

# The urban legends of active share

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- We conducted an analysis that found that, on average, higher-active-share funds—those whose portfolios differ more from their benchmark index—fail to outperform low-cost, low-active-share funds. The investor who should be focusing on risk-adjusted returns may find it advantageous to target low-cost, low-active-share funds.
- We found a significant positive relationship between active share and expense ratios. Funds with higher active share tend to charge more: It is this relationship that leads to a negative relationship between active share and net excess return, so what you pay per unit of active share is important.
- Active share is often misused as a forecasting tool in an attempt to identify outperforming funds or to exclude funds as not being active enough. Additionally, increased active share is not a compensated risk premium—it leads to a wider dispersion of outcomes without a corresponding increase in average returns. The wider dispersion makes it easier for managers to charge high expense ratios, as the impact of fees is less salient in relative comparisons of high-active-share funds. However, this is a manager advantage, not an investor advantage, given that the average gross excess return is not affected by active share.

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Active share is the percentage of the portfolio that differs from a benchmark index and is designed to determine the degree of active management in an actively managed portfolio. As defined in Cremers and Petajisto (2009), 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>:

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

The introduction of the active-share concept by Cremers and Petajisto (2009) and subsequent work by Petajisto (2013) have produced controversy. In their 2009 research, Cremers and Petajisto stated that tracking error was a sign of correlated active bets such as exposure to the same systematic factor, while active share was a lens on stock selection.

Both pieces of research contended that the degree of active share predicts fund performance and that funds deemed "diversified stock pickers" (defined as those with high active share and low tracking error<sup>2</sup>) significantly outperform their benchmark before and after fees. The studies also contended that other combinations of active share and tracking error underperform. This research has convinced many investors and financial professionals that high-active-share funds are superior to low-active-share funds. (Cremers and Petajisto, 2009, and Petajisto, 2013, have deemed low-active-share funds, or "closet indexers," as those with active share below 60%.)

Contrary to this earlier research on active share, we found an inconsistent relationship between active share and outperformance during our analysis period. Our analysis aligns with and confirms conclusions from other subsequent active-share research:

- Schlanger, Philips, and LaBarge (2012) concluded that high levels of active share were not related to subsequent fund performance and they found no evidence that either tracking error or active share predicted performance.

- Frazzini, Friedman, and Pomorski (2016) found that active share did not predict actual fund returns and was as likely to correlate positively with performance as it was to correlate negatively.
- Wittman, Chandrashekar, and Ornatsky (2013) concluded that portfolios with similar active share could have dramatically different risk profiles. They found that active share tells us nothing about portfolio risk or manager skill and that low-active-share funds can generate excess returns. Their research also emphasized that higher levels of active share can signify greater out-of-benchmark exposures and risks and that those risks may be neither desirable nor appropriate for an investor.
- Asness (2016) concluded that active share is not a valuable metric to use in analyzing active managers who are targeting factor exposures. Managers focused on capturing a specific factor exposure most effectively desire to get as much exposure as they can to a given factor while taking on as few other exposures as possible, which in effect means as low an active share as possible.
- Higher levels of active share come with higher levels of return dispersion and greater downside risks, as discussed in Cohen et al. (2014). They also found that active share is not a consistent measure across different market capitalizations and that it was easier and more likely for a small-cap-fund manager to have higher active share than a large-cap-fund manager.<sup>3</sup>

A separate body of research has explored definitional and computational complexities in the term "active share." This research shows that the size and concentration of the benchmark significantly influences the expected active share of a manager. Sapra and Hunjan (2013) ran theoretical simulations and found that the choice of benchmark, the weighting of the holdings in the active portfolio, and the number of holdings in the active portfolio all have a material impact on active-share metrics. The selection of benchmarks with more holdings and less concentration led to greater active share. Brandes (2015) showed that it was difficult to get high-active-share levels without tilting the portfolio substantially toward small-cap stocks, which might make the benchmark a poor performance standard.

<sup>1</sup> A fund with full replication would have an active share of 0% and a long-only fund with no holdings the same as the benchmark would have an active share of 100%. Cremers (2017) proposed a new, simpler formula in which active share starts at 100 and is reduced only through holdings that overlap its benchmark, but it effectively generates the same result as the original formula.

<sup>2</sup> Tracking error is defined as the time-series standard deviation of the return on the active positions.

<sup>3</sup> In some international markets, the number of securities in the benchmark is much lower, with significant concentration in a few companies. This leads to either very low active share if the few large companies are owned by a fund or extremely high active share if they are not.

This paper explores some of these definitional complexities, but our primary goal is to test active share's relationship to cost (which we define as annual expense ratio), risk, and return. A summary of our main conclusions:

- Adjusting for size, active share has an inconsistent relationship to gross excess returns.
- There is a positive, significant relationship between active share and cost, which leads, all else equal, to greater active share delivering more negative net excess returns on average.
- After controlling for fund size and time, we find that higher cost per unit of active share is associated with lower net excess returns.
- On average, low-cost, low-active-share funds—part of the category of “closet index funds”—outperform high-active-share funds. These results suggest that the pejorative label *closet index funds* should be reserved for high-cost, low-active-share funds.
- The dispersion of the behavioral gap increases with an increase in active share, adding another layer of active risk for an investor.<sup>4</sup>

## Data and methodology

The data for all the results in this paper were from a sample obtained from Morningstar, Inc., of actively managed U.S. open-end equity mutual funds 2003–2018, including liquidated and merged funds. We used gross and net monthly fund returns (ignoring front- and back-end loads), annual expense ratios, annual holdings, and total net assets under management. The selected funds are benchmarked to their U.S. 9-box style categories as designated by Morningstar. We excluded all sector and specialty fund categories as well as index funds and ETFs. Additionally, we used only the oldest share class of each fund and eliminated any funds with fewer than ten holdings. Finally, we obtained underlying holdings for the funds in our sample through FactSet.

In most of our analysis, we calculated active share at each year-end against each fund's Russell style benchmark, rather than assigning the fund to a benchmark that produces the lowest active share (as in Cremers and Petajisto, 2009), in order to reduce the number of benchmarks used and to make comparison of active share easier across funds of the same style.<sup>5</sup> When calculating return-based metrics such as excess return and tracking error, we used the fund's self-reported prospectus benchmark because this is what the manager is targeting for outperformance. For most analysis where we were comparing the active share of a fund with some other characteristic, we first segmented the active managers by market capitalization.

Because our objective was to determine both the predictive power and the characteristics of active share through time, we wanted as long a time series as possible, but one in which a majority of the funds available reported holdings. Our sample period and data thus run from December 31, 2003, through December 31, 2018.

While our analysis covered the entire 15-year period, for much of the analysis we broke our sample into three distinct and consecutive five-year periods. Focusing on a shorter time horizon (in our case, five years) effectively reduced the impact of survivorship bias. Our data supported this choice. There were 1,856 funds in our sample at year-end 2003; of those funds, 1,484, or 80%, survived the subsequent five-year period compared with the entire 15-year evaluation period, in which only 947, or 51%, survived.

<sup>4</sup> The term *behavioral gap* was introduced by Richards (2012) and is also known as the investor return gap or IRR-TWR gap (IRR = internal rate of return and TWR = time-weighted return). It is generally defined as the difference between the return realized by an investor and an investment's return.

<sup>5</sup> We tested the consistency of active share and tracking error and found that active share was more consistent than tracking error. The average active share was 83.3% and the standard deviation of the active share of the individual funds in our sample over the ten years ended December 31, 2017, was 3.8%. The average annualized tracking error was 4.43% and the standard deviation of the average annualized tracking error of the individual funds in our sample over the same period was 1.78%. Correlation for year-over-year active share and tracking error was 0.97 and 0.73, respectively.

### Active share: Risks, costs, returns

Our research explored the relationship between active share and various portfolio characteristics. In addition to quantifying these relationships, our findings debunked two persistent urban legends: (1) Funds with both higher active share and low tracking error produce outperformance; and (2) Low-active-share funds are not active enough and produce unsuccessful outcomes for investors.<sup>6</sup>

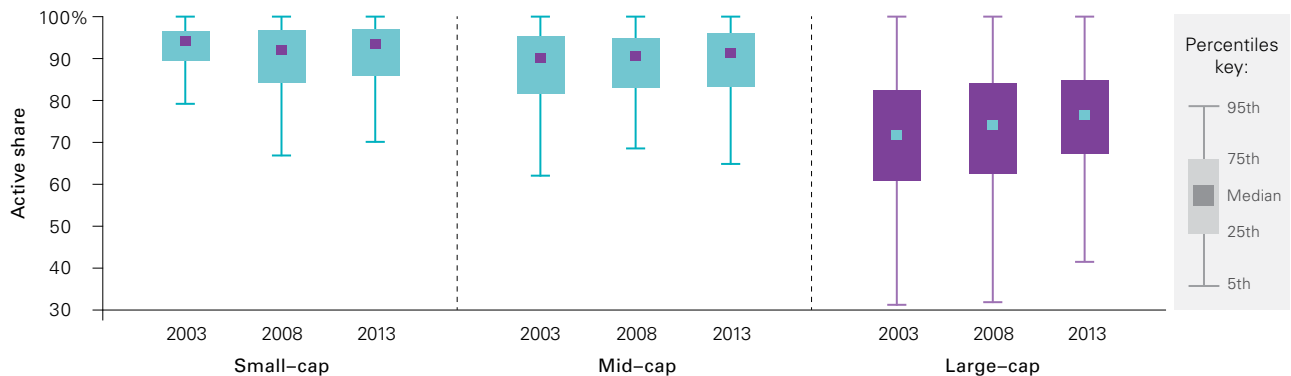
Reconfirming prior research, we found that active share is not consistent across different market capitalizations and benchmarks. **Figure 1** shows that the active share of large-cap funds on average is lower than that of small- and mid-cap funds.<sup>7</sup>

We addressed the notion of risk within the context of active share in three ways:

- Cross-sectional dispersion of excess returns, which we discuss in this section.
- Tracking error relative to the fund's stated benchmark, which we discuss in the next section.
- Fund behavioral gap, which we address in the final section.

Higher dispersion creates more uncertainty of returns around the mean return and is positively correlated to active share. **Figure 2** shows that across market capitalizations and time periods, higher active share seems to lead to a wider dispersion of outcomes and a relatively symmetrical distribution of excess returns across the range of active share.

**Figure 1. Small- and mid-cap funds have higher average active share than large-cap funds**



**Note:** Funds' active share was calculated based on year-end 2003, 2008, and 2013 active share relative to their Russell style benchmark and separated by market capitalization of the benchmark.

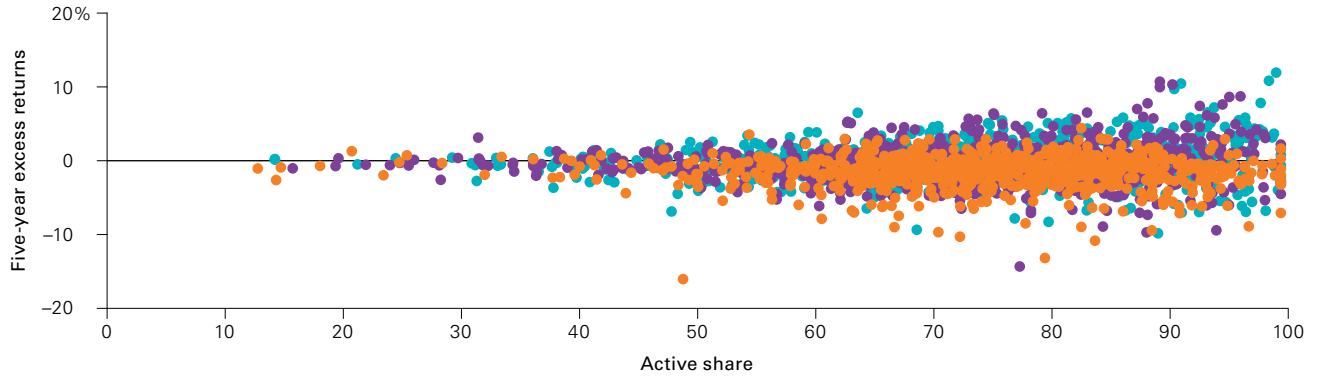
**Source:** Vanguard, using data from Morningstar and FactSet.

<sup>6</sup> Another false impression we find is that there is a relationship between active share and turnover or holding duration. Cremers and Pareek (2016) and Cremers (2017) found that high-active-share funds with patient investment strategies outperform, while our analysis in the Appendix does not confirm these results.

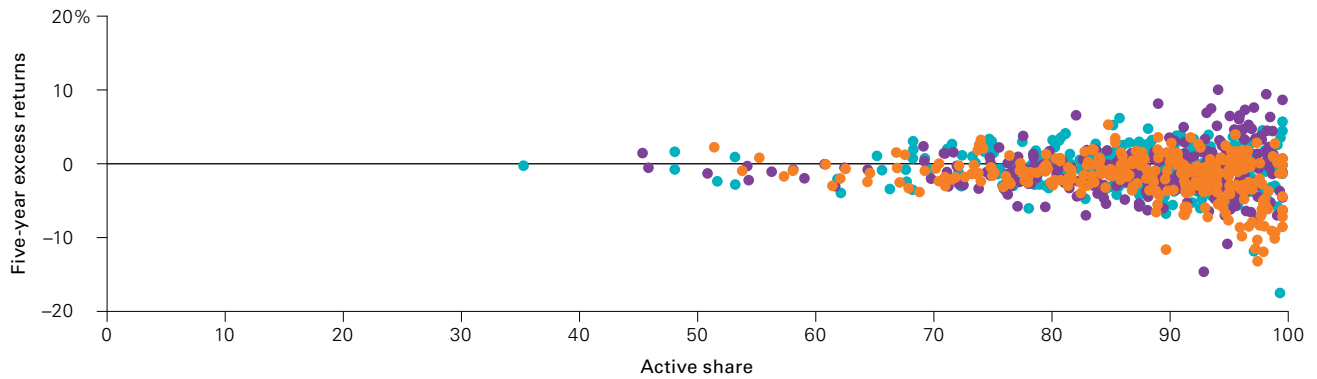
<sup>7</sup> We tested the relationship between size and active share and confirmed our findings that small- and mid-cap funds have statistically significant higher active share than large-cap funds. When we controlled for the number of holdings, our analysis produced similar results.

Figure 2. Higher active share equates to wider cross-sectional dispersion of net excess returns

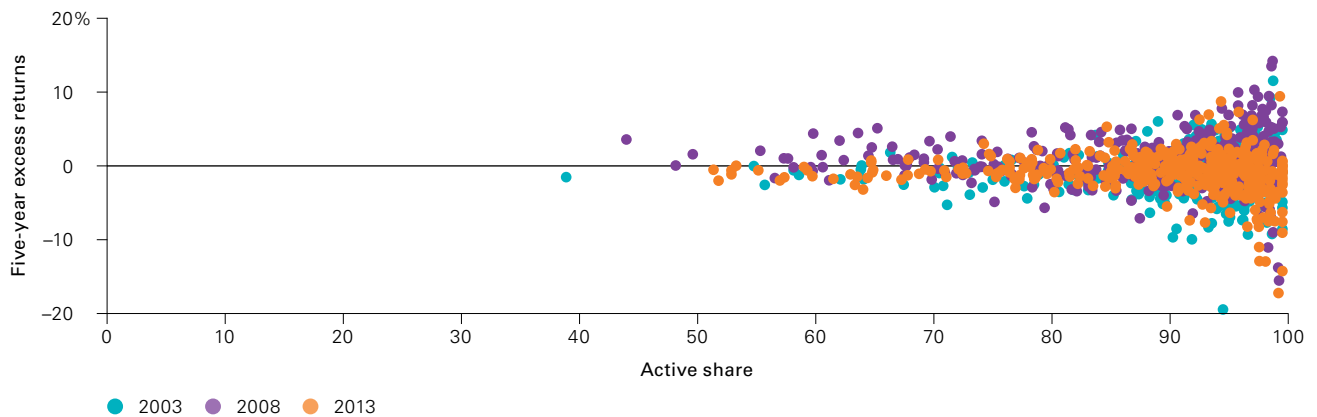
a. Large-cap



b. Mid-cap



c. Small-cap



**Notes:** Each dot plots an individual fund's active share against its excess return. Net excess returns are calculated against prospectus benchmarks. Active share is calculated versus the relevant Russell style benchmark. Active share is as of December 31, 2003 (2003), December 31, 2008 (2008), and December 31, 2013 (2013), and five-year net excess returns are for periods ended December 31, 2008, December 31, 2013, and December 31, 2018, respectively. A few outlier returns (both positive and negative) were removed from the displayed sample.

**Source:** Vanguard calculations, using data from Morningstar and FactSet.

### Active share and tracking error

Active share and tracking error have been explicitly linked in the research discussing active share; researchers disagree about what the interaction of varying degrees of each might imply for performance. The persistent urban legend is that “diversified stock pickers” (previously defined as funds with high active share and low tracking error) significantly outperform their benchmarks. In our analysis on this subject, we first tested the correlation between tracking error and active share of our entire sample using Pearson correlation and found a positive relationship of 0.55, which was significant to 1%.


While we know that there is a significant positive relationship between active share and tracking error, we wanted to address whether funds with certain combinations of active share and tracking error outperform. And if so, do those funds outperform through time?

We sorted all funds sequentially, first by active share and then by tracking error, within each quintile over each of the three five-year periods in **Figures 3 and 4**. Over the 15 years shown in Figure 3, we saw no pattern of returns in the various combinations of tracking error and active share.

**Figure 3. No pattern of returns emerges over the 15 years across combinations of active share and tracking error**

Median excess returns by quintiles of active share and tracking error

Active share quintiles	Tracking error quintiles					Active share
	Low	Q2	Q3	Q4	High	
Low Q1	-0.64%	-0.59%	-0.97%	-0.81%	-1.33%	<67.6
Q2	-0.90%	-0.91%	-0.74%	-0.13%	-0.36%	67.6–78.9
Q3	-0.70%	-0.96%	-0.88%	-0.65%	-0.92%	78.9–87.7
Q4	-1.19%	-0.52%	-0.62%	-0.81%	-0.18%	87.7–94.2
High Q5	-1.92%	0.12%	-0.86%	-0.59%	-0.80%	>94.2
Tracking error (%)	<2.9	2.9–3.8	3.8–4.8	4.8–6.2	>6.2	

 Worse to better outcomes

**Notes:** Active share was measured at December 31, 2003, December 31, 2008, and December 31, 2013. Fund returns and tracking error were measured using monthly returns over five-year periods ended December 31, 2008, December 31, 2013, and December 31, 2018. Only funds that survived each period were included. Excess returns were calculated versus primary prospectus benchmark.

**Source:** Vanguard calculations, using data from Morningstar and FactSet.

**Figure 4. Few funds are in the quintile bucket with highest active share and lowest tracking error**

Number of funds by quintiles of active share and tracking error

Active share quintiles	Tracking error quintiles					Total
	Low	Q2	Q3	Q4	High	
Low Q1	531	183	110	59	28	911
Q2	252	288	209	111	49	909
Q3	94	256	243	198	119	910
Q4	30	134	236	288	221	909
High Q5	6	50	118	243	493	910
Total	913	911	916	899	910	

 Fewer to more funds

**Notes:** Active share and number of funds are measured at December 31, 2003, December 31, 2008, and December 31, 2013. Fund returns and tracking error were measured using monthly returns over five-year periods ended December 31, 2008, December 31, 2013, and December 31, 2018. Only funds that survived each period were included. Excess returns were calculated versus primary prospectus benchmark.

**Source:** Vanguard calculations, using data from Morningstar and FactSet.

In previous research, the parameters used to define high active share and low tracking error have been inconsistent and somewhat subjective. Because of this, we used the following approach to help define this grouping:

- Figure 4 shows that there are only six funds within both the highest-active-share (Q5) and the lowest-tracking-error (Q1) quintiles. This is because of the strong positive correlation between active share and tracking error.
- We therefore looked to expand the high-active-share/low-tracking-error area to include Q4/Q5 for active share and Q1/Q2 for tracking error.<sup>8</sup>
- In Figure 5, when we looked at the funds we defined as high-active-share (Q4/Q5) and low-tracking-error funds (Q1/Q2) over each five-year evaluation period and the entire 15 years, we found average under-performance across each evaluation period.

**Figure 5. High-active-share, low-tracking-error funds have underperformed across various periods**

Median excess return over various time horizons in high-active-share and low-tracking-error quintiles

Active share	Tracking error			
	2004–2008 Q1/Q2	2009–2013 Q1/Q2	2014–2018 Q1/Q2	2003–2018 Q1/Q2
Q4/Q5	-0.33%	-0.44%	-1.17%	-0.74%

Worse to better outcomes

**Notes:** Active share was measured at December 31, 2003, December 31, 2008, and December 31, 2013. Fund returns and tracking error were measured using monthly returns over a 15-year period ended December 31, 2018, and five-year periods ended December 31, 2008, December 31, 2013, and December 31, 2018. Only funds that survived each period were included. Excess returns were calculated versus primary prospectus benchmark.

**Source:** Vanguard calculations, using data from Morningstar and FactSet.

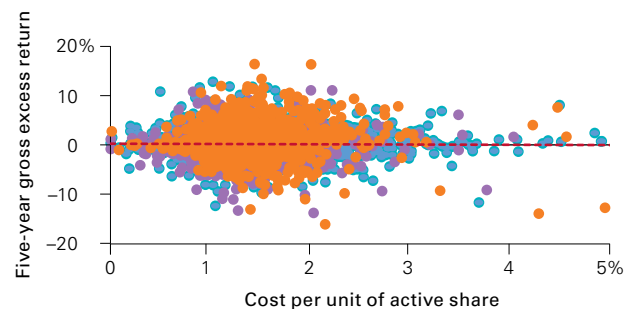
### Active share and cost

As with most other things in life, if investors are paying more, they should get more in return. To determine whether this relationship holds with active share, we look at both the costs and the returns associated with different levels of active share.

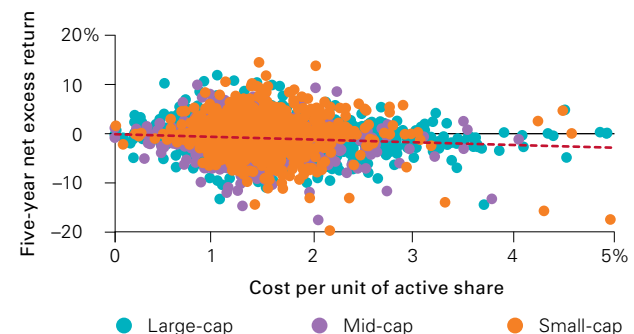
To investigate this, we looked at the relationship between cost per unit of active share and excess returns.<sup>9</sup> We combined each of our three five-year windows on a gross basis (Figure 6a) and on a net basis (Figure 6b) and separated out the funds by market capitalization.

**Figure 6. Higher cost per unit of active share is associated with lower future net excess returns**

a. Gross excess returns



b. Net excess returns



**Notes:** Net and gross excess returns were calculated against prospectus benchmarks. Active share was calculated versus the Russell style benchmark and the expense ratio was measured for each fund at year-end 2003, 2008, and 2013. Net and gross excess returns cover the periods 2004–2008, 2009–2013, and 2014–2018.

**Source:** Vanguard calculations, using data from Morningstar and FactSet.

<sup>8</sup> We also followed the original methodology of Cremers and Petajisto (2009), which defined high active share/low tracking error as the highest quintile of active share (Q5) and all but the highest quintile of tracking error (Q1–Q4) and found results similar to our displayed methodology.

<sup>9</sup> Incremental cost per unit of active share would deduct the cost to invest in the index from the expense ratio of the active fund, but assuming that the cost to invest in the lowest-cost indexed alternative across the 9-box is less than 10 basis points, the results from using cost per unit of active share are similar.

We see no significant relationship between cost per unit of active share and excess return on a gross basis, but on a net basis there is a meaningful negative relationship, suggesting that cost is not a reasonable proxy for skill. Using net returns shows the relationship between what an investor would have paid per unit of active share and what that investor would have received. On the other hand, using gross returns shows the relationship between what the fund manager charged per unit of active share and what the outcome was before costs.

In Figures 6a and 6b, we compare performance gross and net of costs with cost per unit of active share, but it is important to separately understand the relationship between cost and active share and separately assess their impact on returns. We tested the correlation between active share and cost using Pearson correlation and found a moderate positive relationship of 0.30 across

the entire data set with a range between 0.27 and 0.32 for the subsets, all of which were significant to 1%. The inverse relationship between cost and returns has been well documented (see Rowley, Walker, and Ning, 2018, and Financial Research Corporation, 2002).

To determine the relationship between active share and returns and test the robustness of our visual analysis, we first tested the difference in the means between the highest and lowest quintiles of active share and cost per unit of active share against returns on both a gross and net basis. We separated our sample by market cap and used three separate consecutive five-year windows and the entire 15-year sample. We can see from the results in **Figure 7** that the relationship between active share and gross excess return is inconsistent through time. In the 2009–2013 time frame, there is a statistically significant positive relationship between high active

**Figure 7. Relationship between active share and performance is inconsistent**

Difference between means of high and low quintile

		Active share		Cost/Active share	
		Gross return	Net return	Gross return	Net return
2014–2018	Large-cap	-1.43**	-1.89**	0.31	-1.22**
	Mid-cap	-2.28**	-2.94**	-1.03	-1.86**
	Small-cap	-1.55**	-2.08**	0.05	-0.78
2009–2013	Large-cap	1.31**	0.80*	-0.53	-1.35**
	Mid-cap	2.37**	1.81*	-0.08	-1.1
	Small-cap	1.55*	0.89	-0.28	-1.26*
2004–2008	Large-cap	1.46**	1.09**	-0.05	-0.78**
	Mid-cap	-0.44	-0.85	0.23	-0.59
	Small-cap	1.04	0.56	0.00	-0.97
2004–2018	Large-cap	0.22	-0.24	0.01	-0.81**
	Mid-cap	-0.47	-0.86*	-0.48	-1.31**
	Small-cap	0.16	-0.36	0.44	-0.45

**Notes:** Active share and expense ratios were measured at December 31, 2003, December 31, 2008, and December 31, 2013. Fund performance was calculated over three five-year periods and the entire 15-year period: 2004–2008, 2009–2013, 2014–2018, and 2004–2018. Only funds that survived the entire time period were included. Funds that did not survive had lower relative returns and higher expense ratios, lower assets under management, and a lower number of holdings until liquidated or merged, but had similar active share and tracking error. \*\*Significant at 1%, \*significant at 5%.

**Source:** Vanguard calculations, using data from Morningstar and FactSet.



share and gross excess return but that relationship completely reverses in the subsequent five years.<sup>10</sup> There is a reasonably consistent negative and significant relationship between cost per unit of active share and performance on a net return basis across time and market capitalization.

In order to provide more clarity in the relationship between cost per unit of active share and performance, we regressed cost per unit of active share on net excess returns while controlling for fund fixed effects and time effects. The results in **Figure 8** show that higher cost per unit of active share is associated with lower net excess returns. Investors may choose high or low active share depending on their active risk tolerance, but the results show better average outcomes for investors who pay a lower fee per unit of active share.

**Figure 8. Controlling for time-fixed effects, higher cost per unit of active share is associated with lower excess returns**

	Active share	Active share + expense ratio	Cost per unit of active share
Constant	-0.065	0.282	0.712**
Cost per unit of active share			-71.28**
Active share	-0.0048	0.0088*	
Net expense ratio		-1.18**	
Control variables:			
<b>Year:</b>			
2008	0.151	0.034	0.061
2013	-1.089**	-1.281**	-1.255**
<b>Size:</b>			
Mid	-0.355**	-0.408**	-0.517**
Small	0.534**	0.614**	0.472**
Adjusted R <sup>2</sup>	4.54%	7.43%	6.76%

**Notes:** Active share, net expense ratio, and cost per unit of active share were measured at December 31, 2003, December 31, 2008, and December 31, 2013. Fund returns and tracking error were measured using monthly returns over five-year periods ended December 31, 2003, December 31, 2008, and December 31, 2013. Only funds that survived the five-year time period were included. \*\*Significant at 1%, \*significant at 5%.

**Source:** Vanguard calculations, using data from Morningstar and FactSet.

<sup>10</sup> We also performed multivariate regressions of gross excess returns on active share and tracking error while controlling for time effects (the three five-year windows) and fixed effects (the market-capitalization category). While some of the time effects and fixed effects display significance, we did not find a statistically significant relationship between gross excess return and either active share or tracking error.

## Low active share revisited

The second urban legend is that low-active-share funds are not active enough and inherently lead to unsuccessful outcomes for investors. The goal of active management should be to capture the equity risk premium and to generate alpha. Some managers may believe that this is best achieved by making funds as different as possible from their benchmark and that that will morph into high active share. Other managers may believe that the best way to optimize generating alpha is by taking many smaller bets that they believe are the most efficient and effective, therefore essentially minimizing active share.

For example, a fund that is targeting 2% outperformance, is charging an incremental cost of 1.2%, and has an active share of 95% may or may not be a good investment. The same is true of a risk-controlled active fund that is targeting 1% outperformance and charging an incremental cost of 0.20% relative to the investable benchmark index. Its lower active share of 50% is less meaningful than its lower 0.004 cost per unit of active share. This instead should be compared with the 0.013 cost per unit of active share of the 95%-active-share fund.

As mentioned earlier, we see in Figures 2a–c that a majority of low-active-share funds (those below 60%) are large-cap funds; therefore, we select large-cap funds to evaluate the performance of low-active-share versus

high-active-share funds. We first separate the large-cap funds into those with active share above and those with active share below 60%. In **Figure 9**, we see that low-active-share funds tend to have lower median expense ratios and lower dispersion of manager excess returns with higher cost per unit of active share relative to high-active-share funds. The low-active-share funds include both high- and low-cost funds.

In order to understand the potential value of low-active-share funds, we need to separate the high-cost funds from the low-cost funds. We do this by taking the low-active-share funds and quartiling them by net expense ratio. We do the same with high-active-share funds.

Once we separate out the low-cost funds, we find that the median low-cost, low-active-share fund not only has lower cost but also has higher excess returns with lower dispersion and tracking error and lower cost per unit of active share than even low-cost high-active-share funds. This finding indicates that researcher and practitioner criticism of low-cost, low-active-share funds is misplaced. This combination can produce a significant benefit for investors, providing a lower return drag and a lower dispersion of excess returns, and therefore potentially higher expected risk-adjusted returns.

**Figure 9. Low-cost, low-active-share funds outdo high-active-share funds**

	Median active share	Median expense ratio (%)	Median net excess returns (%)	Dispersion of manager net excess returns (%)	Median tracking error (%)	Median cost/active share (%)
Low cost, low active share	46.5	0.42	-0.30	0.99	1.67	0.0087
High cost, low active share	54.2	1.24	-1.15	1.74	3.09	0.0238
<b>Total low active share</b>	<b>51.5</b>	<b>0.84</b>	<b>-0.72</b>	<b>1.56</b>	<b>2.35</b>	<b>0.0170</b>
Low cost, high active share	71.9	0.73	-0.48	2.21	3.49	0.0098
High cost, high active share	82.5	1.50	-0.97	3.25	5.03	0.0186
<b>Total high active share</b>	<b>77.6</b>	<b>1.02</b>	<b>-0.84</b>	<b>2.69</b>	<b>4.08</b>	<b>0.0133</b>

**Notes:** Net excess returns were calculated against prospectus benchmarks. Active share was calculated versus the Russell style benchmark. Active share was as of December 31, 2003, December 31, 2008, and December 31, 2013, and five-year net excess returns were as of periods ended December 31, 2008, December 31, 2013, and December 31, 2018, respectively. These three groups were combined for the analysis. The sample size was 2,374 funds, with 394 deemed low-active-share (less than 60%) and 1,980 high-active-share (greater than 60%). Low- and high-cost funds are deemed to be the lowest- and highest-cost quartiles of funds, respectively, within each category of active share.

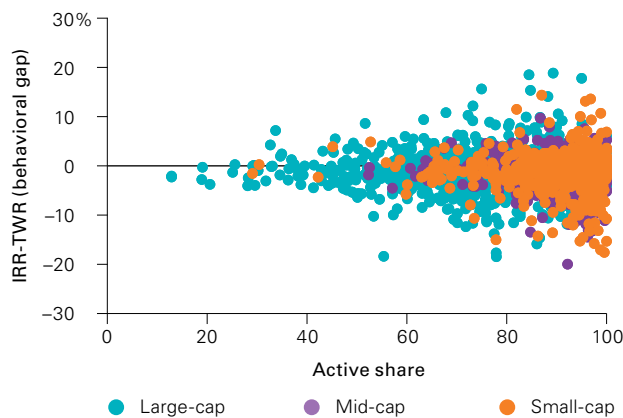
**Source:** Vanguard calculations, using data from Morningstar and FactSet.

## Behavioral gap and active share

Active investing adds active risk to an investor’s portfolio. This active risk or uncertainty has a positive relationship with active share and tracking error. An additional layer of risk for those investing in actively managed funds is the potential behavioral gap. This is calculated by comparing investor returns to fund returns over time. As discussed in Kinniry et al. (2016), large differences between investor and fund returns can be a sign of performance-chasing. History has shown that, on average, the more that fund returns differ from the market, the more pronounced behavioral drag is.

In **Figure 10**, we see results that suggest high-active-share funds tend to produce a larger dispersion in observed behavior gaps, meaning that the difference between the highest and the lowest behavior gap is wider. This larger dispersion of outcomes can be an indication of more extreme performance-chasing. High-active-share funds can make it more difficult to stay the course with active strategies—they add another layer of uncertainty to active equity investing that investors should be aware of.

**Figure 10. An increase in active share equates to wider cross-sectional dispersion of behavioral gaps**



**Notes:** The internal rate of return (IRR) takes into account fund assets, cash flow, and market appreciation to determine an IRR, or the return that investors in the fund actually received. The fund’s reported time-weighted return (TWR) is then subtracted from the IRR to provide a “behavior gap.” Active share is as of December 31, 2007, and December 31, 2012, and the five-year forward fund return is through December 31, 2012, and December 31, 2017. A few outlier IRR-TWR data samples (both positive and negative) were removed from the displayed sample.

**Source:** Vanguard calculations, based on data from Morningstar and FactSet.

## Conclusion

Active share is designed to determine the degree of active management in an actively managed portfolio and, along with other measures, can be 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. It does not, however, measure manager skill, and a myopic use of active share as a manager selection tool can lead to poor decisions. Our research illustrates the pitfalls.

First, our research confirmed prior findings that increasing active share does not lead to outperformance. Higher active share leads to a wider dispersion in gross relative performance that is reasonably symmetrical, meaning about an equal chance of increased out- and under-performance, whether the fund is low active share or high active share.

Second, we found a positive relationship between active share and costs—the higher the active share, the higher the cost. After controlling for size and time-period effects, we found that higher cost per unit of active share is associated with lower excess returns.

Third, contrary to intuition and some prior research, we find that the low-cost, low-active-share strategies that are sometimes dismissed as “not active enough” can in fact be optimal on both a risk-adjusted and non-risk-adjusted basis.

Finally, higher-active-share funds increase the active risk because of the wider dispersion of the behavioral gap.

Active share, combined with careful qualitative judgment regarding the health of the investment manager’s firm and the depth of its analytical team, can provide unique information. For investors looking to add active share to their fund selection toolkit, we demonstrate that low-active-share, low-cost funds are an excellent starting point to help ensure the best chance for investment success not only for the fund itself, but in terms of investor behavior as well.

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## Appendix

### Active share and turnover


Prior research by Rowley, Harbron, and Tufano (2017) found that higher portfolio turnover is associated with lower gross alphas, and Cremers and Pareek (2016) found that high-active-share funds with patient investment strategies outperform but that most of that outperformance is explained by a single time period, when the tech bubble burst. When analysis is run over the more recent 15 years,

our findings do not confirm the prior findings. We sorted all funds sequentially, first by active share and then by portfolio turnover,<sup>11</sup> within each quintile over each of the three five-year time periods and combined the 15 years of results in **Figure A-1**. Over the time period analyzed, we see no pattern of returns when looking at the various combinations of active share and fund turnover. We performed the same analysis by market capitalization and found a similar lack of patterns in the results.

**Figure A-1. No pattern of returns across combinations of active share and fund turnover**

Median excess returns by quintiles of active share and fund turnover

Active share	Turnover					Median	Q1-Q5	
	Low	Q2	Q3	Q4	High			
Low Q1	-0.55%	-0.47%	-0.75%	-0.81%	-0.79%	<67.6	-0.66%	0.24%
Q2	-0.90%	-0.55%	-0.98%	-0.72%	-0.88%	67.6–78.9	-0.82%	-0.02%
Q3	-0.77%	-1.27%	-0.62%	-0.81%	-0.66%	78.9–87.7	-0.87%	-0.12%
Q4	-0.40%	-1.03%	-0.40%	-0.83%	-0.07%	87.7–94.2	-0.55%	-0.33%
High Q5	-0.61%	-0.99%	-0.47%	-0.76%	-0.81%	>94.2	-0.76%	0.20%
	<29.2	29.2–48.7	48.7–71.3	71.3–105.0	>105.0			
Median	-0.63%	-0.84%	-0.65%	-0.77%	-0.69%			
Q5-Q1	-0.05%	-0.52%	0.28%	0.05%	-0.02%			

 Worse to better outcomes

**Notes:** Active share is measured at December 31, 2003, December 31, 2008, and December 31, 2013. Fund returns are measured using monthly returns over five-year periods ended December 31, 2008, December 31, 2013, and December 31, 2018. Turnover is measured as the average of each year's annual turnover. Only funds that survived each five-year time period were included. Excess returns were calculated versus primary prospectus benchmarks.

**Source:** Vanguard calculations, using data from Morningstar and FactSet.

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