# Unobserved Actions of Mutual Funds

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# Unobserved Actions of Mutual Funds


## ABSTRACT

Mutual fund investors cannot observe all the actions of mutual funds managers despite extensive disclosure requirements. Fund investors cannot observe the timing of the trades of fund managers and they cannot observe the trading prices for the transactions. Unobserved actions can create or destroy value. Skilled fund managers can create value by timing the purchases and sales of individual stocks. On the other hand, unobserved actions can destroy value if the total costs of the trades exceed their benefits. We propose the "return gap" as a new measure to quantify the impact of such unobserved actions on fund returns. The return gap is computed for each fund as the difference between the net return of a fund and the gross return of a hypothetical buy-and-hold portfolio that invests in the previously disclosed holdings. We find a substantial heterogeneity in the return gap, indicating that unobserved actions of some funds create value while unobserved actions of others destroy value. We show that the return gap is highly persistent and that funds with favorable return gaps tend to exhibit superior future performance before and after controlling for various fund characteristics including past fund performance.

## I. Introduction

Mutual funds have recently received keen attention from investigators, regulators, and the media. The alleged wrongdoings are often rooted in the conflicts of interest between mutual fund investors and the fund management companies, and ultimately result in investors' bearing substantial agency costs. In the wake of the scandals, the SEC has enacted a series of reforms to protect investors by increasing the transparency of the actions of mutual funds. Transparency seems to play a crucial role in mitigating the apparent conflicts of interest between investors and management. Despite extensive disclosure requirements in the mutual fund industry, mutual fund investors cannot observe all the actions of mutual funds. In this paper, we study the determinants of these unobserved actions and we ask whether these unobserved actions should be a matter of significant concern for fund investors.

Fund investors cannot observe the timing of the purchases and the sales of securities by the mutual fund and they cannot observe the transaction prices of the trades by a fund. Unobserved actions can create or destroy value for fund investors. Skilled fund managers can create value by timing the purchases and sales of individual stocks. On the other hand, unobserved actions of fund managers can destroy value if the total costs of trades exceed their benefits. Apart from agency costs, mutual fund investors face additional costs related to trading by fund managers and other fund investors. Such costs include commissions paid by the mutual funds to their brokers, market impact, and stale-price arbitrage losses. These various hidden costs reduce the performance of mutual funds and hurt their investors.[1]

[1] Mahoney (2004) describes the various costs in more detail.

We measure the impact of unobserved actions on fund performance using the return gap, which is defined as the difference between the net returns of a fund and the gross returns of a hypothetical buy-and-hold portfolio that invests in the previously disclosed holdings of a mutual fund. While disclosed expenses and undisclosed trading costs decrease the return gap, the benefits of interim trades increase the return gap. For example, commissions paid by the mutual fund to their brokers or stale-price arbitrage losses do not affect directly the gross returns of a portfolio, but they do affect the net returns to the investors, because these costs are subtracted from the assets of a fund. On the other hand, if the interim trades of a fund create sufficient value, then we should observe that the disclosed return of a fund exceeds the return of a hypothetical portfolio that invests in the previously disclosed holdings. Thus, the return gap should be negatively related to the hidden costs of a mutual fund and positively related to the benefits due to the interim trades.

This paper has two objectives. The first objective is to explain the cross-sectional variation in the impact of unobserved actions on the performance of mutual funds. To that end, we investigate whether the actions are related to mutual fund characteristics, such as size, age, style, and asset characteristics. The second objective is to determine whether information about past unobserved actions can help investors to select mutual funds that will perform relatively well in the future. If hidden costs and the interim trading benefits are persistent phenomena, then we should observe that funds that have favorable return gaps in the past will also tend to perform relatively well in the future.[2]

[2] 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 reported net return. We argue that, by benchmarking the investor returns against the holding returns, we filter out the

Analyzing more than 3,000 unique U.S. equity funds over the period 1984-2003, we show that the average value of the return gap accounts for about –1.17 percent per year, which is very similar to the disclosed expenses of 1.19 percent per year. This indicates that the total value of hidden costs and interim trades is, on average, relatively small. Although the impact of unobserved actions on fund performance seems small in aggregate, we document a substantial cross-sectional variation. We find a substantial heterogeneity in the return gap, indicating that the unobserved actions of some funds create value while the unobserved actions of others destroy value. Moreover, we find a strong persistence of the return gap up to five years ahead for funds with positive and negative initial return gaps.

To address the main question of whether unobserved actions of mutual funds should be a matter of concern for fund investors, we examine the implications of these actions for future fund performance. We find that conditioning on the past return gap helps predicting future fund performance even after controlling for past fund performance and other fund attributes. Funds with more favorable past return gaps tend to perform consistently better before and after adjusting for risk- and style-characteristics. Specifically, the decile portfolio of funds with the highest initial return gap yields an average excess return of 1.4 percent per year relative to the market return, whereas a portfolio of funds with the lowest return gap yields an average excess return of –2.6 percent per year. The return difference between the two portfolios is statistically and economically significant. This return difference is not affected significantly after adjusting for common factors in stock returns. We confirm the relationship between a

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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 mutual funds.

fund's return gap and its subsequent performance using panel regressions controlling for other fund characteristics and time fixed effects.

The rest of the paper proceeds as follows. After discussing the related literature in Section II, Section III explains the use of the return gap in estimating the impact of unobserved actions. Section IV discusses the data, while Section V documents the empirical estimates and the determinants of the return gap. In Section VI, we study the impact of unobserved actions on future fund performance and Section VII concludes.

## II. Literature

An extensive academic literature examines whether mutual fund managers have superior investment abilities. While some studies focus on the net returns of mutual fund investors, other studies focus on the gross returns of the fund holdings.

The first group of papers analyzes the net returns of mutual funds. Since the seminal paper by Jensen (1968), the majority of studies conclude that mutual funds, on average, underperform passive benchmarks by an economically and statistically significant number. Gruber (1996) finds that between 1985 and 1994, the average mutual fund underperforms passive market indices by about 65 basis points per year. Carhart (1997) demonstrates very little persistence in the mutual fund performance, after controlling for common factors in stock returns and expenses, concluding that mutual fund managers do not have sufficiently high investment ability.[3]

[3] For evidence on fund performance, see, for example, Elton, Gruber, Das, and Hlavka (1993), Hendricks, Patel, and Zeckhauser (1993), Malkiel (1995), Brown and Goetzmann (1995), Ferson and Schadt (1996), Baks, Metrick, and Wachter (2001), Cohen, Coval, and Pástor (2004), Lynch, Wachter, and Boudry (2004).

In contrast, several studies based on the gross returns of fund portfolio holdings conclude that managers who follow active investment strategies exhibit significant stock-picking abilities. Grinblatt and Titman (1989, 1993) conclude that mutual fund managers, in general, and managers of growth-oriented funds in particular, have the ability to choose stocks that outperform their benchmarks. Grinblatt, Titman, and Wermers (1995) and Daniel, Grinblatt, Titman, and Wermers (1997) attribute much of this performance to the characteristics of stocks held by funds. Chen, Jagadeesh, and Wermers (2000) examine trades of the funds rather than the holdings and show that the stocks purchased by funds outperform the stocks they sell by an economically significant margin. Kacperczyk, Sialm, and Zheng (2004) find that funds holding portfolios concentrated in fewer industries perform better, after controlling for differences in risk and style.

Our paper is most related to Grinblatt and Titman (1989) and Wermers (2000), who compare the performance of net and gross mutual fund returns. Grinblatt and Titman (1989) quantify this difference and argue 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 mutual 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. This paper differs from the above studies in that we analyze the cross-sectional properties of the unobserved actions of mutual funds. Moreover, we delineate mutual fund characteristics that affect

these unobserved actions. Finally, we investigate whether investors, when choosing mutual funds, could benefit from taking into account these unobserved actions.

Frank, Poterba, Shackelford, and Shoven (2004) also analyze the difference between gross and net returns. They 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. Copycat funds do not incur the research expenses associated with the actively managed funds they are mimicking, but they miss the opportunity to invest in assets that managers identify as positive return opportunities between disclosure dates. Our paper examines in more detail the difference between net and gross returns and subsequently investigates whether this difference has any predictive power for future abnormal performance.

Several papers have analyzed the trading costs of mutual funds. Livingston and O'Neal (1996) estimate average annual brokerage commissions at 28 basis points for the period 1989 to 1993. Chalmers, Edelen, and Kadlec (1999) find that average annual brokerage commissions and spread costs for a sample of equity mutual funds over the period 1984-1991 were 31 and 47 basis points, respectively.

Open-end mutual funds are not traded continuously; instead, mutual funds collect the buy and sell orders at the end of the day and transact at the net asset value using closing prices. The closing prices might not fully reflect the most recent available information on the values of the underlying securities. The possibility of stale pricing opens up the opportunity for some investors to perform market-timing arbitrages. In addition, sometimes brokers permit investors to place orders after the close of the market. These transactions hurt long-term investors in the mutual fund and decrease their long-

term performance. Goetzmann, Ivkovic, and Rouwenhorst (2001) and Zitzewitz (2003) examine such stale-price arbitrage losses for international mutual funds. Using a sample of 391 U.S.-based open-end international mutual funds, they illustrate that mutual funds are exposed to speculative traders by showing that a simple, day trading rule yields returns that outperform a buy-and-hold strategy by 20 percent per year, at the same time being subject to only 70 percent of the underlying funds' volatility. Zitzewitz (2003) estimates that due to such activity, investors in international equity funds lost on average 56 basis points annually during the late 1990s. Mutual fund managers might window-dress their portfolios around the disclosure dates to hide their actual positions, as discussed by Meier and Schaumburg (2004).

Academic studies have documented agency problems in mutual fund family operations. Nanda, Wang and Zheng (2004) show that a spillover effect from a star fund (star performance results in greater cash inflow to other funds in its family) induce lower ability families to pursue star creating strategies by increasing variation in investment strategies across funds. Gaspar, Massa, and Matos (2004) investigate whether mutual fund families strategically allocate performance across their member funds favoring those more likely to generate higher fee income or future inflows. They find evidence of a strategic cross-fund subsidization of 'high family value' funds (i.e., high fees or high past performers) at the expense of 'low value' funds in the order of 6 to 28 basis points of extra net-of-style performance per month. Reuter (2004) provides evidence that allocations of initial public offerings favor investors who direct brokerage business to lead underwriters. Our results are consistent with such strategic behavior of mutual fund families.

## III. Methodology: Estimating the Impact of Unobserved Actions

To uncover the impact of unobserved actions on mutual fund returns, we compare the reported net return to an estimate of the gross return of the mutual fund holdings. The net return of the mutual fund *f* at time *t* (*RF*) is computed as the relative change in the net asset value of the mutual fund shares (*NAV*) including the total dividend (*D*) and capital gains (*CG*) distributions:

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

On the other hand, the gross return of the 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 mutual 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 mutual 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 the difference between net and gross returns:

$$RG_t^f = RF_t^f - RH_t^f . \tag{5}$$

The return gap includes the following components:

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

The expense ratio is the only component of the return gap that is observable. Expenses are subtracted on a daily basis from the net assets of a mutual fund. The remaining two components constitute what we define as "Unobserved Actions."

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 and on the cross-subsidization between fund families. Even though we can observe the holdings of a fund only at specific points in time, mutual funds may trade actively in 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. Alternatively, mutual fund families might improve the performance of some specific funds through cross-subsidization, as discussed by Gaspar, Massa, and Matos (2004). For example, fund families regularly obtain IPO allocations, as discussed by Reuter (2004), and can subsidize specific funds by allocating the underpriced IPO stocks to these funds.

The other component of the unobserved actions is the hidden costs of a fund (*HC*), which include trading costs and 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.

Of the three components of the total return gap only the expenses are observable. Hence, it is not possible to measure precisely the other two components of the return gap. Since we are unable to disentangle hidden costs and interim trading benefits, most of our results aggregate them, analyze their determinants, and investigate whether these unobserved components have any predictive power for future fund performance.

## IV. Data

Our sample is an updated version of the data used in Kacperczyk, Sialm, and Zheng (2004) and covers the time period between 1984 and 2003.

### *A. Merge of CRSP and Spectrum*

The main data set 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 virtually all 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 in order to find its price and industry classification code. The vast majority of funds have holdings of companies listed on the NYSE, NASDAQ, or AMEX stock exchanges.

*B. Selection of Domestic Equity Funds*

We start our matching process with a sample of all mutual funds in the CRSP mutual fund database. This database lists 24,019 funds 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, and international funds, as well as funds not invested primarily in equity securities. The selection criteria regarding the objective codes and the disclosed asset compositions are described in more detail in the Appendix. After this screen, our sample period includes data on 8,228 equity mutual funds.

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. We also 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). This reduces the number of funds in our data set to 7,951.

In the next step, we are able to match about 94 percent of the CRSP funds to the Spectrum database. For 465 of the 7,951 funds we cannot find a Spectrum entry. These 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 whose holdings are more than three quarters old and whose total value of the disclosed holdings accounts for less than 50 percent or more than 200 percent of the total net assets of the mutual fund. This final selection criterion reduces the number of mutual funds used in this study to 3,008 funds.

*C. Summary Statistics*

Panel A of Table I lists summary statistics of the main fund attributes. Our sample includes 3,008 distinct funds and 240,886 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 226 funds (August 1984) to 2,212 funds (April 2002). The distribution of the total net assets under management is skewed to the right as the mean is considerably higher than the median. Also, the average age of a mutual fund in our sample is 13.11 years and the age ranges between 2 years and 80 years.

The mean expense ratio is 1.31 percent; however, mutual funds differ significantly in their expense ratios.[4] Larger funds tend to charge lower expenses; thus, the value-weighted expense ratio equals just 0.93 percent. Both value- and equally-weighted expense ratios increase significantly over our sample period. For example, the value-weighted expense ratio increases from 0.76 percent in 1984 to 0.92 percent in 2004. Most mutual funds also charge loads ranging from 0 to 9.5 percent. The mean

[4] The maximum expense ratio recorded in our sample of 32.02 percent per year does not appear to be a data error. The "Frontier Funds: Equity Fund Portfolio" indeed charged 19.72 percent in 2000, 15.55 percent in 2001 and 2002, and 32.02 percent in 2003. These high expense ratios are confirmed using alternative data sources.

turnover ratio is 94 percent, indicating that funds tend to hold their positions, on average, for about one year.

Mutual funds tend to hold a relatively large number of stocks. An average fund holds 118 stocks, but a small number of funds hold several thousand stock positions at one point in time.

The mean monthly net return to fund investors equals 0.82 percent (9.84 percent per year), while the mean monthly gross return of the stock holdings equals 0.95 percent (11.4 percent per year). We will analyze the difference between the net and gross returns in more detail in the subsequent parts of the paper.

Panel B reports the correlation structure between the different fund attributes. We can observe that large funds tend to be older and to charge lower expenses. It is not surprising that the holding returns and the reported returns are very highly correlated -- the correlation coefficient between net and gross returns equals 0.97.

*D. Unavailable Holdings*

For our analysis, we do not have detailed data on the holdings of non-equity asset classes, such as preferred stocks, bonds, cash, and other assets. 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.

The first data column of Table II summarizes the mean and the standard deviation of the respective weights. On average, mutual funds in our sample invest 90.24 percent of

their wealth in equity securities and 7.39 percent in cash or cash equivalents. On the other hand, the percentage holdings of bonds, preferred stocks, and other assets are relatively minor.

To adjust fund holding returns for the returns on the various asset classes, we apply three different methods. The first method estimates the relevant returns for each month using the following regression:

$$RF_t^f = \gamma_{Equity,t} w^f_{Equity,t-1} + \gamma_{Bonds,t} w^f_{Bonds,t-1} + \gamma_{Preferred,t} w^f_{Preferred,t-1} + \\ + \gamma_{Cash,t} w^f_{Cash,t-1} + \gamma_{Other,t} w^f_{Other,t-1} + \varepsilon_t^f \quad (7)$$

In this specification, the net return, *RF*, of a mutual fund, *f,* in a particular month, *t*, is regressed on the lagged observed weights, *w*, of the mutual fund in the five different asset classes. This method allows us to impute the returns, $\gamma_{i,t}$, on the different asset classes. This regression is estimated without an intercept as the weights add up to one.

The second method uses the returns on published indices as a proper adjustment technique. For bonds, we use the total return of the Lehman Brothers Aggregate Bond Index, while for cash holdings we use the risk-free interest rate.[5] No reliable index returns are available for preferred stocks and for other asset classes. Thus, we assume that the return on preferred stocks equals the return of the Lehman Brothers Aggregate Bond Index and the return on other assets equals the risk-free rate.

The third 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.

Table II summarizes the return data obtained from the three methods. Importantly, our results throughout the paper are robust to the three different methods and we usually only report the results using the first method. The second column of Table II summarizes the distribution of the monthly returns using regression (7), while the third column summarizes the distribution of the monthly returns of the CRSP Total Value-Weighted Index, the Lehman Brothers Aggregate Bond Index, and the risk-free rate. The correlation between the differently-measured respective returns is relatively high. The correlation between the imputed equity return (imputed bond return) and the CRSP Index (Lehman Brothers Aggregate Bond Index) is 97.97 percent (88.25 percent). In contrast, the correlation between the imputed return on cash positions and the risk-free rate is considerably smaller (22.17 percent). The latter might be a result of seasonal variations in the cash holdings of funds or a result of the fact that mutual funds do not invest their cash-equivalent holdings only in short-term T-bills.

In the subsequent tests, we will use the imputed returns on bonds, preferred stocks, cash, and other assets to adjust the equity holding returns.

## V. Estimating the Return Gap

This section provides summary statistics of the investor and holding returns, quantifies the resulting return gap, and investigates its determinants.

[5] 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.

*A. Quantification of the Return Gap*

To summarize the return data, we compute in each month the equally-weighted average of the reported and holding-based returns of the mutual funds in our sample. In Panel A of Table III, we report the time series average, with the corresponding standard errors in parentheses.[6] Next, we present two different measures of the return gap. The first measure is defined as a difference between the investor returns and the return of the equity holdings and adjusts for the non-equity holdings of a fund using the returns estimated from regression (7).[7] The second measure subtracts the disclosed monthly expenses from the first measure of the return gap, and thus corresponds to the value created by the interim trades net of the hidden costs of the mutual fund.

The average net investor return equals 1.004 percent per month or about 12 percent per year. On the other hand, the average return of a portfolio, including the previously disclosed equity positions, is equal to 1.102 percent. The difference between the investor and the holding return (i.e., the return gap of the equity portfolio before expenses) equals –9.8 basis points per month or –1.17 percent per year. The average expense ratio equals 0.1 percent per month or 1.19 percent per year. The return gap after adjusting for disclosed expenses is insignificantly different from zero. However, we know from previous studies that the trading costs of mutual funds are not insignificant[8] and that the trades of funds create value[9]. We analyze in Appendix B the benefits of

[6] We obtain very similar results if we compute the value-weighted return in each month. However, expenses tend to be smaller using value weights.
[7] We obtain very similar results if we use the index returns instead of the estimated returns.
[8] See, for example, Livingston and O'Neal (1996), Chalmers, Edelen, and Kadlec (1999), Wermers (2000) for studies of the trading costs of mutual funds.
[9] See, for example, Grinblatt and Titman (1989, 1993), Daniel, Grinblatt, Titman, and Wermers (1997), and Chen, Jagadeesh, and Wermers (2000).

interim trades in more detail. Thus, in the aggregate fund sample the hidden costs are similar in magnitude to the benefits of interim trades.

*B. Risk- and Style-Adjusting the Return Gap*

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, Panels B, C, and D of Table III summarize the abnormal returns and the factor loadings using the one-factor CAPM (Panel B), the Fama and French (1993) three-factor model (Panel C), and the Carhart (1997) four-factor model (Panel D). Among the three, the Carhart (1997) is the most comprehensive factor model and has the following specification:

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

where the dependent variable is the quarterly return on portfolio $i$ in quarter $t$ minus the risk-free rate, and the independent variables are given by the returns of the 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, $\alpha_i$, is the Carhart measure of abnormal performance. The CAPM model uses only the market factor and the Fama and French model uses the

[10] The market return is calculated as the value-weighted return on all NYSE, AMEX, and NASDAQ stocks using the CRSP database. The monthly return of the one-month Treasury bill rate is obtained from Ibbotson Associates.

[11] The size, the value, and the momentum factor returns were taken from Kenneth French's Web site http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library.

first three factors. Table III demonstrates that the general conclusions are not affected if we exclude return components that are due to common factors in asset returns.[12]

*C. Distribution of the Return Gap*

Table IV summarizes the return gap conditional on various fund characteristics. Panel A divides our sample into actively and passively managed funds. The vast majority of mutual funds in our sample (96.4 percent) are actively managed. Passively managed funds have a raw return gap that is –0.068 percent per month lower than that of actively managed funds. This difference in the return gap can be explained primarily by differences in disclosed expenses.

Panel B separates the funds into three groups according to their objective code in the Spectrum database. Aggressive growth funds tend to follow the most aggressive investment strategies and invest primarily in growth companies. Growth and income funds follow the least aggressive strategies and invest primarily in value companies. We find that the expenses and the benefits from interim trades are largest for aggressive growth funds and smallest for the growth and income funds.

In Panel C, we split our sample into quintiles with respect to the age of each fund. The average age of funds in the youngest quintile is 3.3 years, while the average age of the funds in the oldest quintile is 40.8 years. Our results indicate that the return gap after the adjustment for expenses (column two) is positive for the youngest funds and negative for the older funds. This result is consistent with Gaspar, Massa, and Matos (2004), who

[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 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.

argue that young funds are more likely to receive subsidies from their families than older funds, because the performance-cash flow sensitivity is more pronounced for younger funds, as shown by Chevalier and Ellison (1997).

Table I shows that the TNA of a fund is positively correlated with fund age. In Panel D of Table IV, we sort the funds according to their lagged TNA. We observe that the largest funds tend to have the lowest return gaps after adjusting for non-equity holdings and expenses. This result is consistent with Berk and Green (2004), who argue about the existence of significant diseconomies of scale in money management.

In Panel E, we divide our sample into quintiles according to fund expenses. We observe that funds with lower average expenses have more favorable return gaps. As a result, we can infer that unobserved actions exhibit a potentially interesting cross-sectional variation.

*D. Persistence of the Return Gap*

From the previous analysis one cannot conclude whether the cross-sectional differences in the return gap are due to persistent hidden benefits and hidden costs. To enhance our understanding of this matter, we study whether the return gap is a persistent phenomenon.

For that purpose, we sort all mutual funds in our sample into quintiles according to their 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 (Panel A) and after adjusting for expenses (Panel B). The first column of Panel A shows that funds in the worst return gap quintile during the previous 12 months generate an average return

gap before expenses of -18.5 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 -1.6 basis points.

The second column of Panel B shows that the return gap after adjusting for expenses is also highly persistent. Funds with the worst return gap during the previous 12 months have an average return gap after expenses of -7.0 basis points in the following month, while funds with the best return gap have an average return gap of 9.0 basis points. The future return gaps of both extreme quintiles are statistically and economically highly significant. The third column indicates that these effects remain even after adjusting the returns for the common factors specified in Carhart (1997). These results show that funds with positive return gaps tend to have persistently higher interim trading benefits than hidden costs and conversely for funds with negative return gaps.

We also track the persistence of the return gap over the subsequent five years and compute their 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 remarkably persistent over time. Panel A adjusts the return gap for non-equity holdings and Panel B for non-equity holdings and expenses. The ranking of the decile portfolios in the month after the formation period remains identical to that in the formation period. The first decile in Panel A has an average return gap of –23 basis points and the tenth decile an average return gap of 3 basis points. The difference in the return gap between the top and the bottom deciles amounts to, approximately, 26 basis points per month or to about 3.1

percent per year.[13] While the literature on the performance persistence of mutual funds documents that the worst funds are persistent, our results show that we find persistence in both tails of the return gap distribution.[14] The results indicate that the benefits of interim trades and the hidden costs are persistent phenomena in the mutual fund industry.

Panel B shows the persistence of the return gap after adjusting for expenses. We find that three 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 seven deciles, we conclude that they have higher hidden costs than interim trading benefits.

Panel C adjusts the return gap for expenses and for four common return factors following Carhart (1997). Carhart shows that performance persistence is less significant after one accounts for possible momentum effects. We find that the abnormal return gap remains persistent even after controlling for common factors. Thus, our results cannot be fully explained by the differences in systematic factors in the interim trading benefits.

Although all figures show an economically significant persistence in the return gap, they do not demonstrate whether this persistence is statistically significant. Table VI summarizes the Spearman rank correlations for the ten portfolios and indicates that our persistence results are generally highly statistically significant.

While the literature generally does not find robust persistence in mutual fund performance after controlling for the momentum factor, we find a relatively strong persistence in the return gap. One reason may be that by measuring the investor returns

[13] 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.
[14] See Hendricks, Patel, and Zeckhauser (1993), Brown and Goetzmann (1995), and Carhart (1997) for studies on the persistence of mutual funds.

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 mutual funds.

*E. Determinants of the Return Gap*

This section analyzes the determinants of the return gap using a panel regression of the return gap on various fund characteristics. We lag all explanatory variables by one month, except for expenses and turnover, which are lagged by one year due to data availability. Using the lagged explanatory variables mitigates potential endogeneity problems. We also take the natural logarithms of the age and size variables, to mitigate an impact of right skewness in the distributions of both variables. Each regression additionally includes time fixed effects.

We estimate the regressions with panel-corrected standard errors (PCSE). The PCSE specification adjusts for heteroskedasticity and autocorrelation in fund returns (Beck and Katz, 1995). Since most mutual funds do not exist over the whole sample period we analyze the unbalanced panel.

Table VII summarizes the regression results. In this regression, we do not need to adjust the return gap for expenses, because we use the expense ratio as an explanatory variable. Since we want to analyze both fund-specific and family-specific effects, we are bound to use two slightly different samples in our regressions. The first data column reports the results using our complete time period between 1984 and 2003. Since the management company of each individual mutual fund is only identified after 1992, column two reports the results using only data between 1993 and 2003. Thus, the number

of observations in column two is smaller than the number of observations using the entire sample period.

First, we analyze the sensitivity of the return gap to a potential impact of expenses and trading costs. We should expect that the return gap decreases if a fund charges higher expenses or if a fund has higher trading costs, unless these revealed and hidden costs are compensated for with higher interim trading benefits. The results indicate a one-to-one relationship between the return gap and expenses: A one percentage point increase in expenses decreases the return gap by 1.173 percentage points. Thus, the interim trading benefits are not sufficiently large for high-expense funds to offset their higher expenses.

Next, we examine how potential trading activities affect the return gap. On one hand, trading costs can be approximated by the turnover of a fund, the exchange on which the stocks are traded, and the characteristics of the stocks held. On the other hand, these variables might also be related to the interim trading benefits. The estimates from our regression exhibit no significant relationship between the turnover of a fund and the future return gap. An insignificant coefficient estimate on turnover, however, does not necessarily imply that the trading costs are not significantly related to turnover. It is 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.

To determine the existence of a relationship between the exchange on which a fund trades stocks and the return gap, for each fund and month, we compute the proportion of their most recent positions, traded either on the NYSE, NASDAQ, or

AMEX. These variables capture differences in trading costs on the three exchanges. We find that funds that hold a larger proportion of stocks traded on the NYSE and NASDAQ tend to have higher return gaps than funds that hold a larger proportion of AMEX stocks. The relationship is highly significant both statistically and economically. This result is consistent with the evidence that, on average, trades on AMEX incur higher costs.

To investigate the extent to what the return gap is related to the size of a funds' holdings we compute the portfolio composition of each fund. Each stock traded on the major U.S. exchanges is grouped into respective quintiles according to its lagged market value. Subsequently, using the quintile information, we compute the value-weighted size score for each mutual fund in each period. For example, a mutual fund that invests only in stocks in the smallest size quintile would have a size score of 1, while a mutual fund that invests only in the largest size quintile would have a size score of 5. We find that the return gap tends to be more favorable for funds that hold small stocks. This result is consistent with Kacperczyk, Sialm, and Zheng (2004), who demonstrate that funds that hold small capitalization stocks tend to exhibit superior performance, presumably because informational asymmetries play a more significant role for these stocks.

Next, we find that, over the sample period, younger funds tend to have more favorable return gaps. However, we do not find any statistically significant difference in return gaps between small and large funds.

Mutual fund families can effectively transfer assets from one mutual fund to another fund in their family. For example, Gaspar, Massa, and Matos (2004) show that families allocate IPO deals to 'high family value funds,' which they identify as young funds with high expense ratios and with positive recent performance. Cross-subsidization

increases the return gap of the subsidized funds and decreases the return gap of the subsidizing funds. This hypothesis indicates that the funds, which are most likely to receive subsidies, such as small and young funds, will tend to have more favorable return gaps. To control for these family effects, we include, as additional explanatory variables, the ratio between the fund and the family expense ratio, the ratio between the fund and the family TNA, and the ratio of the fund and the family age.

We find that the relative age of a fund is negatively related to the return gap and that the relative expenses are positively related to the return gap. These results are consistent with Gaspar, Massa, and Matos (2004), who show that younger funds and funds with higher expense ratios in a fund family tend to be cross-subsidized. We find no evidence that the relative size of a fund in the family affects its return gap.

One specific way of how fund families can favor particular funds is by allocating underpriced IPO purchases to a group of particular funds (Reuter, 2004; Gaspar, Massa, and Matos, 2004). Although we do not know which funds obtain IPO allocations directly, we can assume that funds that have obtained a larger proportion of IPO allocations tend to have a larger fraction of recent IPO stocks in their portfolios. Therefore, we compute for each fund in each month the proportion of stocks that went public during the previous year. If fund families allocate the IPOs consistently to the same funds, then we should observe that funds, which obtained past IPO allocations, will have more favorable return gaps in the future. Table VII shows that the weight of recent IPOs in the fund portfolio has a strong predictive power for the future return gap. This result indicates that part of the cross-subsidization within fund families is due to IPO allocations.

Finally, using older holdings data magnifies the impact of interim trades, but should not affect the hidden costs in a particular month. Thus, we should expect that the return gap improves when the holdings are more stale if interim trades add value. We observe that the return gap improves by 2.5 basis points per month for each quarter of the disclosure delay.

## VI. Predictability of Future Fund Performance

In this section we address the question whether investors should care about unobserved actions of mutual funds. We examine whether our estimate of past unobserved actions can help investors to select mutual funds that will perform relatively well in the future. If the return gap is a persistent phenomenon then we should expect that mutual funds with higher return gaps (i.e., those with more beneficial unobserved actions) outperform funds with lower return gaps in the future.

### *A. Panel Regressions*

To test this hypothesis, we run panel regressions of the risk and style-adjusted performance of mutual funds on estimates of past value of unobserved actions, controlling for other fund-specific characteristics.

Table VIII shows that the return gap has an important impact on the future fund performance, even after controlling for other fund characteristics, such as expenses, turnover, size, and age. Using Carhart's four-factor model, a one percent increase in the past return gap increases the future fund return by 19 basis points. The fact that the gap

remains significant, after controlling for expenses, indicates that unobserved actions, offer an additional insight into the predictability of future fund returns.

Previous evidence indicates some short-term persistence in mutual fund performance, especially for poorly performing funds, for example, Blake, Elton, and Gruber (1993), Goetzmann and Ibbotson (1994), Brown and Goetzmann (1995), Malkiel (1995), Elton, Gruber and Blake (1996), Gruber (1996), and Carhart (1997). Table IX examines the incremental predictability of the return gap for future fund performance over and above past fund returns. We find that past returns are positively related to future returns. Also, the coefficient on the return gap, though smaller in magnitude than that in the previous table, remains positive and significant, even after we control for the lagged net return of the fund, which includes the hidden costs and the interim trading benefits. Using a four-factor model, a one percent increase in the past return gap increases future fund return by 10 basis points. The return gap remains a significant predictor of future performance, because it captures information about fund hidden costs and interim trading in a less noisy fashion than the net returns. We argue that apart from other characteristics, such as expenses, turnover, TNA, and age, fund investors should also take into account the return gap when they select mutual funds.

*B. Trading Strategies*

In this section, we examine the profitability of a hypothetical trading strategy based on the variable return gap, which measures the impact of unobserved actions of mutual funds. Specifically, we sort all mutual funds in our sample into deciles, according to their average return gap during the previous 12 months. Subsequently, we compute the

average returns in the following month by weighting all the funds in a decile equally. In Table X we report the net returns for each of this decile portfolio. The first column reports excess returns of the deciles with respect to the market portfolio, while the remaining three columns report the adjusted abnormal returns according to the one-factor CAPM model, the three-factor model of Fama and French, and the four-factor model of Carhart.

Panel A sorts funds according to the raw return gap. Funds in the first decile have an average return gap of –73.75 basis points per month during the portfolio formation period. On the other hand, funds in the tenth decile have an average return gap of 54.63 basis points per month during the formation period.

We observe that funds with the most favorable past return gaps (decile ten) tend to perform significantly better than 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 33.70 basis points per month or about four percent per year, as compared to investing in the decile-one funds. The relationship between past return gaps and future performance is almost strictly monotonic, which results in a very high Spearman rank correlation coefficient of 98.79 percent.[15] Our results are not affected substantially by the variation in the risk or style factors, as reported in the last three columns of Table X.

Interestingly, the identified performance difference is primarily driven by the poor returns of funds with highly negative return gaps. With the exception of the Fama and

[15] 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.

French abnormal return, no other performance measures are significantly positive for the funds with the most favorable return gaps.

Since we sort funds by the return gap before adjusting for expenses, the return difference in Panel A might be driven by possible differences in the fund expenses. In Panel B of Table X, we sort mutual funds according to the return gap adjusted for expenses, which is equivalent to sorting funds according to the value of their unobserved actions. The results are not affected substantially when using this alternative definition. This indicates that the profitability of our trading strategy most likely results from persistence of hidden costs or interim trading benefits rather than from persistence of expenses. Figure 2 presents the graphical illustration of the results discussed above.

## VII. Conclusions

In a well-functioning financial market, mutual fund investors are supposed to make 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 fully observed by the market participants. These actions may benefit or hurt investors, and thus, learning about these actions may help investors to evaluate mutual funds more thoroughly.

In this paper, we analyze the impact of these unobserved actions on the fund peformance for the U.S. equity mutual funds between 1984 and 2003. We estimate the impact of unobserved actions by taking the difference between the reported net 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 and asset structure, both being 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. For example, in contrast to old funds, young funds, on average, generate positive returns on their unobserved 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. A hypothetical trading strategy that buys funds with a positive return gap and shorts funds with a negative return gap would have generated an economically large return on investment.

Our paper offers several implications for the sector of mutual funds. First, 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. Second, mutual fund investors can make better fund selection decisions if they take into account the unobserved actions of mutual funds.

## APPENDIX

*A. Sample Selection*

In the first step, we select all funds from the CRSP Survivor-Bias Free Database. To focus on domestic equity mutual funds, for which the holdings data are the most complete and reliable, we eliminate balanced, bond, money market, 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 (Aggressive Growth), GI (Growth and Income), LG (Long-term Growth), IN (Income), PM (Precious Metals), SF (Sector Funds), or UT (Utility Fund). If a fund does not have any of the above ICDI objectives, we select funds with the following Strategic Insight objectives: AGG (Aggressive Growth Funds), ENV (Environmental Funds), FIN (Financial Sector Funds), GLD (Gold Oriented Funds), GMC (Growth MidCap Funds), GRI (Growth and Income Funds), GRO (Growth Funds), HLT (Health Funds), ING (Income – Growth Funds), NTR (Natural Resources Funds), RLE (Real Estate Funds), SCG (Small Company Growth Funds), SEC (Sector Funds), TEC (Technology Funds), or UTI (Utility Funds). 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 (Growth), G-I (Growth Income), AGG (Aggressive Growth Fund), ENR (Energy Sector), FIN (Financial Sector), GCI (Growth with Current Income), GPM (Gold and Precious Metals), GRI (Growth and Income), GRO (Growth), HLT (Health Care), MCG (Maximum Capital Gains), SCG (Small Capitalization Growth), TCH (Technology), or UTL (Utilities). 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,. Finally, we exclude funds whose total value of the disclosed equity holdings is more than double the TNA of the fund or whose TNA is more than double the value of the disclosed equity holdings. This eliminates funds which hold a large proportion of assets that are not included in the CRSP stock price database, because they are not traded on the major U.S. exchanges.

*B. Interim Trading Benefits*

An important portion of unobserved actions originates due to the fact that funds can trade between disclosure dates. For example, the return on the holdings underestimates (overestimates) the actual gross return of a fund if a newly acquired stock appreciates (depreciates) prior to the disclosure date. We would also miss the returns generated by stocks that are only held for a short time period in between portfolio disclosure dates. The hidden benefits may also include cases where a fund receives underpriced IPO allocations, which tend to appreciate significantly on the first trading day. Unfortunately, we are unable to observe all these trading benefits. We can only observe the implied trades that follow from subsequent holdings disclosures.

To investigate whether hidden trading benefits exist and to estimate a lower bound of their value, we follow Grinblatt and Titman (1993) and compute the return to the disclosed trades of a mutual fund. The Grinblatt and Titman performance measure is defined as the difference between the current return of a portfolio that holds the most recently disclosed holdings and the current return of a buy-and-hold portfolio that holds the holdings disclosed $\tau$ periods ago:

$$GTBH_{t,\tau}^{f} = \sum_{i=1}^{N} w_{i,t-1}^{f} R_{i,t} - \sum_{i=1}^{N} \tilde{w}_{i,t-1,\tau}^{f} R_{i,t} = \sum_{i=1}^{N} \left( w_{i,t-1}^{f} - \tilde{w}_{i,t-1,\tau}^{f} \right) R_{i,t} \,. \tag{9}$$

While Grinblatt and Titman (1993) use the actual lagged weights, $w_{i,t-\tau}^{f}$, to form the benchmark portfolio, we use the buy-and-hold lagged weights, $\tilde{w}_{i,t-1,\tau}^{f}$, defined as in (4). Using the actual weights requires a trading strategy that rebalances the benchmark portfolio. In our case, we are interested in the contribution of the trades relative to a passive buy-and-hold benchmark portfolio. In this respect, our performance measure computes the contribution of the disclosed trading transactions during the last $\tau$ periods.

For all mutual funds in our database, we compute the *GTBH* measure for different time gaps between disclosure dates $\tau$. In each month, we compute the contribution of the trades using the lagged TNAs of our mutual funds. Figure A1 summarizes the time series average of this measure for the mutual funds in our sample. By construction, the *GTBH* measure is zero if the most recent quarter is also the benchmark quarter (i.e., the quarter difference is zero). We observe that the value-weighted *GTBH* measure increases gradually for the first three quarters and decreases slightly with a four-quarter holdings difference for both the equally- and the value-weighted measures. The equally-weighted measures are larger for all quarter gaps, mainly because small mutual funds tend to

perform better. The disclosed trades between two consecutive quarters contribute 3.6 basis points per month, or about 0.43 percent per year, to the total return of a fund. The 95 percent confidence levels for the time series of the value-weighted *GTBH* performance measures, as presented by the dotted curves, indicate that this performance measure is significantly different from zero. The *GTBH* measure equals 5.9 basis points per month, or about 0.68 percent per year, if we use the disclosed trades during one year. These results are generally consistent with the results obtained by Grinblatt and Titman (1993), although the magnitude using a buy-and-hold portfolio is smaller compared to a rebalanced benchmark portfolio.

Next, we apply the *GTBH* measure to obtain a lower bound on the returns due to interim trading. In particular, funds that disclose their holdings only semi-annually tend to have higher interim trading returns than funds that disclose their holdings quarterly. To obtain monthly returns due to interim trading within a quarter, we perform an interpolation of values between the nodes in Figure A1. The *GTBH* measure constitutes a lower bound on the interim trading return for two following reasons. First, when we compute the *GTBH* measure, we do not observe the profitability of the trades immediately following the purchase decision. Second, if a fund obtains a stock at a price below the market value, such as in an underpriced IPO allocation, then the *GTBH* measure does not capture this effect.

To determine a lower bound of the benefits from the interim trading, in each month we compute the average *GTBH* performance measure at the one, two, three, and four-quarter gap level of all funds in the sample, as shown in Figure A1. We use these returns to estimate the monthly returns due to interim trading. For example, if a fund did

not disclose its holdings in the last quarter, but disclosed its holdings two quarters ago, then we use the average *GTBH* returns with a two quarter lag for all funds which have this measure available in the current month. This method assumes that the interim trade return distribution of funds that did not disclose their holdings last month is identical to the interim trade return distribution of funds that did disclose their holdings last month. Based on this calculation, we obtain interim trade benefits of 3.4 basis points per month.

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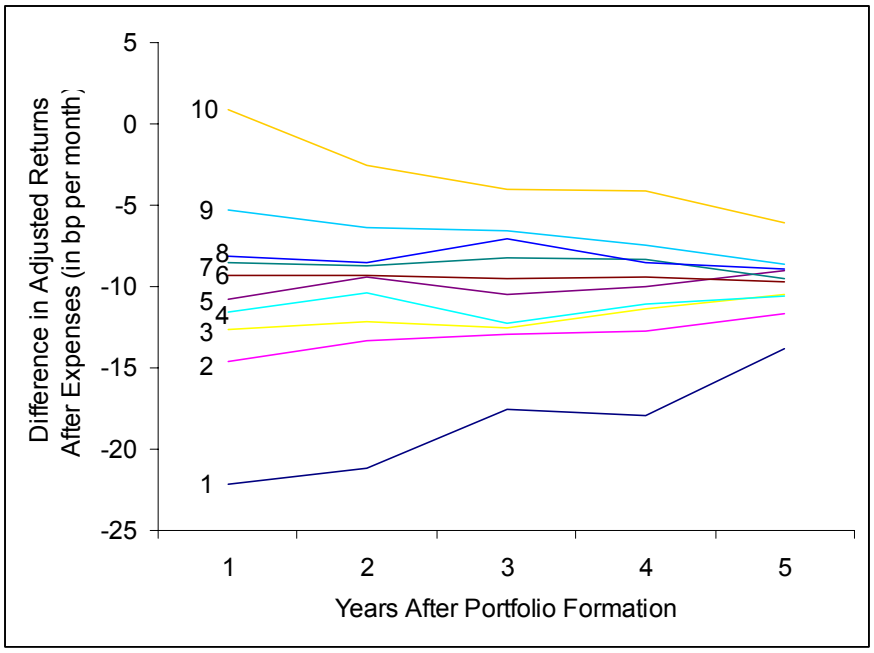
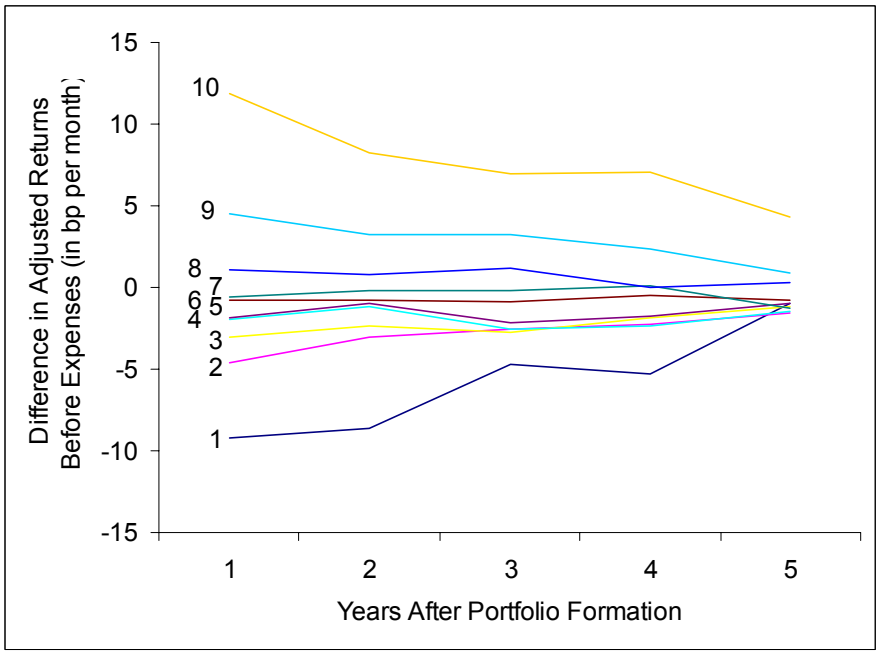
## Figure 1
## Persistence of the Return Gap

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 reported net return and the holding return of the portfolio disclosed in the previous period. 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 case of some funds dropping from the portfolio, the portfolio weights are adjusted equally. In Panel A, we report the total return gap; in Panel B we additionally adjust the difference for expenses; in Panel C, the return is additionally adjusted for four zero-investment portfolios – market, size, value, and momentum, as in Carhart (1997). The Figures do not show the return gap during the formation period.

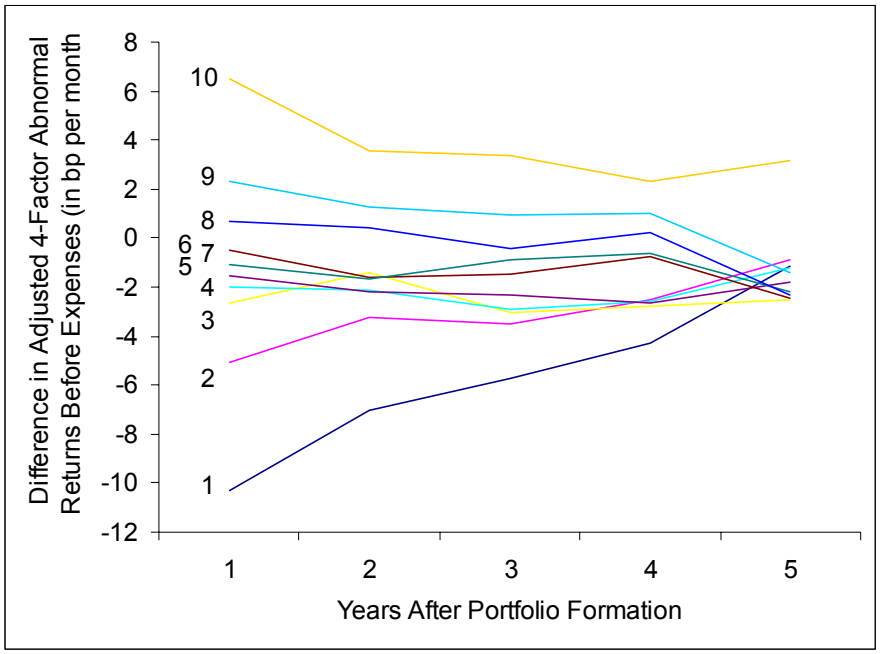
**Panel A: Persistence in the Return Gap before Adjusting for Expenses**




**Panel B: Persistence in the Return Gap after Adjusting for Expenses**



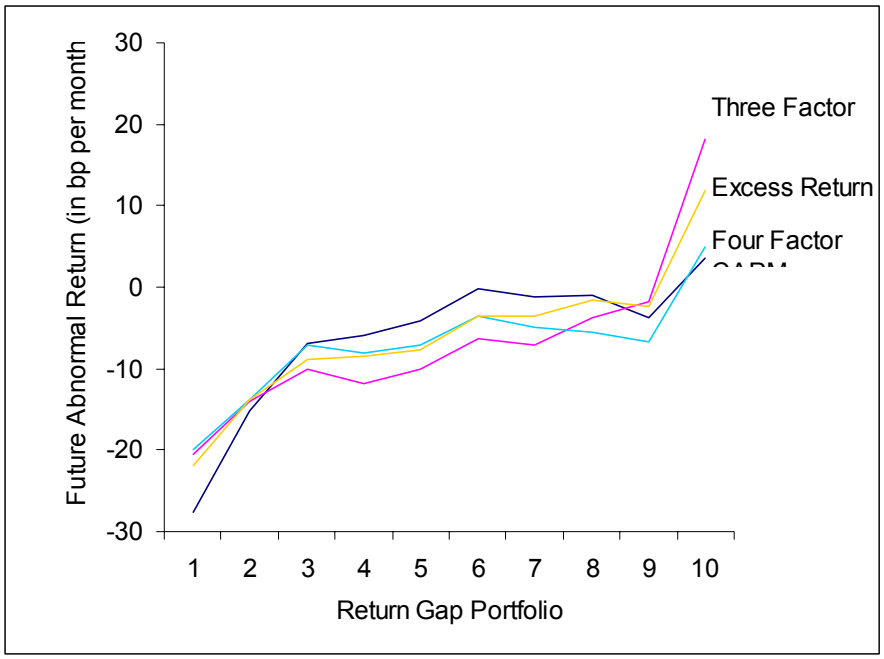
**Panel C: Persistence in the Abnormal Return Gap Using the Carhart Four-Factor Model**



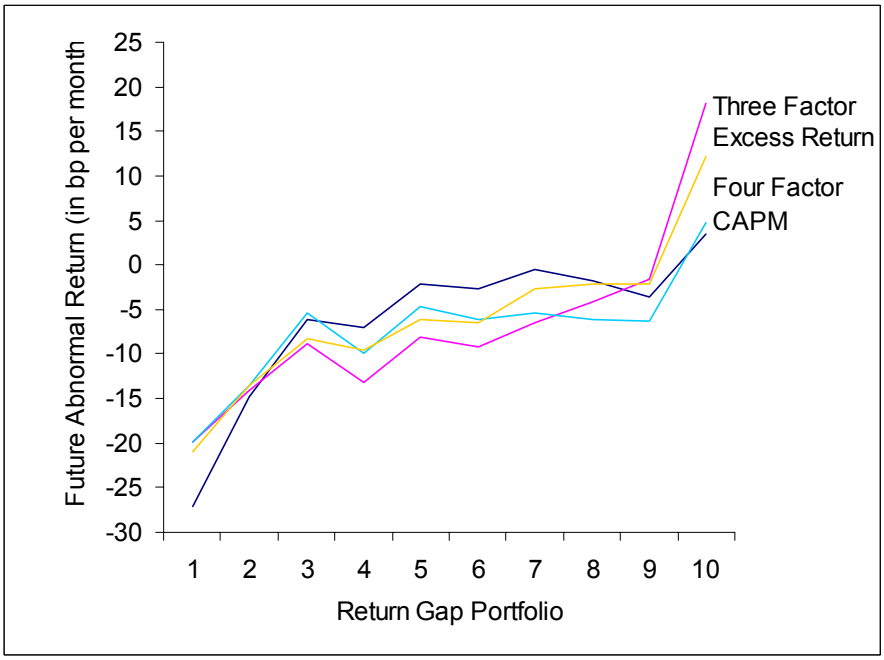
## Figure 2
## Returns of Trading Strategies

This figure shows the average abnormal returns during the month following the formation period (in basis points). 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 risk-free rate; 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 before Adjusting for Expenses**

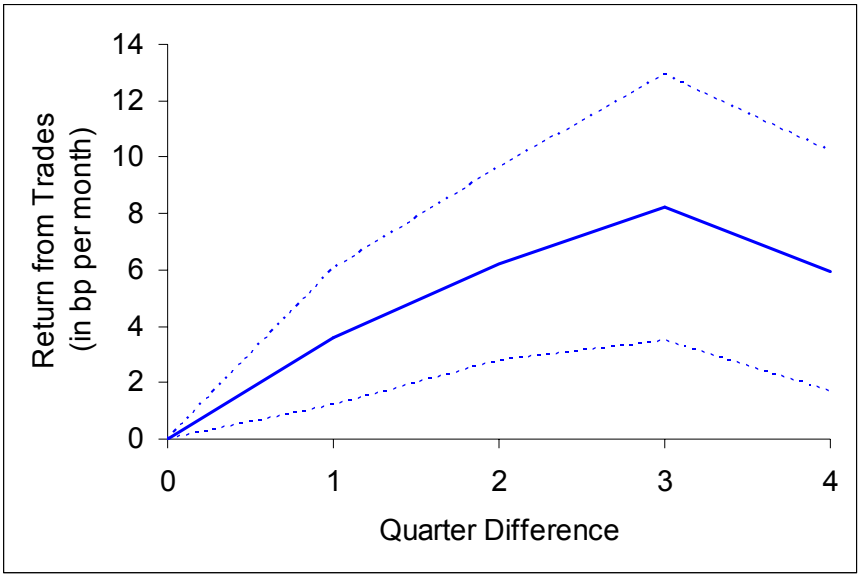



**Panel B: Sorting Based on the Return Gap after Adjusting for Expenses**



## Figure A1
## Return on Trades

This figure depicts the mean return, and the 95 percent confidence interval, on the trades for different quarters for the aggregate equity mutual fund sector. The return from trades is computed for each fund in each month as $GTBH_t = \sum[(w_{j,t-1} - \hat{w}_{j,t-\tau})R_{j,t}]$, where $\hat{w}_{j,t-\tau}$ are the buy-and-hold weights of the portfolio that was held at time $t-\tau$.



## Table I
## Summary Statistics

Panel A presents the summary statistics (mean, median, minimum, and maximum) for the sample of the actively managed equity mutual funds over the period 1984 to 2003. Panel B reports the contemporaneous correlations between the main variables, along with their statistical significance.

**Panel A: Summary Statistics**

| | Mean | Median | Minimum | Maximum |
|---|---|---|---|---|
| Number of distinct mutual funds | 3,008 | | | |
| Number of fund-month observations | 240,886 | | | |
| Number of funds per month | 1,004 | 850 | 226 | 2,212 |
| TNA (Total Net Assets) (in Millions) | 910 | 153 | 0.004 | 110,526 |
| Age | 13.11 | 8 | 2 | 80 |
| Expense Ratio (in Percent) | 1.31 | 1.23 | 0.01 | 32.02 |
| Turnover Ratio (in Percent) | 94.43 | 65.32 | 0.02 | 11,211 |
| Maximum Total Load (in Percent) | 2.14 | 0.31 | 0 | 9.50 |
| Number of stocks held | 118 | 66 | 1 | 3,596 |
| Number of share classes | 1.91 | 1 | 1 | 16 |
| Reported return per month (in Percent) | 0.82 | 1.11 | -89.11 | 95.92 |
| Holdings return per month (in Percent) | 0.95 | 1.26 | -46.97 | 80.00 |

**Panel B: Correlation Structure**

| Variables | TNA | Age | Expen-ses | Turn-over | Load | Stocks | Classes | Reported Return |
|---|---|---|---|---|---|---|---|---|
| TNA | 1.00 | | | | | | | |
| Age | 0.21*** | 1.00 | | | | | | |
| Expenses | -0.13*** | -0.11*** | 1.00 | | | | | |
| Turnover | -0.04*** | -0.06*** | 0.12*** | 1.00 | | | | |
| Load | 0.03*** | 0.19*** | 0.16*** | -0.03*** | 1.00 | | | |
| Number of stocks | 0.12*** | -0.04*** | -0.20*** | -0.06*** | -0.10*** | 1.00 | | |
| Number of classes | 0.09*** | -0.01*** | 0.10*** | 0.01*** | 0.25*** | 0.01*** | 1.00 | |
| Reported return | 0.00 | 0.01*** | -0.01*** | -0.01*** | -0.00* | -0.00 | -0.03*** | 1.00 |
| Holdings return | 0.00 | 0.01*** | -0.00 | -0.01*** | -0.00 | -0.00 | -0.03*** | 0.97*** |

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

## Table II
## Imputing Returns on Non-Equity Holdings

This table summarizes the distribution of asset classes across our sample of mutual funds during the period 1984-2003. The average weight is determined as the time series average of the value-weighted proportions invested in each month in five basic asset classes. The returns of the different asset classes are imputed in each month by running a regression of $RF_{i,t} = \gamma_{Equity,t} w_{Equity,i,t-1} + \gamma_{Cash,t} w_{Cash,i,t-1} + \gamma_{Bonds,t} w_{Bonds,i,t-1} + \gamma_{Prefs,t} w_{Prefs,i,t-1} + \gamma_{Other,t} w_{Other,i,t}$-1+ $\varepsilon_{i,t}$, where $w_{Equity,i,t-1}$ are the lagged weights invested in Equity by fund *i*, and $\gamma_{Equity,t}$ are the estimated returns of the various asset classes. We use the estimated returns in each month as the imputed returns. The corresponding index returns are the CRSP Total Index Return for equity holdings, the risk-free interest rate from French's website for Cash, and the Lehman Brothers Aggregate Bond Index for bonds. No benchmarks were found for preferred stocks and other. Standard deviations of the estimates have been included in parentheses.

| Asset Class | Mean and Standard Deviation of the Weight (in Percent) | Mean and Standard Deviation of Imputed Return (in Percent per Month) | Mean and Standard Deviation of Index Return (in Percent per Month) | Correlation (in Percent) |
|---|---|---|---|---|
| Equity | 90.24 | 0.97 | 1.07 | 97.97*** |
| | (2.99) | (4.82) | (4.57) | |
| Bonds | 1.98 | 0.66 | 0.75 | 88.25*** |
| | (1.06) | (1.29) | (1.35) | |
| Cash | 7.39 | 0.59 | 0.43 | 23.17*** |
| | (2.26) | (0.98) | (0.18) | |
| Preferred Stocks | 0.22 | 0.41 | | |
| | (0.31) | (5.14) | | |
| Other | 0.17 | 0.27 | | |
| | (0.29) | (1.55) | | |

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

## Table III
## Performance of Reported and Holding Returns

This table summarizes the means and the standard errors (in parentheses), along with their statistical significance, for the reported (investor) return, the holding return (before and after expenses), and the return gap over the monthly time series of the equally-weighted portfolio of all funds. The return gap has been defined as a difference between reported return and the holding return of the portfolio disclosed in the previous period. Panel A reports raw returns; Panel B, C, and D report the one-factor, three-factor, and four-factor adjusted performance measures and the factor loadings, respectively.

| | Reported Returns | Holding Returns | | Return Gap | |
|---|---|---|---|---|---|
| | | Before Expenses | After Expenses | Before Expenses | After Expenses |
| **Panel A: Raw Returns** | | | | | |
| Raw Return | 1.004*** | 1.102*** | 1.002*** | -0.098*** | 0.002 |
| | (0.302) | (0.303) | (0.304) | (0.010) | (0.010) |
| **Panel B: CAPM** | | | | | |
| Alpha | -0.067 | 0.025 | -0.075 | -0.092*** | 0.007 |
| | (0.056) | (0.055) | (0.044) | (0.010) | (0.009) |
| Market | 1.006*** | 1.015*** | 1.015*** | -0.008*** | -0.008*** |
| | (0.012) | (0.012) | (0.012) | (0.002) | (0.002) |
| **Panel C: Fama and French Model** | | | | | |
| Alpha | -0.069 | 0.025 | -0.074 | -0.095*** | 0.005 |
| | (0.044) | (0.055) | (0.045) | (0.010) | (0.009) |
| Market | 0.993*** | 1.001*** | 1.001*** | -0.008*** | -0.008*** |
| | (0.011) | (0.011) | (0.011) | (0.001) | (0.002) |
| Size | 0.165*** | 0.155*** | 0.154*** | 0.010*** | 0.011*** |
| | (0.014) | (0.014) | (0.014) | (0.002) | (0.003) |
| Value | 0.023 | 0.018 | 0.018 | 0.005 | 0.005 |
| | (0.016) | (0.017) | (0.017) | (0.002) | (0.004) |
| **Panel D: Carhart Model** | | | | | |
| Alpha | -0.067 | 0.032 | -0.068 | -0.099*** | 0.000 |
| | (0.045) | (0.046) | (0.047) | (0.010) | (0.010) |
| Market | 0.993*** | 1.000*** | 1.000*** | -0.007*** | -0.007*** |
| | (0.011) | (0.011) | (0.011) | (0.002) | (0.002) |
| Size | 0.165*** | 0.155*** | 0.155*** | 0.010*** | 0.010*** |
| | (0.014) | (0.014) | (0.014) | (0.003) | (0.003) |
| Value | 0.023 | 0.017 | 0.016 | 0.006 | 0.006* |
| | (0.017) | (0.017) | (0.017) | (0.004) | (0.004) |
| Momentum | -0.001 | -0.006 | -0.006 | 0.004** | 0.004** |
| | (0.010) | (0.010) | (0.010) | (0.002) | (0.002) |

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

## Table IV
## Summary Statistics on the Return Gap

This table summarizes the means and the standard errors (in parentheses), along with their statistical significance, for the return gap according to various partitions of funds over the monthly time-series of the equally-weighted investor and the holding returns. The return gap has been defined as the difference between the reported return and the holding return of the portfolio disclosed in the previous period. In column one we calculate the return gap before adjusting for expenses; in column two we adjust the gap for expenses, while in column three we additionally adjust the latter gap for four zero-investment portfolios – market, size, value, and momentum – as in Carhart (1997). Panel A sorts funds with respect to their style into actively and passively-managed; Panel B sorts them with respect to their investment strategy into aggressive growth, growth, and growth and income; Panel C sorts funds into quintiles based on their age; Panel D sorts funds into quintiles according to their lagged TNA; Panel E sorts funds into quintiles with respect to their lagged expenses. The sample spans the period 1984 to 2003.

| | Raw Return Gap Before Expenses | Raw Return Gap After Expenses | Abnormal Return Gap After Expenses Using Four-Factor Model |
|---|---|---|---|
| **Panel A: Funds by Style** | | | |
| Actively Managed | -0.099*** | 0.003 | 0.001 |
| Funds | (0.010) | (0.010) | (0.010) |
| Passively Managed | -0.031*** | 0.000 | -0.006 |
| Funds | (0.001) | (0.011) | (0.010) |
| **Panel B: Funds by Investment Strategy** | | | |
| Aggressive Growth | -0.087*** | 0.026 | 0.009 |
| | (0.019) | (0.019) | (0.017) |
| Growth | -0.100*** | -0.002 | -0.000 |
| | (0.010) | (0.010) | (0.010) |
| Growth and Income | -0.099*** | -0.014 | -0.011 |
| | (0.010) | (0.011) | (0.011) |
| **Panel C: Funds by Age** | | | |
| Youngest Quintile | -0.063*** | 0.049*** | 0.043*** |
| Mean Age: 3.3 years | (0.013) | (0.013) | (0.014) |
| Second Quintile | -0.110*** | -0.005 | -0.009 |
| Mean Age: 6.8 years | (0.014) | (0.014) | (0.014) |
| Third Quintile | -0.104*** | -0.003 | -0.000 |
| Mean Age: 11.0 years | (0.012) | (0.012) | (0.012) |
| Fourth Quintile | -0.106*** | -0.010 | -0.005 |
| Mean Age: 18.2 years | (0.011) | (0.011) | (0.011) |
| Oldest Quintile | -0.106*** | -0.020* | -0.025** |
| Mean Age: 40.8 years | (0.012) | (0.012) | (0.012) |

## Table IV
## Summary Statistics on the Return Gap (Cont.)

| | Raw Return Gap Before Expenses | Raw Return Gap After Expenses | Abnormal Return Gap After Expenses Using Four-Factor Model |
|---|---|---|---|
| **Panel D: Funds by Lagged TNA** | | | |
| Smallest Quintile | -0.130*** | 0.000 | 0.009 |
| Mean TNA: $20M | (0.013) | (0.013) | (0.013) |
| Second Quintile | -0.082*** | 0.024** | 0.022* |
| Mean TNA: $60M | (0.012) | (0.012) | (0.012) |
| Third Quintile | -0.091*** | 0.009 | 0.003 |
| Mean TNA: $154M | (0.013) | (0.013) | (0.013) |
| Fourth Quintile | -0.087*** | 0.003 | 0.000 |
| Mean TNA: $411M | (0.012) | (0.012) | (0.013) |
| Largest Quintile | -0.100*** | -0.025** | -0.031** |
| Mean TNA: $9,996M | (0.012) | (0.012) | (0.012) |
| **Panel E: Funds by Expenses** | | | |
| Smallest Expenses | -0.065*** | -0.015 | -0.011 |
| Mean Expenses: 0.050 | (0.011) | (0.011) | (0.011) |
| Second Quintile | -0.093*** | -0.016 | -0.019 |
| Mean Expenses: 0.077 | (0.011) | (0.012) | (0.012) |
| Third Quintile | -0.091*** | 0.004 | 0.008 |
| Mean Expenses: 0.094 | (0.011) | (0.011) | (0.011) |
| Fourth Quintile | -0.089*** | 0.026* | 0.021 |
| Mean Expenses: 0.115 | (0.013) | (0.013) | (0.013) |
| Largest Expenses | -0.151*** | 0.013 | 0.005 |
| Mean Expenses: 0.164 | (0.015) | (0.015) | (0.015) |

## Table V
## Persistence in 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. In column one, we calculate the return gap before adjusting for expenses; in column two, we adjust the gap for expenses, while in column three we additionally adjust the latter gap for four zero-investment portfolios – market, size, value, and momentum – as in Carhart (1997). Panel A sorts funds with respect to the return gap before expenses, while Panel B adjusts the gap for expenses. The sample spans the period 1984 to 2003.

| | Raw Return Gap Before Expenses | Raw Return Gap After Expenses | Abnormal Return Gap After Expenses Using Four-Factor Model |
|---|---|---|---|
| **Panel A: Funds by Lagged Raw Return Gap Before Expenses** | | | |
| Worst Quintile | -0.185*** | -0.069*** | -0.045** |
| Mean *RG*: -0.549 | (0.019) | (0.019) | (0.018) |
| Second Quintile | -0.130*** | -0.033*** | -0.028*** |
| Mean *RG*: -0.211 | (0.010) | (0.010) | (0.011) |
| Third Quintile | -0.102*** | -0.013 | -0.014 |
| Mean *RG*: -0.093 | (0.009) | (0.009) | (0.009) |
| Fourth Quintile | -0.072*** | 0.014 | 0.005 |
| Mean *RG*: 0.019 | (0.011) | (0.011) | (0.011) |
| Best Quintile | -0.016 | 0.086*** | 0.062*** |
| Mean *RG*: 0.356 | (0.022) | (0.022) | (0.020) |
| **Panel B: Funds by Lagged Raw Return Gap After Expenses** | | | |
| Worst Quintile | -0.177*** | -0.070*** | -0.047*** |
| Mean *RG*: -0.438 | (0.018) | (0.018) | (0.018) |
| Second Quintile | -0.126*** | -0.034*** | -0.027** |
| Mean *RG*: -0.117 | (0.011) | (0.010) | (0.011) |
| Third Quintile | -0.099*** | -0.012 | -0.011 |
| Mean *RG*: -0.006 | (0.008) | (0.008) | (0.008) |
| Fourth Quintile | -0.084*** | 0.010 | -0.000 |
| Mean *RG*: 0.109 | (0.011) | (0.012) | (0.012) |
| Best Quintile | -0.019 | 0.090*** | 0.066*** |
| Mean *RG*: 0.462 | (0.022) | (0.022) | (0.020) |

## Table VI
## Persistence of the Return Gaps: Spearman Rank Correlations

This table summarizes the Spearman rank correlation, along with its statistical significance, between quintile portfolios, sorted with respect to the return gap, for different time horizons – one, two, three, four, and five years after formation period. The return gap has been defined as a difference between reported return and the holding return of the portfolio disclosed in the previous period. In column one we calculate the return gap before adjusting for expenses; in column two we adjust the gap for expenses, while in column three we additionally adjust the latter gap for four zero-investment portfolios – market, size, value, and momentum – as in Carhart (1997).

| | Spearman Rank Correlation for the Difference Between Investor and Holdings Returns (in Percent) | | |
|---|---|---|---|
| | Raw Return Gap Before Expenses | Raw Return Gap After Expenses | Abnormal Return Gap After Expenses Using Four-Factor Model |
| One Year After Portfolio Formation | 100.00*** | 100.00*** | 98.79*** |
| Two Years After Portfolio Formation | 100.00*** | 100.00*** | 85.45*** |
| Three Years After Portfolio Formation | 100.00*** | 96.36*** | 100.00*** |
| Four Years After Portfolio Formation | 98.79*** | 95.15*** | 91.52*** |
| Five Years After Portfolio Formation | 95.15*** | 75.76** | -3.03 |

*** 1% significance ($\rho$>0.794); ** 5% significance ($\rho$ >0.648); * 10% significance ($\rho$>0.564)

## Table VII
## The Return Gap and Fund Characteristics

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 a difference between the reported fund return and the return based on the previous quarter's holdings. The independent variables include lagged fund expense ratios, lagged fund turnover, proportion of NASDAQ stocks in the portfolio, proportion of AMEX stock in the portfolio, the size score, the natural logarithm of lagged TNA, the natural logarithm of lagged fund age, the proportion of the previous year's IPO in the portfolio, the age of the reported holdings, the relative expense ratio of a fund to its fund family, the relative TNA of a fund to its fund family and the relative age of a fund to its family. The size score for a mutual fund is defined as a value-weighted size score of its stock holdings in each time period, as each stock traded on the major U.S. exchanges is grouped into respective quintiles according to its market value and assigned a size score of 1 (smallest market cap) to 5 (largest market cap). All regressions include time dummies. Panel-corrected standard errors, along with the statistical significance, have been provided in parentheses.

| | Dependent Variable: Return Gap Before Expenses (in Basis Points Per Month) | |
|---|---|---|
| Expenses | -1.173*** | -1.304*** |
| | (0.158) | (0.180) |
| Turnover | -0.067 | -0.019 |
| | (0.370) | (0.380) |
| Weight NASDAQ | -0.018 | -0.023 |
| | (0.023) | (0.024) |
| Weight AMEX | -0.433** | -0.521*** |
| | (0.155) | (0.188) |
| Size Score | -1.097 | -1.518* |
| | (0.788) | (0.846) |
| Log of TNA | 0.040 | -0.519* |
| | (0.252) | (0.283) |
| Log of Age | -2.885*** | -0.536 |
| | (0.499) | (0.631) |
| Weight of Recent IPOs | 1.628*** | 1.654*** |
| | (0.132) | (0.148) |
| Holdings Age | 2.375*** | 2.625*** |
| | (0.604) | (0.634) |
| Expenses Relative to Family Expenses | | 3.675*** |
| | | (0.850) |
| TNA Relative to Family TNA | | 0.053 |
| | | (1.527) |
| Age Relative to Family Age | | -10.25*** |
| | | (1.441) |
| Time Fixed Effects | YES | YES |
| Number of Observations | 208,492 | 180,330 |

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

## Table VIII
## The Return Gap and Future Fund Performance

This table reports the coefficients of the monthly panel regression of the general form: $PERF_{i,t} = \beta_0 + \beta_1 * RG_{i,t-1} + \beta_2 * EXP_{i,t-1} + \beta_3 * TU_{i,t-1} + \beta_4 * LTNA_{i,t-1} + \beta_5 * LAGE_{i,t-1} + \varepsilon_{I,t}$. The sample includes actively managed equity mutual funds and spans the period of 1984-2003 (including the data used for calculating the abnormal returns). *PERF* measures the quarterly performance using 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. *RG* is defined as the difference between the reported fund return and the return based on the previous quarter's holdings. *EXP* denotes expenses lagged one year*; TU* is the turnover lagged one year*; LAGE* is the natural logarithm of age lagged one quarter; and *LTNA* is the natural logarithm of total net assets lagged one quarter. All regressions include time dummies. Panel-corrected standard errors, along with the statistical significance, have been provided in parentheses.

| | Dependent Variable: Monthly Performance Measure (in Percent) | | | |
|---|---|---|---|---|
| | Market Excess Return | One-Factor Abnormal Return | Three-Factor Abnormal Return | Four-Factor Abnormal Return |
| Adjusted Return Gap | 0.2834*** | 0.2623*** | 0.1886*** | 0.1932*** |
| | (0.0318) | (0.0320) | (0.0266) | (0.0265) |
| Expenses | -0.7133** | -0.8494** | -0.8066** | -0.9541*** |
| | (0.3462) | (0.3462) | (0.3244) | (0.3320) |
| Turnover | 0.0033 | -0.0065 | 0.0095 | -0.0316*** |
| | (0.0124) | (0.0124) | (0.0110) | (0.0110) |
| Log of TNA | -0.0421*** | -0.0310*** | 0.0139*** | -0.0132*** |
| | (0.0061) | (0.0059) | (0.0048) | (0.0048) |
| Log of Age | 0.0033 | -0.0211 | -0.0442*** | -0.0176 |
| | (0.0138) | (0.0136) | (0.0111) | (0.0111) |
| Time Fixed Effects | YES | YES | YES | YES |
| Number of Observations | 180,390 | 168,839 | 168,839 | 168,839 |

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

## Table IX
## The Return Gap and Future Fund Performance

This table reports the coefficients of the panel regression of the general form: $PERF_{i,t} = \beta_0 + \beta_1 * RG_{i,t-1} + \beta_2 * EXP_{i,t-1} + \beta_3 * TU_{i,t-1} + \beta_4 * LTNA_{i,t-1} + \beta_5 * LAGE_{i,t-1} + ER_{i,t-1} + \varepsilon_{i,t}$. The sample includes actively managed equity mutual funds and spans the period of 1984-2003 (including the data used for calculating the abnormal returns). *PERF* measures the quarterly performance using 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. *RG* is defined as the difference between the reported fund return and the return based on the previous quarter's holdings. *EXP* denotes expenses lagged one year*; TU* is the turnover lagged one year*; LAGE* is the natural logarithm of age lagged one quarter; and *LTNA* is the natural logarithm of total net assets lagged one quarter. $ER_{i,t-1}$ is the lagged excess return over the market. All regressions include time dummies. Panel-corrected standard errors, along with the statistical significance, have been provided in parentheses.

| | Dependent Variable: Monthly Performance Measure (in Percent) | | |
|---|---|---|---|
| | One-Factor Abnormal Return | Three-Factor Abnormal Return | Four-Factor Abnormal Return |
| Adjusted Return Gap | 0.1740*** | 0.0534** | 0.0989*** |
| | (0.0317) | (0.0261) | (0.0262) |
| Expenses | -0.8900** | -0.8715*** | -0.9991*** |
| | (0.3557) | (0.3168) | (0.3271) |
| Turnover | -0.0081 | 0.0070 | -0.0334*** |
| | (0.0122) | (0.0109) | (0.0109) |
| Log of TNA | -0.0390*** | 0.0013 | -0.0219*** |
| | (0.0058) | (0.0046) | (0.0047) |
| Log of Age | -0.0087 | -0.0250** | -0.0044** |
| | (0.0134) | (0.0108) | (0.0109) |
| Lagged Excess Return | 0.1389*** | 0.2081*** | 0.1436*** |
| | (0.0113) | (0.0090) | (0.0091) |
| Time Fixed Effects | YES | YES | YES |
| Number of Observations | 168,839 | 168,839 | 168,839 |

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

## Table X
## Trading Strategy 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 previous year's return gap. The return gap is defined as the difference between the reported fund return and the return based on the previous quarter's holdings. We use excess return over the market, 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 table calculates the performance difference between the top and the bottom deciles. We also report Spearman rank correlations of the portfolio rankings and their respective p-values. Panel A sorts funds with respect to their return gap before adjusting for expenses, while Panel B sorts funds based on the return gap after adjusting for expenses.

**Panel A: Decile Portfolios Sorted by the Return Gap before Adjusting for Expenses**

| | Excess Market Returns | CAPM Alphas | Fama and French Alpha | Carhart Alpha |
|---|---|---|---|---|
| First Decile: | -21.88** | -27.70*** | -20.50*** | -20.00*** |
| Mean: -73.75 | (10.10) | (9.85) | (6.61) | (6.80) |
| Second Decile | -13.74** | -15.20** | -14.10** | -13.90*** |
| Mean: -36.27 | (6.51) | (6.55) | (5.52) | (5.68) |
| Third Decile | -8.93 | -7.00 | -9.97* | -7.18 |
| Mean: -24.79 | (5.49) | (5.48) | (5.26) | (5.35) |
| Fourth Decile | -8.47 | -5.93 | -11.80** | -8.08 |
| Mean: -17.49 | (5.66) | (5.60) | (5.37) | (5.42) |
| Fifth Decile | -7.61 | -4.06 | -10.10* | -7.06 |
| Mean: -11.86 | (5.80) | (5.63) | (5.42) | (5.51) |
| Sixth Decile | -3.64 | -0.11 | -6.36 | -3.58 |
| Mean: -6.86 | (5.55) | (5.37) | (5.16) | (5.24) |
| Seventh Decile | -3.52 | -1.24 | -7.03 | -4.96 |
| Mean: -1.57 | (5.62) | (5.59) | (5.39) | (5.53) |
| Eight Decile | -1.60 | -1.00 | -3.83 | -5.45 |
| Mean: 5.30 | (6.04) | (6.10) | (5.34) | (5.47) |
| Ninth Decile | -2.41 | -3.70 | -1.70 | -6.62 |
| Mean: 16.66 | (7.19) | (7.25) | (5.55) | (5.52) |
| Tenth Decile: | 11.82 | 3.52 | 18.20** | 5.03 |
| Mean: 54.63 | (14.74) | (14.40) | (8.19) | (7.51) |
| Tenth Minus First Decile | 33.70* | 31.22* | 38.70*** | 25.00** |
| | (17.83) | (12.30) | (10.50) | (10.10) |
| Spearman Correlation | 98.79*** | 89.09*** | 95.15*** | 86.67*** |

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

**Panel B: Decile Portfolios Sorted by the Return Gap after Adjusting for Expenses**

| | Excess Market Returns | CAPM Alphas | Fama and French Alpha | Carhart Alpha |
|---|---|---|---|---|
| First Decile: | -21.00** | -27.10*** | -19.80*** | -19.90*** |
| Mean: -61.81 | (9.99) | (9.70) | (6.59) | (6.78) |
| Second Decile | -13.60** | -14.80** | -14.10** | -13.60** |
| Mean: -25.90 | (6.30) | (6.35) | (5.48) | (5.63) |
| Third Decile | -8.32 | -6.18 | -8.84* | -5.40 |
| Mean: -15.08 | (5.40) | (5.48) | (5.13) | (5.18) |
| Fourth Decile | -9.49 | -7.05 | -13.20*** | -9.95* |
| Mean: -8.26 | (5.35) | (5.30) | (5.07) | (5.13) |
| Fifth Decile | -6.18 | -2.17 | -8.13 | -4.61 |
| Mean: -3.00 | (5.56) | (5.30) | (5.13) | (5.17) |
| Sixth Decile | -6.54 | -2.70 | -9.12* | -6.10 |
| Mean: 1.76 | (5.79) | (5.58) | (5.38) | (5.47) |
| Seventh Decile | -2.70 | -0.53 | -6.39 | -5.40 |
| Mean: 7.23 | (5.65) | (5.62) | (5.37) | (5.51) |
| Eight Decile | -2.17 | -1.72 | -4.09 | -6.11 |
| Mean: 14.56 | (6.67) | (6.74) | (5.91) | (6.05) |
| Ninth Decile | -2.09 | -3.58 | -1.57 | -6.36 |
| Mean: 26.60 | (7.51) | (7.57) | (5.54) | (5.52) |
| Tenth Decile: | 12.24 | 3.56 | 18.20** | 4.73 |
| Mean: 65.90 | (14.93) | (14.60) | (8.18) | (7.46) |
| Tenth Minus First Decile | 33.24* | 30.60* | 38.00** | 24.60** |
| | (17.97) | (17.50) | (10.50) | (10.10) |
| Spearman Correlation | 97.58*** | 84.24*** | 93.94*** | 54.48 |

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