PERFORMANCE OF FINNISH MUTUAL FUNDS: A DECOMPOSITION APPROACH

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Performance of Finnish Mutual Funds: A Decomposition Approach

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1 Introduction

The monthly fund reports provided by the Helsinki Stock Exchange (HEX) give the reader an easily accessible survey on how Finnish mutual funds have performed recently.¹ These reports do not only present percentage returns earned by the funds, but also risk measures (volatility and beta) and performance measures that take into account return as well as risk (Sharpe ratio and ex-post alfa). The figures shown in the February 2002 report, which is the most recent report currently available, reveal that Finnish domestic stock funds on average underperformed against their benchmark index over the 1.2.2001-31.1.2002. This finding seems to be in line with a growing body of academic research indicating that the fund market as a whole is unable to outperform the market.

In the United States fund managers gain a lot of attention in magazines specifically addressing individual investors as well as in the broader popular press. Successful managers are honored while those with a weaker track record face the risk of being booted from their appointments on a short notice. It is therefore not surprising that the bulk of the academic research on fund manager performance is of American origin. Unfortunately the conclusions reached in these papers are not particularly uplifting for the broad American public saving in mutual funds. For instance Gruber (1996) reports that American domestic stock funds had an average yearly return 0.65 percent below the benchmark index during the 1985-94 period. Furthermore the evidence indicate a negative relationship between net returns and expense levels. Actively managed funds thus seem to be unable to outperform more passive funds on an after costs basis (Carhart 1997).

While the authors cited above have investigated fund share returns, other researchers have looked directly on how the stocks included in the fund portfolios have performed. These researchers investigate whether fund managers are able to identify underpriced stocks and they are not taking direct or indirect expenses burdening fund investors into account. Papers within this line of research have concluded that at least the managers of domestic American funds seem to have the ability to pick stocks that tend to outperform the market (see i.e. Grinblatt and Titman (1989 and 1993) and Daniel et al. (1997)). The evidence is especially strong among growth-oriented funds, which held stocks that outperformed the market with 2-3 percent per year. Daniel et al. (1997) and Grinblatt et al. (1995) however report that the high performance level among these funds more likely is due to the general

¹These reports can be downloaded from www.hex.fi.
characteristics of growth stocks than to the stock picking ability among the fund managers.

In a seminal paper Wermers (2000) decomposes mutual fund net returns in a systematical manner into several components such as an average style component, measures of characteristic timing and stock selectivity, trade related expenses and fees paid by investors. As an example of style selection within the framework of Wermers we might have a fund with a preference for investments in small firms with stocks that have outperformed the market during the last year (momentum stocks) but who still have a relatively low market value compared to their book value (value stocks). A fund manager possesses characteristic timing ability if he tends to invest in stocks with a certain characteristic just before the start of a period with high returns on stocks with this particular characteristic.

Wermers found that the portfolios of American stock funds outperformed the broad value-weighted CRSP-index by an average of 1.3 percent per year during the 1975-94 period. These abnormal returns could to almost fifty per cent be attributed to the characteristics of the stocks. The remaining part was due to the abilities of managers to pick over average performing stocks within each characteristic category. Although the fund portfolios outperformed the benchmark, the net return earned by fund share owners was on average about one percent below the index return. According to Wermers 0.7 percentage points of this discrepancy could be explained by low returns on the cash holdings of the funds, 0.8 percentage points by transaction related expenses and 0.8 percentage points by management fees.

This paper can to some extent be seen as an attempt to adapt the methodology proposed by Wermers (2000) to the Finnish fund market. The purpose of this study is to investigate how managers of Finnish stock funds have performed in a more thorough manner than would be possible if only price data on fund shares were examined. By taking the individual stock holdings of the funds into account an in-depth examination of the fund managers’ strategic decisions is made possible. Furthermore we gain a deeper understanding on how different kinds of expenses affect net returns. We are thereby also

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2 Wermers divided the stock sample into 125 categories based on firm size, market value relative to book value and the stocks historical returns.
ready to form an opinion on whether fund managers’ salaries are in line with their investment skills.

The empirical investigation stretches over the 1991-2000 period and is focused on funds investing solely in domestic stocks. One conclusion that can be drawn from the study is that the fund managers were relatively successful in their long-term strategic decisions. A plausible explanation to this finding is that most funds were over-weighted in the technology sector, a sector that performed exceptionally well during the nineties. Another possible reason could be that the funds to a large extent avoided the small firms outside the main list of the HEX. These stocks underperformed the stocks on the main list during the investigated period. When looking at the managers’ abilities to time the characteristics of their holdings it becomes quite evident that several funds failed to sell off their large technology holdings before the market downturn in 2000.

After the investment characteristics have been controlled for it seems as if the managers at least to some extent were able to find above average performing stocks within the individual categories. The aggregated picture regarding the abilities of domestic stock fund managers is thus predominantly positive and may therefore motivate the current level of the management fees.

This study starts with a description of the empirical data in Section 2. Then a presentation of the various performance measures follows in Section 3. The main empirical findings are reported in two subsections where the first one (4.2) looks at the aggregated picture of the investigated funds while the second one (4.3) contains some individual results on a subset of the funds. The paper is summarized in Section 5.

2 Data

Eighteen stock funds investing on the domestic market have been investigated in this study. We have thus excluded international funds as well as funds with significant positions in bonds or derivatives. Although the investigation covers the 1991-2000 period, most funds do not enter the sample until some years after 1991. This is partially due to the fact that some of the funds were founded after 1991 and partially to the circumstance that
stock holdings from the early nineties on some of the funds were not readily accessible.\textsuperscript{3} Table 3 displays the number of funds included each of the investigated years. To enable a direct comparison between individual funds, a subsample consisting of the nine funds whose holdings from 1994 and on are known, is created. These nine funds are marked with an asterisk in Table 1.

Table 1 contains some more detailed information on the funds. As can be seen from the table three of the funds are directed towards smaller firms. One of the funds, the Seligson & Co FOX index-fund, is a passive index-fund with a fee level clearly below that of the other funds. The fund Gyllenberg Finlandia was until 1995 a pure index fund but has since then positioned itself as an actively managed fund. The other funds in the sample are all actively managed funds with a general investment approach, i.e. they are not specifically directed towards some particular size or industry category. The funds in the sample normally have above ninety percent of their total capital invested in stocks.

The database used in this study includes monthly returns on fund shares as well as information gathered from the funds’ annual reports, including stock holdings and fees. The stock return database consists of monthly returns on all stocks listed on the main list of HEX as well as on the other lists (previously the OTC and brokers lists, currently the I- and NM/Pre-lists).

To make an examination of the funds’ investment strategies possible the stocks have been divided into five characteristic categories.\textsuperscript{4} As a first step the stocks on the main list have been separated from the other stocks, a grouping that is assumed to capture differences in firm size. After that the stocks on the main list have been subdivided into three industry categories: “financial stocks” (firms listed under the headings Banks and finance, Insurance or Investment), “technology stocks” (Telecommunication and electronics) and “others” (all other industry headings). For the stocks outside the main list we have only two categories: “technology stocks” and “others”. Based on this division of the stock sample five equally weighted category indices were constructed. Yearly returns on these indices are displayed in Table 2.

\begin{footnotesize}
\footnotesize
\textsuperscript{3} To be able to investigate the performance of a fund a certain year with the methodology proposed in this study one needs to have access to portfolio holdings two calendar years back in time.

\textsuperscript{4} The limit size of the HEX would make a division of the sample into a larger number of categories inappropriate since the category returns then would be too sensitive to the returns on individual stocks.
\end{footnotesize}
Table 1
Basic fund information

Previous fund names are in parenthesis. The “styles” are the funds’ self declared investment styles. The year in the third column is the first year from which annual reports of the fund in question are available. The research method applied makes estimates of performance measures possible only two calendar years after the first year with known portfolio holdings. The fees and Nokia and Sonera holdings presented in the table are from the 1999 annual reports. The average stock proportion is based on all the years from which portfolio holdings are known for the fund in question. The reported Nokia and Sonera holdings are proportions of total stock holdings, not proportions of total fund capital including cash.

<table>
<thead>
<tr>
<th>Fund Name</th>
<th>Style</th>
<th>Data Since</th>
<th>Entry</th>
<th>Exit</th>
<th>Management</th>
<th>Avg. Stock Proportion</th>
<th>Nokia Proportion</th>
<th>Sonera Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aktia Capital*</td>
<td></td>
<td>1993</td>
<td>1%</td>
<td>0</td>
<td>1.95%</td>
<td>96.11%</td>
<td>4.41%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Alfred Berg Finland*</td>
<td></td>
<td>1994</td>
<td>1%</td>
<td>1%</td>
<td>1.30%</td>
<td>97.06%</td>
<td>8.20%</td>
<td>8.10%</td>
</tr>
<tr>
<td>Alfred Berg Small Cap</td>
<td>Small firm</td>
<td>1998</td>
<td>1%</td>
<td>1%</td>
<td>1.60%</td>
<td>93.90%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Carnegie Suomi Osake*</td>
<td>(Selin Osake)</td>
<td>1993</td>
<td>2%</td>
<td>1%</td>
<td>1.25%</td>
<td>91.24%</td>
<td>9.39%</td>
<td>9.39%</td>
</tr>
<tr>
<td>Conventum Finland</td>
<td>(Arctos Finland)</td>
<td>1997</td>
<td>1%</td>
<td>1%</td>
<td>1.54%</td>
<td>87.13%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Conventum Futura</td>
<td>(Arctos Futura)</td>
<td>1997</td>
<td>1%</td>
<td>1%</td>
<td>2.04%</td>
<td>89.17%</td>
<td>9.78%</td>
<td>7.25%</td>
</tr>
<tr>
<td>Evli Select</td>
<td></td>
<td>1998</td>
<td>1%</td>
<td>1%</td>
<td>2.08%</td>
<td>94.99%</td>
<td>5.44%</td>
<td>9.08%</td>
</tr>
<tr>
<td>Gyllenberg Finlandia*</td>
<td>(Gyllenberg Index)</td>
<td>until 1995</td>
<td>1%</td>
<td>1%</td>
<td>1.30%</td>
<td>93.57%</td>
<td>9.69%</td>
<td>9.60%</td>
</tr>
<tr>
<td>Gyllenberg Small Firm*</td>
<td>Small firm</td>
<td>1994</td>
<td>1%</td>
<td>1%</td>
<td>2.50%</td>
<td>95.53%</td>
<td>0.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Handelsbanken Osake</td>
<td></td>
<td>1998</td>
<td>1%</td>
<td>1%</td>
<td>1.88%</td>
<td>96.20%</td>
<td>9.70%</td>
<td>9.60%</td>
</tr>
<tr>
<td>Leonia Kasvu osake</td>
<td>(PSP Kasvu osake)</td>
<td>Small firm</td>
<td>1996</td>
<td>0.8%</td>
<td>0.5%</td>
<td>1.30%</td>
<td>95.05%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Leonia Osake*</td>
<td>(Presta)</td>
<td>1991</td>
<td>0.8%</td>
<td>1.0%</td>
<td>1.90%</td>
<td>92.11%</td>
<td>9.39%</td>
<td>9.70%</td>
</tr>
<tr>
<td>Leonia Yhteis osake</td>
<td>(PSP Osake)</td>
<td>1997</td>
<td>0.5%</td>
<td>0.5%</td>
<td>0.95%</td>
<td>97.94%</td>
<td>9.52%</td>
<td>9.63%</td>
</tr>
<tr>
<td>Mandatum Osake</td>
<td></td>
<td>1998</td>
<td>0%</td>
<td>0.5%</td>
<td>1.30%</td>
<td>96.92%</td>
<td>9.41%</td>
<td>8.71%</td>
</tr>
<tr>
<td>Merita Fennia*</td>
<td>(Kansallis Kasvu)</td>
<td>1991</td>
<td>1%</td>
<td>1%</td>
<td>2.00%</td>
<td>93.56%</td>
<td>9.71%</td>
<td>9.54%</td>
</tr>
<tr>
<td>Merita Pro Finland*</td>
<td>(Investa Osake)</td>
<td>1991</td>
<td>1%</td>
<td>0%</td>
<td>0.50%</td>
<td>95.05%</td>
<td>9.70%</td>
<td>9.34%</td>
</tr>
<tr>
<td>OP-Delta*</td>
<td></td>
<td>1993</td>
<td>1%</td>
<td>1%</td>
<td>2.03%</td>
<td>88.21%</td>
<td>9.60%</td>
<td>7.36%</td>
</tr>
<tr>
<td>Seligson &amp; Co FOX-index fund</td>
<td>Index</td>
<td>1998</td>
<td>0%</td>
<td>0%</td>
<td>0.50%</td>
<td>91.30%</td>
<td>18.70%</td>
<td>27.80%</td>
</tr>
</tbody>
</table>

* These funds are included in a comparative study described in Subsection 4.3. Portfolio holdings of these funds are known since at least 1994.
The legislation regulating the mutual fund industry in Finland prohibit the actively managed funds from investing more than ten percent of their means in the stocks of a single company. Although this weight limit applies to all stocks listed on the HEX, it has in recent years mainly affected the funds’ investments in the two stocks with the largest weights in the HEX All Shares Index: Nokia and Sonera. During the investigated period the weights of all other stocks in the HEX All Shares were far below ten percent. On the 31.8.2000 for instance the weights of Nokia and Sonera in the HEX All Shares were 68.65 percent and 8.31 percent, respectively. The domestic funds are normally benchmarked against the HEX Portfolio Index, where the maximum weight per stock is ten per cent. In August 2000 both Nokia and Sonera were represented by the ten per cent maximum weight in this index.\(^5\) The fact that the fund returns partially reflect returns on the Nokia and Sonera stocks complicates comparisons between funds for two reasons.

One problem is that funds categorized as special funds (index funds are included among these) are exempted from the ten percent maximum weight rule. These funds had a competitive advantage during the investigated period since they were able to take advantage of the exceptional return on the Nokia stock in a higher degree than the normal funds. The methodology used in this study however also complicates comparisons between two funds that both are subject to the ten percent maximum weight restriction. The reason for this is that the managers’ investment styles and their skills in picking above average performing stocks after the style is given, are simultaneously of interest. If a certain fund for instance choose to invest fifty percent of its means in the category “Large Technology Stocks” then only twenty percent of this amount can be invested in Nokia stocks. A fund that on the other hand invests only ten percent of its money into “Large Technology Stocks” can put the whole amount into Nokia stocks. The manager of the former fund may thus get a lower stock-picking score although managers of both funds have equal true stock-picking talent.

\(^5\) Yearly returns on these indices can be found in Table 2.
To avoid these problems the funds’ abilities to manage the part of their means that are not invested in Nokia or Sonera are investigated separately. To make such an investigation possible these two firms were excluded from the category index for “large technology stocks”. The funds’ picks of other large technology stocks are then benchmarked against this reduced index. The contributions of the funds’ Nokia and Sonera holdings to their total performances are still accounted for but they are separated from the main performance measures utilized in the study. Section 3 gives a detailed description of how the various performance measures are constructed.

3 Methodology

The purpose of this section is to provide a thorough description of the return decomposition methodology. Subsection 3.1 gives a comprehensive picture of how the funds net returns are divided into several performance and expense measures. More detailed descriptions of the various measures can be found in Subsections 3.2-3.7.
3.1 Overview

The manager of an actively managed fund should always try to hold stocks that return more than the fund’s benchmark index. To achieve this goal the manager must be able to predict trends in the economy and weight his portfolio towards sectors that have high potential in the near and midterm future. Furthermore he has to use thorough firm level analysis to be able to identify stocks with a return potential superior to that of other stocks in the same industry. He however also has to consider the costs of identifying and trading these stocks, since shareholders of the fund only care about the realized net return. To get a complete picture of the performance of actively managed funds, we utilize several measures that quantify the manager’s ability to find the right stocks and generate the best possible performance on a net return level.

Figure 1 contains all the measures that contribute to the performance of a fund on the net return level. In the left part of the figure we find the components that make up the gross return on the fund.

Figure 1

<table>
<thead>
<tr>
<th><strong>Fund return components</strong></th>
<th><strong>“Indirect Costs” ((IC)):</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Net contribution from holdings in Nokia and Sonera</td>
<td>- Low return on cash holdings</td>
</tr>
<tr>
<td>“Characteristic Selectivity” ((CS)): contribution from stock picks within individual sectors</td>
<td>- Transaction costs</td>
</tr>
<tr>
<td>“Characteristic Timing” ((CT)): contribution from the timing of sector allocation decisions</td>
<td>- Discrepancy due to imperfect portfolio match</td>
</tr>
<tr>
<td>Excess return related to “Average Style” ((AS-EWTI)): contribution from long-term sector allocation strategy</td>
<td>Management fee ((\phi))</td>
</tr>
<tr>
<td>Return on the “Equally Weighted Total Index” ((EWTI))</td>
<td>Entry- and exit-fees</td>
</tr>
<tr>
<td></td>
<td>Fund’s net return</td>
</tr>
</tbody>
</table>

As a basic benchmark we use an equally weighted index that includes all the stocks found in the various stock lists of the HEX with the exception of Nokia and Sonera. This index
is named EWTI (the “Equally Weighted Total Index”). The exclusion of Nokia and Sonera has to do with the ten per cent weight limit which affected the funds’ investments in those stocks as discussed in Section 2. To form an opinion on a manager’s ability to make the right choices among the other stocks on the HEX, we need a benchmark that solely reflects the performance of these other stocks.

If a fund applies a long term investment style with a stock characteristic weighting scheme superior to that represented by the EWTI-index\(^6\), then the “Average Style” measure (AS)\(^7\) will indicate a positive contribution to overall performance (that is the difference between AS and EWTI will be positive). If the fund manager succeeds in adjusting the weights on the characteristic categories in a manner that is favored by general trends in the economy, then this ability will be manifested in a positive value on the “Characteristic Timing” measure (CT). The next measure is the “Characteristic Selectivity” measure (CS) which quantifies the manager’s ability to pick the best performing stocks within each characteristic category. To arrive at the total gross return on a fund we finally have to take into account the effects of any holdings in the stocks of Nokia and Sonera. If these stocks outperformed the other stocks in the fund portfolio during the investigated period, this measure will be positive.

The various costs that affect fund performance on the net level can be found in the right part of Figure 1. As can be seen in the figure we divide these costs into three parts: “Indirect Costs” (IC), management fees (φ) and entry/exit fees. These components will be described in more detail in the subsections that follow. We should however mention that the indirect costs are not directly observable. We therefore estimate the IC measure by calculating the difference between gross return and net return on a pre management and entry/exit-fee basis.

### 3.2 The Equally Weighted Total Index (EWTI)

The “Equally Weighted Total Index” (EWTI) is the basic component of a fund’s gross return. For a given month \(t\) this index is calculated as:

\(^6\) The EWTI-index weights the characteristic categories simply by the number of listed stocks in the categories.

\(^7\) The AS, CT and CT measures were originally developed by Daniel et al. (1997).
(1) \[ EWTI_j = \frac{1}{N} \sum_{j=1}^{N} R_j^t \]

where \( N \) equals the total number of listed stocks minus two (Nokia and Sonera are excluded from the index). \( R_j^t \) is the return on the \( j \):th stock the given month \( t \). The reason for using an equally weighted index rather than a market-value weighted one is that market values for firms outside the main list from the earlier years of the investigated period were not readily available. Since the \( AS \) measure described in the next subsection is compared to the \( EWTI \) we might arrive at a different conclusion regarding the effects of a fund’s long term investment style than if we would have used a value weighted index.

The \( AS \) measure as well as the subsequent performance measures (\( CT \) and \( CS \)) weight returns according to the fund’s stock weightings. Since the \( CT \) is implicitly benchmarked against the \( AS \) and \( CS \) against the sum of \( AS \) and \( CT \), our interpretation of \( CT \) and \( CS \) will be unaffected by our choice of weighting scheme for the \( EWTI \).

### 3.3 The Average Style Measure (AS)

The proportion of a fund’s gross return that can be attributed to its long term investment style (the “Average Style” measure, \( AS \)) is obtained by the following equation\(^8\):

(1) \[ AS_j = \sum_{j=1}^{N} w_{j,T-2} R_{j,T-2}^t \]

where the time indices \( t \) and \( T \) represent calendar month and calendar year. \( N \) is still the number of listed stocks minus two. The weight \( w_{j,T-2} \) is the weight on stock \( j \) in the fund two calendar years back in time. The stock holdings of the funds are obtained from their annual reports. The portfolio weights are here defined as the fraction of the fund’s means, excluding investments in Nokia and Sonera as well as cash holdings, that is invested in stock \( j \). These weights are multiplied by \( R_{j,T-2}^t \), which measures the month \( t \) return on the stock.

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\(^8\) This as well as subsequent measures is based on Daniel et al. (1997). The portfolio weights are however updated on a yearly basis in this study while quarterly reports in the US make updates on a quarterly basis possible in studies with American data.
characteristic category that stock $j$ belonged to two calendar years back in time. The category returns are equally weighted average returns on all stocks in the category.

The $AS$ measure can thus be seen as a weighted average of category returns where the categories are weighted according to their weights in the investigated fund two years back in time. The measure thus gives us a conception of how much the fund would have returned month $t$ if it had obliged its “historical” investment style and within each category picked stocks that performed similarly to other stocks in the category.

A fictitious example may clarify the procedure. Assume that $t$ stands for March 2000 and that we are going to estimate the effects of Fund X’s long-term investment strategy. Fund X had in the end of 1998 7.2 percent of its means (except for the part that was invested in Nokia and Sonera or held as cash) invested in Stora-Enso stocks. The Stora-Enso stock was in 1998 a member of the category “Other Large Stocks”. One term in the $AS$ measure for March 2000 would therefore be the weight 0.072 multiplied by the average return during March 2000 on all stocks in the category “Other Large Stocks”. “Other Large Stocks” is one of the five categories that the stock sample is divided into. The other four categories are “Large Financial Stocks”, “Large Technology Stocks”, “Small Technology Stocks” and “Other Small Stocks”.

Since the returns used in the $AS$ measure are lagged by two calendar years any effects of fund managers’ attempts to time investment strategies are eliminated. Funds that owns more financial stocks than usual a year when these stocks outperform the broader market will not be rewarded with a higher $AS$ value. Funds that according to their long term strategy always keep a large amount of financial stocks will on the other hand attain high $AS$ values such a year. If a fund in the long run attains $AS$ values above the return on a broad market index this could be explained by a compensation for a higher loading of risk factors than in the market as a whole.

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9 The stocks are reclassified each calendar year. The most common type of category switch is between the main list and some of the other lists.
3.4 The Characteristic Timing Measure (CT)

The fund manager’s ability to time his investment style in a profitable manner is measured by the “Characteristic Timing” measure \((CT)\):

\[
CT_t = \sum_{j=1}^{N} \left( w_{j,t-1} R_{j,T-1}^{b,j} - w_{j,t-2} R_{j,T-2}^{b,j} \right)
\]

A positive \(CT\) value imply that the manager beforehand increased the fund’s weight on those categories that performed well a certain month \(t\). The category mix represented by the fund’s stock portfolio last calendar year thus outperformed the category mix represented by the portfolio two years back in time. A fund’s average \(CT\) value is an important indicator on the manager’s strategic skills. The measure is especially important for funds that are well diversified within the stock categories, i.e. that have many but relatively small holdings. Such funds need to succeed in their category timing in order to appeal to investors.

One shortcoming of the timing measure described above is that changes in the funds’ stock portfolios are recorded only once a year. An alternative approach would therefore be to utilize the information on stock holdings that can be obtained from the funds’ compulsory monthly reports. Although the funds’ holdings are disclosed only partially in the monthly reports\(^{10}\), valuable insights on the managers’ timing abilities in the short run could be obtained using monthly data. Since the funds to a varying extent reveal information on their holdings in the monthly reports this alternative measure would find its most valuable use in assessing the aggregated timing ability of the fund market. The measure would be less suited for comparing funds to each other.

3.5 The Characteristic Selectivity Measure (CS)

The next performance measure looks at the fund manager’s ability to identify stocks that outperform other stocks in the same characteristic category. The “Characteristic Selectivity” measure \((CS)\) is estimated in the following manner:

\(^{10}\) The funds normally report the fifteen largest holdings or all holdings with a weight above one per cent in their monthly reports.
\[ (3) \quad CS_j = \sum_{j=1}^{N} w_{j,T-1} \left( R_{j,t} - R_{j}^{b,j,T-1} \right) \]

where \( R_{j,t} \) is the realized return on stock \( j \) during month \( t \). This stock had the weight \( w_{j,T-1} \) in the fund portfolio at the end of the previous calendar year. To obtain the stock’s “abnormal” return it is benchmarked against the average category return during the same month. This benchmark return is the equally-weighted average of the returns on all the stocks in the category. An individual stock’s contribution to the aggregated \( CS \) value is thus its buy-and-hold return minus the buy-and-hold equally-weighted benchmark return. A fund’s \( CS \) value is calculated as the portfolio-weighted average of the contributions from the individual stocks. These portfolio weights are based on the fund’s holding at the end of the previous calendar year and they normalized in order to sum to one although holdings in Nokia, Sonera and cash are excluded.

The \( CS \) measure focuses, unlike the \( AS \) and \( CT \) measures, on the fund manager’s capability to value individual firms. Funds who use the so called “bottom-up” portfolio strategy should strive to achieve a high average \( CS \) value. The reason for this is that according to the “bottom up” strategy stocks should be chosen only on the basis of the firms own merits and not because some fixed fraction of the fund’s means has to be invested in a certain stock category. To funds applying “top-down” management on the other hand the \( AS \) and \( CT \) measures are of greater importance. This is because “top-down” funds are primarily focused on forecasting economic trends and to a somewhat smaller degree concerned with finding the best stock picks within the categories.

A drawback with the \( CS \) measure is that the stock-picks are only benchmarked against firm size and industry categories. Research by Chan et al. (2000) shows that US fund managers have preferences for stocks with certain other return related characteristics, such as book-to-market ratios, stock momentum and liquidity. If a manager for instance prefers high-liquidity stock and such stocks tend to have lower returns than more illiquid stocks, then the \( CS \) measure will underestimate his stock-picking skills.

The sum of the three performance measures presented so far makes up the gross return on the fraction of a fund’s means that is invested in HEX-listed stocks other than Nokia and Sonera. The total gross return of a fund is however also affected by holdings in Nokia and
Sonera. This gross return will be higher than the sum of $AS$, $CT$ and $CS$ if Nokia and Sonera have outperformed the weighted average return on the other stocks in the fund’s portfolio.

Fund share owners are however primarily interested in their funds’ net returns. We therefore now turn our focus to the various kinds of expenses that burden the wealth of share owners.

3.6 Indirect Costs

Based on its stock holdings at the end of the previous calendar year a funds gross return a given month $t$ can be expressed as

\begin{equation}
R_{F,t}^F = \sum_{j=1}^{N} w_{j,T_{-1},t} R_{j,t}
\end{equation}

This portfolio return deviates from the observed fund share return on the same month for a number of reasons. First of all a management fee, which in Finland is stated in a fund’s prospectus, is on a daily basis deducted from the fund’s share price. The management fee is in this study classified as a direct cost. The remaining difference between the return on the fund portfolio and the return on the fund’s shares is due to several effects that we all include under the generic term “Indirect Costs” ($IC$). The aggregated “Indirect Costs” a given month $t$ is

\begin{equation}
IC_t = \sum_{j=1}^{N} w_{j,T_{-1},t} R_{j,t} - R_{F,t} - \phi_{F,t}
\end{equation}

where $R_{F,t}$ is the fund share return and $\phi_{F,t}$ the management fee (more closely described in the following subsection). The $IC$ can be seen as the costs of implementing a certain investment strategy. We would therefore expect funds putting a lot of emphasis on characteristic timing and stock-picking to exhibit higher $IC$ values than more passively managed funds. Although all fund managers should strive to keep the implementation costs down, successful characteristic timing and above average stock picking ability (high
CT and CS values that is) can however compensate high implementation costs for an actively managed fund.

The “Indirect Costs” are not observable in the same manner as for instance management fees. Instead they have to be estimated by deducting fund share returns and management fees from fund portfolio returns. In the following we will however describe the three main components that make up the aggregated “Indirect Cost” figure.

A. Effects of Cash Holdings

A fraction of a fund’s available means is at a given point in time kept as cash. Ongoing investments and withdrawals made by fund share owners, as well as the need to keep a buffer in case a favorable investment opportunity would emerge, prohibit the fund from being fully invested in stocks all the time. According to Table 1 the funds investigated in this study tend to have between two and thirteen percent of their means in a cash buffer. During periods with rising stock prices (such as the major part of the investigated period) the fund shares will therefore exhibit a lower return than the weighted average return on the fund’s stock holdings.

B. Transactions Costs

The fund manager’s actions on the stocks market result in transaction costs that burden the net performance of his fund. These transaction costs consist of direct fees as well as indirect costs such as the bid-ask spread for managers trading “on the spread”.

C. Portfolio Revisions are Only Recognized Once a Year

During a calendar year a fund’s stock holdings will deviate more and more from the holdings at the end of the previous calendar year. Our estimated fund portfolio return is therefore only an uncertain estimate of the true fund portfolio return. This discrepancy should not be viewed as a cost from the fund share owners perspective. But since we are unable to separate this effect from the other “Indirect Costs” we have to include it in our IC measure. If monthly fund reports were utilized instead of annual reports the problem with continuous portfolio revisions would have been significantly reduced. The fact that
Finnish funds only partially reveal their holdings in the monthly reports however decreases the informational value of these reports

3.7 Direct Costs

To finance their businesses and make profit fund companies charge their customers with various kinds of fees. First of all the customers have to pay an entry-fee when purchasing fund shares. For Finnish funds investing in the domestic market the entry-fee usually vary between zero and two percent of the invested capital. The fees charged by the funds investigated in this study can be found in Table 1. Although the figures in the table are from 1999 they are representative for the whole investigated period. The fund companies only made some minor adjustments in their fee structures during the period.

Several funds also charge a percentage based fee when fund shares are sold. Some funds also have a specified minimum fee in Euros for purchasing or selling fund shares. The effect of these entry- and exit-fees on the net returns earned by fund share owners depends on how long the shares are held. In the HEX monthly fund reports for instance the net return calculations assume a one year investment horizon. It should also be mentioned that the fund companies normally charge reduced fees from customers switching between the companies’ own funds.

I addition to entry- and exit-fees fund share owners also have to pay a management fee. A fraction of the management fee is subtracted from the fund’s share price on a daily basis. As a result the fee does not burden share owners that often switch between funds more than it burdens those saving in the same fund for a long time. The management fees vary between a half and two and a half percent on an annual basis. High fees can in the same manner as high indirect costs be justified by successful stock picking and category timing efforts. A manager managing a fund with high fees may have better opportunities to actively monitor the market and to analyze individual firms than his counterpart managing a low-cost fund. Of the funds investigated in this study the FOX index-fund of Seligson & Co, which is a passively managed index-fund, has the lowest overall fee load. The fund Gyllenberg Small Firm is the most expensive with a management fee of two and a half percent.


4 Results

The results of the empirical investigation are presented in this section. After a swift look on overall fund returns in Subsection 4.1 we turn our focus to the estimated values on the various performance and cost measures. While Subsection 4.2 presents the aggregated picture across all investigated funds, Subsection 4.3 provides a closer comparison between a selection of funds.

4.1 Overall Fund Returns

Average yearly returns on the investigated funds can be found in Table 2. As can be seen in the table, fund returns closely match the returns on the HEX Portfolio Index. The funds however managed to outperform this index during each year from 1997 to 2000. At the bottom of Table 5 individual annualized returns for nine funds over the 1996-2000 period can be found. The funds are ranked according to their average return before entry and exit fees. The best performing fund, the Gyllenberg Small Firm Fund, stands out with an average yearly return of 26.88 per cent. The worst performing fund, Carnegie Suomi Osake, only returned 15.13 per cent annually before entry- and exit-fees. The rest of the funds in this subsample can all be found in a relatively narrow range between 18.54 and 22.74 per cent. The contribution of the different aspects of performance on these overall returns as well as the impact of expenses and transaction costs are traced out in the following two subchapters.

4.2 Decomposition of Fund Returns

Several researchers (see e.g. Grinblatt et al. (1995) or Chen et al. (2000)) have shown that fund managers in the US tend to prefer stocks with distinct characteristics. More specifically, momentum and growth stocks as well as stocks of large firms seem to be preferred to other stocks. Since these characteristics have been shown to correlate with average US stock returns (see Fama and French (1992 and 1996), Chan et al. (1996) and Daniel and Titman (1997)), the performance of US funds may to some part be explained by the characteristics of the stock holdings. Empirical support for this conjecture can be found in Wermers (2000).
According to Table 3 the managers of Finnish mutual funds apply a long term investment strategy that generate returns above the average return on Finnish stocks. The average difference between the “Average Style” measure (AS) and the “Equally Weighted Total Index” (EWTI) is positive all years except 1997. Aggregated over the whole investigated period this difference is also statistically significant. It thus seems as if the fund managers during the period investigated invested in stock categories that performed better than the stock market as a whole. An explanation to this result that lies near at hand is that the funds were over-weighted in technology stocks on the main list at the same time as they avoided the more speculative technology stocks outside the main list. As can be seen in Table 2 the latter category had a negative average return over the investigated period. The negative average return on small technology stocks is to a large extent associated with the crash that hit most internet and telecom related stocks in 2000. The crash was preceded in 1999 by a large number of highly priced initial public offerings from small Finnish technology firms.

But do fund managers have the ability to time the characteristics of their portfolios, that is do they for example tend to by financial stocks just before the start of a period with high returns on such stocks? The figures for the “Characteristic Timing” measure (CT) in Table 3 do not indicate any significant timing effects during the 1993-97 period. During 1998 and 1999 on the other hand the characteristic timing efforts of fund managers seem to have paid off. The positive results for these years were however followed by a strong negative characteristic timing impact in 2000. These findings are most likely related to the technology boom in the late nineties and the crash that followed in 2000. It seems as if most funds did not manage to sell out their technology holdings in time before the downturn. The negative average for the CT measure over the whole investigated period is however biased due to the large number of funds in the sample in 2000 compared to the earlier years.
In addition to long term investment style and characteristic timing ability, the individual stock choices also affect fund performance. The “Characteristic Selectivity” measure (CS) tells us whether a mutual fund manager has picked stocks that outperform other stocks in the same characteristics category. According to Table 3 the CS measure averaged over funds and years is positive, although the figure is insignificant in a statistical sense. The measure vary sharply in 1995 and 1996, but nevertheless the results seem to indicate some stock picking ability among fund managers in general. The results for individual funds will be discussed in some detail in Subsection 4.3.

In Table 4 the various performance and cost measures, aggregated over funds and years, are presented. All the estimates shown in the table are annualized. Besides the performance measures discussed so far (AS, CT and CS), also the funds’ holdings in Nokia and Sonera affect their gross returns. Since the sizes of the Nokia and Sonera positions in many cases apparently were limited by the maximum-ten-percent-weight rule, these stocks have been excluded so far in the analysis in order to make comparisons between managers stock picking skills possible. The 1.53 per cent “Nokia- and Sonera-effect” tells us that these two stocks taken together outperformed the other stocks in the funds’ portfolios and thus made a positive contribution to overall fund performance.
Indirect costs \((IC)\) reduced the fund returns by 2.52 per cent annually. Unfortunately we are unable to trace out the contributions to this figure from transaction costs and the low return earned on cash positions. Since any positive effects of portfolio revisions not detected by the \(CT\) measure will affect the \(IC\) measure instead, it is possible that the true effect of transaction costs and low cash returns is significantly larger than 2.52 per cent.

In addition to indirect costs, also the various fees paid by fund share owners must be taken into account before we arrive at the true net return on a fund. The yearly average effect of management fees is 1.53 per cent. The entry and exit fees cost fund investors 1.69 per cent assuming that the fund shares are held only one year. Since stock funds are associated with long-term savings, the entry- and exit-fee are however likely to be a much smaller burden than indicated by this figure. But what can be said about the size of the management fees? The 1.53 per cent yearly fee level roughly matches the positive contribution from managers’ stock picking efforts. Since fund investors seem to benefit from profitable long term category allocation decisions more than they loose on inadequate timing efforts and indirect costs, the management fee load can be justified for the fund industry as a whole.

The main purpose of this paper has been to analyze the overall performance of domestic mutual funds. A closer look at the performances of individual funds may however give an indication of the robustness of the more general conclusions drawn so far. A comparison between selected funds is therefore presented in the next subsection.
4.3 A Comparison Between Funds

This subsection provides individual performance and cost measures on nine of the eighteen investigated funds. These comparisons may give us a hint on whether the funds exhibit similar performance patterns as well as an indication on whether performance is linked to expense levels. It should however be pointed out that results presented in this subsection are retrospective and should not be viewed as any sort of guidance on future performance potential of individual funds. The nine funds included in Table 5 were picked since data on their stock holdings from as far back as 1994 is available, something which makes an examination of performance measures over a five year period (1996-2000) possible. The choice of nine funds and a five year investigation period is a compromise between the extremes of either looking at the whole 1993-2000 period but only include three funds or examining all funds but then have to limit the examination to the last year.

The funds presented in Table 5 are ranked according their net returns before entry- and exit-fees over the 1996-2000 period. All nine funds have average AS values exceeding the average annual return on the benchmark index EWTI. The customers of the fund companies have thus benefited from the fund managers’ long term allocation decisions. Of all fund investors those investing in the overall best performing fund Gyllenberg Small Firm benefited the least from their fund’s long term sector allocation. The likely reason for this is that small firms on the whole underperformed larger firms (see Table 1). The other eight funds benefited to a roughly equal degree from their long term investment strategies. When looking at the “Characteristic Timing” measure (CT) a mixed picture emerges with positive values on four of the funds. All figures are however statistically insignificant.

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11 All performance and cost measures in Table 5 are annualized.
The positive results regarding fund managers’ stock picking skills in general documented in the previous subsection seem to apply on an individual basis as well. Although two of the funds have slightly negative CS values, the dominating impression is that managers have the ability to identify stock with higher potential than other stocks in the same characteristic category. Two funds, Gyllenberg Small Firm and Alfred Berg Finland, show superior stock picking performance during the investigated period. Especially the Gyllenberg Small Firm fund stands out with a yearly contribution of 15.87 per cent to total performance from stock picking efforts. Although restricted to a low return segment the managers of this fund have been able to boost overall performance by finding above average performance stocks within this segment.

All funds except Gyllenberg Small Firm improved overall performance by holding Nokia and Sonera stocks. Especially the fund Aktia Capital, which sold out its Sonera stocks before the downturn in 2000, got a boost to its average return from holdings in these two firms. Although no formal test of the relationship between cost levels and net performance

<table>
<thead>
<tr>
<th></th>
<th>Gyllenberg Small Firm</th>
<th>Alfred Berg Finland</th>
<th>Merita Pro Finland (Invetea Osake)</th>
<th>Gyllenberg Finlandia</th>
<th>Aktia Capital</th>
<th>Merita Fennia</th>
<th>Loelia Osake (Presta)</th>
<th>Carnegie Suomi Osake (Selin Osake)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EWTI</strong></td>
<td>15.53%</td>
<td>15.53%</td>
<td>15.53%</td>
<td>15.53%</td>
<td>15.53%</td>
<td>15.53%</td>
<td>15.53%</td>
<td>15.53%</td>
</tr>
<tr>
<td><strong>AS-EWTI</strong></td>
<td>0.80%</td>
<td>3.91%</td>
<td>4.88%</td>
<td>3.77%</td>
<td>6.26%</td>
<td>4.65%</td>
<td>3.78%</td>
<td>4.44%</td>
</tr>
<tr>
<td></td>
<td>(0.17)</td>
<td>(0.64)</td>
<td>(0.74)</td>
<td>(0.60)</td>
<td>(1.00)</td>
<td>(0.73)</td>
<td>(0.64)</td>
<td>(0.71)</td>
</tr>
<tr>
<td><strong>CT</strong></td>
<td>-0.57%</td>
<td>-1.41%</td>
<td>0.45%</td>
<td>0.22%</td>
<td>-1.45%</td>
<td>1.13%</td>
<td>-1.67%</td>
<td>0.03%</td>
</tr>
<tr>
<td></td>
<td>(-0.21)</td>
<td>(-0.80)</td>
<td>(0.39)</td>
<td>(0.10)</td>
<td>(-1.18)</td>
<td>(1.02)</td>
<td>(-0.83)</td>
<td>(0.03)</td>
</tr>
<tr>
<td><strong>CS</strong></td>
<td>15.87%</td>
<td>6.17%</td>
<td>2.01%</td>
<td>2.01%</td>
<td>-0.86%</td>
<td>2.29%</td>
<td>2.81%</td>
<td>-0.89%</td>
</tr>
<tr>
<td></td>
<td>(3.65)**</td>
<td>(2.90)**</td>
<td>(0.66)</td>
<td>(0.68)</td>
<td>(-0.10)</td>
<td>(1.20)</td>
<td>(1.81)*</td>
<td>(-0.16)</td>
</tr>
<tr>
<td>Nokia and Sonera Holdings</td>
<td>0.00%</td>
<td>2.38%</td>
<td>1.51%</td>
<td>2.26%</td>
<td>4.02%</td>
<td>0.97%</td>
<td>2.01%</td>
<td>0.90%</td>
</tr>
<tr>
<td></td>
<td>- (0.65)</td>
<td>(0.65)</td>
<td>(0.42)</td>
<td>(0.62)</td>
<td>(2.22)*</td>
<td>(0.28)</td>
<td>(0.57)</td>
<td>(0.27)</td>
</tr>
<tr>
<td><strong>Gross Return</strong></td>
<td>31.63%</td>
<td>26.58%</td>
<td>24.37%</td>
<td>23.79%</td>
<td>23.50%</td>
<td>24.56%</td>
<td>22.45%</td>
<td>20.02%</td>
</tr>
<tr>
<td><strong>IC</strong></td>
<td>-2.30%</td>
<td>-2.65%</td>
<td>-2.03%</td>
<td>-1.88%</td>
<td>-1.65%</td>
<td>-2.96%</td>
<td>-2.03%</td>
<td>-3.64%</td>
</tr>
<tr>
<td>Management Fees</td>
<td>-2.47%</td>
<td>-1.19%</td>
<td>-0.50%</td>
<td>-1.29%</td>
<td>-1.93%</td>
<td>-1.98%</td>
<td>-1.88%</td>
<td>-1.24%</td>
</tr>
<tr>
<td>Return Bef. One-Time Fees</td>
<td>26.86%</td>
<td>22.74%</td>
<td>21.85%</td>
<td>20.62%</td>
<td>19.92%</td>
<td>19.62%</td>
<td>18.54%</td>
<td>15.13%</td>
</tr>
<tr>
<td>Entry- and Exit-Fees***</td>
<td>-1.98%</td>
<td>-1.98%</td>
<td>-1.00%</td>
<td>-1.98%</td>
<td>-1.00%</td>
<td>-1.98%</td>
<td>-1.78%</td>
<td>-2.96%</td>
</tr>
<tr>
<td><strong>Net Return</strong>*</td>
<td>24.88%</td>
<td>20.76%</td>
<td>20.85%</td>
<td>18.64%</td>
<td>18.92%</td>
<td>17.64%</td>
<td>16.76%</td>
<td>12.18%</td>
</tr>
</tbody>
</table>

T-values are in parenthesis.
* and ** indicate statistical significance on the five and one percent levels, respectively.
*** Assuming a one year investment horizon.
has been carried out, it is evident from Table 5 that no such relationship exists. The only thing that gives any support to the existence of a positive relationship between costs and performance is that the fund performing best on a net return basis, Gyllenberg Small Firm, also has the highest management fees.

Taken together the findings presented in this subsection indicate that the results on the aggregated level presented in Subsection 4.2 to a relatively large extent also hold on the individual fund level. Funds tend to benefit from their long term capital allocation strategies, they neither loose nor make any large amounts of money from category timing\textsuperscript{12} and in most cases they profit from their stock picks within the categories. The indirect cost level is also relatively stable across funds.

5 Summary

The aim of this paper was to examine the performance of domestic mutual funds in Finland during the 1993-2000 period. This examination was carried out by a decomposition of fund returns into several performance and cost components. In addition to monthly fund returns, the database used in the study also consisted of detailed information on the funds’ stock holdings and fees gathered from their annual reports. Furthermore monthly returns on all stocks on the various lists of the Helsinki Stock Exchange (HEX) were utilized. This database made it possible to address issues that would remain unsolved if only returns on fund shares were used.

The results indicate that funds held stock portfolios that outperformed a broad market index by 6.6 percent per year. About 5.3 percentage points of this difference were due to the long term investment strategy of the funds, i.e. the way funds allocated their capital between different stock categories. The funds were however unable to profit from the short term timing of their capital allocation decisions. Especially during 2000 the funds suffered from large holdings in small technology firms. Inferior category timing reduced the funds’ returns by 1.7 per cent annually. The funds were however able to identify stocks that outperformed other stocks in the same category. This superior stock picking ability improved average fund performance by 1.5 percentage points annually. Holdings

\textsuperscript{12} The significantly negative average CT value for the larger sample in Table 2 was, as mentioned in Subsection 4.2, affected by the large number of funds included in the sample in 2000.
in blue chips Nokia and Sonera contributed to overall performance with 1.5 per cent per year. These stocks were excluded from the main performance measures since the funds’ holdings in these stocks were limited by a rule dictating that no more than ten percent of a fund’s means can be invested in a single stock.

On a net return level the funds outperformed the benchmark index by 2.5 per cent per year before one-time fees. Several impacts gathered under the common designation “Indirect Costs” reduced net performance by 2.5 percentage points per year. Management fees lowered yearly net returns by a further 1.5 percentage points. Assuming a one year investment horizon one-time entry- and exit-fees reduced returns by another 1.7 per cent. The average net return after these one-time fees was 13.3 per cent or about 0.8 percent above the return on the benchmark index.

Further research is needed to get more thorough results regarding performance persistence in different market conditions. The results presented in this study may have been biased by the abnormal behavior of technology stocks during 1999 and 2000. When data on stock holdings of a larger number of Finnish funds over a longer time period is available it will be worth while re-examining the issues addressed in this paper. In addition, information in the funds’ monthly reports could be utilized in order to make more precise estimates on fund managers’ skills in timing their allocation decisions.
References


