Executive summary. In an effort to identify superior mutual funds, investors use a variety of statistics and portfolio characteristics. This research commentary demonstrates that historical performance provides no more than limited insight into future performance. We investigate alternative attributes that can be used to improve an investor’s odds of selecting alpha-producing funds. We find that fund expense ratios and portfolio turnover are powerful indicators of future performance.
“Past performance is no guarantee of future results.” This regulatory boilerplate captures a dilemma in portfolio construction, particularly for portfolios that include active strategies, which are subject to variation not only in absolute returns but also in performance relative to market indexes. Talented managers can deliver better-than-benchmark returns, and it’s easy enough to identify managers who have produced alpha in the past. Unfortunately, these historical feats shed little light on a fund’s future.

Are there signals that can help investors identify benchmark-beating funds? Yes. More than any other quantifiable attribute that we examined, lower costs are associated with higher risk-adjusted returns. Although this conclusion echoes previous Vanguard and other academic research, it’s inconsistent with the typical relationship between price and quality: When you get behind the wheel, there’s no mistaking a Yugo for a Bentley.

We review the weak link between past performance and future returns. We then examine the use of other fund characteristics to identify funds that are more likely to outperform their benchmarks. The overwhelming conclusion: In the hunt for alpha, investors are more likely to find their quarry in low-cost habitats.

Historical alphas are no help

To identify managers who will outperform in the future, it seems sensible to start with those who have succeeded in the past.

What is “success”? Many investment practitioners define success as the ability to outperform a stated benchmark. The margin of outperformance (or underperformance) is referred to as “excess return.” A limitation of excess return is that it may not account for differences between a manager’s static beta bets—a large-cap manager’s persistent tilt toward small caps, for example—and the benchmark’s beta profile. What appears to be superior portfolio management may simply reflect a mismatch between the fund’s and the benchmark’s betas.

“Alpha,” by contrast, is risk-adjusted return calculated relative to a customized benchmark that seeks to account for a manager’s static beta bets. Alpha is a more demanding measure of a manager’s ability to produce returns that can’t be captured through a combination of low-cost index funds weighted according to the manager’s beta exposures. Throughout this research commentary, we use alpha to examine the relationship between performance and various fund characteristics. Toward the end of our analysis, however, we use excess return to explore how an investor might select a fund without any knowledge of its beta bets, using only information about the fund’s stated benchmark.

Alpha. A portfolio’s risk-adjusted excess return versus its effective benchmark.

Beta. A measure of the volatility of a security or a portfolio relative to a benchmark.

Notes on risk: All investments are subject to risk. Prices of mid- and small-cap stocks often fluctuate more than those of large-company stocks. Diversification does not ensure a profit or protect against a loss in a declining market. Performance data shown represent past performance, which is not a guarantee of future results. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index.
We started our search for superior performers by analyzing a Morningstar database of the returns of actively managed mutual funds from 1990 through 2010. We calculated alphas relative to the stock market’s four common risk factors, as outlined by Fama and French (1993) and Carhart (1997):

- Market risk factor (the difference between the returns of the broad stock market and risk-free U.S. Treasury bills);
- SMB risk factor (a measure of the historical difference between the returns of small- and large-cap stocks; SMB refers to “small [market cap] minus big”);
- HML risk factor (a measure of the historical difference between the returns of stocks with high book-to-market and low book-to-market values; HML refers to “high [book-to-market ratio] minus low”); and
- Momentum risk factor (the historical difference between the returns of stocks with the highest returns over the past 3 to 12 months and those with the lowest).

For each of the rolling 36-month periods in our database, we grouped the funds in quartiles from lowest alpha to highest alpha. We then calculated the probability that a top-quartile fund would remain a top-quartile performer over the following 1-, 3-, 5-, and 10-year periods, as shown in Figure 1.

Figure 1 presents two sets of probabilities, one calculated from a database free of survivorship bias (it includes records both of existing funds and of those no longer in existence) and a database that is survivor-biased. The results based on the two datasets were different, but both led to the same conclusion: The probability that the highest-alpha funds will remain the highest-alpha funds in subsequent periods was no better—and was sometimes worse—than chance. (In a random distribution, we would expect to see 25% of the top-quartile performers in that same quartile in future periods.)

The survivor-bias-free dataset is more reflective of an investor’s real-world experience. An investor’s long-term challenge is to identify a fund that can both outperform and stay in business long enough to deliver that outperformance to shareholders. Calculated from this survivor-bias-free dataset, the probability that a top-quartile performer would remain so was below that same probability in the survivor-biased data. The difference mainly reflects simple arithmetic. Although the numerators—the number of top-quartile funds—were similar in both datasets, the denominators were different. The denominator of the survivor-bias-free dataset included both living and dead funds, while the survivor-biased data included only those funds that survived.
We see a similar disjunction between past and future performance in other return-based measures such as the Morningstar Rating. Like alpha, the star rating is a measure of risk-adjusted performance. Unlike alpha, it takes account of sales loads and evaluates performance relative to mutual fund peer groups, not market indexes.

The Morningstar Rating ranges from 1 star (the worst risk-adjusted performance relative to peer groups) to 5 stars (the best). Can investors improve their chances of outperforming market benchmarks by sticking to the highest-rated funds?

Vanguard research (Philips and Kinniry, 2010) has examined whether these ratings could be used to identify funds that would produce returns superior to those of the relevant style indexes over the subsequent 36 months. The star rating proved to be a poor guide; 5-star funds, the best historical performers, were less likely to outperform their indexes than 1-star funds, the laggards of yesteryear, as shown in Figure 2.

In many comparisons, past performance is an intuitively and empirically sensible guide to future performance: A five-star restaurant will probably serve a good meal a year from now. In investment management, however, this intuition fails. (See Carhart, 1997; and Brown and Goetzmann, 1995.)

Cost: A powerful clue to future performance

If it’s possible to identify sources of alpha in advance, investors clearly will have to rely on signals other than past performance. One likely suspect is cost. In tracking this suspect, we follow in the footsteps of academic and industry researchers. In his widely cited “On Persistence in Mutual Fund Performance,” for example, Mark M. Carhart (1997) stated that “expense ratios, portfolio turnover, and load fees are significantly and negatively related to performance.” Also, Vanguard founder John C. Bogle, from whom the title of this commentary is drawn,1 has published extensively on the relationship between cost and investment performance (see, for example, Bogle, 2005).

Our suspicion would be misguided, however, if higher costs allowed investors to secure the talents of managers who could produce enough alpha to compensate for those higher costs. As a first test of the relationship between cost and performance, we ranked funds by their alphas over rolling 36-month periods from 1990 through 2010, and calculated the average expense ratio for the funds in each alpha quartile, as shown in Figure 3.

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As shown in Figure 3, the average expense ratio of those funds with the highest one-year alphas is 70 basis points below those with the lowest. This gap raised two questions: Do low costs lead to alpha? Or is it coincidence that the higher-returning funds, on average, have lower expense ratios?

To distinguish between cause and effect, and to assess how other variables might affect performance, we examined the relationship between fund alphas and four readily observable fund characteristics:

1. Fund expense ratio. Expenses reduce a fund’s net returns, so we would expect to see a strong relationship between lower costs and higher alpha.

2. Portfolio turnover. Portfolio turnover can be a crude proxy for transaction costs. Can it tell you anything about a fund’s tendency to outperform?

3. Fund asset size. As assets under management increase, an actively managed fund’s opportunity set—the universe of securities that can make a meaningful impact on performance—shrinks. Are smaller and presumably more nimble funds better able to produce alpha?

4. Fund age. A fund won’t survive long if it has no commercial prospects. Those prospects, in turn, depend, in part, on fund performance. Is it reasonable to assume a relationship between fund age and the investment skill necessary to produce strong performance? The presumed wisdom of investing in seasoned funds is codified, to some degree, in investment policies that may prevent an institution from investing in funds less than three years old.

Our analysis included two steps. First, we examined the relationship between fund alphas and each of the four characteristics in isolation. Second, we explored the relationship between alpha and the combination of all four characteristics. This second step allowed us to quantify both the combined impact of these characteristics as well as alpha’s sensitivity to each of them.

Figure 4, on page 6, presents four scatterplots that establish directional relationships between alpha and the four fund characteristics for all U.S. equity funds. In each case, an increase in the value of a fund characteristic seems to be associated with a decline in alpha, though it’s not clear from the scatterplots whether these relationships are meaningful.

In the second step of our analysis, we used the Fama-MacBeth (1973) cross-sectional regressions technique to determine how the interplay of these four characteristics affected alpha. We specified alpha as the dependent variable and the four characteristics as independent variables, and calculated the statistical significance of these relationships.

<table>
<thead>
<tr>
<th>Alpha</th>
<th>Expense ratio</th>
</tr>
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<tr>
<td>1st quartile</td>
<td>1.19%</td>
</tr>
<tr>
<td>2nd quartile</td>
<td>1.54</td>
</tr>
<tr>
<td>3rd quartile</td>
<td>1.47</td>
</tr>
<tr>
<td>4th quartile</td>
<td>1.89</td>
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</table>

Note: All funds sorted based on 36 months of rolling performance.

Sources: Vanguard calculations, based on Morningstar data excluding sector funds, real estate funds, and specialty funds such as bear-market funds.

\[2\] Turnover is a measure of a fund’s trading activity. For this analysis, turnover was based on the lesser of the value of a fund’s purchases or sales divided by average total net assets, as reported by Morningstar for the period specified. This measure can be revised to include a “flow variable,” as defined by Tufano and Sirri (1998): the percentage growth of a fund in excess of the growth that would have occurred had no new funds flowed in and had all dividends been reinvested. The results using the revised turnover measure are similar to what we found using the turnover figures reported by Morningstar.
Figure 4. What drives active fund performance? Comparing four fund characteristics with corresponding alphas: Industry analysis, 2001 through 2010

a. Expense ratio

Ten-year annualized alpha

b. Turnover

Ten-year annualized alpha

c. Age

Ten-year annualized alpha

d. Size

Ten-year annualized alpha

Notes: Each plotted point represents an active equity fund that had at least 36 months of returns over the period January 1, 2001, through December 31, 2010. (We used this subset of our 1990–2010 dataset for ease of presentation. Relationships are similar for the larger dataset.) The funds are plotted to represent the relationship of their expense ratios, turnover, age, and asset size versus the ten-year annualized alpha relative to their customized benchmarks, created by using the Fama-French-Carhart expanded market model (Fama and French, 1993; Carhart, 1997). Each sloping line represents the linear regression, or the best-fit trend line, showing the general relationship of fund characteristics to alpha. The scales are standardized to show the slopes’ relationships to each other. In chart 4d, M = million; B = billion.

Sources: Vanguard calculations, based on all active U.S. equity funds as reported by Morningstar, Inc., for 2001 through 2010. Data exclude sector funds, real estate funds, and specialty funds such as bear-market funds.
This analysis yielded a quantification of alpha’s sensitivity to each of the four characteristics. It also produced an equation that can be used to assess the combined impact of all four characteristics on fund performance.

On average, for every 1 percentage point increase in expenses, alpha declined by 0.78 percentage point. The precise number, which could be influenced by undefined fund attributes, was less important than the existence of a highly negative correlation between expenses and alpha. (These coefficients represent the mean for each variable across all the observations for the 21-year period.) The second most powerful variable, portfolio turnover, also had a negative impact. For every 1 percentage point increase in portfolio turnover, alpha declined by 0.22 percentage point. Again, the number was less important than the relationship, which indicates that turnover has an alpha-destroying cost. Both results were statistically significant at the 95% confidence level. The fund-size and fund-age variables had modestly negative coefficients, but neither value was statistically significant.

A simple, but potent, signal

The expense ratio emerged from our regression analysis as the most powerful predictor of relative performance. (As noted earlier, these regression coefficients are averages. There are some high-cost funds that produced superior returns, just as some low-cost funds delivered weak results.) To demonstrate how this signal might be used in practice, we sorted our Morningstar database by expense ratios and created four equal-sized portfolios of funds by cost quartiles. We then tracked the subsequent returns of these portfolios, an out-of-sample test of the expense ratio’s predictive power.

Funds in the lowest-cost quartile outperformed those in the highest-cost quartile in 58% of all monthly observations from 1990 through 2010. On average, the margin of outperformance was 23 basis points. When we sorted the funds into deciles, the differences were more dramatic. The least expensive 10% of funds outperformed the highest-cost decile in 63% of observations. The average margin of outperformance was 53 basis points.

We saw the same relationship between lower costs and superior performance when we calculated fund returns relative to the style indexes associated with the market segment in which funds invested. Such an analysis frames the investment decision as an investor would see it. That is, the funds’ objectives and the relevant indexes are known in advance; the challenge is to select the funds that are most likely to best those benchmarks.

Figure 5, on page 8, presents the percentage of funds that outperformed their relevant style indexes over the 5, 10, 15, and 20 years ended December 31, 2010. The funds are grouped by cost quartile. First-quartile funds were the lowest cost.

Lower-cost funds boasted better odds of beating the benchmark. Over the 20-year period, for example, 27% of all the funds in the database outperformed their style indexes. For funds in the lowest-cost quartile, 49% outperformed. For those in the highest-cost quartile, a mere 16% of funds outperformed. Similar patterns were apparent in the shorter time periods. Clearly, when it comes to alpha, you get what you don’t pay for.

3 T-statistics, our measure of statistical significance, were based on the time-series mean of the coefficients.
Conclusion

Alpha is the product of investment skill. Unfortunately, the quantitative evidence of this skill—alpha and other measures of historical performance—is of little help in identifying tomorrow’s superior performers. The elements that distinguish talented investment managers are difficult, if not impossible, to quantify in a simple metric. Active management is both art and science. Talent exists, it produces alpha, but its basis can’t be captured in a mechanical formula.

Absent the time or resources to conduct an in-depth qualitative and quantitative review of prospective managers, is there a quantitative signal that can point investors in the right direction? Our analysis shows that the expense ratio is a useful predictor of a fund’s relative performance. Investors can improve their odds of outperforming competing funds and capturing benchmark-beating returns by restricting their search to low-cost funds.

<table>
<thead>
<tr>
<th>Years</th>
<th>All funds</th>
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<th>2nd quartile</th>
<th>3rd quartile</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>39%</td>
<td>48%</td>
<td>37%</td>
<td>39%</td>
<td>28%</td>
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<tr>
<td>10</td>
<td>39%</td>
<td>47%</td>
<td>46%</td>
<td>35%</td>
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<td>15</td>
<td>26%</td>
<td>40%</td>
<td>35%</td>
<td>19%</td>
<td>15%</td>
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<tr>
<td>20</td>
<td>27%</td>
<td>49%</td>
<td>32%</td>
<td>33%</td>
<td>16%</td>
</tr>
</tbody>
</table>

Notes: Data reflect percentage of U.S. equity mutual funds that outperformed their style benchmark for periods ended December 31, 2010. Data include only funds that survived the respective 5-, 10-, 15-, or 20-year periods. “U.S. equity mutual funds” refers to all funds, including those focused on a particular style or market capitalization such as large growth or small value. Sector funds, specialty funds such as bear-market funds, and real estate funds were excluded from the list.

References


For more information about Vanguard funds, visit vanguard.com, or call 800-662-2739, to obtain a prospectus. Investment objectives, risks, charges, expenses, and other important information about a fund are contained in the prospectus; read and consider it carefully before investing.

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