Master's Thesis in Finance
STOCKHOLM SCHOOL OF ECONOMICS

The Effect of Managerial Changes in the Swedish Mutual Fund Industry

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Abstract

The following paper studies the effect of managerial changes on the performance of funds in the Swedish mutual fund industry. Jensen's alpha is used to measure funds' performance, and bootstrapped Student's t-tests are performed to identify differences between the pre-change and post-change alphas, fund flows, fees and fund sizes. The main findings of the paper conclude that the Swedish mutual fund industry can be characterised by high managerial turnover. When skilled managers leave funds, the subsequent performance of those funds on average decreases, while the change of an underperforming manager is associated with subsequent improvements in funds' performance. However, there is no any significant evidence that the performance of managers is persistent over time. There is evidence of statistically significant alphas for specific time periods; however, the tests showed that the performance is not persistent after managerial changes. Skilled managers are also generally moving to funds of a larger size and higher compensation fees.

Key words: mutual funds, performance evaluation, skill, managerial change

Tutor: Associate Professor Paolo Sodini, Department of Finance, Stockholm School of Economics
Date of presentation: 20 December 2011

Acknowledgements

We would like to express our sincere gratitude to the Stockholm School of Economics community for excellent education and study environment. We are particularly thankful to our tutor, Paolo Sodini, for his valuable advice, guidelines, comments and support throughout the whole writing process of the thesis.

Abbreviations

The following abbreviations are used throughout the paper:

2Y_OBS – 2 consecutive years of observations are used for analysis
ALL_OBS – all available years of observations of a particular manager/fund are used for analysis
FLOW – flow of capital either in or out of mutual funds
TNA – total net assets
SE – standard error

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1. Introduction

Mutual funds have a significant role in the financial industry. First of all, they facilitate the transfer of capital in the market via allocating resources for businesses in need of capital from those who have surplus capital. Second of all, mutual funds give individuals an opportunity to diversify their investments by a variety of criteria (e.g., risk, volatility, geographical markets etc.), as well as continuously offer new products to address different investment objectives (Diaconasu and Asavoaei, 2011).

Mutual funds are important players in the Swedish financial industry. Their total assets have increased significantly from 120 billion to 1,944 billion SEK during 1990 - 2011 (Svenska Bankforeningen, 2011). In addition, mutual funds constituted 14% of all household savings in Sweden, which amounted to 445 billion SEK as of 31st December 2010 and around 77% of the population in Sweden have some of their private savings in mutual funds (Svenska Bankforeningen, 2010). Such a high proportion of investments in mutual funds can be explained by the organisation of the Swedish pension system, where a percentage of an individual's pension is invested in mutual funds. Consequently, Swedish mutual fund industry is expected to be well-developed and competitive. There were more than 80 fund companies in Sweden, which together with foreign fund management companies offered investments in around 5,000 funds by the end of 2010 (Svenska Bankforeningen, 2011). Therefore, Swedish mutual fund industry is of a particular interest due to its significant role in the financial market in Sweden.

Despite the persistent demand for mutual funds among investors, there is a widespread debate in the academia on the ability of mutual funds to actually add value. To a large extent, this debate focuses on fund managers and their ability to pick stocks in order to outperform the market and generate abnormal returns. Moreover, these individuals are subject to constant financial press coverage, with profiles of fund managers frequently discussed in public and followed by investors (Chevalier and Ellison, 1999). Overall, managers' high remuneration levels should suggest that they have an ability to add value. However, there is limited evidence that additional value they might generate can be justified by the levels of their compensation (Berk and Stanton, 2007). The investors' increased attention to fund managers imply that investors believe that managers can bring some personal contribution in terms of skills to funds they manage, which in turn affects the returns generated.

Given the competitiveness of the Swedish mutual fund industry, managerial turnover can be expected to frequently take place within the market. There are several factors which may facilitate this phenomenon. First of all, the boards of mutual funds are constantly looking to improve performance, which results in an increased attention to governance mechanisms. Second of all, managers themselves might be seeking ways to increase their revenues via moving to other funds to increase their income (e.g., higher fees, larger funds, getting rid of poor-performing assets etc.).

Therefore, given the importance of fund managers in the industry, this paper will try to examine the presence of skilled versus underperforming managers in the Swedish mutual fund industry, the effects of managerial changes on funds' performance and possible responses from investors. As a result, this study will try to identify whether a manager can actually add value to funds' performance via generating superior returns and whether this skill, if existent, is persistent. Thus, the subsequent performance of funds affected by managerial changes will be investigated to determine the presence of any signal on future performance of funds as a result of a skilled or an underperforming manager's change.

The rest of the paper is organised as follows: Section 2 provides a brief overview of academic papers on the relevant topics and states hypotheses inferred from the prior academic research. Section 3 describes the methodology and models used in the paper. Section 4 describes the data. In Section 5 results of hypotheses testing and relevant analyses are presented. Findings are summarised in Section 6, and Section 7 offers some suggestions for further research and presents the limitations of this study.

2. Literature Review

Academic literature has intensively investigated the topic of mutual fund managers' abilities to select stocks with superior future performance or to time the market. Such skills allow fund managers to outperform benchmarks and consequently build up a positive track record and reputation.

There is an extensive discussion whether the superior performance of funds is attributed mostly to luck or managers' skills. On one hand, some of the research finds evidence that the variation in funds' performance is merely due to luck, not skill. Carhart's (1997) findings do not support the existence of skilled or informed mutual fund managers in the industry. Elton et al. (1993) also document that active mutual fund managers

underperform passive portfolios. Cornell (2009) finds that the relative performance of large cap value managers provides little information on management skill.

On the other hand, there is evidence of the presence of skilled managers in the market. Although Fama and French (2009) argue that "tracks [of skilled managers] are hidden in the aggregate results by the performance of managers with insufficient skill", there is still some evidence of managerial skill to generate superior risk-adjusted benchmark returns and cover costs. Chevalier and Ellison (1999) also find the presence of fund managers' stock-picking ability, especially for those with a higher and more selective education background. In addition, they find that the replacement of managers is based on a company's belief about their skill level. Ding and Wermers (2005) also argue that managers and their prior experience as well as education play a significant role in generating the performance of a fund. Kosowski et al. (2005) find that the performance of funds is related to stock-picking skills of managers, especially for growth-oriented funds. These findings are also supported by Chen et al. (2009) who state that some "star" managers possess substantial growth timing ability. Duan et al. (2008) and Cuthberston et al. (2008) have also found evidence that some managers possess a stock-picking ability. In addition, Benos and Jochec (2008) discuss the presence of persistence in managers' ability to pick stocks and/or to time the market, based on the study of US equity mutual funds. Barras et al. (2005) highlight as well the existence of skilled managers in the mutual fund industry, who have become exceptionally rare. In addition, Berk and Green (2004) stress that the fact that managers as a group do not outperform benchmarks does not imply a lack of skill, but rather the competitiveness of the industry – inflows in best performing funds lead to a decrease in returns for managers deploying their superior ability in active fund management. As a result, "managers increase the size of their funds, and their own compensation to the point at which expected returns to investors are competitive going forward". Bessler (2010) also finds the evidence that good past performance of a fund leads to managers' promotions, which is also in line with the findings of Hu et al. (2000).

Based on the discussion above, there is some evidence of the presence of skilled managers in the industry that positively affects performance of funds. To underline the fact, Cohen et al. (2005) discuss in their paper the possible judgments of managers' skills as an ability to make investment decisions based on private information in comparison to other skilled managers in the industry. In addition, Spigelman (1974) also highlights the fact that superior performance requires fund managers to have special intellectual abilities and approaches to investment opportunities. Kacperczyk et al. (2005) finds evidence of the

investment ability among managers who hold portfolios that are concentrated in a few industries. Khorana (2001) also suggests that the removal of underperforming managers leads to a better performance of a fund, while the contrary holds for overperforming managers. Therefore, the following hypothesis emerges:

Hypothesis 1: When a skilled (underperforming) manager leaves a fund, the post-performance of that fund will worsen (improve).

Based on the general idea of the first hypothesis, the hypothesis stated below arises, as it has not yet been tested, to the authors' knowledge, in the previous research:

Hypothesis 2: When a skilled (underperforming) manager arrives to a new fund, the post-performance of that fund will improve (worsen).

Dahlquist et al. (2000) find evidence of persistence in performance for money market funds only. It would be interesting to analyse the persistence in performance after a change, as there seems to be a lack of papers that test this phenomenon. Therefore, the next hypothesis is stated:

Hypothesis 3: Skilled managers continue to outperform, while underperforming managers continue to underperform after they move to a new fund.

After having identified the presence of managerial skills in the market, if any, the next step is to understand whether investors' decisions to invest in a specific fund are affected by the managers' past performance and consequently their reputation. Dahlquist et al. (2000) have also found some evidence that there is a positive relationship between lagged performance and current flows. Berk and Green (2004) model shows that past performance has a rational effect on flows into mutual funds. In other words, past performance is correlated with capital flows in and out of mutual funds. Fund-flow relationships are also emphasized in the findings by Chevalier and Ellison (1997), Sirri and Tufano (1998) and Birnbaum et al. (2004). Gruber (1996) echoes this conclusion by stating in his research that the "flow of new money into and out of mutual funds follows the predictors of future

performance". Keswani and Stolin (2008) documents the "smart money effect"[1] in both UK and US mutual fund markets. Moreover, Zheng (1998) finds that investors are capable of identifying good and bad performing mutual funds and allocate their money respectively. In addition, Sawicki (2000) finds that Australian institutional investors are also responsive to the recent performance of funds, which affects fund flows.

From the above discussion, skilled managers can be expected to generate better performance, which in turn leads to the increase of capital flows into the funds and the vice versa for underperforming managers:

Hypothesis 4: When a skilled (underperforming) manager arrives to a new fund or when an underperforming (skilled) manager leaves a fund, the post-inflows to that fund will increase (decrease).

At the same time, there are also conflicting findings of the irrationality of investors' decisions. The irrationality of investors can be supported by the existence of a large number of funds with inferior performance either due to the inability of many investors to evaluate funds or due to costly switching (Cuthbertson et al., 2008). Gruber (1996) highlights the presence of sophisticated and disadvantaged clientele, which explains the fact that the inflow of money to well performing funds is larger than the outflow of money from poorly performing funds. Consequently, it is rather challenging to distinguish between those funds which outperform merely due to luck and those funds that are managed by managers with genuine skills. Klinger and Sonsino (1999) argue that based on the performance persistence of mutual funds, consumers allocate more money to past winning funds, based on their prior performance. Indeed, it might be irrational, as past performance does not always signal superior manager's ability to pick stocks, but rather just luck. Moreover, there is also a strong reputation effect, as consumers tend to invest in past winning funds despite the fact that returns diminish (Wermers, 2003). Therefore, the link between the change of a manager and the subsequent outflows from a fund can be less significant in comparison to subsequent inflows.

The external control of skilled managers in the industry, which can be exercised through withdrawal of money from funds or money inflow into funds, is one of the causes of

[1] Investor money is „smart" enough to flow to funds that are going to outperform in the future; thus, investors are able to compare and select funds to invest in.

managerial changes in the industry. Nevertheless, there could also be internal motivators of managers to change funds. According to Bessler (2010), there are several reasons that motivate fund managers to switch funds. First reason is that they move to larger funds, as they anticipate higher compensation. Elton et al. (2003) found some evidence that funds with incentive fees have some tendency to attract managers with superior abilities, which leads to a higher level of effort as well as risk-taking. Ding and Wermers (2005) also argue that experienced managers of large funds, as well as the ones with a good track-record, usually outperform the respective benchmarks. Meanwhile, experienced managers of smaller funds are usually entrenched by the management, which results in underperformance. Another reason is that "star" managers that have outperformed in the past might realise that they are not going to perform as well in the future. Consequently, they change funds to extract higher benefits from the change of the position and their high bargaining power for a better compensation package. As a result, a hypothesis on skilled managers can be formulated based on the discussion above. In addition, the hypothesis will also try to identify any pattern in relation to funds sizes and fees, if present, for underperforming managers.

Hypothesis 5: Skilled (underperforming) managers on average arrive to funds of a larger (smaller) size and/or to funds with higher (lower) compensation fees.

Interestingly, Dishi et al. (2007) find that fund flows as well as objective-adjusted returns have a significant influence on fund management turnover. In other words, the termination of investment mandates increases the probability of a fund management change. In addition, Khorana (1996) finds that poor past performance (a decrease in assets under management and risk-adjusted portfolio returns) of a fund increases the probability of a manager change. Consequently, one more hypothesis is developed based on the discussion above, which might as well relate specifically to the Swedish mutual fund industry:

Hypothesis 6: Pre-change alphas and fund inflows (outflows) are associated with the probability of managers leaving the Swedish mutual fund industry, conditional to a managerial change.

Another interesting issue to understand is whether fund managers are moving from team-managed funds to funds where they have a sole responsibility, or the opposite. This might affect the expectation of the performance of a fund after a managerial change.

According to Baer et al. (2005), in team-managed funds the unsystematic risk is usually lower and the performance is more consistent over time; moreover, these funds also experience higher overall inflows in comparison to individually managed funds. In addition, there is some weak evidence that team-managed funds have a negative effect on their performance. In contrast, Bliss et al. (2006) argue that the performance of individually and team-managed funds is similar on a risk-adjusted basis. Nonetheless, they also find some evidence of lower riskiness of team-managed funds. According to Kovaleski (2000), there has been a high increase in the number of team-managed funds in the industry to avoid over-relying on a "star" manager. Moreover, a team-managed approach allows addressing the complexity of investment opportunities more efficiently in a variety of industries, markets, and companies. Thus, this paper will also try to identify a trend of moving from/to team-managed funds and the subsequent performance effects. So far, it is possible to postulate:

Hypothesis 7: If a manager leaves and/or arrives to a team-managed fund, the post-performance of that fund will not be affected significantly.

Although the topics of managerial skill versus luck and managerial changes in funds have been rigorously discussed by various researchers, there are still some research gaps and lack of combination of these two topics. There is limited research on the managerial change in the mutual fund industry, specifically in the Swedish mutual fund industry. For instance, Dahlquist et al. (2000) have presented some general description of characteristics of the Swedish mutual fund industry; however, not in relation to managerial changes. Overall, as already mentioned before, Khorana (2001) has established a link between an event of a removal of a manager and the subsequent performance of a fund. He also finds in his earlier paper (1996) that the probability of a managerial change increases subject to the poor past performance. However, these findings are not based on the Swedish mutual fund industry. In addition, although there is some evidence that establishes relationship between funds' flows and performance, there is limited research of this topic in relation to managerial changes. The same is true for the research behind managers' motivation to switch funds. Thus, the above-mentioned hypotheses try to summarise issues that were not covered before. The findings of this paper are aimed at adding value via a better understanding of managerial activities within the Swedish financial market and how the presence of skilled and underperforming managers in the industry and their movements across funds affect the performance of such funds from different perspectives.

3. Methodology

3.1. Time span

In order to capture the effect of managerial changes, event-study approach will be used with pre-change and post-change periods being defined for the analysis. Such methodology was applied by Denis and Denis (1995) to measure the effect of a management change. Khorana (2001) also considers specific time spans to measure pre- and post-replacement performance of funds. Moreover, Barras et al. (2005) consider subintervals to measure performance of skilled and underperforming managers, as well as Cuthbertson et al. (2007) who use non-overlapping periods of three consecutive years to identify "good skill" and "bad skill" in the performance of mutual funds in the UK. In this study, a minimum of two non-overlapping consecutive years of performance will be used for the analyses of managerial changes and measuring performance, as it is the most common method used in other papers.

The change year is defined as the year when a new manager appears in a fact sheet of a fund at the year end, replacing a manager mentioned in a previous year's fact sheet. Change year is a split point for pre-change and post-change periods. Change year is excluded from the analysis of performance, as fund reports provide the information at the end of the year and do not usually specify the exact date of a managerial change. For example, a manager could come to a fund at the end of the year, e.g., December, which is unlikely to have any effects on a fund's performance. In addition, it takes time for a manager to affect a fund's performance and make relevant changes in the fund's strategy. Thus, a manager's contribution to the performance of a fund might not yet be fully incorporated during the change year. The first year when a manager appears in a fund is also excluded from the analysis in line with a rationale of excluding the change year.

Consequently, two non-overlapping years mentioned before exclude the "change year" or the "first year". Thus, as a minimum of two full years are used for measuring performance and identifying skill of a manager, if any, pre-change and post-change periods should be at least three years each to qualify for the analysis. In the next step, the "first year" and the "change year" are excluded and only the remaining two full years are considered for each period to measure the performance of a fund.

For robustness reasons two sets of results are computed. The first set considers exactly **two years pre- and post-managerial change for consistency (2Y_OBS)**, and the

second set considers **all available time periods of consecutive data of a manager or a fund in question (ALL_OBS)**. For a detailed example see Appendix 1.

3.2. Model

In order to measure the performance of funds this paper will use the traditional measure proposed by Jensen (1969), which is derived from the Capital Asset Pricing Model. "The Jensen Measure is the intercept in a regression of the time series of excess returns of the evaluated portfolio against the time series of excess returns of the benchmark portfolios" (Grinblatt and Titman, 1994). Jensen's alpha as a risk-adjusted measure is commonly used to measure fund performance by researchers such as Dishi et al. (2007), Bear et al. (2009), Huang et al. (2009), Khorana (2001). In addition, Fama and French (2009) use Jensen's alpha as a measure of skill or luck in active mutual fund management. Khorana (1996) defines positive alpha for overperforming managers and uses CAPM as the underlying model. Grinblatt and Titman (1994) contrast three different performance measures (Jensen Measure, the Positive Period Weighting Measure, Treynor- Mazuy measure) and find that those measures yield similar inferences. Coles et al. (2004) conclude, after the analysis of the best-known evaluation models, that the results are qualitatively the same using four-factor model of Carhart or one-factor CAPM model. Consequently, in order to measure the performance of a fund and assess model parameters (α and β, see Equation 1), the one-factor CAPM model will be used.

The regression model for determining the performance of funds and managers is as follows:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_{benchmark,i} \times (R_{\,benchmark,t} - R_{f,t}) + \varepsilon_{i,t}, \qquad (1)$$

where $R_{i,t}$ is the return of a fund i for the period t, $R_{f,t}$ is the risk free rate for period t, α_i – the excess return of the fund i for the period t, $R_{benchmark,t}$ – the return of the relevant benchmark of a specific fund for the period t, $\beta_{benchmark,i}$ – the beta of the regression, ε_i – the residual of the model.

The alpha is most commonly interpreted as a measure of a fund's performance and serves as a benchmark for performance evaluation. The approach of interpreting the alpha is similar to the one of Barras et al. (2005). **If the true alpha is less than zero (α < 0)**, then a fund manager does not possess enough stock-picking ability to cover costs **(underperforming manager**), whereas **when the true alpha is above zero (α > 0)**, then a

fund manager possesses a stock-picking ability that allows covering costs and outperforming benchmarks **(skilled manager)**. The alphas can be statistically significant or insignificant, when determining skill or performance. Statistical tests are run separately for all the qualifying alphas and for statistically significant alphas only. The motivation behind this is that, firstly, the managers on average generate a positive or a negative alpha, which can be because of luck, but also because of large standard errors that take larger sample sizes to converge. Secondly, this permits the testing of hypotheses where the number of significant alphas is not sufficient for statistical inference. Finally, using both the significant and insignificant alphas is an additional robustness check of the results.

Monthly data is used in regressions in line with Chevalier and Ellison (1999), Dishi et al. (2007), Khorana (2001) and other research articles. Relevant indexes for each individual fund minus the risk-free rate (1 month Swedish Treasury bill rate) serve as benchmarks. Different mutual funds invest in different stocks and bonds in Sweden and globally and have different respective market benchmarks; thus, individual benchmarks for each fund had to be identified to capture the appropriate market portfolio dynamics for each fund. Relevant indexes are reported in funds' fact sheets. Moreover, any changes in benchmarks are noted throughout the analysed period, so that fund returns are consistently compared against appropriate benchmarks to avoid any mismatch and under- or over-estimation of results.

Several funds can be managed by the same manager simultaneously. Therefore, for some of the hypotheses the average performance of such managers should be estimated. The average pre-change (post-change) alpha is weighted by the average fund size multiplied by the average management fee for pre- (post-) change periods regressions. This method is chosen, as a manager might be expected to focus more on a fund where he/she gets higher compensation. Therefore, larger funds with higher management fees are expected to reflect the manager's true alpha to a great extent. The alphas are weighted using the following equation:

$$\alpha_{weighted,m} = \sum_{i=1}^{N} \alpha_{i,m} \times w_{i,m}\text{, where} \qquad (2)$$

$$w_i = \frac{\sum_{t=1}^{T} TNA_{i,t,m} \times ManagementFee_{i,t,m}}{\sum_{j=1}^{N}\sum_{k=1}^{T} TNA_{j,k,m} \times ManagementFee_{j,k,m}},$$

where $\alpha_{weighted,m}$ is the weighted average alpha for a manager *m* either pre- or post-change, $\alpha_{i,m}$ - the alpha of a fund *i* that is managed by a manager *m* and $w_{i,m}$ is its weight. $TNA_{i,t,m}$ - the

total net assets of a fund *i* for the year *t* for a manager *m*, $TNA_{j,k,m}$ - the total net assets of a fund *j* for the year *k* managed by a manager *m*, $ManagementFee_{i,t,m}$ is the management fee of a fund *i* for the year *t* for a manager *m*, $ManagementFee_{j,k,m}$ - the management fee of a fund *j* for the year *k* for a manager *m*, *T* is the number of years used for regressions to determine the alpha for a manager *m*, and *N* is the number of funds that a manager *m* participated in.

For hypothesis 4 testing[2], net capital flows in a fund are specified in consistency with Baks (2002), Huang et al. (2009), Khorana (1996) and Sirri and Tufano (1998). Net capital flow (*FLOW*) is defined as the net growth in fund assets beyond reinvested dividends. Thus, it is calculated the following way:

$$FLOW_{i,t} = \frac{TNA_{i,t} - TNA_{i,t-1} \times (1 + R_{i,t})}{TNA_{i,t-1}} \quad (3)$$

where $R_{i,t}$ is the return of the fund *i* for the end of year *t*, $TNA_{i,t}$ – the total net assets (the closing market value (end of period) of all securities owned, plus all assets, minus all liabilities) of a fund *i* for the period *t*. As a result, $FLOW_{i,t}$ reflects the percentage growth of fund *i* in excess of the growth that would have occurred had no new funds flowed in and had all the dividends been reinvested in the period *t*.

3.3. Regression and Analysis Details

All the alphas presented and analysed are annualized alphas net of fees, unless stated otherwise. A net alpha is estimated based on net returns after fees. In other words, fees that an investor has to pay are subtracted from the total returns a fund generates. The alpha is annualized by multiplying the monthly alpha by 12. A 10% significance level is used throughout the paper, as also used by, for example, Khorana (2001).

Once managers'/funds' pre-change and post-change alphas, fund flows, management compensation data, and fund size data are obtained, they are compared using either the paired Student's t-tests with equal variances or unpaired t-tests with unequal variances. The appropriate test is chosen judging by the equality of variances of the samples. To account for the problem of non-normality in the dataset as well as small sample sizes, the t-statistic is bootstrapped (Stata command *bootstrap*), and then hypotheses are tested. 1,000 replications

[2] Hypothesis 4: When a skilled (underperforming) manager arrives to a new fund or when an underperforming (skilled) manager leaves a fund, the post-inflows to that fund will increase (decrease).

are used in every bootstrap procedure of the t-tests. Bootstrap approach was used by Kosowski et al. (2005), Cuthbertson et al. (2007), as well as Fama and French (2009). In this paper bootstrapping is mainly applied for cross-sectional hypothesis testing due to the issues mentioned above.

Probit regression models are used in this study to determine which factors are linked with the managers' future of staying within the mutual fund industry in Sweden or leaving it. Fund flows and alphas before managerial changes are used as the explanatory variables in separate *probit* regressions. The models are as follows:

$$\Pr(LEAVE_i|alpha_i) = \alpha_i + alpha_i + \varepsilon_{i,t}, \quad (4)$$

$$\Pr(LEAVE_i|FLOW_i) = \alpha_i + FLOW_i + \varepsilon_{i,t}, \quad (5)$$

$$\Pr(LEAVE_i|alpha_i, FLOW_i) = \alpha_i + alpha_i + FLOW_i + \varepsilon_{i,t}, \quad (6)$$

where $LEAVE_i$ is a dummy variable that equals 1 if the manager at a fund i leaves the Swedish mutual fund industry, and zero otherwise, α_i – the constant term, $alpha_i$ and $FLOW_i$ are the explanatory variables for a fund i, and ε_i – the residual of the model. Both the alpha and flow are used in equation 6 as a robustness check for equations 4 and 5. Bootstrap procedure with 1000 replications is applied in *probit* regressions as well.

When calculating the average alphas for a manager who manages several funds simultaneously, simple joint hypothesis testing is not applicable, because there are different dependent and independent variables for each manager of interest. Therefore, to determine the joint significance of average alphas taken from separately estimated models, the Seemingly Unrelated Estimation technique (*suest* in Stata) is used. It allows to run separate regressions to determine the alphas of one manager in different funds (using different dependent and independent variables), and then it combines the estimates of parameters as well as the associated variance and covariance matrices into a single parameter vector and simultaneous robust covariance matrix. This allows the testing of cross-model hypotheses (Weesie, 1999).

Monthly excess returns are known to be stationary; therefore, unit root testing is skipped for the set of variables used in this paper. For regressions the *robust* option in Stata is used to avoid the issues of heteroskedasticity. Autocorrelation is not persistently present when working with monthly returns. There are a few cases when some lags of residuals show signs of autocorrelation; however, this is a short term phenomenon, and is not taken into

account when setting up the CAPM regression model. Normality in residuals is mostly rejected due to skewedness and kurtosis of the financial data. However, normality is not required for the validity of OLS, which is the main model used in this paper. Moreover, for Student's t-tests the problem of normality is avoided by using the bootstrap method.

4. Data

4.1. Data Description

The study is based on a database, which originated from the Stockholm School of Economics. The database covers annual data of Swedish mutual funds from 1998 till 2008 and includes the following relevant fund information for the study: name, ISIN[3], managers, TNAs, fees. In addition, the database was updated to fill in some of the information gaps, which is necessary for the analysis in this paper (e.g., managers, TNAs). As all of the funds are included in the database, whether they are still in the market or not, the analysis is not subject to a survivorship bias. The database includes 2,503 funds in Sweden; however, not all of the funds have information on managers disclosed. As a result, the sample is reduced to 841 funds. Overall, there are 612 different managers in the dataset.

The database covers different types of mutual funds, such as equity, fixed income, money market as well as mixed funds, and includes such main players as Swedbank Robur, SEB Fonder, Handelsbanken Fonder and Nordea Fonder, which have a wide range of funds focusing on different geographical regions, industry sectors and investment types (equities, bonds, etc.) (Svenska Bankforeningen, 2008). Thus, due to the diversified nature of funds and their investments, all of these funds have individual benchmarks that they are compared with. Therefore, all of the funds' fact sheets across the analysed period were reviewed to identify benchmarks for every fund, as well as any changes in the benchmarks throughout the analysed years. When a specific date of a change of a benchmark was unavailable, the beginning of the year was assumed to be the change date. Overall, there were 84 different benchmarks identified.

4.2. Data Modifications and Additions

The data of fund returns was provided by the Stockholm School of Economics and the data of index returns was downloaded from Bloomberg. All of the indexes were converted to

[3] International Securities Identification Number

Swedish Krona (SEK) in order to capture foreign exchange effects in returns to see the perspective of a Swedish investor.

The analysis is based on monthly returns; thus, the following calculations were made to calculate the monthly returns:

$$R_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}} \quad (7)$$

where $R_{i,t}$ is the return of a fund or a benchmark i at the month end t, $P_{i,t}$ – the price of a fund or a benchmark at the end of the month t, $P_{i,t-1}$ – the price of a fund or a benchmark at the beginning of the month (t-1).

Fund returns were recalculated to $r_{i,t}$, which is a return of a fund i for the period t ($R_{i,t}$) in an excess of the risk-free rate (R_f). The risk-free rate used in the analysis is a one-month Swedish Treasury Bill rate, which was downloaded from the Riksbank website (www.riksbank.com).

Some of the fund flow calculations take extreme values. Such outliers are identified and removed specifically for each test. The numbers of such excluded observations are mentioned in the relevant Empirical Findings sections.

4.3. Data Assumptions

It is ensured that the names of managers are consistent and do not repeat in the database, e.g., due to misspelling errors, and a unique identification (ID) number is assigned for each manager. When observations for some years are missing and a manager seems to remain the same (e.g., 2002 – Mats H., 2003-2004 – missing information and 2005 – Mats H. again), it is assumed that the same manager stayed in a fund during these missing years (e.g., 2003-2004 – Mats H.). Thus, such missing observations were filled in with the applicable managers' IDs.

The database sample was stratified based on the following characteristics, which is consistent with Ding & Wermers (2005) and Kostovetsky (2009):

1. Funds with one manager, defined as single-managed funds.
2. Funds with two or three managers, where the longest tenured manager is defined as the "lead manager" (lead-managed funds). Only the characteristics of the lead manager are considered for the empirical tests of a managerial change, as the lead manager is assumed to have the most influence on a fund's performance.

3. Those funds that have four or more managers at least in one year of the observations are defined as team-managed funds.

The analysis of managerial changes is focused on single-managed funds and funds with lead managers, where only the characteristics of these managers are measured in the empirical tests. Team-managed funds are excluded from the sample, as team structure is likely to outweigh an individual contribution, which makes it highly problematic to distinguish an individual manager's skill, if any. However, team-managed funds are analysed separately in line with the hypothesis for team-managed funds stated in the Literature Review section (Hypothesis 7).

4.4. Data Statistics and Preliminary Analysis

Table 4.1 summarises statistics on the dataset used in this study.

Table 4.1. Summary statistics

Description	Number
Number of funds, out of which:	841
single-managed funds	*671*
lead-managed funds	*106*
team-managed funds	*64*
Number of managers, out of which:	612
managers with more than 1 year of observation	*438*
Managers' average career in the industry (years)*	3.31
Average number of years managers spend in individual funds*	2.79
Number of new entrants to the industry (managers that were not active in 1999, but appeared in the database after that year)	291
Number of managers who left the industry (managers were inactive in 2007, but were active before)	260
Managers consistently represented throughout the analysed period	40
Proportion of funds that did not incur any changes in management	34%
Proportion of managers that never switched funds	37%

Note: *These calculations are based on 438 managers, as one year of a manager's presence in any fund is subtracted due to the reasons discussed in the Methodology section (the change year or the first year)

In addition, Figure 4.1 shows how many years an individual manager spent in the industry by frequency and Figure 4.2 shows average number of years managers spent in individual funds by frequency. Figure 4.2 differs from Figure 4.1, as the latter shows how many years an individual manager spent in a fund from a fund's perspective. E.g., manager 1

spent two years in Fund 1, one year in Fund 2 and three years in Fund 3. Thus, the number of such observations is higher than the number of managers in the database, as some managers were managing several funds and each combinations of a fund and a manager is an individual observation.

Figure 4.1. Number of years in the industry by a manager

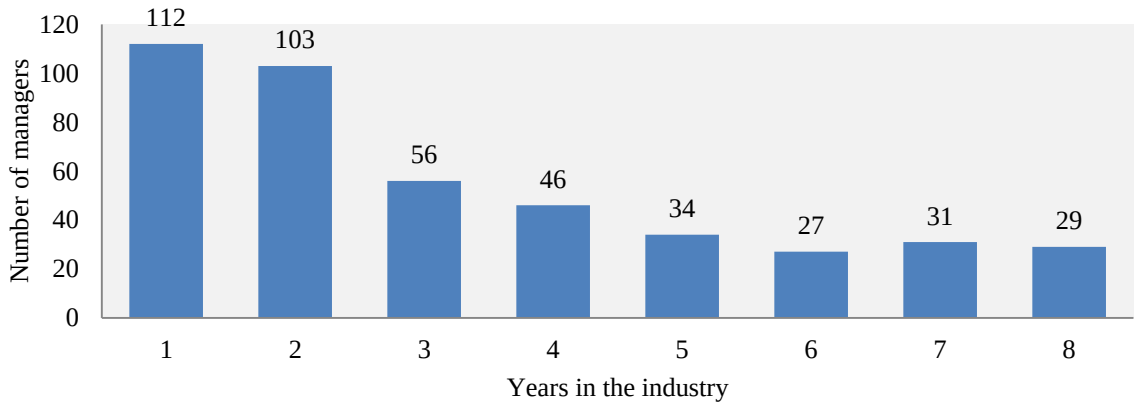
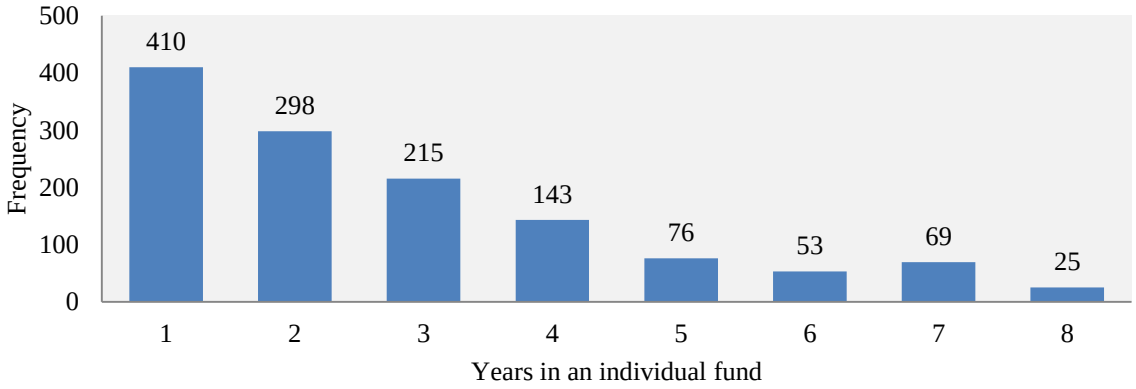


Figure 4.2. Number of years in an individual fund of a manager by frequency of such observations (different combinations of a fund and a manager)



It can therefore be inferred that managers generally do not spend a lot of time in the same fund and do not have a long-standing career in the Swedish mutual fund industry in the study's sample. This can be explained by a high managerial turnover in the industry, reflected in the relatively high number of managers who enter the industry and who leave the industry during the analysed period. Moreover, around 70% of funds in the sample experienced managerial changes and only around 40% of managers never switched funds. Figure 4.3 and 4.4 show the average number of managers per fund and the number of funds an individual manager participated in respectively.

Figure 4.3. Number of different managers per fund

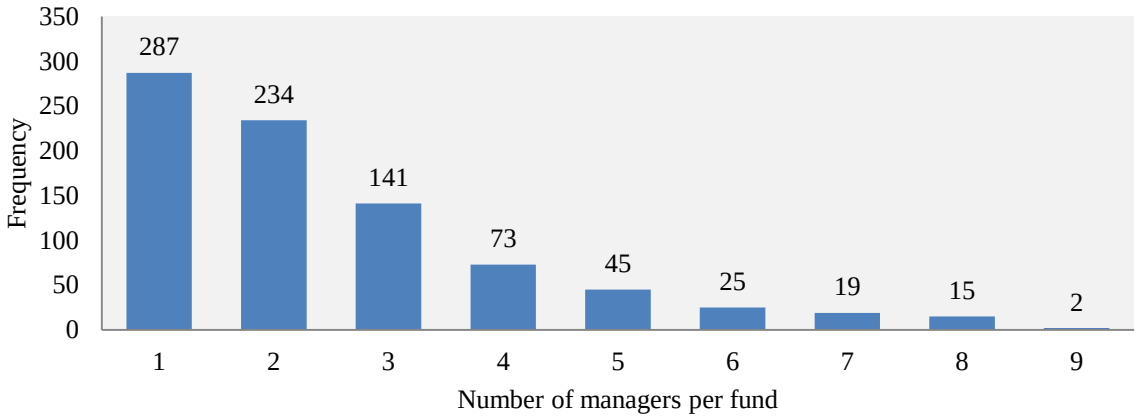
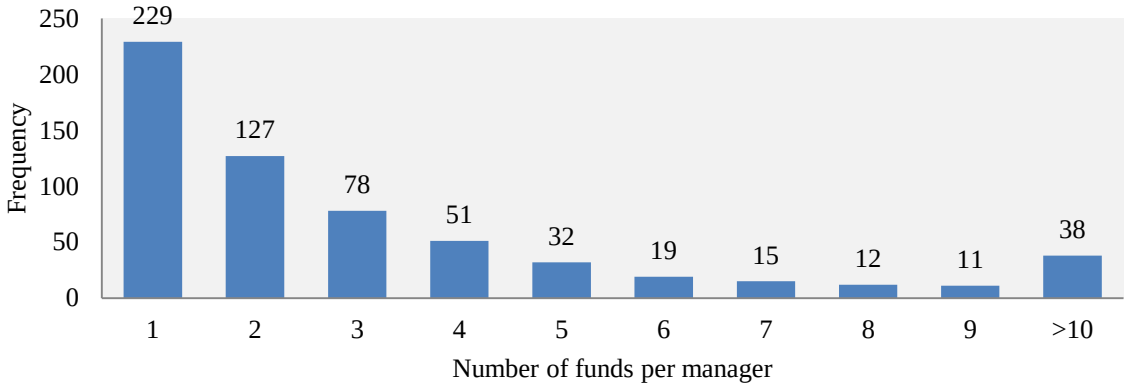


Figure 4.4. Number of different funds a manager participated in



However, these results should be treated cautiously, as there could be several limitations to these findings. First of all, the data on managers in the database was taken from funds' fact sheets, which sometimes do not have relevant information for the study disclosed. This unavailability of information could possibly lead to the lack of consistency in the data, which leads to higher levels of turnover of managers and to a shorter tenure of managers in the industry. Another issue is the fact that most of the funds are usually managed within one company. Four big banks manage around 70% of the total assets under management, with Swedbank Robur accounting for 23% of all total assets managed by Swedish mutual fund companies[4] (Svenska Bankforeningen, 2008). Thus, changes in such companies might occur more often due to reallocations of responsibilities within a large team of managers.

[4] See Figure 1 in Appendix 2 for more details

5. Empirical Findings

The analysis is split into different sections based on the hypotheses stated in the Literature Review section. Sample sizes might differ for different hypotheses, as hypotheses are likely to require different sets of data, which qualify for the analysis. Generally, to qualify for the analysis:

- an event should occur (a managerial change in a fund)
- the number of observations should be sufficient (two consecutive pre- or post-change years)
- individual benchmarks should be available

Some of the funds were excluded from the sample and regression analyses due to the unavailability of data on benchmarks. Some funds' fact sheets do not specify benchmarks or, if specified, these benchmarks are not publicly available.

5.1. Statistics on Managers that Leave a Fund

The first section gives an overview of the Swedish mutual fund industry and a general description of the performance of managers and funds that experienced managerial changes. Moreover, the managers who leave to another fund within the industry and the managers who leave the Swedish mutual fund industry are looked at separately. Hypothesis 6 is tested in this section[5].

The first step is to identify the characteristics of managers who are involved in a change, as well as to distinguish between those who leave the industry and those who remain in the industry and change funds. Every fund with at least two full years of return data is looked at, and only one observation after the change is required to make sure that the manager has left the fund. There are 164 funds that match the criteria; however, two were removed as outliers. Out of the 164, 28 and 30 have statistically significant pre-alphas, depending on the time specification of ALL_OBS and 2Y_OBS respectively. Figures 5.1 and 5.2 below show the distribution of all pre-change alphas of managers that leave their funds.

[5] Hypothesis 6: Pre-change alphas and fund inflows (outflows) are associated with the probability of managers leaving the Swedish mutual fund industry, conditional to a managerial change.

Figure 5.1. Histogram of annualised pre-change alphas of managers that leave their funds (ALL_OBS)

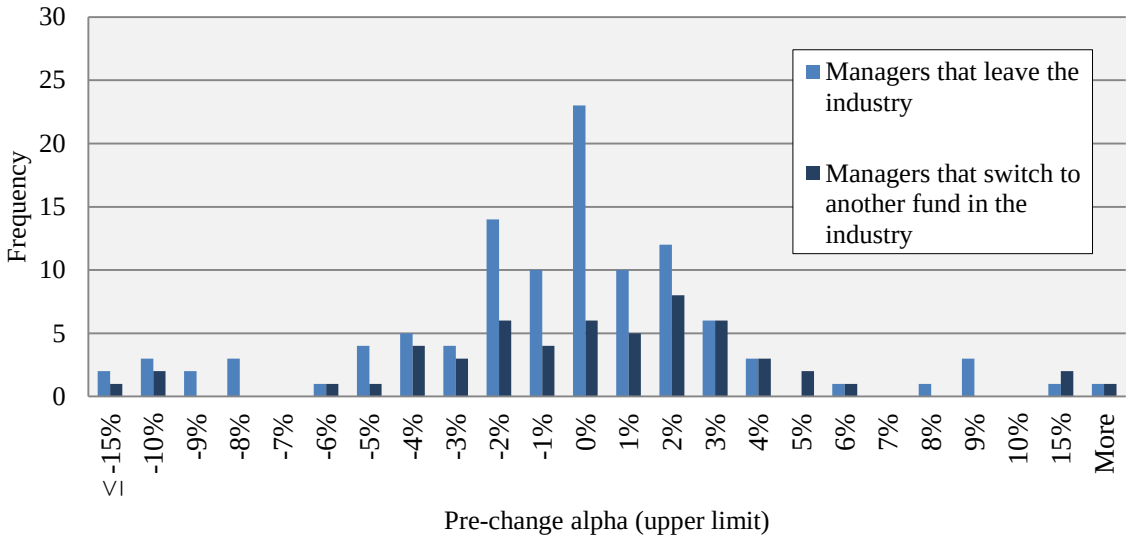
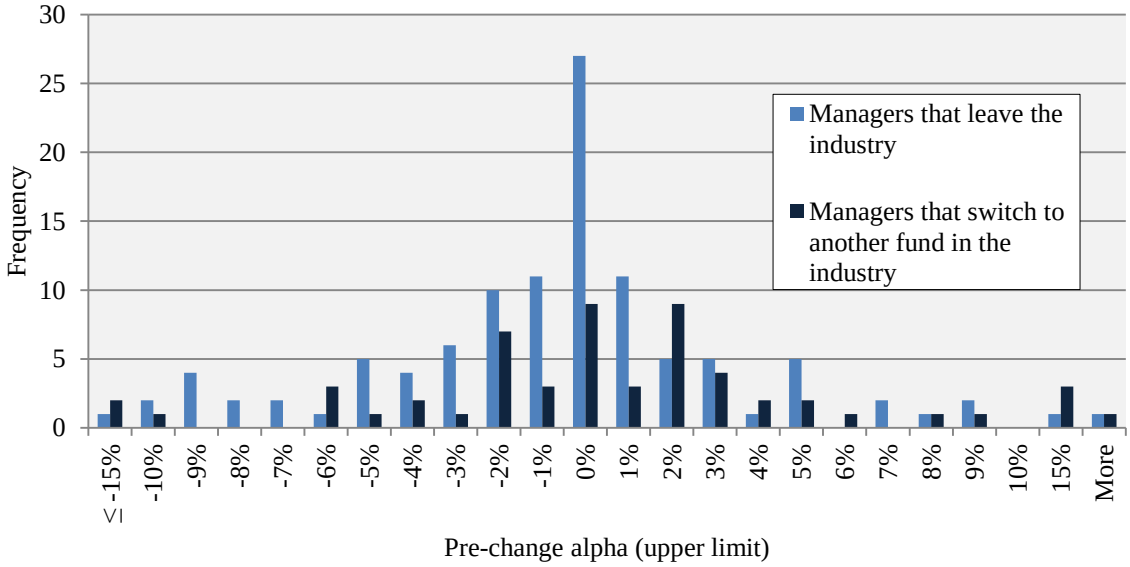


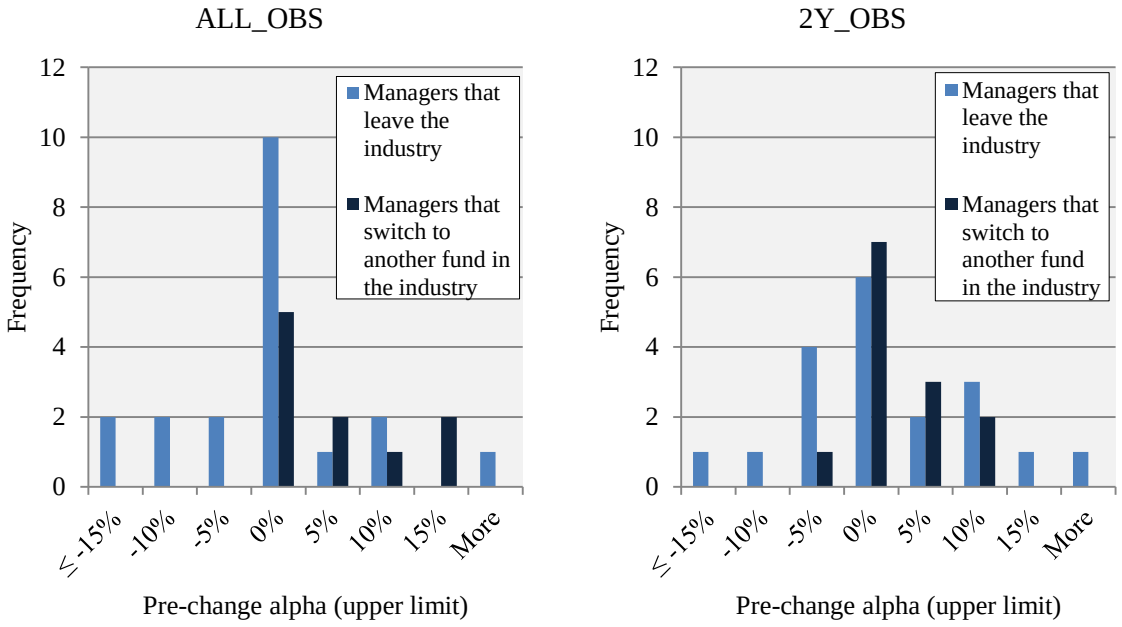
Figure 5.2. Histogram of annualised pre-change alphas of managers that leave their funds (2Y_OBS)



It can be seen that the distributions are quite similar for two years of observations as well as when all available observations are considered. Moreover, it can be observed that the majority of alphas are in the range of -1 to 0% for managers that leave the industry. For managers that switch funds and remain in the industry, alphas are subject to a less extreme distribution, and although volatile, are relatively similar in terms of frequency from -2% to 3%. The combined histograms of these two cases (managers that leave the industry and that switch to other funds in the industry) can be found in Appendix 3 Figures 1 and 2.

Figure 5.3 shows the distribution of statistically significant pre-change alphas of managers that leave their funds. The combined histograms of the two sets of managers can be found in Appendix 3 Figure 3.

Figure 5.3. Histograms of statistically significant annualised pre-change alphas of managers that leave their funds



From Figure 5.3 it can be seen that the majority of managers that left the industry in the sample had significant negative alphas. The ones with positive significant alphas mostly remained in the Swedish mutual fund industry.

The next part will test whether a higher or lower alpha is associated with a higher likelihood of a manager leaving the Swedish mutual fund industry. *Probit* regression models are used to determine this likelihood. Table 5.1 shows the summary of results for the 4 samples represented in Figures 5.1 - 5.3. Only the slope coefficient data is reported, as their significance is the most relevant for conclusions.

Table 5.1. *Probit* regression results of the probability of a manager leaving the industry, conditional to a managerial change, in relation to the pre-change alpha values (see Equation 4)

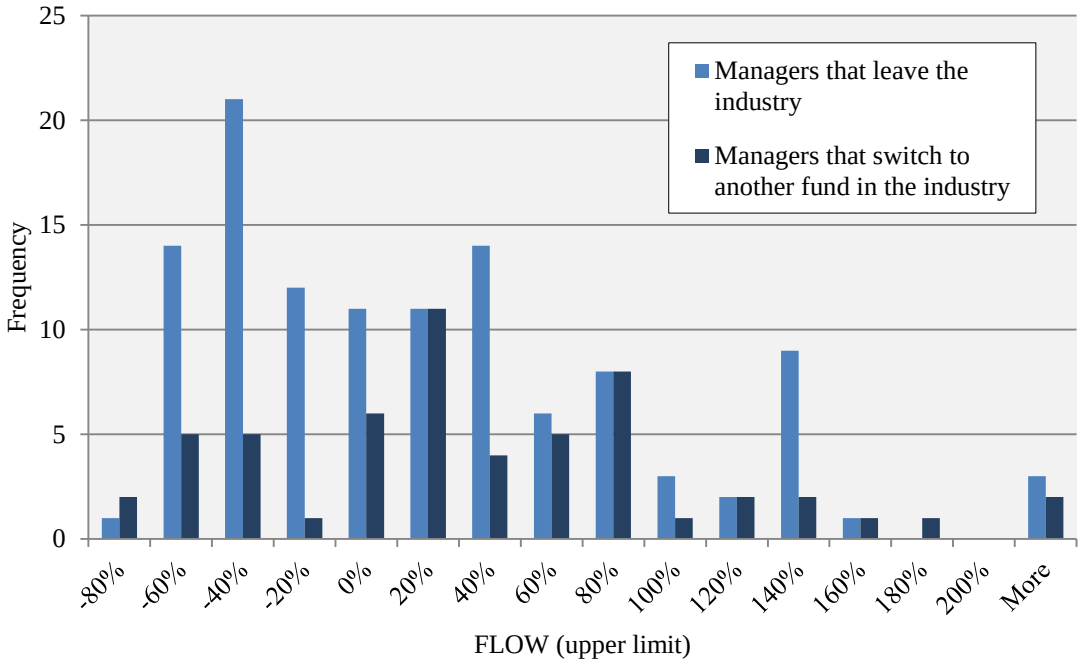
Explanatory variable	Sample size	Slope coef.	Bootstrap SE	z-value	P> |z|
Original *probit* regression specification					
All pre-change α (ALL_OBS)	162	-25.23	27.15	-0.93	0.353
All pre-change α (2Y_OBS)	162	-28.06	26.15	-1.07	0.283
Statistically significant pre-change α (ALL_OBS)	30	-33.18	45.63	-0.73	0.467
Statistically significant pre-change α (2Y_OBS)	28	-3.13	44.77	-0.07	0.944

Note: ***, **, and * denote 1%, 5%, and 10% significance levels respectively.

Table 5.1 shows that there is no statistically significant evidence that pre-change alphas are associated with the probability of managers leaving the Swedish mutual fund industry conditional to a managerial change.

Figure 5.4 shows the distribution of fund flows, which are calculated according to Equation 3. The aggregated fund flow distribution can be seen in Appendix 3 Figure 4. Fund flows tend to be positively skewed. This could be expected, because negative flows are limited by -100%; however, positive flows can take values larger than 100%. It is worth noting that when fund flows take lower values, managers tend to leave the industry more often, compared to positive flow values.

Figure 5.4. Histogram of fund flows before managers leave their funds



A *Probit* regression model is used again to determine whether the fund flows are associated with the probability of a managerial change. Table 5.2 summarizes the results of the regression. The intercept data is not reported again, as it is irrelevant for making inferences. The results for the two specifications of 2Y_OBS and ALL_OBS are equal; therefore, only one of them is presented.

Table 5.2. *Probit* regression results of the probability of a manager leaving the industry, conditional to a managerial change, in relation to the fund flows in the pre-change period (see Equation 5)

Explanatory variable	Sample size	Slope coef.	Bootstrap SE	z-value	P> |z|
All pre-change FLOWs	162	-0.32	0.39	-0.83	0.408

Note: ***, **, and * denote 1%, 5%, and 10% significance levels respectively.

From Table 5.2 it can be concluded that the probability of a manager leaving the Swedish mutual fund industry conditional to a managerial change is not related to higher or lower fund flows.

As a robustness check, regression specification from Equation 6 is used: pre-change alphas and pre-change flows enter the same *probit* regression equation.

Table 5.3. *Probit* regression results of the probability of a manager leaving the industry, conditional to a managerial change, in relation to the pre-change alpha values and fund flows in the pre-change period (see Equation 6)

Explanatory variable	Sample size	Slope coef.	Bootstrap SE	z-value	P> |z|
All pre-change α and all pre-change FLOWs (ALL_OBS)					
α	162	-20.00	29.10	-0.69	0.492
FLOW	162	-0.61	0.38	-1.61	0.107
All pre-change α and all pre-change FLOWs (2Y_OBS)					
α	162	-23.88	28.33	-0.84	0.399
FLOW	162	-0.61	0.38	-1.59	0.111

Note: ***, **, and * denote 1%, 5%, and 10% significance levels respectively.

In conclusion, there is no statistical evidence for the fact that managers' leaving the Swedish mutual fund industry, conditional to a managerial change, could be explained by the pre-change alphas of funds. Moreover, pre-change fund flows do not have any statistically significant explanatory power of the hypothesis either. Furthermore, when alphas and flows are used together in the same *probit* regression, there is no statistical significance identified. Thus, no proof can be found for *Hypothesis 6: Pre-change alphas and fund inflows (outflows)*

are associated with the probability of managers leaving the Swedish mutual fund industry, conditional to a managerial change.

5.2. The Effect of a Leaving Manager on Funds' Performance

Hypothesis 1 will be addressed in this section.[6] As discussed in the Data section, only single-managed funds and funds with lead managers are considered. Funds need to have at least six consecutive years of observations as discussed in the Methodology section, where the first year and the change year are excluded from the actual measurement of performance.

In this section, the same manager should manage a fund for three consecutive years prior to the change year, while post-change three consecutive years are not necessarily with the same manager. The rationale behind it is that two full pre-change consecutive years are needed to measure the performance of a manager to identify whether a manager is skilled ($\alpha>0$) or underperforming ($\alpha<0$) before a change to a fund occurs. This pre-change performance is then compared to the post-change performance of a fund to understand how the performance of a fund has been affected by the fact that a skilled or underperforming manager left it.

Once the funds that match the above-mentioned assumptions are identified and pre- and post-change periods are defined, the hypothesis testing is split in three major steps:

1. First, the alphas for pre-change periods are estimated via regression analysis.
2. Second, post-change alphas are estimated via regression analysis.

Consequently, there are two groups of alphas – pre-change and post-change alphas. In the next step, pre-change alphas are divided into two main groups – positive and negative alphas.

3. Third, positive pre-change alphas are compared against respective funds' post-change alphas and negative pre-change alphas are compared against respective funds' post-change alphas, using mean comparison tests.

Out of 841 funds mentioned before, 126 funds matched the necessary assumptions. Using all available observations (ALL_OBS) in the pre- and post-change periods, 53 positive pre-change alphas were identified, out of which 6 are statistically significant and 73 negative pre-change alphas, out of which 15 are statistically significant. Using two years of data in pre- and post-change periods, 44 positive pre-change alphas were identified, 5 of them being statistically significant and 82 negative pre-change alphas, 15 of them being statistically

[6] Hypothesis 1: When a skilled (underperforming) manager leaves a fund, the post-performance of that fund will worsen (improve).

significant. Figures 5.5 and 5.6 depict post-change alphas versus the statistically significant pre-change alphas.

Figure 5.5. Annualized fund post-change alphas and their 90% confidence interval, relative to statistically significant pre-change alphas of leaving managers (ALL_OBS)

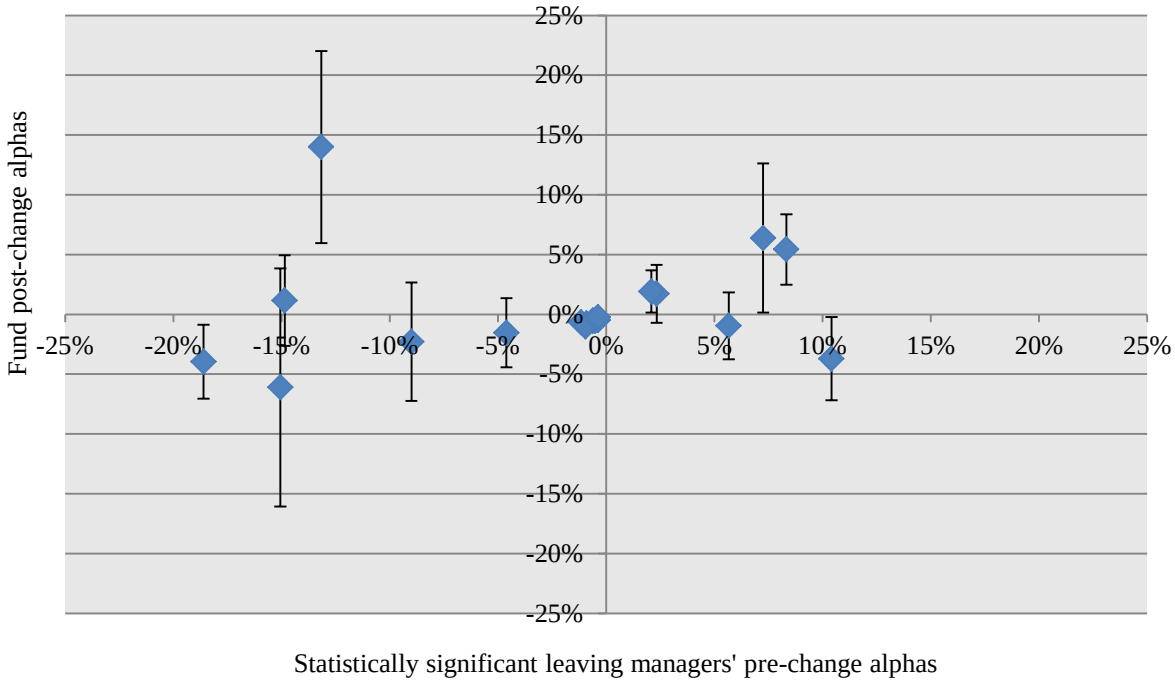
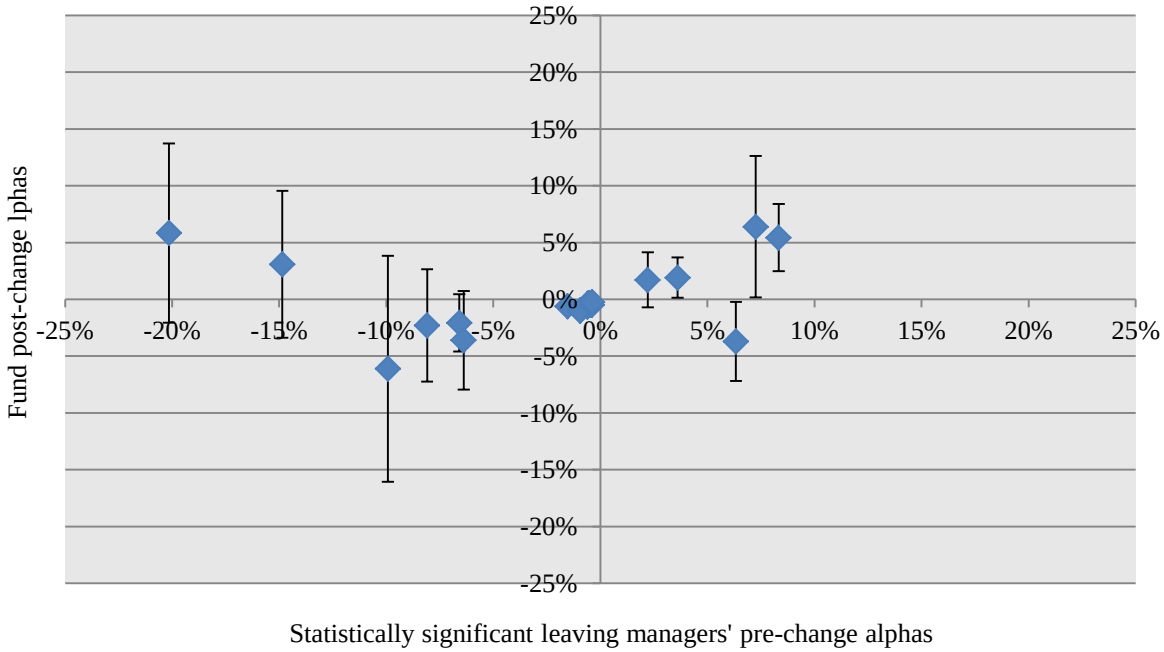


Figure 5.6. Annualized fund post-change alphas and their 90% confidence interval, relative to statistically significant pre-change alphas of leaving managers (2Y_OBS)



It can be observed that when significantly underperforming managers leave, the performance of a fund on average improves. Also, when a skilled manager leaves a fund, the post-

performance of that fund becomes on average worse than before. Thus, the main conclusions for Hypothesis 1 will be obtained from the sample of statistically significant observations. Next, the alphas of all managers in the sample are analysed, disregarding significance, based on the discussion in the Methodology section. The results are presented in Figures 5.7 and 5.8.

Figure 5.7. Funds' annualised post-change alphas relative to pre-change alphas of leaving managers (ALL_OBS)

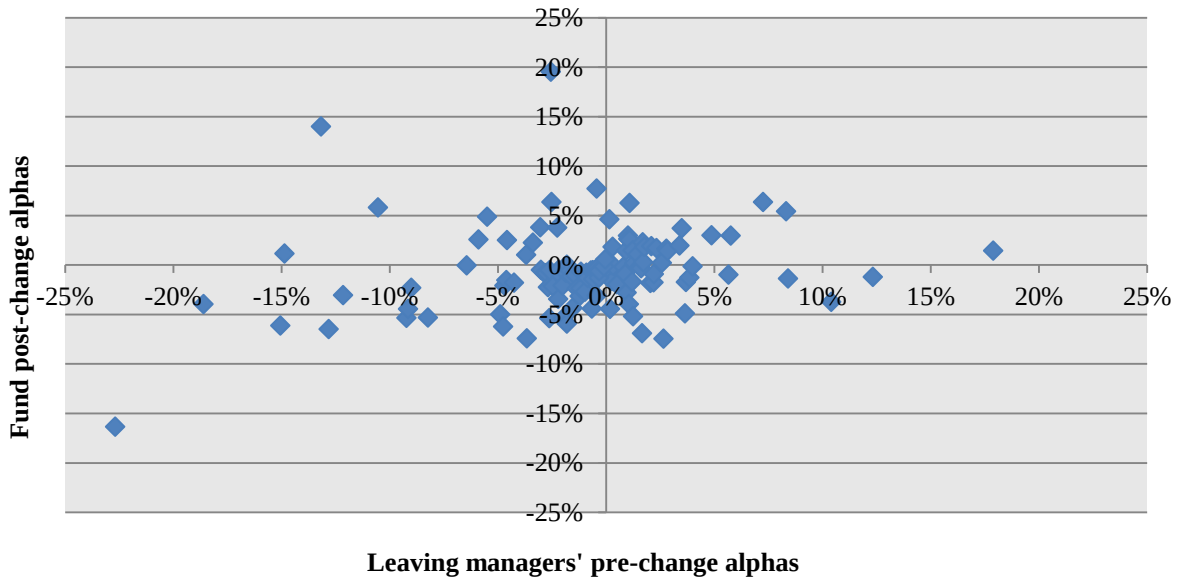
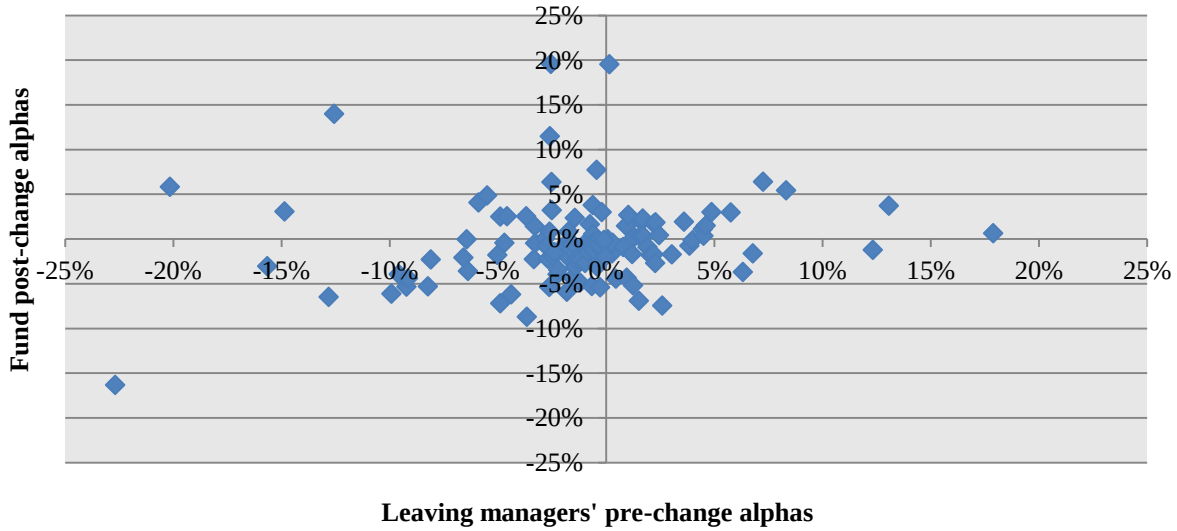


Figure 5.8. Funds' annualised post-change alphas relative to pre-change alphas of leaving managers (2Y_OBS)



The pattern is quite similar to the one of the statistically significant managers.

The paired Student's t-test is used in the next step to test Hypothesis 1, the results of which is summarised in Table 5.4.

Table 5.4. Hypothesis 1 testing – only statistically significant pre-change alphas

Bootstrapped Paired t-tests (only statistically significant pre-change alphas)					
Test variables	Annualized mean (α)	SE(α)	Initial sample size	p-values for: H_0:pre α=post α H_A:pre α<post α	p-values for: H_0:pre α=post α H_A:pre α>post α
Skilled manager leaves a fund (manager's pre-change α>0 and significant) (ALL_OBS)	6.01%	1.36%	6	0.982	0.018**
Post-performance of that fund (ALL_OBS)	1.79%	1.55%	6		
Skilled manager leaves a fund (manager's pre-change α>0 and significant) (2Y_OBS)	5.55%	1.14%	5	0.910	0.090*
Post-performance of that fund (2Y_OBS)	2.35%	1.78%	5		
Underperforming manager leaves a fund (manager's pre-change α<0 and significant) (ALL_OBS)	-5.40%	1.74%	15	0.000***	1.000
Post-performance of that fund (ALL_OBS)	-0.27%	1.11%	15		
Underperforming manager leaves a fund (manager's pre-change α<0 and significant) (2Y_OBS)	-4.82%	1.59%	15	0.000***	1.000
Post-performance of that fund (2Y_OBS)	-0.69%	0.69%	15		

Note: ***, **, and * denote 1%, 5%, and 10% significance levels respectively.

When a skilled manager leaves a fund, the null of equal pre- and post-change alphas is rejected at a 10% significance level against the alternative hypothesis that when skilled managers leave, the post-change alpha decreases. When an underperforming manager leaves a fund, the null is rejected at a 1% significance level against the alternative hypothesis that when underperforming managers leave, the post-change alpha increases. These results are in line with the Hypothesis 1.

For robustness, the paired Student's t-test was also applied to the full sample of both significant and insignificant negative and positive alphas. The test results are summarised in Table 5.5.

Table 5.5. Hypothesis 1 testing – all positive and negative pre-change alphas

Bootstrapped Paired t-tests (all positive and negative pre-change alphas)					
Test variables	Annualized mean (α)	SE(α)	Initial sample size	p-values for: H_0:pre α=post α H_A:pre α<post α	p-values for: H_0:pre α=post α H_A:pre α>post α
Skilled manager leaves a fund (manager's pre-change α>0) (ALL_OBS)	2.87%	0.47%	53	1.000	0.000***
Post-performance of that fund (ALL_OBS)	0.05%	0.41%	53		
Skilled manager leaves a fund (manager's pre-change α>0) (2Y_OBS)	3.35%	0.56%	44	0.990	0.011**
Post-performance of that fund (2Y_OBS)	0.21%	0.62%	44		
Underperforming manager leaves a fund (manager's pre-change α<0) (ALL_OBS)	-3.86%	0.54%	73	0.000***	1.000
Post-performance of that fund (ALL_OBS)	-0.96%	0.54%	73		
Underperforming manager leaves a fund (manager's pre-change α<0) (2Y_OBS)	-3.63%	0.50%	82	0.000***	1.000
Post-performance of that fund (2Y_OBS)	-0.76%	0.52%	82		

Note: ***, **, and * denote 1%, 5%, and 10% significance levels respectively.

Due to the larger number of observations, the standard errors have been significantly reduced. These results support the result previously obtained with statistically significant alphas. The null hypotheses with respect to the relevant alternatives are rejected at 1% and 5% significance levels.

In conclusion, the statistical tests are in line with the Hypothesis 1. These findings are also in line with Khorana (2001). Thus, *Hypothesis 1: When a skilled (underperforming) manager leaves a fund, the post-performance of that fund will worsen (improve)* is not rejected. Therefore, for the skilled managers the magnitude of the decrease in alphas is on average 3 – 4%, while for the underperforming managers, the magnitude of the increase is on average 3 – 5%.

5.3. Managers' Ability of Persistent Performance

In the following section, the sample size includes only those managers that changed funds during their career in the analysed period. In addition, the same manager needs to spend two full years in one fund before the change and two full years in an another fund after the change

of funds. Again, only single managers and lead managers qualify for the analysis. There are 17 such managers in the dataset. Such a low number of qualifying managers is in line with the Data Statistics and Preliminary Analysis section, as the average number of years in a fund per manager is around three years, which is similar to the average career of a manager in the industry. Thus, there is a very limited number of observations when a manager is in the industry for at least six consecutive years (two full pre-change and post-change years, and the change year and the first year). In addition, it was already mentioned before that 37% of managers in the database never switched funds before.

The structure of the analysis in this section is the following:

1. Pre-change alphas of managers are estimated via regressions.
2. Post-change alphas for an individual manager in a fund he/she moved to are estimated via regressions.

Consequently, there are two sets of data for each of those 17 managers (pre-change alphas and post-change alphas). It is worth noting that some managers are simultaneously managing several funds (e.g., during pre-change or post-change periods), and the returns of all those funds are considered to determine a manager's skill in a pre-/post-change periods. See Table 5.6 for an illustration.

Table 5.6. Career of "Manager 3" over the years

ISIN	1999	2000	2001	2002	2003	2004	2005	2006	2007
LU0012156716	1	1	1	1	1				
LU0028040771	1	1	1	1	1				
SE0000709305				1	1	1	1	1	

Note: 1 identifies the presence of a manager in a specific fund in a specific year

In Table 5.6 a manager was simultaneously managing two funds in the pre-change period (2002 is the change year); thus, regressions for these two funds against their individual benchmarks were performed for years 2000 and 2001 to identify a pre-change alpha of a manager in each fund.

3. The pre-change alphas of arriving managers from all the funds they have participated in are combined and the weighted average alpha is calculated for each individual manager.

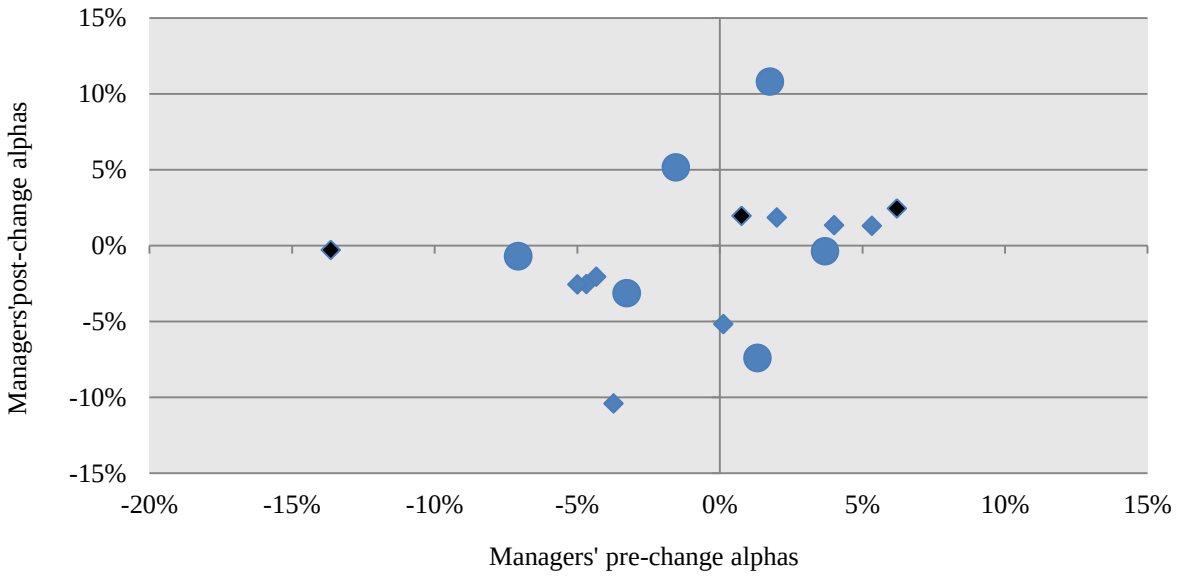
The Seemingly Unrelated Estimation Model is used to determine the significance of the weighted-average manager alphas.

4. Afterwards, one sample mean comparison tests are run for pre- and post-change alphas of managers to see whether skilled managers continue to outperform after the change and underperforming managers continue to underperform (Hypothesis 3).[7]

Based on the seemingly unrelated estimation model, only 3 out of 17 managers have statistically significant performance during the pre-change period. Therefore, for Hypothesis 3, zero is chosen as the split-point between overperforming and underperforming managers, in order to have more observations for the statistical tests. The lack of qualifying observations is a limitation of this study, and the results must be treated with caution.

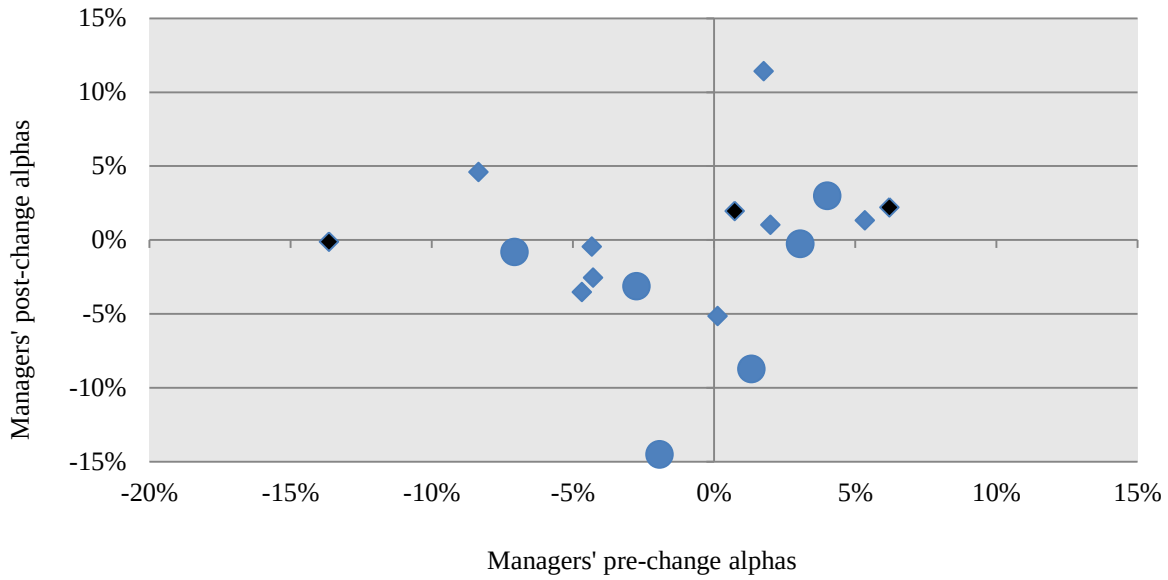
Following the criteria, there were 9 skilled managers (positive pre-change alphas) and 8 underperforming managers (negative pre-change alphas) in the pre-change period. Figures 5.9 and 5.10 depict the post-change alphas in relation to their pre-change alphas. Statistically significant post-change alphas are plotted as larger circles, and statistically significant pre-change alphas are plotted black.

Figure 5.9. Managers' post-change alphas in relation to their pre-change alphas (ALL_OBS)



[7] Hypothesis 3: Skilled managers continue to outperform, while underperforming managers continue to underperform after they move to a new fund.

Figure 5.10. Managers' post-change alphas in relation to their pre-change alphas (2Y_OBS)



From the two figures above it can be inferred that underperforming managers on average tend to perform better and skilled managers tend to perform worse after a managerial change. To judge the significance of this pattern, the results of the one-sample mean comparison tests are presented in Table 5.7.

Table 5.7. Hypothesis 3 testing – all positive and negative pre-change alphas

Bootstrapped One sample mean-comparison tests					
Test variables	Annualized mean (α)	SE(α)	Initial sample size	p-values for: H_0: alpha=0, H_A: alpha<0	p-values for: H_0: alpha=0, H_A: alpha>0
Post-change alpha of a skilled manager (ALL_OBS)	0.75%	1.71%	9	0.634	0.367
Post-change alpha of a skilled manager (2Y_OBS)	0.75%	1.86%	9	0.624	0.376
Post-change alpha of an underperforming manager (ALL_OBS)	-2.06%	1.51%	8	0.458	0.542
Post-change alpha of an underperforming manager (2Y_OBS)	-2.56%	1.93%	8	0.128	0.873

Note: ***, **, and * denote 1%, 5%, and 10% significance levels respectively.

These findings do not support the Hypothesis 3. Table 5.7 shows that the mean of post-change alphas is not significantly different from zero in any of the test cases. Therefore, when a manager moves, the skill or the lack of skill is not persistent over time and is not statistically different from zero. However, it is worth noting that the mean alphas for

previously skilled managers still remain positive, and they remain negative for previously underperforming managers. Also, the decrease in post-change alphas may be due to the fact that skilled managers move to funds with larger fees, and underperforming managers move to funds with lower fees. Therefore, this issue will be accounted for when analysing managerial changes and compensation in Section 5.6.

In conclusion, *Hypothesis 3: Skilled managers continue to outperform, while underperforming managers continue to underperform after they move to another fund* is so far rejected.

5.4. The Effect of an Arriving Manager on Funds' Performance

The following section is aimed at identifying how the performance of a fund is affected by an arrival of a skilled or underperforming manager. For instance, in Table 5.6, the effect of an arrival of a manger to the fund with the ISIN "SE0000709305" is analysed. The performance of this fund in the pre-change period is compared against the performance of the same fund in the post-change period to measure the effect of an arrival of a "Manager 3" to a fund. Regression analyses are used to identify funds' pre-change and post-change alphas.

This section is a continued analysis from the previous section with the same dataset and assumptions. In this section alphas are analysed from a fund's perspective rather than from a manager's perspective, as in the previous section. The previous section identified whether a manager is skilled or not (pre-change alphas, grouped into positive versus negative alphas) and which funds a manager moved to. In this section, the pre-change and post-change periods of those specific funds are identified to estimate the performance of a fund in the respective periods. Finally, paired Student's t-tests are performed to identify whether alphas of those specific funds increased after the arrival of a skilled manager (pre-change alpha versus the post-change alpha of a fund). The same analysis is conducted for underperforming managers to see whether their move to funds is associated with subsequent decrease in the funds' performance.

In this section, as in the section above, there are only 17 managers that have worked in a fund for two full years and then switched or joined another fund for at least two more consecutive years. Two pre-change years are required to identify skill of a manager, which moves to another fund, and two post-change years are necessary to measure the performance of a manager in that fund. Thus, the effect of a skilled or underperforming manager's arrival to a fund can be estimated. As a result, there are 25 funds in our sample, out of which 14

funds are the funds, where one of the 9 skilled managers arrived and 11 funds are the funds, where one of the 8 underperforming managers arrived.

Firstly, funds' post-change alphas and their 90% confidence interval bands versus the pre-change alphas (before the arrival of a manager to a fund) are depicted in Figures 5.11 and 5.12. Statistically significant pre-change alphas are plotted black.

Figure 5.11. Funds' post-change alphas after the arrival of skilled managers with 90% confidence interval, relative to funds' pre-change alphas (ALL_OBS)

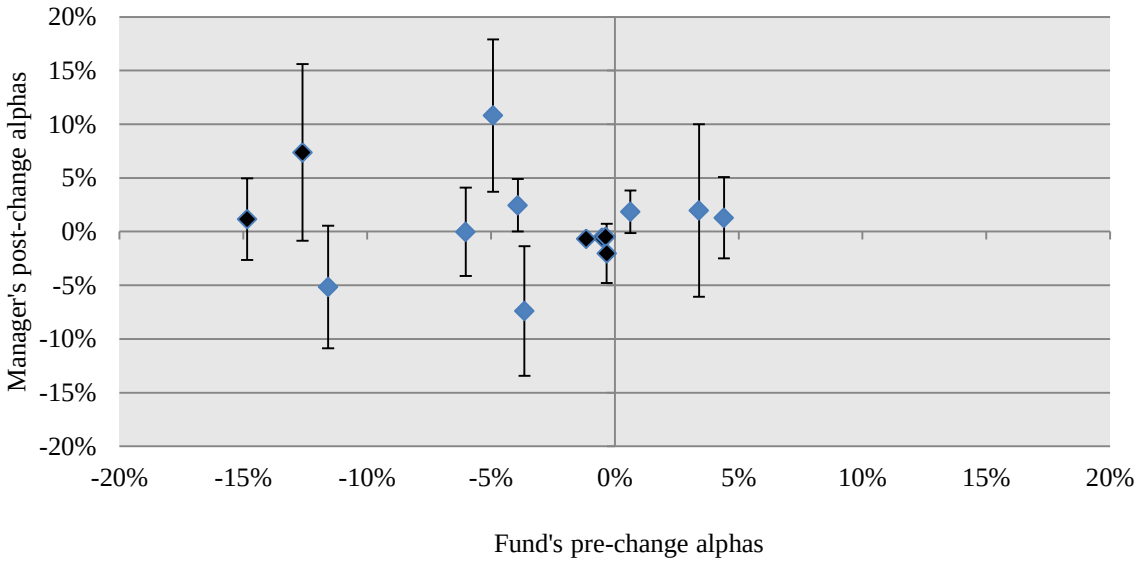
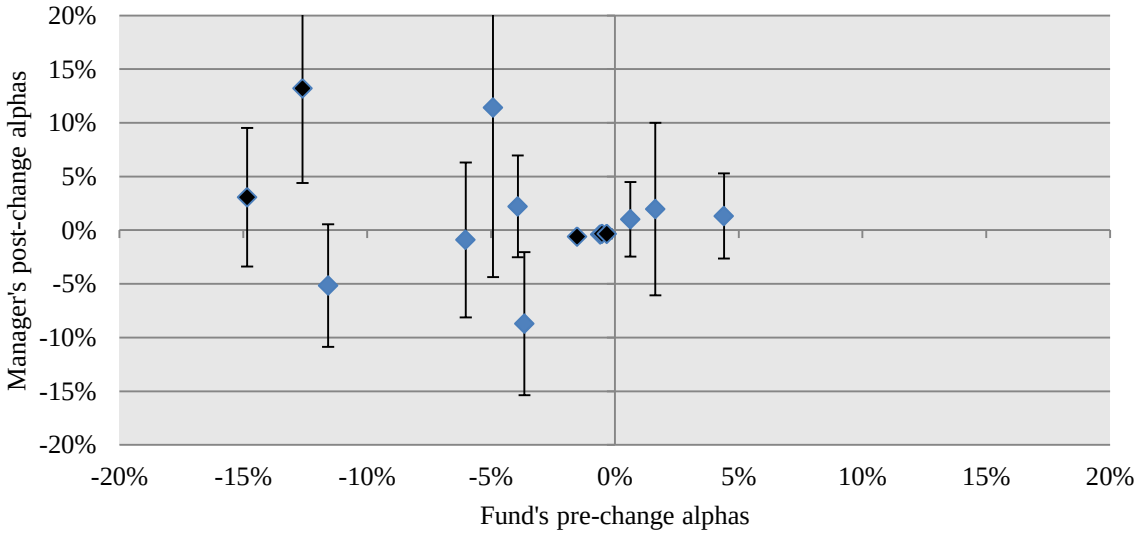


Figure 5.12. Funds' post-change alphas after the arrival of skilled managers with 90% confidence interval, relative to funds' pre-change alphas (2Y_OBS)



From the two figures above, it can be concluded that when a skilled manager arrives to a fund, the post-performance seems to improve. Next, Figures 5.13 and 5.14 show how the performance changes when underperforming managers arrive to a fund. Statistically significant pre-change alphas are plotted black.

Figure 5.13. Underperforming arriving managers' post-change alphas with 90% confidence interval, relative to funds' pre-change alphas (ALL_OBS)

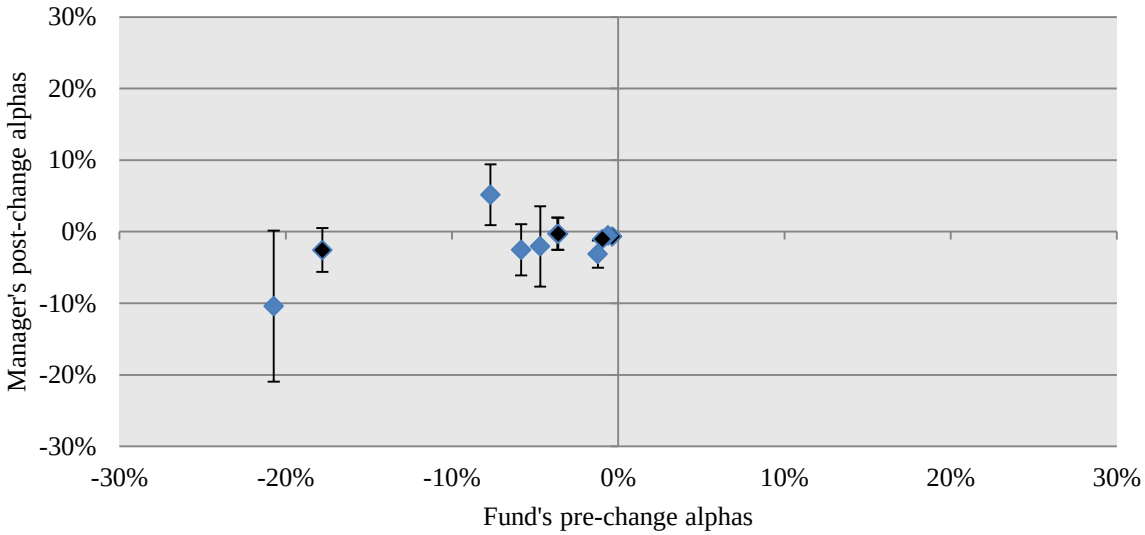
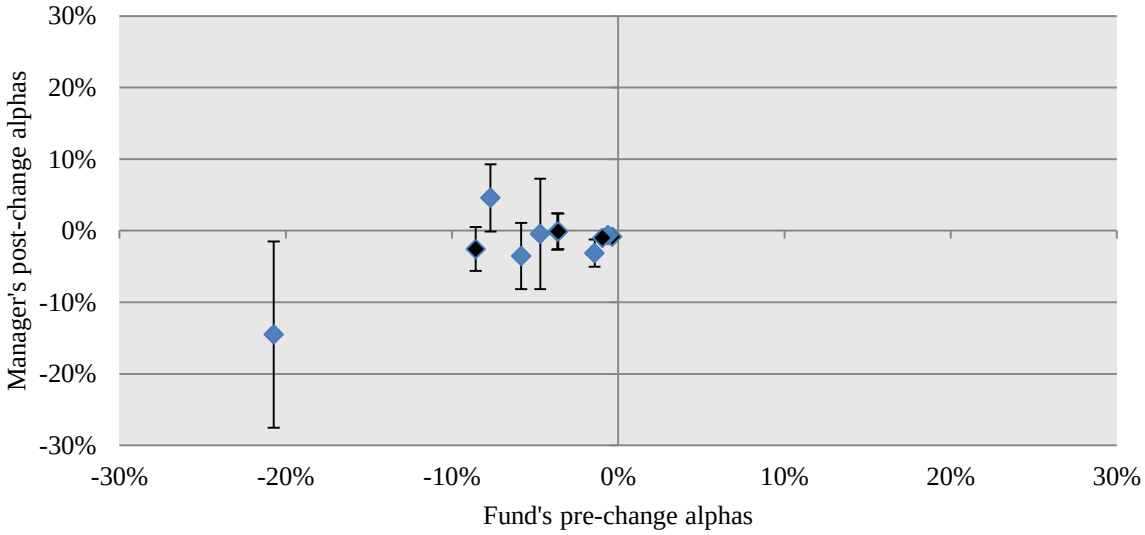


Figure 5.14. Underperforming arriving managers' post-change alphas with 90% confidence interval, relative to funds' pre-change alphas (2Y_OBS)



From the figures it can be concluded that even when underperforming managers arrive to a fund, the post-performance seems to improve on average.

Table 5.8 summarizes the results of the paired Student's t-tests.

Table 5.8. Hypothesis 2 testing – all positive and negative pre-change alphas

Bootstrapped Paired t-tests (all positive and negative pre-change alphas)					
Test variables	Annualized mean (α)	SE(α)	Initial sample size	p-values for: H_0:pre α=post α H_A:pre α<post α	p-values for: H_0:pre α=post α H_A:pre α>post α
Pre-change alpha of a fund a skilled manager arrived to (ALL_OBS)	-3.68%	1.57%	14	0.006***	0.994
Post-change change alpha of a fund a skilled manager arrived to (ALL_OBS)	0.76%	1.21%	14		
Pre-change alpha of a fund a skilled manager arrived to (2Y_OBS)	-3.85%	1.52%	14	0.002***	0.998
Post-change change alpha of a fund a skilled manager arrived to (2Y_OBS)	1.27%	1.50%	14		
Pre-change alpha of a fund an underperforming manager arrived to (ALL_OBS)	-6.11%	2.09%	11	0.001***	0.999
Post-change alpha of a fund an underperforming manager arrived to (ALL_OBS)	-1.67%	1.10%	11		
Pre-change alpha of a fund an underperforming manager arrived to (2Y_OBS)	-5.29%	1.76%	11	0.0035***	0.9965
Post-change alpha of a fund an underperforming manager arrived to (2Y_OBS)	-2.03%	1.41%	11		

Note: ***, **, and * denote 1%, 5%, and 10% significance levels respectively.

The paired Student's t-tests confirm the pattern observed in the figures above. The post-performance is always better on average, whether a skilled or an underperforming manager arrives to a fund. It is worth noting, however, that in all cases the average pre-change performance of funds where a new manager arrives is always negative and statistically significant. When a manager arrives, the post-performance is not statistically different from zero, and consequently, in a statistical sense the performance has improved after the change has taken place. Thus, it is possible to conclude intuitively that on average funds that perform badly seek for a new manager. This can be tested further, as it would be interesting to see whether skilled managers arrive to better performing funds. Fund pre-change alphas and pre-change flows of skilled and underperforming managers are used as proxies for fund performance. Table 5.9 presents the summary of statistical tests.

Table 5.9. Testing whether skilled managers arrive to better performing funds, compared to underperforming managers (all positive and negative pre-change alphas)

Bootstrapped paired and unpaired t-tests (all positive and negative pre-change alphas)					
Test variables	Annualized mean (α)	SE(α)	Initial sample size	p-values for: H_0:pre α=post α H_A:pre α<post α	p-values for: H_0:pre α=post α H_A:pre α>post α
Pre-change alpha of a fund a skilled manager arrived to (ALL_OBS)	-3.68%	1.57%	14	0.798	0.202
Pre-change alpha of a fund an underperforming manager arrived to (ALL_OBS)	-6.11%	2.09%	11		
Pre-change alpha of a fund a skilled manager arrived to (2Y_OBS)	-3.85%	1.52%	14	0.714	0.286
Pre-change alpha of a fund an underperforming manager arrived to (2Y_OBS)	-5.29%	1.76%	11		
	Annual FLOW	Bootstrap SE (FLOW)	Initial sample size	p-values for: H_0:pre FLOW= post FLOW H_A:pre FLOW< post FLOW	p-values for: H_0:pre FLOW = post FLOW H_A:pre FLOW > post FLOW
Pre-change flow of a fund a skilled manager arrived to	25.25%	13.12%	13	0.933	0.067*
Pre-change change flow of a fund an underperforming manager arrived to	-1.53%	4.52%	10		

Note: ***, **, and * denote 1%, 5%, and 10% significance levels respectively.

From Table 5.9 it can be seen that when skilled and underperforming managers arrive to new funds, the funds do not differ in alphas; however, there is a statistically significant difference in pre-change fund flows. In other words, skilled managers arrive to "better" funds that have had larger inflows in the past year.

In conclusion, from the perspective of a skilled manager part of *Hypothesis 2: When a skilled manager arrives to a new fund, the post-performance of that fund will improve* is proven right, and the increase is equal to 4-5% on average. However, w*hen an underperforming manager arrives to a new fund, the post-performance of that fund will* not *worsen* as expected. Instead, there is a statistically significant increase in performance by 3-4% on average. It can be also reasoned that funds that search for a new manager are on average significantly underperforming, and the post-performance of the arriving managers is not significantly different from zero for such funds. Moreover, skilled managers arrive to

funds that have had better inflows pre-change, when compared to the funds that got underperforming managers.

5.5. The Effect of a Managerial Change on Fund Flows

The following section will test Hypothesis 4, and will try to identify how a managerial change affects capital flows to and from a fund where the change happened.[8] Thus, the average inflows of funds in pre-change and post-change periods are calculated and the difference between these periods is assessed. This analysis will be done for those funds from which and to which a skilled or an underperforming manager moved. See Equation 3 for the calculation of fund flows.

The datasets that was used to test Hypothesis 1 (Section 5.2) and Hypothesis 2 (Section 5.4) are used, as the analysis needs to consider how the arrival of skilled and underperforming managers to a fund affects funds' inflows. Therefore, the observations of managers with two pre-change years are required in order to identify a skill, if any, and two post-change years of a manager in a fund are necessary to ensure that a manager is committed to a fund during the post-change period, which is expected by investors. This sample sizes are similar to the ones used in Hypothesis 1 and Hypothesis 2. However, the first is limited to 115 observations (48 skilled and 67 underperforming managers) and the latter is limited to 23 funds (13 for skilled and 10 for underperforming managers) due to the lack of information on TNAs and a few outliers. For the 23 funds statistically significant managers are not analysed separately, as there is not enough observations for statistical inference; therefore, all the positive and negative alphas are used to determine skill.

The next step is to see the difference of the flows to/from a fund after and before the change of a skilled or an underperforming manager. Only one year of the change in flows after the change year will be analysed, implying that news of a managerial change and the respective reaction of investors should be reflected in the flow in the first year after the change has happened.

Table 5.10 summarises the results for the testing of Hypothesis 4.

[8] Hypothesis 4: When a skilled (underperforming) manager arrives to a new fund or when an underperforming (skilled) manager leaves a fund, the post-inflows to that fund will increase (decrease).

Table 5.10. Hypothesis 4 testing – all positive and negative pre-change alphas, as well as statistically significant positive and negative pre-change alphas

Bootstrapped unpaired t-tests with unequal variances (all positive and negative pre-change alphas)

Test variables	Annual FLOW	SE (FLOW)	Initial sample size	p-values for: H_0:pre FLOW= post FLOW H_A:pre FLOW< post FLOW	p-values for: H_0:pre FLOW = post FLOW H_A:pre FLOW > post FLOW
Pre-change flows to a fund a skilled manager left	-5.49%	7.35%	48	0.000***	1.000
Post-change flows to a fund a skilled manager left	69.29%	11.19%			
Pre-change flows to a fund an underperforming manager left	-7.70%	6.18%	67	0.000***	1.000
Post-change flows to a fund an underperforming manager left	38.85%	8.50%			
Pre-change flows to a fund a significantly skilled manager left	Not enough observations for statistical inference				
Post-change flows to a fund a significantly skilled manager left					
Pre-change flows to a fund a significantly underperforming manager left	14.02%	11.16%	13	0.546	0.454
Post-change flows to a fund a significantly underperforming manager left	12.20%	13.30%			
Pre-change flows to a fund a skilled manager moved to	2.16%	7.98%	13	0.300	0.700
Post-change flows to a fund a skilled manager moved to	14.57%	18.15%	13		
Pre-change flows to a fund an underperforming manager moved to	13.53%	7.37%	10	0.593	0.407
Post-change flows to a fund an underperforming manager moved to	17.32%	9.71%	10		

Note: ***, **, and * denote 1%, 5%, and 10% significance levels respectively.

In the table it can be seen that there is no statistical evidence of the fund flows being linked to the arrival of a skilled or underperforming manager. However, when managers leave funds, there are statistically significant increases in the post-change flows of those funds. This increase is on average 75% or 45% for all skilled and underperforming managers respectively. However, this is not true when looking at significantly underperforming managers. Moreover, there is not enough data to test the hypothesis for significantly skilled managers. The increase is in line with the hypothesis for underperforming managers; however, it is the opposite when looking at skilled managers.

It can be concluded that there is some evidence that after a change of a manager the fund flows increase irrespective of skill. However, this is not the case in all test specifications; therefore, this evidence for the following hypothesis is treated with caution: *Hypothesis 4: When a skilled (underperforming) manager arrives to a new fund or when an underperforming (skilled) manager leaves a fund, the post-inflows to that fund will increase (decrease).*

5.6. Fund Size, Managerial Fees, Compensation and Managerial Change

In this section Hypothesis 5 will be tested by analysing fund sizes in the pre-change periods and fund sizes in the post-change periods to investigate whether skilled managers on average move to funds of a larger size and if the opposite is true for underperforming managers.[9] Thus, the dataset, which was used for testing Hypothesis 3 in Section 5.3, will be appropriate in this case, as two consecutive pre-change years and two consecutive post-change years of a manager in a fund are required. The average fund size in the pre-change period will be analysed in contrast to the average size of a fund a manager moved to (post-change period). Similar analysis is performed with fees.

There are 16 managers to analyse with 8 positive and 8 negative pre-change alphas, which is by one manager less than previously, because there was no TNA data available for that manager in the period of interest. There are 35 funds where the 8 skilled managers participated in and another 28 funds for the 8 underperforming managers. The size and fees at the end of the year just before the managerial change are compared with the ones at the end of the change year. Therefore, there is one year between the two observations, and only this specific point in time is considered.

[9] Hypothesis 5: Skilled (underperforming) managers on average arrive to funds of a larger (smaller) size and/or to funds with higher (lower) compensation fees.

Table 5.11 summarises the results for Hypothesis 5, which are related to fund size. Table 5.12 summarises results for Hypothesis 5, which covers the case of compensation fees.

Table 5.11. Hypothesis 5 testing (size) – all positive and negative pre-change alphas

Bootstrapped Paired t-tests (all positive and negative pre-change alphas)					
Test variables	TNA (M SEK)	SE (TNA)	Initial sample size	p-values for: H_0: pre TNA = post TNA, H_A: pre TNA < post TNA	p-values for: H_0: pre TNA = post TNA, H_A: pre TNA > post TNA
Pre-change TNA of a fund a skilled manager moved from	776	352	8	0.018**	0.982
Post-change TNA of a fund a skilled manager arrived to	2507	863	8		
Pre-change TNA of a fund an underperforming manager moved from	729	266	8	0.239	0.761
Post-change TNA of a fund an underperforming manager arrived to	1727	1258	8		

Note: ***, **, and * denote 1%, 5%, and 10% significance levels respectively.

The only significant result that can be seen from Table 5.11 is that managers who are skilled move to funds with larger TNAs at 95% confidence. However, nothing can be concluded about underperforming managers, which could be expected. As discussed in the Literature Review section, skilled managers are likely to move to funds of larger sizes to get higher compensation, which is in line with Bessler (2010). Meanwhile, underperforming managers are unlikely to experience high demand in the market by boards of larger funds. Such managers are also unlikely to switch to funds of smaller size, which would decrease their compensation levels and reduce number of assets under management, which in turn will decrease even more the probability of generating returns above benchmarks for such managers.

Table 5.12. Hypothesis 5 testing (fees) – all positive and negative pre-change alphas

Bootstrapped Paired t-tests (all positive and negative pre-change alphas)					
Test variables	Fee (%)	SE (fee)	Initial sample size	p-values for: H_0: pre fee=post fee, H_A: pre fee<post fee	p-values for: H_0: pre fee=post fee, H_A: pre fee>post fee
Pre-change fee of a fund a skilled manager moved from	1.08%	0.11%	8	0.002***	0.998
Post-change fee of a fund a skilled manager arrived to	1.40%	0.10%	8		
Pre-change fee of a fund an underperforming manager moved from	1.43%	0.11%	8	0.875	0.125
Post-change fee of a fund an underperforming manager arrived to	1.31%	0.15%	8		

Note: ***, **, and * denote 1%, 5%, and 10% significance levels respectively.

It is possible to conclude from Table 5.12 that skilled managers on average move to funds with higher fees, which is in line with Elton et al. (2003). This result is obtained at 99% confidence. Again, nothing can be inferred about underperforming managers, which is in line with the reasoning mentioned above for the case of larger size funds.

Moreover, another test was performed. TNA multiplied by the fee was compared for the same dataset to see the overall effect. Again, there was a statistically significant difference in compensation at 95% confidence when skilled managers moved to new funds. The difference in compensation (TNA times the fee) is on average by 20M SEK.

In conclusion, statistically significant evidence is found for skilled managers. Thus, *Hypothesis 5: Skilled managers on average arrive to funds of a larger size* (by 1.7B SEK larger on average) *and to funds with higher compensation* (by 20M SEK or 0.32% larger on average) have statistical evidence, while no conclusions can be made for underperforming managers.

5.6.1. Managers' Ability of Persistent Performance with Fees Consideration

This section concentrates on addressing the issue raised when testing Hypothesis 3 (Section 5.3), which state that managers with positive (negative) pre-change alphas have persistent positive (negative) performance after the change. This hypothesis was rejected, which could be due to the fact that post-change fees affect subsequent performance (returns after fees) of managers in funds they move to. It could possibly be the case that managers continue to perform well, but higher fees decrease the post-change alphas, while for underperforming managers, lower fees on the contrary increase the post-change alphas. The likelihood that such an explanation is true increases, as findings in this section confirm that skilled managers generally move to funds with higher compensation. Therefore, statistical testing will be used.

Figure 5.15 depicts the net post-change alphas relative to the net pre-change alphas of the managers that change funds; Figure 5.16 shows the same relation, using gross pre- and gross post-change alphas (the value weighted fees are added to the value-weighted returns). These two figures are of the ALL_OBS type. To see the same figures of 2Y_OBS type, see Appendix 3 Figures 5 and 6. Statistically significant pre-change alphas are plotted black. Statistically significant post-change alphas are depicted as larger circles.

Figure 5.15. Managers' post-change alphas relative to their pre-change alphas (ALL_OBS)

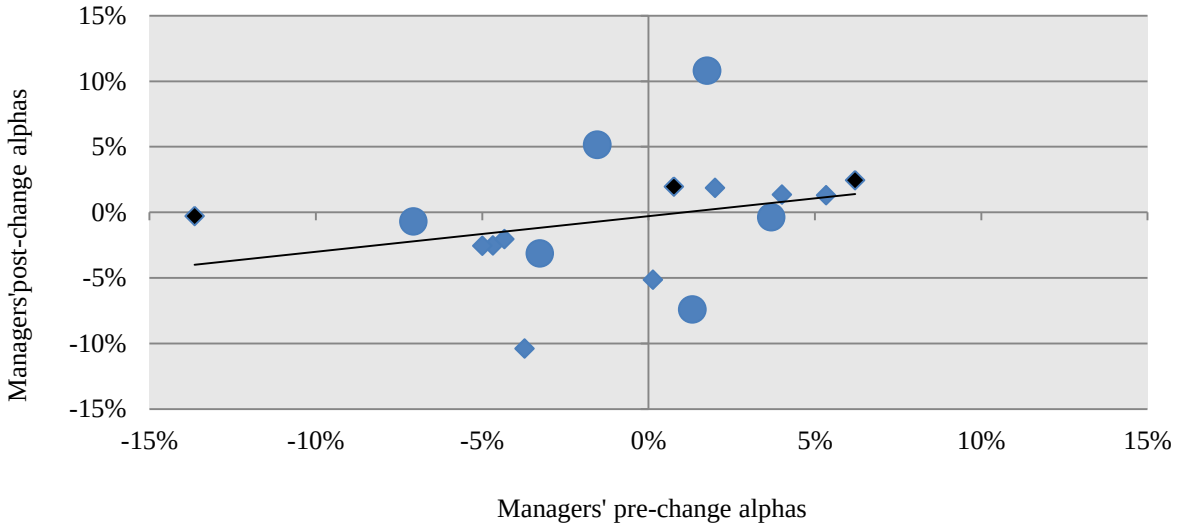
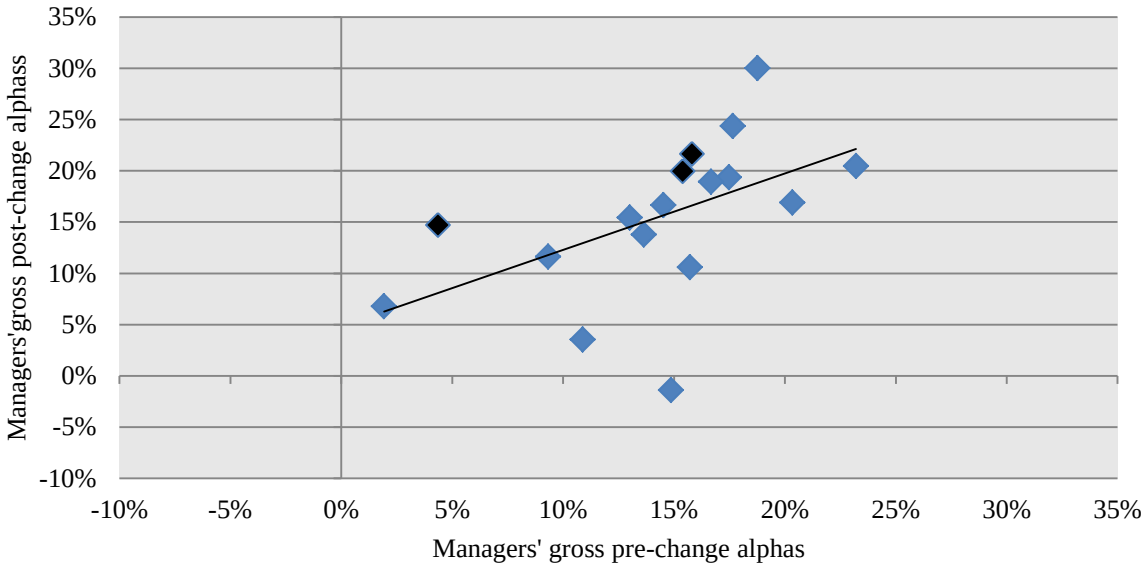


Figure 5.16. Managers' gross post-change alphas relative to their gross pre-change alphas (ALL_OBS)



In Figure 5.15 the statistically significant pre-change alphas are plotted black, and statistically significant alphas are depicted as larger circles. In Figure 5.16 they are not displayed, because fees have been added to the alphas, and the significance is irrelevant. From the figures it can be seen that the trend has become more positive by adding the fees. This would support the hypothesis that outperforming managers continue to outperform, as the post-change alphas are increasing in comparison to pre-change alphas, and that underperforming managers continue to underperform, as the post-change alphas are lower for them, when pre-fee performance is analysed.

The hypothesis can be tested statistically using paired Student's t-test by comparing the performance differences using the gross alphas and the net alphas. Firstly, the differences between the post-change alpha and the pre-change alpha are taken for the two cases: *diff(gross)* and *diff(net).* Afterwards, the mean comparison test is applied on *diff(gross)* and *diff(net).* If there is no statistically significant difference between the two means, then the fees are not responsible for the weak persistence of managerial performance. However, if the difference is statistically significant, then fees alter the post-change alpha, not the poor post-change performance of the manager. Table 5.13 shows the summary of the test results.

Table 5.13. Hypothesis 3 extension with fund fees taken into account. All positive and negative pre-change alphas

Bootstrapped unpaired t-tests with unequal variance (all positive and negative pre-change alphas)					
Test variables	Annualized mean (diff)	SE(diff)	Initial sample size	p-values for: H_0:diff(gross)= diff(net) H_A: diff(gross)< diff(net)	p-values for: H_0:diff(gross)= diff(net) H_A: diff(gross)< diff(net)
Difference in gross pre-change alphas of skilled managers (ALL_OBS)	-2.05%	1.68%	9	0.695	0.611
Difference in gross post-change alphas of skilled managers (ALL_OBS)	-21.72%	20.06%	9		
Difference in gross pre-change alphas of skilled managers (2Y_OBS)	-1.97%	1.80%	9	0.712	0.577
Difference in gross post-change alphas of skilled managers (2Y_OBS)	-20.81%	21.41%	9		
Difference in gross pre-change alphas of underperforming managers (ALL_OBS)	3.34%	2.05%	8	0.145	0.290
Difference in gross post-change alphas of underperforming managers (ALL_OBS)	38.36%	25.14%	8		
Difference in gross pre-change alphas of underperforming managers (2Y_OBS)	3.31%	2.92%	8	0.216	0.431
Difference in gross post-change alphas of underperforming managers (2Y_OBS)	37.99%	35.82%	8		

Note: ***, **, and * denote 1%, 5%, and 10% significance levels respectively.

When revisiting Hypothesis 3 in this section no statistical evidence is found for fund fees being the ones that hinder the persistence of the post-performance of managers. This finding again supports the rejection of *Hypothesis 3: Skilled managers continue to outperform after they move to a new fund, while underperforming managers continue to underperform after they move to a new fund*, even when accounting for fees.

5.7. Team-managed funds

Out of the above-mentioned 64 team-managed funds, only 43 funds had observations for at least six years; however, all of those funds were subject to structural transformations, such as lead- or single-managed funds turning into team-managed funds. There is only one fund in

the database, which was team-managed throughout the analysed period for six consecutive months, which is necessary to qualify for the analysis of a change. Therefore, Hypothesis 7 cannot be tested due to the absence of qualifying observations.[10] Meanwhile, the fact of a structural change might be investigated to see how it affects performance of a fund.

Overall, on average team-managed funds had observations for 6.48 years. There are 25 funds in the dataset that have been initially single or lead-managed for at least three years and then team-managed for at least three consecutive years. Thus, these 25 funds could be analysed in order to understand how the increase in the number of managers affects funds' performance. However, all those funds are managed by Swedbank Group (Robur); therefore, the results could be biased toward one specific company and its management strategies. Moreover, as it was mentioned before, Swedbank Robur has a large team of managers; thus, those funds are to a large extent subject to shifting lead manager responsibilities among the same team of managers. As a result, no further analysis in relation to team-managed funds is carried out in this study to avoid significant bias towards one fund management company in the industry.

6. Findings and Conclusions

The following paper focuses on the analysis of the Swedish mutual funds industry, particularly concentrating on the effect of managerial changes on fund performances. Table 1 in Appendix 3 summarises all of the hypotheses, tests used and results in this paper.

Generally, the Swedish mutual fund industry can be characterised by high managerial turnover. Fund managers on average do not have a long-standing career in the industry. When a manager leaves a fund, the likelihood that he/she will leave the industry cannot be strongly associated with a fund's pre-change alphas or flows.

It is normally true for the industry that on average if skilled managers leave funds, subsequent performance of those funds is decreasing (by 3-4% on average), while the change of an underperforming manager is associated with subsequent improvements in funds' performance (by 3-5% on average). These findings are in line with Khorana (2001). However, there is no any significant evidence that performance of managers is persistent, i.e., skilled managers should not be expected to outperform as well in the fund they move to. This

[10] Hypothesis 7: If a manager leaves and/or arrives to a team-managed fund, the post-performance of that fund will not be affected significantly.

finding is true also when accounting for management fees, which could potentially erode true alpha of a manager. However, the arrival of skilled manager to a fund on average improves the performance of a fund (by 4-5% on average), which is also true for underperforming managers (by 3-4% on average). This is because of the fact that the funds that searched for a new manager were on average significantly underperforming, and the post-performance of the arriving managers was not significantly different from zero for such funds. This implies that there is non-existence of persistent managerial skill. Additionally, skilled managers arrive to funds that have had better inflows pre-change, when compared to the funds that got underperforming managers. Therefore, skilled managers get "*better*" funds in the market and are unlikely to go to draining funds.

Skilled managers are generally moving to funds of larger size (by 1.7B SEK larger on average) and funds with higher compensation (by 20M SEK or 0.32% larger on average), which was hypothesized in the beginning of the study, as they are seeking to increase their compensation levels and to decrease board entrenchment (which is more typical for small funds), if any. This is also in line with Elton et al. (2003). Moreover, this supports the intuition that managers that performed well mainly due to luck change funds to extract higher benefits while having high bargaining power, realising that this over-performance is unlikely to continue in the future. No statistically significant differences in sizes or fees are found for underperforming managers that change funds.

It can be concluded that there is some evidence that after a change of a manager the fund flows increase irrespective of skill. However, this is not the case in all test specifications; therefore, this evidence is treated with caution and no strict conclusion is made.

Finally, there is no straightforward conclusion about the presence of persistent managerial skills after managerial changes. There is evidence of statistically significant alphas for specific time periods; however, the tests showed that the performance is not persistent.

7. Limitations and Suggestions for Further Research

The data availability is limited overall, as funds' fact sheets do not always disclose all the necessary information. Thus, there are limited opportunities to get a full picture of all managers' movements across funds. This may lead to a lack of consistency in the data and to a higher turnover of managers within the industry.

In addition, individual benchmark information is also subject to limitations. Firstly, individual benchmarks are not always disclosed in the fact sheets. Secondly, some of the benchmarks if disclosed are unavailable publicly. Moreover, it leads to bias towards transparent funds, which have detailed information available publicly.

Resulting from the above-mentioned limitations, the number of managers who have been in the industry for an appropriate number of years (at least six years) is relatively small. Thus, the inferences from those findings might be subject to the unrepresentativeness of a sample.

The lack of information on team-managed funds limited the span of research, while it could be investigated further. Thus, the hypotheses stated in the Literature Review section could be tested in future research subject to data availability. In addition, it could be interesting to explore how the increase in the number of managers affects funds' performance.

Moreover, risk-shifting behaviour is another interesting topic for future research. Khorana (2001) finds evidence of risk-shifting behaviour by underperforming managers prior to managerial change. Thus, it could be investigated whether underperforming fund managers tend to increase the risk of the fund pre-replacement in the Swedish mutual fund market.

Furthermore, Dahlquist et al. (2000) have found that performance differs between large and small equity funds, bond funds and money market funds, which can lead to different inferences about the effect of a managerial change on performance of each specific type of fund. Therefore, it might be useful to analyse different types of funds separately in the further research.

Consequently, further research could concentrate on improving data and increasing the analysed period, which might lead to more persistent data on managers and benchmarks and could possibly increase the sample of individual managers' careers of a minimum of six years.

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Appendix 1: Examples of Managerial Change

Table 1. Fund Example

Year	Manager
1999	Tina F.
2000	Johan J.
2001	**Johan J.**
2002	**Johan J.**
2003	**Johan J.**
2004	Peter H.
2005	**Peter H.**
2006	**Peter H.**
2007	**Peter H.**

Table 1 shows an example of how observations are selected for analysis. There is only one observation of Tina F.; therefore, this observation cannot be qualified for the analysis, as a minimum of three consecutive years of a manager in a fund are required. There are four years of observations of Johan J.; however, as mentioned in the Methodology section, exact month of an arrival of a manager to a fund is not specified in a fund's fact sheet. Thus, only the bolded 3 observations can be used to measure performance, as then Johan J. has full yearly influence on the fund. Peter H. arrives in 2004 for four years. Again, the change year (2004) is not considered for the analysis, as the exact timing of change is unavailable. Hence, only observations during 2005-2007 of Peter H. qualify for the analysis.

Two sets of results are produced for robustness check. The first set takes into account exactly two years of performance for consistency. Thus, the performance of Johan J. in 2002 and 2003 is analysed, which are the two years just before the event of a managerial change. The performance of Peter H. is analysed during 2005 and 2006, which is two years just after the change. The second set of results uses all the available information of a manager in question. Therefore, years 2001-2003 and 2005-2007 are used to analyse the performance of Johan J. and Peter H. respectively.

To stress, two years of observations is the minimum period, which is necessary to measure skill of a manager, if any. These two years exclude either the change year or the first year of a manager's appearance in a fund (followed by the two consecutive years). Therefore, to determine the suitability of a specific manager for a study, a minimum of three consecutive years of a manager's presence in a fund are required to measure his/her skill. It concerns both pre-change and post-change periods. See Table 2 below for an illustration.

Table 2. Fund Example

Year	Manager
1999	Tina F.
2000	Tobias M.
2001	Johan J.
2002	**Johan J.**
2003	**Johan J.**
2004	Peter H.
2005	**Peter H.**
2006	**Peter H.**
2007	Frederik S.

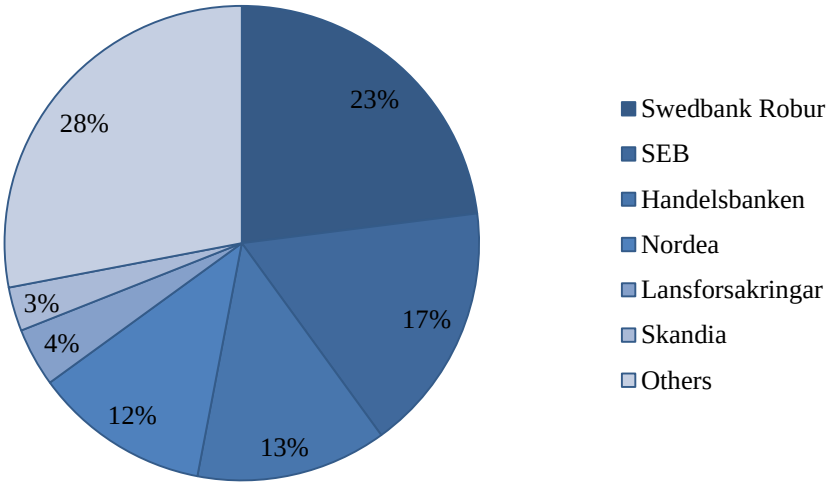
Pre-change period – three consecutive years of the same manager in a fund, where 2001 observation is excluded (the first year)

Post-change period – three consecutive years of the same manager in a fund, where 2004 observation is excluded (the change year)

Therefore, six consecutive years of observations are necessary for the analysis of a specific fund's performance in pre- and post-change periods. This allows identifying the presence of skill, if any, of a manager in the pre-change period (two eligible years) and of another manager in the post-change period (two eligible years). This way, for example, the effect of a change of an underperforming manager to a skilled manager can be measured and compared.

Appendix 2: Mutual Fund Companies in Sweden

Figure 1. Mutual fund companies in Sweden. Share of total assets managed by Swedish mutual fund companies, December 2007



Source: Svenska Bankforeningen, 2008, Banks in Sweden.

Appendix 3: Additional Figures and Tables of Interest

Figure 1. Histogram of annualised pre-change alphas of managers that leave their funds (ALL_OBS)

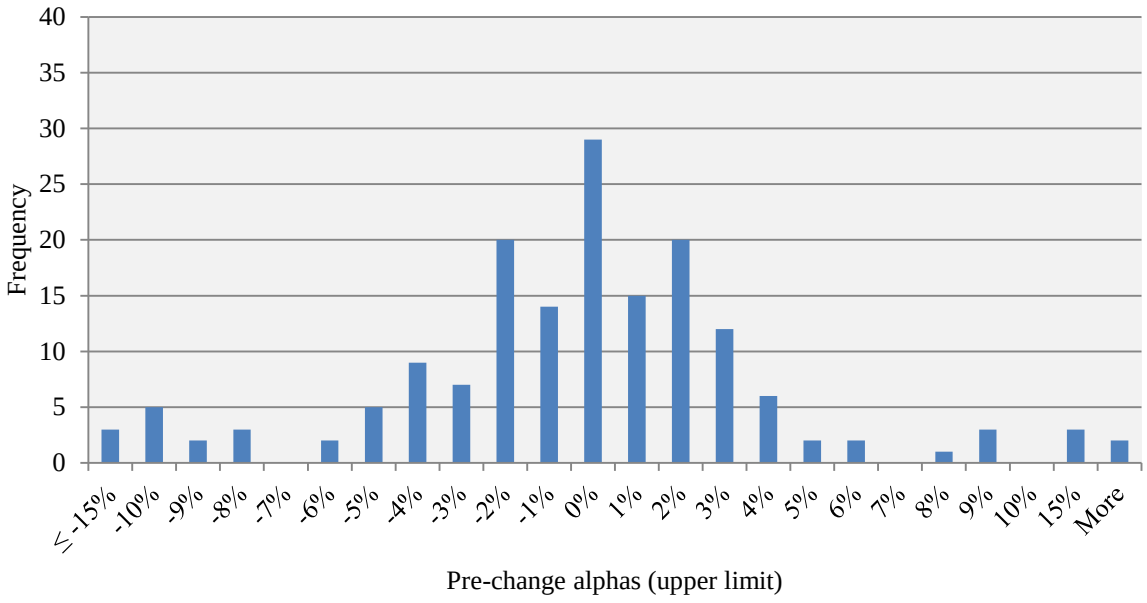


Figure 2. Histogram of annualised pre-change alphas of managers that leave their funds (2Y_OBS)

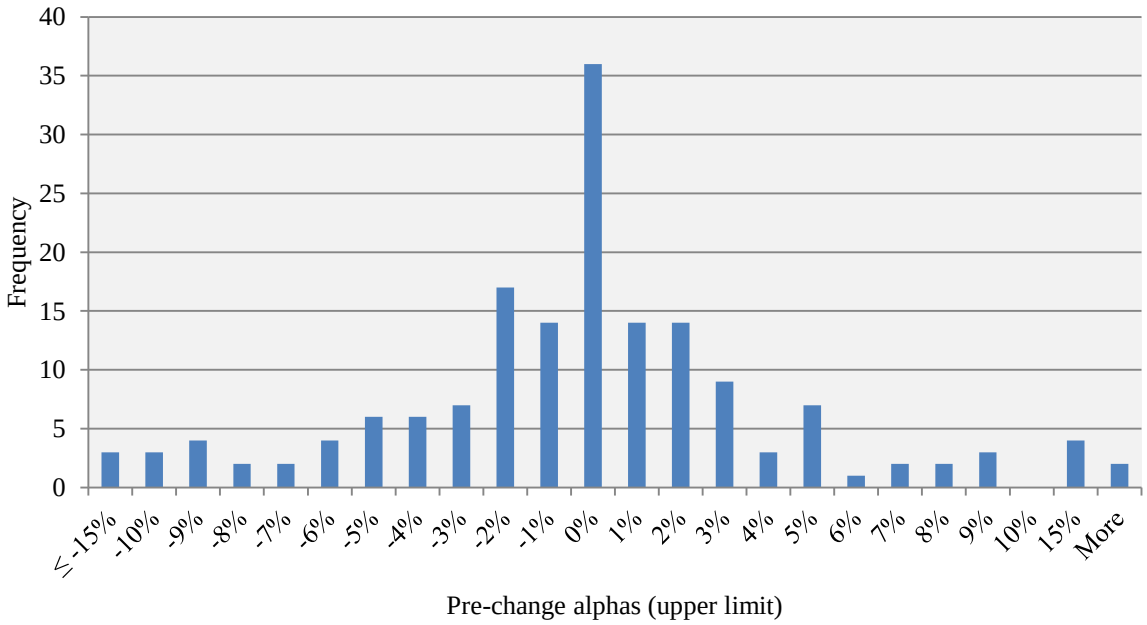


Figure 3. Histograms of statistically significant annualised pre-change alphas of managers that leave their funds

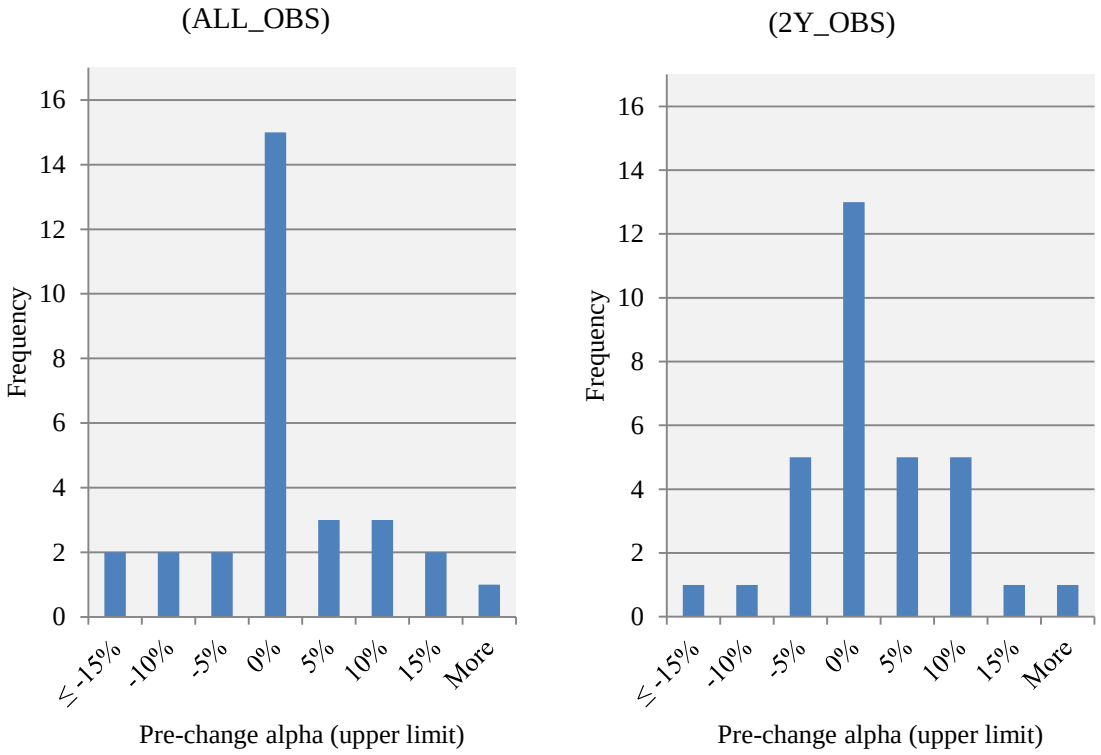


Figure 4. Aggregated histogram of fund flows before managers leave their funds

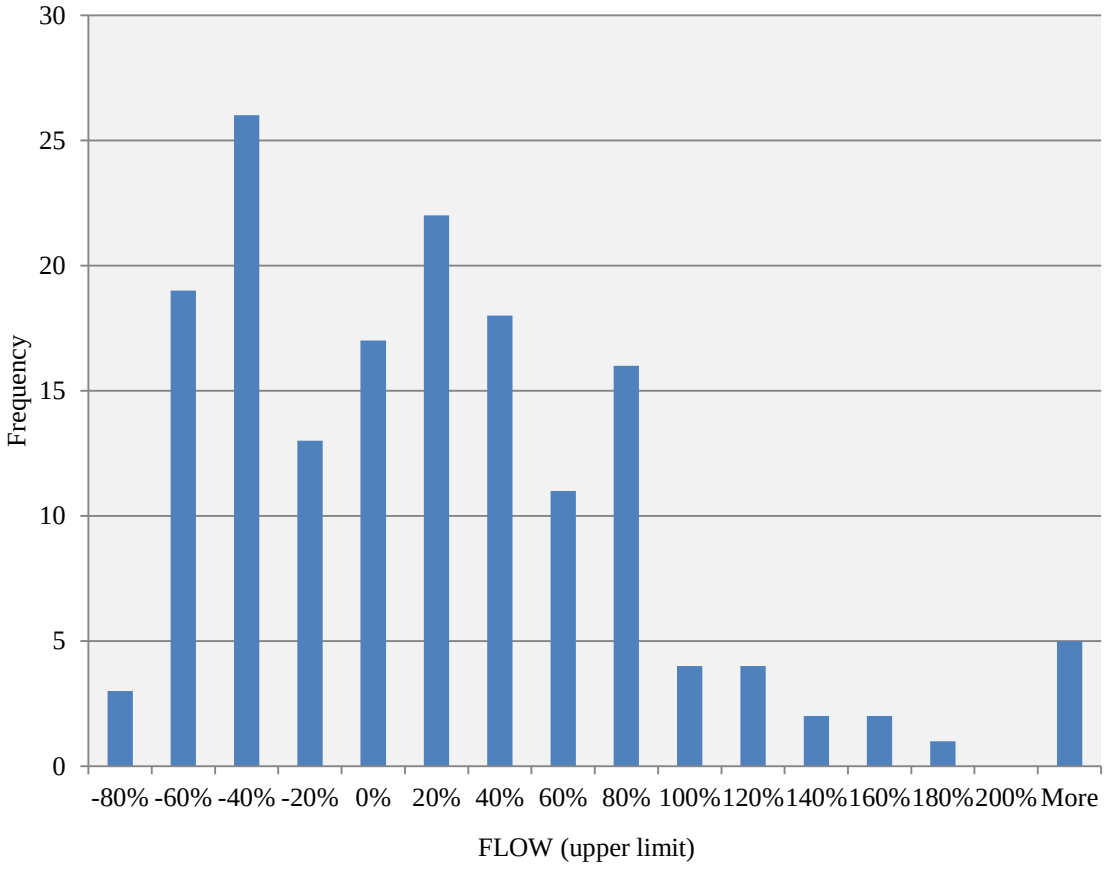


Figure 5. Managers' post-change alphas relative to their pre-change alphas (2Y_OBS)

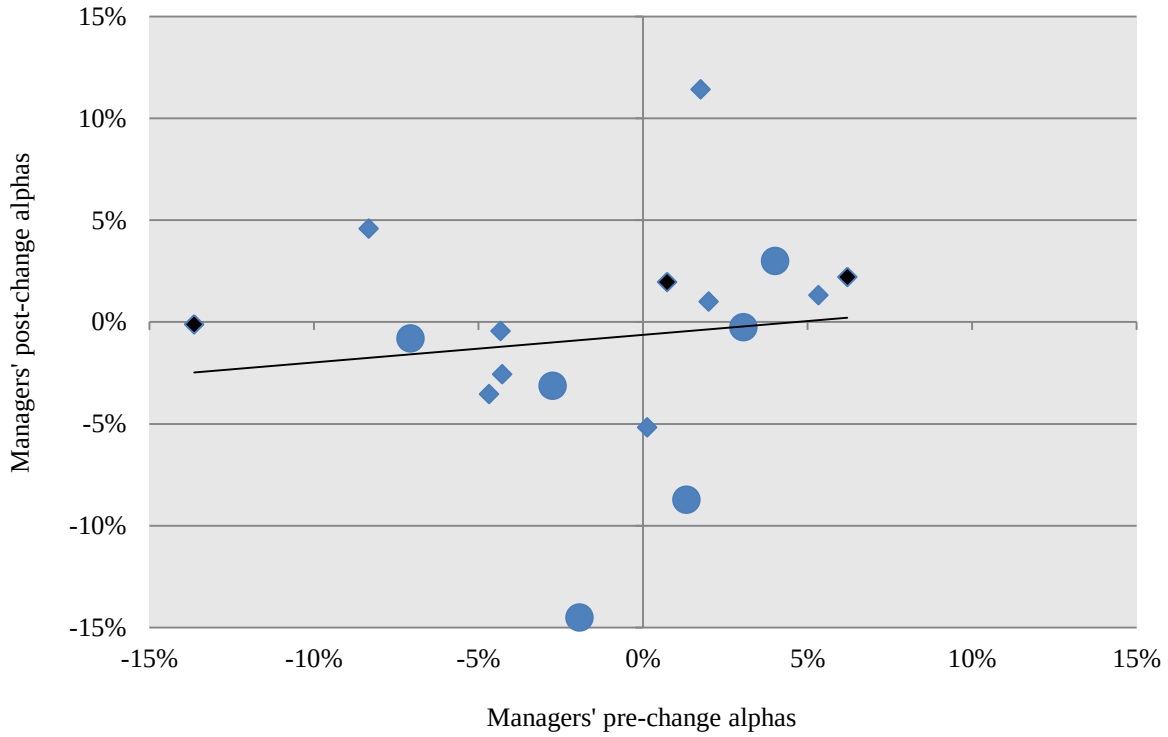


Figure 6. Managers' gross post-change alphas relative to their gross pre-change alphas (2Y_OBS)

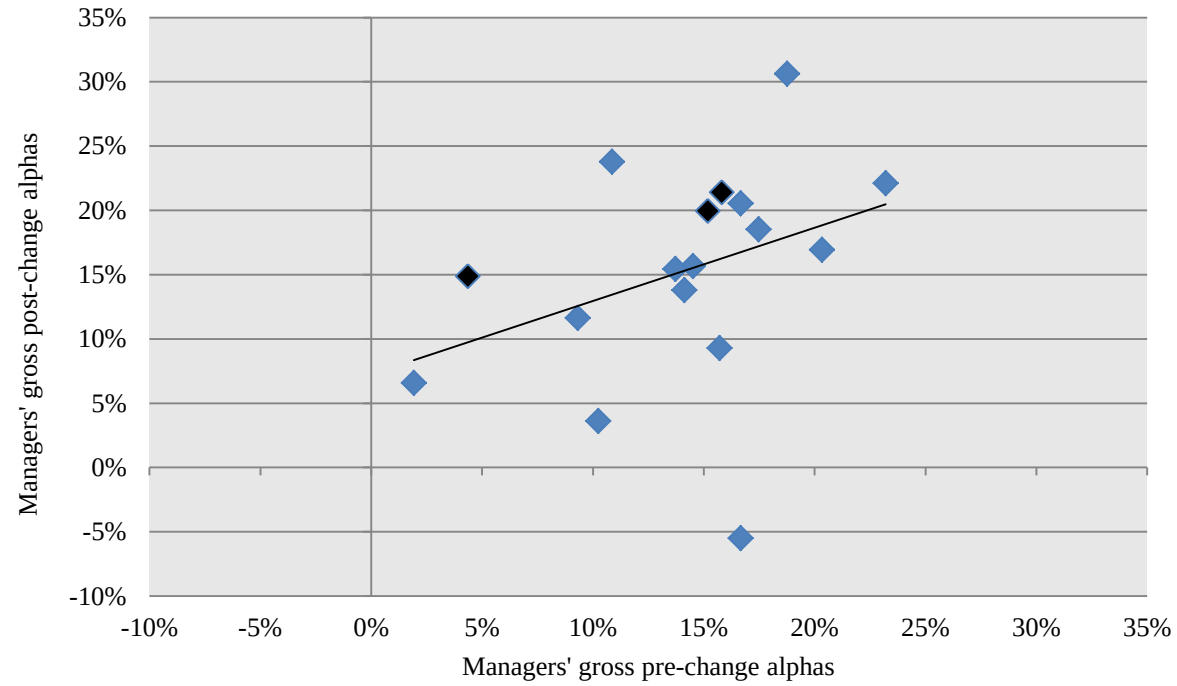


Table 1. Summary of hypotheses, tests used and results (the table continues on the next page)

Hypothesis	Tests used	Results
Hypothesis 1: When a skilled (underperforming) manager leaves a fund, the post-performance of that fund will worsen (improve).	Alphas obtained from OLS CAPM regressions (Equation 1) and then compared by paired Student's t-tests using 1,000 bootstrap replications.	Findings are in line with the hypothesis. When skilled managers leave a fund the decrease in alphas is on average 3 – 4%, while for the underperforming managers, the magnitude of the increase is on average 3 – 5%.
Hypothesis 2: When a skilled (underperforming) manager arrives to a new fund, the post-performance of that fund will improve (worsen).	Alphas obtained from OLS CAPM regressions (Equation 1), weighed according to Equation 2 and then compared by paired Student's t-tests using 1,000 bootstrap replications.	When a skilled manager arrives to a new fund, the post-performance of that fund will increase by 4-5% on average. However, when an underperforming manager arrives to a new fund, the post-performance of that fund will not worsen as expected. Instead, there is a statistically significant increase in the performance by 3-4% on average. Funds that searched for a new manager were on average significantly underperforming, and the post-performance of the arriving managers was not significantly different from zero for such funds. Moreover, skilled managers arrive to funds that have had better inflows pre-change, when compared to the funds that got underperforming managers.
Hypothesis 3: Skilled managers continue to outperform, while underperforming managers continue to underperform after they move to a new fund.	Alphas obtained from OLS CAPM regressions (Equation 1), weighed according to Equation 2 and then compared by one sample Student's t-tests using 1,000 bootstrap replications.	There is no statistically significant persistence in performance. Moreover, no statistical evidence is found that fund fees hinder the persistence of the post-performance of managers.

Hypothesis	Tests used	Results
Hypothesis 4: When a skilled (underperforming) manager arrives to a new fund or when an underperforming (skilled) manager leaves a fund, the post-inflows to that fund will increase (decrease).	Alphas obtained from OLS CAPM regressions (Equation 1), weighed according to Equation 2. Flows calculated using Equation 3 and then compared by unpaired Student's t-tests with unequal variances using 1,000 bootstrap replications.	There is some evidence that after a change of a manager the fund flows increase irrespective of skill. However, this is not the case in all test specifications; therefore, this evidence is treated with caution.
Hypothesis 5: Skilled (underperforming) managers on average arrive to funds of a larger (smaller) size and/or to funds with higher (lower) compensation fees.	Alphas obtained from OLS CAPM regressions (Equation 1), weighed according to Equation 2. TNAs and fees compared by unpaired Student's t-tests with unequal variances using 1,000 bootstrap replications.	Skilled managers on average arrive to funds of a larger size (by 1.7B SEK larger on average) and to funds with higher compensation (by 20M SEK or 0.32% larger on average). No conclusions can be made for underperforming managers.
Hypothesis 6: Pre-change alphas and fund inflows (outflows) are associated with the probability of managers leaving the Swedish mutual fund industry, conditional to a managerial change.	Alphas obtained from OLS CAPM regressions (Equation 1), and flows calculated using Equation 3. Then *Probit* regression models (Equations 4, 5 and 6) are applied using 1,000 bootstrap replications.	There is no statistical evidence for the fact that managers leaving the Swedish mutual fund industry, conditional to a managerial change, could be explained by the pre-change alphas of funds. Moreover, fund flows do not have any statistically significant explanatory power of the hypothesis either.
Hypothesis 7: If a manager leaves and/or arrives to a team-managed fund, the post-performance of that fund will not be affected significantly.	Not applicable	No analysis performed due to limited data availability, team-managed seem to appear in the industry recently, as a result of a structural transformation from single- or lead-managed funds