Unobserved Actions of Mutual Funds

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ABSTRACT

Mutual fund investors do not observe all actions of fund managers despite extensive disclosure requirements. This paper proposes the return gap as a performance measure to capture the impact of unobserved actions on fund returns. The return gap is defined as the difference between the reported fund return and the return of a hypothetical portfolio that invests in the previously disclosed holdings after adjusting for expenses. Analyzing more than 2,500 unique U.S. equity funds over the period 1984-2003, we show that the aggregate return gap is close to zero, indicating that the average fund performs as well as a passive portfolio that is based on the fund's previously disclosed holdings after adjusting for disclosed expenses. Nevertheless, we document a substantial cross-sectional heterogeneity and time-series persistence in the return gap, demonstrating that unobserved actions of some funds persistently create value, while such actions of others destroy value. We document 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.

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 by mutual funds 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 advantages and time the purchases and the sales of individual stocks optimally.[4] In this paper, we empirically test the hypothesis that past unobserved actions have 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 returns of a fund to their investors and the returns of a hypothetical buy-and-hold portfolio that invests in the previously disclosed holdings after adjusting for observable expenses. Our intuition is straightforward: The impact of unobserved actions is captured in the investor returns but not in the buy-and-hold returns of the previously held 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

[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).

other hand, if the interim trades of a fund create sufficient value, then we should observe that the disclosed fund return exceeds the return 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.

An alternative interpretation of the return gap is that the holdings return provides a valid benchmark to evaluate the performance of a mutual fund. Thus, we effectively benchmark mutual funds against their own previously-disclosed holdings.[5]

Analyzing 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. 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 numbers indicate that the magnitude of unobserved actions is relatively small for the aggregate sample. In contrast, we document a substantial cross-sectional variation in the return gap, indicating that hidden costs are more visible for some funds while interim trading benefits are more pronounced for other funds.

To understand the forces driving the return gap, we study its determinants. We show that the return gap is related to the transparency of a fund, measured using the correlation between the holdings and the investor returns of mutual funds. Funds with low correlations are more opaque; hence, unobserved actions are more important for

[5] An extensive literature examines the performance of mutual funds based on net return 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); Kosowski, Timmermann, White, and Wermers (2001); Cohen, Coval, and Pástor (2005); Baker, Litov, Wachter, and Wurgler (2005); and Kacperczyk, Sialm, and Zheng (2005).

these funds. Our findings 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. We also show that the return gap is positively related to the recent IPO allocations to a fund, suggesting the existence of cross-subsidization strategies among funds, as described by Reuter (2005), and Gaspar, Massa, and Matos (2005). In addition, the return gap is related to other fund attributes, such as size, age, and mean new money growth, which have been previously shown to affect fund performance. Finally, we find strong persistence in the return gap of up to five years ahead for funds with positive and negative initial return gaps, which indicates that the return gap is driven by systematic factors.

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. Following Mamaysky, Spiegel, and Zhang (2005), we use a simple filtering technique to mitigate the potential impact of measurement error on the returns of a trading strategy. The results using this method exhibit a substantial increase in the performance difference between the top and the bottom deciles. We confirm the relationship between a fund's return gap and its subsequent performance using pooling

regressions with clustered standard errors, controlling for other fund characteristics and time fixed effects.

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 merely look at its net return. 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 unobserved actions. Hence, we conclude that unobserved actions are likely to contain incrementally relevant information about future fund performance.

Our paper is most related to Grinblatt and Titman (1989), Wermers (2000), and Frank, Poterba, Shackelford, and Shoven (2004). 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 mutual funds during the period of 1975 to 1984. They document that risk-adjusted gross returns of some funds are significantly positive. Wermers (2000) decomposes the performance into stock-picking talent, style selection, transaction costs, and expenses and finds that mutual funds, on average, hold stocks that outperform a broad market index by 130 basis points per year. On the other hand, the average fund net return is 100 basis points per year lower than the return to a broad market index. He shows that a portion of this difference can be explained by the expenses and the trading costs of a fund. Frank, Poterba, Shackelford, and Shoven (2004) use a small sample of funds to 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 similar to those of the funds they are copying. 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 study which fund characteristics affect these unobserved actions. Finally, we investigate whether investors, when choosing mutual funds, could benefit from taking into account such unobserved actions.

The rest of the paper proceeds as follows. Section I motivates the use of the return gap in assessing the scope of unobserved actions. Section II discusses the data, while Section III quantifies the return gap. Sections IV and V investigate the determinants of the return gap and demonstrate that the return gap is highly persistent. Section VI studies the impact of unobserved actions on future fund performance and presents economic significance of this predictability. Section VII concludes.

I. Methodology

To uncover the role of unobserved actions, we need to define a proper measure of such actions. Our measure, the return gap, is based on the comparison of the net investor return to an estimate of the gross return of the fund holdings. 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 holds 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 holding 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:

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

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 need to disclose their expenses to their shareholders on a regular

basis. Thus, our measure of the return gap captures the unobserved actions of funds, which include hidden costs and interim trading benefits to their shareholders:

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

One component of the unobserved actions is the interim trading benefits of a fund (*IT*), which 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 holdings (*RH*) will remain unaffected. Furthermore, if a fund obtains an IPO 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 (*HC*), 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 disentangle hidden costs and interim trading benefits. However, 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 both benefits and costs of the fund one would expect that such actions, if persistent in a fund strategy, would have an important impact on future fund performance.

II. 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.

A. Merge of CRSP and Spectrum

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. We follow Wermers (2000) and merge the CRSP database with the stockholdings database published by CDA Investments Technologies. The CDA database provides stockholdings of U.S. mutual funds, with no minimum survival requirement for a fund to be included in the database. The data are collected both from reports filed by mutual funds with the SEC and from voluntary reports generated by the funds. We link each reported stock holding to the CRSP stock database. The vast majority of funds have holdings of companies listed on the NYSE, NASDAQ, or AMEX stock exchanges.

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 the most complete and reliable. As a result, 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 value-weighted observation. We also exclude funds which hold less than ten stocks and which managed in the previous month less than $5 million. Appendix A describes the details of the sample selection process.

B. Non-Equity Holdings

For our analysis, we do not have detailed data on the holdings of non-equity asset classes, such as cash holdings, bonds, and other asset classes. These holdings, however, affect the fund net return. 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 holding returns to reflect non-equity holdings in the fund portfolio.

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.[6] 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

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

of the Lehman Brothers Aggregate Bond Index and the return on other assets equals the Treasury bill rate.[7]

C. Summary Statistics

Table I lists 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 twenty years, we have significantly more funds in the more recent years of our sample period. The number of funds ranges from 244 funds (January 1984) to 1,816 funds (April 2002).

We obtain the data on age, total net assets (TNA), expenses, turnover, loads, the proportion invested in equity securities, and the return to investors from the CRSP Survivor-Bias-Free Mutual Fund Database. Table I summarizes the distribution of these variables for our sample of equity funds between 1984 and 2003. The average age of a fund in our sample is 13.49 years and the age of the funds ranges between 2 and 80 years. The mean expense ratio is 1.24 percent; however, funds differ significantly in their expense ratios. A significant number of funds also charge loads, ranging from 0 to 9.5 percent. The mean turnover ratio is 88 percent, indicating that funds tend to hold their positions, on average, for about one year. For our sample, we select funds that invest

[7] We have also tried two other methods of adjustments. 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 (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.

primarily in equities. Thus, the proportion invested in equity securities is relatively large. The remaining assets are held primarily in cash or cash-equivalent securities.

Based on the information from the CRSP database, we calculate the mean and the standard deviation of the new money growth in the previous year. We define New Money Growth as the growth rate of the assets under management after adjusting for the appreciation of the assets assuming that all the cash flows are invested at the end of the period:

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

For most of our sample period, we have TNAs available at a monthly frequency. However, until 1990 the TNA is only 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. Table I summarizes the mean and the standard deviation of NMG, which are winsorized at the one percent level to diminish the impact of extreme outliers. Cash flows into mutual funds tend to be large and highly volatile during our sample period.

The 1990s saw a significant increase in the number of share classes offered by mutual funds, as described by Nanda, Wang, and Zheng (2005). Each share class is based on identical holdings, but differs in the structure of expenses and loads. Based on the CRSP data, we find that the average mutual fund has 1.97 share classes. Most of the funds in our sample are actively-managed funds and just 4.54 percent of our observations are index funds.

We obtain the composition of the equity portfolio from the CDA/Spectrum database. Mutual funds tend to hold a relatively large number of stocks. An average fund

holds 130 stocks, but a small number of funds hold several thousand stock positions at one point in time. During most of our sample period, funds were only required by law to disclose their holdings semi-annually. However, about 49 percent of funds in our sample disclose their holdings quarterly.[8] Despite the semi-annual disclosure requirements, we find that 4.6 percent of our observations with valid CRSP data do not have available holdings data during the previous six months. We compute the hypothetical holdings returns using the most recently available portfolio disclosures and assuming that fund managers follow buy-and-hold strategies between disclosure periods.[9] Thus, funds with lower disclosure frequency tend to have more stale holdings returns. We measure the staleness of the holdings information with the time lag of the holdings in months. The average holdings in our sample are 2.04 months stale. We use this staleness variable to capture the impact of interim trading benefits on the return gap, since interim trading benefits are more significant if the holdings are updated less frequently.

Some fund families regularly obtain IPO allocations and thus can subsidize their specific funds by allocating the underpriced IPO stocks to these funds. Since we do not observe directly IPO allocations, we compute the proportion of a mutual fund portfolio that is invested in recent IPOs. We should expect that funds that obtain more IPO allocations exhibit a more favorable return gap since the IPO allocations tend to be

[8] Ge and Zheng (2005) investigates both the determinants and potential effects of portfolio disclosure frequency by comparing funds providing quarterly voluntary disclosure to funds providing only mandatory semiannual disclosure.

[9] We also computed hypothetical portfolio returns based on the future holdings. We find that these forward-looking holding returns are, on average, about three percent 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 towards 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 analyze the forward-looking holdings return because of these severe look-ahead biases.

significantly under-priced. Table I shows that 2.23 percent of asset in the average fund is invested in companies that went public during the last year.

We follow Wermers (2000) and compute the execution costs of mutual funds, based on the results of Keim and Madhavan (1997). Keim and Madhavan use proprietary data to compute total execution costs (commissions and market impact) for a sample of institutional investors between 1991 and 1993. They 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 a sell transaction. In Appendix B, we describe the procedure to estimate the trading costs in more detail. On average, we estimate average execution costs to be at 5 basis points per month or about 0.60 percent per year. These trading costs are consistent with the estimates in Wermers (2000) during the overlapping data period. Our trading costs are also consistent with the trading costs of 0.78 percent estimated by Chalmers, Edelen, and Kadlec (1999) using spread costs and commission costs for a sample of 132 funds between 1984 and 1991, since we obtain trading costs of 0.72 percent between 1984 and 1991.

The mean monthly net return to fund investors equals 0.85 percent (10.2 percent per year), while the mean monthly gross return of the holdings equals 0.97 percent (11.6 percent per year). Interestingly, the difference between the net return to fund investors and the gross return of the holdings is similar in magnitude to the expense ratio of 1.2 percent per year. Finally, it is not surprising that the holding returns and the investor returns are very highly correlated -- the correlation coefficient between net and gross returns equals 0.98. However, some funds have relatively low correlations, reflecting

high turnover in the holdings or a tendency to window-dress, as described by Meier and Schaumburg (2003). Funds with relatively low correlations are opaque funds where unobserved actions are important. These funds effectively hold portfolios that differ significantly from their previously disclosed holdings.

III. Quantifying the Return Gap

In this section, we quantify the return gap for mutual funds in our sample. Table II presents the value- and the equally-weighted average of the return gap for our sample of funds between 1984 and 2003. In the first row of Panel A (Panel B) of Table II, we report the value-weighted (equally-weighted) time series averages, with the corresponding standard errors in parentheses. We present two different measures of the return gap. The first measure is defined as the difference between the investor returns and the return of the equity holdings. The second measure subtracts the disclosed monthly expenses from the first measure of the return gap, and thus corresponds to the return gap, which can be attributed to unobserved actions.

In Panel A, the average net investor return is equal to 0.99 percent per month or about 11.86 percent per year. On the other hand, the average return of a hypothetical portfolio that includes the previously disclosed holdings amounts to 1.07 percent. The difference between the investor and the holdings return (i.e., the return gap before expenses) 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 basis point per month and is insignificantly different from zero. The average return gap after expenses

equals 1.1 basis points per month if we use equally-weighted portfolio returns instead. In summary, in the aggregate sample, we find that the return gap is very small, which indicates that hidden costs are therefore similar in magnitude to the benefits of interim trades.

From the analysis in the previous section, we cannot conclude whether the return gap is correlated with any risk or style factors. To shed more light on this issue, rows two-four of Panel A and Panel B of Table II 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. Among the three, Carhart's is the most comprehensive and has the following specification:

$$R_{i,t} - R_{F,t} = \alpha_I + \beta_{i,M}(R_{M,t} - R_{F,t}) + \beta_{i,SMB} SMB_t + \beta_{i,HML} HML_t + \beta_{i,MOM} MOM_t + e_{i,t}, \qquad (7)$$

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 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 the Fama and French model uses the first three factors. Table II demonstrates that the general conclusions regarding the return

[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

gap are not affected if we account for return components that are due to common risk/style factors in fund returns.[12]

IV. Determinants of the Return Gap

In this section, we provide further justification for using the return gap by looking at its associations with various indicators related to hidden costs and benefits. First, we analyze the determinants of the return gap by forming quintile portfolios based on the various attributes. Next, we estimate the joint impact of the variables using a regression framework. We find that the return gap has significant cross-sectional variation and is related to many factors that proxy for unobserved actions.

A. Univariate Portfolio Analysis

At the end of each month, we form equally-weighted portfolios based on various portfolio formation criteria. Subsequently, we compute the return gap of these portfolios for the following month. Table III summarizes the average return gap for different quintile portfolios.

The first two variables we analyze measure the transparency and the timeliness of the holdings disclosure. We measure the transparency of holdings disclosure using 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

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http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library.

[12] We find in unreported results that the adjustment for non-equity holdings has a substantially smaller impact on the return gap using the abnormal returns from the factor models, because factor models

actions of these funds is thus more important. The low correlation can result from high turnover and from window-dressing, which is a prevalent 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 high correlation funds perform worse.

Sorting funds according to their prior-year return correlations results in a substantial range of the return gap. In particular, funds with very low return correlations tend to have especially low return gaps. For example, funds in the lowest correlation quintile exhibit return gaps of -8.7 basis points per month or -1.04 percent per year. This effect does not seem to be driven by trading costs or turnover as we do not find a similarly strong relationship when we sort funds according to their trading costs or turnover. This result suggests that the opaqueness of a fund might be a good proxy for agency problems, which, in turn, tend to reduce the fund performance.

To capture the timeliness of disclosed holdings, we measure in each month the time lag of the holdings in months. For example, if a fund's most recent disclosure occurred two months ago, then the time lag of the holdings would be two months. If the interim trades of mutual fund managers create value, we should observe that the return gap increases when the holdings become staler, since fund managers have now more opportunities to execute value-creating trades. However, the timeliness of the holdings should not affect the hidden costs of a fund. We observe that the return gap of the mutual funds in the lowest quintile equals -4.7 basis points per month, while the return gap of

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effectively control for cash holdings. This indicates that our method of adjusting for non-equity positions generates similar results as the method using abnormal returns adjusted for common factors.

funds in the highest quintile equals 0.7 basis points per month, indicating that interim trading benefits are increasing with the time lag of the holdings in the hypothetical buy-and-hold portfolio.[13]

The third variable we consider is the trading costs of a mutual fund, as estimated using the methodology of Wermers (2000). Funds with higher trading costs should perform worse, unless the interim trading benefits offset the trading costs. In efficient markets, fund managers would only incur trading costs if the value created by entering this position offsets the corresponding trading cost. We document a negative relationship between trading costs and the return gap for the first four quintiles. However, the quintile with the highest trading costs also exhibits the highest return gap, indicating that these fund managers are able to make up for their high trading costs with substantially large interim trading benefits.

Another way to assess the impact of trading activities is to look at the relationship between turnover and the return gap. We show that funds with higher turnover tend to have lower return gaps, suggesting that turnover captures hidden trading costs to some degree. However, the differences in the return gaps are not statistically significant. An insignificant correlation between turnover and the return gap, however, does not necessarily imply that the trading costs are not significantly related to turnover. It is

[13] One issue of using this variable is that the disclosure frequency is endogenous during a significant portion of our sample period, since funds were only required by law to disclose their holdings semi-annually, but many funds decided to disclose their holdings quarterly. The time lag variable might not capture interim trading benefits if funds with lower disclosure frequencies perform differently from funds with higher disclosure frequencies. To disentangle the staleness effect (i.e., the return gap increases with more stale holdings data if the interim trades create value) from the disclosure frequency effect (i.e., the performance of funds is correlated with the disclosure frequency), we split up the time lag variable into two components. The first component corresponds to the time lag of the fund within a quarter and the second component corresponds to the time lag between quarters. The first component captures the staleness effect and the second component captures the disclosure frequency effect. The first component has very similar properties to the total time lag measure reported here and is positively related with the return gap. The

possible that portfolio turnover has also 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.

Next, we examine how the weights of recent IPOs relate to the return gap. Due to the 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; and Reuter, 2005). Although we do not know which funds obtain IPO allocations directly, we observe stocks that recently went public and are currently held by mutual funds. We sort the funds by the proportion of assets held in companies that went public within the last year. The results show that the weight of recent IPOs in the fund portfolio has a very strong predictive power for the future return gap. The difference between the top and the bottom quintile amounts to 8 basis points per month or slightly less than one percent per year. The performance difference remains significant, even after adjusting the return gap for common factors in fund returns using the Carhart (1997) model.

There are two possible mechanisms that can generate such an excess performance of funds that hold IPOs. One, a fund obtains an underpriced IPO allocation, which results in a more favorable return gap in the corresponding month.[14] Although we do not observe which funds obtain IPO allocations, it is plausible that funds that have a larger fraction of recent IPO stocks in their portfolios are more likely to have obtained these stocks through

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second component is negatively related to the return gap, but the relationship is not statistically significant. For simplicity, we only report the results with the total time lag measure.

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

IPO allocations. If fund families allocate the IPOs consistently to the same funds or subsidize these funds in other ways, then we should observe that funds, which obtained past IPO allocations, will have more favorable return gaps in the future. A second mechanism how funds can improve the return gap using recent IPOs is by trading these stocks optimally between disclosure periods. For example, a fund can generate a positive return gap by selling an IPO stock between adjacent portfolio disclosure dates just before its price starts declining. In this case, the return of a hypothetical holdings portfolio under-estimates the impact of this particular stock on the total return because this hypothetical portfolio holds on to the stocks until the next disclosure date.

Finally, we examine the relationship between the return gap and other fund characteristics that have been shown to affect fund returns in the previous literature, including fund size, age, expenses, new money growth and the standard deviation of new money growth. Consistent with Chen, Hong, Huang, and Kubik (2004), we find that smaller funds tend to exhibit more favorable return gaps than do larger funds, indicating that diseconomies of scale can also be detected using the return gap. 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. The impact of expenses on the return gap is rather insignificant. 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 trades of mutual fund investors can affect fund performance.[15] However, we do not find a significant relationship between the

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

volatility of money flows and the return gap, probably because we only observe net flows into a fund at a monthly or quarterly frequency.

B. Multivariate Regression Evidence

The preceding portfolio analysis has investigated the total effect of various fund attributes on the return gap. The following multivariate regression analysis examines the partial effect of fund attributes on the return gap. We analyze the various 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. We take the natural logarithms of the age and size variables, to mitigate an impact of right skewness in the distributions of both variables.[16]

Since we want to analyze both the raw and the abnormal return gap, we use two slightly different samples in our regressions. To compute the abnormal return, 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 of a fund in each quarter. 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. In addition, since unobserved actions are likely to affect actively-managed and passively-managed funds differently, within each sample range we consider the two groups separately. Table IV summarizes the regression results.

[16] We also computed the coefficient estimates using the Fama and MacBeth (1973) methodology. Since the results do not differ significantly across two methods, for brevity, we only report results using a pooling regression. A comparison of the two methods can be found in Petersen (2005).

The results for actively-managed funds are generally consistent with the univariate analysis. One of the most important determinants of the return gap remains the correlation between holdings and investor returns, which is a proxy for the opaqueness of a fund portfolio strategy. The time lag variable loses statistical significance if we use the abnormal return gap as the dependent variable. This indicates that a portion of the higher interim trading benefits that occur at longer time lags is due to excess returns on common factors. On the other hand, the weight of recent IPOs in the fund portfolio has strong predictive power for the future return gap even after adjusting for common factors in stock returns. This result indicates that part of the cross-subsidization within fund families is due to IPO allocations or profitable trading strategies of IPO stocks.

The size of a fund remains an important determinant of the return gap. We find some evidence that fund age negatively affects its return gap; however, this relationship disappears once we control the return gap for common risk factors. Our results indicate a mildly negative relationship between the return gap and expenses and a significant positive relation between the return gap and past new money growth.

One can observe significant differences in the determinants of the return gap between actively- and passively-managed funds. It is not surprising that most fund attributes do not have a significant impact on the return gap for index funds. The only exception is trading costs. While the relationship between trading costs and the return gap is insignificant for active funds, it is strongly significant for passive funds. This suggests that, on average, the interim trading benefits are sufficiently large for active funds to offset their higher execution costs. On the other hand, passively-managed funds do not

have opportunities to offset the trading costs through interim trading benefits, since they have to hold the respective index portfolio.

V. Persistence of the Return Gap

Many features of the unobserved actions indicate that they should be persistent. For example, if fund governance is weak in one period, as measured, for example, by stale price arbitrage or cross-subsidization, it is likely that it will remain poor in the next period. Moreover, many of the determinants of the return gap discussed in the previous section are also highly persistent indicating that the return gap itself should also be persistent.

To verify this hypothesis, we sort all funds in our sample into deciles according to their raw return gap over the previous year and compute the average return during the subsequent month. Table V reports the results for the return gaps before and after adjusting for expenses. The first column shows that funds in the worst return gap quintile, based on the previous 12 months, generate an average return gap before expenses of -22.3 basis points in the subsequent month. On the other hand, funds in the best return gap quintile generate an average return gap before expenses of just -0.8 basis points.

The second column shows that the return gap after adjusting for expenses is also highly persistent. Funds with the lowest lagged return gap record an average return gap after expenses of -13.2 basis points in the following month, while funds with the highest return gap have an average return gap of 8.6 basis points. The future return gaps of the extreme quintiles are statistically and economically significant. The third column indicates that these effects remain unchanged, even after adjusting the fund returns for the

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.[17]

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 year prior to the portfolio formation. The figure demonstrates that the raw return gap is also remarkably persistent over longer time periods. Panel A reports the raw return gap (after adjusting for expenses), while Panel B additionally adjusts the gap for common risk factors. The ranking of the decile portfolios, based on the raw return gap, in the month after the formation period remains identical to that in the formation period. We find that four deciles have positive return gaps in the month following the formation period, indicating that these funds tend to have higher benefits of interim trades than hidden costs. On the other hand, for six deciles we find that they have higher hidden costs than interim trading benefits. The first decile has an average return gap of –13.2 basis points and the tenth decile an average return gap of 8.6 basis points. The difference in the return gap between the top and the bottom deciles amounts to, approximately, 21.8 basis points per month or to about 2.62 percent per year.[18]

Panel B adjusts the return gap for expenses and for four common return factors following Carhart (1997). Carhart shows that performance persistence is less significant

[17] 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.

[18] We obtain very similar results if we compute the average return during the whole year following the formation period. We report monthly returns to avoid overlapping observations.

after one accounts for possible momentum effects. Contrary to the lack of persistence using the four-factor alpha, we find that the abnormal return gap remains persistent even after controlling for momentum and other common factors in stock returns. Thus, our results cannot be fully explained by the differences in systematic factors in the interim trading benefits. While the literature on the performance persistence of mutual funds generally documents that only the worst funds are persistent,[19] our results show persistence in both tails of the return gap distribution.

So far, we have looked for persistence by focusing on portfolios' rankings over time. It may be interesting to establish whether persistence is also present at the fund level. For that reason, we construct contingency tables for funds sorted into deciles. The results, presented in Table VI, report the proportion of mutual funds in particular return gap deciles one year after the formation period, as well as the proportion of funds that disappeared from the sample. We can reject the Cohen (1968) test of concordance between the two classifications at any conventional significance level (p=0.0000). The results support our previous conclusions and indicate a strong degree of persistence of individual funds' return gaps.

Interestingly, we can also observe that funds with the highest (lowest) return gaps are more likely to move to lowest (highest) return gap deciles rather than somewhere in between. This occurs because funds in the extreme deciles are funds where their actual holdings, by definition, diverge substantially from their previously disclosed holdings resulting in a highly positive or highly negative return gap during the formation period. Since these funds are likely to have a large divergence in the subsequent period, we can

[19] See Hendricks, Patel, and Zeckhauser (1993), Brown and Goetzmann (1995), Elton, Gruber, and Blake (1996), Carhart (1997), Bollen and Busse (2005), and Mamaysky, Spiegel, and Zhang (2005) for studies on

observe that the extreme deciles are more likely to remain at the extremes of the distribution in the subsequent period. We also find that funds in the lowest return gap decile are almost twice as likely to disappear from the sample as funds with the highest gap. This result is consistent with their showing inferior performance compared to other funds.

While the literature generally does not find robust persistence in mutual fund performance after controlling for the momentum factor, we find a strong persistence in the return gap. One reason may be that by measuring the investor returns relative to the holding returns, we filter out the impact of common shocks to both returns and are able to obtain a less noisy signal of the hidden costs and the interim trading benefits of funds than the holdings return.

VI. Predictability of Future Fund Performance

Until now, we have provided evidence that the return gap has interesting properties that are consistent with it being a good proxy for unobserved actions. In this section, we test our main prediction of the paper of 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.

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the persistence of mutual funds.

A. 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 return gap during the previous twelve months. Subsequently, we compute the average returns in the following month by weighting all the funds in a decile equally.

The holdings are generally not disclosed immediately after the effective holdings date. Generally, funds publicly disclose their holdings with a time delay. To allow investors to learn about the holdings disclosures, 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 ten percent of funds that had 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 VII, we report the risk- and style-adjusted net returns for each decile portfolio. The first five performance measures are based on the reported returns of a fund and the last two measures are based on the holdings returns of a fund. The first column reports excess returns of the deciles relative to the market portfolio. The next four columns report the intercepts of time-series regression based on the one-factor CAPM model, the three-factor model of Fama and French (1993) model, the four-factor model of Carhart (1997), and the conditional four-factor model of Ferson and Schadt (1996). 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).[20]

Funds in the first decile have an average return gap of –59.8 basis points per month during the twelve 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.

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 return of 28.40 basis points per month or about 3.41 percent per year in excess of investing in the decile-one funds. The relationship between past return gaps and future performance is highly monotonic.[21]

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.

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

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

[21] The results are unaffected qualitatively 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.

also ignore the interim trading benefits. Figure 2 presents a graphical illustration of the results discussed above.

Consistent with the previously documented under-performance of net fund returns relative to passive benchmarks, the identified performance difference for the factor-based measures is primarily driven by the poor returns of funds with highly negative return gaps. With the exception of the Fama and French abnormal return, no other performance measures are significantly positive for the funds with the most favorable return gaps.

To analyze the time-series performance of this trading strategy, we compute the average annual returns of each decile in each year and depict the excess and abnormal return difference between the top and the bottom return gap decile in Figure 3. The figure illustrates that high return gap funds tend to outperform low return gap funds in the large majority of years in our sample. Moreover, the performance difference does not change significantly after applying the four-factor Carhart (1997) model.

The spread in the adjusted performance widens further if we form twenty equally-sized 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, compared to 28.4 basis points for the difference in the decile portfolios. The difference in the Carhart abnormal return also increases from 22.4 to 34.4 basis points per month using twenty instead of ten 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.

B. Trading Strategy Using Alternative Forecasting Variables

To check the robustness of our results, Table VIII reports the differences in performance between the top and the bottom deciles based on various portfolio formation criteria. The first row simply repeats as a benchmark the performance differences of portfolios formed according to the return gap and is therefore identical to the performance difference in the last row of Table VII.

The second row reports the performance results by forming portfolios using the 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 slightly improves the performance of decile ten relative to decile one.

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 have also high loads, which subsequently could reduce overall performance of the strategies. To address this possibility we exclude load funds and form decile portfolios on the return gap. The results remain qualitatively similar and are summarized in the third row of Table VIII.

Since the return gap aggregates information from both investor and holdings returns, it is appealing to compare the returns of trading strategies based on different portfolio formation criteria. For that reason, we form in the last three rows decile portfolios according to the excess holdings return, the excess investor return, as well as the expense ratio. Sorting funds by the lagged excess holdings return generates

statistically less significant results than the sorts based on the return gap, with the exception of the DGTW selectivity measure.[22]

Selecting funds with low expense ratios tends to yield higher abnormal returns after subtracting expenses than selecting funds with higher expenses. However, we can observe that funds with low expense ratios tend to exhibit slightly lower values of holding-based performance measures.

The investor return is by definition equal to the holdings return minus the expenses plus the return gap. Therefore, investor returns include the impact of these three components, which are analyzed separately in Table VIII. The portfolios formed on this total performance measure generally do not perform much better than portfolios formed according to the return gap. The standard errors for the abnormal returns of this strategy are substantially higher than those using the return gap. This may suggest that the return gap contains less noisy information by identifying, in a more precise manner, the skills and the hidden costs of fund managers.

C. Trading Strategy with Back-Testing

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 be populated by the best and the worst funds, but by funds which have the greatest estimation error. They suggest using back-testing techniques where the statistical model is required to exhibit some past predictive success for a particular fund before it is used to

[22] We avoid sorting returns according to factor-adjusted returns because this can result in a spurious autocorrelation between factor-adjusted returns as described by Carhart (1997) and Spiegel, Mamaysky,

make predictions in the current period. They show that a strategy that uses modest ex-ante filters to eliminate funds whose parameters likely derive primarily from estimation errors produces very significant out of sample risk adjusted returns.

Motivated by Mamaysky, Spiegel, and Zhang (2005), we include a back-testing technique that is likely to eliminate the funds with the most severe measurement errors. In a first step, we sort all funds into deciles according to the average return gap between fifteen and four months prior to the portfolio formation month. This sort yields exactly the same portfolios, as those described in Table VII. In addition, we require that the average reported excess return of a fund relative to the market between three and one month(s) prior to the portfolio formation has the same sign as the lagged return gap. Thus, funds are only considered in the trading strategies if there is a concordance between the lagged return gap and the lagged excess return.

Our results are summarized in Table IX. We find that the performance difference between the top and the bottom return gap deciles 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 holdings-based performance measures become larger and more statistically significant. The performance measure that is least affected by the back-testing method is the Ferson and Schadt performance measure, which conditions on various macro-economic factors.

After filtering out funds which are more likely to have measurement problems, we also find that the funds in the top return gap decile perform very well. The abnormal returns of the top decile range between 1.12 (Ferson-Schadt) and 4.67 (Fama-French)

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and Zhang (2005).

percent per year. All abnormal returns are significantly positive except for the Ferson and Schadt measure.

D. Regression Approach

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

The results in Table X 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 (which is 0.4412 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 coefficient on the excess investor returns, which is the excess holdings returns plus the return gap minus the expense ratio, is estimated with less precision than the adjusted return gap. This fact indicates that unobserved actions may contain useful information. The return gap is a significant predictor of future performance, because it captures information about fund hidden costs and interim trading in a less noisy fashion

than the investor returns. We argue that apart from other characteristics, such as past returns, expenses, turnover, TNA, and age, fund investors should also take into account the return gap when selecting funds.

VII. Conclusions

In a well-functioning financial market, mutual fund investors are supposed to make fully informative decisions about funds based on the information disclosed by the funds to the public. It is well-known that several fund actions are not entirely observed by the market participants. These actions may benefit or hurt investors, and thus, learning about these actions may help investors to evaluate funds more thoroughly.

In this paper, we analyze the impact of these 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 buy-and-hold returns of the portfolio disclosed in the most recent past. Much of this difference is driven by fund expenses, which are disclosed to the public. However, the residual difference, which measures the effect of unobserved actions, presents us with several interesting findings. First, the effect of unobserved actions is persistent in the long-run. Second, funds differ substantially with respect to the impact of such actions. Most importantly, 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, which, 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 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 less than ten 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. 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:

$$C_{i,t}^{Buy} = 1.098 + 0.336 D_{i,t}^{Nasdaq} + 0.092 TradeSize_{i,t} - 0.084 Log(MktCap) + 13.807 \frac{1}{P_{i,t}} \quad (8)$$

$$C_{i,t}^{Sell} = 0.979 + 0.058 D_{i,t}^{Nasdaq} + 0.214 TradeSize_{i,t} - 0.059 Log(MktCap) + 6.537 \frac{1}{P_{i,t}} \quad (9)$$

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 $C_{i,t}^{Sell}$. *Trade Size* 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.[23]

[23] 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 4.99 (5.85) basis points per month for the unadjusted measure and 5.22 (6.23) basis points for the adjusted measure using Stoll and Abel/Noser. The correlation between the two measures is 97.19 percent, indicating that the adjustment has a very minor impact on estimated trading costs.

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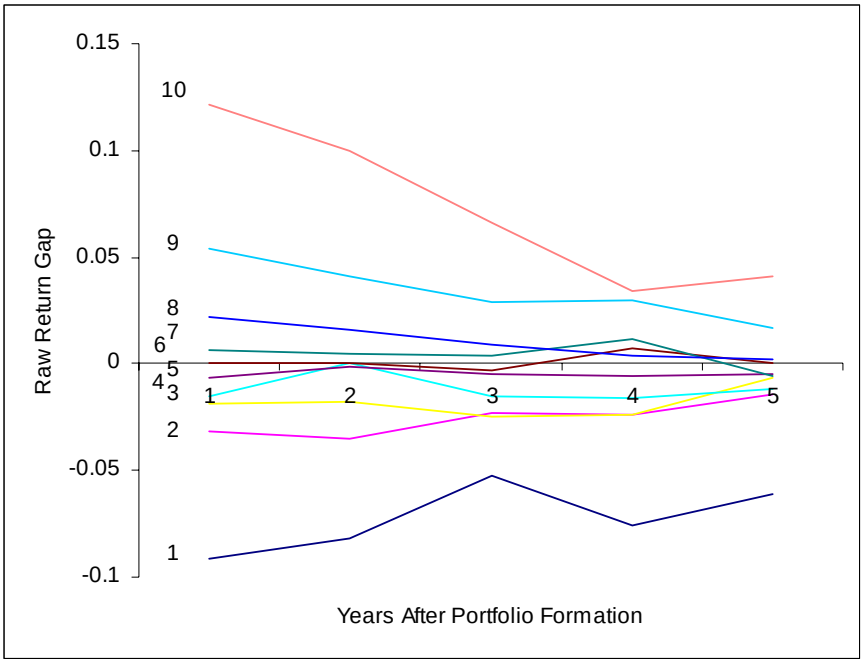
Figure 1
Persistence of the Return Gap

This figure depicts the average return gap of portfolios tracked over a five-year period. 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, the return is additionally adjusted for four-factor Carhart (1997) model.

Panel A: Persistence in the Return Gap



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

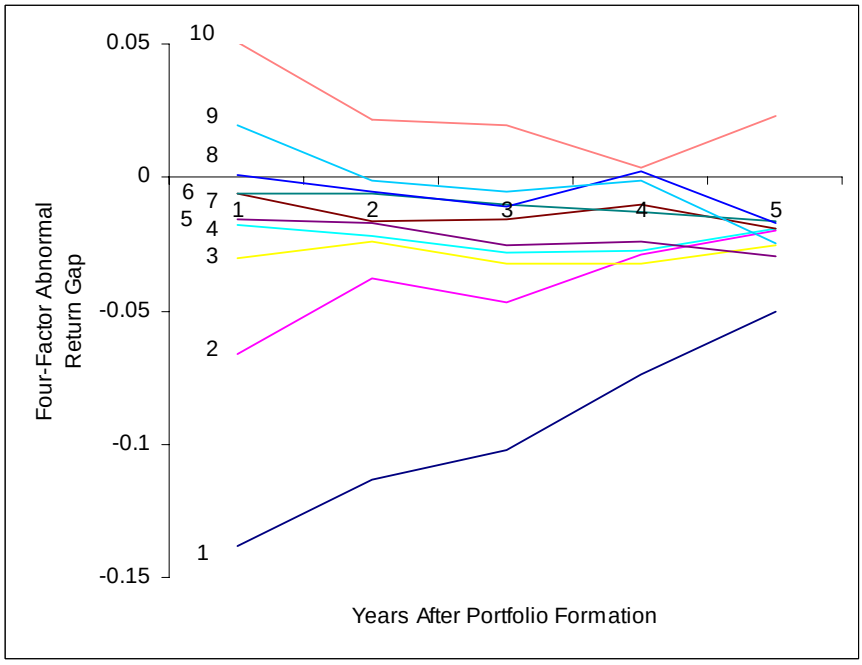
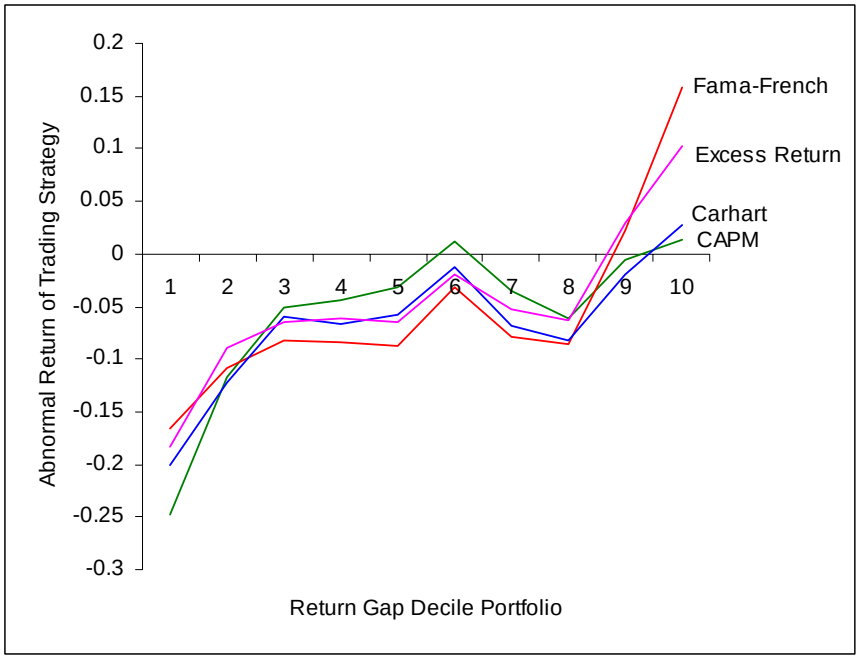


Figure 2
Returns of Trading Strategies

This figure shows the average abnormal returns during the month following the formation period, expressed in percent per month. The decile portfolios are formed based on the previous one-year return gap before adjusting for expenses (Panel A) and after adjusting for expenses (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 excess return in excess of the market return; the market-adjusted abnormal return (CAPM); the three-factor adjusted return as in Fama and French (1993); 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 before Adjusting for Expenses

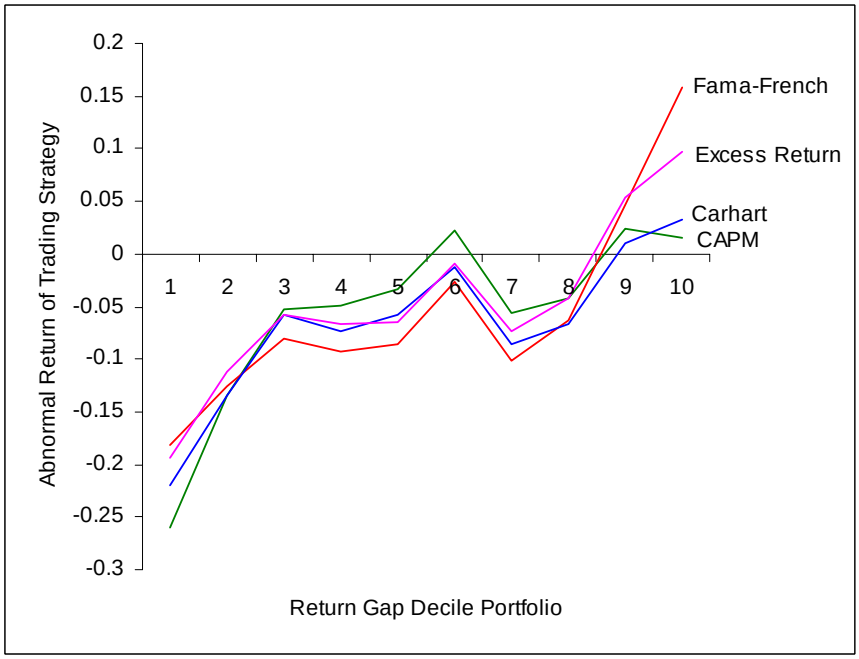
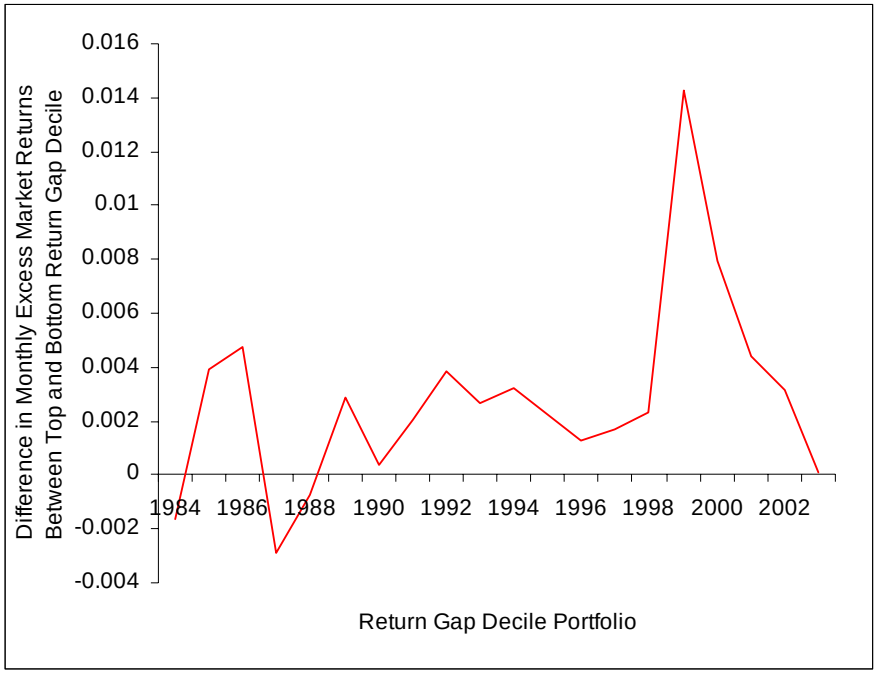


Figure 3
Returns Differences between Return Gap Decile Portfolios

This figure shows the difference in the average excess market returns between the top and the bottom return gap deciles. The decile portfolios are formed based on the previous one-year return gap, where decile one has the lowest return gap and decile ten has the highest return gap. The return differences are expressed in percent per month. In Panel A, we report the difference in the excess returns and in Panel B the four-factor Carhart (1997) alpha.

Panel A: Difference in Excess Market Returns between Top and Bottom Return Gap Deciles



Panel B: Difference in Abnormal Four-Factor Returns between Top and Bottom Return Gap Deciles

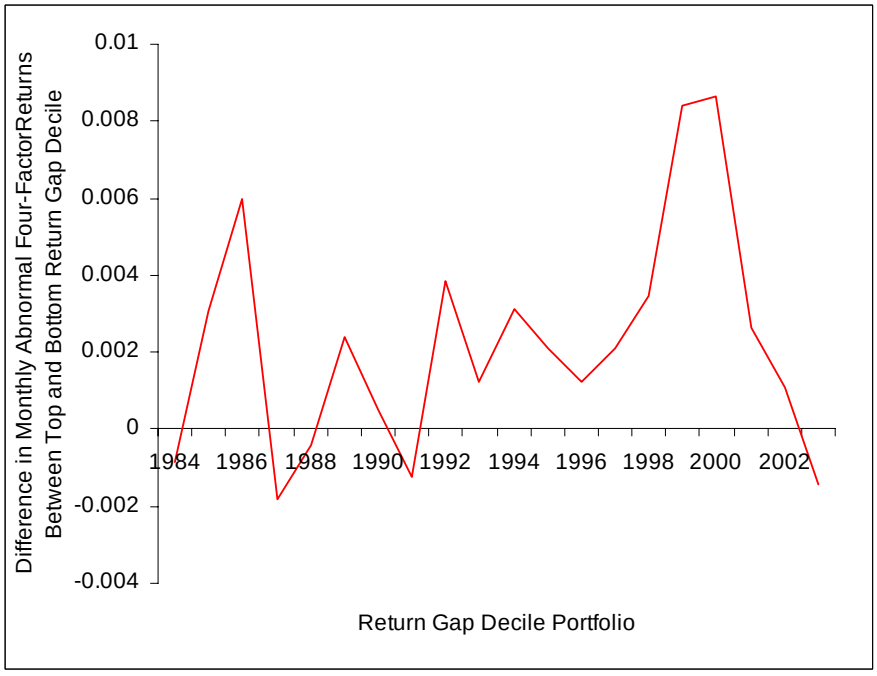


Table I
Summary Statistics

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
Number of share classes	1.97	1	1.39
Mean of Prior-Year New Money Growth (in Percent per month; 1% winsorized)	2.50	0.35	9.45
Std. Dev. of Prior-Year New Money Growth (in Percent per month; 1% winsorized)	6.72	2.91	15.02
Index Fund Indicator Variable (in Percent)	4.54	0	20.81
Number of stocks held	130	72	235
Proportion Invested in Recent IPOs (in Percent)	2.23	0.67	4.09
Time Lag of Holdings in Months	2.04	2	1.99
Trading Costs per month (in Percent)	0.05	0.03	0.06
Investor return per month (in Percent)	0.85	1.15	5.79
Holdings return per month (in Percent)	0.97	1.25	5.77
Correlation Between Monthly Investor and Holdings Return in Prior Year	0.98	0.99	0.05

Table II
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. 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 year 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 III
Cross-Sectional Dispersion of the Return Gap

This table summarizes the equally-weighted raw return gap after subtracting expenses for equally-sized quintile portfolios formed according to various criteria. The returns are expressed in percent per year and the standard errors are summarized in parentheses.

Lagged Fund Attribute	Lowest Quintile	2. Quintile	3. Quintile	4. Quintile	Highest Quintile	Difference (Highest – Lowest)
Correlation	-0.087**	-0.040**	-0.003	-0.001	0.005	0.093***
	(0.035)	(0.019)	(0.014)	(0.012)	(0.009)	(0.035)
Holdings Time Lag	-0.047***	0.018	-0.003	-0.035**	0.007	0.054**
	(0.015)	(0.017)	(0.012)	(0.015)	(0.022)	(0.025)
Trading Costs	0.008	-0.024*	-0.027	-0.041*	0.012	0.003
	(0.011)	(0.015)	(0.017)	(0.021)	(0.023)	(0.023)
Turnover	0.004	0.000	-0.006	-0.034*	-0.039	-0.043
	(0.013)	(0.012)	(0.016)	(0.020)	(0.028)	(0.031)
IPO Holdings	-0.037**	-0.039**	0.005	-0.011	0.039**	0.080***
	(0.017)	(0.016)	(0.016)	(0.015)	(0.019)	(0.024)
TNA	0.015	0.037***	0.007	0.009	-0.015	-0.026**
	(0.011)	(0.011)	(0.013)	(0.014)	(0.013)	(0.011)
Age	0.011	0.008	-0.008	0.002	-0.019	-0.030*
	(0.017)	(0.018)	(0.012)	(0.013)	(0.013)	(0.016)
Expenses	-0.000	-0.033*	-0.015	0.003	-0.012	-0.011
	(0.010)	(0.019)	(0.018)	(0.018)	(0.018)	(0.016)
Mean New Money Growth	-0.028*	-0.030**	-0.021	-0.003	0.024	0.052***
	(0.015)	(0.014)	(0.013)	(0.015)	(0.017)	(0.019)
Standard Deviation of New Money Growth	-0.020	-0.000	-0.023	0.021	0.001	-0.021
	(0.014)	(0.014)	(0.015)	(0.018)	(0.019)	(0.018)

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

Table IV
Determinants of the Return Gap

This table reports the coefficients of the panel regression of the return gap on various fund and fund family characteristics. The sample includes equity mutual funds and spans the period of 1984-2003. The return gap is measured as the difference between the investor fund return and the return based on the previous quarter's holdings. All regressions include time dummies. OLS standard errors take into account clustering by time. The standard errors are provided in parentheses.

	Dependent Variables (in Percent per Month)			
	Actively-Managed Funds		Passively-Managed Funds	
	Raw Return Gap	Abnormal Four-Factor Return Gap	Raw Return Gap	Abnormal Four-Factor Return Gap
Correlation Between Holdings and Investor Returns	0.0069**	0.0101***	-0.0253	0.0250
	(0.0031)	(0.0035)	(0.0176)	(0.0197)
Time Lag of Holdings in Months	0.0090*	0.0010	0.0065	-0.0039
	(0.0046)	(0.0055)	(0.0045)	(0.0069)
Trading Costs per Month	0.1211	-0.0349	-2.0659***	-2.6221***
	(0.2245)	(0.2595)	(0.6668)	(0.7387)
Turnover	-0.0047	-0.0447**	0.0001	-0.1409*
	(0.0127)	(0.0195)	(0.0051)	(0.0816)
Weight of Recent IPOs	0.0157***	0.0132***	0.0118	0.0205
	(0.0031)	(0.0036)	(0.0166)	(0.0339)
Log of TNA	-0.0121***	-0.0154***	-0.0096	-0.0001
	(0.0030)	(0.0037)	(0.0062)	(0.0080)
Log of Age	-0.0195***	0.0062	0.0017	-0.0088
	(0.0051)	(0.0079)	(0.0169)	(0.0237)
Expenses per Month	-0.4157**	-0.2621	-0.4605*	-0.5106
	(0.1715)	(0.2141)	(0.2748)	(0.4715)
Mean New Money Growth	0.0020*	0.0035**	0.0022	0.0003
	(0.0011)	(0.0018)	(0.0022)	(0.0057)
Standard Deviation of New Money Growth	-0.0001	-0.0001	-0.0008	-0.0011
	(0.0007)	(0.0011)	(0.0017)	(0.0026)
Standard Deviation of Investor Returns	0.0046	-0.0095**	-0.0285*	-0.0456
	(0.0104)	(0.0083)	(0.0158)	(0.0341)
Time Fixed Effects	YES	YES	YES	YES
Number of Observations	161,445	113,507	6,569	3,636

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

Table V
Persistence of the Return Gap

This table reports the average and the standard error (in parentheses), along with its statistical significance, of the current return gap for quintile portfolios of the actively managed equity mutual funds sorted by their respective lagged return gap. The return gap has been defined as a difference between reported return and the holding return of the portfolio disclosed in the previous period. The first column summarizes the raw return gap after subtracting expenses and the second column shows the four-factor abnormal return gap after subtracting expenses as in Carhart (1997). The table also calculates the difference in the return gap between the top and the bottom deciles, along with the Spearman rank correlation and the corresponding p-values in parentheses.

	Raw Return Gap	Abnormal Return Gap Using Four-Factor Model
Worst Decile	-0.132***	-0.115***
Mean *RG*: -0.565	(0.033)	(0.032)
Second Decile	-0.023	-0.018
Mean *RG*: -0.244	(0.029)	(0.029)
Third Decile	-0.025*	-0.031**
Mean *RG*: -0.137	(0.014)	(0.015)
Fourth Decile	-0.017	-0.022
Mean *RG*: -0.070	(0.014)	(0.014)
Fifth Decile	-0.015	-0.019
Mean *RG*: -0.020	(0.013)	(0.013)
Sixth Decile	0.002	-0.005
Mean *RG*: 0.025	(0.014)	(0.015)
Seventh Decile	-0.019	-0.030**
Mean *RG*: 0.077	(0.013)	(0.013)
Eighth Decile	0.014	-0.009
Mean *RG*: 0.147	(0.018)	(0.017)
Ninth Decile	0.033	0.006
Mean *RG*: 0.262	(0.023)	(0.023)
Best Decile	0.086*	0.026
Mean *RG*: 0.585	(0.045)	(0.043)
Difference	0.218***	0.141**
	(0.059)	(0.056)
Spearman Rank Correlation	0.915***	0.770***
	(0.000)	(0.009)

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

Table VI
Persistence of the Return Gap by Individual Funds

This table reports for each decile formed according to the one-year return gap (each row), the proportion of mutual funds in particular return gap deciles after one year and the proportion of discontinued funds (each column). The return gap has been defined as the difference between investor return and the holding return of the portfolio disclosed in the previous period after adjusting for expenses. The proportions are expressed in percent per year and the proportions in each row add up to 100 percent.

Initial Return Gap Decile	Return Gap Decile After One Year										
	1	2	3	4	5	6	7	8	9	10	Discon-tinued
1	21.35	11.97	8.14	6.73	5.70	5.36	6.28	7.48	8.02	11.18	7.78
2	12.75	12.41	10.78	8.97	8.08	7.95	8.18	9.05	8.87	7.84	5.09
3	8.47	10.67	11.77	11.21	10.59	9.81	9.58	9.12	8.16	5.96	4.67
4	6.79	9.81	11.08	11.69	12.03	12.29	10.29	8.99	7.44	5.09	4.51
5	5.71	8.62	10.57	12.46	13.39	13.12	11.16	8.90	7.34	4.78	3.95
6	5.40	7.42	9.95	12.31	13.16	13.45	11.61	9.81	8.46	4.85	3.58
7	6.44	8.30	9.76	10.46	11.05	11.77	12.22	11.17	9.32	5.97	3.54
8	7.14	8.85	9.19	9.16	9.67	9.80	11.21	11.61	10.98	8.84	3.56
9	8.57	9.57	8.31	7.50	7.24	7.40	9.21	11.23	13.32	14.13	3.52
10	12.36	8.08	6.24	5.13	4.57	4.90	6.05	8.26	13.98	26.47	3.95

Table VII
Portfolio Returns Based on the Return Gap

This table reports the average performance, along with their significance and standard errors (in parentheses), for deciles of mutual funds sorted according to the lagged one-year return gap. 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 table also calculates the performance difference between the top and the bottom deciles, along with the Spearman rank correlation and the corresponding p-values in parentheses..

	Excess Market Return	CAPM Alpha	Fama French Alpha	Carhart Alpha	Ferson-Schadt 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)
Decile 10 --	0.284***	0.259***	0.321***	0.224***	0.258***	0.060*	0.127**
Decile 1	(0.078)	(0.078)	(0.059)	(0.054)	(0.053)	(0.038)	(0.055)
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 VIII
Return Difference between Top and Bottom Decile Portfolio: Various Sorting Criteria

This table reports the difference in average performance, along with their significance and standard errors (in parentheses), between the top and the bottom decile portfolios formed according to different sorting criteria. 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.

Sorting Criterion	Excess Market Return	CAPM Alpha	Fama French Alpha	Carhart Alpha	Ferson Schadt Alpha	DGTW Selectivity Measure	GT Performance Measure
Return Gap	0.284***	0.259***	0.321***	0.224***	0.258***	0.060*	0.127**
(Base Case)	(0.078)	(0.078)	(0.059)	(0.054)	(0.053)	(0.038)	(0.055)
Return Gap	0.287***	0.272***	0.337***	0.249***	0.280***	0.058	0.103*
Before Expenses	(0.077)	(0.077)	(0.060)	(0.057)	(0.054)	(0.037)	(0.054)
Return Gap for	0.252***	0.239**	0.302***	0.212***	0.370***	0.034	0.101
No-Load Funds	(0.094)	(0.095)	(0.082)	(0.081)	(0.075)	(0.051)	(0.069)
Excess Holdings	0.309	0.237	0.488**	-0.018	-0.190	0.284**	0.039
Return	(0.254)	(0.255)	(0.232)	(0.188)	(0.164)	(0.143)	(0.144)
Expenses	0.100	0.165*	0.070	0.134***	0.124***	-0.062	-0.197***
	(0.101)	(0.098)	(0.049)	(0.047)	(0.047)	(0.040)	(0.052)
Excess Investor	0.395	0.298	0.582**	0.038	-0.110	0.297**	0.124
Returns	(0.271)	(0.271)	(0.240)	(0.190)	(0.169)	(0.146)	(0.146)

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

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

This table reports the average performance, along with their significance and standard errors (in parentheses), for deciles of mutual funds 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 gap 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 between three and one months prior to the portfolio formation. 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 table also calculates the performance difference between the top and the bottom deciles, along with the Spearman rank correlation and the corresponding p-values in parentheses.

	Excess Market Return	CAPM Alpha	Fama French Alpha	Carhart Alpha	Ferson-Schadt 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)
Decile 10 --	0.687***	0.717***	0.795***	0.546***	0.291*	0.246***	0.317***
Decile 1	(0.182)	(0.184)	(0.167)	(0.156)	(0.150)	(0.094)	(0.098)
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 X
Predictability of Future Returns Using Return Gap and Holdings Return

This table reports the coefficients of the pooling regression 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.

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)	
Prior Year Excess Investor Return		0.2607		0.1749		0.2218***		0.1525**
		(0.2285)		(0.2109)		(0.0664)		(0.0674)
Log of Lagged TNA	-0.0533***	-0.0398***	-0.0396***	-0.0229**	-0.0026	0.0064	-0.0222**	-0.0076
	(0.0185)	(0.0145)	(0.0121)	(0.0111)	(0.0115)	(0.0101)	(0.0125)	(0.0088)
Log of Age	0.0061	0.0100	-0.0182	-0.0108	-0.0257*	-0.0210	-0.0222**	-0.0170
	(0.0216)	(0.0229)	(0.0175)	(0.0175)	(0.0144)	(0.0136)	(0.0125)	(0.0125)
Prior-Year Turnover	0.0317	0.0228	0.0233	0.0136	0.0212	0.0157	-0.0469	-0.0541
	(0.0685)	(0.0619)	(0.0711)	(0.0678)	(0.0446)	(0.0414)	(0.0343)	(0.0322)
Index Fund	0.0472	0.0949*	-0.0077	0.0512	0.0164	0.0518	-0.0153	0.0680*
	(0.0489)	(0.0565)	(0.0465)	(0.0561)	(0.0323)	(0.0388)	(0.0315)	(0.0517)
Time Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Number of Observations	160,895	185,166	150,210	163,427	150,210	163,427	150,210	163,427

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