Stockholm School of Economics
Master's thesis in Finance

# Fund Manager Replacement
# Performance Persistence

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ABSTRACT
This thesis will focus on the relation between funds' performance and the fund managers. Since there is reason to assume that the manager personally brings an effect to performance, there should also be reason to suspect that a replacement of this manager ought to change the performance of the fund. The purpose of this thesis is to examine whether the replacement of a fund manager affects the funds' performance. The topic is approached using event studies comparing the Jensen's alpha, a risk-adjusted performance measure, of funds before and after the replacement of the funds' manager. The study results indicate that a poorly performing fund is likely to experience a significant performance increase while there is no statistically significant support for an observed decrease in performance when well-performing funds experience manager replacement.

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# 1 Introduction

## 1.1 Introduction and background

The Swedish fund market has developed from humble beginnings over half a century ago into one of the most dominant forms of savings in Sweden, encompassing 1600 billion SEK or ca 30% of the Swedish household financial assets. Seven out of ten Swedes, or nine out of ten including the pension scheme PPM, are fund investors. Net inflows to funds have been strongly positive every year since at least 1995. (Fondbolagens förening, 2007) Hence, aspects concerning the performance and performance characteristics of these funds are of great interest and relevance.

This thesis will focus on the relation between funds' performance and the fund managers, the actual individuals making investment decisions which in turn directly affect the performance of the investment portfolio. This angle on fund performance is less common in the literature where fund performance usually is equalled with manager performance. This assumption is of course logical as long as the same manager keeps managing the same fund, but a quick overview of the industry shows that replacements of fund managers are far from uncommon. Since there is reason to assume that the manager personally brings an effect to performance[1], and the study of manager rather than fund performance hence is justified, there should also be reason to suspect that a replacement of this manager ought to change the performance of the fund.

## 1.2 Purpose

The purpose of this thesis is to examine whether the replacement of a fund manager affects the funds' performance and to try and establish whether it is appropriate to speak of fund manager performance persistence (i.e. whether such a discussion would matter depending on whether

[1] This is the underlying reasoning of actively managed funds. The justification of active management has been studied a number of times over, often concluding that a certain overperformance relative the market benchmark pre-fees is possible but often the higher fees demanded by active management nets out this and net performance is slightly below the benchmark. (Winroth, 2007) It is also noted that the investor body places a certain importance on the manager and especially inexperienced investors take an interest The conclusions of Donner & Oxenstierna (2007) was that inexperienced investors place importance on the character of the fund promoter and manager when choosing a fund whereas experienced investors care for fund specifics risk and past return, where at least the latter can be tied to the manager in accordance with above.

managers appear replaceable or not).

## 1.3 Structure

The remainder of this paper is structured as follows: After a summary review of literature on the topics of fund performance persistence and manager performance persistence the method for approaching the subject of replacement effects will be set out. Thereafter, a section dedicated to the data used for the study, both general funds data for sample selection and time series data for performance evaluation, will be described in greater detail. This is followed by a section setting out and discussing the approach for analysing the results and a section with the results and corresponding analysis. Finally, the paper summarises the conclusions and topics for further research.

# 2 Literature review

## 2.1 Fund performance persistence

A substantial amount of research has been published on the subject of performance persistence in mutual funds. These studies, however, focus on the performance development of the fund instead of that of the manager directly as they usually equal fund performance with manager performance. Nonetheless, the knowledge gained from these studies form an interesting background to the topic of fund manager performance persistence and the question of persistence or not of fund performance when the manager is replaced.

Most studies have been conducted on US data, and while findings differ, many studies do find evidence of performance persistence for many categories of funds in the short run whereas longer run persistence can not be documented which in turn supports the capital market efficiency theory. Tests on persistence could be said to have started with the research of Sharpe (1966), who found persistence in the one-year perspective but not for longer periods. Hendricks et al. (1993) found evidence of one-year persistence, which later was fully explained by other researchers, Carhart (1997) and Detzel & Weigand (1998).

Looking at more recent studies, Goetzman & Ibbotson (1994) found persistence on monthly, annual and biannual basis. Elton et al. (1996) found a relation between alphas in the one-year perspective as well as the three-year perspective.

Christensen (2005) found no proof of persistence in Danish funds. Wermers (2002), Cesari & Panetta (2002) and Daniel et al. (1997) present evidence supporting the informational efficiency hypothesis of Grossman & Stiglitz (1980) where average active management delivers superior returns before costs though not after, hence hinting of the possibility of consistent performance.

Few studies have been conducted on Swedish data. In 2000, Dahlqvist et al. found little evidence of performance persistence 1993-1997. A thesis at Stockholm School of Economics by Garbalinska & Gustavsson (2007), finds short term persistence in the latter part of their period 1993-2006.

Based on these previous studies, we could hence entertain the notion of a certain amount of short term performance persistence in an average fund though not during any longer periods of time. The evidence found by Garbalinska & Gustavson, which is the most relevant for this

study, certainly makes the question of a replacement effect relevant.

## 2.2 Manager performance persistence

The most significant research on the topic of fund manager replacement impact on fund performance has been conducted by Khorana (2001). Khorana's paper is an event study performed on American mutual fund data spanning over the period of 1979-1991. Four different types of performance measures are applied; i) a one-factor and a four-factor abnormal performance measure, ii) an objective-adjusted performance, iii) a matched sample approach, and iv) the percentile performance rankings of the fund.

Discussing these methods, the one-factor and four-factor models (method i) appear to function as inferior alternatives to the objective-adjusted performance measure (method ii) since they both build on the same theoretical foundation, that of the CAPM, but only the second takes into consideration such factors as sector, industry and style effects. The third method, the matched sample approach, is useful as a robustness test – since results of the manager replacements are expected to be contrarian to previous fund performance, matching the sample with a similar selection without the event should effectively clear any suspicions of performance reversion being the result of mean reversion rather than of new manager impact. The fourth method of percentile rankings appears adding more evidence in answering the research question but might not be vital to the study.

Khorana (2001) divides his sample in pre-replacement underperformers and over-performers. The study yields that underperforming funds significantly increase performance post replacement (they do however continue to under-perform but on a lesser level) and over-performing funds display a significant decrease in performance post replacement. Khorana also finds, upon analysing the characteristics of the sample over time, that underperformers' turnover and residual risk tend to increase up until the manager replacement, perhaps suggesting that badly performing managers desperately try to right their performance by foregoing diversification and window-dressing or second-guessing. Expenses have decreased continuously for both underperformers and over-performers. This is in line with the generally observable trend of increasing investor awareness leading to decreasing fees. From a Swedish perspective, this is interestingly contrarian to the by fund market professionals observed phenomenon of increasing fees for underperforming funds – since no new investors enter the fund but existing ones are reluctant to divest (in accordance with the relation past performance and fund flows) the fund promoter seizes the opportunity to at least increase their profits before taking the

necessary steps of closing the fund one way or another (liquidation or merger).

Lastly, Khorana also concludes on the effects of replacement on flows with results adding to the knowledge body saying that poor performers attract low inflows which are significantly increased following a manager replacement.

A study not related to the world of asset management and portfolio performance was conducted on top management replacement in listed firms by Denis& Denis in 1995. They investigate the effect of forced management replacement on stock price, operating income and other key characteristic figures, hence possibly providing some foundation for my study on the subset of poorly performing fund managers. They conclude that forced replacements are preceded by large and significant operating performance declines and followed by significant improvements in operating performance. The firms significantly downsize their operations following the management change, exhibiting large and significant declines in employment, capital expenditures, and total assets. Furthermore, the forced resignation sub-sample displays an unusually high incidence of post-turnover external corporate control market activity.

# 3 Method

The research in this paper will be carried out using event studies. Funds which have had a change in management will be selected and the performance previous to the replacement will be compared to that subsequent of the event for any significant changes.

## 3.1 Sample selection criteria

The sample has been selected from a database spanning mutual funds offered in Sweden during 1999-2006. In keeping with the background reasoning of this study, we only select replacement events in actively managed funds. Both equity funds, bond funds and money market funds are included in the sample. The database, which originates from the Institute of Finance at Stockholm School of Economics and has been augmented for the purpose of this thesis, is based on annual fund fact sheet information. For some funds, especially those promoted by agents not mainly based in Sweden, these facts have proven harder to obtain and there are hence gearings towards funds with Swedish and "transparent" promoters. When funds are managed by teams of managers[2], a change in the management team has been interpreted as a replacement of the management team and the event includes the fund in the sample. Since this study is carried out founding results on comparison to the funds' benchmark indices, funds without a benchmark index are excluded from the population.

## 3.2 Event window

The pre-event window will span over the two years preceding the year of the replacement and the post-event window will span over one year following the year of the replacement. The year of the replacement will be excluded partly because it is not always possible for us to discern when during this year the change took place which leaves us without cut-off points and partly to be sure to sort for effects perhaps directly attributable to the replacement event[3]. The time span of the pre- and post-event windows have been chosen based on previous literature, most notably Khorana (2001) and Denis & Denis (1995). The objective when selecting the time frames was to catch the pre-period in which the replaced manager delivers the performance which then

[2] 37 funds out of 420, or 9%, in 2004 and average 7.6% 1999-2004 were managed by more than one person.

[3] Khorana (2001) finds a notable increase in turnover for a period surrounding the replacement, implying that a manager replacement spurns window dressing activities (which negatively affect the fund with for example higher transaction costs).

(possibly) could be grounds from dismissal or promotion and to catch the post-period where the new manager puts his or her mark on the fund performance.

## 3.3 Performance evaluation

As a measurement of performance, Jensen's alpha (Jensen, 1967) will be applied. This is probably the best recognised portfolio management performance measure, defined as the return in excess of that associated with the portfolios beta (systematic risk) or correlation with the relevant market benchmark. The relevance of alpha as a portfolio or fund performance measure was confirmed by Grinblatt & Titman in 1994. Using alpha enables an estimation of the managers' skill adjusted for market effects.

$$R_{it} = \alpha_i + \beta_i R_{Mt} + \varepsilon_{it}$$

Where:
$R_{it}$ = the return of fund *i* in period *t* in excess of the risk-free rate;
$\alpha_i$ = the unconditional risk-adjusted excess return of fund *i* in the period;
$\beta_i$ = systematic risk of the fund, measuring the sensitivity of the excess return of fund *i* to the excess return on the Index;
$R_{mt}$ = the return on the market portfolio in period *t* in excess of the risk-free rate; and
$\varepsilon_{it}$ = the residual term of the model.

Whereas using this CAPM style regression usually provokes debate on the definition of a relevant market benchmark, this discussion is elegantly avoided analysing mutual funds – since funds usually pre-determines a benchmark against which to evaluate itself no proxy index needs to be used and a very important variable does not need to be estimated or justified on a solely theoretical basis.

Using alpha enables an estimation of the managers' skill adjusted for market effects and risk level, leaving a for the purpose of this paper rather "pure" measure of performance.

## 3.4 Test structure and hypotheses

The foundation of this paper is the comparison of pre- and post- manager replacement alphas:

*Hypothesis 1*: pre-alpha$_i$ =/= post-alpha$_i$

where *i* is an investment fund.

In order to facilitate the execution of the study, the sample will be divided into two groups based on the pre-event window; initially good performers, denoted W for winners and defined by

positive[4] alpha, and initially bad performers, denoted L for losers and defined by negative[4] alpha. Hence, hypothesis 1 translates into two subhypotheses:

*Hypothesis 1a*: pre-alpha$_{iW}$ > post-alpha$_i$

*Hypothesis 1b*: pre-alpha$_{iL}$ < post-alpha$_i$

In other words, interpreting H1a; when a fund is left by its hereto successful manager, perhaps due to him/her wanting to pursue other tempting offers following their impressive track record, it is expected that a new average fund manger will lead to a decreased performance of the fund. Pre-study speculation partly contradicting this could be that a fund promoter cares greatly for their "star" funds and take care to find a well tested and proven replacement; then the new manager is hardly average and a continued success streak could be expected. However, if this is the reason H1a is rejected, it merely suggests that the test for H1a was misspecified while supporting a hypothesis that there is manager persistence after all. Reversely, H1b implies that a fund replacing a bad manager should experience a performance improvement. H1b should not be as sensitive to the by the hypothesis implied randomness of the new manager as perceived "star" managers should be either retained in their successful funds or poached to replace "deserted star-funds" as described above.

[4] The definitions of which funds are defined as winners and losers are discussed in greater detail in section 5.1.

# 4 Data

## 4.1 Data sources

### *4.1.1 Fund facts data (data underlying fund selection)*

The study is based on a database originating from the Stockholm School of Economics where information such as manager, TNA, fees, turnover, benchmark etcetera has been listed per fund. This database has been updated manually using relevant information from financial reports, prospectuses and direct contact with the fund companies in question. The database covers annual information 1999-2006 and covers on average 92% of the total Swedish fund savings[5].

It is worth noting that the database should be free from survivorship bias; it is compiled in such way that funds ceasing to exist are still included for the years they still were open.

### *4.1.2 Time series data*

Time series data for funds, interest rate and benchmark indices have been downloaded from DataStream and Bloomberg. Benchmark indices used are those stated by the fund promoter as the appropriate benchmark of the fund, i.e. no grouping or approximation based on fund style or classification has been made but each fund is matched with the index declared best suitable by the fund promoter. Some funds change their benchmark index during the sample period; the index given at the end of the selected period has then been used.

The study uses daily data. Part of the reason for this is an attempt to achieve significance of the results; with estimation periods of one and two years, monthly data would yield only twelve observations for the one-year estimation periods. Discussing whether to apply weekly or daily data, we acknowledge the discussion advocating weekly data over daily data due to the higher "noise-level" of daily data but ultimately we select daily data over weekly data both in order to maximise the observations underlying the estimation (ca 260 observations over ca 52 for a one-year estimation period) and by reflecting on that fund NAV-quotes are less prone to "noise".

## 4.2 Data transformation

All figures have been translated to Swedish Krona (“SEK”) which adds a foreign exchange effect for certain benchmarks and a few funds. The reasoning behind this is the perspective of a

[5] Calculated as sum of TNA in database versus sum of TNA in statistics report “Fondförmögenhet”, source Svensk Fondstatisik, as published at www.fondbolagen.se.

Swedish investor. Regarding distortions from currency translation on SEK-denoted funds investing in foreign-denoted securities; translating a foreign index to SEK makes sense only if the SEK-denoted fund does not hedge against currency fluctuations – a browse of the selected funds show that very few funds do hedge in this way; while many are allowed almost no fund used any hedging instruments; knowing this it is most appropriate to do translate indices etc in this study.

Time series of fund and benchmark indices were downloaded as described above. Where applicable, several indices were combined to form synthetic benchmark indices as prescribed by the investment fund. Returns, denoted $R_{it}$, were calculated as

$$R_{it} = (P_{it} - P_{i(t-1)}) / P_{i(t-1)}$$

where $P_{it}$ denotes the price of an investment fund at time t and $P_{i(t-1)}$ denotes the price for the same fund the preceding day or month, depending on the particular data frequency used for the testing in question. Benchmark indices underwent the same treatment.

Excess returns, denoted r, which form the source for further regression analysis were calculated by subtracting the corresponding risk-free rate

$$r_{it} = R_{it} - R_{ft}$$

with $R_{ft}$ denoting the risk free rate. As a proxy for the risk free interest rate, all funds have been evaluated against Stockholm Intrabank Overnight Rate (STIBOR).

### *4.2.1 Estimating alphas*

Finally, having constructed a time series database where, for each fund, excess returns are listed alongside the returns of the benchmark index returns as defined for that particular fund, we run regressions estimating daily pre- and post-alpha for each fund according to the model set out in section 3.3. The alpha estimations have been annualised by multiplying the estimated daily alpha by 365.

## 4.3 Data set

Below table lists the funnel approach taken in order to from the Fondfakta database weed out funds eligible to include in our sample:

| Funnel approach for fund selection | Funds (ISINs) |
|---|---|
| Funds in Fondfakta database | 7346 |
| Filtering Fondfakta database for<br>-actively managed funds<br>-funds experiencing replacement<br>-funds displaying manager data for relevant pre-post event window periods<br>-funds with public benchmark information<br>-funds with available time series data for NAV and benchmark<br>Sample size | 116 |

For comment on some of the choices, please refer to next section 4.4 Weaknesses in the dataset.

## 4.4 Weaknesses in the dataset

Since we evaluate the fund performance against the benchmark defined by the fund itself, all funds experiencing a manager replacement but do not have a defined benchmark are excluded from the sample. Second, we were not able to obtain appropriate time series for all selected funds. The proportion of funds falling out from our sample of benchmarked funds experiencing replacement due to lack of time series is about 29%. As far as a non-systematic review tells, the funds without time series are randomly distributed over the sample so that it is not appropriate to redefine the population in order to exclude the time series-lacking funds but rather accept hard fact and bear in mind when reading further that the sample is, to a certain extent, incomplete. Hopefully, the number of funds in the sample of benchmarked funds experiencing replacement for which we actually do have access to time series is high enough to still provide relevant results.

Another weakness arises from using the Swedish risk free rate proxy for funds not denoted in SEK – cash held in these funds would more likely be invested in the base currency risk free rate and performance from substitution of such by investment in stocks or bonds should be evaluated accordingly. 7 funds, denoting 6% in absolute numbers and representing 16 110 MSEK or 3.3% of AuM were not based in SEK, which we consider insignificant enough to allow for this simplification in measurement.

# 5 Testing and analysing

## 5.1 Definitions

Ranking is made by the risk-adjusted excess returns, that is; the Jensen's alphas. Funds are ranked as winners if their excess return or their alpha, respectively, is equal to or above the defining value (see below for discussion of such values). If their performance is below the applicable defining value the funds are classified as losers. Funds which are identified as winners over two subsequent periods are denoted winner-winner (WW) whereas funds which are losers in both periods are called loser-loser (LL). These two classes represent funds whose performance tends to be persistent for the period in question. Remaining funds do not show persistence and are classified as winner-loser (WL) or loser-winner (LW).

### *5.1.1 Value for definition of winner/loser*

#### *5.1.1.1 Zero*

Perhaps the most logical value, zero intuitively defines a winning manager as someone who achieves a positive alpha, i.e. is able to beat his or her benchmark and a losing manager as someone who is outperformed by his or her benchmark. From the point of the investor, a positive alpha indicates that the fund manager has done his or her job in actively managing the fund (even net of corresponding fees) to beat index, making it a "winner", and even more plainly – a manager who actively managed a fund to a performance worse than index is intuitively labelled a loser. Another pleasant implication of using zero as definition value, apart from its easy interpretation, is that it is stable over time.

#### *5.1.1.2 Mean*

Applying the applicable period mean is a little less intuitive but aims to sort managers in a more relative manner; if a manager produces alpha exceeding that of the average manager's alpha, we could consider him or her a winner and correspondingly, a manager underperforming the average manager could be considered a loser.

#### *5.1.1.3 Median*

Similarly to mean, using the median aims to relate managers performance to the performance of the sample. Using the median could provide clearer results when the mean is influenced by outliers.

#### *5.1.1.4 Implications of various definition values*

As we recall from section 3.4, our hypothesis 1 states that

*Hypothesis 1*: pre-alpha$_i$ =/= post-alpha$_i$

Below follows an overview of the implications of the definition values discussed above for our sample. It sets out the allocation of funds for our sub-set sample for sub-hypothesises 1a and 1b which are analysed in sections 6.1 to 6.3 further below.

| Definition value: | Zero | | Mean | | Median | |
|---|---|---|---|---|---|---|
| (pre-values) | 0% | | -3.40% | | -1.72% | |
| | *Funds* | *%* | *Funds* | *%* | *Funds* | *%* |
| Pre-replacement winners (α > definition value) | 38 | 34% | 61 | 53% | 56 | 49% |
| Pre-replacement losers (α < definition value) | 78 | 66% | 55 | 47% | 60 | 51% |
| *Total sample:* | *116* | *100%* | *116* | *100%* | *116* | *100%* |

We note that the simplest definition yields the fewest number of winners; only about a third of the managers actually delivered performance beating out their respective benchmarks. Looking at the more relative definitions, we note that the mean indeed appears more affected by outliers; taking the two together and relating them to the zero-definition outcome we note that the average fund manager delivers a negative alpha and that some managers bring down the average so that it is exceeded by the median. Please note that the mean and median value given above refer to the entire pre-period 1999-2004 and act as an indication of the values only. The evaluation of fund performance relative to the mean and median have been performed using the mean and median applicable for the evaluated period, i.e. for a fund with a manager replacement in 2004, the alpha of the old manager is compared to the mean and median alpha of 2002-2003 and the alpha of the new manager is compared to the mean and median of 2005.

## 5.2 Stratification

In order to analyse the results, it could perhaps prove meaningful to break down the sample into sub-categories depending on investment style since the investment restrictions of a fund would implicate different possibilities of straying from the market performance. The sample is made up as follows:

| **Fund classification** | **Funds** | **%** |
|---|---|---|
| Equity fund | 93 | 80% |
| Mixed fund | 5 | 4% |
| Bond fund | 10 | 9% |
| Money market fund | 8 | 7% |
| *Total* | *116* | *100%* |

Based on this allocation, it makes sense to stratify the sample into equity and fixed income sub-divisions. Mixed funds are included with equity with the reasoning that these tend to contain more equity than bonds at most times.

# 6 Results

## 6.1 Hypothesis 1a and 1b for all funds

To recapitulate, our hypothesis 1 translates into two subhypotheses:

*Hypothesis 1a*: pre-alpha$_{iW}$ > post-alpha$_i$
*Hypothesis 1b*: pre-alpha$_{iL}$ < post-alpha$_i$

### *6.1.1 Hypothesis 1a*

Tabulating the pre-winners, i.e. the selection for hypothesis 1a, we see:

| **Zero** | | | | **Mean** | | | | **Median** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-replacement winners (α>0) | | | | Pre-replacement winners (α>μ) | | | | Pre-replacement winners (α>m) | | | |
| Pre-replacement alpha | | Post-replacement alpha | | Pre-replacement alpha | | Post-replacement alpha | | Pre-replacement alpha | | Post-replacement alpha | |
| Mean | σ | Mean | σ | Mean | σ | Mean | σ | Mean | σ | Mean | σ |
| 7.8% | 8.5% | 2.6% | 12% | 2.8% | 9.3% | 1.5% | 9.8% | 3.8% | 9.1% | 0.9% | 10.1% |
| T-statistic: 0.71 < 1.96 $T_{crit}$ | | | | T-statistic: 0.24 < 1.96 $T_{crit}$ | | | | T-statistic: 0.50 < 1.96 $T_{crit}$ | | | |

Mean = mean of alpha (sum of all alphas exceeding definition value (i.e zero, mean or median) divided by number of summed alphas)
σ (sigma) = cross-sectional standard deviation of the alphas

It is clear that the pre-period mean alpha is higher than the post-period mean alpha, loosely supporting our hypothesis 1a. When mean or median defines the status of a fund's performance (winner or loser) the trend is clear but the effect not surprising. When alpha above zero defines whether the fund is a winner or loser, the decrease in average manager-dependent performance amounts to over 5 percentage units. It is interesting to note that while, regardless of status definition, previous winners maintain a positive, albeit lower, alpha, i.e. while when the star managers left their funds, the funds went from earning a positive non-systematic return to a lower positive non-systematic return or said otherwise; the stock-picking ability of the old managers was not matched by the new managers but not to the extent that active management looks like a costly idea.

We also tabulate the development relating to the performance of our sample;

| Definition value: | Zero | | Mean | | Median | |
|---|---|---|---|---|---|---|
| (post-values) | 0% | | -3.63% | | 0.72% | |
| | *Funds* | *%* | *Funds* | *%* | *Funds* | *%* |
| Pre-replacement winners (α>df) | 38 | 100% | 61 | 100% | 56 | 100% |

| | | | | | | |
|---|---|---|---|---|---|---|
| Post-replacement winners (α> df) | 23 | 61% | 28 | 46% | 21 | 38% |
| Post-replacement losers (α<df) | 15 | 39% | 33 | 54% | 35 | 63% |
| *Total sample:* | *38* | *100%* | *61* | *100%* | *56* | *100%* |

df = definition value, i.e. zero, mean or median of all funds in sample.

We note that a majority of the pre-winners remain winners after the manager replacement, when "winner" is defined as in this paper i.e. alpha is above the zero or the sample mean for the time period in question. These two tables taken together then translates to that while a fund might remain ahead of several competitors, i.e. being a WW, actual performance might still deteriorate substantially since alpha is likely to decrease with the new manager.

Unfortunately, the above results could not be confirmed to be statistically significant as evident from the T-test statistics. In order to reject the null-hypothesis that pre-alpha equals post-alpha, at the 95% level the t-statistic must exceed the critical value 1.96 which is not the case for any of our sub-samples.

### *6.1.2 Hypothesis 1b*

Tabulating the pre-losers, i.e. the selection for hypothesis 1b, we see:

| **Zero** | | | | **Mean** | | | | **Median** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-replacement losers (α<0) | | | | Pre-replacement losers (α<μ) | | | | Pre-replacement losers (α<m) | | | |
| Pre-replacement alpha | | Post-replacement alpha | | Pre-replacement alpha | | Post-replacement alpha | | Pre-replacement alpha | | Post-replacement alpha | |
| Mean | σ | Mean | σ | Mean | Σ | Mean | σ | Mean | σ | Mean | σ |
| -11.3% | 12.2% | 2.4% | 10.4% | -13.8% | 13.8% | 3.6% | 12.0% | -13.4% | 13.2% | 3.9% | 11.5% |
| T-statistic: - 2.56 < -1.96 $T_{crit}$ | | | | T-statistic: - 2.54 < - 1.96 $T_{crit}$ | | | | T-statistic: - 2.69 < -1.96 $T_{crit}$ | | | |

Mean = mean of alpha (sum of all alphas not exceeding definition value (i.e zero, mean or median) divided by number of summed alphas)
σ (sigma) = cross-sectional standard deviation of the alphas

As with the winners in above section, a superficial analysis comparing pre- and post- mean alphas supports the hypothesis of the replacement event having an effect on the fund performance since, in line with expectations, funds which prior to the manager replacement performed poorly increase their performance with the new manager. Interesting to note is that mean post-alpha, regardless of definition for winner-loser, is positive, i.e. indicating that the new manager not only improved on the funds performance relative its own history but actually achieved positive alpha and thus actively contributed to a benchmark-beating performance. Worth noting is also that, as opposed to the pre-winners post-performance, the relative stability of the variance paired with the dramatic improvement of performance enables us to statistically

confirm the superficial analysis with a t-test; note that in the table above all t-statistics exceed the 95% confidence interval t-critical value.

| Definition value: | Zero | | Mean | | Median | |
|---|---|---|---|---|---|---|
| (post-values) | 0% | | -3.63% | | 0.72% | |
| | *Funds* | *%* | *Funds* | *%* | *Funds* | *%* |
| Pre-replacement losers (α<df) | 78 | 100% | 55 | 100% | 60 | 100% |
| Post-replacement winners (α>df) | 42 | 54% | 34 | 77% | 31 | 52% |
| Post-replacement losers (α<df) | 36 | 46% | 21 | 23% | 29 | 48% |
| *Total sample:* | *78* | *100%* | *55* | *100%* | *60* | *100%* |

df = definition value, i.e. zero, mean or median of all funds in sample.

Listing the development of the relative performance of the pre-losers, it appears that using zero or median as value defining who is a loser and who is a winner yields a rather similar scenario – about half of the former losers turned out winners and the other half remained losers (though taking the increased average alpha into account, even those funds which remain losers have an on average much better performance than with the old manager. The drastically different allocation of winners and losers when these are defined relative to the mean alpha of the population can be interpreted as the mean value being strongly affected by outliers (and this interpretation is confirmed when consulting underlying data).

Comparing the above results with our pre-testing reasoning, as set out in section 3.4, we note that, given manager performance persistence or the notion thereof among fund promoters, loser managers seem to leave the manager population to be replaced by a more average performing manager. In order to shed further light in this matter, a closer study of the manager population is necessary – do the bad managers get hired elsewhere where their performance is better (i.e. more average) (which leads to our loser funds displaying better alphas with the new guy or our winner funds to display deteriorated performance) or do they leave the profession confirming the hypothesis of fund manager performance persistence?

## 6.2 Hypothesis 1a & 1b for equity funds

Since stratification as per section 5.2 yields that a non-equity fund sub-sample could consist of maximum 19 funds and since significant deviations from benchmarks are most likely to occur when investing in equity rather than fixed income, we perform the same analysis as in section 6.16.1 but on the equity funds only.

As can be read in the table fully included in Appendix A, limiting our sample does not change any conclusions drawn from the general sample. As expected, all figures are slightly amplified

by the removal of the fixed income funds but the fundamentals of our analysis above remains.

## 6.3 Hypothesis 1a & 1b for fixed income funds

Analogue to section 6.2 above, and for completeness rather than significance, we list the results for fixed income funds only, i.e. bond funds and money market funds. Please refer to appendix A for tabulated results.

That t-tests indicate very low statistical significance is expected since the number of analysed funds is so low. A superficial analysis of the results does support the hypothesis 1a and 1b since pre-winners generally perform worse after the replacement and vice versa for pre-losers. The exception is pre-losers when such are defined as displaying alpha below zero; this performance is even worse after the replacement. Analysing the underlying data, we note that this is due the strong positive performance of a fund displaying a pre-alpha just above zero but below the corresponding mean/median which leads to its inclusion in the loser-sample for the mean/median defined tests and its subsequent significant contribution to the positive mean. A superficial analysis of the sample in non-aggregated form, as opposed to the mean alpha values tabulated above, does not yield any conclusive contribution.

## 6.4 Robustness of results – regression analysis

Additionally to approaching the analysis using aggregated measures such as t-tested means of the alpha estimates as per sections 6.1 to 6.3 above, we also apply some simple regression analysis to ensure the robustness of above results and potentially add further insight regarding the topic at hand. For the regression analysis section, we will assume the notion that positive alpha defines a winner and negative alpha a loser – it is the most elegant and intuitive measure and the attempt at challenging it by applying alternative definitions as per section 5.1 has not yielded strong arguments against its use.

### *6.4.1 Base-case regression analysis – hypothesis 1*

By regressing the post-alphas onto the pre-alphas;

$$\alpha_i^{post} = \beta_1 \alpha_i^{pre} + u_i$$

we see the nature and significance of the relation between pre-replacement performances and

post-replacement performances. The results of the base-case regression are listed in the following table:

| | **β1** |
|---|---|
| **Coefficient** | -0.16364 |
| **t-value** | -2.44 |
| **$R^2$** | 0.05 |

This supports our hypothesis since a negative pre-alpha would lead to a positive post-alpha and vice versa.

### *6.4.2 Dummy variable regression analysis – hypothesis 1a and 1b*

In order to directly investigate our sub-hypothesises 1a and 1b, we add dummy variables to our pre-alphas, defining them as winners or losers and then transform the expression to directly related the post-performance alpha to the pre-performance one, observing whether the pre-replacement status of the fund makes any difference for our results.

The integrated dummy variable model reads

$$\alpha_i^{post} = \beta_1(\alpha_i^{pre} * W_i) + \beta_2(\alpha_i^{pre} * L_i) + u_i$$

where $W_i$ and $L_i$ take on the value 1 or 0 depending on whether the fund prior to replacement was a winner or a loser.

The result of the regression is listed in the following table:

| | **β1** | **β2** |
|---|---|---|
| **Coefficient** | 0.2781 | -0.2663 |
| **t-value** | 1.88 | -3.73 |
| **$R^2$** | 0.13 | |

We note that, similar to our results from section 6.1, a look at the coefficients confirms the expectations regarding post-replacement performance as related to pre-replacement performance; prior winners retain a positive alpha albeit not nearly as high as prior to the replacement and prior losers do turn round to the extent of earning a positive alpha. However, again similar to section 6.1, only results for prior losers are statistically significant.

### *6.4.3 Dummy variable regression analysis – time effects*

Finally, we play at another version of the base-case regression; by adding dummy variables for the years of the replacements we investigate whether the timing of the replacement had

significant impact on the post performance. Remember, since we evaluate the excess return contributed by the manager against a benchmark specifically defined for each fund, time effects should theoretically not come into play since a winning manager can generate positive alpha regardless of market direction and other economic factors. Therefore, this test evaluates one of the thesis's underlying assumptions/underlying questions; is the fund manager responsible for the excess return or are there other explanatory variables in the mix? Whether replacement *timing* is the most suited explanatory variable to test against is possibly a topic for discussion but since timing could be argued to be good enough, we will select it for the purpose of this robustness test. The regression model is then:

$$\alpha_i^{post} = \beta_1\alpha_i^{pre} + \beta_2 E2002_i + \beta_3 E2003_i + \beta_4 E2004_i + \beta_5 E2005_i + u_i$$

where $E2002_i$, $E2003_i$, $E2004_i$ and $E2005_i$ take on the value 1 if the fund manager was replaced that year, otherwise the variable is 0 .

The results of the regression are listed in the following table:

| | $\beta_1$ | $\beta_2$ | $\beta_3$ | $\beta_4$ | $\beta_5$ |
|---|---|---|---|---|---|
| **Coefficient** | -0.111104 | 0.1061886 | 0.0567886 | 0.1631677 | 0.0837082 |
| **t-value** | -1.47 | 2.75 | 1.45 | 3.74 | 2.17 |
| $\mathbf{R^2}$ | 0.17 | | | | |

As is clear from the above table, adding dummies for effects other than pre-alpha, in this case replacement years, yields results conflicting with the preceding results; while the coefficient of the pre-alpha variable remains in line with expectations and results in section 6.4.1 it is no longer significant while the dummies for replacement taking place in 2002, 2004 and 2005 show significant effect as compared with a replacement in 2001, as measured at the 5% level.

# 7 Conclusion

Drawing on the divided results as per above section, we must conclude that based on our work performed, the replacement of a star fund manager can not be claimed to significantly impact the fund performance despite some superficial indications of decreased though still positive alpha following a star manager's departure. On the other hand, we can claim indications of significantly improved fund performance following the replacement of a sub-par fund manager. Eventually, our final regression analysis also prompted us to further consider factors affecting fund performance outside of economic factors and fund manager contribution.

# 8 Further research

While working on this paper, several possible extensions and implications of the topic at hand have emerged. The matter whether it is appropriate to speak of fund manager performance persistence is a captivating topic which investigates the same core mechanisms as this paper; the potential impact and significance of the individual fund manager. A topic related to manager replacement is several possible variations on the funds flow indicator; how is net new money related to manager replacement (or the other way around), how are in-flows and out-flows related to past performance and to the past performance of a newly appointed manager?

Foremost though, in order to better conclude on the topic of fund manager replacement effects on fund performance, similar studies with better access to replacement event information, a matching sample approach and perhaps further empirical testing on several event window horizons would prove insightful.

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# Appendix A

## Detailed results for stratified sample

### *Hypothesis 1a & 1b for equity funds (6.2)*

| **Zero** | | | | **Mean** | | | | **Median** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-replacement winners (α>0) | | | | Pre-replacement winners (α>μ) | | | | Pre-replacement winners (α>m) | | | |
| Pre-replacement alpha | | Post-replacement alpha | | Pre-replacement alpha | | Post-replacement alpha | | Pre-replacement alpha | | Post-replacement alpha | |
| Mean | σ | Mean | σ | Mean | σ | Mean | σ | Mean | σ | Mean | σ |
| 10.8% | 8.7% | 3.3% | 14.5% | 3.1% | 10.2% | 1.6% | 10.8% | 4.5% | 10.1% | 1.1% | 11.4% |
| T-statistic: 0.79 < 1.96 $T_{crit}$ | | | | T-statistic: 0.22 < 1.96 $T_{crit}$ | | | | T-statistic: 0.49 < 1.96 $T_{crit}$ | | | |

Mean = mean of alpha (sum of all alphas exceeding definition value (i.e zero, mean or median) divided by number of summed alphas)
σ (sigma) = cross-sectional standard deviation of the alphas

| **Zero** | | | | **Mean** | | | | **Median** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-replacement losers (α<0) | | | | Pre-replacement losers (α<μ) | | | | Pre-replacement losers (α<m) | | | |
| Pre-replacement alpha | | Post-replacement alpha | | Pre-replacement alpha | | Post-replacement alpha | | Pre-replacement alpha | | Post-replacement alpha | |
| Mean | σ | Mean | σ | Mean | σ | Mean | σ | Mean | σ | Mean | σ |
| -12.1% | 12.2% | 2.6% | 10.7% | -15.5% | 13.7% | 4.0% | 12.6% | -14.9% | 13.1% | 4.2% | 12.0% |
| T-statistic: - 2.62 < -1.96 $T_{crit}$ | | | | T-statistic: - 2.66 < - 1.96 $T_{crit}$ | | | | T-statistic: - 2.81 < -1.96 $T_{crit}$ | | | |

Mean = mean of alpha (sum of all alphas exceeding definition value (i.e zero, mean or median) divided by number of summed alphas)
σ (sigma) = cross-sectional standard deviation of the alphas

### *Hypothesis 1a & 1b for fixed income funds (6.3)*

| **Zero** | | | | **Mean** | | | | **Median** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-replacement winners (α>0) | | | | Pre-replacement winners (α>μ) | | | | Pre-replacement winners (α>m) | | | |
| Pre-replacement alpha | | Post-replacement alpha | | Pre-replacement alpha | | Post-replacement alpha | | Pre-replacement alpha | | Post-replacement alpha | |
| Mean | σ | Mean | σ | Mean | σ | Mean | σ | Mean | σ | Mean | σ |
| 1.5% | 2.2% | 0.9% | 2.4% | 1.5% | 2.4% | 0.5% | 2.2% | 1.5% | 2.4% | 0.5% | 2.2% |
| T-statistic: 0.09 < 1.96 $T_{crit}$ | | | | T-statistic: 0.16 < 1.96 $T_{crit}$ | | | | T-statistic: 0.16 < 1.96 $T_{crit}$ | | | |

Mean = mean of alpha (sum of all alphas exceeding definition value (i.e zero, mean or median) divided by number of summed alphas)
σ (sigma) = cross-sectional standard deviation of the alphas

| **Zero** | | | | **Mean** | | | | **Median** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pre-replacement losers (α<0) | | | | Pre-replacement losers (α<μ) | | | | Pre-replacement losers (α<m) | | | |
| Pre-replacement alpha | | Post-replacement alpha | | Pre-replacement alpha | | Post-replacement alpha | | Pre-replacement alpha | | Post-replacement alpha | |
| Mean | σ | Mean | σ | Mean | σ | Mean | σ | Mean | σ | Mean | σ |
| -0.5% | 0.5% | -0.7% | 0.6% | 0.0% | 0.4% | 0.5% | 2.4% | 0.0% | 0.4% | 0.5% | 2.4% |
| T-statistic: -0.05 > -1.96 $T_{crit}$ | | | | T-statistic: - 0.08 > - 1.96 $T_{crit}$ | | | | T-statistic: - 0.08 > -1.96 $T_{crit}$ | | | |

Mean = mean of alpha (sum of all alphas exceeding definition value (i.e zero, mean or median) divided by number of summed alphas)
σ (sigma) = cross-sectional standard deviation of the alphas