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Performance Persistence in Sweden-based Equity Mutual Funds

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ABSTRACT

The aim of this thesis is to investigate if there is evidence of performance persistence in Sweden-based equity mutual funds. The study is performed on raw-and risk-adjusted returns data from a unique survivorship-bias-free sample of funds. We test for one-year persistence in the years 1993-2006 using both parametric and non-parametric tests. Significant persistence is found among funds investing in Sweden, Europe, Eastern Europe and globally. The strongest evidence is found in the latter half of the period.

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“Historical returns are no guarantee for future returns”

- Finansinspektionen (the Swedish Financial Supervisory Authority)

Table of Contents

1. INTRODUCTION 1

2. REVIEW OF PREVIOUS RESEARCH 3

3. THE SWEDISH MUTUAL FUND INDUSTRY 8

3.1 HISTORY 8
3.2. INTERNATIONAL OUTLOOK 9
3.3 COMPOSITION 10

4. DATA 12

4.1. DESCRIPTIVE STATISTICS 14

5. METHODOLOGY 16

5.1 ESTIMATING RISK-ADJUSTED RETURNS 16
5.2 TESTING PERFORMANCE PERSISTENCE 17
5.2.1. CROSS PRODUCT RATIO TEST 17
5.2.2. AUTOREGRESSIONS 19

6. EMPIRICAL RESULTS AND ANALYSIS 20

6.1 CROSS PRODUCT RATIO TEST RESULTS 20
6.2 AUTOREGRESSION RESULTS 26
6.3 MAIN FINDINGS AND FURTHER DISCUSSION 28
6.4 SUGGESTIONS FOR FURTHER RESEARCH 30

7. CONCLUSIONS 32

REFERENCES 33

APPENDIX 37

1. Introduction

The Swedish mutual fund industry has grown immensely in the past couple of decades. Amounting to about SEK 300 million in the early 70's, it had almost 1 600 billion under management at the end of 2006. Currently, savings in mutual funds constitute 30 percent of the households' financial assets. In 1980, the corresponding figure was only 0.4 percent. Judging by the allocation of savings, equity funds is the most popular fund category (SIFA, 2007a), representing 58% of the total fund wealth in the first quarter of 2007 (SCB, 2007a).

These dramatic increases have not passed unnoticed by academics. Rather, the increased role of mutual funds for investors, and society in general, has triggered research in the area. The performance of mutual funds has been carefully investigated by scholars, primarily in the United States. One special phenomenon which has attracted attention is performance persistence, that is whether the performance of a particular fund tends to repeat itself year after year. If the efficient market hypothesis were true, no fund managers would consistently beat the average after adjusting their performance correctly for risk exposures. In praxis, the Swedish Financial Supervisory Authority requires the mutual funds registered in Sweden to inform their customers that historical returns are no guarantee for future returns (Finansinspektionen, 2004). Still, 42% of Swedish investors use historical performance as the main criteria when choosing mutual funds (SIFA, 2006a). Are Swedish investors wise to disregard the advice of the Swedish Financial Supervisory Authority?

Considering the extensive research performed on performance persistence in the United States and the implications the subject might have on investment behaviour, we find it surprising how little attention the subject has attracted in Sweden. Previously, it has only been treated by Dahlquist et al. (2000), who limited the study to Swedish equity and fixed income mutual funds investing domestically. Using returns data from 1992 to 1997, the authors found no clear evidence of performance persistence in equity funds. As we find the subject to be of high importance and since nine years of additional data is now available, we believe that the results of Dahlquist et al. (2000) should be revisited. In other words, we intend to study performance

persistence in Sweden-based equity mutual funds, including funds investing abroad and using returns data for the period 1993-2006. In contrast to Dahlquist et al. (2000), we will focus on relative performance persistence and not evaluate absolute mutual fund performance. The question that we intend this thesis to answer is: *Is there performance persistence in Sweden-based equity funds?*

The outline of the paper is as follows. In the next section we give a more detailed review of previous literature on performance persistence, whereas in section 3 we describe the Swedish mutual fund industry. In section 4 we present the data and in section 5 the methodology that we use. The empirical results and analysis are found in section 6 and finally our conclusions are outlined in section 7.

2. Review of Previous Research

Performance persistence can be positive or negative. When funds over-perform in successive time periods, persistence is positive. In contrast, funds which continuously under-perform show negative persistence. In this context, over- and under-performance is usually defined in relation to the median fund performance.

Research on performance persistence in mutual funds began in the United States in the 1960's, shortly after modern portfolio theory had been presented by Markowitz (1952) and further developed by Sharpe (1963) and Fama (1965). Alongside research on mutual fund performance, performance persistence has been investigated using different methods, datasets and time periods, but mainly on US mutual funds.

There are two types of performance persistence tests: parametric and non-parametric. In the latter, no assumption is made about the probability distribution of the observations. Instead, these methods are based on various types of rankings and persistence is proved if a sufficient number of funds beat the average fund performance at least two successive periods. The most common non-parametric test is the Cross Product Ratio test[1], explained in detail in section 5. Parametric tests are usually autoregressions[2] of the return in period *t* on the return in period *t-1*. Both total returns and risk-adjusted returns have been used as input in previous research. Risk-adjusted returns are estimated using both single and multi-factor models. The different methods will be carefully explained in section 5. Below we present the main findings of previous research, briefly explaining the method and data used.

The first test was performed by Sharpe (1966), who found one-year persistence in equity funds' Treynor Index[3] in the years 1954-1963 using a non-parametric test. Carlson (1970) continued by doing non-parametric tests of 10- and 5-year persistence on risk-adjusted returns of equity, fixed income and balanced mutual funds, from

[1] Other non-parametric tests are the Spearman's rank correlation and the Kolmogorov-Smirnov tests.
[2] Another parametric test is the estimation of autocorrelations.
[3] Treynor Index is defined as $\frac{A_i - r_f}{\beta_i}$, were A_i is the average rate of return of portfolio *i*, r_f is the risk-free rate and β_i is the market risk of fund *i*. See Treynor (1965).

1948 to 1967. He found no consistent evidence, but noted that a fund's performance in relation to the market depends on the time period and benchmark chosen. To avoid this problem, Carlson used an index based on the funds in his sample.

Hendricks et al. (1991) found strong evidence for one-year persistence in US equity growth funds 1974-1988 using parametric tests. According to Brown et al. (1992), these results were due to survivorship bias in the dataset. When not including funds which have been closed down, the dataset will only consist of surviving funds, among which positive performance persistence is more likely to be found. Because of this, Hendricks et al. (1993) repeated the study from 1991 with a new dataset, free from survivorship bias, finding the same results as before. They used three types of benchmarks in the estimation of risk-adjusted returns: an equally weighted index of the NYSE, an eight-portfolio benchmark accounting for anomalies related to firm size, dividend yield and mean reversion in equity returns (a so-called P8-benchmark) and an equally weighted index of the mutual funds in the sample.

Goetzmann and Ibbotson (1994) performed both non-parametric and parametric tests on raw and risk-adjusted returns from 1976 to 1988. The benchmark used was the S&P 500. Because of cross-sectional dependencies, the authors also performed the tests on style-categorised sub-groups, thereby correcting for potential investment style effects. They found significant monthly, yearly and two year performance persistence in the whole sample as well as in the sub-samples. Furthermore, Brown and Goetzmann (1995) also found one-year persistence and explained it by a cross-dependency not captured by traditional style categories or risk adjustments. The dependency was particularly strong in periods when the persistence pattern was reversed. According to the authors, this could be caused by common investment strategies conditioned upon macroeconomic factors. They also argued that the market is unable to eliminate all underperforming funds. Financial markets are not always efficient and funds which do badly may still remain on the market year after year. Therefore, these funds add to the existence of negative persistence. The authors performed non-parametric tests on both raw and risk-adjusted returns 1976-1987. The benchmarks used were a single-index model (S&P 500), as well as a three-index model (S&P 500, Ibbotson Small Firm Index and a government bond index) and the

funds were divided into ten different sub-groups after investment style, size expense ratios and time since inception.

Elton et al. (1996) performed non-parametric tests on a sample free from survivorship bias during the period 1977-1993. A Fama French multifactor-model was used as a benchmark. The authors found that past alphas carry information about future alphas for one and three years ahead. They also found that the results are economically significant, since they managed to create a profitable trading strategy based on them.

Carhart (1997) found that the strong proof of performance persistence laid forward by Hendricks et al. (1993) was driven by funds which follow a momentum strategy in stocks[4]. The only persistence not explained by Carhart (1997) could be found among the worst performing mutual funds. He used a four-factor model, including the three Fama French factors and a factor-mimicking portfolio for one-year momentum. Detzel and Weigand (1998) continued on the same track, trying to explain the persistence which remained unexplained by Carhart (1997). In contrast to previous research, they used a model which consisted of factors directly related to the characteristics of the shares held by the mutual fund: the median market capitalisation, the median book-to-market ratio, the median earnings yield and the median cash flow yield. They then tested for serial correlation in the alphas estimated by the model and could not reject the null hypothesis of no serial correlation. In other words, the persistence found in US growth stocks in the period 1976-1985 by Hendricks et al. (1993) was explained.

Only a limited amount of non-US studies on performance persistence have been performed. Dahlquist et al. (2000) studied Swedish mutual fund returns 1993-1997, including equity, fixed income and money market funds but limiting the sample to funds investing domestically. Using a model allowing for time-varying betas, they estimated alphas, for which persistence was tested using both parametric and non-parametric tests. Strong evidence of persistence was found only for money market funds.

[4] See Jegadeesh and Titman (1993).

Keswani and Stolin (2006) grouped UK mutual funds data from the years 1991-2001 into four categories: domestic equity, domestic non-equity, global equity and global non-equity. They then studied if performance persistence is dependent on the level of competition within the group, defining high competition as low concentration of assets under management. The authors found significant persistence for all categories and concluded that persistence was positively related to concentration.

Grünbichler and Pleschiutschnig (2000) investigated a sample of European equity mutual funds, from 1988 to 1998. Applying both parametric- and non-parametric tests, they found significant persistence which did not disappear after including the Rouwenhorst (1998) momentum effect, Fama French factors or Sharpe's asset class factors in their model. However, the dataset was not free from survivorship bias, which is likely to have affected the results.

The most recent survey, to our knowledge, on European mutual fund performance is a study by Otten and Bams (2002). Their study was conducted on domestically investing equity funds based in the five most important European countries: France, Germany, Italy, the Netherlands and the UK. The sample was free of survivorship bias and consisted of monthly returns data on funds from 1991 to 1998. The authors used the Carhart (1997) 4-factor asset pricing model to estimate risk-adjusted returns and perform a parametric test. Strong persistence was only found for the UK. A similar semi-annual analysis was performed with no change to the results.

Christensen (2005) studied Danish mutual funds, both equity and fixed income, in the period 1996-2003, classifying them by the region in which they invest. The risk-adjusted returns were estimated through CAPM and a multi-factor model. For the funds investing domestically, the Danish KAX index was used as benchmark. For the rest, a regional MSCI index was used, for example MSCI Europe for the funds investing in Europe. In addition to CAPM, the author constructed a multi-factor model by adding a Danish and a global market proxy to the single-factor model, namely the KAX index and the MSCI Word index. Christensen did so in order to capture the fact that funds are allowed to deviate from their main strategy, investing up to 25% of the assets under management in other regions. However, the estimated coefficients of the added factors are only significant for two of the fund strategies,

Europe and Global. Furthermore, the average adjusted R^2 increased marginally for these two regions when estimating the multi-factor model. Thus, this model did not contribute to the study. Performing both parametric and non-parametric tests, the author found no proof of performance persistence.

To summarize, performance persistence in equity funds has been thoroughly studied in the United States, and the persistence found has been almost fully explained. As for European countries, the few tests which have been performed have not given strong evidence for persistence. Short-term persistence, that is one year or less, seems to be more prevalent than long-term persistence. Finally, survivorship bias is judged to have severe impact on results.

3. The Swedish Mutual Fund Industry

3.1 History

As outlined in the introduction, the Swedish mutual fund industry has been subject to rapid growth in recent years. However, saving in funds is not a new phenomenon, it dates back more than 50 years. Yet the industry did not start to grow until 1978 with the introduction of the tax-subsidised program *Skattespar* and the rocketing share prices of the 80s. In 1984, when the program was replaced by the (initially) entirely tax-exempt *Allemansfonder,* mutual funds really became a means of savings for the public (SIFA, 2007a).

For a long time the Swedish mutual fund industry focused on the domestic market. However, the currency deregulations of 1989 paved way for funds investing abroad. This added to the popularity of mutual funds since foreign investments otherwise require large amounts of money and access to exclusive information. The growth of the industry can also be attributed to the big tax reform of 1991 which fundamentally changed the way in which Swedes save. The increased propensity to save resulting from this reform made funds more attractive. Regulations altering Swedish pensions, such as the transition towards private pension plans also contribute to the growth of the Swedish mutual fund industry. (SIFA, 2007a).

The development of the mutual fund industry is illustrated in *Figure 1* below which shows the amounts of assets under management during the period of interest for our thesis: 1993-2006. The diagram points at the general trend of increasing amounts of assets under management. It also captures the great change in amounts between the start and end of the period as well as the effects of the events around the millennium. In addition, the diagram shows the distribution of assets under management over equity, balanced, fixed income and hedge funds. It is clear that equity funds make up the main part of the mutual fund industry.

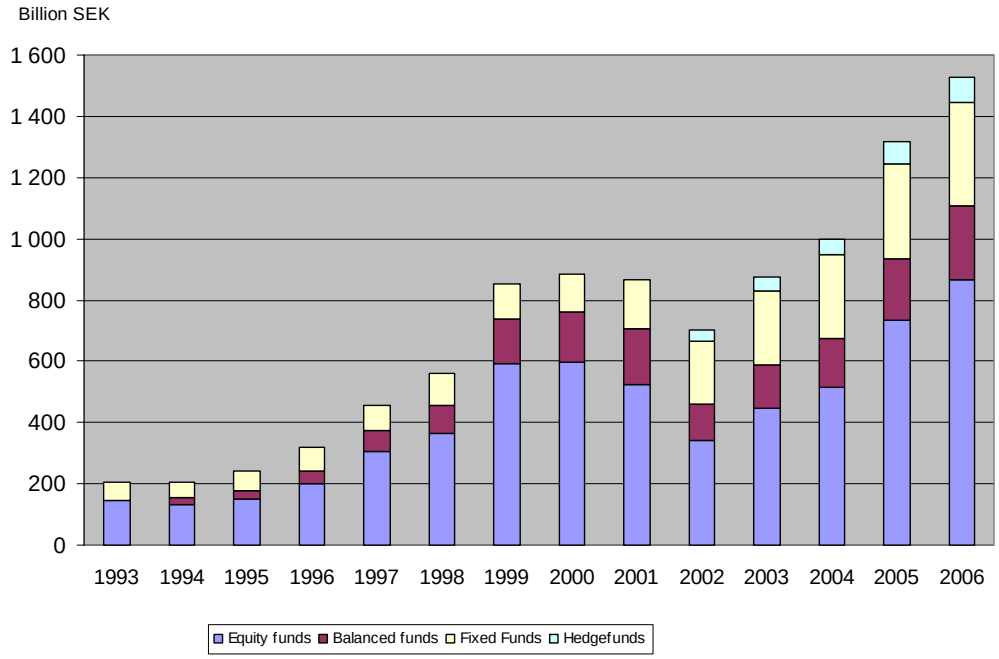


Figure 1. Assets under management by fund type in the Swedish mutual fund industry 1993-2006. (SIFA, 2007b)

3.2. International Outlook

The global mutual funds market is described by statistics supplied by The Investment Company Institute (ICI, 2007). Unsurprisingly, the industry is largest in the continents of America and Europe. As for Sweden's role in the European mutual fund industry, the country ranked as number 8 of 25 in late 2006 in terms of assets under management and as number 13 of 25 when ranking by the number of funds. Luxembourg, France and the UK have the largest assets under management whereas the largest number of funds is found in France, Luxembourg and Spain. The corresponding ranks could also be measured per capita[5]. Then, the importance of Sweden is improved, ranking as number 6 for total net assets and as country number 12 for the number of funds. When measured per capita, Luxembourg, Liechtenstein and Italy dominate both in terms of assets under management and the number of funds.

[5] Population statistics, obtained from the United Nations Statistics Division (UN, 2007).

3.3 Composition

The regulations disciplining the financial markets are homogenous for members of the European Union. Thus, Swedish mutual funds are subjected to the same rules as other funds within the EU through the UCITS (Undertakings for Collective Investments in Transferable Securities). In Sweden, the Financial Supervisory Authority (Finansinspektionen) is responsible for the monitoring of the actions of the fund management firms. As for Swedish equity funds, managers are in general compelled to place at least 75% of the assets under management in stocks. Another minimum requirement is the obligation to invest in at least 16 different firms (SIFA, 2007c).

The Swedish market for mutual funds is treated in a PM from the Swedish Investment Fund Association (SIFA, 2006b) which clearly states that the market, traditionally, has been greatly dominated by the four largest banks. This dominance could be explained by the fact that the *Allemansfonder* were offered mainly through the banks. Also, the advisory role of the banks has given them an advantage in the mutual fund industry. The competition is now increasing as other players enter the market. There is an increasing number of foreign fund management firms and the change of the pensions system has given the Swedish insurance companies a greater role. The composition of the suppliers of funds in the Swedish market is presented in *Table 1* where it can be observed that the market share of the banks is decreasing.

SUPPLIER	1999	2000	2001	2002	2003	2004	2005
Banks	85%	80%	77%	74%	72%	70%	68%
Insurance companies	7%	10%	11%	11%	11%	12%	12%
Other	8%	11%	12%	15%	17%	18%	20%

Table 1. Share of assets under management by supplier. (SIFA, 2006b)

Savings in mutual funds is an important way for private savings to be canalised into financial markets. A big proportion of Swedes save in funds. Nearly 94 % of the adult population and 70 % of all children held savings in mutual funds, as measured in spring 2006 (SIFA, 2006b). The popularity of mutual funds makes households the second most important group of investors in the mutual fund industry. This pattern is demonstrated in *Table 2* which shows assets under management by investor type in

the last quarter of 2006. Households account for 32 % of the market whereas Swedish financial corporations make up the largest sector with a share of about 35 %.

SECTOR	Q4 2006 (SEK millions)	Share (%)
Financial corporations	482 130	35.2%
Households	435 230	31.8%
Social security funds	250 044	18.3%
...of which PPM	242 762	17.7%
Non-financial corporations	77 791	5.7%
Non-profit institutions serving households	48 590	3.6%
Foreign owners	48 447	3.5%
Other domestic owners	13 696	1.0%
Local government	12 828	0.9%
TOTAL	1 368 756	100%

Table 2. Assets under management of mutual funds specified by sector. (SCB, 2007b)

4. Data

The dataset consists of 352 Sweden-based equity funds with returns data from 1993 to 2006. As stated in Dahlquist et al. (2000), few funds were registered in Sweden before 1992. The reason for choosing the year 1993 is that an even number of years is needed when testing for one-year persistence. For the same reason, funds with less than two years of returns data were excluded from the sample. We define a fund to be Sweden-based if it is registered in Sweden and if its main office is located in the country. Thus, foreign investment firms with Swedish sales offices were not included. However, this does not mean that only funds invested domestically have been included in the sample. As pointed out earlier, the largest fraction of fund saving is in the form of equity. This is the main reason for which we have decided to limit our study to equity mutual funds.

All funds were classified by the region they invest in. In line with Christensen's (2005) categorisation of Danish funds, we choose to group the funds by the classes presented in *Table 3*. If less than ten funds could be attributed to a region, it was not taken into consideration. This was the case for funds investing in China, Russia, Latin America and Emerging Markets. For 65 of the non-surviving funds, no investment strategy information was found, making it impossible to include them in the study. Furthermore, we do not include funds investing in specific industries, such as telecoms or IT, or in one single country (the exception being Sweden). The reason for this is that other benchmarks would have been needed and that the funds would have been nearly alone in their categories so that no real inference could have been drawn from the results. In contrast to the US fund market, very few Swedish funds have an official value- or growth-oriented strategy. Thus, these funds were excluded from the sample for the same reasons as stated above.

The sample includes funds which did not live on for the entire observed time period. This has been done in order to increase the validity of our results which would otherwise have suffered from survivorship bias as described in Brown et al. (1992) and Brown and Goetzmann (1995). Approximately 37% of the funds in our sample are non-survivors.

The list of funds as well as their weekly net asset values (NAVs) were collected from the *SIX TRUST* Database. This database takes account of capital gains, regards dividends as reinvested and subtracts for administrative fees. The NAVs were then used to calculate a weekly log-return series for each fund:

$$R_t = \ln\left[\frac{NAV_t}{NAV_{t-1}}\right]$$

Previous studies are not unanimous in their choice of the frequency of the returns data. We reject the choice of daily data which would presumably introduce inappropriate noise and instead follow the example of Dahlquist et al. (2000) who use weekly returns. In order to assess the performance of the funds we considered raw as well as excess returns. In the latter case, the one-week STIBOR rate was used as risk free rate. As benchmarks, we used different indices depending on region as seen in *Table 3.* The indices for the domestically investing funds were collected from the *SIX TRUST* database whereas data on the risk-free rate and all other indices were drawn from *Datastream*. All foreign currency indices were converted to SEK.

GROUP	Benchmark
Sweden	SIX Portfolio Return Index[6]
Nordics	MSCI[7] Nordic Price Index
Europe	MSCI Europe Price Index
Eastern Europe	MSCI EM Eastern Europe Price Index
North America	MSCI North America Price Index
Global	MSCI World Price Index
Asia	MSCI Pacific Price Index
Japan	MSCI Japan Price Index

Table 3. Classification of funds and benchmarks applied.

[6] The SIXPRX is an index of the average performance in the Stockholm stock market, taking into account the placement restrictions which apply to equity funds. Thus, it is particularly useful for comparing the performance of equity funds investing in Sweden.
[7] Morgan Stanley Capital International.

4.1. Descriptive Statistics

The dataset used in this study is, to the best of our knowledge, the largest sample of Sweden-based equity funds ever collected for the purpose of research. The study of Swedish equity funds previously performed by Dahlquist et al. (2000) contained a smaller and not as recent sample. Therefore, we judge it valuable to leave room for a description of some properties of the data. A complete list of the names of all funds included in this study is found in *Table A1* in the appendix. Data on the number of funds within each category as well as their main characteristics is provided in *Table 4* below.

It is clear that funds investing domestically dominate the sample which also contains a large number of Global and Europe funds. The greatest average annual returns are obtained by Swedish small cap funds. Also, investing in the Nordics and Eastern Europe has generated high returns on average. The lowest average results were found for funds investing in Japan. The highest variability in returns was demonstrated by North America and the lowest by the Nordics.

Data on the properties of the benchmarks is also supplied in *Table 4*. The benchmarks show similar patterns as the funds in our sample as the best average returns was again for the regions Sweden, Eastern Europe and the Nordics. The highest variability was now found for Eastern Europe whereas Europe and Global funds had the lowest standard deviation, most likely due to a high level of diversification. In general, the returns for the benchmarks are higher than those of the sample. The majority of the funds' excess returns do not pass the normality test, implying that alphas could potentially be misspecified. Alternative estimation methods, which avoid this problem, exist and are discussed in section 6.5. However, these methods are beyond the scope of this study.

MUTUAL FUNDS	No of funds (of which dead)	Average annual return	Standard deviation	Skewness	Kurtosis	No. passed
Sweden	100 (30)	11.65%	24.79%	-0.40	7.69	5
of which small cap	15 (3)	15.40%	20.28%	-0.20	7.24	0
Nordic	19 (9)	12.40%	18.95%	-0.25	5.24	1
Europe	62 (20)	7.78%	19.79%	-0.30	5.46	4
Eastern Europe (1997-2006)	11 (4)	11.98%	24.44%	-0.79	7.23	0
Global	95 (35)	6.69%	24.08%	-0.27	5.02	12
North America	23 (11)	7.10%	25.26%	-0.29	4.52	6
Japan	22 (11)	1.24%	21.42%	0.10	4.34	3
Asia	20 (11)	3.23%	21.72%	-0.57	5.78	1
Total	**352 (131)**					
BENCHMARKS						
SIXPRX		15.90%	18.34%	-0.13	5.80	0
MSCI Nordic		14.45%	21.48%	-0.40	5.65	0
MSCI Europe		9.48%	15.04%	0.25	4.62	0
MSCI Eastern Europe (1997-2006)		14.65%	31.06%	-0.70	6.71	0
MSCI Global		7.47%	15.08%	-0.25	3.83	0
MSCI North America		8.33%	17.76%	-0.33	4.28	0
MSCI Japan		2.07%	22.30%	0.23	3.73	0
MSCI Pacific		3.17%	19.59%	0.14	3.60	0

Table 4. Descriptive statistics for the dataset. Skewness and kurtosis is calculated on excess returns. The last column provides the number of funds which passed a normality test on the 5% significance level.

5. Methodology

Before conducting tests for performance persistence it is necessary to determine which length of period to perform them on. Previous research has shown that one-year persistence is the most prevalent one[8], namely returns from the previous year are most likely to be persistent the following year. Tests of performance persistence are usually conducted on raw and risk-adjusted returns. To estimate the latter, we use Sharpe's (1964) CAPM, as explained in section 5.1. Among the funds investing domestically, approximately 15% invested primarily in small caps. This being a significant share of the sample, we ran one set of tests including them and another excluding them. When investing in small caps, funds are exposed to risks not captured by CAPM, which could bias the results of the performance persistence tests. By performing two sets of tests, we will be able to see the extent to which the results are influenced. Among the funds investing in other regions, the number of small cap funds was too small to make a similar procedure worthwhile. Instead, these funds were excluded from the sample.

Section 5.2 presents the different tests of performance persistence which we have used in this study. All performance persistence tests are performed by fund groups and sub-periods.

5.1 Estimating risk-adjusted returns

The risk-adjusted returns are estimated by Sharpe's (1964) CAPM:

$$r_{it} - r_{ft} = \alpha_i + \beta_i \times (r_{mt} - r_{ft}),$$

where r_{it} is the return of the fund *i*, r_{ft} is the risk-free rate and r_{mt} the benchmark return at time *t*. The intercept, α_i, is Jensen's alpha, which is a risk-adjusted return and a measure of the fund's over- or underperformance in relation to the benchmark. In *Table 3,* the benchmarks for the different categories of funds were shown. The one-week STIBOR is used as the risk-free rate.

[8] See for example Brown and Goetzmann (1995), Elton et al. (1996), Goetzmann and Ibbotson (1994), Hendricks et al. (1993) and Keswani and Stolin (2006).

As described in the literature review, several researchers have used additional models to estimate risk-adjusted returns. Since we received satisfactory R^2-measures[9] when estimating the CAPM, we limited our study to include only one type of risk-adjusted returns: Jensen's alphas.

5.2 Testing Performance Persistence

Performance persistence tests can be classified into two groups: parametric and non-parametric. We have chosen to perform a so-called Cross Product Ratio test and an autoregression.

5.2.1. Cross Product Ratio Test

The Cross Product Ratio test is a non-parametric test in which no assumptions are made about the probability distribution of the observations. Instead, the test is based on a ranking procedure of the funds in the sample. We begin by dividing the 14-year-long period into seven non-overlapping sub-periods. In other words, each sub-period consists of two subsequent years: 1993-1994, 1995-1996, 1997-1998, 1999-2000, 2001-2002, 2003-2004 and 2005-2006. Each year, from 1993 to 2006, we rank the funds by their performance. One ranking is made by the raw returns and another one by the risk-adjusted returns, that is the Jensen's alphas. Funds are ranked as winners if their return or their alpha, respectively, is equal to or above the median value. If their performance is below the annual median the funds are classified as losers. Funds which are identified as winners over two subsequent years are denoted winner-winner (WW) whereas funds which are losers in both periods are called loser-loser (LL). These two classes represent funds whose performance tends to be persistent for the period in question. Remaining funds do not show persistence and are classified as winner-loser (WL) or loser-winner (LW).

Having categorised the funds, we calculate a Cross Product Ratio for each sub-period. The CPR statistic is defined as

$$CPR = \left[\frac{WW \times LL}{WL \times LW} \right],$$

[9] See *Table A2*.

where the numerator refers to funds which show performance persistence and the denominator to funds which do not show performance persistence. If there is no persistence, the four classes are equally likely to occur and should, in a large sample, each take up approximately 25%. This implies that the CPR-measure equals one under the null hypothesis of no persistence. To test whether the CPR-statistic is statistically significant, we calculate a Z-statistic by taking the natural logarithm of the CPR and dividing it by its standard error:

$$\text{Z –statistic} = \frac{\ln(CPR)}{\sigma_{\ln(CPR)}},$$

where $\sigma_{\ln(CPR)}$ is defined as: $\sigma_{\ln(CPR)} = \sqrt{\frac{1}{WW} + \frac{1}{WL} + \frac{1}{LW} + \frac{1}{LL}}$.

The Z-statistic is assumed to follow a standard normal distribution, implying that the CPR-measure is significant on a 5% level in all cases where its corresponding Z-statistic is higher or equal to 1.96.

We also apply a χ^2-test on the winner-loser data. It has been argued that the χ^2-test is more robust to survivorship bias than other test methodologies (Carpenter and Lynch, 1999). Even though our dataset, to the best of our knowledge, is free from survivorship bias, we still calculate the χ^2-statistic in the event that the *SIX TRUST* database is lacking data on some non-surviving funds. The χ^2-test compares the observed distribution of the four categories with their expected distribution and is defined as:

$$\chi^2 = \frac{\sum (O_i - E_i)^2}{E_i},$$

where O_i refers to observed frequencies and E_i to expected frequencies in the four cases WW, LL, LW and WL. The statistic is calculated as[10]:

[10] Agarwal & Naik (2000)

$$\chi^2 = \frac{(WW - D1)^2}{D1} + \frac{(WL - D2)^2}{D2} + \frac{(LW - D3)^2}{D3} + \frac{(LL - D4)^2}{D4}$$ where

$$D1 = (WW + WL) \times \frac{(WW + LW)}{N},\ D2 = (WW + WL) \times \frac{(WL + LL)}{N},$$

$$D3 = (LW + LL) \times \frac{(WW + LW)}{N}$$ and $$D4 = (LW + LL) \times \frac{(WL + LL)}{N}.$$

The χ^2-statistic has one degree of freedom. Therefore a value above 3.84 indicates significant persistence at the 5 % level.

5.2.2. Autoregressions

In addition, we perform a parametric test for persistence by estimating an autoregressive model

$$r_t = a_0 + a_1 r_{t-1} + \varepsilon,$$

where r_{t-1} and r_t are the returns in two successive periods. Again, we split the sample into seven sub-periods, each consisting of two subsequent years and perform the tests both for raw- and risk-adjusted returns. If the return in one period can be explained by the return in the previous period, that is when the estimated a_1 coefficient is positive and significant, there is evidence of persistence.

6. Empirical Results and Analysis

In this section, we present the results obtained using the methods described above. We also discuss possible explanations to our findings.

6.1 Cross Product Ratio Test Results

The results of the Cross Product tests are presented in *Table 5* and *Table 6* which appear in the end of section 6.1. To get an overview and to examine the differences between fund groups, we plot the proportions of WW, LL, WL and LW cases by region, aggregating the sub-periods. *Figure 2* shows the results for raw returns and *Figure 3* for Jensen's alphas.

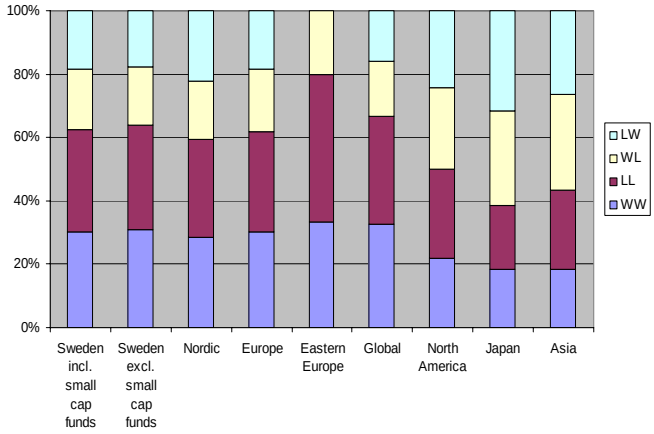


Figure 2. The proportions of persistent and non-persistent performance for raw returns for the full period.

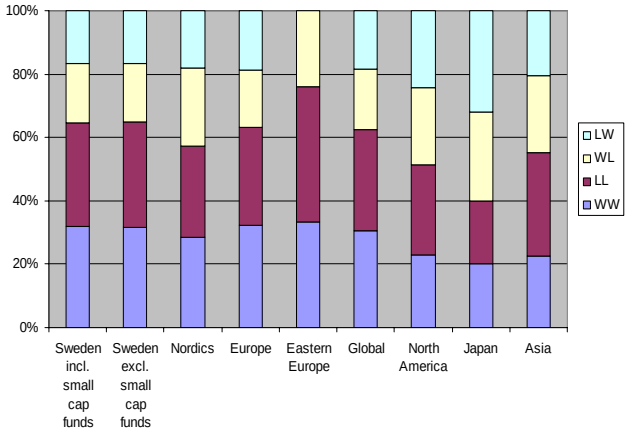


Figure 3. The proportions of persistent and non-persistent performance for Jensen's alphas for the full period.

Statistically significant persistence for the full period is found for funds investing in Sweden, Europe, Eastern Europe and globally, raw returns and Jensen's alphas alike. The lowest level of persistence was found among funds investing in North America. One explanation for the differences between the groups is that an informational advantage is more likely to exist among fund managers investing in certain regions than in others. Among funds investing in Eastern Europe, for example, where markets are considered to be less efficient, it might be more probable to find large differences in how well-informed fund managers are, than among North America funds. Performance persistence would then occur as managers with an informational

advantage consistently beat the ones without such an advantage. However, this reasoning is less applicable on the Sweden, Europe and Global funds. The results for these groups could be related to the fact that the funds have different levels of activity since some follow the index closer, while others take active bets. The findings of Dahlquist et al. (2000) suggest that actively managed Swedish equity funds perform better than passive funds. This could mean that the passive funds are relative under-performers. However, the study of Dahlquist et al. (2000) was limited to the time period 1993-1997 and to funds investing domestically. Hence, their result might not be applicable to the latter part of the period studied by us.

There is an alternative explanation for the persistence we found, which also is related to the fact that the funds have different levels of active management. The CAPM might not capture the risk exposures of the active funds properly when using the SIXPRX, MSCI Europe, MSCI Eastern Europe and MSCI Global indices as market proxies. The effect of this could be that the estimated Jensen's alphas are too high, making some funds constant over-performers which introduces additional persistence. Judging from the R^2 reported in *Table A2*, this could be applicable for the Global group which had an average R^2 of 0.57. The goodness of fit measures for the Sweden, Europe and Eastern Europe groups, however, were 0.82, 0.70 and 0.78, indicating that CAPM succeeded in explaining the majority of the variation in returns.

Among the groups of funds which showed significant persistence, the results are mainly driven by three most recent sub-periods, that is 2001-2006. The only exception is the group of funds investing globally, among which significant results can also be found in the years 1993-1994 and 1997-1998. The explanation for this shift might lie in the nature of the Cross Product Ratio test which is sensitive to the number of observations. When this number is large, it is easier to prove significant persistence.

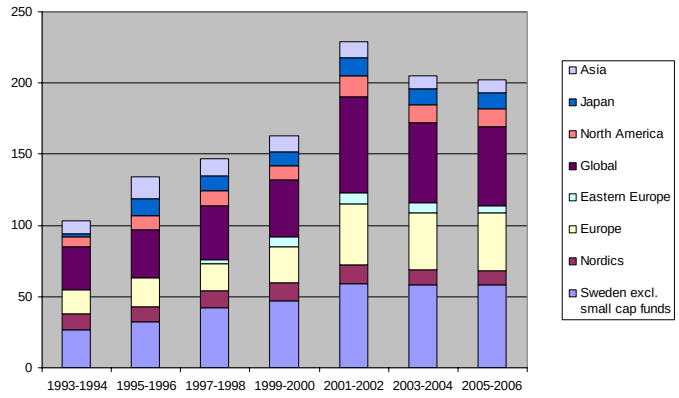


Figure 4. Number of funds by region and sub-period.

As shown in *Figure 4* above, the number of funds in the sample increases substantially during the period studied, peaking in the years 2001-2002. However, this trend is not very strong for the group of funds investing in Sweden, among which significant persistence was found. Thus, the results cannot be fully explained by the characteristics of the non-parametric test.

Alternatively, the findings could be attributed to the level of competition in the Swedish mutual fund industry. The influence of competition on performance persistence was recently investigated by Keswani and Stolin (2006). Examining the level of performance persistence in mutual fund peer groups, they found that persistence is positively related to the degree of concentration of assets under management. According to statistics provided by the Swedish Investment Fund Association, Swedish assets under management in equity funds rose by 21% due to asset inflows[11] from the end of 2000 to 2006, while the number of funds increased by 80% (SIFA, 2000, 2001, 2002, 2003, 2004, 2005, 2006c, 2007d). These figures indicate that the competition increased during the period, suggesting that the conclusions of Keswani and Stolin (2006) might be inapplicable on this study. Nevertheless, this should be verified by future research.

The exclusion of the small cap funds from the Sweden group, did not alter the results for the aggregated time period. However, when we examine the results by sub-periods, we notice that the exclusion of small cap funds reduces the number of periods

[11] Assets under management are affected by two factors: portfolio value changes and inflows of new assets. The percentage above only takes the inflow effect into account.

in which significant performance persistence is found. Thus, small cap funds do bias the results and should therefore not be included in the sample.

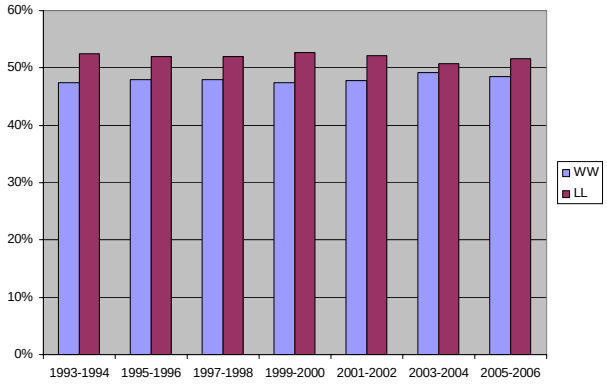


Figure 5. The proportions of winner-winner and loser-loser categories using raw returns to rank funds.

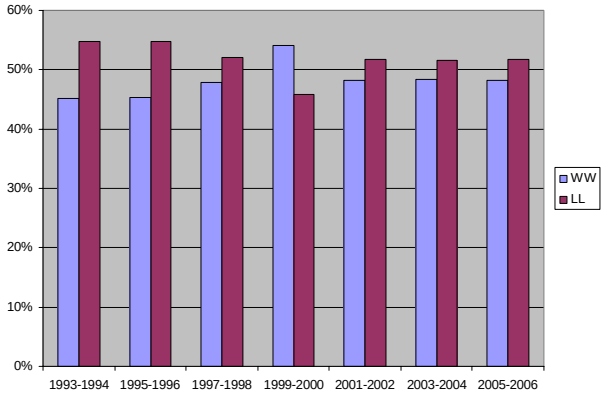


Figure 6. The proportions of winner-winner and loser-loser categories using Jensen's alphas to rank funds.

Hendricks et al. (1993) found that performance persistence was found mainly among constant under-performers. In order to verify if this is confirmed by our study, we compare the number of funds classified as WW to the ones classified as LL in *Figure 5* and *Figure 6* above. The category LL dominates somewhat, indicating that negative persistence is more prevalent than positive persistence. In other words, funds, which under-perform relative to other funds with the same investment strategy, seem to be somewhat more prone to continue under-performing.

Sweden incl. small cap funds	WW	LL	WL	LW	N	CPR	σ	Z	χ^2
93-94	9	10	6	6	31	2.50	0.74	1.24	1.57
95-96	11	13	8	6	38	2.98	0.68	1.61	2.66
97-98	12	11	15	15	53	0.59	0.55	-0.96	0.93
99-00	15	15	15	14	59	1.07	0.52	0.13	0.02
01-02	24	28	10	9	71	7.47	0.54	3.74*	15.24*
03-04	21	22	13	14	70	2.54	0.49	1.90	3.66
05-06	27	27	8	8	70	11.39	0.57	4.27*	20.63*
Full period	119	126	75	72	392	2.78	0.21	4.89*	24.47*

Sweden excl. small cap funds	WW	LL	WL	LW	N	CPR	σ	Z	χ^2
93-94	9	9	5	4	27	4.05	0.82	1.71	3.03
95-96	9	9	7	7	32	1.65	0.71	0.71	0.50
97-98	10	12	10	10	42	1.20	0.62	0.29	0.09
99-00	12	12	12	11	47	1.09	0.58	0.15	0.02
01-02	20	23	9	7	59	7.30	0.59	3.37*	12.37*
03-04	17	18	11	12	58	2.32	0.54	1.57	2.49
05-06	23	23	6	6	58	14.69	0.65	4.15*	19.93*
Full period	100	106	60	57	323	3.10	0.23	4.88*	24.50*

Nordics	WW	LL	WL	LW	N	CPR	σ	Z	χ^2
93-94	3	4	2	2	11	3.00	1.26	0.87	0.78
95-96	3	3	2	3	11	1.50	1.22	0.33	0.11
97-98	3	3	3	4	12	0.50	1.19	-0.58	0.34
99-00	3	3	3	3	13	2.67	1.15	0.85	0.74
01-02	4	5	2	2	13	5.00	1.20	1.34	1.89
03-04	4	5	1	1	11	20.00	1.57	1.91	4.41*
05-06	2	2	3	3	10	0.44	1.29	-0.63	0.40
Full period	23	25	15	18	81	2.13	0.45	1.67	2.81

Europe	WW	LL	WL	LW	N	CPR	σ	Z	χ^2
93-94	4	5	4	4	17	1.25	0.97	0.23	0.05
95-96	5	7	5	3	20	2.33	0.94	0.91	0.83
97-98	5	6	4	4	19	1.88	0.93	0.68	0.46
99-00	7	6	6	6	25	1.17	0.80	0.19	0.04
01-02	13	14	8	8	43	2.84	0.63	1.66	2.81
03-04	13	12	8	7	40	2.79	0.65	1.57	2.51
05-06	15	15	5	6	41	7.50	0.71	2.85*	8.84*
Full period	62	65	40	38	205	2.65	0.29	3.39*	11.71*

Eastern Europe	WW	LL	WL	LW	N	CPR	σ	Z	χ^2
93-94	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.
95-96	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.
97-98	1	1	1	0	3	N.A.	N.A.	N.A.	0.75
99-00	2	3	2	0	7	N.A.	N.A.	N.A.	2.10
01-02	3	4	1	0	8	N.A.	N.A.	N.A.	4.80*
03-04	3	4	0	0	7	N.A.	N.A.	N.A.	7.00*
05-06	1	2	2	0	5	N.A.	N.A.	N.A.	0.83
Full period	10	14	6	0	30	N.A.	N.A.	N.A.	13.13*

Global	WW	LL	WL	LW	N	CPR	σ	Z	χ^2
93-94	11	11	4	4	30	7.56	0.83	2.45*	6.53*
95-96	13	13	4	4	34	10.56	0.81	2.92*	9.53*
97-98	14	14	5	5	38	7.84	0.74	2.79*	8.53*
99-00	7	10	13	10	40	0.54	0.65	-0.96	0.92
01-02	20	20	14	13	67	2.20	0.50	1.58	2.53
03-04	23	22	6	5	56	16.87	0.67	4.19*	20.67*
05-06	17	18	10	10	55	3.06	0.56	1.99*	4.08*
Full period	105	108	56	51	320	3.97	0.24	5.81*	35.17*

North America	WW	LL	WL	LW	N	CPR	σ	Z	χ^2
93-94	1	2	2	2	7	0.50	1.58	-0.44	0.19
95-96	3	4	2	1	10	6.00	1.44	1.24	1.67
97-98	2	2	3	3	10	0.44	1.29	-0.63	0.40
99-00	3	4	2	1	10	6.00	1.44	1.24	1.67
01-02	4	4	3	4	15	1.33	1.04	0.28	0.08
03-04	2	3	4	4	13	0.38	1.15	-0.85	0.74
05-06	2	3	4	4	13	0.38	1.15	-0.85	0.74
Full period	17	22	20	19	78	0.98	0.45	-0.03	0.00

Japan	WW	LL	WL	LW	N	CPR	σ	Z	χ^2
93-94	0	0	1	1	2	0.00	N.A.	N.A.	2.00
95-96	3	3	3	3	12	1.00	1.15	0.00	0.00
97-98	2	2	3	4	11	0.33	1.26	-0.87	0.78
99-00	2	2	3	3	10	0.44	1.29	-0.63	0.40
01-02	3	3	3	4	13	0.75	1.12	-0.26	0.07
03-04	2	2	4	3	11	0.33	1.26	-0.87	0.78
05-06	1	2	4	4	11	0.13	1.41	-1.47	2.40
Full period	13	14	21	22	70	0.39	0.49	-1.90	3.66

Asia	WW	LL	WL	LW	N	CPR	σ	Z	χ^2
93-94	0	2	4	3	9	0.00	N.A.	N.A.	3.60
95-96	4	4	3	4	15	1.33	1.04	0.28	0.08
97-98	2	3	4	3	12	0.50	1.19	-0.58	0.34
99-00	3	3	3	2	11	1.50	1.22	0.33	0.11
01-02	1	1	5	4	11	0.05	1.57	-1.91	4.41
03-04	2	3	2	2	9	1.50	1.35	0.30	0.09
05-06	2	3	2	2	9	1.50	1.35	0.30	0.09
Full period	14	19	23	20	76	0.58	0.47	-1.17	1.39

*Table 5. CPR test results on raw returns. For results to be statistically significant at the 5% level, the Z-statistic should be equal to or larger than 1.96 and the χ^2–statistic equal to or larger than 3.84. Significance at the 5% level is marked by *.*

Sweden incl. small cap funds	WW	LL	WL	LW	N	CPR	σ	Z	χ^2
93-94	8	8	6	6	28	1.78	0.76	0.75	0.57
95-96	10	12	8	8	38	1.88	0.66	0.95	0.92
97-98	8	9	18	16	51	0.25	0.60	-2.33	5.65
99-00	21	20	10	7	58	6.00	0.58	3.07*	10.11*
01-02	24	26	10	9	69	6.93	0.54	3.59*	13.92*
03-04	26	25	11	10	72	5.91	0.52	3.42*	12.51*
05-06	26	26	9	8	69	9.39	0.56	4.00*	17.78*
Full period	123	126	72	64	385	3.36	0.21	5.68*	33.28*
Sweden excl. small cap funds									
93-94	7	8	5	4	24	2.80	0.85	1.22	1.51
95-96	7	10	6	6	29	1.94	0.76	0.88	0.77
97-98	11	13	8	8	40	2.23	0.65	1.24	1.57
99-00	15	14	10	8	47	2.63	0.60	1.60	2.62
01-02	22	23	7	6	58	12.05	0.63	3.94*	17.68*
03-04	19	18	12	11	60	2.59	0.53	1.79	3.27
05-06	19	19	10	9	57	4.01	0.56	2.47*	6.35*
Full period	100	105	58	52	315	3.48	0.24	5.27*	28.71*
Nordics									
93-94	1	1	3	3	8	0.11	1.63	-1.35	2.00
95-96	2	2	2	2	8	1.00	1.41	0.00	0.00
97-98	4	5	2	2	13	5.00	1.20	1.34	1.89
99-00	4	1	7	1	13	0.57	1.55	-0.36	0.13
01-02	5	5	2	2	14	6.25	1.18	1.55	2.57
03-04	3	5	1	2	11	7.50	1.43	1.41	2.21
05-06	3	3	2	2	10	2.25	1.29	0.63	0.40
Full period	22	22	19	14	77	1.82	0.46	1.29	1.68
Europe									
93-94	1	2	4	3	10	0.17	1.44	-1.24	1.67
95-96	5	5	2	2	14	6.25	1.18	1.55	2.57
97-98	5	4	3	4	16	1.67	1.02	0.50	0.25
99-00	10	8	6	8	32	1.67	0.72	0.71	0.51
01-02	12	12	10	10	44	1.44	0.61	0.60	0.36
03-04	14	14	7	6	41	4.67	0.67	2.29*	5.51*
05-06	17	17	4	4	42	18.06	0.79	3.68*	16.10*
Full period	64	62	36	37	199	2.98	0.29	3.71*	14.11*
Eastern Europe									
93-94	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.
95-96	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.
97-98	1	1	1	0	3	N.A.	N.A.	N.A.	0.75
99-00	1	2	1	0	4	N.A.	N.A.	N.A.	1.33
01-02	2	3	0	0	5	N.A.	N.A.	N.A.	5.00*
03-04	2	2	1	0	5	N.A.	N.A.	N.A.	2.22
05-06	1	1	2	0	4	N.A.	N.A.	N.A.	0.44
Full period	7	9	5	0	21	N.A.	N.A.	N.A.	28.32*

Global	WW	LL	WL	LW	N	CPR	σ	Z	χ^2
93-94	4	4	0	2	10	N.A.	N.A.	N.A.	4.44*
95-96	5	5	5	1	16	5.00	1.26	1.27	1.78
97-98	11	11	4	5	31	6.05	0.79	2.26*	5.49*
99-00	8	7	11	10	36	0.51	0.68	-1.00	1.00
01-02	16	17	14	15	62	1.30	0.51	0.51	0.26
03-04	19	20	9	10	58	4.22	0.56	2.57*	6.90*
05-06	18	21	7	6	52	9.00	0.64	3.42*	12.94*
Full period	81	85	50	49	265	2.81	0.25	4.07*	16.92*
North America									
93-94	1	2	2	1	6	1.00	1.73	0.00	0.00
95-96	3	4	1	1	9	12.00	1.61	1.55	2.72
97-98	1	1	4	4	10	0.06	1.58	-1.75	3.60
99-00	3	2	3	3	11	0.67	1.22	-0.33	0.11
01-02	4	5	3	3	15	2.22	1.06	0.76	0.58
03-04	3	4	3	4	14	1.00	1.08	0.00	0.00
05-06	3	4	3	3	13	1.33	1.12	0.26	0.07
Full period	18	22	19	19	78	1.10	0.45	0.20	0.04
Japan									
93-94	0	0	0	1	1	N.A.	N.A.	N.A.	N.A.
95-96	1	1	1	2	5	0.50	1.87	-0.37	0.14
97-98	1	1	2	2	6	0.25	1.73	-0.80	0.67
99-00	3	2	0	2	7	N.A.	N.A.	N.A.	2.10
01-02	3	3	3	2	11	1.50	1.22	0.33	0.11
03-04	0	1	5	4	10	0.00	N.A.	N.A.	N.A.
05-06	2	2	3	3	10	0.44	1.29	-0.63	0.40
Full period	10	10	14	16	50	0.45	0.58	-1.40	1.97
Asia									
93-94	0	0	0	1	1	N.A.	N.A.	N.A.	N.A.
95-96	1	2	2	1	6	1.00	1.73	0.00	0.00
97-98	1	2	2	2	7	0.50	1.58	-0.44	0.19
99-00	2	3	2	1	8	3.00	1.53	0.72	0.53
01-02	4	5	0	0	9	N.A.	N.A.	N.A.	9.00*
03-04	0	0	5	4	9	0.00	N.A.	N.A.	9.00
05-06	3	4	1	1	9	12.00	1.61	1.55	2.72
Full period	11	16	12	10	49	1.47	0.58	0.66	0.44

*Table 6. CPR test results on Jensen's alphas. For results to be statistically significant at the 5% level, the Z-statistic should be equal to or larger than 1.96 and the χ^2–statistic equal to or larger than 3.84. Significance at the 5% level is marked by *.*

As mentioned in the methodology section, an underlying assumption of the Cross Product Ratio test is that the natural logarithm of the CPR-statistic follows a normal distribution. To test the robustness of the results we performed a normality test of all CPR-statistics from the tests. The results are presented in *Table A3*, showing that the null hypothesis of a normal distribution could not be rejected on a 5% or 10% significance level, and thus supporting the validity of the CPR-statistic.

6.2 Autoregression Results

Table 7 presents the estimated autoregression coefficients α_1 by region and sub-period. The results confirm the findings from the non-parametric test for the most part, finding significant persistence mainly in years of 2001-2006 among the funds investing in Sweden, Europe, Eastern Europe and globally, both for raw and risk-adjusted returns. However, significant results are also found for one or two sub-periods in each of the groups of funds investing in North America, Japan and Asia. Thus, the parametric test detects significant persistence in a larger number of groups and sub-periods as compared to the Cross Product Ratio test. When examining the results for the Jensen's alphas of the Sweden group including small cap funds, significant persistence is now found in all sub-periods. Even after excluding these funds, persistence is found in four sub-periods. This should be compared to the non-parametric test which only detects significant persistence in two sub-periods. It is possible that these results are linked to the fact that estimated alphas rarely follow a normal distribution[12]. Since the non-parametric test does not make any assumption about the probability distribution of the alphas, it is less sensitive to the non-normality of the raw and risk-adjusted returns. We therefore judge the results from the Cross Product Ratio test to be more reliable.

[12] See Kosowski et al. (2006)

	RAW RETURNS			JENSEN'S ALPHA		
Sweden incl. small cap funds	**Est. α_1**	**Prob.**	**Adj. R^2**	**Est. α_1**	**Prob.**	**Adj. R^2**
1993-1994	0.73	0.00*	0.72	0.29	0.00*	0.29
1995-1996	-0.17	0.55	-0.02	0.71	0.02*	0.11
1997-1998	-0.05	0.86	-0.02	-0.91	0.00*	0.21
1999-2000	0.08	0.63	-0.01	0.44	0.01*	0.11
2001-2002	0.44	0.02*	0.07	0.37	0.00*	0.17
2003-2004	0.45	0.00*	0.41	0.49	0.00*	0.55
2005-2006	0.59	0.00*	0.53	0.50	0.00*	0.55
Sweden excl. small cap funds						
1993-1994	0.75	0.00*	0.77	0.17	0.07	0.14
1995-1996	-0.04	0.89	-0.03	0.44	0.08	0.08
1997-1998	0.54	0.00*	0.17	-0.05	0.86	-0.03
1999-2000	0.14	0.53	-0.01	0.63	0.01*	0.13
2001-2002	0.66	0.00*	0.18	0.53	0.00*	0.28
2003-2004	0.42	0.00*	0.25	0.33	0.00*	0.16
2005-2006	0.40	0.00*	0.15	0.29	0.00*	0.14
Nordics						
1993-1994	0.07	0.79	-0.10	-0.07	0.76	-0.15
1995-1996	0.03	0.86	-0.11	-0.18	0.60	-0.10
1997-1998	0.26	0.46	-0.04	0.32	0.25	0.04
1999-2000	-0.30	0.59	-0.06	0.10	0.88	-0.09
2001-2002	0.60	0.025*	0.32	0.37	0.13	0.11
2003-2004	0.42	0.28	0.03	0.53	0.12	0.16
2005-2006	-0.47	0.54	-0.07	-0.51	0.54	-0.07
Europe						
1993-1994	-0.18	0.23	0.03	-0.12	0.65	-0.09
1995-1996	-0.11	0.71	-0.05	0.48	0.01*	0.36
1997-1998	0.87	0.01*	0.32	0.42	0.35	0.00
1999-2000	-0.24	0.11	0.07	-0.01	0.91	-0.03
2001-2002	0.18	0.19	0.02	0.12	0.18	0.02
2003-2004	0.50	0.00*	0.30	0.48	0.00*	0.26
2005-2006	0.77	0.00*	0.45	0.82	0.00*	0.56
Eastern Europe						
1993-1994	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1995-1996	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1997-1998	0.19	0.71	-0.38	0.21	0.60	-0.20
1999-2000	-0.45	0.38	-0.02	-0.25	0.18	0.34
2001-2002	0.63	0.30	0.03	1.14	0.01*	0.90
2003-2004	0.71	0.04*	0.52	1.19	0.01*	0.86
2005-2006	0.43	0.04*	0.53	0.00	0.98	-0.25

	RAW RETURNS			JENSEN'S ALPHA		
Global	**Est. α_1**	**Prob.**	**Adj. R^2**	**Est. α_1**	**Prob.**	**Adj. R^2**
1993-1994	0.43	0.00*	0.25	-0.06	0.92	-0.12
1995-1996	0.68	0.00*	0.21	0.16	0.11	0.11
1997-1998	0.55	0.00*	0.23	1.16	0.00*	0.44
1999-2000	0.09	0.43	-0.01	-0.13	0.25	0.01
2001-2002	0.41	0.02*	0.06	0.30	0.00*	0.34
2003-2004	0.38	0.00*	0.31	0.16	0.07	0.04
2005-2006	0.31	0.23	0.01	0.53	0.00*	0.30
North America						
1993-1994	-0.39	0.23	0.13	0.34	0.56	-0.14
1995-1996	0.73	0.04*	0.37	0.21	0.55	-0.08
1997-1998	-0.39	0.51	-0.06	-0.42	0.12	0.19
1999-2000	0.31	0.09	0.24	0.26	0.02*	0.40
2001-2002	1.15	0.00*	0.70	0.87	0.01*	0.42
2003-2004	-0.30	0.28	0.03	-0.13	0.54	-0.05
2005-2006	-0.22	0.11	0.15	-0.16	0.16	0.10
Japan						
1993-1994	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1995-1996	0.40	0.16	0.11	-0.16	0.87	-0.32
1997-1998	-0.35	0.02*	0.43	-0.39	0.13	0.35
1999-2000	-0.10	0.46	-0.05	-0.03	0.87	-0.19
2001-2002	0.04	0.89	-0.09	-0.13	0.57	-0.07
2003-2004	-0.23	0.39	-0.02	-0.43	0.18	0.11
2005-2006	-0.06	0.85	-0.11	0.14	0.29	0.03
Asia						
1993-1994	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1995-1996	0.23	0.34	0.00	-0.03	0.93	-0.25
1997-1998	0.01	0.88	-0.10	0.08	0.91	-0.20
1999-2000	0.37	0.33	0.01	0.48	0.37	-0.01
2001-2002	-0.78	0.04*	0.31	0.50	0.01*	0.58
2003-2004	-1.38	0.12	0.22	-2.20	0.11	0.22
2005-2006	-0.03	0.89	-0.14	0.13	0.47	-0.06

*Table 7. Results for autoregressions on raw returns and Jensen's alphas. Significant estimated coefficients on the 5% level are marked by *.*

6.3 Main Findings and Further Discussion

As we have performed two tests of persistence on two measures of performance (raw and risk-adjusted returns) there are a number of different results for the groups of funds and the sub-periods of study. In order to get a better overview of the results, we provide a summary in *Table 8*. All cases of significant persistence are labelled Y (yes), whereas no persistence is labelled N (no). We judged that evidence for persistence could be considered strong when three or more tests for a specific region and period indicated its existence. To highlight such cases, bold typing was used. As is illustrated in the table, we found clear evidence for performance persistence for several groups of funds. For Sweden, excluding small cap funds, it was found in 2001-2002 and 2005-2006. Europe showed persistence in 2003-2006 and Eastern Europe in 2001-2004. In the group of funds investing globally, significant persistence was detected in 1993-1994, 1997-1998 and 2003-2006. It thus stands clear that the main part of the persistence belongs to the latter part of the observed time period.

Since little research has been conducted on performance persistence in Swedish mutual funds, we cannot perform a proper comparative analysis. However, we can say that the results above do not contradict the results of Dahlquist et al. (2000), as we found no evidence of significant persistence in the years 1993-1997. To the best of our knowledge, more recent data on Swedish mutual funds has not been studied. As for equity funds investing in the European market, Otten and Bams (2002) only found weak evidence of performance persistence in the years 1991-1998. In the sub-periods 1995-1996 and 1997-1998, we found significant persistence only in the results from the parametric test. In 1995-1996, it was found in the risk-adjusted returns only and in the two following years it was found just in the raw returns. Thus, our study confirms the results of Otten and Bams (2002), finding only weak evidence of persistence among the funds investing in Europe in the years 1993-1998. Finally, the evidence of significant persistence in the group of funds investing globally which is presented in this thesis, confirms the results of Keswani and Stolin (2006). They studied UK-based equity funds with the same strategy. As far as we know, no research has been performed on Eastern European equity funds.

		Sweden incl. small cap funds	Sweden excl. small cap funds	Nordics	Europe	Eastern Europe	Global	North America	Japan	Asia
1993-1994	CPR raw	N	N	N	N	-	**Y**	N	-	-
	CPR alphas	N	N	N	N	-	**Y**	N	-	-
	AR raw	Y	Y	N	N	-	**Y**	N	-	-
	AR alphas	Y	N	N	N	-	N	N	-	-
1995-1996	CPR raw	N	N	N	N	-	Y	N	N	N
	CPR alphas	N	N	N	N	-	N	N	N	N
	AR raw	N	N	N	N	-	Y	Y	N	N
	AR alphas	Y	N	N	Y	-	N	N	N	N
1997-1998	CPR raw	N	N	N	N	-	**Y**	N	N	N
	CPR alphas	N	N	N	N	-	**Y**	N	N	N
	AR raw	N	Y	N	Y	N	**Y**	N	Y	N
	AR alphas	Y	N	N	N	N	**Y**	N	N	N
1999-2000	CPR raw	N	N	N	N	N	N	N	N	N
	CPR alphas	Y	N	N	N	N	N	N	N	N
	AR raw	N	N	N	N	N	N	N	N	N
	AR alphas	Y	Y	N	N	N	N	Y	N	N
2001-2002	CPR raw	**Y**	**Y**	N	N	**Y**	N	N	N	N
	CPR alphas	**Y**	**Y**	N	N	**Y**	N	N	N	Y
	AR raw	**Y**	**Y**	Y	N	N	Y	Y	N	N
	AR alphas	**Y**	**Y**	N	N	**Y**	Y	Y	N	Y
2003-2004	CPR raw	N	N	Y	N	**Y**	**Y**	N	N	N
	CPR alphas	**Y**	N	N	**Y**	N	**Y**	N	N	N
	AR raw	**Y**	Y	N	**Y**	**Y**	**Y**	N	N	N
	AR alphas	**Y**	Y	N	**Y**	**Y**	N	N	N	N
2005-2006	CPR raw	**Y**	**Y**	N	**Y**	N	**Y**	N	N	N
	CPR alphas	**Y**	**Y**	N	**Y**	N	**Y**	N	N	N
	AR raw	**Y**	**Y**	N	**Y**	Y	N	N	N	N
	AR alphas	**Y**	**Y**	N	**Y**	N	**Y**	N	N	N
Full period	CPR raw	Y	Y	N	Y	Y	Y	N	N	N
	CPR alphas	Y	Y	N	Y	Y	Y	N	N	N

Table 10. Summary of results.

6.4 Suggestions for Further Research

With exception to the United States, performance persistence is still a rather uninvestigated phenomenon. It would be of interest to see whether the factors, which are found to explain persistence in US research, apply to Swedish and European data as well. We suggest the following topics for future research.

Several scholars argue that the superior performance implied by positive persistence is due to the momentum effect described in Jegadeesh and Titman (1993). Among these are Grinblatt et al. (1995) and Carhart (1997). There has been no evidence of momentum for Swedish equity historically (Rouwenhurst,1998), but this could have changed in recent years[13]. It remains to be seen if this is an explanation for the emergence of performance persistence in the latter half of the period which we have studied.

Previously, it has been found that US persistence can be explained through examining the characteristics of the stocks held by the fund: the market capitalisation, the book-to-market ratio, the earnings yield and the cash flow yield (Detzel and Weigand, 1998). Future research could investigate if these portfolio characteristics are valid determinants of persistence also for the performance of Sweden-based mutual funds.

In section 6.1, we discuss whether the performance persistence found among funds investing in Eastern Europe could be caused by an informational advantage held by some managers. As far as we know, no research has been conducted on this topic, which is well worth looking into.

The findings of Keswani and Stolin (2006) regarding UK-based mutual fund sector competition and its link to performance persistence could be an explanation of the persistence found in this study. Considering the increasing competition in the Swedish fund market, a similar study performed on Swedish data could provide interesting results.

In this study, we conclude that performance persistence can be found among Sweden-based mutual funds. However, we have not examined whether the results are

[13] To the best of our knowledge, there is no more recent study on the momentum of Swedish stocks.

economically significant, that is whether a profitable investment strategy can be based upon them. This has previously been done by Elton et al. (1996), among others, on US data. Therefore, this topic is also suggested for future research.

Finally, to test the robustness of our results, the study could be re-performed using a bootstrap technique as presented in Kosowski et al. (2006). This technique allows for the estimation of alphas without making assumptions on the probability distribution of the returns. This way, the problem of non-normal alphas can be avoided.

7. Conclusions

Mutual funds constitute an increasingly important part of the financial industry in Sweden. Consequently, it becomes important to evaluate their performance. Of predominantly large interest is to examine whether previous returns could be an indication of future returns, since investors use such information when selecting which funds to invest in. For these reasons, we have devoted this thesis to the examination of the existence of performance persistence in Sweden-based equity funds.

Using the largest survivorship-bias-free dataset of Sweden-based equity mutual funds ever collected, classified by the regions in which they invest, we perform two types of tests. The Cross Product Ratio test looks for subsequent winners or losers, whereas autoregressions are used as a means to examine the extent to which performance in one period could be explained by the performance of the previous period. We find evidence of persistence for funds investing in several regions: Sweden, Europe, Eastern Europe and globally. In general, persistence was found in the latter part of the observed time period, from 2001 to 2006. Our findings contribute substantially to the scarce previous research on performance persistence in the Swedish, European, Eastern European and global markets, by confirming the results of Dahlquist et al. (2000), Otten and Bams (2002) and Keswani and Stolin (2006), and by providing results of significant persistence in a time period never previously studied.

Further research needs to be conducted on the subject, as suggested in section 6.5, before concrete investment advice can be formulated. However, the bottom line of our thesis is that historical returns could actually be an indication of future returns.

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Accessed through the Stockholm School of Economics.

Thomson Datastream Advance Version 4.0 SP5B
Accessed through the Stockholm School of Economics.

Appendix

Table A1. Funds included in the investigation classified by region. The second and forth columns from the left provide the first year from which data is available. For non-surviving funds, the end date is also provided.

Sweden	Year
Akelius/HQ Select Fund	1995
Aktie-Ansvar Sverige	1990
Aktiespararna Topp Sverige	1999
AMF Pension Aktiefond Sverige	1998
Banco Etisk Sverige Special	1999
Banco Hjälpfond	1995
Banco Humanfond	1990
Banco Ideella Miljöfond	1990
Banco Samaritfond	1994
Banco Svensk Miljöfond	1994
Carnegie Sverige	1996
Cicero Sverige	2000
Danske Fonder SRI Sverige	2001
Danske Fonder Sverige	1996
Didner & Gerge Aktiefond Sverige	1994
Eldsjäl Gåvofond	1997
Eldsjäl Sverigefond	1997
Enter Sverige	1999
Enter Sverige Fokus	1999
Erik Penser Aktieindex Sverige	1996
Folksam LO Sverige	1999
Folksam LO Väst	1999
Folksam Sverige	1994
Folksam Tj.man Sverige	1999
Handelsbanken 30 i Topp Index	2000
Handelsbanken Aktiefond Index	1987
Handelsbanken Bofond	1987
Handelsbanken Radiohjälpsfond	1995
Handelsbanken Reavinstfond	1988
Handelsbanken Seniorbofond Aktie	1991
HQ Swedish Equity Fund A	1998
HQ Sverigefond	1987
IKANO Banken Svensk Aktiefond	1998
Kaupthing Sverige Index 30	1997
Lannebo Sverige	2000
Länsförs Sverigefond	1991
Moderna Fonder Sv Topp 30	1999
Nordea Alfa	1984
Nordea Beta	1984
Nordea Inst. Aktiefonden Sverige	1998
Nordea Olympia	1988
Nordea Portfölj Sverige	1999
Nordea Selekta Sverige	2000

Sweden (cont'd)	Year
Nordea Sverigefond	1978
Robur Ethica Miljö Sverige	1996
Robur Hockeyfond	2001
Robur Sverigefond	1984
Robur Sverigefond MEGA	1994
Robur Vasaloppsfond	2001
SEB Stiftelsefond Sverige	1998
SEB Sverigefond 1	1984
SEB Sverigefond Chans/Risk	1995
Skandia Cancerfonden	1988
Skandia Sverige	1994
SPP Aktiefond Sverige	1996
SPP AktieIndex Sverige	1998
XACT Fonder OMXS30	2000
Öhman Sverige	1996
Non-surviving:	
Alfred Berg Pension Sverige	2000-2004
Alfred Berg Sverige Extrakt	2000-2004
Allemans SHB, Reavinstfond	1996-1999
Banco Etiska Sverigefond	2000-2004
CB Asset Swedish Blue Chips D	1998-1999
FSB/Robur, Sverige	1991-2002
Föreningsbanken, Sverige	1988-1998
Hagstr &Qviberg, Sverige	1988-1993
Invit, Aktiefond	1997-2001
Nordbanken, Fondspar (fd Gota)	1994-1996
Nordbanken, SverigeInvest	1987-1994
Nordea Gamma	1987-2003
Poncera, Swedish Agressive Fund	1997-1998
SEB A, Allemansfond	1996-1999
SEB A, Sverige (fd Aktiefond)	1988-1999
SEB Aktiv Sverige	1991-1995
SEB Allemansf Chans/Risk	1995-1999
SEB Svenska Stift	1991-1995
SEB Sverigefond	1987-1999
SHB Chans/Risk	1984-2002
SHB SSF Sweden	1995-2004
Svecia, Swedish Eq Se	1996-2001
Trygg Fonder Sverige	1994-1997
Trygg Fri Placering Sverige	1991-1994
Trygg, Sverige	1988-1999
Wasa Fondförsäkring Sverige	1991-1997
Wasa Försäkring, Sverigefond	1989-1994

Sweden (cont'd)	Year
Small cap funds:	
Banco Småbolagsfond	1989
Carnegie Småbolag	1996
Catella Reavinstfond	1998
Handelsbanken Småbolagsfond	1994
HQ Strategifond	1988
HQ Strategy Fund	1990
Kaupthing Småbolag	1994
Länsförs Småbolagsfond	1997
Robur Småbolagsfond Sverige	1995
SEB Sverige Småbolag Chans/Risk	1995
SEB Sverigefond Småbolag	1987
Skandia Småbolag Sverige	1998
Non-surviving:	
FSB/Robur, Allemansfond Export	1995-1999
FSB/Robur, Allemansfond Småbolag	1995-1999
Trygg Fonder Småbolagsfond	1997-1999
Nordics	
Banco Etisk Norden	1987
Carnegie Nordic Markets	1996
Handelsbanken Norden Aggressiv	2000
Handelsbanken Nordenfond	1989
Nordea Avanti	1987
Nordea Nordenfonden	1989
Robur Nordenfond	1997
SEB Nordenfond	1997
Skandia Ideer för Livet	1995
Öhman Nordisk Miljö	1998
Non-surviving:	
Alfred Berg S, Norden	1987-2005
Carlson, Nordic	1990-2004
FSB/Robur Nordic Equity	1989-2003
Föreningsbanken, Norden	1988-1998
Gota Global Sel. Nordic	1989-1993
Nordea Nordic Equity	1999-2004
SEB Allemansfond Norden	1997-1999
SEB Nordenfond (exkl Sverige)	1987-2002
Trygg Fri Placering Norden	1991-1999
Europe	
Akelius ELIT	2000
Akelius Europafond	2000
Aktie-Ansvar Europa	2000
AMF Pension Europafond-Euro	1999
Banco Etisk Europa	1989
Banco Eurotop 50	1999
Carnegie European Equity	1999
Carnegie, Fides P/S Europafond	1999
CB Asset Euro Qual	1995
Danske Fonder Europe	2000
Danske Fonder Sverige/Euro	1998
Danske Fonder Utland	1999
Erik Penser Aktieindex Europa	1999
Folksam Europa	1994

Europe (cont'd)	Year
Handelsbanken Esprit Fund	1987
Handelsbanken Euroland Aktie	1998
Handelsbanken Europa Aggressiv	1999
Handelsbanken Europa Index	2000
Handelsbanken Europafond	1989
IKANO Banken Europa	1999
Länsförs Europafond	1991
Länsförs Mega Europa	1992
Moderna Fonder Eu Topp 100	2000
Nordea Euroland	1998
Nordea Europafond	1989
Nordea Selekta Europa	1995
Robur Europafond	1994
Robur Europafond MEGA	2000
Robur Exportfond	1993
SEB Cancerfonden	1999
SEB Etisk Europafond	1988
SEB Europa Chans/Risk	1999
SEB Europafond	1989
SEB Europafond 1	1988
SEB Europafond 2	1998
SEB Europafond 3	1988
SEB Östersjöfond/WWF	1999
Skandia Europa	1995
SPP AktieIndex Europa	1998
SPP EMU Aktie	1998
SPP EMU Bland	1998
Öhman Index Europa	1999
Non-surviving:	
Aktie-Ansvar Europa	1990-1992
Alfred Berg, Europa	1995-2004
Banco Europa Pension	2000-2004
Carlson, Continental Europe	1990-2004
Carnegie, Fides P/S Europafond	1989-1994
Firstnordic Fonder Europa Index	2000-2001
FSB/Robur, Sparfond Europa	1991-1997
Föreningsbanken, Europa (fd EG)	1988-1998
Gota Global Central Europe	1989-1995
Gota Global Mediterranean	1989-1995
Gota Global, Europe	1988-1995
Länsförsäkringar, Europa	1991-1998
Nordbanken, EG-fond	1988-1994
Nordea Euro Equity	1999-2003
SEB Europafond (old)	1991-1999
Svecia, Euro Top	1992-2000
Trygg Europa fond	1989-1999
Trygg Fri Placering Europa	1991-1994
Wasa Europafond (Fd Nordenfond)	1988-1994
Wasa Fondförsäkring Europa	1991-1997

Eastern Europe	Year
East Capital Baltikumfonden	1998
East Capital Osteuropafond	1998
Handelsbanken Östeuropa	1996

Eastern Europe (cont'd)	Year
Nordea Österuropa	1996
Robur Österuropafond	1996
SEB ÖsteurfondxRyssland	1996
SEB Österuropafond	1997
Non-surviving:	
Carlson Fund Eq. Eastern Europe	1996-2003
East Capital Baltic Blue-chip	1997-2003
Föreningsbanken, Osteuropa	1996-1998
SHB Sv Select East Europea	1998-2003
Global	
Akelius/HQ Utlandsfond	1995
AMF Pension Aktiefond Global	2001
AMF Pension Aktiefond Världen	1998
Banco Etiska Global	1998
Banco Offensiv	1984
Banco Offensiv Pension	2000
Carnegie World Wide	1996
Cicero Global	2000
Danske Fonder Global	2000
Danske Fonder Global Index	2000
Danske Fonder SRI Global	2001
Danske Fonder Stockpick	2000
Folksam Globala Aktiefond	2000
Folksam Idrottsfond	1995
Folksam LO Världen	1999
Folksam Tj.man Världen	1999
Handelsbanken Gbg Univ Forskning	1996
Handelsbanken Sverige/Världen	1998
Handelsbanken UL Aggressive	1992
Handelsbanken Utlandsfond	1987
HQ Gorilla A	2000
HQ Utlandsfond	1988
IKANO Banken Global Aktiefond	1999
KPA Aktiefond	1999
Länsförs Globalfond	1995
Länsförs Total	1991
Lärarfonder Lärarfond 28-44 år	1999
Nordea Global	1999
Nordea Inst. Aktiefonden Världen	1998
Nordea Pensions Maxi	1999
Nordea Spektra	1987
Robur Aktiefond Pension	1999
Robur Allemansfond I	1984
Robur Allemansfond II	1984
Robur Allemansfond III	1987
Robur Allemansfond IV	1989
Robur Allemansfond V	1984
Robur Ethica Sverige Global	1984
Robur Globalfond	1984
Robur Globalfond MEGA	1998
Robur IP Aktiefond	1994
Robur Kapitalinvest	1984
Robur Talenten Aktiefond MEGA	1994

Global (cont'd)	Year
Robur IP Aktiefond	1994
Robur Kapitalinvest	1984
Robur Talenten Aktiefond MEGA	1994
SEB Aktiesparfond	1984
SEB Etisk Globalfond	1991
SEB Generationsfond 50-tal	2000
SEB Generationsfond 60-tal	2000
SEB Generationsfond 70-tal	2000
SEB Global Chans/Risk	2000
SEB Globalfond	1987
SEB Stiftelsefond Utland	1999
Skandia AiE Offensiv	1995
Skandia Världen	1989
Skandia Världsnaturfonden	1988
SPP Aktieindex Global Sust	2000
SPP/Capital Global Equity	1997
Öhman Hjärt-Lung	1989
Non-surviving:	
Akelius, Jackpot	2000-2003
Banco, Global	1987-2004
Carlson 28-44 år	2000-2003
Carlson 45-58 år	2000-2003
Carlson 59+ år	2000-2003
Carlson ST 28-44 år	2000-2003
Carlson ST 45-58 år	2000-2003
Carlson ST 59+	2000-2003
FSB/Robur, Sparfond Global	1991-1997
Föreningsbanken, Global	1987-1998
Gota Global International	1988-1995
Hagstr&Qviberg Utland 2	1989-1995
Nordea SPARA femman	1996-2003
Poncera, Global Agressive Fund	1996-1998
SEB A, Totalfond	1994-1999
SEB Aktiv Global	1991-1995
SEB Global Stift	1991-1995
SEB Världen (fd Utdelnfo)	1987-1995
SEB Världen 2	1989-1996
SEB Världenfond (old)	1991-1999
SEB, Globalfond	1992-2001
SHB Aktiefond utl	1991-1994
SHB Flermarknadsfond	1992-1994
SHB Generation 40-tal	2000-2003
SHB Generation 50-tal	2000-2003
SHB Generation 60-tal	2000-2003
SHB Generation 70-tal	2000-2003
SHB Sv Selection Int	1988-2004
Skandia Life/H & Q, Global	1993-1998
Skandia Life/Svecia Glob. Selec.	1993-2001
SkandiaLink A Berg, Global	1994-1999
SkandiaLink Carlson Inter Eq A	1994-2000
SkandiaLink SEB Miljöfond	1997-2001
SkandiaLink SEB Utlandsfond	1991-1999
Wasa U-hjälpsfond	1996

North America	
Danske Fonder US	2000
Erik Penser Aktieindex USA	1999
Folksam USA	1994
Handelsbanken Amerikafond	1989
Länsförs Nordamerikafond	1995
Nordea Nordamerikafond	1989
Nordea US Fund	1989
Robur Amerikafond	1994
SEB Nordamerikafond	1991
Skandia USA	1994
SPP AktieIndex USA	1999
Öhman Index USA	1999
Non-surviving:	
Alfred Berg S, North America	1991-2004
Carnegie, Fides US	1988-1994
Firstnordic Fonder USA Index	2000-2001
Föreningsbanken, Amerika	1990-1998
Gota Global North America	1988-1995
Länsförsäkringar, USA	1996-1998
Nordea North America Equity	2000-2003
SEB Nordamerika Chans/Risk	1999-2004
Trygg Fri Placering Nordamerika	1991-1994
Trygg Nordamerika fond	1989-1999
Wasa Nordamerika fond	1996
Japan	
Erik Penser Aktieindex Japan	1999
Folksam Japan	1997
Handelsbanken Japanfond	1989
Länsförs Japanfond	1995
Nordea Japanfonden	1989
Robur Japanfond	1994
SEB Japan Chans/Risk	2000
SEB Japanfond	1994
Skandia Japan	1994
SPP AktieIndex Japan	1999
Öhman Index Japan	1999

Japan (cont'd)	
Non-surviving:	
Alfred Berg, Japan	1994-2004
Alterum Bcm Zipangu Japan	2000-2004
Banco, Japan	1994-2004
Carlson, Japan Regional	1994-2002
Föreningsbanken, Japan	1994-1998
Länsförsäkringar, Japan	1996-1998
Nordea Japan Equity	2000-2003
SEB, Aktiefonder, Japanfond (old)	1994-1999
Trygg Fri Placering Japan	1994-1997
Trygg, Japan Fond	1994-1999
Wasa Japan fond	1996
Asia	
Folksam Asien	1997
Handelsbanken Asienfond	1989
Länsförs Asienfond	1993
Nordea Asian Fund	1989
Nordea Fjärran Östern	1994
Robur Pacificfond	1989
SEB Asienfond ex Japan	1991
Skandia Far East	1994
Öhman Index Pacific	1999
Non-surviving:	
Alfred Berg S, Far East	1992-2004
FSB/Robur, Sparfond Pacific	1991-1997
Föreningsbanken, Asien/Pacific	1988-1998
Gota Global, Far East	1988-1995
Royal Skandia HTR India	1995-1998
SEB Pacific	1993-2002
SHB Sv Selection Pacific	1990-2003
SkandiaLink Carlson Far East	1994-2001
Trygg Fri Placering Asien	1992-1999
Wasa Fondförsäkring Asien	1993-1997
Öhman, Pacific	1990-1992

Table A2. Goodness of fit-measures and estimates from the CAPM regressions.

	Average adj. R^2	Percentage of Jensen's alphas significant at 5%	Percentage of Jensen's alphas significant at 10%
Sweden incl. small cap funds	0.82	7.80%	4.19%
Sweden excl. small cap funds	0.82	6.89%	3.70%
Nordics	0.75	0.00%	4.94%
Europe	0.70	2.92%	3.37%
Eastern Europe	0.78	6.67%	0.00%
Global	0.57	7.41%	7.41%
North America	0.62	1.81%	0.60%
Asia	0.35	5.41%	0.90%
Japan	0.85	3.31%	7.44%

Table A3. A Shapiro-Wilk Normality test for the natural logarithm of the CPR-statistic.

Shapiro-Wilk W test for normal data				
Obs	**W**	**V**	**z**	**Prob>z**
119	0.98227	1.694	1.181	0.11884