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What daily data can tell us about mutual funds: Evidence from Norway

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ABSTRACT

This paper studies the performance and persistence of Norwegian mutual funds utilizing a new data set of daily returns. Daily data allow us to evaluate the performance over short time horizons in a reliable manner, which is important because the risk exposure of funds can change over time. We complement the existing literature by providing the first study based on daily data outside of the US. Our results show that the performance of top and bottom funds cannot be explained by luck. The performance of these top and bottom funds persists for short horizons, of only up to one year. The mutual fund industry as a whole underperforms the benchmark by approximately the fund fees.

1. Introduction

Two basic questions in finance are whether actively managed funds outperform their benchmarks and whether superior performance persists? For investors it is important to know whether investing in actively managed funds is worth the extra cost compared to investing in low-cost passive funds, and if so, which funds they should invest in. Considering the importance of these issues, it is not surprising that this matter has been the focus of many studies.

Some funds usually perform well and the important question is whether the performance of these funds is genuine evidence of skill or whether it simply reflects luck, as discussed in e.g. Cuthbertson et al. (2008). A complementary way to analyze performance is to study whether it persists. Earlier studies (Hendricks et al., 1993; Grinblatt and Titman, 1992; Brown and Goetzmann, 1995; Elton et al., 1996) find persistence in performance of funds. Carhart (1997) argues that this result is mostly driven by the momentum effect and finds no evidence of performance persistence after controlling for momentum. Kosowski et al. (2006) apply a bootstrap analysis and find that performance persists for up to three years.

The above-mentioned studies and the vast majority of the existing mutual fund research is based on monthly data. Studies based on daily data are infrequent due to limited data availability. Research utilizing daily data was pioneered by Busse (1999), who finds that funds are able to time market volatility, i.e. to decrease market exposure when volatility is high, and therefore increase risk-adjusted returns. Bollen and Busse (2001) conclude that in contrast to previous studies based on monthly data, funds are able to time even the market returns. Similarly, Busse (2001) shows that tournament-like behavior meaning that funds lagging in performance increase risk, disappears when the analysis is conducted on daily rather than monthly frequency. Research based on daily data can improve our knowledge about mutual funds for two main reasons. First, when a fund manager changes the strategy of the fund, the factor loadings of the fund will change and standard static methods will provide biased results. Such dynamic analysis is greatly facilitated by the availability of daily data. Busse et al. (2006) and Mamaysky et al. (2008) find that factor loadings vary considerably. The usual way to tackle this problem is to estimate a conditional model which allows factor loadings to vary according to some macroeconomic variables. However, Mamaysky et al. (2008) find that conditional models often do not perform better than standard models and macroeconomic variables cannot capture the factor variation sufficiently. As a possible solution, Mamaysky et al. (2008) suggest a Kalman filter model and Busse et al. (2006) suggest using daily instead of monthly data. Second, monthly data allow us to analyze long-term persistence only, because to reliably estimate a 4-factor model we need enough data, e.g. Kosowski et al. (2006) use 3 years of data. However, persistence can be a short-lived phenomenon and superior performance is potentially only observable when funds are evaluated several times a year (Bollen and Busse, 2005). Busse et al. (2012) find that stocks bought by funds significantly outperform the

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stocks that they sell, but the difference in performance is concentrated on the day of the trade. Busse and Tong (2012) find that persistence in performance is driven by industry-selection skill, which accounts for a third of fund performance. All these studies stress the importance of daily data as this reaches conclusions that are different or not available from studies based on monthly data.

We contribute to the literature by investigating a new set of data, namely a survivorship-bias-free data set from Norway. To the best of our knowledge, this is the first study utilizing daily data stemming from outside the US. Since the Norwegian fund industry is rather similar to the US, our results are directly comparable with the results from the US. Despite the fact that the Norwegian economy is one of the most developed in the world, there are almost no studies of Norwegian mutual funds. The only research known to us is the unpublished work of Sørensen (2009) and Sandvik and Heitmann (2010). Both these studies are based on monthly data and conclude that there is no persistence for either top or bottom funds. We analyze daily data and find the opposite result, using 4-factor model of Carhart (1997) as a benchmark. In accordance with Mamaysky et al. (2008), Busse et al. (2006) and Busse and Tong (2012), we find that the factor loadings vary significantly over time. Therefore we estimate the model separately for every year in order to evaluate the performance of the funds more precisely. We adopt the bootstrap method of Kosowski et al. (2006) and Fama and French (2010) to determine the significance of the results. Furthermore, we investigate whether managerial skill, if present, is due to stock-picking or market-timing ability. We find that top funds outperform bottom funds in terms of both stock-picking and market-timing abilities.

Persistence in performance is assessed using several methods. First, we evaluate the performance potential of investment strategies based on short-term persistence, as done previously by Hendricks et al. (1993). We use short measurement periods from one month to two years to evaluate persistence and find, in accordance with Bollen and Busse (2005), that performance persists for short intervals only. Second, we check for performance persistence by running several nonparametric tests, both in a two-period and a multi-period framework. In a two-period test we check whether the winners (losers) of the last period are also the winners (losers) in the next period. This is similar to the method used by Carhart (1997) and Karoui and Meier (2009). For the multi-period test, where more than two consecutive periods are considered, we use the Kolmogorov–Smirnov test, as described by Agarwal and Naik (2000) and Eling (2009). We find that performance persists, but only for up to one year.

In summary, our results for Norwegian mutual funds are in accordance with results from the US. Norwegian mutual funds under-perform the benchmark by approximately the management fees. However, the performance of top and bottom funds is too large to be explained by luck and persists for up to one year.

The remainder of this paper is organized as follows. Section 2 gives an overview of our data set. In Section 3 we study the performance of mutual funds and decompose it into stock-picking and market-timing ability. Section 4 studies the persistence in the performance of mutual funds. Section 5 concludes.

2. Data

2.1. Norwegian mutual funds

Our database contains daily net asset values (NAV) per share of 64 Norwegian actively managed open-end equity funds over 11 years (January 2000 to December 2010).[1] The NAV include reinvestment of all distributions (e.g. dividends) and are net of expenses, but disregard load charges and exit fees. In aggregate, these 64 funds represented 74% of the mutual fund industry in Norway as of December 2010.[2] We restrict our sample to domestic equity funds. All of these funds have at least 36 months of data available. We exclude funds that invest in bonds, funds that invest in only one sector of the economy, passive funds tracking some index and equity funds that invest more than 20% of their assets internationally. We calculate the fund returns as follows:

$$r_{i,t} = \ln\left(\frac{NAV_{i,t}}{NAV_{i,t-1}}\right) \tag{1}$$

where $NAV_{i,t}$ is the net asset value per share of fund i at day t and $r_{i,t}$ is the return of fund i at day t.

As shown by for instance Brown et al. (1992), survivorship bias in a sample can severely affect the results. If funds that are shut down or merged into another one within the sample period are excluded from the sample data, an overestimation of the average performance may occur. This is due to the fact that those funds that are shut down often have had poor performance. Therefore, we include funds that have been terminated, and started, within the sample period, thus avoiding the survivorship issue in our data set.

Additionally, we have monthly data on assets under management (AUM), inflow and outflow for each fund for the entire time period.[3] Summary statistics are presented in Table 1. The macro data we use are oil price, 3- and 12-month Norwegian Treasury bill rates (ST1X and ST5X, respectively), and 12-month Norwegian Inter Bank Offered Rate (NIBOR).[4]

2.2. Benchmarks

We construct the daily excess market return by deducting the Norwegian 3-month Treasury bill index (ST1X) from the Oslo Stock Exchange All-Share Index (OSEAX).[5] The time-series for daily returns for the remaining factors of Carhart's 4-factor model for Norway are available from the web page of prof. Bernt Arne Ødegaard.[6] The summary statistics for the factors are in Table 2.

The OSE All-Share Index is plotted in Fig. 1 together with the equally weighted fund portfolio. The aggregate return of the market index is 31% higher than the aggregate return of the equally weighted portfolio. Additionally, Fig. 1 displays the returns of the equally weighted portfolio of funds which are terminated within the sample period. We observe that the portfolio of dead funds have lower returns than the portfolio including all funds. This illustrates that survivorship bias could be present in the data set if the defunct funds were excluded.

In order to analyze this issue further, we perform a probit analysis similar to Brown and Goetzmann (1995), see Table 11 in the Appendix. However, we find no significant relationship between performance and extinction. The seemingly contradiction between the Fig. 1 and Table 11 is caused by the fact that there are just a few dead funds. Therefore, even if these funds have below-average returns, there are too few of them to obtain statistically significant results.

[1] The data is obtained from Børsprosjektet, which is administered by the Norwegian School of Economics.

[2] Statistics Norway.

[3] The data is obtained from the Norwegian Fund and Asset Management Association (Verdipapirfondenes Forening).

[4] The data is obtained from Ecowin Reuters.

[5] The data is obtained from Ecowin Reuters.

[6] These risk factors are constructed using stocks at the Oslo Stock Exchange, following Fama and French (1993) and Jegadeesh and Titman (1993), as described in detail in (Næs et al., 2009).