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UNOBSERVED ACTIONS OF MUTUAL FUNDS

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ABSTRACT

Despite extensive disclosure requirements, mutual fund investors do not observe all actions of fund managers. We estimate the impact of unobserved actions on fund returns using the return gap, which is defined as the difference between the reported fund return and the return of a portfolio that invests in the previously disclosed holdings after adjusting for expenses. Analyzing monthly return data on more than 2,500 unique U.S. equity funds over the period 1984-2003, we document a substantial cross-sectional heterogeneity and time-series persistence in the return gap, thus demonstrating that unobserved actions of some funds persistently create value, while such actions of others destroy value. Most important, we show that the return gap helps to predict future fund performance and conclude that fund investors should use the return gap as an additional measure to evaluate the performance of mutual funds.

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Mutual fund investors do not observe all actions of fund managers despite extensive disclosure requirements. They do not observe the exact timing of the purchases and the sales of securities and the corresponding transaction costs. On the one hand, fund investors bear hidden costs, such as trading costs,[1] agency costs,[2] and negative investor externalities.[3] On the other hand, they can benefit from unobserved interim trades by skilled fund managers who can use their informational advantage to time the purchases and the sales of individual stocks optimally.[4] In this paper, we test the hypothesis that past unobserved actions have a significant predictive power for future returns of mutual funds.

We estimate the impact of unobserved actions on fund returns using the return gap. The return gap is defined as the difference between the reported return of a fund to their investors and the return of a hypothetical buy and hold portfolio that invests in the previously disclosed holdings after adjusting for reported expense ratios. Our intuition behind this measure is straightforward: The impact of unobserved actions is captured in the investor return but not in the hypothetical return of the previously disclosed portfolio. For example, commissions paid by mutual funds to their brokers or stale-price arbitrage losses do not affect directly the returns of the holdings, but they do adversely affect the returns to investors, because these costs are effectively subtracted from the assets of a fund. On the other hand, if the interim trades of a fund create sufficient value, then we should observe that the disclosed fund return exceeds the return

[1] See, for example, Livingston and O'Neal (1996); Chalmers, Edelen, and Kadlec (1999); Wermers (2000); and Karceski, Livingston, and O'Neal (2005) for studies of the trading costs of mutual funds. Mahoney (2004) describes the various costs in more detail.

[2] See, for example, Brown, Harlow, and Starks (1996); Chevalier and Ellison (1997); Carhart, Kaniel, Musto, and Reed (2002); Gaspar, Massa, and Matos (2004); Meier and Schaumburg (2004); Nanda, Wang, and Zheng (2004); and Davis and Kim (2005).

[3] See, for example, Edelen (1999); Dickson, Shoven, and Sialm (2000); Goetzmann, Ivkovic, and Rouwenhorst (2001); Greene and Hodges (2002); Rakowski (2002); Zitzewitz (2003); Johnson (2004); and Nanda, Wang, and Zheng (2005).

[4] See, for example, Grinblatt and Titman (1989, 1993); Daniel, Grinblatt, Titman, and Wermers (1997); Chen, Jagadeesh, Wermers (2000); and Ferson and Khang (2002).

of a hypothetical portfolio that invests in the previously disclosed holdings. As a result, the return gap should be negatively related to the hidden costs and positively related to the hidden benefits of a mutual fund.

One issue with using portfolio holdings data to evaluate fund manager performance is that the disclosed data reveal information only about the major equity positions on particular dates but do not indicate the exact purchase and sale dates. As a result, the exact holding period of securities is unknown. Furthermore, as shown by Meier and Schaumburg (2004), some funds window-dress their portfolios to hide their actual investment strategy from their investors or from competing funds. Thus, studies analyzing only the returns of the disclosed holdings might be subject to significant measurement error since they do not capture the impact of interim trades and various hidden costs. Our paper focuses on the difference between holdings and investor returns and argues that this difference captures important determinants of mutual fund performance, which cannot be detected by merely considering holdings returns.

Even though estimating the impact of unobserved actions may serve as a helpful tool to evaluate mutual funds, an alternative and simpler way to judge any fund's actions could be to just consider its net returns. We argue that, by benchmarking the investor returns against the holdings returns, we filter out the impact of common shocks to both returns and are able to obtain a more precise measure of the short-term unobserved actions.[5] Further, we hypothesize that if the unobserved actions are persistent over time, then the return gap is likely to contain relevant information about future fund performance. However, the return gap does not capture

[5] An extensive literature examines the performance of mutual funds based on net returns and holdings returns. The studies based on net returns generally conclude that mutual funds underperform passive benchmarks. On the other hand, studies based on the holdings returns show that fund managers often have investment ability. Some papers on fund performance include Jensen (1968); Grinblatt and Titman (1989, 1993); Grinblatt, Titman, and Wermers (1995); Malkiel (1995); Gruber (1996); Ferson and Schadt (1996); Carhart (1997); Daniel, Grinblatt, Titman, and Wermers (1997); Chen, Jagadeesh, and Wermers (2000); Wermers (2000); Baks, Metrick, and Wachter (2001);

longer-term investment abilities, such as longer-term abnormal performance due to active stock picking or style timing, which is captured by the established performance measures, e.g., one-factor, three-factor, four-factor alphas and holding-based measures.

Analyzing monthly return data on more than 2,500 unique U.S. equity funds over the period 1984-2003, we show that the average return gap is very close to zero. In particular, the value-weighted return gap for all mutual funds in our sample is –1.0 basis points per month, while the equally weighted return gap is 1.1 basis points per month. These results indicate that the magnitude of unobserved actions is relatively small in the aggregate sample. In contrast, we document a substantial cross-sectional variation in the return gap, indicating that hidden costs are more important for some funds while hidden benefits are more pronounced for other funds. We also find strong persistence in the return gap for up to five years ahead, which suggests that the return gap is driven by systematic factors. Moreover, we find persistence in the return gap not only for the worst performers, but also for the best performers.

Consistent with our main hypothesis, we find that the past return gap helps to predict future fund performance. Funds with favorable past return gaps tend to perform consistently better before and after adjusting for differences in their risks and styles. Specifically, the decile portfolio of funds with the highest lagged return gap yields an average excess return of 1.2 percent per year relative to the market return, whereas the decile portfolio of funds with the lowest return gap yields an average excess return of –2.2 percent per year. The return difference between the two portfolios is statistically and economically significant. To mitigate the potential impact of measurement error on the returns to our trading strategy we apply a simple filtering technique, originally proposed by Mamaysky, Spiegel, and Zhang (2005). The results using this

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Kosowski, Timmermann, White, and Wermers (2001); Mamaysky, Spiegel, and Zhang (2004, 2005); Cohen, Coval, and Pástor (2005); Baker, Litov, Wachter, and Wurgler (2005); and Kacperczyk, Sialm, and Zheng (2005).

method exhibit a substantial increase in the performance difference between the top and bottom deciles. Furthermore, their filtering technique allows us to identify mutual funds that significantly outperform passive benchmarks even after taking into account fund expenses. We confirm the relationship between a fund's return gap and its subsequent performance via pooling regressions with clustered standard errors, controlling for other fund characteristics and time fixed effects.

Next, we examine the determinants of the return gap. Consistent with our interpretation of the return gap, we find that trading costs are an important component of the return gap. Specifically, trading costs, estimated following Wermers (2000), reduce the returns to investors by about 60 basis points per year.

Most funds in our sample exhibit a relatively large correlation between the hypothetical holdings returns and the investor returns, indicating that their actual investment strategies do not differ significantly from their disclosed strategies. However, some funds have relatively low correlations between holdings and investor returns. Since funds with low correlations are more opaque, unobserved actions are more important for these funds. Our results indicate that such opaque funds tend to exhibit particularly low return gaps. This result suggests that these funds are subject to more agency problems, which induce them to camouflage their effective portfolio strategies.

Finally, we show that the return gap is positively related to the recent IPO holdings of a fund, suggesting the existence of cross-subsidization strategies among funds, as described by Gaspar, Massa, and Matos (2005) and Reuter (2005). In addition, the return gap is related to other fund attributes, such as size, age, and average new money growth, which have been previously shown to affect fund performance. Further, we examine whether the return gap is

related to funds' trading securities between different industries and styles. We do not find a significant relationship between the industry and the style turnover and the return gap.

Several papers have compared the reported fund returns to hypothetical fund returns based on disclosed portfolio holdings. Grinblatt and Titman (1989) is the first paper that compares reported fund returns to holdings returns. They use the difference to estimate the average fund transaction costs for a sample of 157 mutual funds during the period 1975 to 1984. They document that the average difference before subtracting fund expense ratio is about 1.68 percent per year using Jensen's alpha. The authors further point out that the estimated difference can also be affected by interim trades within a quarter and possible window dressing activities. Analyzing a large sample of diversified equity mutual fund for the period 1975 to 1994, Wermers (2000) decomposes fund performance into stock-picking talent, style selection, transaction costs, and expenses. He finds an average 2.3 percent difference between the gross returns of the hypothetical portfolio and the reported fund returns. He further indicates that 0.7 percent of this difference is due to nonstock holdings and the remaining 1.6 percent is due to expenses, transaction costs and other unreported costs. Frank, Poterba, Shackelford, and Shoven (2004) show that "copy-cat" funds – funds that purchase the same assets as actively managed funds as soon as these asset holdings are disclosed – can earn returns net of expenses similar to those of the funds they are copying. More recently, Meier and Schaumburg (2004) compare the actual return of a fund with the return of a hypothetical portfolio based on the future holdings to investigate whether funds window-dress their portfolios to hide their actual investment strategy from their investors or from competing funds. Our paper differs from the above studies in that we primarily analyze the cross-sectional properties of the unobserved actions of mutual funds. Moreover, we investigate whether investors, when choosing mutual funds, could benefit from

taking into account such unobserved actions. Finally, we analyze which fund characteristics affect these unobserved actions.

The rest of the paper proceeds as follows. Section 1 motivates the use of the return gap in assessing the scope of unobserved actions and quantifies the return gap. Section 2 studies the impact of unobserved actions on future fund performance and discusses the economic significance of this predictability. Section 3 investigates the determinants of the return gap using a regression analysis. Section 4 concludes.

1. The Return Gap

To uncover the role of unobserved actions, we define the return gap as the difference between the net investor return and the gross return of the fund holdings after adjusting for expenses. This section describes the computation of the return gap and summarizes the distribution of the return gap for our sample of mutual funds.

1.1. Methodology

The net return of the fund *f* at time *t* (*RF*) is computed as the relative change in the net asset value of the fund shares (*NAV*), including the total dividend (*D*) and capital gains (*CG*) distributions:

$$RF_t^f = \frac{NAV_t^f + D_t^f + CG_t^f - NAV_{t-1}^f}{NAV_{t-1}^f}. \quad (1)$$

Fund managers subtract management fees and other expenses on a regular basis from the assets under management. Thus, these fees will reduce the total return of the investors, *RF*.

On the other hand, the gross return of the fund's holdings (*RH*) is defined as the total return of a hypothetical buy and hold portfolio that is invested in the most recently disclosed stock positions:

$$RH_t^f = \sum_{i=1}^{N} \tilde{w}_{i,t-1}^f R_{i,t} \,. \tag{2}$$

If a fund discloses its holdings in the previous month, then the weights of the individual asset classes depend on the number of stocks held by the fund (*N*) and the stock price (*P*):

$$\tilde{w}_{i,t-1}^f = \frac{N_{i,t-1}^f P_{i,t-1}}{\sum_{i=1}^{N} N_{i,t-1}^f P_{i,t-1}} \,. \tag{3}$$

On the other hand, if the holdings disclosure occurs more than one month prior to a specific month *t*, then we use the most recent holdings disclosed at time $t-\tau$ and update the weights assuming that the fund manager follows a buy and hold strategy:

$$\tilde{w}_{i,t-1}^f = \frac{N_{i,t-\tau}^f P_{i,t-\tau} \prod_{j=1}^{\tau-1}\left(1+R_{i,t-j}\right)}{\sum_{i=1}^{N} N_{i,t-\tau}^f P_{i,t-\tau} \prod_{j=1}^{\tau-1}\left(1+R_{i,t-j}\right)} \,. \tag{4}$$

Based on the above, we define the return gap (*RG*) as a difference between net and gross returns after adjusting for expenses:

$$RG_t^f = RF_t^f - (RH_t^f - EXP_t^f) \,. \tag{5}$$

We adjust the difference in investor returns and holdings returns for expenses, because mutual funds have to disclose their expenses to their shareholders on a regular basis.

As mentioned in the introduction, the investor returns and holdings returns have been previously compared by Grinblatt and Titman (1989), Wermers (2000), Frank, Poterba,

Shackelford, and Shoven (2004), and Meier and Schaumburg (2004). Meier and Schaumburg (2004) compute the difference between the investor returns and the hypothetical returns based on both the previous and the future holdings to investigate the prevalence of window-dressing in the mutual fund industry. In our paper, we report test results using the previously disclosed portfolio holdings to compute the holdings returns. We do not discuss the return gap using forward-looking holdings because we want to compare the actual net fund returns to the returns of a passive strategy that continues to hold the previously disclosed securities.[6]

The return gap captures the unobserved actions of funds, which include hidden costs and interim trading benefits to their shareholders:

$$\begin{aligned} RG_t^f &= Unobserved \;\; Actions_t^f = \\ &= Interim \;\; Trades_t^f - Hidden \;\; Costs_t^f \end{aligned} \tag{6}$$

Following Ferson and Khang (2002), we term one component of the unobserved actions the interim trading benefits of a fund. The interim trading benefits depend primarily on the profitability of the intermediate trades of a fund. Even though we can observe fund holdings only at specific points in time, funds may trade actively between these disclosure dates. If these interim trades create value, then the return of the fund (*RF*) will increase, while the return of the disclosed holdings (*RH*) will remain unaffected. For example, if a fund purchases a well-performing stock, then the abnormal return will only be reflected in the return of the fund and not in the holdings return until the stock position is disclosed. Furthermore, if a fund obtains an IPO

[6] In unreported tests, we also compute hypothetical portfolio returns based on the future holdings. We find that these forward-looking holding returns are, on average, about three percentage points per year higher than the backward-looking holdings returns, because many mutual funds tend to invest in stocks that recently performed well either because they follow momentum strategies or because they window-dress their portfolios toward recent winners. We also find that the forward-looking holdings return is less correlated with the reported return than the backward-looking holdings return, indicating that the backward-looking return is a better proxy of the effective holdings of a fund than the forward-looking return. We do not discuss these forward-looking holdings returns in more detail because of potential look-ahead biases.

allocation, then the interim trading benefit will be positive on the first trading day if the market price of a newly listed stock increases relative to its IPO allocation price.

The other component of the unobserved actions is the hidden costs of a fund, which include trading costs, commissions paid by the mutual fund to brokers, and potential agency costs. For example, funds that are subject to a higher price impact or funds that are exposed to higher commissions will have higher hidden costs.

Neither the hidden costs nor the interim trading benefits of a mutual fund are observable, and therefore it is not possible to fully disentangle hidden costs and interim trading benefits. Thus, the primary interest of this study is the overall impact of unobserved actions. By analyzing the sign and the magnitude of the return gap, we can infer their relative importance for a given fund. Given that unobserved actions may have an impact on fund return one would expect that such actions, if persistent in a fund strategy, would have a significant predictive power for fund performance.

1.2. Data and Summary Statistics

Our sample is an updated version of the data used in Kacperczyk, Sialm, and Zheng (2005) and covers the time period between 1984 and 2003. The main set of data has been created by merging the CRSP Survivorship Bias Free Mutual Fund Database with the CDA/Spectrum holdings database and the CRSP stock price data.

The CRSP Mutual Fund Database includes information on fund returns, total net assets, different types of fees, investment objectives, and other fund characteristics. The CDA database provides stockholdings of mutual funds. The data are collected both from reports filed by mutual funds with the SEC and from voluntary reports generated by the funds. During most of our

sample period, funds are required by law to disclose their holdings semi-annually. Nevertheless, about 49 percent of funds in our sample disclose their holdings quarterly.[7] Another 4.6 percent of our observations with valid CRSP data do not have available holdings data during the previous six months. In these cases, we compute the hypothetical holdings returns using the most recently available portfolio disclosures, assuming that fund managers follow buy and hold strategies between disclosure periods. We link each reported stock holding to the CRSP stock database.

We start our matching process with a sample of all funds in the CRSP database. The focus of our analysis is on open-end domestic equity mutual funds, for which the holdings data are most complete and reliable. For that reason, we eliminate balanced, bond, money market, international, and sector funds, as well as funds not invested primarily in equity securities. Since different share classes have the same holdings composition, we aggregate all the observations pertaining to different share classes into one fund level observation.[8] We also exclude funds which hold less than 10 stocks and those which in the previous month manage less than $5 million. Appendix A describes the details of the sample selection process.

Our database does not include detailed information on the holdings of non-equity asset classes, such as cash holdings, bonds, and other asset classes. To mitigate this problem, we focus on domestic stock funds, primarily invested in common stocks, as described before. We also compute in each time period the proportion of the total fund value invested in five different classes of assets – equity, bonds, cash, preferred stocks, and other – and adjust the holdings returns to reflect non-equity holdings in the fund portfolio, as is further described in Appendix B.

[7] Ge and Zheng (2005) investigate both the determinants and potential effects of portfolio disclosure frequency by comparing funds providing quarterly voluntary disclosure to funds providing only mandatory semiannual disclosure.
[8] For most variables, we use a value-weighted average for the fund level observation. For fund age, we use the maximum of all share classes.

Table 1 reports summary statistics of the main fund attributes. Our sample includes 2,543 distinct funds and 211,001 fund-month observations. Due to the substantial growth in the mutual fund industry over the last 20 years, we have significantly more funds in the more recent years of our sample period. The number of funds ranges from 244 (January 1984) to 1,816 (April 2002).

We report summary statistics on fund total net assets (TNA), age, expenses, turnover, loads, the proportion of money invested in equity securities, and the new money growth. We define New Money Growth (*NMG*) as the growth rate of the assets under management (*TNA*) after adjusting for the appreciation of the assets of a mutual fund (R^f) assuming that all the cash flows are invested at the end of the period: [9]

$$NMG_t^f = \frac{TNA_t^f - TNA_{t-1}^f\left(1+R_t^f\right)}{TNA_{t-1}^f}. \tag{7}$$

1.3. Quantifying the Return Gap

In this section, we quantify the return gap for funds included in our sample. Table 2 presents the value and the equally weighted averages of the return gap for our sample of funds between 1984 and 2003. In the first row of Panel A (Panel B) of Table 2, we report the value-weighted (equally weighted) time-series averages, along with their corresponding standard errors in parentheses.

The average net investor return, reported in Panel A, is equal to 0.988 percent per month or about 11.86 percent per year. On the other hand, the average return of a hypothetical portfolio that invests in the previously disclosed holdings amounts to 1.071 percent per month. The difference between the investor and the holdings return (i.e., the return gap before expenses)

[9] For most of our sample period, we have *TNA*s available at a monthly frequency. However, until 1990 the *TNA* has only been available at a quarterly frequency. In this case, we compute the quarterly new money growth and divide it equally across the three months in each quarter. To diminish the impact of extreme outliers, we winsorize this variable at the one percent level.

comes to –8.3 basis points per month or –1.0 percent per year. The average value-weighted expense ratio equals 0.07 percent per month or about 0.88 percent per year. The return gap after adjusting for disclosed expenses equals –1.0 basis points per month and is not significantly different from zero. Likewise, if we use equally weighted portfolio returns instead, the average return gap after expenses equals 1.1 basis points per month and is again not significantly different from zero, as reported in Panel B. In summary, we find that, in the aggregate sample, the return gap is very small, which is equivalent to saying that hidden costs are similar in magnitude to the benefits of interim trades.

To examine whether the return gap is correlated with any risk or style factors, in Table 2 we summarize the abnormal returns and the factor loadings using the one-factor CAPM, the Fama and French (1993) three-factor, and the Carhart (1997) four-factor model. The Carhart model has the following specification:

$$R_{i,t} - R_{F,\,t} = \alpha_i + \beta_{i,M}(R_{M,t} - R_{F,t}) + \beta_{i,SMB}\,SMB_t + \beta_{i,HML}\,HML_t + \beta_{i,MOM}\,MOM_t + e_{i,t}, \qquad (8)$$

where the dependent variable is the quarterly return on portfolio i in quarter t minus the risk-free rate, and the independent variables are given by the returns of the following four zero-investment factor portfolios. The term $R_{Mt} - R_{Ft}$ denotes the excess return of the market portfolio over the risk-free rate;[10] *SMB* is the return difference between small and large capitalization stocks; *HML* is the return difference between high and low book-to-market stocks; and *MOM* is the return difference between stocks with high and low past returns.[11] The intercept of the model, α_i, is the Carhart measure of abnormal performance. The CAPM model uses only the market factor, and

[10] The market return is calculated as the value-weighted return on all NYSE, AMEX, and NASDAQ stocks using the CRSP database. The monthly return of the one-month Treasury bill rate is obtained from Ibbotson Associates.
[11] The size, the value, and the momentum factor returns were taken from Kenneth French's Web site http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library.

the Fama and French model uses the first three factors. Based on the results in Table 2, we conclude that the general conclusions regarding the return gap are not affected if we account for return components that are due to common risk or style factors in fund returns.

1.4. Persistence of the Return Gap

Many features of the unobserved actions indicate that such actions should be persistent. For example, if fund governance is weak in one period because of stale price arbitrage or cross-subsidization, it is likely to remain poor in the next period.

To test this hypothesis formally, we sort all funds in our sample into deciles according to their lagged return gap and compute the average return gap during the subsequent month by weighting all funds in each decile equally. Table 3 reports the raw and the abnormal four-factor return gap of decile portfolios formed according to the average return gap during the previous one-, three-, and five-year interval. The first column shows that funds in the worst return gap decile, based on the previous 12 months, generate an average return gap before expenses of –11.3 basis points in the subsequent month. On the other hand, funds in the best return gap decile generate an average return gap of 15.4 basis points. The difference in the return gap between the two extreme deciles and between the top five and the bottom five deciles is economically and statistically highly significant. Furthermore, the average return gaps are almost monotonic for the deciles, as is indicated by the high value of the Spearman rank correlation coefficient.

The persistence pattern remains similar if we sort funds according to longer-term past return gaps, as shown in the second and the third columns. The last three columns indicate that the persistence findings remain unchanged, even if we adjust the fund returns for the four common factors of Carhart (1997). These results show that funds with positive return gaps tend

to have persistently higher interim trading benefits than hidden costs. The opposite is true for funds with negative return gaps.[12]

To provide evidence on long-term stability of the observed patterns, we also track the persistence of the return gap over the subsequent five years and compute the respective average monthly return gap. Figure 1 depicts the future return gaps for decile portfolios formed according to the average return gap during the 12 months prior to the portfolio formation. Panel A reports the raw return gap, while Panel B additionally adjusts the gap for common factors in stock returns. The figure demonstrates that the raw return gap is also remarkably persistent over longer time periods. The ranking of the decile portfolios, based on the raw return gap, in the year after the formation period remains identical to that in the formation period. Although we find some evidence for reversion towards the mean for the extreme deciles, the persistence of both top and bottom performers remains over the longer term.[13]

Carhart (1997) shows that performance persistence is not significant for well-performing funds after one accounts for possible momentum effects.[14] Contrary to his finding regarding the lack of persistence using four-factor alpha, we find that the abnormal return gap remains persistent in both tails of the return gap distribution even after controlling for momentum and other common factors in stock returns, as shown in Panel B. Hence, our results cannot be fully explained by differences in common factors in interim trading benefits. One reason may be that

[12] Persistent return gaps might result just because of persistent differences in the disclosure frequencies of mutual funds. However, this potential problem does not affect our persistence results. We continue to find significant levels of persistence if we only consider funds that disclosed their holdings within the last three months and ignore funds that did not disclose their holdings during the last three months.

[13] The return gaps in the first period after the portfolio formation differ between Figure 1 and Table 3 because they cover a different estimation window. Figure 1 gives the average return gap over the whole *year* after the portfolio formation, while Table 3 reports the monthly return gap in the *month* after the portfolio formation to avoid overlapping observations. For example, funds in the top return gap decile based on the previous 12 months have an average return gap of 15.4 basis points during the first month after the portfolio formation (Table 3) and an average monthly return gap of 12.1 basis points during the first year after the portfolio formation (Figure 1).

by measuring the investor returns relative to the holding returns we filter out the impact of common shocks to both returns and thus are able to focus on a more persistent component of fund returns.

2. Predictability of Future Fund Performance

Until now, we have provided evidence that the return gap has interesting properties that are consistent with its potential of being a good predictor of future fund performance. In this section, we test the main hypothesis of our paper, i.e., whether unobserved actions indeed contain valuable information that could be used to predict future fund performance. Given that the return gap is a persistent phenomenon, we should expect that funds with higher return gaps (i.e., those with more beneficial unobserved actions) outperform funds with lower return gaps in the future.

2.1. Trading Strategy Using the Return Gap

Our first predictability test examines the performance of a trading strategy based on the past return gap. Specifically, we sort all funds in our sample into deciles, according to their average lagged return gap during a one-year period. Subsequently, we compute the average returns in the following month by weighting all the funds in a decile equally.

In general, the holdings are not disclosed immediately after the effective holdings date. For example, Frank, Poterba, Shackelford, and Shoven (2004) document that funds publicly disclose their holdings with a time delay. In light of their findings, we introduce an additional three-month lag in the return gap before implementing a trading strategy. This implies that the return of the tenth decile portfolio in January 2003 is based on the 10 percent of funds that had

[14] See Hendricks, Patel, and Zeckhauser (1993); Brown and Goetzmann (1995); Elton, Gruber, and Blake (1996);

the highest return gap between October 2001 and September 2002. Including this additional implementation lag reduces the profitability of our trading strategy slightly, because there appears to be a mean-reversion in the return gap, as indicated in Figure 1.

In Table 4, we report the risk- and style-adjusted net returns for each decile portfolio. Funds in the first decile have an average return gap of –59.8 basis points per month during the 12 months prior to the portfolio formation. On the other hand, funds in the tenth decile have an average return gap of 65.7 basis points per month during the formation period.

The first five performance measures are based on the fund-reported returns, and the last two measures are based on the fund holdings returns. The first column reports excess returns of the deciles relative to the market portfolio. The next four columns report the intercepts from a time-series regression based on the one-factor CAPM model, the three-factor model of Fama and French (1993), the four-factor model of Carhart (1997), and the conditional four-factor model of Ferson and Schadt (1996).[15] The two holding-based performance measures are the selectivity measure (CS) of Daniel, Grinblatt, Titman, and Wermers (DGTW) (1997) and the benchmark-free performance measure of Grinblatt and Titman (GT) (1993).[16]

We observe that funds with the most favorable past return gaps (decile ten) tend to significantly outperform funds with the least favorable past return gaps (decile one) in the subsequent month. Investing in the decile-ten funds would have generated an additional excess

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Carhart (1997); Bollen and Busse (2005); and Mamaysky, Spiegel, and Zhang (2005) for studies on the persistence of mutual funds.

[15] For the Ferson and Schadt (1996) conditional model, we regress the return of a portfolio of mutual funds on the four Carhart (1997) factors and interaction terms between the four factors and five demeaned lagged macro-economic variables. Consistent with the previous studies, we consider the following five macro-economic variables: the one-month Treasury bill yield, the dividend yield of the S&P 500 Index, the Treasury yield spread (long- minus short-term bonds), the quality spread in the corporate bond market (low- minus high-grade bonds), and an indicator variable for the month of January.

[16] The benchmark returns for the DGTW performance measures were obtained from Russ Wermer's Web site at http://www.smith.umd.edu/faculty/rwermers/ftpsite/Dgtw/coverpage.htm. The benchmark assignments are

return of 28.4 basis points per month or about 3.41 percent per year compared to investing in the decile-one funds. The relationship between past return gaps and future performance is highly monotonic, which is confirmed by the high value of the Spearman rank correlation.[17] Our results are not influenced substantially by the variation in the risk or style factors, as reported in the next three columns. Also, controlling for the conditioning macroeconomic information, as suggested by Ferson and Schadt (1996), does not adversely affect our findings.[18]

The results, though still statistically significant, become a little weaker if we consider the remaining two, holding-based measures. This is plausible since the holdings returns do not reflect any of the factors that drive the hidden costs of mutual funds and also ignore the interim trading benefits. Nevertheless, these results still show a positive relationship between the holding-based performance measures and the return gap, thus indicating that funds that appear to have skills based on their disclosed trades also tend to have more favorable return gaps. Panel A of Figure 2 presents a graphical illustration of the results discussed above.

All the performance measures for the top decile funds are positive, but many are not statistically significantly positive. However, the trades of these funds create value that compensates investors at least for the expenses and the trading costs of the funds. Thus, our results indicate that the top decile funds perform at least as well as passive benchmarks even after adjusting for portfolio management costs.

To analyze the time-series performance of this trading strategy, we compute the average annual returns of each decile in each year. In the untabulated results, we find that the top five

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conducted as described on page 7 of Wermers (2004), which is a slight modification to the original assignments in Daniel, Grinblatt, Titman, and Wermers (1997).

[17] The results are qualitatively unaffected if we compute the average returns over the entire year after the portfolio formation, as opposed to calculating them in the subsequent month after the portfolio formation. We report the latter to avoid overlapping return observations.

return gap decile funds outperform the bottom five return gap decile funds in 18 of 20 years (all years except 1992 and 2003), indicating that the relationship between the return gap and future performance is relatively stable over time.

The spread in the adjusted performance widens further if we form 20 portfolios based on the lagged return gap. The difference in the excess return relative to the market between the top and the bottom five percent of funds amounts to 38.5 basis points, as compared to 28.4 basis points for the difference in the decile portfolios. The difference in the Carhart abnormal returns between extreme portfolios also increases from 22.4 to 34.4 basis points per month using 20 instead of 10 return gap portfolios.

Investors cannot short-sell mutual funds, and therefore it is not feasible for them to obtain the returns given by the difference between the top and the bottom deciles. However, by conditioning on the return gap investors can avoid potential losses that are proportional to the return differences between the deciles.

2.2. Trading Strategy with Back-Testing

In a recent study, Mamaysky, Spiegel, and Zhang (2005) provide empirical evidence that previous performance studies are plagued by estimation problems. Since many sorting criteria are measured with noise, the top and the bottom deciles of a trading strategy might not just be populated by the best and the worst funds, but also by funds which have the highest estimation errors. To alleviate this problem, they suggest using a back-testing technique, in which the statistical model is required to exhibit some past predictive success for a particular fund before it is used to make predictions in the current period. They show that a strategy that uses modest ex-

[18] Farnsworth, Ferson, Jackson, and Todd (2002) show that many stochastic discount factor models have a mild negative bias when performance is neutral. The average bias is about -0.19% per month for the unconditional

ante filters to eliminate funds whose parameters likely derive primarily from estimation errors produces very significant out of sample risk-adjusted returns.

Motivated by their study, we apply a back-testing technique with the view of eliminating the funds with the most severe measurement errors. In the first step, we sort all funds into deciles according to their average return gap between 15 and four months prior to the portfolio formation month. This sort yields exactly the same portfolios as those described in Table 4. In addition, we require that the average reported excess return of a fund relative to the market during the three months immediately prior to the portfolio formation has the same sign as the lagged return gap. Thus, funds are only considered in the trading strategy if there is a concordance between the lagged return gap and the lagged excess return.

Our results – summarized in Table 5 – show that the performance difference between the top and the bottom return gap decile portfolios widens dramatically for all performance measures. For example, the difference in the abnormal four-factor return increases from 22.4 basis points per month to 54.6 basis points per month. We also observe that the differences in the two holding-based performance measures become larger and statistically more significant.

After filtering out funds that are more likely to suffer from measurement problems, we find that the funds in the top return gap decile perform particularly well. The abnormal returns of the top decile range between 1.12 (Ferson-Schadt) and 4.67 (Fama-French) percent per year. All abnormal returns are now significantly positive except for the Ferson and Schadt measure.

2.3. Trading Strategies Using Alternative Selection Criteria

To check the robustness of our results, Table 6 reports the abnormal four-factor returns of decile portfolios of mutual funds based on various portfolio formation criteria. Panel A reports the

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models and -0.12% per month for conditional models.

results formed by sorting the mutual funds according to different measures of the return gap, and Panel B also includes the findings based on the back-testing method suggested by Mamaysky, Spiegel, and Zhang (2005).

The first columns of Panels A and B simply repeat as a benchmark the performance differences of portfolios formed according to the return gap and are therefore identical to the performance measures in the fourth columns of Tables 4 and 5. The second and the third columns report the performance results by forming portfolios using the return gaps over the previous 36 and 60 months as the portfolio formation criterion. The results remain qualitatively unaffected using the alternative formation windows.

The fourth columns report results sorting funds according to their return gap before expenses, which is defined as the raw return gap minus the monthly expenses. This measure corresponds to the total gap between investor returns and hypothetical holdings returns. Taking into account expenses improves the performance of decile ten relative to decile one only slightly.

Finally, in calculating returns on our strategies we do not take into account the loads that need to be paid to purchase respective funds. Perhaps high return gap funds also have high loads, which subsequently could reduce overall performance of the proposed strategies. To assess the robustness of our results to this possibility we exclude load funds and form decile portfolios based on the return gap. The results remain qualitatively similar to our earlier evidence and are summarized in the last column.

2.4. Regression Approach

This section uses a pooling regression approach to confirm that the return gap has a predictive power for future excess and abnormal returns, controlling for other fund-specific characteristics.

Table 7 summarizes the estimates of the coefficients with the dependent variables being the excess return of a mutual fund about the market return, the one-factor abnormal return, the three-factor Fama and French (1993) abnormal return, and the four-factor Carhart (1997) abnormal return, respectively. The factor loadings are estimated by regressing the fund returns on the common factors during a 36-month window prior to the relevant monthly observation. Thus, the abnormal return regressions have fewer observations than the excess return regression. In addition, all regressions include time fixed effects and the standard errors are corrected for clustering by time.[19] We take the natural logarithms of the age and size variables to mitigate the impact of right skewness in the distributions of both variables.

The results, reported in Table 7, demonstrate that the return gap has an important impact on future fund performance, even after controlling for other fund characteristics and for time fixed effects. For example, using a four-factor model, a one standard deviation increase in the past return gap (0.44 percent per month) increases the future fund return by approximately 9.49 basis points per month or about 1.14 percent per year. Lagged expenses and lagged excess holdings returns also exhibit a significant impact on the three- and four-factor adjusted returns. For example, a one standard deviation increase in monthly expenses (0.04 percent per month) decreases the four-factor abnormal return by 7.63 basis points, and a one standard deviation increase in excess holdings return (1.21 percent per month) increases the four-factor abnormal return by 17.61 basis points per month.

The sign of the remaining coefficients is consistent with the existing evidence. For example, we find a negative relationship between size and fund performance, confirming Chen, Hong, Huang, and Kubik's (2004) diseconomies of scale argument. On the other hand, age,

[19] We also compute the coefficient estimates using the Fama and MacBeth (1973) methodology. Since the results do not differ significantly across the two methods, for brevity, we only report results using a pooling regression. A

turnover, and the index fund indicator variable play a secondary role.[20] We conclude that apart from other characteristics, such as past returns, expenses, turnover, TNA, and age, fund investors also should take into account the return gap when selecting funds.

3. Determinants of the Return Gap

This section provides further justification for using the return gap as a measure for unobserved actions by looking at its association with various indicators related to hidden costs and benefits applying a multivariate regression framework. We find that the return gap has a significant cross-sectional variation and is related to many factors that proxy for unobserved actions.

We analyze the different determinants using a pooling regression of the return gap on the various fund characteristics. Each regression additionally includes time fixed effects. We estimate the pooling regressions with clustered standard errors to account for a possible contemporaneous correlation structure.[21]

Table 8 summarizes the regression results for four specifications. The first two columns use the raw return gaps as the dependent variables, whereas the last two columns use the abnormal four factor-adjusted return gaps as the dependent variables. Like in the previous section, we use three years of past monthly return gaps to estimate the coefficients of the four-factor Carhart (1997) model. Subsequently, we subtract the expected return from the realized fund return to determine the abnormal return gap of a fund in each month. Given that the risk-adjusted measure of each individual fund requires at least three years of data we lose the first three years of fund returns. Furthermore, two specifications include the mutual fund family size

comparison of the two methods can be found in Petersen (2005).

[20] We identify index funds by their names using the CRSP mutual fund data set.

[21] The results using Fama and MacBeth's (1973) methodology are similar and available upon request.

as an additional variable. This variable is available from the CRSP mutual fund database only after 1991.

The first variable we consider is the trading costs of a mutual fund. We follow Wermers (2000) and compute the execution costs of mutual funds, based on the results of Keim and Madhavan (1997), who use proprietary data to compute total execution costs (commissions and market impact) for a sample of institutional investors between 1991 and 1993. Keim and Madhavan (1997) estimate the cross-sectional dependence of total institutional trading costs on the market in which a stock is traded, the size of the trade, the market capitalization, the price of the stock, and whether the trade is a purchase or sell transaction. In Appendix C, we describe the procedure to estimate the trading costs in more detail. We estimate average execution costs to be at 5 basis points per month or at about 0.60 percent per year. Our estimates of trading costs are consistent with the estimates in Wermers (2000) during the periods when both data overlap. The magnitude of our trading costs also is consistent with the magnitude of trading costs estimated by Chalmers, Edelen, and Kadlec (1999), who use spread costs and commission costs for a sample of 132 funds between 1984 and 1991. In particular, between 1984 and 1991 we obtain trading costs of 0.72 percent as compared to 0.78 percent documented in their study.

Funds with higher trading costs should perform worse, unless the interim trading benefits offset their trading costs. We document a negative relationship between trading costs and the return gap both before and after adjusting for common risk factors. The coefficient estimates on the trading costs are statistically significantly different from zero, but they are not significantly different from –1. A coefficient of –1 implies that an increase in the trading costs of 10 basis points also will reduce the return gap by 10 basis points. Thus, as expected, trading costs have an important impact on the return gap.

Another variable we consider is the fund IPO allocations. Due to their incentive to maximize family level profit, fund families may allocate IPOs strategically to subsidize certain funds in the family (Nanda, Wang, and Zheng, 2004; Nimalendran, Ritter, and Zhang, 2004; Gaspar, Massa, and Matos, 2005; Reuter, 2005). As a result, we expect funds that obtain more IPO allocations to exhibit a more favorable return gap since the IPO allocations tend to be significantly underpriced. Although we do not know which funds obtain IPO allocations directly, we observe stocks that go public and are subsequently held by mutual funds. On each disclosure date, we compute the weight of companies that went public and are held by a fund. The fund might have obtained these stocks through an IPO allocation or it might have obtained them on the open market subsequent to the IPO. An average mutual fund holds 1.3 percent of its assets in companies that went public during the previous disclosure period. The median proportion of IPO stocks held is close to zero, and a relatively small fraction of funds account for most of the IPO holdings.

We find a strong relationship between this variable and the return gap, indicating that funds that own stocks immediately after they go public have particularly favorable return gaps during this time interval. This result is consistent with the hypothesis that these funds obtain favorable IPO allocations, which result in significant first-day trading profits. The coefficient estimate implies that a one-percent increase in holding of IPO stocks increases the return gap by 23.3 basis points, which is generally consistent with the average underpricing during this time period.[22] The IPO variable remains significant, even after adjusting the return gap for common factors in fund returns using the Carhart (1997) model.

[22] For example, Ritter and Welch (2002) show that the average first-day return of IPOs between 1980 and 2001 amounts to 18.8 percent.

The third variable that we consider measures the transparency of the holdings disclosure and is defined as the correlation coefficient between monthly holdings and investor returns during the previous year. We argue that funds with a lower correlation between holdings and investor returns tend to follow investment strategies that are more opaque. Investigating unobserved actions of these funds is thus of considerable importance. The low correlation can result from high turnover and from window dressing, which is a fairly common practice in the mutual fund sector, as described by Meier and Schaumburg (2004). If the low correlation is due to agency problems, then we should observe low-correlation funds to perform worse. On the other hand, if the low correlation is driven by managers opting to hide their valuable investment ideas, then we should find that low-correlation funds perform better. We find a significantly positive relationship between the correlation and the return gap. This result suggests that the opaqueness of a fund might be a good proxy for agency problems, which, in turn, adversely affect the fund performance.

Next, we examine the relationship between the return gap and other fund characteristics that the existing literature has shown to affect fund returns, including fund expenses, turnover, size, age, expenses, new money growth, the standard deviation of the fund returns, holdings characteristics of the funds, and an indicator variable for index funds. We observe that funds do not compensate for their higher expenses by either having lower hidden costs or higher interim trading benefits. In fact, we find a significantly negative relationship between expenses and the raw return gap.

An alternative way to assess the impact of trading activities is to look at the relationship between turnover and the return gap. We do not find a significant relationship between turnover and the return gap. An insignificant correlation between turnover and the return gap, however,

does not necessarily imply that trading costs are not significantly related to turnover. It is possible that portfolio turnover also has a positive association with the interim trading benefits. For example, existing studies (e.g., Pástor and Stambaugh, 2002) argue that turnover may proxy for the unobserved managerial skills. Consequently, these two effects may be offsetting each other.

Consistent with Chen, Hong, Huang, and Kubik (2004), we find that smaller funds and larger fund families tend to exhibit more favorable return gaps.[23] We find that the age of a fund is negatively related to its return gap. However, the effect of age on the return gap is relatively small. Consistent with the "smart-money" effect in Gruber (1996) and Zheng (1999), we find a significant and positive relationship between the mean lagged money flow and the return gap. It has been shown in the literature that liquidity demand of investors can negatively affect fund performance.[24] However, we do not find a significant relationship between the volatility of the fund returns and the return gap.

The characteristics of the stocks held by a fund may have a significant impact on the return gap. To capture potential style differences between mutual funds we follow Kacperczyk, Sialm, and Zheng (2005) and group the holdings according to their size, value, and momentum characteristics. Each stock traded on the major U.S. exchanges is grouped into respective quintiles according to its market value, its book-to-market ratio, and the lagged one-year return. Subsequently, using the quintile information, we compute the value-weighted size, value, and momentum score for each mutual fund in each period.[25] For example, a mutual fund that invests

[23] In their theoretical models, Nanda, Narayanan, and Warther (2000) and Berk and Green (2004) exploit the notion of decreasing returns to scale of mutual funds.

[24] See, for example, Edelen (1999); Goetzmann, Ivkovic, and Rouwenhorst (2001); Rakowski (2002); Zitzewitz (2003); Johnson (2004); and Nanda, Wang, and Zheng (2005).

[25] The book-to-market and the momentum quintiles are formed by dividing the stocks equally into the five groups. On the other hand, the size quintiles are formed by using cut-offs from the NYSE only.

only in stocks in the smallest size quintile would have a size score of 1, while a mutual fund that invests only in the largest size quintile would have a size score of 5.

The regression results indicate that funds focusing on large and momentum stocks tend to have worse return gaps before and after controlling for the four Carhart (1997) risk factors. This result might be caused by the fact that profitable interim trading opportunities are less prevalent or hidden costs are higher in these style classes.

In unreported tests, we also investigate whether funds that turn over their portfolios between different industries and styles exhibit superior or inferior return gaps. However, we do not find a significant relationship between the return gap and the industry or the style turnover.

Finally, we find that index funds tend to have worse return gaps than actively managed funds.[26] Index funds have only very limited opportunities to create value through interim trades, and the return gap reflects primarily the hidden costs of fund management.

4. Conclusions

Mutual fund investors must make investment decisions based on publicly available information. It is well known that market participants cannot entirely observe several fund actions. These actions may benefit or hurt investors, thus, learning about them may help investors to evaluate funds more accurately.

In this paper, we analyze the impact of the unobserved actions on the fund performance using a large sample of U.S. equity mutual funds between 1984 and 2003. We estimate the impact of unobserved actions by taking the difference between the net investor returns and the

[26] This result is driven primarily by small index funds. The Vanguard 500 Index Fund, which has been the largest index fund, has an average positive return gap of 0.66 basis points per month, whereas other index funds have an average return gap of -1.93 basis points per month. The surprisingly large heterogeneity in index funds has been described by Elton, Gruber, Busse (2004) and Hortacsu and Syverson (2004).

buy and hold returns of the portfolio disclosed in the most recent past. This difference – termed the return gap – presents us with several interesting findings. First, the effect of unobserved actions is persistent in the long run both for bottom and top performing funds. Second, funds differ substantially with respect to the impact of such actions. Most important, the cross-sectional difference in unobserved actions has a significant predictive power for future performance, indicating that funds with value-enhancing unobserved actions outperform funds whose unobserved actions predominantly reflect hidden costs.

Our paper offers several implications for the mutual fund industry. First, fund investors can make more informed fund selection decisions if they take into account the unobserved actions of mutual funds. Second, the existence of systematic differences in the scope of the unobserved actions among funds raises concerns for funds with persistently large negative return gaps. This is especially important in light of the fact that funds with negative actions adversely affect investors' return on funds.

APPENDIX

A. Sample Selection

We start our matching process with a sample of all mutual funds in the CRSP mutual fund database covering the period between 1984 and 2003. The focus of our analysis is on domestic equity mutual funds, for which the holdings data are the most complete and reliable. As a result, we eliminate balanced, bond, money market, sector, and international funds, as well as funds not invested primarily in equity securities. We base our selection criteria on the objective codes and on the disclosed asset compositions. First, we select funds with the following ICDI objectives: AG, GI, LG, or IN. If a fund does not have any of the above ICDI objectives, we select funds with the following Strategic Insight objectives: AGG, GMC, GRI, GRO, ING, or SCG. If a fund has neither the Strategic Insight nor the ICDI objective, then we go to the Wiesenberger Fund Type Code and pick funds with the following objectives: G, G-I, AGG, GCI, GRI, GRO, LTG, MCG, and SCG. If none of these objectives are available and the fund has the CS policy (Common Stocks are the mainly held securities by the fund), then the fund will be included. We exclude funds that have the following Investment Objective Codes in the Spectrum Database: International, Municipal Bonds, Bond and Preferred, and Balanced. Since the reported objectives do not always indicate whether fund portfolio is balanced or not, we also exclude funds that, on average, hold less than 80 percent or more than 105 percent in stocks.

Elton, Gruber, and Blake (2001) and Evans (2004) identify a form of survival bias in the CRSP mutual fund database, which results from a strategy used by fund families to enhance their return histories. Fund families might incubate several private funds and they will only make public the track record of the surviving incubated funds, while the returns for those funds that are terminated are not made public. To address this incubation bias, we exclude the observations

where the year for the observation is prior to the reported fund starting year and we exclude observations where the names of the funds are missing in the CRSP database. Data may be reported prior to the year of fund organization if a fund is incubated before it is made publicly available; and these funds might not report their names or some other fund attributes, as shown by Evans (2004). Incubated funds also tend to be smaller, which motivates us to exclude funds that had in the previous month less than $5 million in assets under management.

In the next step, we are able to match about 94 percent of the CRSP funds to the Spectrum database. The unmatched funds tend to be younger and smaller than the funds for which we find data in Spectrum. As previously mentioned by Wermers (2000), the Spectrum data set often does not have any holdings data available during the first few quarters listed in the CRSP database.

Mutual fund families introduced different share classes in the 1990s, as discussed in Nanda, Wang, and Zheng (2004). Since different share classes have the same holdings composition, we aggregate all the observations pertaining to different share classes into one observation. For the qualitative attributes of funds (e.g., name, objectives, year of origination), we retain the observation of the oldest fund. For the total net assets under management (TNA), we sum the TNAs of the different share classes. Finally, for the other quantitative attributes of funds (e.g., return, expenses, loads), we take the weighted averages of the attributes of the individual share classes, where the weights are the lagged TNAs of the individual share classes. The aggregation of multiple share classes reduces our sample size to 3,171 unique funds.

For most of our sample period, mutual funds were required to disclose their holdings semi-annually. A large number of funds disclose their holdings quarterly, while a small number of funds have gaps between holding disclosure dates of more than six months. To fill these gaps,

we impute the holdings of missing quarters using the most recently available holdings, assuming that mutual funds follow a buy-and-hold strategy. In our sample, 72 percent of the observations are from the most recent quarter and less than 5 percent of the holdings are more than two quarters old. We exclude funds who have fewer than 10 identified stock positions and whose holdings are more than three quarters old. This final selection criterion reduces the number of mutual funds used in this study to 2,543 funds.

B. Non-Equity Holdings

The holdings database includes only common stock positions and excludes other non-equity holdings. Mutual funds in our sample invest on average 93.16 percent of their assets in equity securities and considerably less in cash or cash equivalents (5.51 percent). Finally, the percentage holdings of bonds (0.75 percent), preferred stocks (0.24 percent), and other assets (0.33 percent) are relatively minor.

To adjust fund holdings returns for the returns on the various asset classes, we proxy for the returns of these assets using published indices. For bonds, we use the total return of the Lehman Brothers Aggregate Bond Index, while for cash holdings we use the Treasury bill rate.[27] No reliable index returns are available for preferred stocks and for other asset classes. Thus, we assume that the return on preferred stocks equals the return of the Lehman Brothers Aggregate Bond Index, and the return on other assets equals the Treasury bill rate.[28]

[27] Data on the Lehman Brothers Aggregate Bond Index are obtained from Datastream, and the risk-free interest is obtained from French's Web site: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french .

[28] We also have tried two other methods of adjustment. In the first method, we calculate the implied returns on different asset classes in each month by regressing the return of a fund on the weights invested in the five asset classes (equity, bonds, preferred stocks, cash, and other). The coefficients are estimates of the imputed returns of the different asset classes. We find that these imputed returns are highly correlated with the returns of the corresponding index returns. The second method adjusts the returns by estimating abnormal returns using various factor models, such as the CAPM model, the three-factor model of Fama and French (1993), or the four-factor model of Carhart

C. Trading Costs

We follow Wermers (2000) in estimating the execution costs of mutual funds. He bases his estimate on Keim and Madhavan (1997), who provide fitted regressions for total institutional execution costs (commissions and market impact) for a sample of investors between 1991 and 1993. The execution costs are estimated separately for the costs of buying and selling stocks. The costs of buying or selling particular stocks are as follows:

$$C_{i,t}^{Buy} = 1.098 + 0.336 D_{i,t}^{Nasdaq} + 0.092 TradeSize_{i,t} - 0.084 Log(MktCap) + 13.807 \frac{1}{P_{i,t}} \quad (9)$$

$$C_{i,t}^{Sell} = 0.979 + 0.058 D_{i,t}^{Nasdaq} + 0.214 TradeSize_{i,t} - 0.059 Log(MktCap) + 6.537 \frac{1}{P_{i,t}} \quad (10)$$

The total costs (in percentage of the trade value) of a given purchase and sale transaction of stock *i* in quarter *t* are denoted by $C_{i,t}^{Buy}$ and $C_{i,t}^{Sell}$. *TradeSize* denotes the dollar value of a trade divided by the market capitalization of the stock; *MktCap* denotes the market capitalization of the stock (expressed in thousands); $P_{i,t}$ is the stock price; and $D_{i,t}^{Nasdaq}$ is an indicator variable of whether the stock is traded on NASDAQ. Monthly execution costs are obtained by dividing the quarterly costs equally over the three months.[29]

(1997). These models are believed to adjust appropriately for cash holdings or other factors captured in the various models. The results remain qualitatively unchanged if we use an alternative method.

[29] Unlike Wermers (2000), we do not adjust the trading costs by a year factor, since consistent measures of trading costs are not available for our whole sample period. However, our estimates of the trading results are not affected significantly if we adjust the trading costs with a year factor. One alternative specification we used to estimate trading costs adjusts the annual trading costs by the time-series of the aggregate execution costs on the different markets (NYSE and NASDAQ) from Stoll (1995) between 1984-1992 and the time-series of the execution costs between 1992-2004 as obtained from Abel/Noser. The means (standard deviations) of the two alternative measures of trading costs are very similar and equal 4.80 (5.52) basis points per month for the unadjusted measure and 5.02 (5.91) basis points for the adjusted measure using Stoll and Abel/Noser. The correlation between the two measures is 97.09 percent, indicating that the adjustment has a very minor impact on estimated trading costs.

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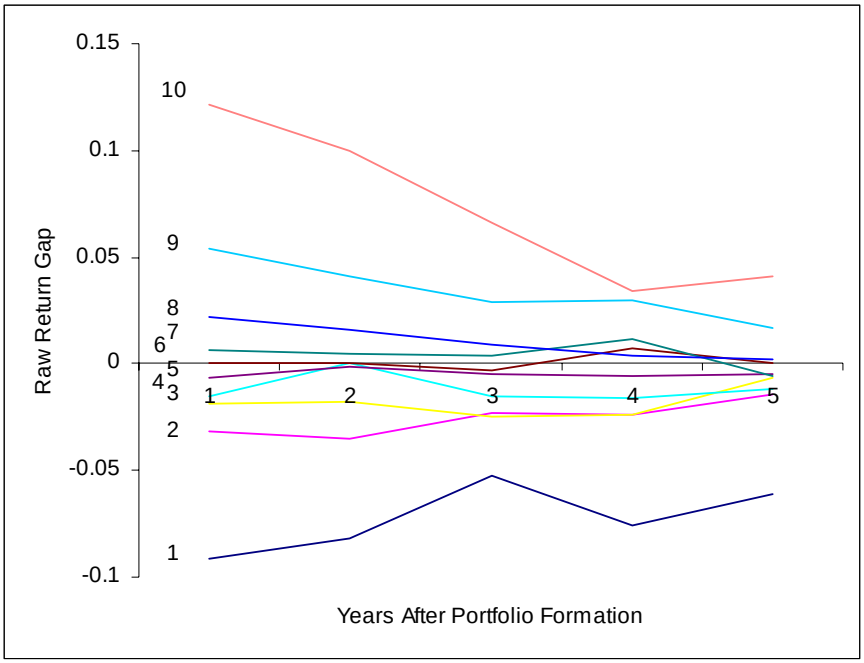
Figure 1
Persistence of the Return Gap

This figure depicts the average return gap of portfolios tracked over a five-year period for the period 1984 and 2003. The return gap is defined as the difference between the net investor return and the holding return of the portfolio disclosed in the previous period and is expressed in percent per month. The portfolios are formed by sorting all the funds into deciles according to their initial return gap during the previous year. Subsequently, each portfolio is tracked over the next five-year period. In Panel A, we report the raw return gap, and in Panel B we report the return adjusted for the four factor Carhart (1997) model.

Panel A: Persistence in the Return Gap



Panel B: Persistence in the Four-Factor Abnormal Return Gap

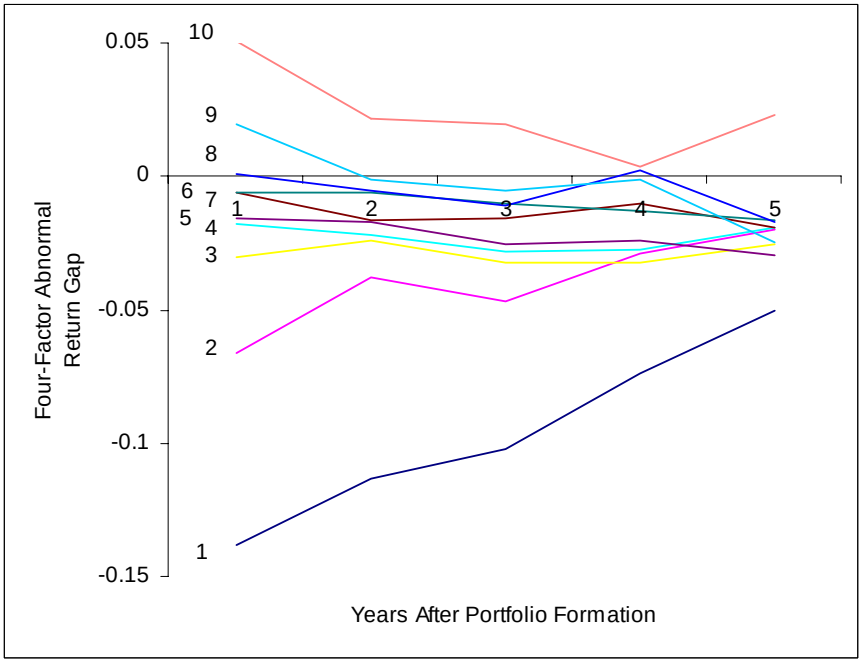
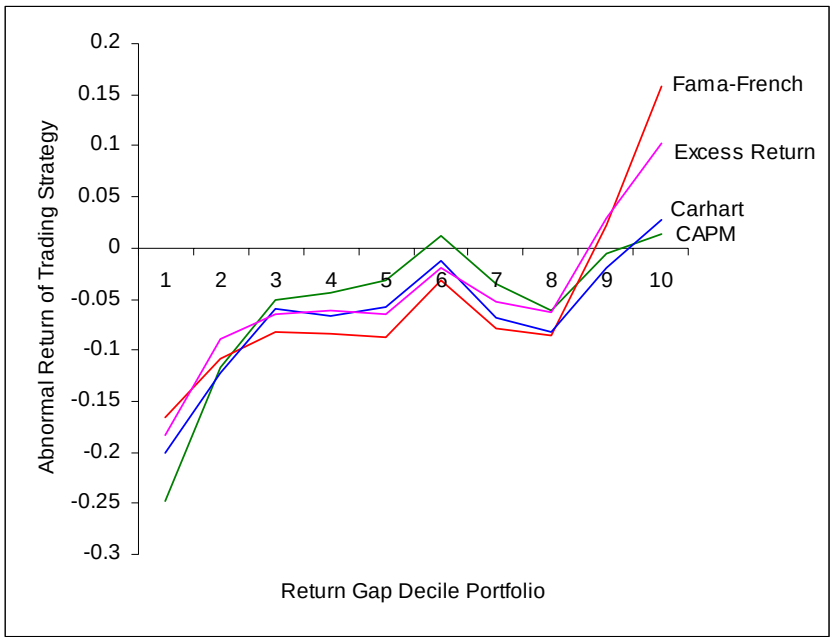


Figure 2
Returns of Trading Strategies

This figure shows the average abnormal returns during the month following the formation period over the period 1984 and 2003, expressed in percent per month. The decile portfolios are formed based on the previous one-year return gap (Panel A) and on the previous one-year return gap using the back-testing technique of Mamaysky, Spiegel, and Zhang (2005) (Panel B), where decile one has the lowest return gap and decile ten has the highest return gap. We use four measures of abnormal returns – the return in excess of the market return; the market-adjusted abnormal return (CAPM); the three-factor adjusted return as in Fama and French (1993); and the four-factor adjusted return as in Carhart (1997).

Panel A: Sorting Based on the Return Gap



Panel B: Sorting Based on the Return Gap with Back-Testing

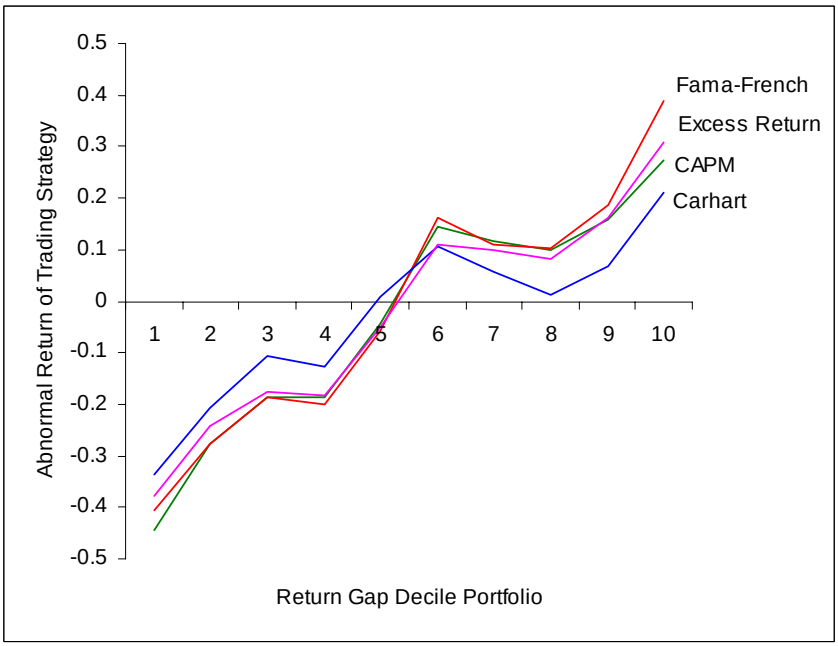


Table 1
Summary Statistics

This table presents the summary statistics for the sample of equity mutual funds over the period 1984 to 2003.

	Mean	Median	Standard Deviation
Number of distinct mutual funds	2,543		
Number of fund-month observations	211,001		
Number of funds per month	879	720	
TNA (Total Net Assets) (in Millions)	952	166	3,771
Age	13.49	8	13.98
Expense Ratio (in Percent)	1.24	1.20	0.44
Turnover Ratio (in Percent)	88.06	65.00	103.51
Maximum Total Load (in Percent)	2.10	0.28	2.52
Proportion Invested in Equity (in Percent)	93.16	95.22	7.72
Mean of Prior-Year New Money Growth (in Percent per month; 1% winsorized)	2.50	0.35	9.45

Table 2
Performance of Investor and Holdings Returns

This table summarizes the investor returns, the holdings returns before and after subtracting expenses, and the return gaps before and after subtracting expenses for the value- and equally weighted portfolio of all funds in our sample over the period 1984 to 2003. The return gap has been defined as the difference between the investor return and the holdings return of the portfolio disclosed in the previous period. We report the raw returns, the one-factor alpha of Jensen (1968), the three-factor alpha of Fama and French (1993), and the four-factor alpha of Carhart (1997) to measure fund performance. The returns are expressed in percent per month and the standard errors are summarized in parentheses.

	Investor Return	Holdings Return		Return Gap	
		Before Expenses	After Expenses	Before Expenses	After Expenses
Panel A: Value-Weighted Returns					
Raw Return	0.988***	1.071***	0.998***	-0.083***	-0.010
	(0.294)	(0.295)	(0.295)	(0.012)	(0.012)
CAPM Alpha	-0.075**	0.006	-0.067**	-0.082***	-0.009
	(0.032)	(0.033)	(0.033)	(0.012)	(0.012)
Fama-French Alpha	-0.064**	0.028	-0.045	-0.092***	-0.019*
	(0.031)	(0.032)	(0.032)	(0.011)	(0.011)
Carhart Alpha	-0.072**	0.022	-0.051	-0.094***	-0.021*
	(0.032)	(0.033)	(0.033)	(0.012)	(0.012)
Panel B: Equally Weighted Returns					
Raw Return	1.014***	1.100***	1.003***	-0.086***	0.011
	(0.305)	(0.305)	(0.305)	(0.009)	(0.009)
CAPM Alpha	-0.064	0.021	-0.077	-0.085***	0.012
	(0.056)	(0.056)	(0.056)	(0.010)	(0.010)
Fama-French Alpha	-0.057	0.034	-0.062	-0.092***	0.005
	(0.044)	(0.045)	(0.045)	(0.009)	(0.009)
Carhart Alpha	-0.068	0.026	-0.071	-0.095***	0.002
	(0.045)	(0.046)	(0.046)	(0.009)	(0.009)

*** 1% significance; ** 5% significance; * 10% significance

Table 3
Persistence of the Return Gap

This table reports the means and the standard errors (in parentheses) of the current return gaps for decile portfolios of the mutual funds sorted by their average lagged return gaps during the previous one, three, and five years over the period 1984 to 2003. The return gap is defined as the difference between the reported return and the holding return of the portfolio disclosed in the previous period. The first three columns summarize the raw return gaps, and the last three columns show the four-factor abnormal return gaps as in Carhart (1997). The returns are expressed in percent per month. The table also calculates the differences in the return gaps between the top and the bottom deciles and the top and the bottom halves, along with the Spearman rank correlations and the corresponding *p*-values in parentheses.

	Raw Return Gap			Abnormal Return Gap Using Four-Factor Model		
Estimation Window	1 Year	3 Years	5 Years	1 Year	3 Years	5 Years
1. Decile (Lowest RG)	-0.113*** (0.026)	-0.122*** (0.024)	-0.113*** (0.027)	-0.088*** (0.025)	-0.113*** (0.022)	-0.100*** (0.026)
2. Decile	-0.026 (0.020)	-0.040*** (0.014)	-0.055*** (0.020)	-0.015 (0.020)	-0.041*** (0.015)	-0.063*** (0.021)
3. Decile	-0.019 (0.011)	-0.024 (0.022)	-0.028** (0.013)	-0.017 (0.011)	-0.024 (0.023)	-0.028** (0.013)
4. Decile	-0.015 (0.010)	-0.016 (0.012)	-0.022* (0.012)	-0.024*** (0.009)	-0.018 (0.012)	-0.018 (0.012)
5. Decile	-0.008 (0.009)	-0.002 (0.011)	-0.010 (0.012)	-0.015 (0.010)	-0.012 (0.012)	-0.013 (0.012)
6. Decile	0.001 (0.011)	-0.001 (0.010)	-0.006 (0.012)	-0.013 (0.011)	-0.009 (0.010)	-0.013 (0.012)
7. Decile	-0.003 (0.012)	-0.013 (0.012)	-0.005 (0.014)	-0.016 (0.012)	-0.024** (0.012)	-0.019 (0.014)
8. Decile	0.018 (0.014)	0.029** (0.012)	0.020 (0.017)	0.002 (0.014)	0.013 (0.012)	-0.004 (0.016)
9. Decile	0.049*** (0.016)	0.053*** (0.019)	0.050* (0.028)	0.025* (0.015)	0.023 (0.018)	0.040 (0.030)
10. Decile (Highest RG)	0.154*** (0.033)	0.111*** (0.025)	0.122*** (0.023)	0.116*** (0.031)	0.078*** (0.023)	0.088*** (0.022)
Tenth Decile – First Decile	0.268*** (0.043)	0.234*** (0.031)	0.235*** (0.033)	0.204*** (0.040)	0.191*** (0.028)	0.188*** (0.031)
Second Half – First Half	0.080*** (0.016)	0.077*** (0.012)	0.082*** (0.012)	0.055*** (0.015)	0.058*** (0.011)	0.063*** (0.012)
Spearman Rank Correlation	0.988*** (0.000)	0.964*** (0.000)	1.000*** (0.000)	0.839*** (0.002)	0.906*** (0.000)	0.924*** (0.000)

*** 1% significance; ** 5% significance; * 10% significance

Table 4
Portfolio Returns Based on the Return Gap

This table reports the means and the standard errors (in parentheses) for deciles of mutual funds sorted according to the lagged one-year return gap over the period 1984 to 2003. The return gap is lagged for one additional quarter to account for the possible delay in reporting the holdings. The return gap is defined as the difference between the investor fund return and the return based on the previous holdings. We use the excess return over the market, the one-factor alpha of Jensen (1968), the three-factor alpha of Fama and French (1993), the four-factor alpha of Carhart (1997), and the Ferson-Schadt (1996) conditional measure based on the four-factor model to measure fund performance. Moreover, we report the Characteristic Selectivity (CS) measure of Daniel, Grinblatt, Titman, and Wermers (1997), and the Grinblatt and Titman (1993) performance measure. The returns are expressed in percent per month. The table also reports the differences in the return gaps between the top and the bottom deciles and the top and the bottom halves, along with the Spearman rank correlations and the corresponding *p*-values in parentheses.

	Excess Market Return	CAPM Alpha	Fama French Alpha	Carhart Alpha	Ferson-Schad Alpha	DGTW Selectivity Measure	GT Performance Measure
1. Decile:	-0.183*	-0.246**	-0.164***	-0.199***	-0.191***	0.065	0.195*
Mean: -0.598	(0.098)	(0.095)	(0.061)	(0.062)	(0.061)	(0.061)	(0.107)
2. Decile	-0.090	-0.118*	-0.110**	-0.123**	-0.093*	0.050	0.124
Mean: -0.245	(0.062)	(0.061)	(0.053)	(0.054)	(0.050)	(0.043)	(0.087)
3. Decile	-0.064	-0.051	-0.082*	-0.061	-0.063*	0.054	0.126*
Mean: -0.137	(0.051)	(0.052)	(0.048)	(0.049)	(0.037)	(0.037)	(0.072)
4. Decile	-0.062	-0.044	-0.084*	-0.066	-0.073**	0.045	0.090
Mean: -0.070	(0.049)	(0.049)	(0.047)	(0.048)	(0.035)	(0.033)	(0.063)
5. Decile	-0.066	-0.032	-0.090*	-0.059	-0.067*	0.033	0.066
Mean: -0.019	(0.053)	(0.052)	(0.049)	(0.050)	(0.035)	(0.033)	(0.058)
6. Decile	-0.018	0.013	-0.032	-0.011	-0.027	0.053*	0.075
Mean: 0.026	(0.051)	(0.049)	(0.048)	(0.049)	(0.033)	(0.031)	(0.060)
7. Decile	-0.053	-0.037	-0.080	-0.069	-0.077*	0.042	0.127*
Mean: 0.078	(0.058)	(0.058)	(0.056)	(0.057)	(0.041)	(0.039)	(0.068)
8. Decile	-0.064	-0.063	-0.086*	-0.083	-0.087**	0.025	0.110
Mean: 0.149	(0.058)	(0.059)	(0.051)	(0.052)	(0.040)	(0.039)	(0.077)
9. Decile	0.029	-0.003	0.022	-0.019	0.026	0.091*	0.200**
Mean: 0.266	(0.082)	(0.082)	(0.056)	(0.056)	(0.052)	(0.048)	(0.098)
10. Decile:	0.101	0.012	0.156**	0.025	0.068	0.125*	0.322**
Mean: 0.657	(0.151)	(0.148)	(0.078)	(0.071)	(0.072)	(0.075)	(0.140)
Tenth Decile –	0.284***	0.259***	0.321***	0.224***	0.258***	0.060*	0.127**
First Decile	(0.078)	(0.078)	(0.059)	(0.054)	(0.053)	(0.038)	(0.055)
Second Half –	0.088***	0.097***	0.091***	0.076***	0.078***	0.008	0.016
First Half	(0.024)	(0.023)	(0.024)	(0.024)	(0.023)	(0.014)	(0.018)
Spearman Rank	0.839***	0.697**	0.794***	0.649**	0.661**	0.103	0.297
Correlation	(0.002)	(0.025)	(0.006)	(0.042)	(0.038)	(0.770)	(0.405)

*** 1% significance; ** 5% significance; * 10% significance

Table 5
Portfolio Returns Based on the Return Gap with Back-Testing

This table reports the means and the standard errors (in parentheses) for deciles of mutual funds over the period 1984 to 2003 sorted according to the lagged one-year return gap with back-testing as suggested by Mamaysky, Spiegel, and Zhang (2005). Mutual funds are sorted into deciles according to the average return gaps between fifteen and four months prior to the portfolio formation. In addition, funds are only considered if the sign of the average return gap equals the sign of the excess reported fund return during the three months prior to the portfolio formation. We use the performance measures described in Table 4. The returns are expressed in percent per month.

	Excess Market Return	CAPM Alpha	Fama French Alpha	Carhart Alpha	Ferson-Schad Alpha	DGTW Selectivity Measure	GT Performance Measure
1. Decile:	-0.378***	-0.443***	-0.406***	-0.336***	-0.198**	-0.035	0.065
Mean: -0.600	(0.106)	(0.103)	(0.098)	(0.099)	(0.096)	(0.069)	(0.106)
2. Decile	-0.242***	-0.276***	-0.278***	-0.207**	-0.047	-0.013	0.066
Mean: -0.245	(0.088)	(0.088)	(0.088)	(0.089)	(0.085)	(0.052)	(0.090)
3. Decile	-0.176**	-0.185**	-0.187**	-0.105	0.002	0.036	0.090
Mean: -0.137	(0.085)	(0.086)	(0.088)	(0.087)	(0.080)	(0.053)	(0.092)
4. Decile	-0.184**	-0.185**	-0.200***	-0.126*	0.001	0.017	0.039
Mean: -0.070	(0.074)	(0.075)	(0.076)	(0.076)	(0.070)	(0.044)	(0.081)
5. Decile	-0.050	-0.043	-0.057	0.009	0.101	0.054	0.025
Mean: -0.019	(0.070)	(0.070)	(0.072)	(0.072)	(0.068)	(0.039)	(0.077)
6. Decile	0.111	0.144*	0.163**	0.106	-0.002	0.106**	0.141*
Mean: 0.026	(0.084)	(0.083)	(0.076)	(0.077)	(0.072)	(0.045)	(0.084)
7. Decile	0.100	0.116	0.110	0.056	-0.090	0.097*	0.202**
Mean: 0.078	(0.093)	(0.094)	(0.085)	(0.082)	(0.075)	(0.051)	(0.087)
8. Decile	0.081	0.100	0.102	0.013	-0.102	0.088*	0.204**
Mean: 0.149	(0.095)	(0.096)	(0.082)	(0.081)	(0.073)	(0.051)	(0.090)
9. Decile	0.162	0.157	0.187**	0.068	-0.008	0.118**	0.256**
Mean: 0.266	(0.113)	(0.115)	(0.091)	(0.087)	(0.084)	(0.057)	(0.103)
10. Decile:	0.310*	0.275*	0.389***	0.210**	0.093	0.211***	0.382***
Mean: 0.640	(0.166)	(0.166)	(0.115)	(0.106)	(0.105)	(0.081)	(0.138)
Tenth Decile –	0.687***	0.717***	0.795***	0.546***	0.291*	0.246***	0.317***
First Decile	(0.182)	(0.184)	(0.167)	(0.156)	(0.150)	(0.094)	(0.098)
Second Half –	0.364***	0.397***	0.417***	0.262**	0.059	0.111**	0.137**
First Half	(0.120)	(0.120)	(0.117)	(0.111)	(0.104)	(0.056)	(0.064)
Spearman Rank	0.939***	0.875***	0.939***	0.903***	0.200	0.939***	0.806***
Correlation	(0.000)	(0.001)	(0.000)	(0.000)	(0.580)	(0.000)	(0.005)

*** 1% significance; ** 5% significance; * 10% significance

Table 6
Portfolio Returns Based on the Return Gap: Various Sorting Criteria

This table reports the abnormal returns according to the four-factor model of Carhart (1997), along with their standard errors (in parentheses), for deciles of mutual funds formed according to different sorting criteria over the period 1984 to 2003. Panel A sorts the funds according to the lagged return gap between fifteen and four months prior to the portfolio formation. Panel B uses in addition the back-testing technique suggested by Mamaysky, Spiegel, and Zhang (2005), by considering only funds if the sign of the average return gap equals the sign of the excess reported fund return during the three months prior to the portfolio formation. The returns are expressed in percent per month.

Panel A: Sorting According to Lagged Return Gap Measures

	Return Gap 1 Year	Return Gap 3 Years	Return Gap 5 Years	Return Gap Before Expenses 1 Year	Return Gap for No-Load Funds 1 Year
1. Decile (Lowest RG)	-0.199*** (0.062)	-0.234*** (0.060)	-0.146** (0.068)	-0.221*** (0.062)	-0.183*** (0.068)
2. Decile	-0.123** (0.054)	-0.100* (0.055)	-0.115* (0.063)	-0.134** (0.053)	-0.131** (0.059)
3. Decile	-0.061 (0.049)	-0.060 (0.049)	-0.097* (0.054)	-0.057 (0.051)	-0.072 (0.058)
4. Decile	-0.066 (0.048)	-0.029 (0.043)	-0.112** (0.049)	-0.074 (0.052)	-0.004 (0.059)
5. Decile	-0.059 (0.050)	-0.090** (0.046)	-0.053 (0.050)	-0.057 (0.050)	-0.027 (0.063)
6. Decile	-0.011 (0.049)	-0.055 (0.050)	-0.087* (0.049)	-0.013 (0.050)	-0.000 (0.052)
7. Decile	-0.069 (0.057)	-0.075 (0.057)	-0.100 (0.061)	-0.085 (0.054)	-0.008 (0.062)
8. Decile	-0.083 (0.052)	-0.067 (0.057)	-0.013 (0.066)	-0.067 (0.051)	-0.109* (0.058)
9. Decile	-0.019 (0.056)	0.019 (0.060)	0.038 (0.069)	0.012 (0.053)	-0.078 (0.057)
10. Decile (Highest RG)	0.025 (0.071)	-0.017 (0.067)	0.012 (0.070)	0.028 (0.071)	0.029 (0.079)
Tenth Decile – First Decile	0.224*** (0.054)	0.217*** (0.056)	0.158*** (0.054)	0.249*** (0.057)	0.212*** (0.081)
Second Half – First Half	0.076*** (0.024)	0.058** (0.025)	0.084*** (0.024)	0.091*** (0.023)	0.065** (0.030)
Spearman Rank Correlation	0.649** (0.042)	0.697** (0.025)	0.879*** (0.001)	0.736** (0.015)	0.515 (0.123)

*** 1% significance; ** 5% significance; * 10% significance

Panel B: Sorting According to Lagged Return Gap Measures with Back-Testing

	Return Gap 1 Year	Return Gap 3 Years	Return Gap 5 Years	Return Gap Before Expenses 1 Year	Return Gap for No-Load Funds 1 Year
1. Decile (Lowest RG)	-0.336*** (0.099)	-0.370*** (0.096)	-0.271*** (0.099)	-0.371*** (0.099)	-0.295*** (0.113)
2. Decile	-0.207** (0.089)	-0.188** (0.093)	-0.227** (0.094)	-0.207** (0.087)	-0.178** (0.089)
3. Decile	-0.105 (0.087)	-0.078 (0.078)	-0.165* (0.090)	-0.127 (0.082)	-0.123 (0.102)
4. Decile	-0.126* (0.076)	-0.098 (0.078)	-0.176** (0.087)	-0.116 (0.081)	-0.085 (0.092)
5. Decile	0.009 (0.072)	-0.101 (0.076)	-0.100 (0.084)	-0.108 (0.083)	0.023 (0.087)
6. Decile	0.106 (0.077)	0.041 (0.069)	-0.020 (0.058)	-0.021 (0.074)	0.084 (0.079)
7. Decile	0.056 (0.082)	-0.013 (0.084)	-0.014 (0.083)	-0.043 (0.072)	0.080 (0.096)
8. Decile	0.013 (0.081)	0.048 (0.085)	0.042 (0.096)	0.035 (0.079)	-0.037 (0.087)
9. Decile	0.068 (0.087)	0.156* (0.093)	0.151 (0.104)	0.095 (0.084)	0.075 (0.097)
10. Decile (Highest RG)	0.210** (0.106)	0.112 (0.098)	0.137 (0.105)	0.206* (0.106)	0.275** (0.123)
Tenth Decile – First Decile	0.546*** (0.156)	0.482*** (0.146)	0.408*** (0.152)	0.577*** (0.157)	0.572*** (0.187)
Second Half – First Half	0.262** (0.111)	0.224** (0.108)	0.242** (0.110)	0.232*** (0.085)	0.252** (0.118)
Spearman Rank Correlation	0.903*** (0.000)	0.927*** (0.000)	0.964*** (0.000)	0.988*** (0.000)	0.855*** (0.002)

*** 1% significance; ** 5% significance; * 10% significance

Table 7
Predictability of Future Returns Using Return Gap and Holdings Return

This table reports the coefficients of pooling regressions of excess and abnormal returns on various fund attributes. The sample includes all equity mutual funds in our sample and spans the period of 1984-2003 (including the data used for calculating the abnormal returns). The dependent variables are the market excess return, the one-factor abnormal return, the three-factor abnormal return of Fama and French (1993), and the four-factor abnormal return of Carhart (1997), respectively. All regressions include time dummies. Cluster-corrected standard errors have been provided in parentheses. The returns are expressed in percent per month.

Dependent Variable	Excess Market Return	One-Factor Abnormal Return	Three-Factor Abnormal Return	Four-Factor Abnormal Return
Prior-Year Adjusted Return Gap	0.3619**	0.2771	0.2184***	0.2152***
	(0.1841)	(0.1772)	(0.0468)	(0.0446)
Prior-Year Expenses	-1.4478	-1.7218**	-1.0450***	-1.7348***
	(0.9769)	(0.8461)	(0.4037)	(0.4389)
Prior-Year Excess Holdings Return	0.2349	0.1579	0.2211***	0.1450**
	(0.2313)	(0.2110)	(0.0687)	(0.0673)
Log of Lagged TNA	-0.0533***	-0.0396***	-0.0026	-0.0222**
	(0.0185)	(0.0121)	(0.0115)	(0.0125)
Log of Age	0.0061	-0.0182	-0.0257*	-0.0222**
	(0.0216)	(0.0175)	(0.0144)	(0.0125)
Prior-Year Turnover	0.0317	0.0233	0.0212	-0.0469
	(0.0685)	(0.0711)	(0.0446)	(0.0343)
Index Fund	0.0472	-0.0077	0.0164	-0.0153
	(0.0489)	(0.0465)	(0.0323)	(0.0315)
Time Fixed Effects	YES	YES	YES	YES
Number of Observations	160,895	150,210	150,210	150,210

*** 1% significance; ** 5% significance; * 10% significance

Table 8
Determinants of the Return Gap

This table reports the coefficients of the panel regressions of the return gaps on various fund and fund family characteristics. The sample includes equity mutual funds and spans the period of 1984-2003. The return gap is defined as the difference between the investor fund return and the return based on the previous holdings. All regressions include time-fixed effect dummies. The standard errors take into account clustering by time and are provided in parentheses. The returns are expressed in percent per month.

	Dependent Variables (in Percent per Month)			
	Raw Return Gap		Abnormal Four-Factor Return Gap	
Trading Costs per Month	-0.7633***	-0.8331***	-0.7996***	-0.8683***
	(0.2394)	(0.2653)	(0.3056)	(0.3517)
Weight of Recent IPOs	0.2332***	0.2441***	0.2052***	0.2285***
	(0.0265)	(0.0300)	(0.0314)	(0.0366)
Correlation Between Holdings and Investor Returns	0.6964**	0.6802**	1.0620***	1.0832***
	(0.3085)	(0.3269)	(0.3527)	(0.3804)
Expenses per Month	-0.3534**	-0.3618**	-0.2003	-0.2039
	(0.1640)	(0.1666)	(0.2116)	(0.1928)
Turnover	0.0092	0.0069	-0.0193	-0.0255
	(0.0112)	(0.0120)	(0.0172)	(0.0192)
Log of TNA	-0.0112***	-0.0229***	-0.0130***	-0.0234***
	(0.0029)	(0.0042)	(0.0035)	(0.0047)
Log of Family TNA		0.0121***		0.0097**
		(0.0032)		(0.0039)
Log of Age	-0.0179***	-0.0132**	0.0069	0.0126
	(0.0050)	(0.0059)	(0.0076)	(0.0090)
Mean New Money Growth	0.2198***	0.2087***	0.4132***	0.3948***
	(0.0576)	(0.0614)	(0.1337)	(0.1410)
Standard Deviation of Investor Returns	0.0113	0.0131	0.0016	0.0047
	(0.0101)	(0.0105)	(0.0092)	(0.0099)
Index Fund	-0.0393**	-0.0467***	-0.0559***	-0.0623***
	(0.0158)	(0.0158)	(0.0194)	(0.0201)
Size-Score	-0.0330***	-0.0387***	-0.0395***	-0.0420***
	(0.0112)	(0.0128)	(0.0133)	(0.0156)
Value-Score	-0.0133	-0.0116	0.0006	0.0152
	(0.0195)	(0.0223)	(0.0179)	(0.0206)
Momentum-Score	-0.0657**	-0.0746**	-0.1132***	-0.1234***
	(0.0299)	(0.0352)	(0.0342)	(0.0413)
Time Fixed Effects	YES	YES	YES	YES
Number of Observations	167,983	145,328	117,130	97,788

*** 1% significance; ** 5% significance; * 10% significance