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Performance and characteristics of actively managed retail equity mutual funds with diverse expense ratios

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Abstract

We investigate the relation between the performance and characteristics of 1,779 domestic, actively managed retail equity mutual funds with diverse expense ratios. We show that using expense ratio standard deviation classes is an effective method for characterizing fund expenses for investors. Using various performance measures including Russell-index-adjusted returns, the results indicate that superior performance, on average, occurs among large funds with low expense ratios, low trading activity, and no or low front-end loads. Performance is invariant with respect to whether funds have 12b-1 fees. © 2008 Academy of Financial Services. All rights reserved.

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1. Introduction

Actively managed retail equity mutual funds in the United States have trillions of dollars in assets and collect tens of billions in management fees. These funds also attract tens of millions of investors because they offer a convenient method of investing, diversification benefits, and liquidity. Most studies find that the universe of mutual funds does not outperform its benchmarks after expenses and only a small percentage of mutual fund managers have market timing ability or selectivity expertise. Nonetheless, retail investors continue to

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pour money into actively managed funds in pursuit of superior performance. Baks, Metrick and Wachter (2001) caution that the case against investing in actively managed funds cannot rest solely on the available statistical evidence.

In this study, we focus on domestic equity mutual funds designed for retail investors. Our purpose is threefold: (1) to analyze the disparity of expense ratios of actively managed retail equity funds, (2) to examine fund performance and fund characteristics partitioned by expense ratio class, and (3) to identity fund attributes that contribute significantly to fund performance. We make a strong effort to establish robust results by using a wide range of performance measures and a large cross-section of funds.

Our findings contribute to the financial services literature in several ways. First, we update and expand previous mutual fund research and provide recent evidence on the relation between fund performance and characteristics. An important issue facing investors is whether they can use mutual fund characteristics such as expense ratios and other attributes to distinguish superior from inferior performance. Second, unlike previous studies, we use expense ratio standard deviation classes to examine mutual fund performance and other fund attributes.

2. Data and method

2.1. Measuring expense ratios

We use expense ratios as a percentage to measure mutual fund costs and standard deviations to characterize expense ratio diversity.[1] The expense ratio is total expenses divided by fund average net assets.[2] 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.[3]

2.2. 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. By contrast, our method classifies each fund based solely on the magnitude of its expenses relative to its peer-group average rather than based on the fund's position after 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.

2.3. Sample

The sample consists of 1,779 U.S. actively managed retail equity mutual funds identified from Morningstar as of December 31, 2006.[4] In compiling this sample, we screen out index

funds, enhanced index funds, funds of funds, and exchange traded funds. We retain only the largest share class for each fund, so each portfolio appears in the sample only once. We split the total sample into nine subsamples, 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. Given that expense ratios represent the actions of individual decision units, the analysis is cross-sectional and the individual fund cost ratios are unweighted. We identify seven standard deviation classes for expense ratios and define each relative to the mean expense ratio for funds in each Morningstar category and overall 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 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.

2.4. 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, 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.

2.5. 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. 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 $+3\sigma$).

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 $+2\sigma$ (very high) and -1σ (low) versus $+1\sigma$ (high).

The first hypothesis is therefore:

H_1: Performance, as measured by each median performance measure is 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 expense ratio class and each performance measure.

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. Thus, we expect a positive relation between both front-end loads and deferred loads and expense ratio class.

Third, funds with high expense ratios are likely to carry larger agency problems that extend to component management fees and other costs. Management fees, as the largest component of expense ratios, are likely to have a strong positive relation with the expense ratio. 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. 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. Thus, 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. The authors 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 the expense ratio. 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 more risky funds, such as small-cap funds. These smaller funds with fewer scale advantages tend to have larger expense ratios. Therefore, 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, and beta of retail equity mutual funds.

The second hypothesis is therefore:

H_2: Median front-end load, deferred load, management fees, 12b-1 fees, turnover, and beta are statistically smaller 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 positive relation between each of these characteristics and expense ratio class.

Next, we discuss relations between four other fund characteristics and expense ratios. First, the literature is in general agreement that larger funds with economies of scale have smaller expense ratios. Thus, 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 mutual fund's holding cash on performance is positive and significant and higher performance reflects lower expense ratios. Funds with higher percentages of cash have lower transaction costs (and higher performance) because of greater liquidity to meet redemptions. Thus, we expect a negative relation between cash and expense ratio class.

Fourth, larger funds 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.

We use the Wilcoxon test to determine whether differences exist across expense ratio classes for median net assets, tenure, cash, and dividend yield of institutional equity mutual funds.

The third hypothesis is therefore:

H_3: Median net assets, tenure, cash, and dividend yield 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 characteristic and expense ratio class.

2.6. Model specifications

To reduce the inherent problem of interpretation posed by using a single risk measure, we use three measures to assess risk-adjusted performance: the Sharpe ratio, Jensen's alpha, 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, such as the expense ratio, loads and fees, and other attributes, are useful in explaining fund performance. To make informed decisions, investors should be aware of the impact of these variables on fund performance. For example, funds may charge various fees such as front-end loads, deferred sales charges, and 12b-1 fees. An issue facing investors is which fee, if any, is justifiable on a cost-benefit basis.

Our performance model follows is an expanded version of that proposed by Dellva and Olson (1998). Specifically, it contains an expense ratio class variable plus explanatory variables for fund size, magnitude of front-end and deferred loads, portfolio turnover, beta, cash, and dividend yield. We also include a dummy variable indicating the presence or absence of a 12b-1 fee. Our model tests several factors that could affect fund performance as explained below.

Next, we discuss several factors that could affect mutual fund performance. First, Bogle (2005) 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 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 and fourth, front-end loads, deferred loads (and 12b-1 fees), or a combination thereof, serve to compensate brokers and dealers. According to Malhotra and McLeod (1997), mutual funds paying only loads give the sales agents little incentive to keep investors in the fund. This is because loads provide no recurring income to sales agents, except in the infrequent case where the reinvestment of income and capital gains also carries a load. Therefore, the task and expenses of keeping investors invested rests with funds. Thus, we expect negative relations between front-end loads, deferred loads, and fund performance.

Fifth, 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 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 Securities and Exchange Commission's Walsh (2004) reports results that are inconsistent with either higher net returns or gross returns for 12b-1 equity funds. Freeman (2007) 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. We, therefore, expect a negative relation between 12b-1 fees and fund performance.

Sixth, 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 et al. (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.

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

Eighth, 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.

Ninth, 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. However, given that larger funds hold more stable larger cap portfolios, we expect a positive relation between dividend yield and fund performance.

We use a regression model to estimate the characteristics we expect to explain fund performance.

The fourth hypothesis is therefore:

$$\begin{aligned} \textit{Performance}_{pi} = {} & b_0 + b_1\,(\textit{Expense ratio class}_i) + b_2\,(\text{Net assets}_i) + b_3\,(\textit{Front-end load}_i) \\ & + b_4\,(\textit{Deferred load}_i) + b_5\,(\textit{12b-1 fees}_i) + b_6\,(\textit{Turnover}_i) + b_7\,(\textit{Beta}_i) \\ & + b_8\,(\textit{Cash}_i) + b_9\,(\text{dividend } \textit{yield}_i) + e_i \end{aligned} \tag{1}$$

$\textit{Performance}_{pi}$ is the value for performance measure p, measured net of expenses, for fund i. Performance measures are the Sharpe ratio and Jensen's alpha, each measured over three years. Russell-index-adjusted annualized returns are returns net of annual expenses for each fund, less the return on the applicable Frank Russell Associates index, over varying periods (3, 5, 10, and 15 years). $\textit{Expense ratio class}_i$ 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. $\textit{Net assets}_i$ is the natural logarithm of fund i's net assets (in $ millions) because this variable may be nonlinearly related to performance. $\textit{Front-end load}_i$ and *deferred load*, respectively, expressed as a percentage, for buying fund i. $\textit{12b-1 fees}_i$ is the dummy variable that equals 1 if fund i has a 12b-1 plan in place and 0 otherwise. $\textit{Turnover}_i$ is the annual portfolio turnover as a whole percentage for fund i. $\textit{Beta}_i$ is the three-year beta for fund i used to indicate the systematic risk of a fund. $\textit{Cash}_i$ is the whole percentage of fund i assets. $\textit{Dividend yield}_i$ is the prospective fund i yield over the next

Table 1
Median, mean, and standard deviation of expense ratios for 1,779 actively managed retail equity mutual funds partitioned by Morningstar category and combined

	Expense ratio (%)					
	Median		Mean			
Morningstar category	Across funds	Per dollar invested	Unweighted	Asset-weighted	Standard deviation	*n*
Large value	1.16	0.57	1.21	0.72	0.39	261
Large blend	1.18	0.87	1.22	0.86	0.46	312
Large growth	1.25	0.88	1.33	0.90	0.46	371
Mid-cap value	1.25	1.10	1.34	1.05	0.36	77
Mid-cap blend	1.33	0.91	1.40	1.03	0.39	114
Mid-cap growth	1.36	1.08	1.41	1.05	0.43	227
Small value	1.41	1.25	1.46	1.27	0.41	88
Small blend	1.40	1.20	1.45	1.22	0.47	128
Small growth	1.49	1.18	1.57	1.15	0.54	201
Combined	1.27	0.88	1.35	0.89	0.46	1,779

This table reports expense ratio medians, means, and standard deviations for 1,779 retail 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 rightmost column presents the standard deviation of the expense ratio.

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 hypothesized signs of the coefficients of the explanatory variables relative to mutual fund performance are: expense ratio class (−), asset size (+), front-end load (−), deferred load (−), 12b-1 fees dummy (−), turnover (−) beta (+), cash (+), and dividend yield (+).

3. Empirical results

Tables 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.

3.1. Average expense ratios by Morningstar category

Table 1 contains expense ratio medians, means, and standard deviations for 1,779 retail 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 (1.16%) and small growth (1.49%), respectively. The median expense ratios per dollar invested are lowest for large value funds (0.57%) and highest for small value funds (1.25%). 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 (1.21%) and highest for small growth funds (1.57%). For the combined Morningstar categories, the mean (1.35%) is slightly higher than the median (1.27%) 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 are the expense ratios per dollar invested in certain funds. For example, the expense ratio of one large-cap value fund (Wells Fargo Advantage U.S. Value Class B, 2.00%) is two standard deviations above its Morningstar category's unweighted mean, but three standard deviations above the asset-weighted mean. As with other measures of central tendency, large value funds have the lowest asset-weighted mean (0.72%). Small value funds have the highest asset-weighted mean (1.27%).

As shown in the second column from the right in Table 1, small growth mutual funds have the highest standard deviation of expense ratios (0.54%). This Morningstar category also has the highest median and mean expense ratios. Midcap value funds have the lowest standard deviation of expense ratios (0.36%), despite not having the lowest median or mean.

3.2. Expense ratio classes

Table 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 8.6% of the 1,779 funds have -1σ (low) or -2σ (very low) expense ratios while 11.4% 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 0.34% in the -2σ class to 3.26% in the $+3\sigma$ class. The combined mean expense ratio is 1.35%.

3.3. Performance measures

Table 3 summarizes the median performance characteristics of the retail 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 Table 3 presents the median Sharpe ratios, Jensen's 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 1.04 and -0.47; Jensen's alpha is 0.70% and -4.87%; and the

Table 2
Frequency distributions and mean expense ratios of 1,779 actively managed retail equity funds partitioned by Morningstar category and expense ratio class

	Expense ratio class							
Morningstar category	-2σ Very low	-1σ Low	Within -1σ below average	Within $+1\sigma$ above average	$+1\sigma$ High	$+2\sigma$ Very high	$+3\sigma$ Extremely high	
Panel A: Frequencies								Total
Large value	5	24	118	79	23	8	4	261
Large blend	2	27	143	108	19	8	5	312
Large growth	3	33	184	105	23	18	5	371
Mid-cap value	1	5	42	19	7	2	1	77
Mid-cap blend	1	12	55	29	12	4	1	114
Mid-cap growth*	3	13	113	72	13	9	4	227
Small value	1	5	46	26	6	2	2	88
Small blend		9	66	42	5	4	2	128
Small growth	1	8	115	61	9	4	3	201
Combined	17	136	882	541	117	59	27	1,779
Panel B: Mean expense ratios (%)								Combined
Large value	0.35	0.70	1.05	1.33	1.74	2.20	2.55	1.21
Large blend	0.11	0.60	1.01	1.37	1.88	2.27	3.33	1.22
Large growth	0.24	0.72	1.12	1.51	2.03	2.44	2.94	1.33
Mid-cap value	0.44	0.88	1.20	1.44	1.92	2.22	2.83	1.34
Mid-cap blend	0.35	0.90	1.22	1.55	1.98	2.26	3.01	1.40
Mid-cap growth	0.42	0.83	1.21	1.54	2.01	2.42	3.15	1.41
Small value	0.54	0.94	1.28	1.59	2.03	2.53	3.06	1.46
Small blend		0.90	1.26	1.58	1.99	2.54	4.03	1.45
Small growth	0.46	0.85	1.34	1.76	2.32	2.88	4.66	1.57
Combined	0.34	0.75	1.16	1.50	1.96	2.40	3.26	1.35

This table presents the frequency distributions and the mean expense ratios (%) for the 1,779 actively managed retail equity mutual funds in the Morningstar database as of December 31, 2006. Data are shown for each of the seven expense ratio classes and combined. Blank cells represent sample sizes of zero.

Morningstar rating is 3.00 and 1.00, respectively. With the exception of the $+1\sigma$ class, these performance measures decrease monotonically across the expense ratio classes.

Panel A of Table 3 also shows the results of the Wilcoxon two-sample tests involving the implied impact of expenses on returns for all Morningstar categories combined.[5] As previously stated, we hypothesize that performance, as measured by the median of each measure, is statistically greater in the -2σ (very low) versus $+2\sigma$ (very high) and -1σ (low) versus $+1\sigma$ (high) expense ratio classes. The evidence supports this hypothesis (H_1). Thus, funds with lower versus higher expense ratios experience superior performance as measured by median Sharpe ratios, Jensen's alphas, and Morningstar ratings.

Panels B and C of Table 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, but this decline is not monotonic, except for five-year annualized and cumulative returns. The Wilcoxon tests show that the annualized and cumulative returns are statistically greater in both the -2σ versus $+2\sigma$ and -1σ versus $+1\sigma$ expense ratio classes, which is consistent with H_1.

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 Frank Russell Associates index from each fund's return. Hence, each of the Russell Index-adjusted returns listed in Panel D of Table 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 midcap blend (growth, value) funds, we use the Russell Midcap (growth, value) index, and for small-cap blend (growth, value) the Russell 2000 (growth, value) index.

As Panel D of Table 3 shows, the Russell Index-adjusted returns are striking. For the various periods studied (1, 3, 5, 10, and 15 years), none of the adjusted returns in any expense ratio class is positive except -1σ and "within -1σ" based on 10-year annualized returns. In the "Combined" column, the combined medians below zero document the lack of success that most portfolio managers experience in trying to beat indexes. Specifically, funds in high expense ratio classes have strongly negative risk-adjusted returns. The inability to mirror a benchmark becomes more acute over long periods, particularly for funds in high expense ratio classes. Survivorship bias likely produces more conservative results, as poorly performing mutual funds will not survive to their 10th and 15th anniversaries, and will not be included in the table.

The results of the Wilcoxon tests strongly and consistently support the hypothesis (H_1) that Russell Index-adjusted returns are statistically greater in both the -2σ versus $+2\sigma$ and -1σ versus $+1\sigma$ expense ratio classes. Wherever sample sizes permitted, our findings hold for the 1, 3, 5, 10, and 15-year investment periods.

Table 4 shows the percentage 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 percentage of funds with positive Russell Index-adjusted returns generally decreases when moving from lower to higher expense ratio classes. For example, based on the five-year period, 36% percent of funds have positive Russell Index-adjusted returns in the -1σ class versus 13% in the $+3\sigma$ class.

We use a χ^2 test to evaluate at the 0.05 level the null hypothesis that the percentage of mutual funds in each cell beating the benchmark differs from 50%. The results show that the percentage is significantly lower than 50% for most measurement periods, and particularly for the high expense ratio categories. The percentage is indistinguishable from 50% for funds in the -2σ class for one-year returns, and in the -1σ class for 10 and 15-year returns. In the vast majority of cases tested (22 of 26), the percentage of funds with positive Russell-adjusted returns beating the benchmark is significantly less than 50%. Consistent with prior research, portfolio managers have difficulty in outperforming their benchmarks. This finding reinforces the relevance to investors of identifying fund characteristics associated with inferior and superior performance.

As noted earlier, our evidence confirms that actively managed 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

Table 3
Median performance measures of actively managed retail equity funds partitioned by expense ratio class

Performance measure	n	Expense ratio class								Wilcoxon two-sample test	
		-2σ Very low	-1σ Low	Within -1σ (w−) below average	Within $+1\sigma$ (w+) above average	$+1\sigma$ High	$+2\sigma$ Very high	$+3\sigma$ Extremely high	Combined	$-2\sigma >$ $+2\sigma$	$-1\sigma >$ $+1\sigma$
Panel A: Sharpe ratios, Jensen's alphas (%), and Morningstar ratings											
Sharpe ratio	1,616	1.04	0.86	0.77	0.72	0.73	0.63	−0.47	0.75	Yes***	Yes***
Jensen's alpha	1,616	0.70	−0.47	−1.04	−1.51	−1.19	−2.17	−4.87	−1.18	Yes***	Yes***
Morningstar rating	1,616	3.00	3.00	3.00	2.00	2.00	2.00	1.00	3.00	Yes***	Yes***
Panel B: Annualized returns (%)											
1-year	1,766	16.78	13.81	12.94	12.50	12.09	9.85	10.61	12.78	Yes***	Yes**
3-year	1,616	11.93	10.76	10.98	10.15	10.06	9.29	7.36	10.68	Yes***	Yes**
5-year	1,448	8.61	7.57	7.47	6.08	6.00	5.49	3.01	6.87	Yes***	Yes***
10-year	830	9.91	9.48	8.63	7.54	7.03	7.50	6.03	8.37	#	Yes***
15-year	431	11.36	10.95	10.11	9.30	9.32	6.60	4.50	10.02	#	Yes**
Panel C: Cumulative returns (%)											
3-year	1,616	40.24	35.88	36.69	33.75	33.32	30.54	23.74	35.57	Yes***	Yes**
5-year	1,448	51.13	44.03	43.36	34.30	33.82	30.63	15.98	39.37	Yes***	Yes***
10-year	830	157.26	147.26	128.82	106.87	97.18	106.10	79.51	123.40	#	Yes***
15-year	431	402.27	375.24	323.75	279.32	280.62	175.26	98.67	318.87	#	Yes**
Panel D: Russell index-adjusted returns (%)											
1-year	1,766	−1.63	−1.81	−2.57	−3.07	−4.75	−3.61	−4.48	−2.84	Yes**	Yes***
3-year	1,616	−1.56	−1.20	−1.06	−1.66	−2.99	−2.79	−5.09	−1.43	Yes**	Yes***
5-year	1,448	−1.01	−1.28	−0.74	−1.77	−3.56	−1.50	−3.81	−1.18	Yes*	Yes***
10-year	830	−0.30	0.19	0.01	−0.89	−0.84	−1.70	−4.56	−0.27	#	Yes**
15-year	431	−0.59	−0.02	−0.57	−1.38	−2.32	−2.36	−5.79	−0.66	#	Yes**

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

This table presents three-year Sharpe ratios, Jensen's alphas, and Morningstar ratings for retail equity mutual funds. In addition, the table reports annualized, cumulative, and Russell Index-adjusted returns 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) vs. the $+2\sigma$ (very high) expense ratio class and in the -1σ (low) vs. the $+1\sigma$ (high) expense ratio class. The # sign indicates a sample size below 15.

example, Panel A of Table 6). Although regulatory requirements for fiduciaries mandate that fund-holders' interests are pre-eminent, a paradox would exist if fund managers with the lowest and highest benchmark-adjusted performance net of expenses received the same fees.

Table 5 shows mean and median expense ratios and management fees for mutual funds with positive returns net of a representative Russell benchmark versus those with negative returns. Panel A of Table 5 indicates that the expense ratios generally decrease over time regardless of whether the returns are positive or negative. As Table 4 shows, the number of funds decreases when moving across the five periods (1, 3, 5, 10, and 15 years). Thus, the results in Panel A indicate a tendency of expense ratios to become lower for more mature

Table 4
Percent of actively managed retail equity funds with positive Russell index-adjusted returns partitioned by expense ratio class

		Expense ratio class						
Period	*n*	-2σ Very low	-1σ Low	Within -1σ (w−) below average	Within $+1\sigma$ (w+) above average	$+1\sigma$ High	$+2\sigma$ Very high	$+3\sigma$ Extremely high
1-year	1,766	*41*	**32**	**25**	**22**	**20**	**22**	**12**
3-year	1,616		**37**	**36**	**28**	**22**	**21**	**14**
5-year	1,448		**36**	**39**	**28**	**22**	**24**	**13**
10-year	830		*53*	*50*	**36**	**38**		
15-year	431		*49*	**42**	**28**			

This table shows the percentage of mutual funds with positive Russell Index-adjusted returns by expense ratio class. A χ^2 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%. Values in bold indicate that the percentage is significantly less than 50%, and italic values indicate that the percentage is not distinguishable from 50%. Cells with no values contain fewer than 15 funds, and tests were not run on these funds.

funds. This finding suggests that investors selecting more established funds may, on average, experience lower expense ratios. For example, older funds are likely to be larger than younger funds and experience economies of scale. The Wilcoxon test indicates that for 1-, 3-, and 5-year performance periods, funds whose Russell Index-adjusted returns are zero or

Table 5
Expense ratios and management fees for actively managed retail equity mutual funds with positive and negative Russell index-adjusted returns

	Mutual funds with Russell index-adjusted returns > 0%		Mutual funds with Russell index-adjusted returns ≤ 0%		Wilcoxon test of medians
Return interval	Mean	Median	Mean	Median	z-statistic
Panel A: Expense ratio					
1 year	1.31%	1.25%	1.36%	1.28%	−1.73*
3 years	1.28%	1.25%	1.36%	1.29%	−3.48***
5 years	1.27%	1.25%	1.34%	1.27%	−2.43**
10 years	1.25%	1.21%	1.26%	1.21%	0.67
15 years	1.15%	1.13%	1.18%	1.15%	−0.65
Panel B: Management fee					
1 year	0.79%	0.75%	0.80%	0.75%	2.16**
3 years	0.79%	0.75%	0.79%	0.75%	−1.43
5 years	0.80%	0.75%	0.77%	0.75%	2.52**
10 years	0.79%	0.75%	0.73%	0.74%	4.22***
15 years	0.74%	0.75%	0.70%	0.70%	2.30**

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

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

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

Panel B of Table 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 typically decline, probably because of the fact that older funds tend to be larger and experience scale economies. Moreover, the difference in management fees between the two groups is significant for 1-, 5-, 10-, and 15-year periods. In the longer term, managers who generate above-benchmark returns even if that is largely because of maintaining a low overall expense ratio, receive compensation that is greater than that of their underperforming peers.

3.4. Fund characteristics

Table 6 summarizes the relation between median mutual fund characteristics and expense ratio class. Panel A of Table 6 presents the results involving front-end and deferred loads, 12b-1 fees, and beta. 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 class. Mean front-end loads are highest in the within $+1\sigma$ (5.00%) and within -1σ (2.59%). Median and mean deferred loads are also 0% for the -2σ class. Equity funds in the two lowest expense ratio classes typically do not charge loads or impose substantial 12b-1 fees. Both 12b-1 and management fees trend upward when moving from lower to higher expense ratio classes.

The turnover ratio (%) trends upward, but not monotonically, when moving from lower to higher expense ratio classes. For example, portfolio turnover is lowest (34%) in the -2σ class and highest (73%) in the $+1\sigma$ class. The pattern of portfolio betas shows beta increasing from 1.01 in the -2σ class to 1.60 in the $+3\sigma$ class.

With one exception, beta, the univariate tests support the hypothesized relations (H_2). That is, retail equity mutual funds in the -1σ (low) and -2σ (very low) classes have significantly lower front-end loads, deferred loads, 12b-1 fees, management fees, and portfolio turnover ratios than do those in the $+1\sigma$ (high) and $+2\sigma$ (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. Beta differs significantly at the 0.01 level for the -1σ versus the $+1\sigma$ class, but not for the -2σ versus the $+2\sigma$ class at normal levels.

As Panel A of Table 6 shows, the expense ratio, by construction, increases monotonically from 0.35% in the -2σ class to 3.00% in the $+3\sigma$ class. The median expense ratios differ slightly from the mean expense ratios contained in Panel B of Table 2. The Wilcoxon tests show that the median expense ratios are statistically lower in the -2σ (very low) versus the $+2\sigma$ (very high) and the -1σ (low) versus the $+1\sigma$ (high) expense ratio class.

Panel B of Table 6 presents the results for other mutual fund characteristics (net assets, manager tenure, cash, and dividend yield) partitioned by expense ratio class. As hypothesized, median net assets decrease when moving across expense ratio classes from \$3.306 billion in the -2σ (very low) class to \$10.00 million in the $+3\sigma$ (extremely high) class. Thus, mutual funds with lower expense ratios have attracted a substantially higher level of funds than do those with higher expense ratios. In similar fashion, manager tenure, cash, and

Table 6
Median characteristics of actively managed retail equity mutual funds partitioned by expense ratio class

	Expense ratio class									
Characteristic	-2σ Very low	-1σ Low	Within -1σ (w−) below average	Within $+1\sigma$ (w+) above average	$+1\sigma$ High	$+2\sigma$ Very high	$+3\sigma$ Extremely high	Combined	Wilcoxon two-sample test	
Panel A: Loads, fees, turnover, and beta									$-2 < +2\sigma$	$-1\sigma < +1\sigma$
Front-end load, %	0.00	0.00	0.00	3.25	0.00	0.00	0.00	0.00	Yes*	Yes**
(mean)	(0.00)	(0.92)	(2.59)	(5.00)	(1.72)	(0.56)	(1.24)	(2.49)		
Deferred load, %	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	Yes***	Yes***
(mean)	(0.00)	(0.03)	(0.00)	(0.06)	(0.75)	(2.28)	(0.54)	(0.15)		
12b-1 fees, %	0.04	0.00	0.25	0.25	0.25	0.75	0.75	0.25	Yes***	Yes***
(mean)	(0.10)	(0.06)	(0.14)	(0.23)	(0.46)	(0.73)	(0.54)	(0.21)		
Management fee (%)	0.38	0.57	0.75	0.84	0.90	0.85	1.00	0.75	Yes***	Yes***
Turnover ratio (%)	34.00	53.00	63.00	69.00	73.00	72.00	55.00	65.00	Yes***	Yes***
Beta (3-year)	1.01	1.15	1.27	1.22	1.26	1.20	1.60	1.25	No	Yes**
Expense ratio	0.35	0.78	1.16	1.50	1.95	2.35	3.00	1.27	Yes***	Yes***
Panel B: Other characteristics									$-2\sigma > +2\sigma$	$-1\sigma > +1\sigma$
Net assets ($MM)	3,306.30	897.65	227.35	54.60	27.40	12.80	10.00	122.60	Yes***	Yes***
Manager tenure (years)	4.20	4.30	3.80	3.10	3.30	3.00	3.80	3.40	No	No
Cash (%)	3.60	2.20	2.20	2.10	2.20	2.10	2.00	2.20	No	No
Dividend yield (%)	1.40	1.25	1.20	1.20	1.20	1.00	0.90	1.20	Yes**	Yes*
Observations	17	136	882	541	117	59	27	1,779		

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

This table presents the median characteristics for the 1,779 retail equity mutual funds. For front-end 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) vs. the $+2\sigma$ (very high) and -1σ (low) vs. the $+1\sigma$ (high).

dividend yield tend to decrease when moving from the -2σ (very low) to the 3σ (extremely high) classes. For net assets and dividend yield, the Wilcoxon tests support H_3 in that median net assets and dividend yield 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. For manager tenure and cash, the differences between the -2σ versus the $+2\sigma$ and the -1σ versus the $+1\sigma$ expense ratio classes are not statistically significant at normal levels.

3.5. Regression results

Table 7 presents the results of a regression model, as depicted by Eq. (1), used to examine the relation between mutual fund performance and various explanatory variables. For a more recent period, our results are directionally similar in many respects to those reported by Dellva and Olson (1998). The adjusted R^2s for the six regressions range from 0.1150 to 0.4285. 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. The results reflect the sensitivity of the funds' average performance to the choice of the performance measure.

The expense ratio class is negative and statistically significant at normal levels for the Sharpe ratio, Jensen's alpha, and 3- and 10-year return measures and not for the 5- and 15-year measures. The significant coefficient for expense ratio class indicates that when all fees are taken into account, mutual funds with lower total expenses have better returns. As for the absence of strong results for the 15-year period, there are at least two explanations. First, for each fund portfolio we examine only the largest fund class, so only the classes most successful at attracting assets remain. Second, given the high level of mortality for underperforming funds, there is a strong survivorship bias associated with the longer performance periods.

The magnitudes of the regression coefficients for expense ratios also suggest economic significance. For example, using the performance model based on 10-year annualized Russell-index-adjusted returns, the coefficient for expense ratio class is -0.2689, meaning that even after controlling for other mutual fund characteristics, an increment of 1 in the expense ratio class is associated with about a 27 basis point lower annual return. This apparent economic and statistical significance supports investors' use of expense ratio class as an indicator of relative investment prospects. When comparing retail equity mutual funds, investors should generally minimize expenses because additional expenses do not provide a clear economic benefit.

Because we controlled for expenses, we included other variables (net assets, front-end load, deferred load, 12b-1 fees, turnover, beta, cash, and dividend yield) for measuring an independent effect of these factors on returns. The results show that fund size is positive and significant at the 0.01 level for all performance measures, which suggests that fund size is a distinguishing variable for explaining performance. By contrast, the results of Dellva and Olson (1998) suggest that fund size is not a distinguishing variable for superior and inferior mutual funds for three traditional measures of risk-adjusted performance. Apparently, larger

Table 7
Regression results for the performance and characteristics of actively managed retail equity mutual funds

Explanatory variables	Hypothesized sign	Dependent variable					
				Annualized Russell index-adjusted return			
		Sharpe ratio	Jensen's alpha	3-year	5-year	10-year	15-year
Intercept		**0.5419*** **	**1.7240** **	**1.9412*** **	**−1.6267***	**−1.1999**	**−1.8280***
Expense ratio class	−	**−0.0237** **	**−0.2601** **	**−0.3545*** **	−0.1838	**−0.2689***	−0.1426
Net assets ($MM)	+	**0.0336*** **	**0.3234*** **	**0.3992*** **	**0.5077*** **	**0.5390*** **	**0.5951*** **
Front-end load (%)	−	−0.0004	−0.0082	0.0047	**−0.0627***	**−0.1280*** **	**−0.1414*** **
Deferred load (%)	−	**−0.0189***	−0.1597	−0.0006	−0.1463	−0.0019	0.1018
12b-1 fees dummy	−	0.0013	−0.1761	−0.0149	−0.1365	0.1607	0.2997
Turnover ratio	−	**−0.0003*** **	**−0.0042*** **	−0.0009	−0.0013	**−0.0069*** **	**−0.0077*** **
Beta (3 year)	+	**−0.1406*** **	**−4.4086*** **	**−1.7104*** **	−0.0424	**1.2316*** **	0.5277
Cash (%)	+	**0.0096*** **	**0.0804*** **	**−0.0302***	0.0267	0.0047	0.0285
Dividend yield (%)	+	**0.2345*** **	**1.3492*** **	**−1.5548*** **	**−1.0155*** **	**−1.5856*** **	**−1.6288*** **
F		114.3064***	117.7715***	24.2462***	22.2717***	31.7104***	36.8180***
Adjusted R^2		0.3878	0.3950	0.1150	0.1169	0.2589	0.4285
N		1,611	1,611	1,610	1,447	827	431

**, **, * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively.
Bold indicates statistical significance of the variables.

retail equity funds can achieve economies of scale, but we captured this factor in the expense ratio class variable. Hence, the strong positive size-performance relation is independent.

Front-end loads are negative and significant at the 0.01 level for longer-term (beyond three years) performance measures. Hence, mutual fund performance decreases as load charges increase. Longer-term performance is generally not related to the magnitude of deferred load charges. Funds with superior performance typically do not charge loads. The evidence suggests that investor avoidance of funds with front-end and deferred load charges is a necessary but not sufficient condition for achieving superior performance.

The coefficient for the 12b-1 fees dummy variable is statistically insignificant in all regressions. Thus, importantly, the results do not confirm that 12b-1 fees reduce mutual fund performance. The turnover ratio is negative and highly significant, except for the three- and five-year annualized Russell index-adjusted returns. The results for Table 6 reveal that turnover activity trends upward when moving from lower to higher expense ratio classes. Our evidence shows that superior mutual funds tend to engage in less portfolio trading activity than do inferior funds. This finding contrasts with evidence by Dellva and Olson (1998) that no difference exists in turnover activity for superior and inferior performing funds.

For the 10-year annualized Russell index-adjusted return, the coefficient for beta is positive and significant at the 0.01 level. This result is consistent with our expectation. Yet, betas are significantly negative for the three-year performance measures. 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, depending on the measure used.

The effects of a mutual fund's cash holdings on performance are positive and significant at the 0.01 level for the Sharpe ratio and Jensen's alpha. Using these performance measures, funds that hold 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 & Cheong, 1996). Our results also show a negative and significant relation between cash and 3-year annualized Russell index-adjusted return, but other findings are statistically insignificant. These mixed results do not lead to a definitive interpretation on the relation between cash and performance.

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 performance.

4. Summary and conclusions

In this study, we provide extensive evidence on the performance and characteristics of 1,779 U.S. domestic, actively managed retail equity mutual funds. We find that expense ratios differ widely among Morningstar categories. Overall, our results indicate that funds with low expense ratios outperform those with higher expense ratios. An implication of these findings is that retail investors generally could gain insight into fund expenses and performance prospects relative to peers if research services such as Morningstar, Lipper, and Value

Line included each fund's expense ratio standard deviation class in their basic suite of data items.

Consistent with previous studies, we find strong evidence that the average actively managed mutual fund fails to outperform its benchmark after expenses. Furthermore, the probability of a fund achieving a positive risk-adjusted return increases as its expense ratio decreases. Similar findings in the past have lead many experts to conclude that investors would be better off in low-cost passively managed index funds. Our results show that expenses must be at least one and perhaps two standard deviations below the peer-group mean for investors to have close to a 50–50 chance of beating a relevant benchmark.

We also examine mutual fund characteristics partitioned by expense ratio class. Compared with funds in high and very high expense ratio classes, our major results show that those in low or very low expense ratio classes have significantly lower front-end and deferred loads, 12b-1 fees, management fees, and turnover. An implication of this evidence is that expense conscious investors should look carefully at these fund characteristics before investing.

Our study provides evidence that supports links between mutual fund performance and fund attributes. Based on our regression analysis, we find evidence suggesting that larger equity funds tend to outperform smaller equity funds, which may reflect economies of scale. We find a significant negative relation between performance and loads (especially front-end loads), turnover, and beta (specifically using three-year performance measures). In addition, our results indicate no significant relation between performance and 12b-1 fees. We find evidence of statistically significant but mixed performance results for beta, cash, and dividend yields. In general, investors should be aware of these relations before investing.

Notes

1. Performance evaluation is the most studied issue in mutual fund research. The empirical literature on active management ability has found 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 actually destroy 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.
2. 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.
3. Haslem (2003) and Haslem, Baker and Smith (2006, 2007) discuss fund expenses and high expense funds, respectively.
4. All of these mutual funds are technically domestic funds but most contain foreign securities. In our sample, 1,489 funds have 10% or less in non-U.S. securities and 344 of these have 0%.

5. For Table 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.

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