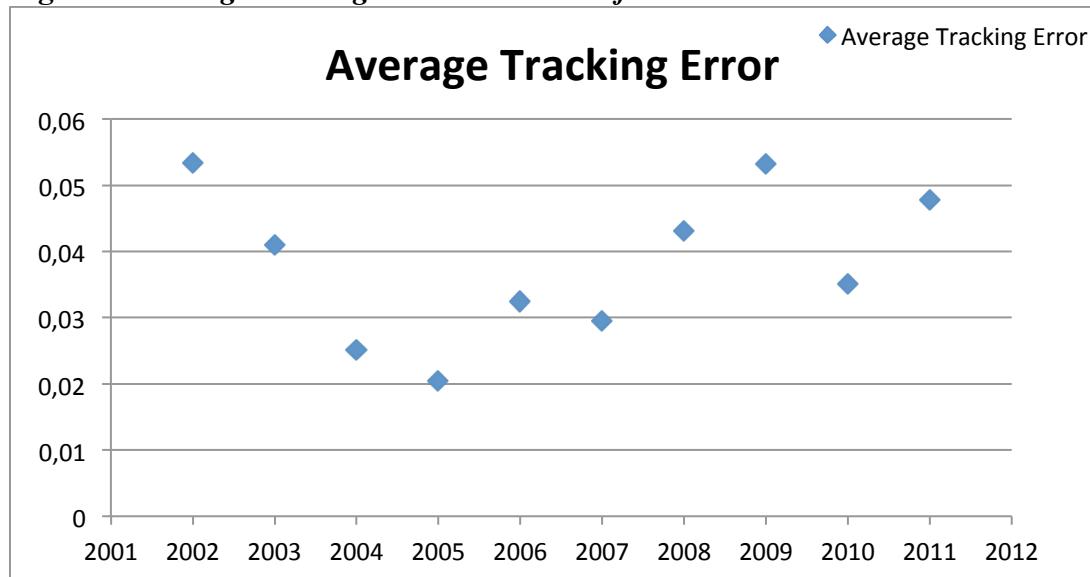
Tracking error is first introduced as a stand alone measure on active fund management and later combined with Active Share. The Tracking error distribution across time and across our earlier specified categories is presented in *Table 4* below:

Table 4 Tracking Error fund categorization						
Date	0-3%	3-6%	6-9%	9-12%	>12%	Total
<b>2002</b>	1	17	10	0	1	29
<b>2003</b>	4	22	3	0	0	29
<b>2004</b>	24	4	1	0	0	29
<b>2005</b>	26	3	0	0	0	29
<b>2006</b>	11	17	1	0	0	29
<b>2007</b>	19	10	0	0	0	29
<b>2008</b>	9	14	4	2	0	29
<b>2009</b>	1	22	3	1	2	29
<b>2010</b>	9	19	1	0	0	29
<b>2011</b>	6	19	3	0	1	29
<b>Total</b>	110	147	26	3	4	290
<b>Average</b>	11	14,7	2,6	0,3	0,4	29
<b>% of Total funds</b>	38%	51%	9%	1%	1%	100%

Table 4 contains yearly distributions of Tracking Error for all the funds in our sample<sup>3</sup>. It shows that a Tracking Error of 3-6 % is by far the most common category followed by the category of 0-3 %, suggesting that the tracking error of the funds included in the sample are mainly concentrated in the lower and middle part of the spectrum. The distribution of Tracking error is similar to the distribution of Active Share, displayed in Table 1, where most of the funds were classified in the second lowest activity category. The existence of a strong relationship between these measures can further be strengthened by a high correlation, which is consistent with Cremers and Petajisto (2009) study.

Tracking error is presented as a stand alone measure, with a yearly average through the sample period, in Graph 5. It shows how Tracking Error has developed in this sample period. It has been fairly stable and stretches within the interval of 2-6%, which is quite low comparing to Cremers and Petajisto (2009).

**Figure 6: Average tracking error based on 29 funds**



In order to combine Active Share and Tracking Error results, 154 Active share calculations were removed from the sample because returns for several funds were inaccessible and therefore tracking error could not be calculated. This provides the study with 290 observations for each of the two measures. Results from Table 5 shows that a large amount of Swedish

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<sup>3</sup> We did not have access to all funds return so we were only able to calculate Tracking Error for 29 of our total 37 funds.

funds, a total of 56 percent of total funds, is distributed in the area of 20-40% Active Share combined with 0-3% - 3-6% Tracking error.

<b>AS/TE</b>	<b>0-3%</b>	<b>3-6%</b>	<b>6-9%</b>	<b>9-12%</b>	<b>&gt;12%</b>	<b>Total</b>
<b>0-20</b>	10	12	1	0	1	24
<b>20-40</b>	81	80	7	0	1	169
<b>40-60</b>	17	47	11	1	0	76
<b>60-80</b>	1	10	6	2	2	21
<b>80-100</b>	0	0	0	0	0	0
<b>Total</b>	<b>109</b>	<b>149</b>	<b>25</b>	<b>3</b>	<b>4</b>	<b>290</b>

#### **4.2.2) Fund activity in relation to fund Performance**

In order to investigate whether Active Share and Tracking error has a statistically significant effect on fund performance regression analysis are implemented. The empirical findings are displayed in Table 6 below:

**Table 6**

<b>Dependent/Independent</b>	<b>Active Share</b>	<b>Tracking Error</b>	<b>Volatility</b>	
<b>Excess Return (BM)</b>	0,003	0,611	0,093	<i>coefficient</i>
$r^2=0,103761$	0,023	0,173	0,054	<i>std. Error</i>
$n=290$	0,905	0,001	0,089	<i>p-value</i>
<b>Excess Return (RF)</b>	-0,211	3,892	-2,71	<i>coefficient</i>
$r^2=0,272848$	0,162	1,54	0,196	<i>std. Error</i>
$n=290$	0,194	0,012	0	<i>p-value</i>
<b>Information Ratio</b>	0,154	11,469	6,47	<i>coefficient</i>
$r^2=0,203381$	0,517	4,856	1,449	<i>std. Error</i>
$n=290$	0,766	0,019	4,465	<i>p-value</i>
<b>Sharpe Ratio</b>	-0,691	9,466	-13,696	<i>coefficient</i>
$r^2=0,314322$	0,914	5,38	0,738	<i>std. Error</i>
$n=290$	0,45	0,08	0	<i>p-value</i>

In total four different regressions are run for the sample of 29 funds over 11 years. One for each of the four dependent variables; Excess return over Benchmark Index, Excess return over Risk Free rate, Information Ratio and Sharpe Ratio. The independent variables are constant for all regression and consist of Active Share, Tracking Error and Volatility. All regressions suffer from non-normality but this is not unusual when dealing with financial data, and should not be a problem since it asymptotically follows a normal distribution (Brooks 2008). When testing for Excess Return (Bm) there is no heteroskedasticity, however

there exist cross-section random effects so a panel estimated generalized least square-regression is used. Testing for the three other regressions heteroskedasticity is found and corrected with Whites Cross-Selection.

The p-value for Tracking Error is significant, implying that there is positive relation between Excess Return and Tracking Error. When testing for Excess Return (RF) Tracking Error is positively related with Excess Return while volatility is negatively correlated. Regarding Information Ratio, Tracking Error is the only variable that shows a positive explaining power. A negative relationship can be seen for the volatility and the Sharpe Ratio. Notable is that Active Share fails to show any significance when explaining the excess returns and performance measures. However, Tracking Error does the opposite for all independent variables except for the Sharpe Ratio.

Descriptive findings are displayed in Table 6 below. Here we introduce interesting results concerning the benchmark-adjusted returns for the sample<sup>4</sup>. The most active levels of Tracking Error with an average of 12% and an Active share of 65,85% produces the highest returns for all different measures except the Sharpe Ratio. The funds in the low category, with average Tracking error of 2,7% and Active Share of 18,97%, performs remarkably worse during this sample period, except for the Sharpe Ratio were it is slightly better. These results are similar to the results of Cremers and Petajisto (2009). This outcome indicates that the most active funds have a stock-picking ability that makes it possible for them to outperform the benchmark indices, even after fees.

<b>Table 7 Comparison between different groups of activity</b>						
<b>Category</b>	<b>TE</b>	<b>AS</b>	<b>ER (Bm)</b>	<b>ER (RF)</b>	<b>IR</b>	<b>SR</b>
<b>High AS/TE</b>	0,120352	65,85773	<b>0,13904</b>	<b>0,181703</b>	<b>1,057427</b>	0,313796
<b>Middle AS/TE</b>	0,04418	40,34471	-0,01427	0,028389	-0,34016	0,339597
<b>LOW AS/TE</b>	0,027405	18,97912	0,007142	0,049805	0,20721	<b>0,375566</b>

Noticeable is that the funds in the middle category regarding Tracking error and Active Share, with an average of 4,4% and 40,34% respectively, is performing far worse than the high and low categories. This is similar to the results when investigating the performance measure of

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<sup>4</sup> The sample period for this test are shortened to 2008-2011 due to a lack of observations that consists of both high TE and AS. Finding funds with low TE and AS was not a problem tough.

Active Share alone. Overall, Table 6 states in general that when Swedish fund managers applies high activity they outperform its benchmark index.

## 5) Analysis

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*The analysis section contains interpretations and analysis regarding the empirical findings explained in the previous section. The results will be compared with theory and previous studies. The analysis is structured in two parts: Analysis of fund manager's activity and secondly their performance. Since there have not been made any substantial research in Sweden in the area of active fund management, measured with Active share, the empirical findings will mainly be compared to Cremers and Petajistos (2009) study.*

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### 5.1) Activity

Swedish fund managers have implemented a rather low activity level when comparing to American fund managers. Cremers and Petajisto (2009) discovered in their research that 83,6% of the funds in their sample had an Active Share above 50%. The Average Active share for American large-cap equity funds was approximately 65%. In contrast, this study shows that only 16,55% has an active share above 50% and Swedish large-cap equity funds has an average Active Share of 35,5% across the sample period. The difference in Active Share can partly be explained by the difference in size of Swedish and American stock markets and benchmark indices. After all, American fund managers have considerably more stocks to choose from and therefore greater opportunities to differ from benchmark. In addition, American benchmark indices hold a significantly higher amount of stocks. Consider a fund with a holding of 50 stocks, which is not uncommon in neither Sweden nor America, and two benchmark indices, one with 300 and the other one with 5000 stock holdings. The fund will intuitively have a higher Active Share when compared to the benchmark index of 5000 stock holdings than the one with 300 stock holdings. Hence, comparison of fund activity with Active Share across funds with different usage of benchmark indices will not be entirely correct. Considering that the 37 funds generally use the same benchmark index, the funds activity can be compared with Active Share as a stand alone measure.

When measuring activity with Tracking error it turns out that it is similarly distributed as Active Share with a fund distribution of 89% in the two lowest categories whereas the two lowest categories of Active Share stands for 69 % of the observations. Tracking error

corresponds with the results obtained from Active Share that the Swedish equity funds are to a great extent semi-actively managed. The study shows that these two measures have a positive correlation of 0,759 which are in line with Cremers and Petajisto (2009). Although they are correlated, a fund within our sample is distributed in the lowest category of Active share and at the same time distributed in the highest Tracking error category<sup>5</sup>. That specific fund is mainly using the factor timing approach and will thus delude research made with only Active Share and be classified as a passive managed fund and vice versa. Therefore it is of great importance to distinguishing between the stock picking approach and factor timing approach to find reliable results of active managed funds.

The average level of Active Share has developed fairly constant during the sample period. Overall, the year with the highest Active Share on average was 2002 with a value of 36,98% while the lowest Active Share was 34,36% which was observed in 2003. There is almost a non-existing observed trend regarding whether Active Share tends to decrease or increase over time. This suggests that Active Share is a good predictor for next year and the year after that. In contrary, Cremers and Petajisto (2009) proved that there exists a clear time trend toward lower Active Share from 1987-2003 in America. However, from 2009 until 2012 the average Active Share in Sweden seems to increase at a slow pace from 34,58% to almost 37%. This slight increase may be related to the fact that Cremers and Petajistos (2009) refuted earlier studies of active management and showed that high Active Share was correlated with high excess return. Fund managers have recognized these results and they could therefore have incentives to take more active bets.

## **5.2) Activity and Performance**

### **5.2.1) Statistical Approach**

The results of the regressions points out two things of particular interest, namely that Tracking Error is positively significant for all the dependent variables except the Sharpe Ratio, and that Active Share is not significant for any of the dependent variables. Interpreting these results, one can say that a higher Tracking Error leads to a higher excess return and Information Ratio while Active Share has no impact what so ever on the mentioned measures. A possible explanation for the lack of relationship between Active Share and the independent variables

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<sup>5</sup> For more information about the fund distribution between Active Share and Tracking error turn to Table 4

may be that we have few observations that have an Active Share over 60%, and this is according to Cremes and Petajisto (2009) the group of funds that is most likely to generate an excess return. Worth mentioning for these regressions are that the funds are not sorted into different categories because of the lack of observations in the top-quintile. Instead all of the funds are tested as the same group; leading to that no interpretation can be made about if the top quintile of Active Share funds performs better or worse than the others. However, Tracking Error is significant which lead one to conclude that activity, in terms of factor timing is rewarded with greater excess return. This is in line with the results in the descriptive approach and the results Cremers and Petajisto (2009) found out regarding Tracking Error. Moreover the control variable volatility is significantly negatively correlated with Excess return over risk free rate and with the Sharpe Ratio. The latter is perhaps not a surprise since the definition of the measure requires a higher excess return per taken amount of volatility to generate a positive Sharpe Ratio. An explanation for the lack of significance between Sharpe Ratio and Active Share/Tracking Error may be that this sample period is overall very volatile, including the turbulence by the start of the 21st century and later the financial crisis. Kidd (2011) points out that the Sharpe Ratio has been criticized for its dependence on standard deviation and that when the stock market is very volatile it may be skewed one way or another. Considering this sample period a volatile one, a cautious approach would be recommended when analyzing the Sharpe Ratios.

### **5.2.2) Descriptive Approach**

Previous studies suggest that actively managed funds cannot outperform their benchmark indices. This is corresponding to the large part of the sample. All categories of 0-60% fail to generate excess return over the benchmark index indicating too high fees relative to the level of activity and/or that these categories consists of closet index funds.

The study also shows that funds with the most active levels of Active Share seems to have stock-picking ability and produce the highest excess return. The Active Share category of 60-80% produces an average excess return of 10% over the risk free rate and 2% over the benchmark return. These findings are quite similar to Cremers and Petajisto (2009) results but their tests showed even higher excess return for the highest Active Share quintile. Furthermore, this category generates the least negative Information ratio and second lowest Sharpe ratio while the lowest quintile of active share produces the highest results for the Sharpe

Ratio. Notable is that the average Information ratio is negative for the highest category while the excess return is positive. According to the interpretation of this measure the fund managers are not compensated enough for the amount of risk taken. The same applies to the other categories although this comes as no surprise since they have negative excess return.

When both activity measures were applied in combination with the performance measures the same interpretation and ranking can be applied as when using Active share as a stand alone measure. The highest category still generates the largest return even though this is only tested for the last four years. Comparing this sample period with the previous, a striking difference can be observed, namely that the Information ratio is now positive for the highest and lowest activity group. When Tracking error is included in the results the highest activity categories are changed which can partly explain the positive information ratio. But since the sample period differs, conservative conclusion ought to be made regarding the relationship between activity and the Information ratio. Overall, the results shows that high fund activity, when measured with both Active Share and Tracking error, increases fund performance in Sweden.

Regarding the middle group of fund activity, it produces the lowest results for the two performance measures and excess return. The middle categories high fees relative to activity could explain this. When studying Graph 2 we can decipher high fees on medium active managed funds. These fees devour a possible return for investors. As Cremers and Petajisto said “an active manager can only add value relative to the index by deviating from it”, thus when fund managers charge high fees, the only way to compensate for these fees is to deviate the funds portfolio holdings in comparison to the benchmark index, otherwise the investors will suffer.

Overall, Swedish funds do not over perform the benchmark index. The excess return is -1,98% for all funds included in this study through the sample period, with an average Active Share of 35. These findings are similar to Cremers and Petajistos (2009) results and other previous Swedish studies (Dahlquist, Engström & Söderlind, 2000).

However, we have analyzed our findings assuming that the factor of survivorship bias does not have a major impact. Grinblatt and Titman (1994) proved that the effect of survivorship bias was only 0.5 % per year. Supposing a similar effect on this study’s results would not have a significant effect on the results. On the other hand, Maikel (1995) argues that

survivorship bias may have a significant impact when implementing these kinds of studies. Considering that a majority of the 37 funds in this sample fall into the lowest categories of activity, it is more intuitive to believe that any non-surviving fund was a part of one of these categories. If this hypothesis holds, this would affect the result of the lowest activity categories in a slightly negative way. However, the results for the highest activity category would be unchanged. On the contrary, this is pure speculation, even though it seems like intuitive speculation we have to beware that there is a possible effect of survivorship bias.

## 6) Conclusion

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*This chapter contains a conclusion of the empirical findings and the analysis in this study.*

*Results found in this thesis will be compared with those previous studies that can be found within the area of active management.*

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Traditionally, Tracking error is often used when studying fund activity and it measures how fund prices tracks the benchmark prices. According to Cremers and Petajisto (2009), this measure fails to capture one of the two different dimensions of activity, namely stock-picking. In this thesis the active management of Swedish equity funds is studied during the last decade. These funds are examined and analyzed with the customary measure Tracking Error and the new acknowledged activity measure called Active Share in order to capture the two dimensions of activity. By measuring how the fund deviates from the benchmark index in terms of portfolio holdings, the degree of active management with regards to stock picking can be obtained in percent. As Active Share puts equal weights to all active bets irrespective of diversification, the level of stock picking can be discovered.

Swedish equity funds have an average Active Share and Tracking error of 35% and 3,8% respectively. This means that, on average, 65% of equity in funds is invested in accordance with the benchmark index. The biggest proportion of funds in Sweden has an Active Share between 20-40%. A total of 83,45% of funds has an Active Share below 50% while Cremers and Petajisto (2009) discovered in their research in US that 16,6% have their sample had an Active Share below 50%. Swedish fund activity is regarded as low according to Cremers and Petajisto (2009). They classify funds with an Active Share below 40% as closet index funds. However, Active Share of Swedish and American fund cannot be compared unless they use resembling sizes on benchmark indices. But the conclusions can be made that equity funds in Sweden follow the benchmark index to a greater extent than American funds. The biggest proportion of Swedish funds has a Tracking error of 3-6%, which is also regarded as low fund activity. Nevertheless, a positive trend of activity seems to have started in 2009 and continued until today when looking at average Active Share through time. In 2009, the average Active share was 34,58% while at the end of 2011, the Active Share was almost 37%, which is the biggest increase during the sample period. This can be explained by fund managers recognition and usage of Active Share since 2009.

In order to statically examine if Active Share and Tracking error has any effect on the performance of funds, four separate pooling-regressions were performed. Interestingly, our results show that Active Share has no significant explaining power on excess return over benchmark, excess return over risk-free rate, Sharpe ratio or the Information Ratio. In contrast, Cremers and Petajistos (2009) findings show that Active Share has a significant explaining power on excess return. However our descriptive results show that funds with high Active Share have the highest excess return. This insignificance can partly be explained by the small amount of observations in the highest categories of Active Share and a large amount of observations in categories with semi-low Active Share. However, Tracking Error has a significant effect on excess return over benchmark, excess return over risk-free rate and the Information Ratio. Therefore, the conclusion can be made that activity in form of factor timing is rewarded with greater excess return. In conclusion, for the funds in our sample Active Share has no relation with fund performance while Tracking Error do.

## **7) Suggested future research**

Based on this thesis, a couple of ideas regarding future research have occurred. Firstly, the data used could be extended to include a larger set of funds and over a longer sample period, hopefully this could be done in a few years when more observations are available. This way a higher reliability could be reached. Secondly, the study could include non-existing funds and thus directly deal with the uncertainty of survivorship bias. Thirdly, in order to be able to reach findings with a greater certainty, it would be interesting to include more indices. However, one should be aware that calculating Active Share manually for each fund is very time consuming, and perhaps something that a student at the bachelor or master level should be aware of if he/she considers future research in this area.

## 8) Appendix

**Table 8:**

An example of an Active Share calculation.

AMF Pension Fund	Fund Weight(%)	SIXPRX	Benchmark Weight(%)	
ALFALAVAL AK	3,0411697	ABB	0,94	0,94
ASTRAZENECAK	6,0711712	ACAD-B	0,00	0
BERGMAN AK B	0,4268446	ACAP-B	0,01	0,01
BOLIDEN AK	2,775808	ACOM	0,00	0
CAPIO AK	0,6074174	ACSC	0,01	0,01
ELEKTA AK B	1,2354425	ACTI	0,09	0,09
ERICSSON AK B	9,9174278	ADDT-B	0,07	0,07
FÖRENSPARB AK A	3,0116346	AFAB-B	0,02	0,02
H&M AK B	8,7405515	AFFS-B	0,01	0,01
HANDELSB AK A	4,2383834	ALFA	0,54	2,5011697
IFS AK B	0,9818259	ALIV-SDB	0,16	0,16
INVESTOR AK B	6,5563915	ANGP-B	0,04	0,04
JM AK	0,2196198	ANOD-B	0,02	0,02
KINNEVIK AK B	1,6558492	ANOT	0,10	0,1
MICRONIC AK	1,1838332	ARTI-B	0,01	0,01
NETONNET AK	0,2247818	ASP	0,02	0,02
NIBEINDUST AK B	0,7086144	ASSA-B	1,33	1,33
NOBIA AK	2,4655732	ATCO-A	3,17	3,17
NORDEA AK	4,4978458	AUDV-B	0,02	0,02
PEAB1 AK B	0,269219	AXFO	0,35	0,35
QMED AK	1,5879459	AXIS	0,11	0,11
SAAB AK B	4,8244193	AZA	0,08	0,08
SANDVIK AK	1,745382	AZN	4,05	2,0211712
SCANIA AK B	4,4125726	BALD-B	0,03	0,03
SEB Deposit	0	BALL	0,05	0,05
SECOTOOLS AK B	1,6204066	BCOR	0,05	0,05
SECURITAS AK B	2,7843289	BEIA-B	0,06	0,06
SKANSKA AK B	4,2348348	BEIJ-B	0,03	0,03
SSAB AK A	2,7586696	BELE	0,02	0,02
TELE2 AK B	4,8863828	BERG-B	0,09	0,3368446
TELELOGIC AK	0,3444038	BILI-A	0,10	0,1
TELIASONER AK	2,3938487	BILL	0,15	0,15
VOLVO AK B	8,5484828	BINV	0,02	0,02
ÅrhusKarlshamn	1,0289175	BIOG-B	0,01	0,01
<b>Sum</b>	<b>100%</b>	BIOP	0,01	0,01
		BIOT-A	0,03	0,03
		BLIN	0,00	0
		BOL	0,53	2,245808
		BONG	0,02	0,02
		BOSS	0,04	0,04
		BRG-B	0,00	0

BRIN-B	0,05	0,05
BRIO-B	0,01	0,01
BRO-B	0,15	0,15
BTS-B	0,02	0,02
BURE	0,04	0,04
CAP	0,34	0,2674174
CAPO	0,08	0,08
CAR	0,22	0,22
CARD	0,17	0,17
CASH-B	0,02	0,02
CAST	0,35	0,35
CCOR-B	0,06	0,06
CFA-B	0,16	0,16
CHER-B	0,03	0,03
CLAS-B	0,28	0,28
CNTA	0,01	0,01
CONS-B	0,01	0,01
CTT	0,02	0,02
CYBE	0,01	0,01
DAYD-B	0,00	0
DIAM-B	0,02	0,02
DORO-A	0,00	0
DURC-B	0,00	0
DV	0,00	0
EKTA-B	0,32	0,9154425
ELAN-B	0,03	0,03
ELGR-B	0,01	0,01
ELUX-B	1,85	1,85
ENEA	0,06	0,06
ENRO	0,52	0,52
ERIC-B	10,07	0,1525722
EXPA-B	0,01	0,01
FABG	0,41	0,41
FAG	0,05	0,05
FEEL	0,01	0,01
FING-B	0,00	0
FIX-B	0,02	0,02
FPAR	0,05	0,05
FRAM	0,03	0,03
FSPA-A	3,32	0,3083654
GAMB-A	0,85	0,85
GETI-B	0,64	0,64
GIAB	0,03	0,03
GLOC	0,03	0,03
GUNN	0,10	0,1
GVKO-B	0,03	0,03

HAGQ	0,05	0,05
HAKN	0,42	0,42
HAV-B	0,01	0,01
HEBA-B	0,05	0,05
HEMX	0,06	0,06
HEXA-B	0,47	0,47
HIQ	0,06	0,06
HL-B	0,03	0,03
HLDX	0,10	0,1
HM-B	6,39	2,3505515
HOGA-B	0,17	0,17
HOLM-B	0,64	0,64
HUFV-A	0,32	0,32
HUMA	0,01	0,01
IBS-B	0,06	0,06
ICON	0,04	0,04
ICTA-B	0,01	0,01
IFS-B	0,06	0,9218259
IJ	0,16	0,16
INDT	0,10	0,1
INDU-A	1,20	1,2
INT-B	0,12	0,12
INVE-B	3,03	3,5263915
INVK-B	0,06	0,06
JC	0,04	0,04
JEEV	0,01	0,01
JM	0,25	0,0303802
JP-A	0,02	0,02
KABE-B	0,04	0,04
KARO	0,02	1,0089175
KAUP-SEK	0,08	0,08
KINV-B	0,55	1,1058492
KLED	0,30	0,3
KLIP	0,01	0,01
KLOV	0,08	0,08
KMT	0,04	0,04
KNOW	0,02	0,02
LAGR-B	0,02	0,02
LATO-B	0,26	0,26
LDEX	0,18	0,18
LEDS-B	0,02	0,02
LJGR-B	0,08	0,08
LUMI-SDB	0,08	0,08
LUND-B	0,60	0,6
LUPE	0,63	0,63
LUXO-SDB	0,02	0,02

MAND	0,01	0,01
MCOV-SDB	0,03	0,03
MEAB-B	0,01	0,01
MEDA-A	0,32	0,32
MEKO-B	0,09	0,09
MICR	0,12	1,0638332
MIC-SDB	0,38	0,38
MIDW-B	0,03	0,03
MOD1	0,00	0
MSC-B	0,00	0
MTG-B	0,63	0,63
MTRO-SDB-A	0,20	0,2
MTRS	0,16	0,16
MULQ	0,00	0
MVIR-B	0,02	0,02
NCC-B	0,45	0,45
NDA-SEK	6,51	2,0121542
NEA-B	0,04	0,04
NEF-B	0,04	0,04
NEO	0,02	0,02
NETI-B	0,03	0,1947818
NEWA-B	0,16	0,16
NEXU	0,01	0,01
NIBE-B	0,16	0,5486144
NILG-B	0,00	0
NN-B	0,10	0,1
NOBE	0,05	0,05
NOBI	0,26	2,2055732
NOCM-B	0,02	0,02
NOKI-SDB	0,53	0,53
NOLA-B	0,06	0,06
NON	0,02	0,02
NOTE	0,02	0,02
NOVE	0,04	0,04
NTEK-B	0,01	0,01
O2C	0,01	0,01
OBS	0,07	0,07
OEM-B	0,04	0,04
OMX	0,37	0,37
OPCO	0,01	0,01
OPTI-A	0,01	0,01
ORC	0,04	0,04
ORES	0,20	0,2
ORI-SDB	0,33	0,33
ORTI-B	0,02	0,02
ORX	0,04	0,04

OXGN	0,01	0,01
PACT	0,01	0,01
PART	0,04	0,04
PEAB-B	0,25	0,019219
PERG	0,07	0,07
POOL-B	0,02	0,02
PREC-A	0,01	0,01
PREV-B	0,01	0,01
PRIC-B	0,02	0,02
PROB	0,01	0,01
PROE-B	0,03	0,03
PROF-B	0,01	0,01
PROT	0,05	0,05
PWAV	0,03	0,03
QMED	0,17	1,4179459
RABT-B	0,03	0,03
RATO-B	0,45	0,45
RAY-B	0,06	0,06
RESC-B	0,00	0
RNBS	0,04	0,04
RROS	0,04	0,04
RSOF-B	0,03	0,03
RTIM-B	0,01	0,01
SAAB-B	0,52	4,3044193
SAEK	0,09	0,09
SALA-B	0,02	0,02
SAND	2,52	0,774618
SARD	0,03	0,03
SAS	0,50	0,5
SCA-B	2,00	2
SCMI	0,05	0,05
SCOR	0,01	0,01
SCRI-B	0,03	0,03
SCV-B	1,88	2,5325726
SDIA-SEK	1,39	1,39
SEB-A	3,26	3,26
SECO-B	0,33	1,2904066
SECT-B	0,06	0,06
SECU-B	1,37	1,4143289
SEMC	0,03	0,03
SENE-A	0,01	0,01
SENS	0,02	0,02
SHB-A	3,79	0,4483834
SIGM-B	0,03	0,03
SINT	0,02	0,02
SION	0,00	0

SKA-B	1,46	2,7748348
SKF-B	1,45	1,45
SKIS-B	0,11	0,11
SOF-B	0,01	0,01
SSAB-A	0,76	1,9986696
STEK	0,07	0,07
STE-R	0,50	0,5
STRA-B	0,05	0,05
SWEC-B	0,10	0,1
SVED-B	0,03	0,03
SVIK	0,05	0,05
SWMA	0,87	0,87
SVOL-B	0,02	0,02
TEL2-B	1,07	3,8163828
TELC-B	0,06	0,06
TGNT	0,02	0,02
THAL-B	0,01	0,01
TICK	0,01	0,01
TIEN	0,13	0,13
TLOG	0,15	0,1944038
TLSN	5,56	3,1661513
TPEP	0,01	0,01
TRAC-B	0,03	0,03
TRAD	0,12	0,12
TREL-B	0,43	0,43
TRIC	0,01	0,01
TRIO	0,01	0,01
TWW-SDB-B	0,13	0,13
UNIB-SDB	0,13	0,13
WAFV-B	0,01	0,01
WALL-B	0,18	0,18
VBG-B	0,02	0,02
WED-B	0,01	0,01
WEST-B	0,01	0,01
WIHL	0,10	0,1
VIKT	0,00	0
VITR	0,01	0,01
VLT-B	0,02	0,02
WM-B	0,30	0,3
VOLV-B	4,60	3,9484828
VOST-SDB	0,52	0,52
WSON-B	0,03	0,03
XANO-B	0,01	0,01
XPON	0,02	0,02
ZODI-B	0,02	0,02
<b>ACTIVE SHARE</b>		<b>45,424241</b>

**Table 9**

Funds	Active Share/Tracking error											
	2001	2002		2003		2004		2005	2006			
AMF Pension	40,5	-	53,4	6,5%	55,3	7,0%	51,1	1,7%	51,7	2,3%	45,4	3,7%
Banco Hjälp	53,7	-	52,1	7,4%	20,0	3,8%	23,7	2,3%	22,9	2,5%	30,1	3,8%
Banco Human	51,4	-	55,8	7,1%	54,5	3,8%	23,5	2,3%	22,7	3,2%	29,9	4,9%
Banco Ideell	49,4	-	58,2	7,1%	17,1	4,2%	22,1	2,3%	22,9	2,5%	43,8	3,8%
Banco Sverige	49,2	-	47,8	-	14,8	-	22,1	-	34,1	-	29,1	-
DNB Sverige	32,7	-	30,1	3,9%	36,1	3,2%	38,3	1,4%	35,2	1,5%	33,0	2,2%
Carnegie Sv.	34,8	-	38,9	6,5%	56,3	7,9%	64,0	5,7%	67,5	1,8%	58,7	3,2%
Catella Rea.	51,4	-	45,4	6,1%	42,4	3,9%	41,1	2,0%	52,5	3,4%	64,4	6,4%
Catella Trygg.	53,5	-	49,1	-	47,5	-	48,6	-	54,2	-	62,2	-
Cicero SRI	54,4	-	56,4	6,3%	48,2	3,3%	33,0	2,2%	38,3	2,3%	39,2	3,8%
Danske Sverige	37,9	-	36,8	4,9%	36,6	4,0%	37,2	2,5%	42,3	2,7%	49,8	3,6%
Didner Gerge	66,0	-	65,0	6,1%	67,6	5,0%	69,8	7,7%	70,6	4,1%	72,2	4,8%
Eldsjäl Sv.	36,2	-	33,2	-	34,8	-	36,0	-	38,8	-	41,7	-
Enter Sv.	50,6	-	45,6	2,3%	42,6	3,3%	39,8	2,5%	44,6	2,6%	51,8	3,5%
Erik Penser Sv.	30,5	-	29,3	-	27,8	-	23,3	-	26,9	-	28,2	-
Folksam LO	19,5	-	18,1	-	19,8	-	20,8	-	21,7	-	20,1	-
Folksam LO V.	23,2	-	25,7	-	22,8	-	21,5	-	19,2	-	17,7	-
Folksams Aktie	23,2	-	22,3	-	19,6	-	17,4	-	29,6	-	20,8	-
Folksam Tjänst	18,6	-	18,3	-	19,5	-	22,5	-	22,3	-	20,8	-
Handelsb. Bo.	31,6	-	33,4	3,7%	32,1	4,0%	31,1	2,2%	23,2	2,2%	20,4	3,0%
Handelsb. Rea.	33,9	-	31,4	3,5%	32,8	4,5%	31,3	2,0%	25,7	1,3%	22,7	2,1%
Lannebo	61,6	-	61,7	4,2%	57,2	3,5%	52,6	3,8%	54,3	2,2%	64,5	5,2%
LF Sv.	28,5	-	26,8	5,3%	24,2	3,2%	20,4	2,1%	23,4	2,1%	26,6	2,6%
Nordea Etisk	47,8	-	49,3	3,7%	31,0	3,0%	27,4	1,2%	30,4	1,4%	35,9	3,5%
Nordea Sv.	31,6	-	30,2	8,5%	33,0	3,9%	37,0	2,3%	32,7	1,1%	27,8	2,0%
Robur Mega	18,8	-	17,7	3,5%	19,8	3,6%	20,0	1,6%	15,2	1,5%	20,6	1,4%
Robur Sv.	18,5	-	17,2	12,4%	18,8	4,0%	25,2	2,0%	23,7	1,8%	20,5	1,5%
SEB stiftelse	35,5	-	34,0	3,2%	32,6	2,7%	27,7	1,9%	25,1	1,5%	24,8	2,8%
SEB Sv. Ch/R	45,5	-	40,3	5,2%	44,4	3,5%	47,1	1,2%	46,4	1,4%	45,2	3,2%
SEB Sv. storbolag	30,8	-	28,7	4,8%	36,7	2,8%	57,4	2,0%	34,3	1,6%	27,5	2,3%
SEB Sverige	33,2	-	32,3	4,6%	29,7	2,9%	27,9	1,8%	24,3	1,5%	22,9	2,2%
Skandia Aktie Sv.	34,8	-	32,0	7,4%	34,6	5,6%	36,2	1,5%	27,2	1,3%	23,2	1,5%
Skandia Cancer	30,2	-	29,5	4,0%	32,8	4,5%	36,9	2,5%	34,5	1,5%	32,9	3,8%
Skandia VNF	33,8	-	32,3	4,4%	35,4	3,8%	40,9	2,8%	42,1	2,2%	43,2	4,2%
SPP aktieindex	24,1	-	23,5	4,9%	24,3	3,8%	23,6	3,3%	26,9	1,9%	29,7	3,4%
SPP Aktie	28,2	-	27,6	3,3%	28,7	4,5%	31,8	1,9%	26,2	1,4%	22,5	2,3%
Öhman	39,9	-	38,9	4,3%	40,3	5,8%	42,7	3,9%	44,5	2,4%	41,0	3,5%

**Table9,  
continuing**

Funds	2007		2008		2009		2010		2011		2012	
AMF Pension	38,3	2,2%	28,9	2,7%	19,3	4,0%	22,1	2,5%	20,6	4,2%	26,8	-
Banco Hjälp	29,7	2,6%	37,4	4,4%	35,4	3,9%	29,5	4,1%	33,6	4,4%	30,9	-
Banco Human	30,0	3,4%	36,5	4,4%	39,1	3,9%	30,3	4,5%	32,0	4,7%	30,7	-
Banco Ideell	44,5	5,6%	35,3	3,7%	42,4	4,6%	45,8	4,0%	45,4	5,2%	43,9	-
Banco Sverige	29,4	-	37,5	-	35,9	-	33,9	-	35,0	-	29,6	-
DNB Sverige	38,1	1,8%	33,0	1,9%	33,2	4,2%	35,8	3,2%	33,5	2,3%	34,9	-
Carnegie Sv.	60,0	4,7%	51,8	5,6%	48,4	3,9%	49,6	3,7%	56,8	3,7%	48,7	-
Catella Rea.	57,3	4,7%	49,3	3,5%	44,4	4,8%	41,1	3,7%	38,7	2,3%	33,6	-
Catella Trygg.	57,1	-	50,8	-	56,3	-	62,9	-	72,4	-	84,2	-
Cicero SRI	41,8	3,0%	38,1	4,0%	49,1	3,6%	51,9	2,6%	39,1	2,4%	36,4	-
Danske Sverige	48,3	3,0%	47,3	4,3%	42,3	9,2%	36,7	3,4%	43,1	6,6%	47,8	-
Didner Gerge	71,4	5,7%	69,4	10,3%	68,3	13,4%	69,8	5,7%	68,5	5,8%	67,5	-
Eldsjäl Sv.	38,0	-	33,3	-	38,9	-	41,2	-	42,3	-	41,5	-
Enter Sv.	55,6	5,5%	62,7	6,6%	58,6	5,4%	53,4	3,1%	54,9	3,0%	55,2	-
Erik Penser Sv.	28,6	-	29,4	-	27,3	-	25,6	-	27,0	-	25,9	-
Folksam LO	23,6	-	25,2	-	24,7	-	24,0	-	23,2	-	25,4	-
Folksam LO V.	23,7	-	26,4	-	25,9	-	27,2	-	29,0	-	27,9	-
Folksams Aktie	23,9	-	25,1	-	24,7	-	24,8	-	22,6	-	21,3	-
Folksam Tjänst	22,3	-	24,9	-	22,5	-	23,6	-	25,7	-	25,2	-
Handelsb. Bo.	18,2	3,1%	17,8	2,5%	17,3	8,5%	13,3	2,9%	17,4	4,0%	19,4	-
Handelsb. Rea.	19,4	2,5%	17,8	1,8%	17,0	4,0%	14,9	2,6%	17,7	3,7%	20,7	-
Lannebo	57,9	3,6%	52,9	4,1%	50,1	8,7%	57,1	4,9%	60,0	7,1%	57,4	-
LF Sv.	28,5	1,5%	33,4	3,4%	36,1	4,2%	44,5	4,2%	42,5	6,8%	42,0	-
Nordea Etisk	27,7	1,4%	33,5	3,1%	23,1	4,7%	34,6	3,6%	31,1	4,7%	60,6	-
Nordea Sv.	28,7	1,3%	30,4	3,8%	33,2	4,8%	36,7	3,5%	43,7	4,9%	51,7	-
Robur Mega	19,8	1,5%	21,0	1,9%	19,3	2,8%	26,7	3,3%	25,0	4,8%	23,8	-
Robur Sv.	22,6	1,8%	22,0	4,9%	22,8	4,5%	23,9	3,2%	23,2	4,6%	24,0	-
SEB stiftelse	55,3	4,9%	61,7	11,9%	64,1	12,6%	65,2	7,5%	57,2	5,3%	52,7	-
SEB Sv. Ch/R	37,5	2,0%	26,9	7,0%	25,1	3,4%	24,2	2,1%	26,1	19,3%	27,6	-
SEB Sv. storbolag	29,0	2,5%	31,3	6,0%	32,4	4,6%	33,7	2,6%	29,9	3,4%	27,1	-
SEB Sverige	19,6	1,7%	17,0	4,7%	17,5	3,8%	18,1	2,4%	16,6	3,0%	14,7	-
Skandia Aktie Sv.	24,3	1,2%	23,8	2,0%	27,4	4,4%	33,7	3,3%	36,9	2,2%	37,3	-
Skandia Cancer	34,7	1,8%	37,6	2,1%	37,9	4,3%	38,1	3,2%	36,0	2,3%	34,0	-
Skandia VNF	40,3	2,0%	36,9	1,9%	37,6	4,2%	38,6	3,1%	36,0	2,6%	34,8	-
SPP aktieindex	28,9	2,5%	28,4	4,4%	26,8	3,8%	25,7	2,6%	26,0	3,7%	26,3	-
SPP Aktie	22,0	2,6%	22,0	1,8%	24,1	3,7%	40,5	4,8%	44,8	6,0%	49,4	-
Öhman	29,1	5,7%	32,0	6,6%	30,8	6,5%	21,9	2,0%	23,8	5,7%	25,5	-

**Table 10**

Dependent Variable: Excess Return (BM)  
 Method: Panel EGLS (Cross-section random effects)  
 Date: 05/23/12 Time: 13:31  
 Sample: 2002 2011  
 Periods included: 10  
 Cross-sections included: 29  
 Total panel (balanced) observations: 290  
 Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.063656	0.011867	-5.364030	0.0000
AS	0.002687	0.022552	0.119149	0.9052
TE	0.611255	0.172873	3.535861	0.0005
VOL	0.092689	0.054325	1.706176	0.0891
Effects Specification				
			S.D.	Rho
Cross-section random			0.011853	0.0637
Idiosyncratic random			0.045427	0.9363
Weighted Statistics				
R-squared	0.103761	Mean dependent var	-0.017348	
Adjusted R-squared	0.094360	S.D. dependent var	0.047537	
S.E. of regression	0.045239	Sum squared resid	0.585311	
F-statistic	11.03709	Durbin-Watson stat	1.939751	
Prob(F-statistic)	0.000001			
Unweighted Statistics				
R-squared	0.124450	Mean dependent var	-0.022491	
Sum squared resid	0.621242	Durbin-Watson stat	1.827560	

**Table 11**

Dependent Variable: Information Ratio  
 Method: Panel EGLS (Period random effects)  
 Date: 05/23/12 Time: 13:29  
 Sample: 2002 2011  
 Periods included: 10  
 Cross-sections included: 29  
 Total panel (balanced) observations: 290  
 Swamy and Arora estimator of component variances  
 White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.544394	0.294002	-8.654348	0.0000
AS	0.153579	0.516504	0.297344	0.7664
TE	11.46881	4.856070	2.361748	0.0189
VOL	6.469827	1.449061	4.464840	0.0000

Effects Specification		S.D.	Rho
Period random		0.000000	0.0000
Idiosyncratic random		1.247906	1.0000
Weighted Statistics			
R-squared	0.203381	Mean dependent var	-0.863734
Adjusted R-squared	0.195024	S.D. dependent var	1.381901
S.E. of regression	1.239848	Sum squared resid	439.6456
F-statistic	24.33903	Durbin-Watson stat	1.533509
Prob(F-statistic)	0.000000		
Unweighted Statistics			
R-squared	0.203381	Mean dependent var	-0.863734
Sum squared resid	439.6456	Durbin-Watson stat	1.533509

**Table 12**

Dependent Variable: Excess Return (RF).  
 Method: Panel EGLS (Period random effects)  
 Date: 05/23/12 Time: 13:42  
 Sample: 2002 2011  
 Periods included: 10  
 Cross-sections included: 29  
 Total panel (balanced) observations: 290  
 Swamy and Arora estimator of component variances  
 White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.490105	0.076632	6.395583	0.0000
AS	-0.211272	0.162121	-1.303177	0.1936
TE	3.891698	1.539795	2.527413	0.0120
VOL	-2.710245	0.195899	-13.83491	0.0000
Effects Specification		S.D.	Rho	
Period random		0.000000	0.0000	
Idiosyncratic random		0.271697	1.0000	
Weighted Statistics				
R-squared	0.272848	Mean dependent var	0.061424	
Adjusted R-squared	0.265221	S.D. dependent var	0.312310	
S.E. of regression	0.267710	Sum squared resid	20.49719	
F-statistic	35.77182	Durbin-Watson stat	0.194552	
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.272848	Mean dependent var	0.061424	
Sum squared resid	20.49719	Durbin-Watson stat	0.194552	

**Table 13**

Dependent Variable: Sharpe Ratio  
 Method: Panel EGLS (Period random effects)  
 Date: 05/23/12 Time: 13:31  
 Sample: 2002 2011  
 Periods included: 10  
 Cross-sections included: 29  
 Total panel (balanced) observations: 290  
 Swamy and Arora estimator of component variances  
 White cross-section standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.082893	0.429819	7.172540	0.0000
AS	-0.690954	0.914047	-0.755929	0.4503
TE	9.465593	5.379518	1.759562	0.0796
VOL	-13.69609	0.737658	-18.56698	0.0000
Effects Specification				
			S.D.	Rho
Period random			0.000000	0.0000
Idiosyncratic random			1.333287	1.0000
Weighted Statistics				
R-squared	0.314322	Mean dependent var	0.668161	
Adjusted R-squared	0.307129	S.D. dependent var	1.577648	
S.E. of regression	1.313216	Sum squared resid	493.2174	
F-statistic	43.70171	Durbin-Watson stat	0.172682	
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.314322	Mean dependent var	0.668161	
Sum squared resid	493.2174	Durbin-Watson stat	0.172682	

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