

The search for outperformance: Evaluating ‘active share’

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In the search for actively managed stock funds that will outperform, can measuring “active share” be useful? To find out, Vanguard analyzed fund data from 2001 through 2011.

“Active share”—the percentage of a portfolio that differs from a benchmark index—is designed to determine the degree of active management in an actively managed portfolio. Previous studies have suggested that high active-share mutual funds were more likely to outperform. We analyzed fund data spanning 2001–2011 to investigate the issue.

The situation: Interest in “active share”—the percentage of a portfolio that differs from a benchmark index—has been increasing because some earlier studies found that high active-share funds were more likely to outperform.

The question: Does a high level of active share help identify funds likely to outperform in the future, as some believe?

Vanguard conclusion: Although active share can play a useful role in the manager selection and ongoing evaluation process, Vanguard’s study found no relationship between high levels of active share and subsequent fund outperformance for the period studied.

Active share is calculated as the sum of the absolute value of the differences between the weights of the securities in a portfolio and the weights of securities in the fund’s benchmark, divided by two:¹

$$\text{Active Share} = \frac{1}{2} \sum_{i=1}^N |w_{\text{fund},i} - w_{\text{index},i}|$$

(See **Figure 1**, on page 2, for a hypothetical example.)

Cremers and Petajisto (2009) defined active share as the “fraction of the portfolio that is different from the benchmark index” and stated that “it provides information about a fund’s potential for beating its benchmark index.”²

For active equity portfolios, the more the fund’s composition differs from the benchmark’s, in both holdings and the percentage weighting of those holdings, the higher its active share. So, for long-only equity funds, active share could range from 0% to 100%. Our research looked at a sample of 903 long-only active, domestic equity mutual funds selected from the Morningstar database. (See the appendix for more details on our methodology.)

Because our objective was to determine the predictive power of active share, we divided our sample period into two distinct segments: We used data from the

Note: This article is adapted from a 2012 Vanguard research paper by the same authors and title; available at <http://vanguard.com/activeshare>.

- 1 If one were to disregard the absolute value of the fund’s weighting differences, this formula would be the simple average deviation of the fund’s weightings from its benchmark index. Underweights would be canceled out by overweights, resulting in an average deviation, or active share, of zero for long-only funds. The formula’s use of absolute value corrects for this, but because the overweights are counterbalanced by the underweights, active share could be as high as 200% for a fund with zero overlap with its benchmark. Dividing by two removes the effect of this double-counting.
- 2 Of course, outperformance depends on the portfolio not only holding different security positions from that of the benchmark but also earning a higher return than the benchmark. See Grinold (1989) and Grinold and Kahn (1999) for a discussion of the interplay between the breadth of a portfolio manager’s investment decisions and his or her skill level.

evaluation period, the five years from January 1, 2001, through December 31, 2005, to calculate five analytical “toolkit” measures (active share, concentration, style drift, excess return, and tracking error) for each fund in our sample. We designated the second time period, January 1, 2006, through December 31, 2011, as our performance period and used it to assess how each fund performed against the five measures (see the definitions of these measures and more on our methodology in the accompanying appendix). This enabled us to analyze whether high active-share funds performed better than low active-share funds and whether active share in the first period was related to outperformance in the second.

Analysis of active equity groups

Cremers and Petajisto (2009) stated that an active equity manager can position a portfolio to be different from its underlying benchmark index through security selection—picking individual stocks that the manager expects to outperform the benchmark while holding similar exposure to such factors as sector, industry, and market cap. Alternatively, the fund manager could engage in factor timing, or tactical asset allocation, which changes the exposure to these systematic factors over time. Or the manager could do both. The researchers argued that active share is the appropriate metric to measure stock selection and that tracking error is the appropriate metric to measure factor timing.³

When viewed within this framework, four distinct groups of active-equity portfolios emerge, as shown in Figure 2.⁴ We used 60% active share as the break-point to indicate high or low levels of stock selection and the median level of tracking error to separate the portfolios exhibiting high or low levels of factor bets. The number of funds that fell into each group is listed below each group name in the figure.⁵

Figure 1. A hypothetical active share calculation

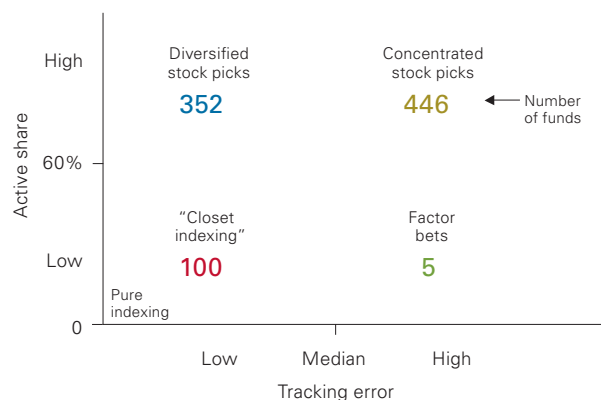
Consider a ten-security benchmark index and a portfolio that invests in five of those securities. For simplicity, we assume both are equally weighted. The active share of such a portfolio would be 50%.

Security	Portfolio weighting	Benchmark weighting	Active share
1	20%	10%	5%
2	20	10	5
3	20	10	5
4	20	10	5
5	20	10	5
6	—	10	5
7	—	10	5
8	—	10	5
9	—	10	5
10	—	10	5
			50%

Note: These results are hypothetical and do not represent any particular mutual fund.

Source: Vanguard.

Figure 2. Portfolio groups defined by degree of active share and tracking error



Sources: Vanguard, using framework from Cremers and Petajisto (2009) and data from Morningstar, Inc.

3 R-squared has often been used to measure the similarity of a portfolio’s returns to those of its benchmark index. The higher the R-squared, the more in lockstep are the returns. So an index fund would be expected to have an R-squared close to 100%. Active share attempts to measure the fund-benchmark relationship by comparing their holdings rather than their returns.

4 It is important to note that although Figure 2’s framework of four fund categories comes from Cremers and Petajisto (2009), their work did not analyze the funds based on this categorization. Petajisto (2010) grouped funds according to quintiles of active share and tracking error, removing the diversified group and adding two additional groups, “stock pickers” and “moderately active.”

5 The 60% active-share cutoff agrees with the Cremers-Petajisto (2009) methodology. However, because their paper gave no specific tracking-error number, we elected to use the median fund’s tracking error as the cutoff value to categorize our fund sample in this dimension.

Portfolios with high levels of stock selection and factor timing, or “concentrated stock picks,” tend to concentrate on a limited number of securities and factors. “Diversified stock picks” have a high degree of stock selection (big “bets” away from the benchmark’s weightings) but little divergence from the benchmark index with respect to factors such as sector exposure and market capitalization.

“Closet indexing” refers to portfolios with low levels of both stock selection and factor timing, and has the negative connotation that the fund manager is closely “hugging” the benchmark to lessen the odds of underperformance. A “factor-bet” fund has significant factor divergence from the benchmark index but little deviation in stock selection. Our fund sample produced only five funds in this category (see Figure 2). Therefore, we focused on the three other active equity groups.

Figure 3a, on page 4, shows the average annualized rolling three-year excess returns for the concentrated, diversified, and closet indexing groups. **Figure 3b**, on page 4, shows each group’s average excess return and tracking error over the evaluation and performance periods, along with a measure of risk-adjusted performance—the information ratio—defined as excess return divided by tracking error. For the evaluation period, we also show the average expense ratio and other metrics from our portfolio toolkit.

Of note, funds classified as concentrated delivered positive risk-adjusted outperformance during the evaluation period, with an information ratio of 0.30. Diversified funds delivered marginally positive excess returns, and closet indexers underperformed. However, during the performance period, none of the three groups delivered positive excess returns. Concentrated funds, for example, followed up their 2.96% average excess return from the evaluation period with an average excess return of –0.77% per year from 2006 through 2011.⁶ A similar trend was evident when examining risk-adjusted performance; negative excess returns translated into negative information ratios for all three groups.

A visual comparison of the evaluation period’s excess returns with those of the performance period shows that the returns were much less dispersed in the latter period. Although there is no consensus as to the reasons for this result, macro events such as the global recession, the Eurozone sovereign-debt crisis, and the U.S. Treasury downgrade in the latter half of the decade may have been contributing factors.

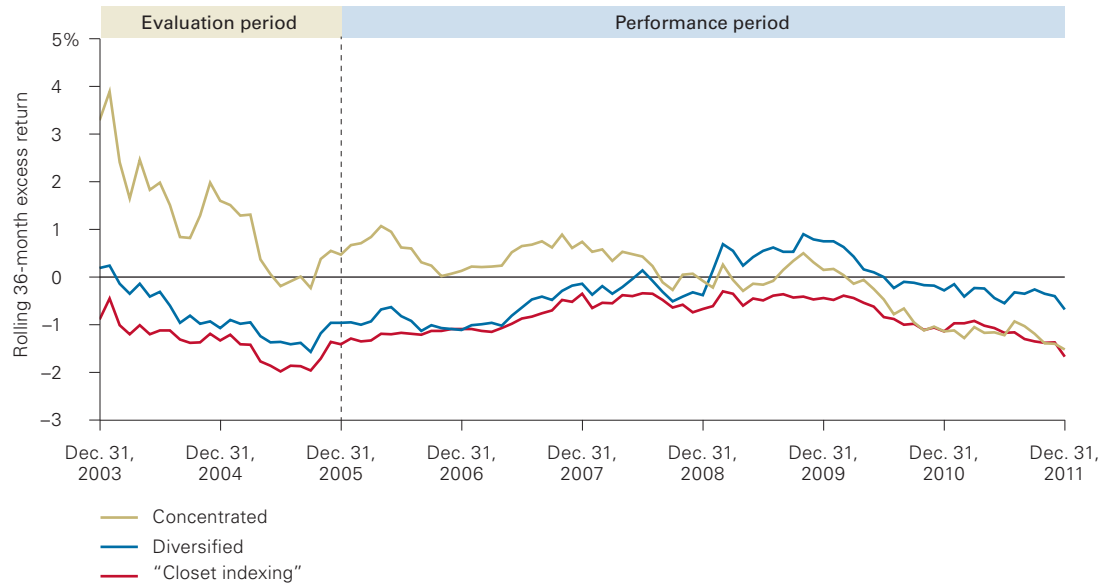
One additional point of interest is that, on average, higher levels of active share came at a higher cost. For example, the average expense ratio of concentrated funds was 1.37%, versus 0.99% for closet indexers. Although both concentrated and diversified funds exhibited brief periods of positive excess returns, the returns generated were typically not enough to overcome costs consistently over time. By contrast, the underperformance of the closet indexing group was closer to its average expense ratio. This may be a major cause of the disfavor with which these funds are sometimes regarded. Although the expense ratios of the closet indexers were not far below those of the concentrated and diversified groups, at no time during the analysis period did these less-active funds generate positive excess returns after costs.

Not surprisingly, in both periods, tracking error was lowest for the closet indexing funds, followed by the diversified funds. The concentrated funds had the highest tracking error. This relationship was also evident when analyzing excess returns, as shown in **Figure 4**, on page 5. The figure shows the relationship between active share and average annualized excess returns during the performance period. Higher levels of active share led to greater dispersion of excess returns. The superimposed triangle emphasizes this relationship. When viewed within this framework, the dispersion of excess returns above and below the benchmark is nearly symmetrical for each level of active share. Thus, while adding another dimension to our toolkit of analytical measures, high active-share funds were almost equally likely to underperform as to outperform.

⁶ This finding is in direct contrast to that of Cremers and Petajisto (2009). Using data for 1980–2003, they concluded that the concentrated group did have performance persistence. However, in 2010, Petajisto published an updated analysis with data through 2009 that confirmed our findings that concentrated funds underperformed during the latter part of the decade.

Figure 3. Performance of groups across periods

a. During the performance period, no group showed consistent outperformance



b. Average measures of active management and expense ratio by active management group

Evaluation period (January 1, 2001–December 31, 2005)

Performance period (January 1, 2006–December 31, 2011)

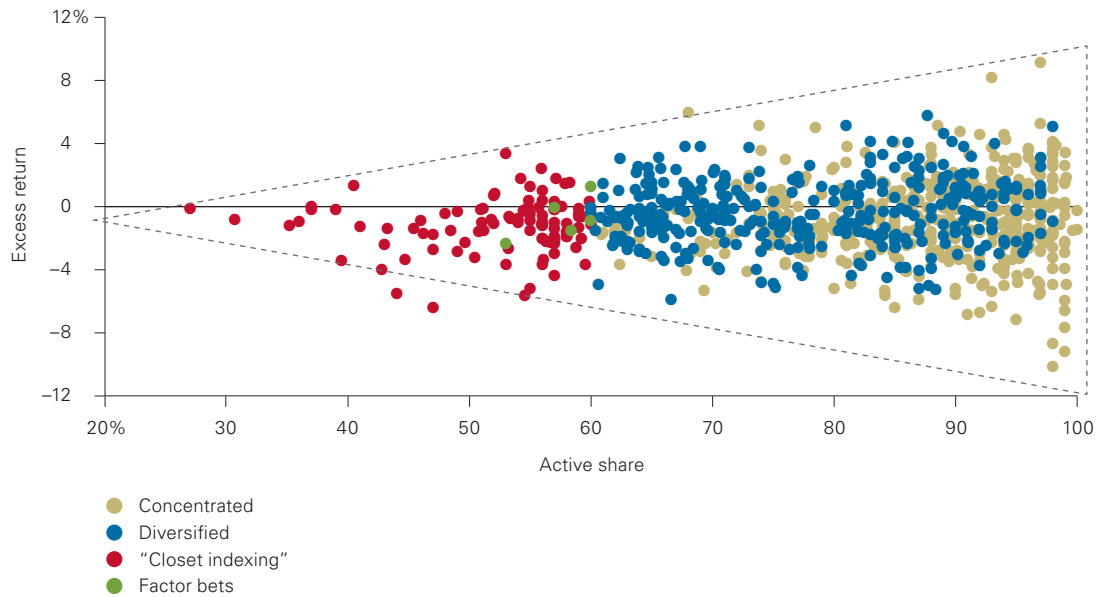
	Evaluation period		
	Concentrated	Diversified	"Closet indexing"
Active share	87.62%	77.98%	51.91%
Concentration	33.84%	27.48%	26.69%
Style drift	22.30%	13.82%	10.29%
Excess return	2.96%	0.11%	-0.67%
Tracking error	9.84%	4.88%	3.50%
Expense ratio	1.37%	1.18%	0.99%
Information ratio	0.30	0.02	-0.19

	Performance period		
	Concentrated	Diversified	"Closet indexing"
Excess return	-0.77%	-0.42%	-1.22%
Tracking error	6.44%	4.68%	3.36%
Information ratio	-0.12	-0.09	-0.36

Notes: Expense ratios are based on the five-year average from the evaluation period. Portfolios classified as diversified outperformed for the three years ended December 2003 and then underperformed for the subsequent two years, leading to slight outperformance over the evaluation period.

Sources: Vanguard calculations, using data from Morningstar, Inc.

Figure 4. Higher active share led to higher dispersion of excess returns (January 1, 2006–December 31, 2011)



Note: One portfolio plotted below the range of active share displayed here.
Sources: Vanguard calculations, using data from Morningstar, Inc.

Active share and style consistency

Active share can be a useful tool to check for consistency in a portfolio's investment strategy over time. To examine whether the characteristics of our fund sample changed over time, we computed the average active share over the performance period and found a high positive correlation (+0.86) with active share from the evaluation period. The correlation of tracking error between periods was lower, at 0.65. As shown in Figure 5, on page 6, we then compared the classifications of the four fund groups during the performance period with those from the evaluation period (as shown in Figure 2). While the majority of funds stayed in their original group, 35% changed groups in the second period. Most of these reclassifications were driven by tracking error, such as a move from concentrated to diversified, and vice versa.

However, most interesting was the small number of funds that moved from concentrated to closet indexing, or vice versa. These moves required

changes in both active share and tracking error, from high to low or low to high. Such significant differences should trigger the need for further analysis to identify the underlying reasons and evaluate whether there has been a change in a portfolio's investment strategy. Active share, along with the other analytical measures from the investor's toolkit, can help identify these opportunities.

Examining deciles of active share

How is active share related to the other measures of active management in our toolkit? Figure 6a, on page 6, presents the average portfolio characteristics corresponding to each decile of active share. Funds with higher levels of active share tended to have higher levels of concentration and style drift, as well as higher average expense ratios. A further breakdown, in Figure 6b, on page 6, shows that this top active-share decile tended to be concentrated in small- and mid-capitalization equities.⁷

⁷ This is a reasonable result, given that the investable pool is much larger for small-cap managers. For example, the Standard & Poor's 500 Index (a popular large-cap index) contains 500 stocks, whereas the Russell 2000 Index, a popular small-cap index, contains 2,000 stocks.

Figure 5. Classification of groups in evaluation and performance periods

Evaluation period		Performance period			
		Concentrated	Diversified	"Closet indexing"	Factor bets
Concentrated	446	324	119	3	—
Diversified	352	113	219	20	—
"Closet indexing"	100	11	43	44	2
Factor bets	5	—	4	—	1
Total funds	903	448	385	67	3

Note: Because of missing data, we were unable to calculate active share for four funds during the performance period. In those instances, we elected to leave the funds in their original groups.

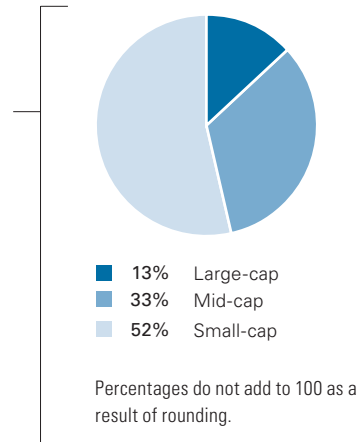
Sources: Vanguard calculations, using data from Morningstar, Inc.

Figure 6. Examining deciles of active shares

a. Average portfolio characteristics by decile of active share: January 1, 2001–December 31, 2005

	Evaluation period			
	Active share	Concentration	Style drift	Expense ratio
1	97.95%	41.54%	23.02%	1.55%
2	94.87	33.01	21.84	1.35
3	92.12	28.56	20.90	1.39
4	88.90	28.50	20.81	1.32
5	85.18	29.70	18.91	1.34
6	80.42	31.56	17.83	1.24
7	75.13	29.21	16.70	1.23
8	69.07	28.64	14.30	1.14
9	62.78	27.66	11.90	0.99
10	51.09	26.82	10.33	1.01

b. Capitalization of top-decile active-share funds



Sources: Vanguard calculations, using data from Morningstar, Inc., and DataStream.

Conclusion

Contrary to earlier research findings that high levels of active share were significantly related to subsequent fund outperformance, we found no such relationship during our analysis period. To outperform a benchmark index, a portfolio must differ in either the securities selected or their percentage weighting, or both. However, apparently it is not enough to be different: The portfolio manager's bets must also be accompanied by manager skill, and the overweights must be in the outperforming stocks. Thus, active share by itself does not indicate whether a fund will outperform an unmanaged benchmark.

However, combined with careful qualitative judgment regarding the health of the investment manager's firm and the depth of its analytical team, active share can be a useful addition to the investor's toolkit of portfolio evaluation measures. Although moderately correlated with other measures of active management, the relationship is not perfect. Thus, active share adds another unique dimension. It is equally helpful in comparing the appropriateness of different benchmarks and in monitoring the consistency in a portfolio's investment strategy over time.

For investors looking to add active share to their fund selection toolkit, we have demonstrated that a consideration of costs might be a reasonable starting point. Also, because of the significant performance dispersion of high active-share funds, investors might consider using such funds as a satellite to complement a broadly diversified core equity portfolio. This could help mitigate the potential for significant loss to the entire portfolio if the manager's bets have not been successful. On the other hand, if the manager's choices succeed, the satellite allocation could still add to the portfolio's aggregate performance.

References

- Carhart, Mark M., 1997. On Persistence in Mutual Fund Performance. *Journal of Finance* 52(1): 57–82.
- Cremers, K.J. Martijn, and Antii Petajisto, 2009. How Active Is Your Fund Manager? A New Measure That Predicts Performance. *Review of Financial Studies* 22(9): 3329–65.
- Davis, Joseph H., Glean Sheay, Yesim Tokat, and Nelson Wicas, 2007. *Evaluating Small-Cap Active Funds*. Valley Forge, Pa.: The Vanguard Group.
- Ennis, Richard M., and Michael D. Sebastian, 2002. The Small-Cap Alpha Myth. *Journal of Portfolio Management* 28(3): 11–16.
- Fama, Eugene F., and Kenneth R. French, 2010. Luck Versus Skill in the Cross-Section of Mutual Fund Returns. *Journal of Finance* 65(5): 1915–47.
- Financial Research Corporation, 2002. *Predicting Mutual Fund Performance II: After the Bear*. Boston: Financial Research Corporation.
- Grinold, R.C., 1989. The Fundamental Law of Active Management. *Journal of Portfolio Management* 15(3): 30–37.
- Grinold, R.C., and R.N. Kahn, 1999. *Active Portfolio Management: A Quantitative Approach to Providing Superior Returns and Controlling Risk*. New York: McGraw-Hill.
- Idzorek, Thomas M., and Fred Bertsch, 2004. The Style Drift Score. *Journal of Portfolio Management* (Fall): 76–83.
- Jensen, Michael C., 1968. The Performance of Mutual Funds in the Period 1945–1964. *Papers and Proceedings of the Twenty-Sixth Annual Meeting of the American Finance Association*. Washington, D.C., December 28–30, 1967. Also *Journal of Finance* 23(2): 389–416.

Kinnel, Russel, 2010. Find Out How Active Your Fund Is. Morningstar.com (August 16); available at <http://ffr.morningstar.com/Article.aspx?T=A&documentid=348506>.

Lauricella, Tom, 2006. Professors Shine a Light Into 'Closet Indexes.' *Wall Street Journal*, August 18.

Mamudi, Sam, 2009. What Are You Paying For? *Wall Street Journal*, December 8.

Petajisto, Antii, 2010. *Active Share and Mutual Fund Performance*. New York: New York University Stern School of Business.

Philips, Christopher B., 2012. *The Case for Indexing*. Valley Forge, Pa.: The Vanguard Group.

Philips, Christopher B., and Francis M. Kinniry Jr., 2010. *Mutual Fund Ratings and Future Performance*. Valley Forge, Pa.: The Vanguard Group.

Philips, Christopher B., Francis M. Kinniry Jr., and Todd Schlanger, 2012. *Enhanced Practice Management: The Case for Combining Active and Passive Strategies*. Valley Forge, Pa.: The Vanguard Group.

Sharpe, William F., 1966. Mutual Fund Performance. *Journal of Business* 39 (1, Part 2: Supplement on Security Prices): 119–38.

Sharpe, William F., 1992. Asset Allocation: Management Style and Performance Measurement. *Journal of Portfolio Management* 18: 7–19.

Wallick, Daniel W., Neeraj Bhatia, Raphael A. Stern, and Andrew S. Clarke, 2011. *Shopping for Alpha: You Get What You Don't Pay For*. Valley Forge, Pa.: The Vanguard Group.

Appendix. Methodology

Our fund sample of long-only active, domestic equity mutual funds was selected from the Morningstar database. To be included, a fund must have been alive on January 1, 2001, and possess an active-share statistic.⁸ In addition, our fund sample consisted only of surviving funds, because Morningstar does not report the holdings data needed to calculate active share for closed funds. When a fund in our sample had multiple share classes, we selected the one with the lowest expense ratio.⁹ If the expense ratios were identical, we used the share class with the longest history. Our sample period covered January 1, 2001, through December 31, 2011.

Of the 1,461 funds available at the beginning of 2001, a total of 503, or 34.4%, were merged or liquidated over our analysis period, and 55 others had missing data.¹⁰ Our final fund sample comprised 903 funds.¹¹

In addition to “active share,” we used four other quantitative portfolio measures of active management. These “tools”—concentration, style drift, excess return, and tracking error—are more easily available to the average investor and, as a result, probably more familiar. We used these tools to enhance our understanding of the characteristics of our fund sample and to help gauge the effectiveness of active share. We defined the five measures as follows: *Active share* is the fraction of a portfolio that differs from its style-box benchmark index; *concentration* is the percentage of a portfolio that is concentrated in the top-ten holdings; *style drift* is a measurement of how a portfolio’s investment style changes over time; *excess return* is the difference between a portfolio’s return and the style-box benchmark’s

return; and *tracking error* is a measurement of the variability of excess returns versus the portfolio’s style-box benchmark.

We calculated active share, tracking error, and excess return versus a Russell benchmark corresponding to the fund’s Morningstar style box.¹² Because our objective was to determine the predictive power of active share, we divided our sample period into two distinct segments. We used data from the evaluation period, the five years from January 1, 2001, through December 31, 2005, to calculate the five analytical measures for each fund in our sample. We designated the second time period, January 1, 2006, through December 31, 2011, as our performance period and used it to assess how each fund performed against the five toolkit measures.¹³ This enabled us to analyze whether high active-share funds performed better than low active-share funds and whether active share in the first period was related to outperformance in the second.

We recognize that the performance period encompassed recent stresses to the macro environment, such as the global financial crisis, the Eurozone sovereign-debt crisis, and the U.S. Treasury downgrade, that may have affected our results. However, that time span also included two years (2006 and 2007) characterized by low volatility and positive equity market performance. In addition, the evaluation period included the technology stock bear market and the 9/11 attacks. Because each period included both bull- and bear-market cycles as well as periods characterized by both high and low volatility, we are comfortable in our assumption that our sample period spanning 2001–2011 is a reasonable time frame for evaluating the degree and success of active management.

8 We started our analysis in 2001 based on holdings-data constraints.

9 Mutual fund companies often offer the same equity portfolio as different share classes. The funds in our sample had three different Morningstar share-class designations: investor, A-shares, and no-load. Loads and sales charges were not factored into returns. Wallick et al. (2011) found that cost is a critical indicator in future excess returns, so the funds with the lowest expense ratio were used to give the best chance for outperformance.

10 Funds in the Morningstar database that are no longer in existence do not disclose their prior-year holdings, which were needed to calculate active share.

11 Although potential survivorship bias is always of concern with mutual fund performance studies, Kinnel (2010) examined this issue to see if only high active-share funds failed. He concluded that “the number of funds killed off didn’t vary much by active share.”

12 We used the following nine Russell style-box benchmarks: Large Blend, Russell 1000 Index; Large Growth, Russell 1000 Growth Index; Large Value, Russell 1000 Value Index; Mid-Cap Blend, Russell Midcap Index; Mid-Cap Growth, Russell Midcap Growth Index; Mid-Cap Value, Russell Midcap Value Index; Small Blend, Russell 2000 Index; Small Growth, Russell 2000 Growth Index; Small Value, Russell 2000 Value Index.

13 These time segments often are described as in- and out-of-sample periods.



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