In this update to our original 2009 paper, we reexamine the active-versus-index debate from the perspective of market cyclicality and provide context for the changing nature of performance leadership.

We show that when evaluating the performance of active managers versus a benchmark index, investors should be acutely aware of the differences in the managers’ strategies involving factors such as size (market capitalization), style (price/earnings ratio and price/book ratio), and relative positioning.

We show that the market environment can have a greater impact on relative performance than manager skill or even cost differences.

Most important, we show that during periods of significant performance deviation between opposing market segments (for example, large- and small-capitalization, or growth and value), active managers will produce a wider distribution of returns showing more pronounced performance differences relative to the market.
Setting the stage: Is ten years long enough?

Today, a majority of investors would probably consider ten years to be a long-term investment horizon. However, even over that length of time, historical trends don’t always hold true. For example, although stocks have outperformed bonds and cash over the very long term, they have lagged bonds in 17 of 79 rolling ten-year periods since 1926 and even trailed cash 12 times. The performance of active funds relative to a broad market benchmark index can be similarly volatile. As Figure 1 demonstrates, in the ten years ended December 31, 1999, 71% of active managers underperformed the U.S. stock market. But during the decade ended December 31, 2008, 37% lagged, a change of 34 percentage points over nine years. We see a further shift when looking at the ten years ended 2013, when 55% of active managers underperformed. This volatility not only clearly implies that ten years is not long enough to be considered “long term,” it also raises the question of what exactly may be contributing to these swings in performance leadership.

Notes about risk and performance data: Investments are subject to market risk, including the possible loss of the money you invest. Bond funds are subject to the risk that an issuer will fail to make payments on time and that bond prices will decline because of rising interest rates or negative perceptions of an issuer’s ability to make payments. Past performance is no guarantee of future returns. 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. Note that hypothetical illustrations are not exact representations of any particular investment, as you cannot invest directly in an index or fund-group average.
Figure 1. Performance leadership can shift over ten-year periods

a. Distribution of active manager net excess returns versus benchmark: Ten years ended December 31, 1999

Underperformed: 452 funds (71%)
Outperformed: 188 funds (29%)

Number of funds

-8% to -7%
-7% to -6%
-6% to -5%
-5% to -4%
-4% to -3%
-3% to -2%
-2% to -1%
-1% to 0%
0% to 1%
1% to 2%
2% to 3%
3% to 4%
4% to 5%
5% to 6%
6% to 7%
7% to 8%
> 8%

Underperformed: 1009 funds (37%)
Outperformed: 1682 funds (63%)

Number of funds

-8% to -7%
-7% to -6%
-6% to -5%
-5% to -4%
-4% to -3%
-3% to -2%
-2% to -1%
-1% to 0%
0% to 1%
1% to 2%
2% to 3%
3% to 4%
4% to 5%
5% to 6%
6% to 7%
7% to 8%
> 8%

Underperformed: 2057 funds (55%)
Outperformed: 1684 funds (45%)

Number of funds

-8% to -7%
-7% to -6%
-6% to -5%
-5% to -4%
-4% to -3%
-3% to -2%
-2% to -1%
-1% to 0%
0% to 1%
1% to 2%
2% to 3%
3% to 4%
4% to 5%
5% to 6%
6% to 7%
7% to 8%
> 8%

Sources: Vanguard and Morningstar.
Notes: This comparison evaluates active funds after costs against a market benchmark index that incurred no costs. It excludes sector funds, specialty funds, and real estate funds. See Appendix for list of benchmarks used.
One widely noted change from the ten-year period ended 1999 to the decade ended 2008 was the nearly simultaneous shift in performance leadership from growth stocks to value stocks and from larger stocks to smaller. As the large-cap growth bull market of the late 1990s ended, small-cap and value stocks began to outperform. Figure 2 demonstrates the magnitude of this change. The orange line, representing the cumulative ten-year performance spread between value and growth stocks, shows a reversal from 2000 to 2008 of the trend established in the 1990s, when growth dominated value. The yellow line representing the cumulative ten-year spread between large-cap and small-cap stocks shows a similar shift. By the end of 2008, value had outpaced growth over the previous ten years by a cumulative 35%, and small-caps had outpaced large-caps by a cumulative 43%. Interestingly, in the subsequent five years, although growth has rebounded, small-caps have continued to outpace large-caps.

When returns are so widespread, large-caps play an even greater role in market and fund manager performance. For example, Figure 3 shows a hypothetical scenario in which large-cap value stocks outperform large-cap growth stocks by 500 basis points.

The extreme performance spread and reversal in segment dominance in 2000 are important for two main reasons. First, large-caps typically account for close to 70% of the capitalization of the aggregate market; mid-caps make up approximately 20%, and small-caps 10%. So it is no surprise that the market will realize a total return most similar to that of large-caps.

When returns are so widespread, large-caps play an even greater role in market and fund manager performance. For example, Figure 3 shows a hypothetical scenario in which large-cap value stocks outperform large-cap growth stocks by 500 basis points.
Because of the distribution of weights across the six style boxes, large-cap value is the only segment that beats the overall market. In such circumstances, active managers in this segment would probably find it easier to also outperform the market. Those in the remaining style boxes would face a headwind beyond their control—an environment in which their style is decidedly out of favor and lags the market.

As Figure 4 shows, in the late 1990s, the performance of large-cap growth stocks far exceeded those of large-cap value and most others. As a result, the market itself outperformed most individual segments—including large-cap value—and, by extension, a larger portion of active managers.

Of course, the opposite can happen as well, as we saw during the ten years through the end of 2008. In this period, large-caps in general underperformed smaller stocks. In direct contrast to 1999, large-cap growth dramatically lagged every other style, including large-cap value. This very poor performance depressed the return of the overall market to the point that even large-cap value outperformed it by more than 130 basis points. In contrast to the headwind they faced in 1999, small-cap value managers benefited from a significant tailwind. In the most recent period, although the market still marginally beat each of the large-cap segments, the return spreads across styles were much tighter, so manager performance experienced fewer head- or tailwinds.
Figure 5. The relative performance of all managers depends on the relative performance of market segments

a. Distribution of active manager net excess returns versus market benchmark: Ten years ended December 31, 1999

Underperformed (#, %):
- Large blend (119, 74%)
- Large growth (32, 32%)
- Large value (123, 95%)
- Mid blend (43, 83%)
- Mid growth (36, 49%)
- Mid value (35, 95%)
- Small blend (17, 89%)
- Small growth (21, 51%)
- Small value (26, 96%)

Outperformed (#, %):
- Large blend (41, 26%)
- Large growth (68, 68%)
- Large value (7, 5%)
- Mid blend (9, 17%)
- Mid growth (38, 51%)
- Mid value (2, 5%)
- Small blend (2, 11%)
- Small growth (20, 49%)
- Small value (1, 4%)

b. Distribution of active manager net excess returns versus market benchmark: Ten years ended December 31, 2008

Underperformed (#, %):
- Large blend (301, 60%)
- Large growth (436, 75%)
- Large value (88, 20%)
- Mid blend (15, 11%)
- Mid growth (99, 29%)
- Mid value (0, 0%)
- Small blend (3, 2%)
- Small growth (66, 23%)
- Small value (1, 1%)

Outperformed (#, %):
- Large blend (199, 40%)
- Large growth (143, 25%)
- Large value (360, 80%)
- Mid blend (126, 89%)
- Mid growth (237, 71%)
- Mid value (81, 100%)
- Small blend (190, 98%)
- Small growth (224, 77%)
- Small value (122, 99%)

c. Distribution of active manager net excess returns versus market benchmark: Ten years ended December 31, 2013

Underperformed (#, %):
- Large blend (537, 81%)
- Large growth (596, 67%)
- Large value (502, 81%)
- Mid blend (70, 44%)
- Mid growth (125, 30%)
- Mid value (36, 19%)
- Small blend (85, 29%)
- Small growth (82, 22%)
- Small value (24, 16%)

Outperformed (#, %):
- Large blend (123, 19%)
- Large growth (250, 33%)
- Large value (118, 19%)
- Mid blend (88, 56%)
- Mid growth (291, 70%)
- Mid value (149, 81%)
- Small blend (211, 71%)
- Small growth (284, 78%)
- Small value (130, 84%)

Sources: Vanguard and Morningstar.
See Appendix for list of benchmarks used.
This brings us to the second reason to note the extreme performance spread and the shift in dominance between large-cap growth stocks and small-cap value: the equal weighting methodology for calculating the percent of funds out- or underperforming. To illustrate the impact of the equal weighting methodology, Figure 5 breaks the distributions in Figure 1 into the nine style-box components (large-cap, mid-cap, and small-cap, and growth, blend, and value) for the three ten-year periods. In line with the trends shown in Figure 2, we see a wholesale shift in the style of fund that outperformed the market from the ten years ended 1999 to the decade ended 2008. Indeed, although 96% of small value funds underperformed over the first period, only 1% lagged over the second.1

Because we are counting each fund to calculate the percentage that outperformed the market, the actual number of funds in each style box in each time period is just as important as the performance of the style itself. For example, as of 1999, 61% of all funds were large-cap, 25% were mid-cap, and 14% were small-cap. In 2008, the percentages had shifted to 56% large-cap, 21% mid-cap, and 23% small-cap. As a result, although 63% of active managers beat the broad market over the ten years ended December 31, 2008, most of that success can be attributed directly to the performance of value and small-cap stocks combined with the outsized growth in the number of small-cap funds. Likewise, the significant underperformance of active managers over the decade ended December 31, 1999, was largely due to the performance of large-cap growth stocks and the large portion of funds in the large-cap blend and large-cap value style boxes. The takeaway, then, is that during periods of notable deviation in performance between opposing market segments (such as large and small, or growth and value), the distribution of returns among active managers will be much more pronounced. This was the case in the 1990s and has been the case in the 2000s. During a prolonged period of less severe deviations, we would expect fund styles to have much less of an impact and costs to be a major component of relative returns.

1 In analysis not shown here, we also examined markets outside of the United States and found a similar pattern. Through December 2008, 70% of small- and mid-cap funds outperformed a broad-market benchmark index, but only 25% of large-cap funds did the same.
Digging deeper into style box performance cyclicality

In addition to influencing the perception of how active managers perform in comparison with the overall market, the relative performance of one style versus another may also affect how we evaluate active managers against their style benchmark index. Even within more narrowly defined market segments, we have seen significant volatility in the distribution of returns for active managers around a given benchmark.

Figure 6 evaluates the relative performance of active managers versus their style-specific benchmark index for the ten-year periods ended 1999, 2008, and 2013. Clearly, the volatility in the percentage of outperforming funds observed in Figure 5 is also present within each style box. For example, over the decade ended 1999, 76% of large-cap growth managers lagged their benchmark. But over the ten years ended 2008, only 40% lagged. Although it is possible that these managers suddenly became more skilled at picking stocks, it is far more likely that the volatility reflects differences in how they built their portfolios and the dynamics of the large-cap growth market over time.

To generate a return higher than that of a benchmark index, an active manager’s portfolio must differ from that benchmark in some respect. A manager may choose to hold more or fewer stocks, to hold them at different weights, or, more likely, to resort to some combination of the two. For example, a large-cap value manager holding 50 stocks in equal proportions (2% per stock) may be measured against a market cap-weighted large-cap value benchmark with more than 300 names. The degree to which the fund’s holdings and weightings differ from those of the benchmark and the distribution of winners and losers within the benchmark will dictate the fund’s relative performance. As shown in Figure 7, regardless of time period, active managers in any market segment are a heterogeneous group, characterized by wide differences in basic valuation metrics such as size (market capitalization) and style (price/earnings ratio).

This analysis provides several key takeaways. First, and most critical to the importance of cyclicality to relative performance, the median statistics for funds differ in some respects from those for their benchmarks. For example, in 1999, median market capitalization was $24.23 billion for large-cap value funds and $31.76 billion for the benchmark index. More than 50% of large-cap value funds had a smaller market cap than the benchmark median. All else being equal, then, during periods of large-cap outperformance such as 1999, the benchmark index will tend to beat a majority of active managers simply because of the difference in median market capitalization. Across the time periods studied, the median for each fund style consistently differed from that of its benchmark index in P/E ratio, market cap, or both.
Figure 7. Peer-group fundamentals show wide dispersion

Fund statistics as of December 31, 1999

<table>
<thead>
<tr>
<th>Capitalization</th>
<th>Value funds</th>
<th>Market benchmark</th>
<th>Growth funds</th>
<th>Market benchmark</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Percentile</td>
<td>P/E ratio</td>
<td>Market capitalization ($B)</td>
<td>P/E ratio</td>
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<td></td>
<td>95% median</td>
<td>5%</td>
<td>$52.20</td>
<td>24.23</td>
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<tr>
<td>Large</td>
<td>14.68</td>
<td>19.58</td>
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<td>1.31</td>
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Fund statistics as of December 31, 2008

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<th>Market benchmark</th>
<th>Growth funds</th>
<th>Market benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percentile</td>
<td>P/E ratio</td>
<td>Market capitalization ($B)</td>
<td>P/E ratio</td>
</tr>
<tr>
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<td>5%</td>
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<td>30.81</td>
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<tr>
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Fund statistics as of December 31, 2013

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<th>Value funds</th>
<th>Market benchmark</th>
<th>Growth funds</th>
<th>Market benchmark</th>
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<tbody>
<tr>
<td></td>
<td>Percentile</td>
<td>P/E ratio</td>
<td>Market capitalization ($B)</td>
<td>P/E ratio</td>
</tr>
<tr>
<td></td>
<td>95% median</td>
<td>5%</td>
<td>$79.56</td>
<td>45.65</td>
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<tr>
<td>Large</td>
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<td>13.77</td>
<td>4.56</td>
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<tr>
<td>Mid</td>
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<td>14.04</td>
<td>12.47</td>
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<tr>
<td>Small</td>
<td>21.53</td>
<td>17.22</td>
<td>13.44</td>
<td>2.86</td>
</tr>
</tbody>
</table>

Sources: Vanguard and Morningstar.
See Appendix for list of benchmarks used.
Second, each style box contains a substantial difference in medians between the funds with the largest market cap and highest P/E ratio and those with the smallest market cap and lowest P/E ratio. For example, in 1999, the market-cap spread among large-cap value funds was $40 billion. In other words, the top 5% of funds were exposed to stocks with a median market capitalization more than four times as large as that for the stocks the bottom 5% were exposed to. In a period when the largest stocks outperformed (all else being equal), funds with significant exposure to those stocks would outperform those with exposure to smaller stocks, even within the same market segment.

Third, the top 5% of large-cap value funds in 1999 also maintained a larger profile than the index’s. Their median market cap was $52.20 billion, while the market benchmark’s was $31.76 billion. Again, all else being equal, at a time when the largest stocks outperformed, those funds with more exposure to large stocks would beat the index, and those with less exposure would lag.

The differences between the funds and their benchmarks are not as notable for the median P/E ratio as for the market cap. We do see some differences, however, particularly among small-caps. In 1999, 2008, and 2013, the median P/E ratio for small-cap managers was lower than for the benchmark index, particularly within small-cap growth. If this scenario representing a tilt toward value exists during a period when growth dominates value, we would expect a majority of the funds to underperform.

The spread between the 5% of funds with the highest median P/E ratio and the 5% with the lowest is also significant. In fact, among large-cap value stocks in 1999, the spread was nearly double: 24.68x versus 14.82x. Naturally, this metric would be of interest to a value investor, as low and high P/E stocks would be expected to perform quite differently in this environment. Because the highest 5% of funds were exposed to stocks with higher P/E ratios than the benchmark median, in a growth-dominated market, these funds would be expected to outperform (all else being equal). On the other hand, the lowest 5% of funds, with a median P/E lower than the benchmark median, would be expected to outperform in a value-dominated market. As with market cap, the valuation dispersion within a particular style box can lead to very different performance among similar funds.

We have looked at the large-cap value segment to this point, but based on the statistics presented in Figure 6, large-cap growth stocks may be of particular interest. In 1999, not only did this segment show very significant dispersion across market caps and P/E ratios, the benchmark index also was characterized by a larger market cap and P/E than those for virtually all the funds in the sample. This situation, combined with the fact that 1999 represented the peak of the bull market dominated by large-cap growth stocks, makes it no surprise that the benchmark outperformed 76% of large-cap growth managers over the ten years ended 1999. On the other hand, it’s easy to see how, when small-cap and value subsequently dominated, a majority of active managers were able to outperform the large-cap growth benchmark over the decade ended 2008.
Figure 8. Measuring the cyclicality of an equity style box: Rolling distributions of actively managed large-cap growth funds versus large-cap growth index, ten-year excess returns

![Graph showing the cyclicality of equity style box]

Sources: Vanguard and Morningstar.
See Appendix for list of benchmarks used.

Figure 8 shows the constantly shifting relationship between active managers and their target indexes over time, with peaks and valleys that seem to coincide with the long-term relative outperformance of one style or another. In 1998 and 1999, when large-cap growth stocks predominated, large-cap growth managers found it difficult to consistently outperform their benchmark index. (Managers who beat the benchmark are above the x-axis; those who underperformed are below.) However, in 2007 and 2008, when their style lagged the others, large-cap growth managers found it easier to outperform. As we discussed, this cyclicality is probably driven by differences in weighting between the managers’ portfolios and the benchmark. During periods when a larger percentage of stocks out- or underperform, the aggregate performance differences between funds and the benchmark will be magnified. As we have seen, particularly in the large-cap growth segment from the late 1990s through 2008, active managers’ weighting schemes have appeared to result in substantial performance volatility in a given period. The cumulative effect was significant underperformance when the index was strongest and notable outperformance when it was weakest.
Cyclicality in the fixed income market

Market cyclicality also has an impact on the aggregate performance of active managers in the fixed income market. Of all the risk factors that affect their returns relative to their benchmarks, duration is the most important. Indeed, in one of the most famous studies on this topic, Litterman and Scheinkman (1991) found that a change in interest rates is the most important determinant of the returns of a bond or bond portfolio.\(^2\) As a result, whether to maintain a more aggressive (longer) or less aggressive (shorter) duration than the benchmark will tend to overwhelm an active manager’s decisions about other factors such as sector exposure and credit quality.

The duration of a fund (or a group of funds) therefore allows the investor to understand the likelihood of success relative to a benchmark index in various interest rate scenarios. For example, if the fund has a shorter duration than the benchmark and interest rates fall, the benchmark will rise in value more than the fund, all else being equal. If a majority of fund managers expect interest rates to perform one way (and position their funds’ durations accordingly) and they in fact go in another direction, a majority of active fixed income funds will likely underperform.\(^3\)

Figure 9 shows how the percentage of active managers who outperformed the Barclays U.S. Government Bond Index over the previous 12 months has fluctuated over time with respect to changes in intermediate-term interest rates. We find a reasonably strong relationship, with a correlation of 0.7. This weakens somewhat to 0.3 when using short-term rates. The most obvious seemingly direct relationship occurred during 2007-2008, when the percentage of managers beating the index over the previous 12 months approached 0% as intermediate-term interest rates plunged. Of course, one possible explanation is that active managers collectively had a shorter duration than the benchmark in anticipation of interest rate increases. Another possible explanation is that they held significantly more lower-quality agency securities just as these securities underperformed as a result of the credit- and mortgage-market turmoil. Finally, the general flight to quality in late 2007 and 2008 may have contributed. We also examined how corporate fund managers performed in relation to the credit spread and found a positive though weaker relationship, with a correlation of 0.4. This is likely due to the fact that coping with credit spreads in addition to duration and yield curve makes the relationship noisier over time.

Figure 9. The relationship between interest rate changes and active manager performance

Sources: Vanguard and Morningstar.
See Appendix for list of benchmarks used.

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\(^2\) The findings of Litterman and Scheinkman were confirmed and expanded upon in a number of later studies, including but not limited to Bliss (1997), Golub and Tilman (1997), and Matzner-Løber and Villa (2004).

\(^3\) Of course, outperformance also depends on other factors, such as whether credit spreads widened or tightened, how the slope and curvature of the yield curve may have shifted, and the magnitude of these changes.
Conclusion

This analysis demonstrates that the volatility in the percentage of funds outperforming a benchmark index is directly related to underlying market trends. The number of active managers in each style box and the differences in the style and size characteristics of their portfolios will explain a significant portion of out- or underperformance. Deciding whether active management or indexing is a “better” strategy requires an investor to focus on the rationale for active management. Active management offers the opportunity to outperform a given benchmark, but at the cost of higher average expenses, potentially significant tracking error, and the risk of underperforming. Indexing does not offer the ability to outperform a benchmark, but because of its relatively low expenses and tracking error, the strategy has outperformed many similarly positioned active managers over the long term.

References


Appendix: Benchmarks used in this analysis
