Performance and Characteristics of Actively Managed Institutional Equity Mutual Funds

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Institutional-class mutual funds are designed as investment vehicles for pension funds, corporations, not-for-profit organizations, endowments, foundations, municipalities, and other large investors, including individuals. These funds offer investors flexibility, liquidity, convenience, diversification, and other services. Studies of mutual funds typically distinguish between retail and institutional investors because of their differing attributes. For example, a common assumption is that "retail" investors face substantial search costs and are less informed than institutional or "wholesale" investors. Thus, the lower search costs of institutional investors may lead them to focus on different and more sophisticated investment selection criteria than individual investors (Del Guercio and Tkac [2002]; James and Karceski [2006]).

Although the same companies that help run retail mutual funds (banks, insurance companies, brokers, and fund advisory companies) operate institutional mutual funds, these funds have several distinguishing characteristics. First, institutional funds require considerably higher minimum initial investments than retail funds, typically $100,000 or more. Second, compared to retail funds, institutional funds typically offer lower costs to investors.[1] In fact, only a small percentage of institutional funds have front or deferred loads, redemption fees, or 12b-1 marketing expenses. Yet, James and Karceski [2006] find that despite significantly lower expenses, institutional funds, on average, do not outperform retail funds. Third, institutional funds tend to trade securities less frequently than retail funds. Fourth, less frequent trading leads to greater tax efficiency because institutional funds hold their positions longer, which is more apt to result in long-term gains taxed at a lower rate than short-term capital gains.

As James and Karceski [2006] report, a large and growing segment of the mutual fund market is targeted towards institutional clients. According to the Investment Company Institute [2007], assets of U.S. institutional-class funds were about $1.35 trillion in 2006. Money market funds represented the largest amount of institutional accounts with $721 billion, followed by $439 billion in equity funds, $159 billion in bond funds, and $32 billion in hybrid funds. Documented differences by James and Karceski in the flow and performance characteristics of retail and institutional equity mutual funds justify separate analysis of the latter.

This article focuses on domestic equity mutual funds designed for institutional investors. Given the large amount of assets managed by institutional funds in recent years, it is important to determine if there is anything unique about institutional funds that we do not already know from prior studies on mutual funds in general. Our purpose is five-fold: 1) to analyze the disparity of expense ratios of actively managed institutional equity funds; 2) to determine whether actively managed institutional equity funds can beat their benchmark after expenses; 3) to examine fund performance and fund characteristics partitioned by expense ratio class; 4) to identity fund attributes that contribute significantly to performance; and 5) to compare our results with those in the existing mutual fund literature in order to link any potential difference in findings to the characteristics of institutional funds. We make a strong effort to establish robust results by using a wide range of performance measures, a large cross-section of funds, and an adjustment for style category.

Some findings related to each of our five objectives follow. First, the expense ratios of actively managed institutional equity mutual funds differ by a fund's investment category. Second, the average actively managed institutional equity mutual fund cannot beat a representative benchmark after expenses. These two findings are consistent with prior evidence on actively managed retail equity mutual funds. Third, mixed evidence exists about whether institutional funds with low expense ratios outperform those with higher expense ratios. Fourth, larger institutional equity funds and those with greater cash holdings tend to perform better. Fifth, the finding that fund size enhances performance is consistent with the results of Haslem, Baker, and Smith [2008]. Yet, this result contrasts with evidence from Chen, Hong, Huang, and Kubik [2004] and Yan [2008] on the effect of scale on performance in the active money management industry, showing a significant inverse relation between fund size and performance.

Our findings contribute to the literature in several ways. First, only in recent years have actively managed institutional-class mutual funds become of interest to researchers. Unlike retail mutual funds, few studies focus on performance characteristics of institutional funds.[2] A likely reason for this disparity is the fact that the assets of mutual funds held in individual accounts are much greater than those in institutional accounts ($9.06 trillion versus $1.35 trillion, respectively, in 2006). We present new evidence about performance characteristics of actively managed institutional equity mutual funds. An important issue facing institutional investors is whether they can use fund characteristics such as expense ratios, size, and other attributes to distinguish superior from inferior performance. Thus, our study complements research involving open-end actively managed equity funds.[3] In general, we examine similar fund characteristics that other studies use that focus on retail mutual funds in order to determine whether these characteristics also relate to the performance of institutional equity mutual funds.

Second, unlike previous studies, we use expense ratio standard deviation classes to examine fund performance and other fund attributes. An advantage of this approach is that it adjusts for the statistical properties of the expense ratio for each fund's investment style category. For example, an expense ratio of 1.20% is more than one standard deviation above the category mean for large-cap blend funds, but it is below the mean for small-cap value funds. Hence, our approach produces different expense ratio classifications for a large-cap blend fund with a 1.20% expense ratio versus an otherwise identical small-cap value fund. Given the number of institutional funds and the size of their assets, our evidence should be of particular interest to fund advisers, regulators, researchers, institutional investors, and large individual investors.

DATA AND METHOD

Measuring expense ratios

We use expense ratios as a percent to measure mutual fund costs and standard deviations to characterize expense ratio diversity. The expense ratio is total expenses divided by fund average net assets.[4] This ratio consists of management fees, Rule 12b-1 fees, and "other" expenses but excludes sales loads and fees directly charged to shareholder accounts and security transaction costs (brokerage fees, bid-ask spreads, and market impact costs) that reduce portfolio returns.

Classifying funds by standard deviation

We use a simple, probabilistic method to identify mutual funds with varying degrees of expense ratios based on their standard deviation. This approach is conceptually similar to sorting funds into deciles or quintiles by expenses, which Malkiel [1995] and Carhart [1997] have already done for the entire population of equity funds. By contrast, our method classifies each fund based solely on the magnitude of its expenses relative to its Morningstar style-category peer-group average. Our approach aims to generate more precise results than a simple sorting procedure. We apply the distribution-free Chebyshev's inequality because there is no certainty that a normal distribution applies for the financial variables under consideration. The likelihood of observing expense ratios two or three standard deviations above the mean is relatively small, even if the variable is not normally distributed.

Sample

The sample consists of 1,118 U.S. actively managed institutional equity mutual funds identified from Morningstar as of December 31, 2006. All of these mutual funds are technically domestic funds, but most contain some foreign securities. In compiling this sample, we screen out index funds, enhanced index funds, funds of funds, and exchange-traded funds. We retain only the largest institutional share class for each fund, so each portfolio appears in the sample only once. We split the total sample into nine sub-samples, one for each of the Morningstar equity style categories. Each Morningstar category represents a combination of market capitalization (large, mid-cap, or small) and fund investment style (value, blend, or growth), as discussed by Detzel [2006].

We then classify each mutual fund according to how far its expense ratio is below or above the mean of its Morningstar category. Our initial objective is to identify the specific funds with low and high expense ratios to varying degrees. We identify seven standard deviation classes for expense ratios and define each relative to the mean expense ratio for each Morningstar category as follows: -2σ (very low), -1σ (low), within -1σ (below average), within $+1\sigma$ (above average), $+1\sigma$ (high), $+2\sigma$ (very high), and $+3\sigma$ (extremely high). Here, -2σ and -1σ indicate expense ratios more than two standard deviations below the mean and between one and two standard deviations below the mean, respectively. The expense ratio classes $+1\sigma$, $+2\sigma$, and $+3\sigma$ are interpreted similarly for values above the mean. Within -1σ (within $+1\sigma$) indicate expense ratios within one standard deviation below (above) the mean.

Considering each fund's actively managed portion

We supplement the analysis by using the method proposed by Miller [2007]. He demonstrates that actively managed mutual funds are more expensive than commonly believed. The reason is that funds bundle passive and active management in a way that understates the true cost of active management. Funds that engage in "closet" indexing charge investors for active management but actually provide little more than indexed portfolios. In fact, more than 90% of the variance of the average fund's returns is explained by its benchmark index.

During the past 20 years with the rise of index mutual funds and hedge funds, investors have become increasingly skeptical of investment management. Once investors could "own" stock indexes, index funds became viable investments. Further, Sharpe's introduction of style analysis and Morningstar's popularization of it changed the way of assessing the performance of traditional money managers. That is, money managers received credit only for performance they earned by active management.

The active management expense ratio provides the true cost of active management in a single number. The measure requires only a virtual decomposition of fund assets into passive and active components, which requires calculating the fund's explained variance relative to its benchmark index. Then the fund's active management expense ratio and its active performance alpha can be computed from readily available data. This approach derives from the Black-Scholes-Merton model.

Miller's method disaggregates the passive and active components of each mutual fund portfolio, including their implied expense ratios and alphas. The only inputs required for these calculations are the expense ratios and alphas for the actively managed fund (C_F and a_F) and a representative index fund (C_I and a_I), and the R^2 from regressing the actively managed fund's return on that of the index. The inputs are all available from Morningstar. We assume that C_I takes on a value of eight basis points, the typical expense ratio for institutional-class Russell-index mutual funds offered by TIAA-CREF.

As part of its routine analysis, Morningstar identifies which 1 of 45 indexes corresponds most closely with each fund's monthly returns over the previous 36 months. Morningstar designates the index generating the highest R^2 as a fund's "best fit index." We isolate those funds whose "best fit index" is a Russell large-cap, mid-cap, or small-cap index, and for which there exists an institutional-class index fund for comparison. We find that out of our sample of 1,118 actively managed institutional equity funds, 397 funds pass this screen.

Following Miller, for each fund we calculate the weight of the active share of the portfolio (w_A) as follows:

$$w_A = \frac{\sqrt{1 - R^2}}{R + \sqrt{1 - R^2}} \tag{1}$$

We calculate the active expense ratio for each fund as:

$$C_A = C_F + \frac{R(C_F - C_I)}{\sqrt{1 - R^2}} \tag{2}$$

Miller notes that assuming that alpha for a zero-expense index fund will be zero, the alpha for an index fund with expenses should be the negative of the index fund expense ratio, $-C_I$. Alpha for each fund's active portion is then calculated as:

$$\alpha_A = \alpha_F + \frac{R(\alpha_F + C_I)}{\sqrt{1 - R^2}} \tag{3}$$

While the typical fund's expense ratios top out at about 2%, the implied expense ratio for the actively managed portion is sometimes at least double that percentage. Moreover, the means vary dramatically across investment styles in a manner consistent with that shown in Exhibit 1 for overall expense ratios. For each best-fit index, we create *active* expense ratio classes that range from –2 to +5, using a process described in the previous section.

Performance measures

We examine the association of expense ratios with selected performance measures for mutual funds in each Morningstar style category. To reduce the inherent problem of interpretation posed by using a single measure, we use several common methods to assess risk-adjusted performance. We use three-year Sharpe ratios, Jensen's alphas, Miller's active alphas, and Morningstar ratings over the period January 2004 through December 2006 as well as annualized returns and cumulative returns over multiple periods (1, 3, 5, 10, 15 years). We also use Russell Index-adjusted returns. Each measure is likely to capture different performance aspects than the other measures, so taking several measures together enables us to draw more definitive conclusions.

Hypotheses and univariate tests

We examine each performance measure across the standard deviation classes of expense ratios. We use the Kruskal-Wallis one-way analysis of variance by ranks to identify whether the independent samples represented by the standard deviation classes are from different populations with respect to each performance measure.

EXHIBIT 1

Median, Mean, and Standard Deviation of Expense Ratios for 1,118 Actively Managed Institutional Equity Mutual Funds Partitioned by Morningstar Category and Combined

This exhibit reports expense ratio medians, means, and standard deviations for 1,118 institutional equity mutual funds by Morningstar category and combined. Under the "Median" column are the median fund's expense ratio and the expense ratio for the median dollar invested across all funds. Under the "Mean" column are the unweighted (equally-weighted) mean and the mean weighted by net assets as of December 31, 2006. The right-most two columns present the standard deviation of the expense ratio and the number of funds in the sample.

	Expense Ratio (%)					
	Median		Mean			
Morningstar Category	Across Funds	Per Dollar Invested	Unweighted	Asset-Weighted	Standard Deviation	n
Large value	0.86	0.67	0.88	0.60	0.30	183
Large blend	0.87	0.72	0.89	0.69	0.29	187
Large growth	0.93	0.79	0.97	0.82	0.31	220
Mid-cap value	1.00	0.89	1.01	0.89	0.27	50
Mid-cap blend	1.03	0.99	1.12	1.05	0.27	47
Mid-cap growth	1.04	0.74	1.06	0.82	0.31	146
Small value	1.09	0.87	1.22	0.84	0.56	58
Small blend	1.05	1.08	1.07	0.98	0.25	94
Small growth	1.10	1.03	1.15	0.98	0.26	133
Combined	0.97	0.79	1.00	0.77	0.33	1,118

The Kruskal-Wallis technique tests the null hypothesis that no difference exists in the average performance of retail equity mutual funds among the seven standard deviation classes of expense ratios (–2σ through +3σ).

Where the Kruskal-Wallis test judges the medians to differ across the standard deviation classes, we use the Wilcoxon two-sample test to determine the specific pairs for which values differ at the 0.10 or higher significance level. Although we test all pairs, we focus only on the two-sample tests for –2σ (very low) versus +2σ (very high) and –1σ (low) versus +1σ (high).

Our first hypothesis is:

> H_1: Performance, as measured by each median performance measure, is statistically greater in 1) the –2σ (very low) versus the +2σ (very high) expense ratio class, and 2) the –1σ (low) versus the +1σ (high) expense ratio class.

Thus, we expect a *negative* relation between each performance measure and expense ratio class. Although several possible explanations exist for the hypothesized relation, one possibility is that higher expense ratios reflect greater agency problems. As a result, funds that charge higher fees may perform worse because they are more entrenched.[5]

We next discuss the relation of six other factors to expense ratio class. The first two factors, front-end loads and deferred loads, are not components of the expense ratio. Houge and Wellman [2006] find that load-fund expense ratios are 50 basis points higher than those of no-load funds. Load funds consistently charge higher 12b-1 fees, asset management fees, and total expenses than no-load funds. This result may reflect a lower level of sophistication for load-fund investors relative to no-load fund investors. Accordingly, we expect a positive relation between both front-end loads and deferred loads and expense ratio class. As previously noted, however, very few institutional mutual funds have front or deferred loads.

Third, funds with high expense ratios are likely to carry larger agency problems that extend to component management fees and other costs. Because management fees, as the largest component of expense ratios, are likely to have a strong positive relation with the expense ratio, the relation between management fees and expense rations is largely mechanical. Thus, we expect a positive relation between management fees and expense ratio class.

Fourth, 12b-1 fees are a component of mutual fund expense ratios. As previously noted, most actively managed institutional equity mutual funds do not have 12b-1 fees. Proponents argue that 12b-1 fees allow mutual funds to decrease other loads, especially front-end loads, which attract new investors and reduce fund expense ratios through economies of scale. These distribution fees have partly replaced traditional front-end loads. However, studies by Ferris and Chance [1987], Malhotra and McLeod [1997], Dellva and Olson [1998], and Dukes, English and Davis [2006], among others, find that using 12b-1 fees more than offsets reductions in front-end loads and increases expense ratios. Hence, we expect a positive relation between 12b-1 fees and expense ratio class.

Fifth, portfolio turnover represents mutual fund trading activity, but it does not capture all the differences in trading costs arising from differences in trade size. This is not surprising given the mixed relation between turnover and fund returns in the literature. Edelen, Evans, and Kadlec [2007] find that for funds with relatively small (large) average trade size, trading is positively (negatively) related to fund returns. Trading costs are comparable in size to the expense ratio and have a higher cross-sectional variation related to trade size. Edelen et al. also find that portfolio turnover has a marginally negative relation to fund performance. Further, they find trading costs (including turnover) have a positive relation to expense ratio class. Dellva and Olson [1998] also find that turnover activity increases fund expenses but does not necessarily lead to better performance. Therefore, we also expect a positive relation between turnover and expense ratio class.

Sixth, we expect systematic risk, as measured by beta, to be higher for smaller and more risky funds, such as small-cap funds. These smaller funds with fewer scale advantages tend to have larger expense ratios. Thus, we expect a positive relation between portfolio beta and expense ratio class.

We use the Wilcoxon test to determine whether differences exist across expense ratio classes for median front-end load, deferred load, management fees, 12b-1 fees, turnover ratio, and beta of institutional equity mutual funds. Our second hypothesis is:

> H_2: Median front-end load, deferred load, management fees, 12b-1 fees, turnover ratio, and beta are statistically smaller in 1) the –2σ (very low) versus the +2σ (very high) expense ratio class, and 2) the –1σ (low) versus the +1σ (high) expense ratio class.

Thus, we expect a *positive* relation between each of these characteristics and expense ratio class.

Next, we discuss relations between five other fund characteristics and expense ratios (see, for example, Malhotra and McLeod [1997] and Dellva and Olson [1998]). First, the literature is in general agreement that larger funds with economies of scale have smaller expense ratios. Accordingly, we expect a negative relation between fund asset size and expense ratio class.

Second, some disagreement exists in the literature concerning the relation between fund asset size and portfolio manager tenure, but we expect a generally positive relation. Since larger funds tend to have lower expense ratios, we expect a negative relation between tenure and expense ratio class.

Third, Dellva and Olson [1998] find that the effect of a mutual fund's holding cash on performance is positive and significant, and that higher performance reflects lower expense ratios. Funds with higher percentages of cash have lower transaction costs (and higher performance) due to greater liquidity to meet redemptions. Thus, we expect a negative relation between cash and expense ratio class.

Fourth, larger mutual funds tend to have lower expense ratios and invest in less-risky larger-cap stocks with higher dividend yields. Therefore, we expect a negative relation between dividend yield and expense ratio class.

Fifth, we expect minimum required initial purchases to diminish in relative size as mutual funds increase in asset size, and larger funds have smaller expense ratios. As a result, we expect a negative relation between minimum initial required purchase and expense ratio class.

We use the Wilcoxon test to determine whether differences exist across expense ratio classes for median net assets, tenure, cash, dividend yield, and minimum required initial purchase of institutional equity mutual funds. The third hypothesis is therefore:

> H_3: Median net assets, tenure, cash, dividend yield, and minimum required initial purchase are statistically greater in 1) the -2σ (very low) versus the $+2\sigma$ (very high) expense ratio class, and 2) the -1σ (low) versus the $+1\sigma$ (high) expense ratio class.

Thus, we expect a *negative* relation between each of these characteristics and expense ratio class.

Model specifications

To reduce the inherent problem of interpretation posed by using a single performance measure, we use four measures to assess risk-adjusted performance: the Sharpe ratio, Jensen's alpha, active alpha as developed by Miller [2007], and Russell Index-adjusted return over 3-, 5-, 10-, and 15-year periods. Although consistency among the measures would lend robustness to our results, each measure captures somewhat different information about performance than the other measures.

We use a multiple regression model to examine whether mutual fund characteristics are useful in explaining fund performance. Our performance model is a modified version of that proposed by Dellva and Olson [1998]. Specifically, it contains an expense ratio class variable plus explanatory variables for mutual fund asset size, portfolio turnover, beta, cash holdings, and dividend yield. We also include a dummy variable indicating the presence or absence of 12b-1 fees. In a departure from Dellva and Olson's approach, we exclude variables for front-end loads and deferred loads because these features are extremely rare in institutional-class funds.

Next, we discuss several factors that could affect mutual fund performance. First, Bogle [2005, p. 21] notes "... the costs of mutual fund ownership remain a substantial impediment to the ability of equity funds and their shareholders to capture the returns generated by the stock market." Other studies, such as Carhart [1997], Dellva and Olson [1998], and Jan and Hung [2003], show a negative relation between fund net returns and expense levels. Therefore, we expect a negative relation between expense ratios and performance.

Second, higher performing mutual funds are likely to attract more investor purchases. Funds can use the additional money to cover fixed costs, which, in turn, should result in lower expense ratios. As funds increase in asset size, they experience operating efficiencies from scale economies that management may pass on to fund investors in the form of lower expense ratios. Therefore, we expect a positive relation between fund asset size and performance.

Third, proponents of 12b-1 fees contend that mutual funds with 12b-1 plans have higher performance than non-12b-1 funds because of better management. They argue that 12b-1 fees promote greater stability in fund assets, which enables funds to minimize cash assets. However, the evidence against 12b-1 fees continues to mount. Opponents argue that 12b-1 fees represent conflicts of interest between mutual fund managers and shareholders, with higher expense ratios and lower fund performance. Malhotra and McLeod [1997] find that 12b-1 equity funds earned a lower rate of return than non-12b-1 plan funds during both 1992 and 1993. Further, they add that 12b-1 fees and other fees represent "deadweight costs" to investors who do not need any (potential) derived service benefits.

Similarly, the SEC's Walsh [2004] reports results that are inconsistent with either higher net returns or gross returns for 12b-1 equity funds. Freeman [2006] finds that 12b-1 fees have not provided the "promised" benefits of lower expenses to fund shareholders. He concludes (p. 11): "The idea that sales to new investors financed out of fund assets are beneficial to existing fund shareholders is dubious and not supported by the literature. No credible evidence exists demonstrating shareholders receive a pecuniary benefit from 12b-1 fees." Thus, the now-common statement that 12b-1 fees represent "deadweight costs" appears correct, and we expect a negative relation between 12b-1 fees and fund performance.

Fourth, as discussed above, portfolio turnover represents mutual fund trading activity, but it does not capture differences in trading costs arising from differences in trade size. Elton, Gruber, Das, and Hlavka [1993] find that funds with higher fees and turnover underperform those with lower fees and turnover. Dowen and Mann [2004] confirm those results for turnover. Again, Edelen, Evans, and Kadlec [2007] find that for funds with relatively small (large) average trade size, trading is positively (negatively) related to fund returns. Trading costs are comparable in size to expense ratios and increasingly reduce fund performance as relative trade size increases. They find that portfolio turnover has a marginally negative relation to fund performance. Therefore, we expect a negative relation between portfolio turnover and fund performance.

Fifth, as a measure of systematic risk, beta should help explain differences in mutual fund performance. Funds with riskier portfolios should have higher betas and therefore higher performance. We expect a positive relation between beta and fund performance.

Sixth, mutual funds normally meet shareholder redemptions by liquidating securities or reducing cash. By selling securities, funds incur transaction costs and reduce fund performance. By holding a higher percentage of cash, funds have lower transaction costs because they have greater liquidity to meet redemptions, but cash holdings also lower returns. Despite this tradeoff, we expect a positive relation between cash and fund performance.

Seventh, Dellva and Olson [1998] report mixed results between dividend yield and various performance measures. The dividend yields ranged from significantly positive to significantly negative relative to fund performance. We view the performance versus dividend relation to be an empirical question.

We use the following regression model to estimate the characteristics that might explain superior and inferior risk-adjusted mutual fund performance.

$$\begin{aligned} \mathit{Performance}_{pi} = {} & b_0 + b_1\,(\mathit{Expense\ ratio\ class}_i) \\ & + b_2\,(\mathit{Net\ assets}_i) + b_3\,(\mathit{12b\text{-}1\ fees}_i) \\ & + b_4\,(\mathit{Turnover}_i) + b_5\,(\mathit{Beta}_i) \\ & + b_6\,(\mathit{Cash}_i) \\ & + b_7\,(\mathit{Dividend\ yield}_i) + e_i \end{aligned} \tag{4}$$

- $\mathit{Performance}_{pi}$ is the value for performance measure *p*, measured net of expenses, for fund *i*. Performance measures are the Sharpe ratio, Jensen's alpha, and Miller's active alpha, each measured over three years, as well as Russell-Index-adjusted annualized returns. Russell-Index-adjusted annualized returns are returns net of annual expenses for each mutual fund, less the return on the applicable Frank Russell Associates index, over varying periods (3, 5, 10, and 15 years).
- $\mathit{Expense\ ratio\ class}_i$ is the standard deviation class for fund *i*'s annual expense ratio, where expenses more than 2σ below the mean produce a class value of 1, expenses between -2σ and -1σ of the mean produce a class value of 2, expenses up to -1σ below the mean produce a class value of 3, and so on through 7 for net expenses above $+3\sigma$. All standard deviation classes are defined relative to the mean for relevant capitalization and style class for actively managed equity funds.
- $\mathit{Net\ assets}_i$ is the natural logarithm of fund *i*'s size of net assets (in $ millions) since this variable may be nonlinearly related to performance. $\mathit{Front\text{-}end\ load}_i$ and $\mathit{deferred\ load}_i$ are, respectively, expressed as a percentage, for buying fund *i*.
- $\mathit{12b\text{-}1\ fees}_i$ is the dummy variable equal to 1 if fund *i* has a 12b-1 plan and 0 otherwise.
- $\mathit{Turnover}_i$ is the annual portfolio turnover ratio as a whole percent for fund *i*.

- *$Beta_i$* is the three-year beta for fund *i* used to indicate the systematic risk of a fund.
- *$Cash_i$* is cash holdings as a whole percent of fund *i* assets.
- *Dividend $yield_i$* is the prospective yield of fund *i* over the next 12 months, calculated as the value-weighted average dividend yield for all stocks in the fund, and e_i is the error term.

In summary, the expected signs of the coefficients are: expense ratio class (–), asset size (+), 12b-1 fees (–), turnover (–), beta (+), cash (+), and dividend yield (?).

EMPIRICAL RESULTS

Exhibits 1 through 7 present the empirical results of our study. These results allow us to partition our sample of mutual funds in terms of expense ratios. We can also characterize the relation between expense ratios and performance for Morningstar categories combined.

Average expense ratios by Morningstar category

Exhibit 1 contains expense ratio medians, means, and standard deviations for 1,118 actively managed institutional equity mutual funds partitioned by Morningstar category and combined. Under the "Median" column, the funds with the lowest and highest median expense ratios are large value (0.86%) and small growth (1.10%), respectively. The median expense ratios per dollar invested are lowest for large value funds (0.67%) and highest for small blend funds (1.08%). We obtained these numbers by sorting the funds in each Morningstar style category by expense ratio, then aggregating the net assets until we obtained half the total for the category, and noting the expense ratio for the fund that represents the halfway point. Under the "Mean" column, the unweighted (equally weighted) mean expense ratio is lowest for large value funds (0.88%) and highest for small value funds (1.22%). For the combined Morningstar categories, the mean (1.00%) is slightly higher than the median (0.97%), indicating a positively skewed distribution.

Under the "Mean" column is an alternate measure of central tendency. The asset-weighted mean shows the expense ratio weighted by the portfolio assets invested as of December 31, 2006. Compared with the unweighted mean expense ratios, the mean expense ratios derived under this approach are lower for all nine Morningstar categories and for equity mutual funds combined. The lower mean for the asset-weighted approach underscores how truly extreme the expense ratios per dollar invested are in certain funds. As with other measures of central tendency, large value funds have the lowest asset-weighted mean (0.60%). Mid-cap blend funds have the highest asset-weighted mean (1.05%).

As shown in the second column from the right in Exhibit 1, small value mutual funds have the highest standard deviation of expense ratios (0.56%). This Morningstar category also has the highest unweighted mean expense ratios. Small blend funds have the lowest standard deviation of expense ratios (0.25%), despite not having the lowest median or mean.

Expense ratio classes

Exhibit 2 summarizes the number of mutual funds and the mean expense ratios (%) for the Morningstar categories separately and combined in each standard deviation class. Panel A shows that 10.20% of the 1,118 funds have -1σ (low) or -2σ (very low) expense ratios while 12.08% have high expense ratios to varying degrees ($+1\sigma$ through $+3\sigma$). Panel B summarizes the mean expense ratios (%) for the Morningstar categories separately and combined across the standard deviation classes. By definition, the expense ratios increase in each successively larger standard deviation class. The results reveal a wide dispersion of expense ratio standard deviation classes. For example, expense ratios for the combined category increase from 0.22% in the -2σ class to 2.34% in the $+3\sigma$ class. The combined mean expense ratio is 1.00%.

Performance measures

Exhibit 3 summarizes the median performance characteristics of the institutional equity mutual funds partitioned by expense ratio class. We report the results using medians instead of means because the underlying variables tend to be non-normally distributed. Panel A of Exhibit 3 presents the median Sharpe ratios, Jensen's alphas, Miller's active alphas, and Morningstar ratings for all Morningstar categories combined. The medians of these performance measures are highest in the -2σ (very low) class and lowest in the $+3\sigma$ (extremely high) class. For these two classes, the Sharpe ratio is 1.00 and 0.56;

EXHIBIT 2
Frequency Distributions and Mean Expense Ratios for Actively Managed Institutional Equity Mutual Funds

This exhibit presents the frequency distributions and the mean expense ratios (%) for the 1,118 actively managed institutional equity funds in the Morningstar database as of December 31, 2006. Also shown are mean active expense ratios (%) for the 377 funds whose expense ratios can be decomposed into passive and active expense ratios as in Miller [2007]. Data are shown for each of the seven expense ratio classes and overall. Blank cells represent sample sizes of zero.

	Expense Ratio Class							
Morningstar Category and Russell Best-Fit Index	**−2σ Very Low**	**−1σ Low**	**Within −1σ Below Average**	**Within +1σ Above Average**	**+1σ High**	**+2σ Very High**	**+3σ Extremely High**	
Panel A. Frequencies								**Total**
Large value	5	13	77	67	14	4	3	183
Large blend	2	19	78	62	19	6	1	187
Large growth	4	14	109	70	15	4	4	220
Mid-cap value		6	26	14	3		1	50
Mid-cap blend		5	23	11	5	2	1	47
Mid-cap growth	1	21	56	56	5	4	3	146
Small value		2	39	13	3		1	58
Small blend*		10	40	27	13	3		94
Small growth*	1	11	64	35	18	2	1	133
Combined	13	101	512	355	95	25	15	1,118
Panel B. Mean fund expense ratios (%)								**Combined**
Large value	0.18	0.51	0.75	0.97	1.27	1.59	2.15	0.88
Large blend	0.15	0.47	0.75	0.99	1.30	1.62	2.26	0.89
Large growth	0.19	0.59	0.82	1.12	1.46	1.67	2.17	0.97
Mid-cap value		0.68	0.93	1.13	1.39		2.35	1.01
Mid-cap blend		0.80	0.97	1.21	1.45	1.73	2.00	1.12
Mid-cap growth	0.40	0.67	0.93	1.19	1.52	1.80	2.22	1.06
Small value		0.57	1.02	1.46	2.10		4.55	1.22
Small blend		0.71	0.95	1.17	1.42	1.65		1.07
Small growth	0.53	0.81	1.02	1.26	1.52	1.82	2.10	1.15
Combined	0.22	0.62	0.87	1.11	1.43	1.68	2.34	1.00
Panel C. Mean active expense ratios (%)								**Combined**
Russell								
1000 Growth	0.18	1.23	2.20	3.12	3.76		5.79	2.66
1000 Value		1.05	2.12	2.96	4.22			2.65
2000		2.89	3.54	4.23	5.21	5.97		4.01
2000 Growth		2.68	3.54	4.32	5.45	6.36		4.02
2000 Value		2.85	3.32	4.46	5.84			4.17
Mid Growth	0.70	1.76	2.70	3.65	4.82	5.82		3.20
Mid Value		2.04	2.72	3.27	4.12	4.65		3.11
Combined	0.43	1.84	2.67	3.44	4.71	6.00	5.79	3.15

**Two funds are in the −3σ class: one each in small blend and small growth.*

Jensen's alpha is 0.50% and –3.01%; Miller's active alpha is 0.01% and –7.15%; and the Morningstar rating is 3.50 and 2.00, respectively. In general, these performance measures tend to trend downward across the expense ratio classes but not monotonically.

Panel A of Exhibit 3 also shows the results of the Wilcoxon two-sample tests involving the implied impact of expenses on returns for all Morningstar categories combined.[6] As previously stated, we hypothesize that performance, as measured by the median of each measure, is statistically greater in the –2σ (very low) versus +2σ (very high) and –1σ (low) versus +1σ (high) expense ratio classes. The evidence supports this hypothesis (H_1) only for the Sharpe ratio and active alpha, which constitutes partial support for the hypothesis. Although not statistically significant, the Jensen's alpha and Morningstar ratings show directional consistency with the hypothesis.

Panels B and C of Exhibit 3 contain the results for the annualized and cumulative returns over various periods (1, 3, 5, 10 and 15 years). These performance numbers generally trend downward across increasingly higher expense ratio classes, except 10- and 15-year annualized and cumulative returns in the +2σ (very high) or +3σ (extremely high) expense ratio classes. The Wilcoxon tests show that the 3- and 15-year annualized returns are statistically greater in the –2σ versus +2σ expense ratio classes, and the 10-year annualized returns are statistically greater in the –1σ versus +1σ expense ratio classes at the 0.05 level. These tests also differ significantly in the expected direction for 15-year cumulative returns between the –2σ versus +2σ expense ratio classes and for 10-year cumulative returns between the –1σ versus +1σ expense ratio classes. These results are consistent with our hypothesis H_1.

EXHIBIT 3

Median Performance Measures of Actively Managed Institutional Equity Mutual Funds Partitioned by Expense Ratio Class

This exhibit presents three-year Sharpe ratios, Jensen's alphas, and Miller's active alphas as well as Morningstar ratings for institutional equity mutual funds. Annualized, cumulative, and Russell Index-adjusted returns are shown for various periods. Where the Kruskal-Wallis test has judged the medians to differ across the seven expense ratio classes, the rightmost columns list the results of the Wilcoxon two-sample tests for class medians of whether each performance measure is statistically greater in the –2σ (very low) versus the +2σ (very high) expense ratio class and in the –1σ (low) versus the +1σ (high) expense ratio class.

		Expense Ratio Class								Wilcoxon Two-Sample Test	
Performance Measure	n	−2σ Very Low	−1σ Low	Within −1σ (w−) Below Average	Within +1σ (w+) Above Average	+1σ High	+2σ Very High	+3σ Extremely High	Combined	−2σ > +2σ	−1σ > +1σ
Panel A. Sharpe ratios, Jensen's alphas (%), active alphas, and Morningstar ratings											
Sharpe ratio	977	1.00	0.83	0.84	0.76	0.79	0.87	0.56	0.81	Yes*	Yes*
Jensen's alpha	977	0.50	−0.86	−0.42	−1.09	−0.76	−0.63	−3.01	−0.87	No	No
Miller's active alpha	377	0.01	0.35	−1.65	−2.77	−4.94	−0.47	−7.15	−2.22	Yes***	Yes***
Morningstar rating	977	3.50	3.00	3.00	3.00	3.00	2.50	2.00	3.00	No	No
Panel B. Annualized returns (%)											
1-year	1,108	16.88	13.12	13.30	13.20	13.38	12.71	9.44	13.20	No	No
3-year	977	11.59	11.30	11.42	11.02	11.45	10.25	8.51	11.25	Yes**	No
5-year	866	7.25	7.66	7.67	6.81	7.30	5.31	6.21	7.25	No	No
10-year	493	9.97	9.18	8.80	8.22	8.30	9.83	10.96	8.67	No	Yes**
15-year	231	11.53	11.29	10.41	10.12	9.40	12.78	n/a	10.45	Yes**	No
Panel C. Cumulative returns (%)											
3-year	977	38.96	37.88	38.32	36.82	38.43	34.03	27.76	37.69	No	No
5-year	866	41.90	44.63	44.70	39.01	42.23	29.52	35.19	41.90	No	No
10-year	493	158.67	140.58	132.43	120.33	130.25	155.39	182.92	129.67	No	Yes**
15-year	231	413.90	397.56	341.70	324.33	290.67	507.44	n/a	344.11	Yes**	No
Panel D. Russell index-adjusted returns (%)											
1-year	1,108	−1.48	−1.95	−2.45	−2.55	−2.73	−2.22	−5.57	−2.49	No	No
3-year	977	−0.01	−0.61	−0.73	−1.39	−1.05	−2.23	−4.80	−0.96	Yes*	No
5-year	866	−0.62	−0.88	−0.81	−1.15	−1.56	−2.55	−3.68	−0.96	Yes**	Yes*
10-year	493	−0.69	0.32	0.16	−0.19	−1.41	−2.31	2.34	0.08	No	Yes**
15-year	231	−0.62	−0.32	−0.36	−0.83	−2.54	0.37	n/a	−0.44	No	Yes*

, **, and * indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, using a one-tailed test.*

n/a = sample size below 15.

When using annualized returns, the mix of the nine equity mutual fund styles changed during the 15-year return measurement period. This fact, combined with the market's characteristic rotation of various styles through relatively strong and weak return periods, warrants caution when pooling funds in a combined sample. We measure performance for the combined sample by subtracting the return on the relevant Russell Index from each fund's return. Hence, each of the Russell Index-adjusted returns listed in Panel D of Exhibit 3 adjusts for a commonly used benchmark. For large-cap blend funds, we use the Russell 1000 index, and for large-cap growth and value, we use the Russell 1000 growth and value indexes, respectively. For mid-cap blend (growth, value) funds, we use the Russell Mid-cap (growth, value) index, and for small-cap blend (growth, value) the Russell 2000 (growth, value) Index.

As Panel D of Exhibit 3 shows, the Russell Index-adjusted returns are striking. For the various periods studied (1, 3, 5, 10, and 15 years), none of the 34 adjusted returns in any expense ratio class is positive except –1σ, "within –1σ," and +3σ based on 10-year annualized returns and +2σ based on 15-year annualized return. In the "Combined" column, the combined medians below zero, except the 10-year period, document the lack of success that most portfolio managers experience in trying to beat indexes. With a few exceptions, funds in high expense ratio classes have strongly negative risk-adjusted returns. The inability to match the index's performance becomes more acute over long periods, particularly for mutual funds in high expense ratio classes. Fund mortality produces survivorship bias, which results in our reporting more conservative results. Thus, Exhibit 3 does not include poorly performing funds that do not survive to their 10th and 15th anniversaries.

The results of the Wilcoxon tests show mixed support for the hypothesis (H_1) in that half (5 of 10) of the tests support this hypothesis. Specifically, Russell Index-adjusted returns are statistically greater in the –2σ versus +2σ expense ratio classes for 3- and 5-year periods and in the –1σ versus +1σ expense ratio classes for 5-, 10-, and 15-year periods.

Exhibit 4 shows the percent of mutual funds with positive Russell Index-adjusted returns by expense ratio class over varying periods (1, 3, 5, 10, and 15 years). Overall, the results indicate that the percent of funds with positive Russell Index-adjusted returns typically decreases when moving from lower to higher expense ratio classes. For example, based on the 5-year period, 38% of funds have positive Russell Index-adjusted returns in the –1σ class versus 29% in the +1σ class.

We use a chi-square test to evaluate at the 0.05 level whether the null hypothesis that the percentage of mutual funds in each cell beating the benchmark differs from 50%.

EXHIBIT 4

Percent of Actively Managed Institutional Equity Mutual Funds with Positive Russell Index-Adjusted Returns Partitioned by Expense Ratio Class

This exhibit shows the percent of funds with positive Russell Index-adjusted returns by expense ratio class. A chi-square test is used to evaluate at the 0.05 level the null hypothesis that the percentage of funds in each cell beating the benchmark differs from 50%. Dark shading indicates that the percent is significantly less than 50% and light shading indicates that the percent is not distinguishable from 50%. Unshaded cells contain fewer than 15 funds, and tests were not run on these.

		Expense Ratio Class						
		−2σ Very Low	−1σ Low	Within −1σ (w−) Below Average	Within +1σ (w+) Above Average	+1σ High	+2σ Very High	+3σ Extremely High
Period	n	Percent of Funds with Positive Russell Index-Adjusted Returns						
1 year	1,108		26	23	26	23	12	
3 years	977		37	40	31	32	33	
5 years	866		38	39	34	29		
10 years	493		59	54	48	40		
15 years	231		45	45	42			

The results show that the percentage is significantly less than 50% for 1-, 3-, and 5-year periods for all expense ratio classes examined, except the +2σ (very high) class for the 3-year period. The percent is indistinguishable from 50% for funds in the +2σ class for 3-year returns, the −1σ class through +1σ class for 10-year returns, and the −1σ through within +1 class for 15-year returns. Consistent with prior research, an implication of these results is that funds have great difficulty beating their benchmarks. This finding reinforces the relevance to institutional investors of identifying fund characteristics that they can use to distinguish superior and inferior performance.

As noted earlier, our evidence provides some support for the notion that institutional mutual fund performance varies inversely with expense ratios across style categories. Moreover, a positive relation exists between the level of expense ratios and the level of management fees (see, for example, Panel A of Exhibit 6). Although regulatory requirements for fiduciaries mandate that fund-holders' interests are preeminent, a paradox would exist if fund managers with the lowest and highest benchmark-adjusted performance net of expenses received the same fees.

Exhibit 5 shows mean and median expense ratios and management fees for institutional mutual funds with positive returns net of a representative Russell benchmark versus those with negative returns. Panel A of Exhibit 5 indicates that the expense ratios are generally lower for long-lived funds, regardless of whether the returns are positive or negative. As Exhibit 4 shows, the number of funds decreases when moving across the five periods (1, 3, 5, 10, and 15 years) from 1,108 for 1 year to 231 for 15 years. Thus, the results in Panel A indicate a tendency of expense ratios to be lower for more mature funds. This finding suggests that institutional investors selecting more established funds may, on average, experience lower expense ratios. One explanation is that older funds are likely to be larger than younger funds and experience economies of scale. The Wilcoxon test indicates that for 1-, 3-, and 10-year performance periods, funds whose Russell Index-adjusted returns are zero or negative have

EXHIBIT 5

Expense Ratios and Management Fees for Actively Managed Institutional Equity Mutual Funds with Positive and Negative Russell Index-Adjusted Returns

This exhibit shows the mean and median expense ratios and management fees for funds whose returns exceeded returns for a representative benchmark and those that did not, over various investment periods. The z-statistics from Wilcoxon tests of differences of medians are shown in the right-most column.

Return Interval	Funds with Russell Index-Adjusted Returns > 0%		Funds with Russell Index-Adjusted Returns ≤ 0%		Wilcoxon Test of Medians
	Mean	Median	Mean	Median	z-statistic
Panel A. Expense ratio					
1 year	0.99%	0.96%	1.01%	0.98%	−0.37***
3 years	0.96%	0.95%	1.00%	0.98%	−1.84*
5 years	0.96%	0.96%	0.98%	0.96%	−0.50
10 years	0.96%	0.95%	0.92%	0.90%	−1.76*
15 years	0.88%	0.88%	0.84%	0.82%	1.50
Panel B. Management fee					
1 year	0.74%	0.75%	0.76%	0.75%	−1.83*
3 years	0.71%	0.75%	0.75%	0.75%	−2.88***
5 years	0.74%	0.73%	0.74%	0.70%	0.28
10 years	0.73%	0.75%	0.68%	0.70%	−3.62***
15 years	0.69%	0.70%	0.65%	0.65%	2.02**

, **, * indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

significantly higher expense ratios than do those with positive Russell Index-adjusted returns.

Panel B of Exhibit 5 shows the management fees for mutual funds with positive and negative Russell Index-adjusted returns. As the investment interval lengthens, the management fees for both groups show a downward trend, probably due to the fact that older funds tend to be larger and experience scale economies that are shared. Moreover, the difference in management fees between the two groups is significant for the 1-, 3-, 10-, and 15-year periods. In the longer term, managers who generate above-benchmark returns, even if that is largely due to maintaining a low overall expense ratio, receive compensation that is greater than that of their underperforming peers.[7]

Fund characteristics

Exhibit 6 summarizes the relation between median institutional mutual fund characteristics and expense ratio class. Panel A of Exhibit 6 presents the results involving front-end loads, deferred loads, management fees, 12b-1 fees, turnover ratio, and beta. As previously discussed, we expect a *positive* relation between each of these characteristics and expense ratio class. We provide both medians and means for front-end loads, deferred loads, and 12b-1 fees for descriptive purposes. Although the median front-end load is 0% for all expense ratio classes, the mean front-end load is 0% only for the –2σ, +1σ, +2σ, and +3σ classes. Mean front-end loads are highest but very small, in the within +1σ (0.06%), –1σ (0.05%), and within –1σ (0.02%) categories. In general, funds in the highest expense ratio classes do not have front-end loads. Relatively few funds have deferred loads but those that do are typically in the highest expense ratio classes (+1σ, +2σ, and +3σ). For example, the mean deferred load in the +3σ expense ratio class is 2.47%. Although funds typically do not impose 12b-1 fees, those that do tend to be in the higher expense ratio classes. For example, the mean 12b-1 fee in the +3σ class

EXHIBIT 6

Median Characteristics of Actively Managed Institutional Equity Mutual Funds Partitioned by Expense Ratio Class

This exhibit presents the median characteristics for the 1,118 institutional equity mutual funds. For front loads, deferred loads, and 12b-1 fees, means are shown in parentheses below the medians. Where the Kruskal-Wallis test has judged the medians to differ across the seven expense ratio classes, the rightmost columns list the results of the Wilcoxon two-sample tests for class medians for the following expense ratio classes: –2σ (very low) versus the +2σ (very high) and –1σ (low) versus the +1σ (high).

	Expense Ratio Class								Wilcoxon Two-Sample Test	
Characteristic	−2σ Very Low	−1σ Low	Within −1σ (w−) Below Average	Within +1σ (w+) Above Average	+1σ High	+2σ Very High	+3σ Extremely High	Combined	−2σ < +2σ	−1σ < +1σ
Panel A. Loads, fees, turnover, and beta										
Front-end load (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	No	No
(mean)	(0.00)	(0.05)	(0.02)	(0.06)	(0.00)	(0.00)	(0.00)	(0.04)		
Deferred load (%)	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	Yes*	Yes**
(mean)	(0.00)	(0.00)	(0.00)	(0.00)	(0.03)	(0.16)	(2.47)	(0.04)		
12b-1 fees (%)	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.00	Yes***	Yes***
(mean)	(0.00)	(0.00)	(0.00)	(0.02)	(0.06)	(0.15)	(0.57)	(0.03)		
Management fees (%)	0.26	0.53	0.70	0.75	0.90	0.85	0.90	0.74	Yes***	Yes***
Turnover (%)	38.00	74.00	67.00	68.00	77.00	135.00	59.00	69.50	Yes**	Yes*
Beta (3-year)	1.15	1.29	1.25	1.23	1.33	1.25	1.37	1.25	No	No
Expense ratio	0.17	0.64	0.87	1.11	1.43	1.68	2.20	0.97	Yes***	Yes***
Panel B. Other characteristics									−2σ > +2σ	−1σ > +1σ
Net assets ($MM)	1,273.7	282.30	130.20	69.90	20.00	6.90	17.60	90.10	Yes***	Yes***
Tenure (years)	4.20	3.40	3.00	2.80	2.90	1.40	2.90	2.90	Yes***	Yes*
Cash (%)	3.70	1.80	1.90	2.15	2.00	4.40	0.45	2.00	No	No
Dividend yield (%)	1.30	1.10	1.20	1.20	1.10	1.20	0.90	1.20	No	No
Min. initial purchase ($MM)	0.10	0.50	0.38	0.10	0.25	0.10	0.10	0.25	No	No
Observations	13	101	512	355	95	25	15	1,118		

, **, and * indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively, using a one-tailed test.*

is 0.57%. Management fees trend upward when moving from the –2σ class (0.26%) to the +3σ class (0.90%).

The turnover ratio (%) displays substantial variability when moving from lower to higher expense ratio classes. For example, portfolio turnover is lowest (38%) in the –2σ class and highest (135%) in the +2σ class but declines sharply in the +3σ class (59.00%). The pattern of 3-year portfolio betas shows that beta varies among the expense ratio classes but is lowest in the –2σ class (1.15) and highest in the +3σ class (1.37).

With two exceptions involving front-end loads and beta, the univariate tests support the hypothesized relation (H_2). That is, institutional equity mutual funds in the –1σ (low) and –2σ (very low) classes have significantly lower deferred loads and fees (12b-1 and management) and portfolio turnover ratios than do those in the +1σ (high) and +2σ (very high) classes. The pattern of loads, fees, and turnover helps to explain why expenses increase when moving from lower to higher expense ratio classes.

As Panel A of Exhibit 6 shows, the expense ratio, by construction, increases monotonically from 0.17% in the –2σ class to 2.20% in the +3σ class. The median expense ratios differ somewhat from the mean expense ratios contained in Panel B of Exhibit 2. The Wilcoxon tests show that the median expense ratios are statistically lower in the –2σ (very low) versus the +2σ (very high) and the –1σ (low) versus the +1σ (high) expense ratio classes.

Panel B of Exhibit 6 presents the results for other mutual fund characteristics (net assets, manager tenure, cash holdings, dividend yield, and minimum initial purchase) partitioned by expense ratio class. As previously discussed, we expect a negative relation between these five characteristics and expense ratios. Median net assets generally decrease when moving across expense ratio classes from about $1.27 billion in the –2σ (very low) class to $17.60 million in the +3σ (extremely high) class. The inverse relationship between fund assets and expense ratios may reflect economies for the investment advisor generally. Thus, mutual funds with lower expense ratios attract a substantially higher level of funds than do those with higher expense ratios. In fact, our results show that funds in the two lowest expense ratio classes (–2σ and –1σ) have 86.4% of the net assets. In similar fashion, manager tenure, cash holdings, and dividend yield tend to decrease when moving from the –2σ (very low) to the 3σ (extremely high) classes. The pattern involving the minimum initial purchase exhibits considerable variability when moving across the seven expense ratio classes. In summary, Panel B of Exhibit 6 shows that the Wilcoxon tests support our hypothesis H_3 for net assets and managers.

Regression results

Exhibit 7 presents the results of a regression model, as depicted by Equation (4), used to examine the relation

EXHIBIT 7

Regression Results for the Performance and Characteristics of Actively Managed Institutional Equity Mutual Funds

This exhibit presents the results of multiple regressions of performance measures on various fund characteristics for actively managed institutional equity mutual funds.

	Dependent Variable						
				Annualized Russell Index-Adjusted Return			
Explanatory Variable (Hypothesized Sign)	Sharpe Ratio	Jensen's Alpha	Miller's Active Alpha	3-year	5-year	10-year	15-year
Intercept	**0.3511*****	**−2.5339*****	−3.5800	−0.1223	**−2.4893*****	**−3.8621*****	**−1.8698*****
Expense ratio class (−)	−0.0090	−0.0991	**−1.2089****	−0.1046	−0.0340	−0.0473	−0.0649
Net assets ($MM) (+)	**0.0241*****	**0.2337*****	0.4005	**0.3170*****	**0.4124*****	**0.3629*****	**0.3526*****
12b-1 fees dummy (−)	0.0086	0.0297	−0.9318	0.0253	0.0486	0.3192	0.2460
Turnover (−)	**−0.0003***	**−0.0033****	**−0.0174****	**0.0052*****	0.0002	0.0004	**−0.0066*****
Beta (3 year) (+)	−0.0654	**−2.3389*****	1.9582	**−1.2205*****	−0.0179	**2.3344*****	**1.3414****
Cash (%) (+)	**0.0225*****	**0.2325*****	**0.8185*****	**0.0701****	**0.1274*****	**0.1471*****	0.0574
Dividend yield (%) (?)	**0.3204*****	**2.3701*****	−0.4761	**−1.0067*****	**−0.7453*****	**−1.0313*****	**−1.3814*****
F	122.2897***	108.4538***	5.7032***	11.1196***	12.8246***	18.9758***	18.6882***
Adjusted R^2	0.4670	0.4370	0.0805	0.0681	0.0879	0.2047	0.3509
N	970	970	377	970	860	490	230

, **, * indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.*

between mutual fund performance and various explanatory variables. The adjusted R^2s for the six regressions range from 0.0681 to 0.4670. By the normal measures of cross-sectional analysis, our model performed well in explaining fund returns. F values for each regression are significant at the 0.01 level.

For all the regressions the expense ratio class coefficient is negative, as expected, but statistically significant at normal levels only for the Miller's active alpha regression. The coefficient for active alpha indicates that a one-class increment in expense ratio class is associated with a 121-basis-point decrease in alpha for the actively managed portion of the fund. These findings are reasonably consistent with the univariate results shown in Exhibit 3, which reveal a highly significant relation between Miller's active alpha and expense ratio classes and a weak or insignificant relation between the Sharpe ratio and Jensen's alpha and expense ratio classes, respectively.

Because we controlled for expenses, we include six other variables (net assets, 12b-1 fees, turnover, beta, cash, and dividend yield) for measuring an independent effect of these factors on returns. For all regressions, the sign is consistent with our expectations only for net assets (+). The signs of the other variables show mixed results to varying degrees.

The results show that large funds tend to perform significantly better using all performance measures, except active alpha, which suggests that fund asset size is a distinguishing variable for explaining performance. The superior performance of large funds suggests the presence of substantial economies of scale, but we capture this factor in the expense ratio class variable. Hence, the strong positive size-performance relation is independent. James and Karceski [2006] find that even after accounting for difference in expenses, small institutional funds perform poorly. They attribute this poor performance to the lack of monitoring by investors in these funds. Consistent with this explanation, they find that small institutional funds are offered primarily to trust accounts and through for-fee financial advisors. Finding that large funds generally perform better may indicate that greater size leads to increased monitoring for institutional funds.

The coefficient for the 12b-1 dummy variable is statistically insignificant in all regressions. Thus, we fail to confirm that 12b-1 plans impose a penalty or enhance fund value. These fees are relatively uncommon for institutional-class funds, as are loads. In our sample, 9.7% of the funds impose 12b-1 fees, whereas 0.6% and 1.4% of the funds have front and deferred loads, respectively.

The turnover ratio is negative, as expected, and statistically significant only for the Sharpe ratio, Jensen's alpha, Miller's active alpha, and 15-year annualized Russell Index-adjusted returns. Yet, this ratio is significantly positive for the 3-year annualized Russell Index-adjusted return. Although we find mixed evidence, the results favor the observation that superior equity mutual funds tend to engage in less trading activity than do inferior performing funds.

There are mixed results concerning the relation between beta and performance. For the 10- and 15-year annualized Russell Index-adjusted return, the coefficient for beta is positive, as expected, and significant at normal levels. Yet, the coefficients are significantly negative for Jensen's alpha and the 3-year annualized Russell Index-adjusted return. In these instances, there appears to be an inverse relation between systematic risk and performance. Dellva and Olson [1998] also find mixed results for beta versus performance of actively managed mutual funds, depending on the measure used. These mixed results do not lead to a definitive interpretation on the relation between beta and performance.

As expected, the effect of a mutual fund's cash holdings on performance is positive and significant at normal levels for all performance measures except the 15-year annualized Russell Index-adjusted return. Consequently, funds holding more cash typically do not underperform those that hold less cash. This result may seem surprising given that some portfolio managers express concern about the negative impact of cash drag in a rising market (Hill and Cheong [1996]). In theory, there is a trade-off between the opportunity cost of holding cash and the benefit of greater liquidity associated with cash reserves. There are several possible explanations for the positive relation between cash holdings and performance. For example, for funds experiencing very volatile flows, holding more cash tends to enhance performance. Alternatively, greater cash reserves may lead to better performance for managers possessing market timing skills. Another possibility is that greater current or past performance leads to greater inflows and therefore larger amounts of uninvested cash.

The coefficient for dividend yield is significantly positive for the Sharpe ratio and Jensen's alpha but significantly negative for all the annualized Russell Index-adjusted returns. These inconsistent results show that each measure captures different aspects of mutual fund performance.

Fund performance characteristics: institutional versus retail

Comparing our results on fund performance characteristics for actively managed institutional equity mutual funds with those in the existing mutual fund literature reveals both similarities and differences. Perhaps the most comparable studies to our current study are those by Dellva and Olson [1998] and Haslem et al. [2008], who examine the effects of mutual fund characteristics on measures of performance for actively managed retail equity mutual funds.

Consistent with evidence by Dellva and Olson [1998] and Haslem et al. [2008], our results reveal a negative relation between expenses and fund performance. This relation tends to be much weaker for actively managed institutional equity mutual funds compared with their retail counterparts. For example, Dellva and Olson report that the expense ratio is negative and significant at the 1% for each of their four performance measures. Expenses do not tend to be a distinguishing variable of performance for institutional funds because such expenses are substantially lower than for retail funds.

Our evidence that larger institutional funds tend to outperform smaller institutional funds is consistent with the results of Haslem et al. [2008] but in sharp contrast with Chen et al. [2004] and Yan [2008], who find that fund size erodes performance of U.S. actively managed equity mutual funds. However, Della and Olson report that size is not necessarily linked to risk-adjusted performance for equity mutual funds available to the general public. Chen et al. document that fund returns, both before and after fees and expenses, decline with lagged fund size, even after accounting for various performance benchmarks. Yan finds that this inverse relation between fund size and fund performance is stronger among funds that hold less liquid portfolios and is more pronounced among growth and high-turnover funds that often have high demands for immediacy. Thus, evidence from Chen et al. and Yan suggests that liquidity helps to explain why fund size erodes performance.

The results are mixed involving the relation between 12b-1 fees and performance. Both our study and Haslem et al. [2008] indicate no significant relation. Dellva and Olson [1998] find that the coefficient for the 12b-1 variable is significant and positive but conclude that only a limited number of funds with 12b-1 fees earn a risk-adjusted return that can justify this fee. As previously mentioned, 12b-1 fees are far less common in institutional funds than retail funds.

We also find mixed results involving the role of turnover, beta, and dividend yield as related to performance. We generally find a significantly negative relation between turnover and performance for institutional funds, which is similar to the results reported by Haslem et al. [2008] for retail funds. By contrast, Dellva and Olson [1998] find that no statistically significant difference exists in turnover activity for superior and inferior actively managed retail funds. Betas and dividend yields range from significantly positive to significantly negative depending on the performance measure for studies involving institutional funds and retail funds.

The effects of a mutual fund's holding cash on performance tend to be positive and significant for both institutional funds and retail funds. For example, our regression results document that the coefficient of cash (%) is significantly positive for six of the seven performance measures. Haslem et al. [2008] report a significantly positive relation using the Sharpe ratio and Jensen's alpha for retail funds. Dellva and Olson [1998] report a positive relation between a fund's cash holdings and performance for each of their four performance measures. Consequently, a fund's cash holdings do not appear to be a distinguishing characteristic of institutional funds versus retail funds.

Load charges are another characteristic, especially among retail funds, that relate to fund performance. In our study, we exclude load charges because few institutional funds have front-end or deferred loads. For retail funds, Dellva and Olson [1998] find front-end load charges are negative and significant for each of their performance measures. Haslem et al. [2008] generally report a negative and occasionally significant relation depending on the performance measure. Therefore, fund performance typically declines as funds increase their load charges as a percent of assets.

SUMMARY AND CONCLUSIONS

This article provides extensive evidence on the performance characteristics of 1,118 U.S. domestic, actively managed institutional equity mutual funds. We measure performance using such measures as three-year Sharpe ratios, Jensen's alphas, and Miller's active alphas as well as annualized Russell Index-adjusted returns over multiple periods (1, 3, 5, 10, and 15 years). We relate performance to fund attributes including expense ratio class, net assets, 12b-1 fees dummy, turnover ratio, beta, cash, and dividend yield.

We analyze the disparity of expense ratios of actively managed institutional equity mutual funds and find that expense ratios differ widely among Morningstar categories. Consistent with previous studies involving actively managed retail equity mutual funds, we find strong evidence that the average actively managed institutional equity mutual fund cannot beat a representative benchmark after expenses.

We also examine fund characteristics partitioned by expense ratio class and conduct univariate tests. We obtain mixed results concerning whether funds with low expense ratios outperform those with higher expense ratios. Our findings are sensitive to the performance measure and time period used. Compared with mutual funds in high and very high expense ratio classes, our results show that funds in low or very low expense ratio classes have significantly lower deferred loads, 12b-1 fees, management fees, and portfolio turnover. In addition, lower expense ratio funds are larger and have managers with a longer tenure. This evidence suggests that expense-conscious institutional investors should look carefully at these characteristics before investing.

Our study provides new evidence that supports links between their performance of actively managed institutional equity mutual funds and fund attributes. Based on our multiple-regression regression, we find a consistently negative sign in the relation between expense ratio class and performance but statistical significance only for Miller's active alpha performance measure. There is strong support suggesting that larger institutional equity funds tend to outperform smaller institutional equity funds, which may reflect greater monitoring. This finding implies that institutional investors should focus on larger mutual funds as a means of enhancing their portfolio returns. We show that the effect of an institutional equity fund's holding cash on its performance is consistently positive and significant in six of the seven regressions. Our evidence shows statistically significant but mixed results for turnover, beta, and dividend yield. In addition, our results indicate no significant relation between performance and the existence of 12b-1 fees.

Finally, we compare our results with the extant mutual fund literature in order to link any potential difference in findings to the characteristics of institutional funds. Our analysis reveals that expenses have a weaker relation with fund performance for institutional funds than retail funds because institutional funds, on average, have substantially lower expenses. However, fund asset size appears to be a more important indicator of fund performance for institutional funds than for retail funds. Finally, for both institutional funds and retail funds, a positive relation exists between a higher percentage of cash held and better fund performance. These findings warrant further investigation.

ENDNOTES

[1]U.S. Securities and Exchange Commission [2000] reports that institutional funds generally have lower operating expense ratios than other types of funds.

[2]Performance evaluation is the most studied issue in mutual fund research. The empirical literature on active management ability reports somewhat disparate results. For example, studies by Jensen [1968], Malkiel [1995], Gruber [1996], and Carhart [1997] find that the average active fund does not outperform its benchmarks after expenses. This suggests that active managers typically erode value. Others such as Grinblatt and Titman [1993] and Wermers [2000] find that funds tend to select stocks that outperform both a broad market index and passive benchmarks of stocks with similar characteristics. Baks, Metrick, and Wachter [2001] conclude that some skeptical prior beliefs about portfolio manager skill can nonetheless lead to economically significant investments in actively managed funds.

[3]Numerous studies examine actively managed mutual fund performance, such as Malhotra and McLeod [1997], Dellva and Olson [1998], and Ferreira, Miguel and Ramos [2006].

[4]According to U.S. Securities and Exchange Commission [2000], several fund attributes are related to the size of expense ratios: asset size, fund family assets and number of funds, fund category, index funds, institutional funds, front-end loads, 12b-1 fees, portfolio turnover, number of portfolio holdings, use of multiple-share class funds, and fund age.

[5]If this is indeed the case, replacing expense ratios with management fees should yield similar results since management fees compose the largest part of the expense ratio.

[6]For Exhibit 3, we conduct a Wilcoxon two-sample test using medians. To test for robustness, we also use means with Duncan's multiple-range test. The test results are qualitatively similar.

[7]Using a sample of 10,586 open-end actively managed equity funds from 19 countries between 1999 and 2005, Ferreira, Miguel and Ramos [2006] report that funds with higher fees have superior performance.

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