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# The search for outperformance: Evaluating 'active share'

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**Executive summary.** "Active share" is defined as the percentage of a portfolio that differs from a benchmark index. Designed to determine the degree of active management in an actively managed portfolio, active share is also helpful as a manager evaluation tool. It can be used to compare the appropriateness of different benchmarks and to check for consistency in a portfolio's investment strategy over time. Interest in this measure has been increasing as a result of the difficult performance environment active equity managers have faced recently, and also because some earlier studies found that high active-share funds were more likely to outperform.

Authors

Todd Schlanger

Christopher B. Philips,  
CFA

Karin Peterson LaBarge,  
Ph.D., CFP<sup>®</sup>

Based on our analysis, we conclude that investors should not use active share as their sole measure of portfolio selection. Instead, they should add it to their toolkit of analytical portfolio measures. Some of our key findings include:

- Higher levels of active share did not predict outperformance.
- Contrary to conventional wisdom, “high-conviction funds” with high active share did not significantly outperform low-active-share funds.
- The higher the active-share level, the larger the dispersion of excess returns.
- The higher the active-share level, the higher the fund costs.
- Funds with the highest level of active share tended to be concentrated in mid- and small-capitalization equities.

Just as investors should not choose mutual funds on the basis of past returns, neither should they construct a portfolio based on any single statistic such as active-share level. Combined with careful qualitative judgment regarding the health of the investment manager’s firm and the depth and skill of its analytical team, along with a consideration of costs, active share can play a useful role in the manager selection and ongoing evaluation process.

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### **An introduction to active share**

Although no clear consensus exists as to when active share or similar analytical measures were first devised, the concept became well-known in the 2000s through the work of Cremers and Petajisto (2009), who used active share in

conjunction with tracking error to categorize domestic equity mutual funds by degree of active management. Petajisto (2010) also used it to show that monitoring an active fund for consistency of active share over time is a useful way to monitor changes in the fund’s investment strategy.

*Notes on risk: All investing is subject to risk. Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index. Be aware that fluctuations in the financial markets and other factors may cause declines in the value of your account. There is no guarantee that any particular asset allocation or mix of funds will meet your investment objectives or provide you with a given level of income. Diversification does not ensure a profit or protect against a loss in a declining market. Investments in bond funds are subject to interest rate, credit, and inflation risk. Funds that concentrate on a relatively narrow market sector face the risk of higher share-price volatility.*

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:<sup>1</sup>

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

(See Figure 1, for an 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.”<sup>2</sup>

One may deconstruct an equity portfolio into two components: a passive portfolio that holds securities in the same weights as the fund’s benchmark index (much like an index fund), and an active portfolio that holds securities in weights different from the benchmark in an attempt to outperform. Active share tells you the percentage of a fund that is invested in the active portfolio. Therefore, it can also be used to evaluate the appropriateness of the fund’s benchmark versus various alternative indexes: The benchmark with the lowest active share is a good candidate for the fund’s benchmark.

Because index funds seek to track passive benchmark indexes by holding only those securities in the index through either full replication or a sampling method, an index fund has an active share of approximately 0%, with complete or nearly complete overlap with its benchmark index. 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%.

**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.

## 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.<sup>3</sup> 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.<sup>4</sup> If the expense

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.

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

4 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.

**Figure 2.** Five measures of active management (our “toolkit”)

Measure	Definition	Methodology
Active share	Fraction of a portfolio that differs from the benchmark index.	Based on the average calculation by Morningstar versus the portfolio’s style-box benchmark as of each year-end period.
Concentration (percentage in top ten)	Percentage of a portfolio concentrated in the top-ten holdings.	Based on the average monthly percentage reported.
Style drift	Measures how a portfolio’s investment style changes over time.	Based on the rolling 36-month style weightings assigned through returns-based style analysis (Sharpe, 1992; Idzorek and Bertsch, 2004).
Excess return	The difference between a portfolio’s return and the benchmark’s return.	The annualized excess return versus the portfolio’s style-box benchmark.
Tracking error	Measures the variability of excess returns.	The annualized standard deviation of monthly excess returns versus the portfolio’s style-box benchmark.

Sources: Vanguard; Cremers and Petajisto (2009).

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.<sup>5</sup> Our final fund sample comprised 903 funds.<sup>6</sup>

Given that active share has fairly robust data requirements—month-end security holdings for both the fund and the benchmark index—we also 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.

Rather than assigning the fund the benchmark index that produced the lowest active share (as in Cremers and Petajisto, 2009), we calculated active share, tracking error, and excess return versus a Russell benchmark corresponding to the fund’s Morningstar style box.<sup>7</sup> Our rationale was that investors would most likely choose a static benchmark using Morningstar or the fund’s prospectus. Given that the Russell 1000 indexes are composed of Russell 200 and Russell Midcap indexes and that the Russell Growth and Value indexes make up the core benchmarks, we used only six Russell indexes for our style-drift analysis, to prevent overlap.<sup>8</sup> (For more details, see the page 6 shaded box titled “How interrelated are the measurement tools?” and Figure 4.)

<sup>5</sup> 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.

<sup>6</sup> Although potential survivorship bias is always of concern with mutual fund performance studies, Kinneil (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.”

<sup>7</sup> 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.

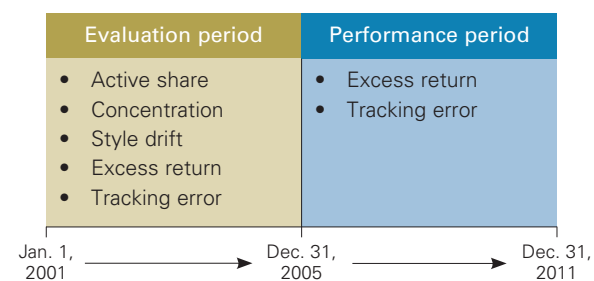
<sup>8</sup> For our style-drift calculations, we used six Russell benchmarks: Large Growth, Russell Top 200 Growth Index; Large Value, Russell Top 200 Value Index; Mid-Cap Growth, Russell Midcap Growth Index; Mid-Cap Value, Russell Midcap Value Index; Small Growth, Russell 2000 Growth Index; Small Value, Russell 2000 Value Index.

Figure 2 briefly defines and describes the methodology for each measure of active management in our toolkit. The first three measures describe the portfolio’s positioning. Active share indicates to what degree the portfolio’s stock selection differs from the benchmark index; portfolio concentration reflects the portfolio manager’s conviction in the top-ten holdings; and style drift summarizes the extent to which the manager moves around to different areas of the market in search of new investment ideas over time.<sup>9</sup> The final two measures are related to portfolio performance: Excess return is the amount of return over the fund’s benchmark, and tracking error measures the variability in excess returns.

Because our objective was to determine the predictive power of active share, we divided our sample period into two distinct segments as shown in Figure 3. 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.<sup>10</sup> 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.

**Figure 3.** Analysis timeline and periods



Source: Vanguard.

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.

### 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.<sup>11</sup>

<sup>9</sup> Style drift may occur as a result of the portfolio manager’s intentional investing decisions. Alternatively, it may result from market-related changes; for example, a change in the equity portfolio’s size categorization—say, from small-cap to mid-cap—may occur after the fund’s holdings increase in value.

<sup>10</sup> These time segments often are described as in- and out-of-sample periods.

<sup>11</sup> 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.

## How interrelated are the measurement tools?

Figure 4 presents the cross-sectional correlations among the five measures of active management from our evaluation period and the out-of-sample excess returns and tracking error from our performance period. We found moderate correlation among the measures of active management. Most notable was the very low correlation between the five measures (including excess return) from our evaluation period and the excess returns from our performance period. We confirm this finding in a subsequent analysis in this paper, where we show a near-symmetrical dispersion of excess returns above and below the benchmark for each level of active

share. There was, however, a stronger relationship between the measures of active management and tracking error between periods.

Because the calculation of active share has fairly robust data requirements, investors may try to substitute one of the other measures, such as tracking error, for active share. However, although the correlation between active share and tracking error was the strongest, the relationship was not perfect. Thus, active share should be considered a unique addition to the investor's toolkit.

**Figure 4.** Correlation among measures of active management and out-of-sample excess return and tracking error

	Evaluation period					Performance period	
	Active share	Concentration	Style drift	Excess return	Tracking error	Excess return	Tracking error
Active share	1						
Concentration	0.23	1					
Style drift	0.49	0.31	1				
Excess return	0.29	0.14	0.12	1			
Tracking error	0.58	0.35	0.64	0.25	1		
Excess return	0.08	-0.01	-0.02	-0.09	-0.12	1	
Tracking error	0.58	0.41	0.44	0.20	0.65	-0.01	1

Note: Correlations must be larger than approximately +/-0.06 to be statistically significant at 95% confidence.

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

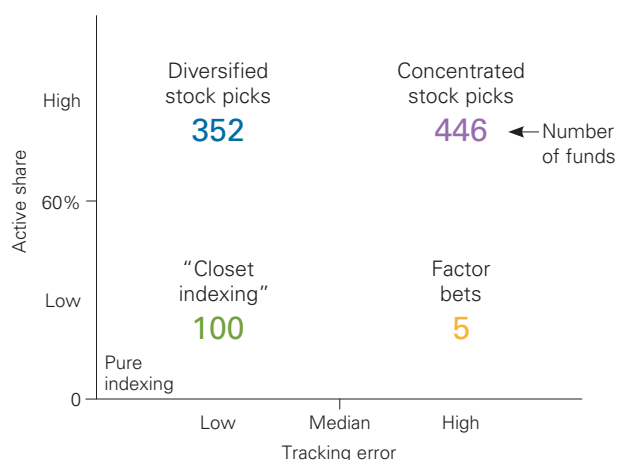
When viewed within this framework, four distinct groups of active-equity portfolios emerge, as shown in Figure 5.<sup>12</sup> We used 60% active share as the breakpoint to indicate high or low levels of stock selection and the median level of tracking error to

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.<sup>13</sup>

<sup>12</sup> It is important to note that although Figure 5'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."

<sup>13</sup> 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.

**Figure 5.** 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.

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. Because active equity funds have higher fees, on average, than pure index funds (Phillips, 2012), investors may sometimes feel that they are paying for active management but not getting it (Lauricella, 2006). However, some caution

is warranted on this point, as some funds in this category have an investment mandate to be “risk controlled,” with the goal of minimizing tracking error through low active share.<sup>14</sup>

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. Therefore, we will focus on the three other active equity groups for the remainder of this paper.

Figure 6a, on page 8, shows the average annualized rolling three-year excess returns for the concentrated, diversified, and closet indexing groups. Figure 6b 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.

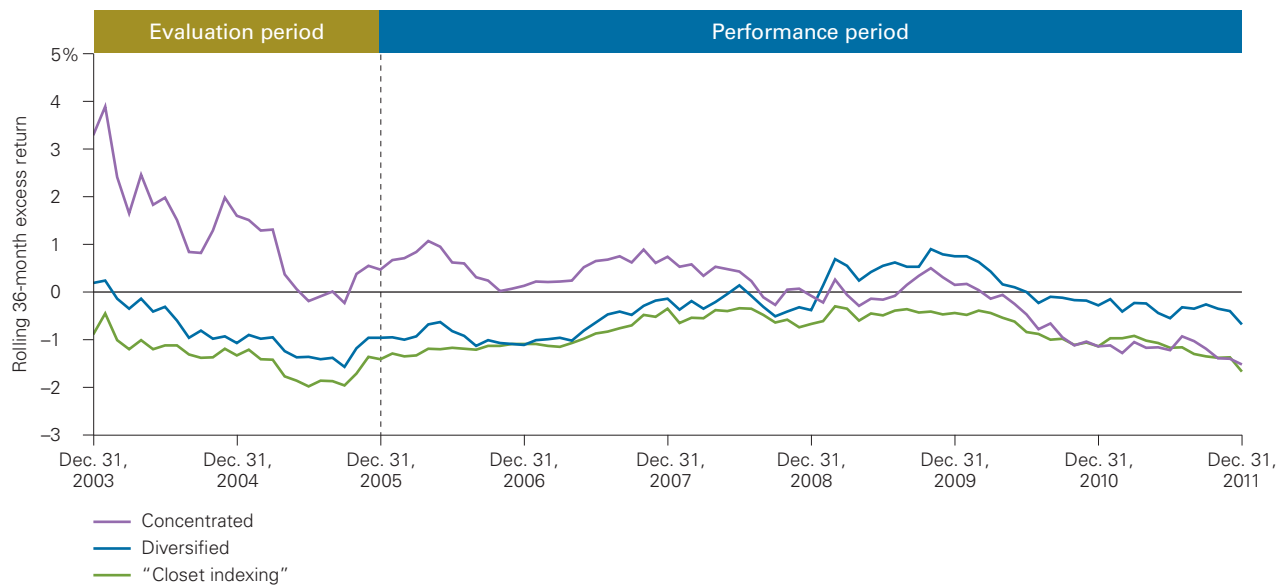
Of note, funds classified as concentrated delivered positive risk-adjusted outperformance during the evaluation period, with an information ratio of 0.30. Diversified funds delivered marginally positive excess returns, and closet indexers underperformed. However, during the performance period, none of 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.<sup>15</sup> A similar trend was evident when examining risk-adjusted performance; negative excess returns translated into negative information ratios for all three groups.

<sup>14</sup> Mamudi (2009) pointed out that the closet indexing category includes enhanced index funds, which seek to closely track their benchmark index while adding value through small bets or slight deviations in security weightings. Thus, it is important to compare a fund’s characteristics with its stated investment mandate to determine whether it is purposely risk-controlled or a closet indexer.

<sup>15</sup> 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 6.** 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 (December 1, 2001–December 31, 2005)

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

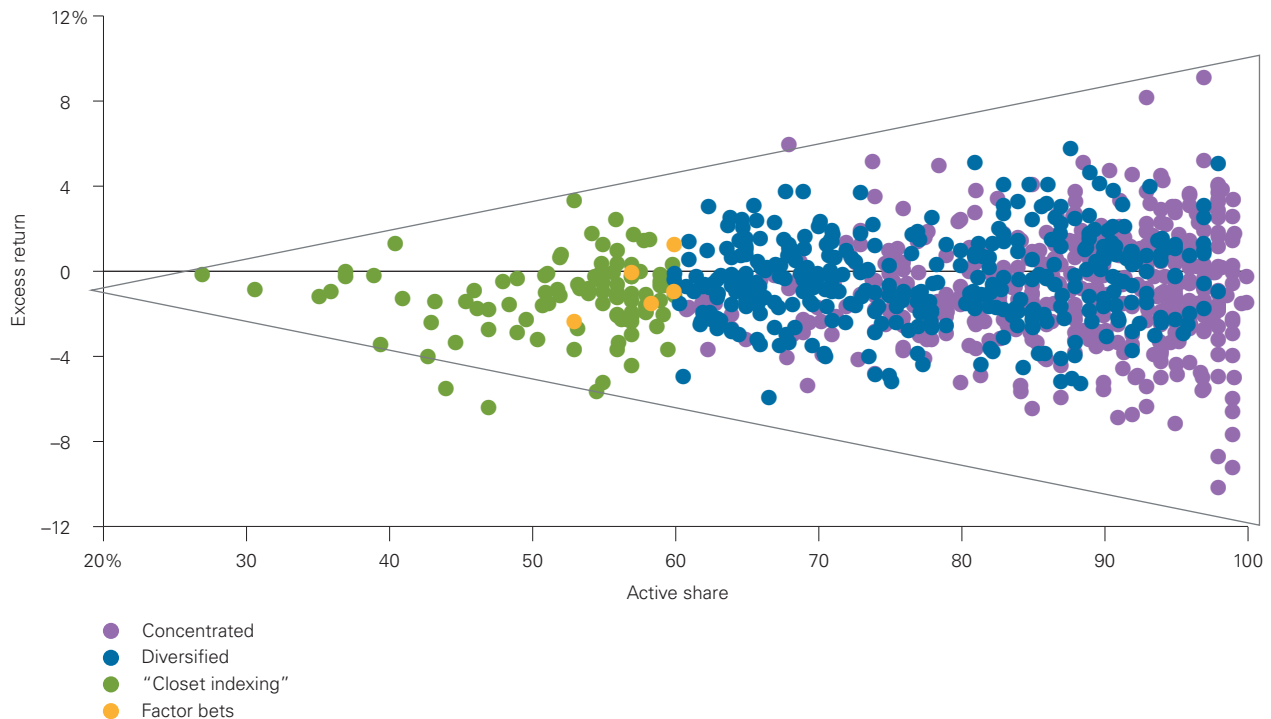
	Evaluation period			Performance period		
	Concentrated	Diversified	"Closet indexing"	Concentrated	Diversified	"Closet indexing"
Active share	87.62%	77.98%	51.91%			
Concentration	33.84%	27.48%	26.69%			
Style drift	22.30%	13.82%	10.29%			
Excess return	2.96%	0.11%	-0.67%	-0.77%	-0.42%	-1.22%
Tracking error	9.84%	4.88%	3.50%	6.44%	4.68%	3.36%
Expense ratio	1.37%	1.18%	0.99%			
Information ratio	0.30	0.02	-0.19	-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 7.** 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.  
Source: Vanguard calculations, using data from Morningstar, Inc.

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 7**. 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

**Figure 8.** 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
<b>Total funds</b>	<b>903</b>	<b>448</b>	<b>385</b>	<b>67</b>	<b>3</b>

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.

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

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.

### 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 8**, we then compared the classifications of the four fund groups during the performance period with those from the evaluation period (as shown in **Figure 5**). 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 9a** 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. For example, during our evaluation period, the top decile of active-share funds had an average active share of almost 98%, indicating only a 2% overlap with the benchmark. These funds had an average concentration of 42% in their top ten stocks, a style-drift coefficient (Sharpe, 1992; Idzorek and Bertsch, 2004) of 23%, and an average expense ratio of 1.55%. A further breakdown, in **Figure 9b**, shows that this top active-share decile tended to be concentrated in small- and mid-capitalization equities.<sup>16</sup> (For more details on the average portfolio characteristics by style box, please see **Appendix Figure A-1**.)

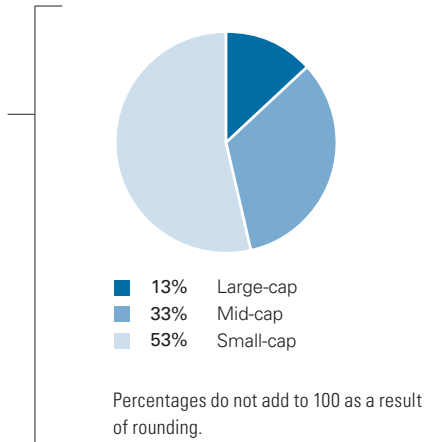
<sup>16</sup> This is a reasonable result, given that the investable pool is much larger for small-cap managers. For example, the Standard & Poor’s 500 Index (a popular large-cap index) contains 500 stocks, whereas the Russell 2000 Index, a popular small-cap index, contains 2,000 stocks.

**Figure 9.** Examining deciles of active share

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.

One caveat to any discussion of outperformance: It is very important to use the correct benchmark. As documented by Davis et al. (2007), the typical active small-cap equity fund’s outperformance disappeared after correcting for mismatches between active funds and popular small-cap benchmarks, thus helping to dispel the common belief that small-cap funds outperform because of an “inefficient small-cap market.” Similarly, Ennis and Sebastian (2002) advocated judging the performance of active small-cap equity funds against a combination of market indexes—which may better capture the considerable heterogeneity among small-cap portfolios—rather than a single style-box index.<sup>17</sup>

Figure 10, on page 12, shows the average excess return and tracking error for our two sample periods. Without exception, excess returns fell from the first

to the second period; tracking error declined more modestly. And although the difference between the top and bottom deciles of excess returns was a positive and statistically significant 6.12% (*t*-statistic of 4.03) in the first period, it fell to a statistically insignificant 0.62% (*t*-statistic of 0.51) in the second period. Most important is that none of the active-share fund deciles produced positive excess returns, on average, during the performance period. In fact, the average difference in outperformance between the top and bottom active-share deciles fell by almost half in the second period, from 46% to 25%. So even though funds with higher active share on average outperformed those with lower active share during both periods, they did not outperform an unmanaged benchmark index for the period 2006 through 2011.

<sup>17</sup> For those portfolio managers with wider investment mandates not confined to one style box, such a multi-index benchmark may be more appropriate.

**Figure 10.** From the first period to the second, excess return fell more than tracking error

Active share decile	Evaluation period			Performance period		
	Excess return	Tracking error	Percentage outperforming	Excess return	Tracking error	Percentage outperforming
1 = High	5.39%	10.88%	81.11%	-0.61%	8.28%	41.11%
2	2.93	9.37	75.82	-0.62	6.98	42.86
3	2.08	8.51	67.78	-0.37	5.94	50.00
4	1.03	8.67	55.56	-0.37	5.95	44.44
5	1.69	7.15	68.13	-0.59	5.44	41.76
6	0.63	7.08	60.00	-0.77	5.23	32.22
7	1.42	6.76	70.00	-0.84	4.64	34.44
8	-0.01	5.52	48.89	-0.67	4.33	35.56
9	-0.03	4.54	43.33	-0.76	3.76	24.44
10 = Low	-0.73	3.55	35.16	-1.23	3.34	16.48
High-Low	6.12%	7.34%	45.95%	0.62%	4.94%	24.63%
T-statistic	4.03			0.51		

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

This result is not surprising, given the vast literature on the absence of performance persistence. For years, academics have studied whether past performance has predictive power. More than 40 years ago, Sharpe (1966) and Jensen (1968) found limited to no persistence. Three decades later, Carhart (1997) reported no evidence of persistence in fund outperformance after adjusting for the well-known Fama-French three-factor model or after adding momentum as a fourth factor. Carhart's study reinforced the importance of fund costs and reiterated that not accounting for survivorship bias can skew results of active/passive studies in favor of active managers. More recently, Fama and French (2010) reported results of a separate, 22-year study suggesting that it is extremely difficult for an actively managed investment fund to regularly outperform its benchmark.

### The role of costs

We have demonstrated the inherent challenge of using active share alone to predict a fund's outperformance. While many studies have shown the difficulty in relying on any predictive measure, several have concluded that using costs can offer a better chance of realizing outperformance. In 2002, Financial Research Corporation evaluated the predictive value of fund metrics including past performance, Morningstar rating, alpha, and beta. The study found that a fund's expense ratio was the most reliable predictor of its future performance. Wallick et al. (2011) also concluded that "the expense ratio is a useful predictor of a fund's relative performance," as did Philips (2012). In addition, Philips and Kinniry (2010) showed that a fund's Morningstar rating was less reliable than its expense ratio as a guide to future performance.

Referring back to Figure 9, we show that funds with higher active share also carried the highest average expense ratios. This is important, because Figure 10 reveals that higher active share did not lead to positive future excess returns. So a logical question might be, would a combination of lower costs and higher active share improve the odds of achieving positive excess returns, or is the dispersion of outcomes so great that future performance truly is a “random walk”?

Figure 11 ranks the funds by quartile for both active share and cost, showing the excess returns for the performance period for each combination. Although a clear trend is lacking (lending support to the idea of a random walk), generally speaking, the lower the cost, the better the outcome (even if the outcome is only less negative underperformance). In fact, the combinations that generated the highest average excess returns were those with the highest active share and the lowest average cost.

### Conclusion

Active share is an analytical measure designed to capture the degree of a portfolio’s active management. 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

**Figure 11. Higher expense ratios associated with lower excess returns**

(January 2006–December 31, 2011)

Active share	Q4 = High	0.21%	-0.65%	0.09%	-1.22%
	Q3	0.25%	-0.96%	-0.57%	-0.35%
	Q2	-0.47%	-1.05%	-0.56%	-0.99%
	Q1 = Low	-0.79%	-1.08%	-1.20%	-0.59%
		Q1 = Low	Q2	Q3	Q4 = High
		Expense ratio			

Notes: Percentages in each box refer to the excess return for each respective quartile of active share/expense ratios. Although this figure shows no clear trend in terms of excess return and cost in general, the lower the cost, the higher the excess return (green indicates more positive outcomes, and shades of yellow and red indicate less positive outcomes).

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

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 demonstrate 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.

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## Appendix.

**Figure A-1.** Measures of active management by size and style for evaluation and performance periods

As this figure's data demonstrates, examining active management by size and style reveals:

- Large-cap funds had lower active share and higher concentration.
- Mid- and small-cap funds had higher active share and (for the most part) more style drift.
- Growth funds had the most style drift.

	Evaluation period					Performance period	
	Active share	Concentration	Style drift	Excess return	Tracking error	Excess return	Tracking error
Large-cap blend	71.09%	32.39%	14.42%	1.21%	5.27%	-0.75%	4.43%
Large-cap growth	73.14	35.38	19.07	2.37	8.18	-1.54	5.27
Large-cap value	72.09	32.32	13.65	-0.26	4.68	0.35	4.78
Mid-cap blend	92.28	30.74	19.82	1.39	7.97	-1.71	6.44
Mid-cap growth	86.31	28.62	22.19	0.77	9.80	-0.56	6.06
Mid-cap value	90.19	27.79	18.93	-1.00	6.41	-0.14	5.47
Small-cap blend	91.37	23.09	18.26	3.50	7.48	-0.07	5.82
Small-cap growth	91.15	24.91	19.40	2.17	8.80	-1.01	6.03
Small-cap value	89.45	22.88	14.99	1.60	6.27	1.08	6.37

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



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