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ABSTRACT

This paper represents the first attempt in the literature to specifically and solely examine the relationship between active share and emerging market equity fund performance. To do this we use a sample of U.S.-based actively managed diversified emerging market equity funds that we follow for six years from 2009–2014. With this sample of funds, we find a positive and significant relationship between the average level of a fund's active share and fund performance. Funds that are more active have significantly better performance than other funds. We also find evidence that highly active funds that keep the level of activeness consistent over time have significantly better performance than funds that vary the level of activeness. Finally, we document that a significant number of diversified emerging market funds were closet indexing over the period 2009–2014, but that the percentage of funds that pursue this strategy has been declining.

INTRODUCTION

There is a prevailing wisdom that emerging financial equity markets are less efficient than developed markets. De Santis and Imrohoroğlu (1997) and Bekaert and Harvey (1997) find that emerging financial markets offer significant growth opportunities but at the cost of high political and economic risk, making them more volatile than developed markets. Because this volatility is likely to be caused by local factors, it increases idiosyncratic risk and thus allows active fund managers to place bets that generate outperformance.

Despite this perceived inefficiency in emerging markets, evidence is mixed as to whether active mutual fund managers can exploit these inefficiencies consistently. Gottesman and Morey (2007) and Basu and Huang-Jones (2015) find little to no evidence that actively managed emerging market mutual funds outperform their benchmarks. On the other hand, studies by Huij and Post (2011) and Lin (2013) find that actively managed mutual funds outperform their benchmarks. Specifically, Huij and Post (2011) show that past winning funds continue to predict strong performance, whereas Lin (2013) shows that institutional, actively managed, emerging market funds have positive and significant alphas over long periods of time. The mixed nature of the results with emerging markets may be showcased best by Eling and Faust (2010), which finds that emerging market hedge funds outperform their benchmarks but actively managed emerging market mutual funds do not.

In this study we re-examine the question of whether or not active management in emerging markets delivers outperformance by using a relatively new method of defining a fund's activeness. Specifically, we use the active share measure created by Cremers and Petajisto (2009) and later used by Petajisto (2013), Cremers et al. (2016), Cremers and Pareek (2016), and Frazzini et al. (2016). This metric provides a determination of which active funds are truly active and which funds are not as active.

The most relevant of the above papers to our analysis is Cremers et al. (2016), because it examines activeness of internationally based funds. However, although Cremers et al. (2016) includes some emerging market funds, their sample is dominated by funds that hold assets in developed countries. Moreover, none of the seven tables in Cremers et al. (2016), nor the appendix to the paper, provide a specific breakdown of how emerging market funds perform or the number of emerging market funds in the sample.

Given the lack of specific analysis about emerging market funds, we therefore believe our paper is the first to specifically and solely examine the active share of emerging market funds.

To examine the question of whether more active funds outperform among emerging market funds we use a straightforward method. Specifically, at the end of the year 2008 (when Morningstar starts to provide active share data on emerging market equity funds) we choose all actively managed diversified emerging market equity funds that use as their benchmark the MSCI Emerging Markets Index. This produces sixty-seven funds. We follow these funds for the relatively long period of six years (2009–2014). For these six years we examine the average levels of active share of each fund and relate it to the performance of the fund, controlling for many factors. This six-year period replicates the length of time a relatively long-term retail investor may hold such a fund.

Using this approach we find some interesting results. First, we find a positive and significant relationship between the average level of a fund's active share and fund performance; i.e., more-active funds have significantly better performance than less-active funds. We find this result with three different performance metrics. Second, because we have a time series of active share data on each fund for six years, we can calculate the standard deviation of a fund's active share over time. Using this measure we find that a fund's standard deviation of active share is a negative and significant predictor of fund performance. Highly active funds that vary the active share over time have significantly worse performance than funds that keep the level of activeness consistent over time. This result is broadly consistent with Cremers and Pareek (2016), which finds that active funds (i.e., those with high active share) with patient investment strategies (i.e., holding durations of more than two years) significantly outperform other funds. Third, we find that expenses matter significantly in emerging market equity funds. In every regression we run, expenses are negatively and significantly related to fund performance.

We also examine the prevalence of closet indexing in these emerging market equity funds. As its name suggests, closet indexing is the practice of an actively managed fund holding a portfolio close to that of the benchmark index while still charging fees similar to those charged by funds that are truly actively managed. For investors, closet indexing usually offers a bad deal: higher fees and pre-expense performance similar to that of an index fund.

Because fees for emerging market equity funds are significantly higher than fees for U.S. equity funds, investors in emerging market equity funds likely are more impacted by closet indexing than investors in U.S. equity funds, making closet indexing within this sector a worthy subset of focus. Consider for example that in 2014 the difference in the expense ratio between an average actively managed U.S. equity fund and the Vanguard U.S. Total Stock Market Index was 81 basis points. Conversely, the difference in the expense ratio between the average actively managed diversified emerging market fund and the Vanguard Emerging Markets Index was 136 basis points, or 68 percent more than in U.S. equity funds.[1] Therefore, an investor that buys a closet index fund in emerging markets likely is paying much higher expenses than a similar investor in U.S. equities.

Moreover, if it is the case that emerging market equity markets are not as efficient as developed markets, closet indexing in emerging market equity funds robs investors of the opportunity to outperform, and thus it is arguably more damaging to investors than closet indexing in more-efficient, developed market equities.

In an analysis of twenty-four separate quarters of data on actively managed diversified emerging market equity funds we find that on average about 16 percent of the funds in the sample were closet indexing. However, we also find that the percentage of the funds closet indexing falls considerably during 2009–2014. In 2009, roughly 30 percent of the funds were closet indexing; by 2014, it had fallen to 11 percent.

DATA AND METHODOLOGY

ACTIVE SHARE

To measure the level of active management in mutual funds, we use a metric called "active share." First devised by Cremers and Petajisto (2009), active share uses the fund's holdings data to measure the percentage of holdings that differs from the fund's benchmark index, and in this way identifies how close the active fund is to replicating the benchmark.

Active share is defined as:

$$= 1/2 \sum_{i=1}^{n} \left| w_{fund,i} - w_{index,i} \right|$$

where $w_{fund,i}$, is the weight of stock i in the fund's portfolio, and $w_{index,i}$ is the weight of the same stock in the fund's benchmark index, and the sum is computed over the universe of all assets. According to Petajisto (2013), funds that have an active share above 80 percent are truly active funds because they are holding a portfolio that is substantially different from the benchmark index. On the other hand, funds with active share of 60 percent or less are closet indexers because they are holding a portfolio that bears a substantial resemblance to an index fund. Funds with active share of 20 percent or less are pure index funds.

To calculate active share we use holdings data from Morningstar. Specifically, we take all funds in the Morningstar database that are diversified emerging market funds whose stated prospectus benchmark is the MSCI Emerging Markets Index (additional detail on why we choose these funds is provided below). We take the holdings data for these funds (again from Morningstar) and calculate the active share using the method described above. We do this for each quarter from 2009–2014, or twenty-four quarters. For the benchmark, we use the MSCI Emerging Markets Index because this is the benchmark stated in the prospectuses.

FUND AND SAMPLE SELECTION

Cremers et al. (2016) is the only other paper known to have examined active share in international funds. Cremers et al. (2016) follows a methodology similar to Carhart (1997), which for each year examines all the funds and then pools the various years together. To measure annual performance, both Cremers et al. (2016) and Carhart (1997) take the past three-year returns and estimate a four-index alpha. Both then subtract the expected return from the realized fund return to estimate the fund abnormal return (alpha) in each year, which is measured as the sum of the intercept of the model and the residual. This

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method allows calculation of a one-year four-index alpha measure, and it provides the authors with a larger sample size, which improves the chances of finding significant results. Indeed, table 7b in Cremers et al. (2016) examines the relationship between active share and performance, using a sample of 346,711 fund-year observations.

In this paper, we take an alternative approach to Cremers et al. (2016). Instead of using the Carhart (1997) method, we put ourselves in the position of a typical investor that buys and holds a fund for a relatively long period of six years. Instead of pooling annual samples, we choose all the emerging market equity funds as of a certain time, i.e., December 31, 2008, and follow them for the relatively long period of six years.[2] This approach has the distinct disadvantage of using a smaller sample, but we believe it has some clear advantages. First, the long time series for each fund allows us to avoid the Carhart method of obtaining a one-year alpha. For the typical practitioner, Carhart one-year alphas are hard to understand and almost never used. Second, we do not have to pool the data because each fund has a long time series of returns. We believe this is a distinct advantage because the pooling of the fund years requires dealing with unbalanced pools that may have substantial serial correlation. Third, the long time series for each fund allows us to examine the time series of active share for each fund. As a result, we can now examine how the activeness of the fund itself has changed over six years.

With the above as background, the specifics of our fund selection process are as follows. To begin, we only include diversified emerging market equity funds whose stated prospectus benchmark index is the MSCI Emerging Markets Index. We choose these funds for three reasons. First, they represent, by far, the largest number of emerging market equity funds on the Morningstar database that shared the same benchmark. Second, existing size (back to January 2009), value, and momentum indexes for the MSCI Emerging Markets Index allow us to calculate a four-index alpha for these funds. These factor indexes do not exist back to January 2009 for many of the other emerging market equity benchmarks. Third, and most importantly, as Frazzini et al. (2016) shows, active share in U.S. equity funds is correlated with benchmark results. In other words, Frazzini et al. (2016) show that funds with high active share have benchmarks that consistently underperform the benchmarks of funds with low active share. Therefore, funds with high active share are outperforming because their benchmark returns perform poorly and funds with low active share are underperforming because their benchmark returns perform relatively well. Indeed, according to Frazzini et al. (2016), when one examines funds within only one benchmark, active share does not predict fund performance. In light of this, we choose to examine only one style of fund (diversified emerging markets) with one prospectus benchmark (the MSCI Emerging Markets Index). If we had chosen to include other funds we would have had to use other benchmarks and our results may have the problem described above, i.e., high active share funds that are doing well because they are being compared to benchmarks that underperform.

Using only funds that use the MSCI Emerging Markets Index as the prospectus benchmark, we create our sample by taking funds in existence on the Morningstar Principia Disk as of December 31, 2008, with holdings data for the quarter ending December 31, 2008 (so that we could calculate the active share as of that date). We choose this time period because Morningstar did not provide holdings data to calculate the active share before the end of 2008. We eliminate any replicate funds due to multiple share classes. This produced a sample of sixty-seven funds. We follow these funds for the next six years (until the end of 2014). For every quarter during the six years, we calculate the active share of the fund using the holdings data from Morningstar. If a fund's quarterly active share data disappears for more than one quarter[3] or its monthly returns or other fund characteristics (net assets, expense ratio, and turnover) discontinue due to a merger or liquidation, we consider the fund to have dropped out of the sample. All but fourteen of the sixty-seven funds survive the entire six-year period. For each of the fourteen funds that drop out of the sample, we assume that we have the fund's actual returns and fund characteristics before it drops out. After the fund drops out, it takes on the characteristics of the average surviving fund; i.e., after the fund has dropped out, the monthly returns, active share, net assets, expense ratio, and turnover of the fund are those of the average surviving fund. This procedure ensures that our sample includes funds that did not survive the six-year sample period.

METHODOLOGY

Our main question in this paper is whether more-active funds, as proxied by active share, produce better fund performance. To answer this question, we regress the average active share of the fund on fund performance over the sample period. This is somewhat different from Cremers et al. (2016), which examines whether active share in one year predicts performance in the following year.[4] We believe our methodology is an improvement because we are examining active share contemporaneously with performance and as such can see more clearly the relationship between active share and performance. In the Cremers et al. (2016) method of using active share in year t to predict fund performance in year $t + 1$, the active share of the fund may have changed during the year when the performance is measured.

Besides the average active share, we also use other variables to control for size, expenses, turnover, and fund age (these controls have been widely used in the mutual fund literature). For the fund controls, we use the first available annual average reported by Morningstar during the year. Fund age is age of the fund, measured in years, as of January 1, 2009.

Table 1

DESCRIPTIVE STATISTICS AND CORRELATIONS BETWEEN VARIABLES

We take all diversified emerging market funds (whose prospectus benchmark is the MSCI Emerging Markets Index) listed on Morningstar's database as of December 31, 2008, that also had active share data on this date. We follow all these funds for six years, through 2014. We include funds that survive the entire six years and funds that drop out of the sample. Average active share is average active share of the fund over the sample period. Fund size is the average annual net assets of the fund (as of beginning of each year) over the sample period. Expense ratio is the average annual expense ratio of the fund (as of the beginning of each year) over the sample period. Turnover ratio is the average annual turnover of the fund (as of the beginning of each year) over the sample period. Fund age is the age of the fund (in years) as of December 31, 2008.

(A): Descriptive Statistics

	2009–2014	
	Mean	**Standard Deviation**
Average Active Share (%)	68.9722	12.5696
Fund Size ($ millions)	2,500.82	4,645.55
Expense Ratio (%)	1.5103	0.3673
Turnover Ratio (%)	66.2693	47.0272
Age of Fund (years)	8.7960	5.3799
Sharpe ratio	0.1743	0.0292
Single-Index-Alpha	0.1814	0.1818
Four-Index Alpha	0.1351	0.1573
Observations	67	
Number of funds that drop out before the end of sample period	14	

To measure fund performance we use three metrics. First we use the Sharpe ratio, which is the mean excess monthly return divided by the standard deviation of the excess monthly returns. Second, we calculate a single-index alpha using the excess MSCI Emerging Markets Index returns as the benchmark index. Third, we use a four-index alpha, which uses the excess MSCI Emerging Markets Index returns and three other excess equity index returns that approximate the size, value, and momentum factors. Specifically, for size we use the MSCI Emerging Markets Equal Country Weighted Index. This index includes the same holdings as the MSCI Emerging Markets Index; however, at each quarterly rebalance date, all the holdings are weighted equally, effectively removing the influence of its holdings current price (high or low). For value we use the MSCI Emerging Markets Value Weighted Index, which captures the value effect by using index weights that are determined by using fundamental accounting data—sales, book value, earnings, and cash revenues—rather than market prices. For momentum we use the newly created MSCI Emerging Markets Momentum Index, which is designed to reflect the performance of an equity momentum strategy by emphasizing stocks with high price momentum.[5]

RESULTS

ACTIVE SHARE AND FUND PERFORMANCE IN EMERGING MARKET FUNDS

In table 1A, we present the mean and standard deviation of the variables. Recall that for each fund we calculate the average active share over the sample period, so this is the quarterly

(B): Correlations between Variables for the 2009–2014 Sample

*****, **, * indicate the correlation is significantly different from zero at the 1-, 5-, and 10-percent levels, respectively**

	Average Active Share	**Expense Ratio**	**Turnover Ratio**	**Fund Size**	**Age of Fund**	**Sharpe Ratio**	**Single-Index Alpha**
Average Active Share		0.3117**	0.1540	–0.0701	–0.0221	0.24180**	0.2668**
Expense Ratio	0.3117**		0.3895***	–0.3923***	0.0971	–0.2931**	–0.2951**
Turnover Ratio	0.1540	0.3895***		–0.4226***	0.0439	–0.1861	–0.1592
Fund Size	–0.0701	–0.3923***	–0.4226***		0.0888	0.2803**	0.2324*
Age of Fund	–0.0221	0.0971	0.0439	0.0888		–0.167	–0.1664
Sharpe Ratio	0.2418**	–0.2931**	–0.1861	0.2803**	–0.1670		0.9891***
Single-Index Alpha	0.2668**	–0.2951**	–0.1592	0.2324*	–0.1664	0.9891***	
Four-Index Alpha	0.2470**	–0.3298***	–0.2364*	0.3088**	–0.1433	0.9574***	0.9659***

(C): Simple Regressions of Average Active Share on Controls

*****, **, * indicate significance at the 1-, 5-, and 10-percent levels, respectively**

Dependent Variable:	**Average Active Share**	**Average Active Share**	**Average Active Share**	**Average Active Share**
Intercept	75.8559***	52.9896***	66.6116***	70.0849***
log (Fund Size (mm))	-0.3238			
Expense Ratio (%)		10.6927***		
Turnover Ratio (%)			0.0384	
Age of Fund (years)/100				-11.0109
Adjusted *R*-squared	-0.0136	0.0828	0.0057	-0.0128
Observations	67	67	67	67

average for twenty-four quarters (2009–2014). For other fund characteristics (fund size, expense ratio, and turnover ratio), we take the average of the six annual observations. Table 1A also shows the mean and standard deviation of the performance metrics (Sharpe ratio, single-index alpha, and four-index alpha). Table 1B reports the correlations between the variables. Table 1C reports the simple regression of each control variable against average active share.

Tables 1A–C show several notable results. First, there is a large amount of variation in average active share across funds. The average active share of the funds is 68.97 percent and the standard deviation of the average active share is 12.57. Second, as stated in the introduction, the expense ratios on these funds are relatively high compared to actively managed U.S. equity funds. We see annual expense ratios average 1.51 percent. Third, active share is positively and significantly correlated with the expense ratio, so more-active funds are generally more expensive. Fourth, larger funds have lower expenses and turnover, so fund size is negatively and significantly correlated with these variables. Fifth, there are strong positive and significant correlations between the Sharpe, single-index, and four-index alphas. Table 1C shows that average active share is significantly and positively correlated with expense ratio; i.e., higher expense ratio funds have higher active share.

Table 2A presents our regression results on the relationship between average active share and fund performance. We show the results using all controls and then using only average active share. In spite of our relatively small sample of sixty-seven funds, we find a positive and significant relationship between the average active share and fund performance for every performance metric. Controlling for other factors, we find that more-active funds significantly outperform other funds. We also find, similar to much of the mutual fund literature, that expenses are negatively and significantly related to fund perfor-

Table 2

FUND PERFORMANCE AND ACTIVE SHARE

(A): Fund Performance and Active Share (includes all funds and adjusts for survivorship bias)

This table presents the results of the relationship between active share and fund performance over the period 2009–2014. We use a sample of diversified emerging market equity funds whose prospectus stated benchmark was the MSCI Emerging Markets Index. Active share is average active share of the fund over the period 2009–2014. Fund size is the log of average annual net assets of the fund in millions of dollars (as of the beginning of each year) from 2009–2014. Expense ratio is the average annual expense ratio of the fund (as of the beginning of each year) from 2009–2014. Turnover ratio is the average annual turnover of the fund (as of the beginning of each year) from 2009–2014. Fund age is the age of the fund (in years) as of December 31, 2008. ***, **, * indicate significance at the 1-, 5-, and 10-percent levels, respectively.

Sample Period:	2009-2014					
Dependent Variable:	Sharpe Ratio	Single-Index Alpha	Four-Index Alpha	Sharpe Ratio	Single-Index Alpha	Four-Index Alpha
Intercept	0.0873	-0.2228	-0.3232	0.1356***	-0.0848	-0.078
Average Active Share (%)	0.0008***	0.0055***	0.0047***	0.0006**	0.0039**	0.0031**
log (Fund Size (mm))	0.0036	0.0157	0.0193			
Expense Ratio (%)	-0.0239**	-0.1691**	-0.1421**			
Turnover Ratio (%)	0.000	-0.0001	-0.0003			
Age of Fund (years)/100	-0.0783	-0.4555	-0.3364			
Adjusted *R*-squared	0.1951	0.1983	0.2355	0.044	0.0569	0.0466
Observations	67	67	67	67	67	67

(B): Fund Performance and Active Share (includes only surviving funds)

This panel only uses funds that survived the entire six-year sample period, 2009–2014.

Sample Period:	2009–2014					
Dependent Variable:	Sharpe Ratio	Single-Index Alpha	Four-Index Alpha	Sharpe Ratio	Single-Index Alpha	Four-Index Alpha
Intercept	0.0659	-0.3439	-0.4124	0.1406***	-0.0502	-0.0727
Active Share (%)	0.0009**	0.0059***	0.0055***	0.0005	0.0034	0.0031*
log (Fund Size (mm))	0.0045	0.0208	0.0222			
Expense Ratio (%)	-0.0267**	-0.1812**	-0.1714**			
Turnover Ratio (%)	0.0000	0.0001	-0.0002			
Age of Fund (years)/100	-0.0503	-0.2676	-0.1004			
Adjusted *R*-squared	0.149	0.1439	0.2254	0.0199	0.0301	0.0338
Observations	53	53	53	53	53	53

mance. Our results indicate that investors would do well to select emerging market equity funds that are truly active and yet do not have the highest expenses. The other control variables do not show any significance across the regressions.[6]

To show that our findings in table 2A are not an artifact of our survivorship-bias method, we examined the results using a sample of only surviving funds (fifty-three funds); i.e., only funds that survived the entire six-year period are included. When using all the controls, these results showed very similar results to those in table 2A (i.e., that active share is positively and significantly related to fund performance). However, when no controls are used the significant relationship between active share and performance disappears. These results are provided in table 2B.[7]

To further understand the relationship between active share and fund performance, we examine the univariate results of active share on fund performance. Specifically, we create fund quintiles based on active share and examine the average performance of these funds over the sample period. Table 3 shows the results of this analysis, which uses the sample of funds that includes funds that have not survived the entire sample period, i.e., sixty-seven funds. The table 3 results are similar to the results reported in table 2: Higher active share funds outperform other funds.

The bottom of table 3 includes the performance results of the iShares MSCI Emerging Markets Index exchange-traded fund (ticker symbol EEM) and the percentage of the actively managed funds that beat this fund during the sample period. We find that in most cases around 70 percent of the actively managed funds have better performance than the exchange-traded EEM.

Next, we investigate if a fund's consistency in active share is significantly related to fund performance. One advantage of our sample is that we have a time series of active share data. We can thus assess if the fund is changing its level of activeness or keeping the level stable over the six-year sample period.

To measure the consistency of active share, we calculate the standard deviation of active share over the twenty-four quarters (2009–2014) for each fund. We then regress the standard deviation of a fund's active share on fund performance controlling for the level of active share and the other control variables. A concern with this regression is that the standard deviation of active share may be correlated with the level of active share and, to some extent, turnover.[8] Such correlation may lead to a multicollinearity problem in the regression. To address this issue, we first calculated the correlations between the fund's standard deviation of active share and the other variables. The results are shown in table 4A, which shows that the correlations are relatively mild. A fund's average active share is not significantly correlated with a fund's standard deviation of active share. The only non-performance metric that is significantly correlated with a fund's standard deviation of active share is, not surprisingly, turnover. Specifically, we find that turnover is positively and significantly correlated with a fund's standard deviation of active share. This result makes intuitive sense. As funds turn over their portfolios they will likely change their levels of activeness. That being said, the degree of correlation, 0.24, is low by traditional standards.

Note also that table 4B shows the results of regressing the standard deviation of active share against each control variable. We find that fund size is significantly and negatively related to the standard deviation of active share (at the 10-percent level); i.e., larger funds have lower standard deviation of active share. We also find, similarly reported above, that turnover is positively and significantly related to the standard deviation of active share. Again, not surprisingly, funds that have more turnover have a higher standard deviation in the active share.

Table 3

UNIVARIATE RESULTS OF ACTIVE SHARE AND FUND PERFORMANCE

We create fund quintiles based on average active share and examine the average performance of these funds over the sample period 2009–2014. EEM is the iShares MSCI Emerging Markets ETF and the percentage that beat the EEM is the percentage of the actively managed funds that outperformed the EEM exchange-traded fund over the period 2009–2014. Table 3 is based on a sample of funds that includes funds that did not survive the entire sample; i.e., the sample with sixty-seven funds.

Performance Metric:	Monthly Returns	Sharpe Ratio	Single-Index Alpha	Four-Index Alpha
Sample Period:	**2009–2014**	**2009–2014**	**2009–2014**	**2009–2014**
Highest Average Active Share	1.1895	0.1979	0.3322	0.2731
2nd Highest Average Active Share	1.1174	0.1780	0.2080	0.1475
Middle Average Active Share	1.0497	0.1628	0.1146	0.0836
2nd Lowest Average Active Share	1.0331	0.1664	0.1257	0.0790
Lowest Average Active Share	1.0579	0.1666	0.1285	0.0958
EEM (ETF of MSCI EM)	0.9960	0.1597	0.0746	0.0596
% of actively managed funds that beat EEM	0.6866	0.7463	0.7761	0.6866

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Table 4

FUND PERFORMANCE AND STANDARD DEVIATION OF ACTIVE SHARE USING SIX-YEAR SAMPLE (2009–2014)

We take all funds whose prospectus benchmark was the MSCI Emerging Markets Index, were listed on Morningstar's database as of December 31, 2008, and had active share data on this date. We follow all these funds for six years through 2014. We calculate the standard deviation of each fund's active share over the six-year sample period (2009–2014). This represents approximately twenty-four quarterly observations. Table 4A shows the correlations between the standard deviation of active share and the other fund characteristics. Table 4B shows some simple regression results of standard deviation of active share against the controls. Table 4C shows the regression results on the entire sample. Table 4D shows the regression results on the sample of surviving funds only. Table 4E shows the interaction regression results.

(A): Correlations between Standard Deviation of Active Share and Other Variables

***, **, * indicate the correlations are significantly different from zero at the 1-, 5-, and 10-percent levels, respectively.

	Average Active Share	Expense Ratio	Turnover Ratio	Fund Size	Age of Fund	Sharpe Ratio	Single-Index Alpha	Four-Index Alpha
Standard Deviation of a Fund's Active Share	-0.17822	0.00254	0.24162**	-0.19189	0.07301	-0.39418***	-0.35836***	-0.39535***

(B): Simple Regressions of Standard Deviation of Active Share on Controls

***, **, * indicate the correlations are significantly different from zero at the 1-, 5-, and 10-percent levels, respectively.

Dependent Variable:	St. Dev of Active Share	St. Dev of Active Share	St. Dev of Active Share	St. Dev of Active Share
Intercept	14.9127**	4.7763**	3.5544***	4.2912***
log (Fund Size [mm])	0.4871*			
Expense Ratio (%)		0.0189		
Turnover Ratio (%)			0.019**	
Age of Fund (years)/100				5.9563
Adjusted *R*-squared	0.0271	-0.0151	0.0467	-0.0067
Observations	67	67	67	67

(C): Regression Results (includes all funds and adjusts for survivorship bias)

Standard deviation of active share is the standard deviation of the fund's active share over the period 2009–2014. Active share is average active share of the fund over the sample period. Fund size is the log of the average annual net assets of the fund in millions of dollars (as of beginning of each year). Expense ratio is the average annual expense ratio of the fund (as of the beginning of each year). Turnover ratio is the average annual turnover of the fund (as of the beginning of each year). Fund age is the age of the fund (in years) as of December 31, 2008. ***, **, * indicate significance at the 1-, 5-, and 10-percent levels, respectively.

Sample Period:	2009-2014					
Dependent Variable:	Sharpe Ratio	Single-Index Alpha	Four-Index Alpha	Sharpe Ratio	Single-Index Alpha	Four-Index Alpha
Intercept	0.1280**	0.0063	-0.1123	0.1896***	0.2684***	0.2182***
Std. Dev. of Active Share (%)	-0.0025***	-0.0143**	-0.0132***	-0.0032***	-0.0180***	-0.0172***
Average Active Share (%)	0.0007**	0.0047***	0.0039***			
log (Fund Size [mm])	0.0027	0.0104	0.0145			
Expense Ratio (%)	-0.0264***	-0.1829***	-0.1548***			
Turnover Ratio (%)	0.0000	0.0002	0.0000			
Age of Fund (years)/100	-0.0645	-0.3778	-0.2648			
Adjusted *R*-squared	0.2775	0.2630	0.3112	0.1424	0.1150	0.1433
Observations	67	67	67	67	67	67

Continued >

To further test for the possibly of multicollinearity, we calculated the variance inflation factor (VIF) for the standard deviation of active share. The VIF involves regressing the predictor on all the other predictors in the regression and obtaining the R-squared from that regression. The VIF is calculated as 1/(1 – R-squared). We found the VIF for the standard deviation of active share to be at a low level (1.14), so we proceeded with the regression (typically a cautionary VIF is in the neighborhood of 2.50).[9]

The results of regression analysis are shown in table 4C, which shows that a fund's standard deviation of active share is itself a significant indicator of performance. We find the standard deviation of active share is negatively and significantly related to fund performance in every performance metric. This result holds after controlling for the level of the active share and the other control variables; funds that keep their active share consistent throughout the sample period significantly outperform other funds. Indeed, all things being equal, a fund that keeps

TABLE 4, CONTINUED

(D): Fund Performance and Active Share (includes only surviving funds)

This panel uses only funds that survived the entire six-year sample period, 2009–2014. ***, **, * indicate significance at the 1-, 5-, and 10-percent levels, respectively.

Sample Period:	2009-2014					
Dependent Variable:	**Sharpe Ratio**	**Single-Index Alpha**	**Four-Index Alpha**	**Sharpe Ratio**	**Single-Index Alpha**	**Four-Index Alpha**
Intercept	0.1094	-0.1022	-0.1944	0.1898***	0.2679***	0.2187***
Std. Dev. of Active Share (%)	-0.0028***	-0.0158**	-0.0142***	-0.0031***	-0.0172**	-0.0167***
Active Share (%)	0.0008**	0.0052**	0.0050***			
log (Fund Size [mm])	0.0034	0.0148	0.0169			
Expense Ratio (%)	-0.0291**	-0.1949**	-0.1838***			
Turnover Ratio (%)	0.0001	0.0003	0.0001			
Age of Fund (years)/100	-0.0454	-0.2403	-0.0758			
Adjusted *R*-squared	0.2560	0.2272	0.3195	0.1346	0.1014	0.1337
Observations	53	53	53	53	53	53

(E): Interaction Regression Results

Standard Deviation of Active Share is the standard deviation of the fund's active share over the period 2009–2014. Active share is average active share of the fund over the sample period. High Active Share Dummy is a dummy that is 1 if the fund was in the highest quintile of funds in terms of average active share and 0 otherwise. Low Active Share Dummy is a dummy that is 1 if the fund was in the lowest quintile of funds in terms of average active share and 0 otherwise. Fund size is the log of average annual net assets of the fund in millions of dollars (as of the beginning of each year). Expense ratio is the average annual expense ratio of the fund (as of the beginning of each year). Turnover is the average annual turnover of the fund (as of the beginning of each year). Fund age is the age of the fund (in years) as of December 31, 2008. ***, **, * indicate significance at the 1-, 5-, and 10-percent levels, respectively.

Sample Period:	2009–2014					
Dependent Variable:	**Sharpe Ratio**	**Single-Index Alpha**	**Fobur-Index Alpha**	**Sharpe Ratio**	**Single-Index Alpha**	**Four-Index Alpha**
Intercept	0.1805***	0.3721	0.2134	0.1788***	0.2028***	0.1791***
Std. Dev. of Active Share (%)	-0.0020	-0.0114	-0.0147**	-0.0020*	-0.0112	-0.016**
Highest Active Share Dummy	0.0543***	0.3395***	0.2473***	0.0550***	0.3371***	0.2550***
Lowest Active Share Dummy	-0.0134	-0.0906	-0.0967	-0.0095	-0.0664	-0.0767
Std. Dev Active Share × Highest Active Share Dummy	-0.0075***	-0.0446***	-0.0275**	-0.0070***	-0.0414***	-0.0247**
Std. Dev Active Share × Lowest Active Share Dummy	0.0013	0.0088	0.0124	0.0016	0.0099	0.015
log (Fund Size (mm))	0.0015	0.0027	0.0074			
Expense Ratio (%)	-0.0233***	-0.1589***	-0.1300***			
Turnover Ratio (%)	0.0001	0.0007	0.0004			
Age of Fund (years)/100	-0.0467	-0.2725	-0.1936			
Adjusted *R*-squared	0.4522	0.4211	0.4251	0.3878	0.3527	0.3654
Observations	67	67	67	67	67	67

its active share at a relatively constant level over time likely will outperform a similar fund that attempts to time the market in terms of its activeness.[10]

Table 4D shows regression results using only the funds that survived the entire sample, i.e., the sample of fifty-three funds. The results are similar to the results shown in table 4C; therefore, the results are not an artifact of our survivorship bias method.

In sum, so far we have found that the level of activeness matters for performance. More-active funds outperform. In addition, we have found that the consistency of the fund's activeness also matters for performance. Funds that keep their active share consistent over time outperform funds that attempt to alter their active share over time.

In our final regression, we examine the interaction of the two above-reported results. That is, we examine the interaction

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between a fund's average level of active share and the fund's standard deviation of active share. To do this we create a dummy variable (High Active Share Dummy) that takes a value of 1 if a fund was in the top quintile of funds in terms of average active share, i.e., the top quintile of funds in table 3, and 0 otherwise. Similarly, we create a second dummy variable, (Low Active Share Dummy) that takes a 1 if a fund was in the bottom quintile of funds in terms of average active share (as in table 3) and 0 otherwise. We regress the standard deviation of active share on performance but use the dummy variables to examine the interaction between the level of average active share and the standard deviation in active share. The analysis uses the sample that includes all funds including those that did not survive the entire sample. The results are reported in table 4E.[11]

The results show that the interaction variable (Standard Deviation of Active Share × High Active Share Dummy) is strongly negative and significant across all three performance metrics and is significant whether we introduce other controls or not. This result indicates that highly active funds that alter the level of active share over time will have significantly worse performance than highly active funds that do not alter their active share over time. So it is the highly active funds that remain consistently active (have a low standard deviation of active share) that truly outperform other funds. On the other hand, we find that altering the activeness of the portfolio over time does not significantly impact the performance of low active share funds; i.e., we find the interaction term (Standard Deviation of Active Share × Low Active Share Dummy) to be not significant. Therefore it does not matter much in terms of performance if a low active share fund alters its active share over time or not. Indeed, once we adjust for the interaction between the level of active share and standard deviation of active share, a fund's standard deviation of active share variable itself becomes insignificant in some cases.

Our results showing consistency of active share as an important indicator of fund performance are broadly consistent with Cremers and Pareek (2016). In an analysis of U.S. equity funds, they find that funds with high active share that do not alter their portfolios for long periods have better performance than other funds. The difference is that we focus on changes in activeness whereas Cremers and Pareek (2016) focus on changes in the portfolio itself.

In sum, we have three findings. First, more-active emerging market equity funds outperform less-active funds. Second, funds that alter the active share over time (as proxied by the standard deviation of active share) have significantly worse performance. However, this effect seems to hold mostly in funds that are highly active. Funds that are not as active do not seem to suffer as much in performance if they vary the level of activeness over time. Third, expenses matter. In every regression we run, expenses are negatively and significantly related to performance.

CASE STUDY

To better help readers understand our results we present a case study that shows the results of one highly and consistently active fund and one less active fund. First consider the Dimensional Fund Advisors Emerging Markets Small Cap I fund. Over the period 2009–2014, this fund's primary prospectus benchmark was the MSCI Emerging Markets Index (and it still is today). Its average quarterly active share during 2009–2014 was 94.51 percent, with very little variation in the active share over the twenty-four quarters 2009–2014; the standard deviation of active share was only 1.25 percent. Indeed, the quarterly active share never fell below 92 percent or rose above 96 percent for the entire period 2009–2014. The mean monthly return of the fund during 2009–2014 was 1.52 percent, resulting in average annual return of 19.84 percent.

Now consider the USAA Emerging Markets Fund. This fund's primary prospectus benchmark for the period 2009–2014 was the MSCI Emerging Markets Index (and still is today). Its average active share during 2009–2014 was 60.72. The standard deviation of active share over the twenty-four quarters was 10.71 percent and ranged from 48 percent in one quarter down to 75 percent in another. The mean monthly return of the fund during 2009–2014 was 0.88 percent, resulting in an average annual return of about 11.09 percent.

These results illustrate that a highly and consistently active fund strongly outperforms a similar fund that is much less active yet more varied in its level of activeness over the study period.

ROBUSTNESS CHECK USING A LARGER SAMPLE

In order for our results to be robust to the concerns brought forward by Frazzini et al. (2016), we restricted our sample to those emerging market funds that had the same prospectus benchmark, i.e., the MSCI Emerging Markets Index. The downside of this restriction is that we end up with a relatively small sample of sixty-seven funds. As a robustness check, we now create a much larger sample of funds and test this sample to see if our results still hold.

To create the larger sample, we include all diversified emerging market equity funds in the Morningstar database regardless of prospectus benchmark. To calculate the active share we use as the benchmark index the stated prospectus benchmark of the fund; so, we use many different benchmarks to calculate the active share as opposed to just using the MSCI Emerging Markets Index. With these data we create two samples. First, we create a survivor fund sample that takes only funds that survived and had active share data for each quarter during 2009–2014. This sample includes 135 funds. Second, we create a sample that is free from survivorship-bias that includes all funds

Table 5

ROBUSTNESS TEST WITH LARGER SAMPLE OF DIVERSIFIED EMERGING MARKET FUNDS

Table 5 reports results using two different samples: a survivorship-bias-free sample that includes all actively managed, U.S.-based diversified emerging market equity funds that had active share data for the first quarter of 2009; and a sample of all actively managed, U.S.-based diversified emerging market equity funds that survived and had active share data for each quarter during 2009–2014. For the survivorship-bias-free sample, we follow all the funds identified until the end of 2014. If a fund drops out due to merger/liquidation or not having active share data, we assume that after the fund drops out, the fund takes on the qualities of the average surviving fund in the same category. After the fund has dropped out, the monthly returns, quarterly active share, annual size, and annual expense ratio of the fund are that of the average surviving fund in the same category. The standard deviation of active share is calculated over the period 2009–2014 (twenty-four observations). The Sharpe ratio and single-index alpha are calculated for the period 2009–2014. Size is the average annual net assets of the fund over the period 2009–2014. Expense ratio is the average annual expense ratio over the period 2009–2014. The active share is the average active share of the fund over the period 2009-2014. ***, **, * represent significance at the 1-, 5-, and 10-percent levels, respectively.

Sample Period:	2009–2014 Survivorship-Bias-Free		2009–2014 Surviving Funds	
Dependent Variable:	**Single-Index Alpha**	**Four-Index Alpha**	**Sharpe Ratio**	**Single-Index Alpha**
Intercept	0.1294***	-0.2137**	0.1219***	-0.3143***
Std. Dev. of Active Share (%)	-0.0023***	-0.0102***	-0.00352***	-0.0190***
Average Active Share (%)	0.0009***	0.0076***	0.00105***	0.0089***
log (Fund Size (mm))	0.0001	0.0005*	0.0001***	0.0007**
Expense Ratio (%)	-0.0004	-0.0441	-0.0065	-0.0309
Turnover Ratio (%)	-0.0002***	-0.0007***	0.0001	-0.0001
Age of Fund (years)/100	-0.0414	-0.0648	-0.0278	-0.1477
Adjusted *R*-squared	0.27	0.29	0.34	0.35
Observations	281	281	135	135

that had active share data for the first quarter of 2009. For this sample, we follow all the funds identified until the end of 2014. If a fund drops out due to merger/liquidation or not having active share data, we assume that after the fund drops out, the fund takes on the qualities of the average surviving fund. After the fund has dropped out, the monthly returns, quarterly active share, annual size, and annual expense ratio of the fund are that of the average surviving fund. This sample includes 281 funds.

Note that because many of the benchmark indexes used in this sample did not have size, value, or momentum indexes available back to 2009, we do not calculate a four-index alpha here. Instead we calculate only the Sharpe ratio and single-index alpha. To create the single-index alpha we use the returns of the fund's stated prospectus benchmark. This sample includes 135 funds.

The results of this analysis are shown in table 5 and are very similar to our previous results. We see that average active share is consistently positive and significantly related to fund performance, and standard deviation of active share is consistently negatively and significantly related to fund performance. Again, more-active, and more consistently active, funds seem to outperform. Note that this result is for a sample of funds that is not robust to the benchmark problem noted in Frazzini et al. (2016).

PREDICTING FUTURE PERFORMANCE

As a final robustness check, we examined the predictive ability of the active share. Again, our results so far show only the contemporaneous relationship of active share to performance as we are regressing average active share against the performance of the fund over the same period. To examine predictive ability, we took the 2009–2011 values for our independent variables and regressed these against the 2012–2014 values for our performance metrics. For example, we are regressing the average active share of a fund for the period 2009–2011 against the performance metric for 2012–2014. Similarly, we use the 2009–2011 standard deviation of a fund's active share (which is only twelve observations because we have twelve quarters) against fund performance for 2012–2014. In this analysis, we use the original sample of sixty-seven funds that shared the same MSCI Emerging Markets Index Prospectus (i.e., the same sample used in tables 1–4) and we use the larger sample of funds (i.e., the sample used in table 5). Again, for the larger sample, the funds are all diversified emerging market funds but they have different prospectus benchmarks. The results of this analysis are shown in table 6. Table 6A shows the results for the original sample and table 6B shows the results for the larger sample. Tables 6A and 6B show the results for the survivorship-bias-free sample and a sample of funds that survived the entire 2009–2014 period.

The results here are somewhat mixed. Table 6A suggests that average active share over 2009–2011 significantly predicts fund performance for the period 2012–2014 (and this is the case only in the survivorship-bias-free sample and only at the 10-percent level of significance). However, standard deviation of active share does not predict future performance. Again, this may be

Table 6

PREDICTING FUTURE PERFORMANCE

Table 6 shows the results of regressing the 2009–2011 values for the independent variables on the 2012–2014 performance metrics; i.e., we are regressing the 2009–2011 standard deviation of active share and the 2009–2011 average active share against the performance for the next three years (2012–2014). The results in table 6 allow us to examine the predictive ability of active share. Table 6A shows results using the original sample of sixty-seven funds (all funds have the MSCI Emerging Markets Index as the prospectus benchmark). Table 6B shows results using the larger sample of funds (all funds are diversified emerging markets but have different prospectus benchmarks). Both table 6A and 6B report on a sample of all funds and sample of funds that survived the entire sample period. ***, **, * indicate significance at the 1-, 5-, and 10-percent levels, respectively.

(A): Original Sample of Sixty-Seven Funds (all with MSCI Emerging Markets Index as prospectus benchmark)

	Survivorship-Bias Free Sample (includes all funds)			Surviving Funds (only includes funds that survived entire sample)		
Dependent Variable:	**2012–2014 Sharpe Ratio**	**2012–2014 Single-Index Alpha**	**2012–2014 Four-Index Alpha**	**2012–2014 Sharpe Ratio**	**2012–2014 Single-Index Alpha**	**2012–2014 Four-Index Alpha**
Intercept	0.0525	0.0369	-0.1676	0.1291	0.3762	0.2532
2009–2011 Std. Dev. of Active Share (%)	-0.0018	-0.0077	-0.0051	-0.0048	-0.0206	-0.0152
2009–2011 Average Active Share (%)	0.0008*	0.0035*	0.001	0.0005	0.0023	0.0002
2009–2011 log (Fund Size [mm])	0.0026	0.0103	0.0188	0.0001	-0.0016	0.0013
2009–2011 Expense Ratio (%)	-0.0336**	-0.1485**	-0.1132*	-0.0329*	-0.1452*	-0.1237
2009–2011 Turnover Ratio (%)	0.0002**	0.0009*	0.001**	0.0003**	0.0011*	0.0011**
Age of Fund as of 2009 (years)/100	-0.1194	-0.4786	-0.2457	-0.0689	-0.239	0.1542
Adjusted *R*-squared	0.1112	0.1085	0.0499	0.0577	0.0467	0.0134
Observations	67	67	67	53	53	53

(B): Larger Sample of Funds (all diversified emerging market funds but with different prospectus benchmarks)

	Survivorship-Bias-Free Sample (includes all Funds)		Surviving Funds (only includes funds that survived entire sample)	
Dependent Variable	**2012–2014 Sharpe Ratio**	**2012–2014 Single-Index Alpha**	**2012–2014 Sharpe Ratio**	**2012–2014 Single-Index Alpha**
Intercept	-0.0612	-0.3954	-0.0697	-0.5741***
2009–2011 Std. Dev. of Active Share (%)	-0.0042*	-0.0131	-0.0104***	-0.0437***
2009–2011 Average Active Share (%)	0.0027***	0.0102***	0.0029***	0.0140***
2009–2011 log (Fund Size (mm))	0.0002	0.0006	0.0002	0.0013**
2009–2011 Expense Ratio (%)	0.0014	-0.0224	-0.0126	-0.0235
2009–2011 Turnover Ratio (%)	-0.0001	-0.0001	0.0004***	0.0011*
Age of Fund as of 2009(years)/100	-0.0542	-0.1507	-0.1587	-0.6629
Adjusted *R*-squared	0.22	0.22	0.31	0.36
Observations	281	281	135	135

due to the relatively small sample of funds. Conversely, in table 6B, we find that for the larger sample of funds that standard deviation of active share and average active share generally predict future performance. We find that funds with higher standard deviation of active share during 2009–2011 have significantly lower performance during 2012–2014. We also find that funds with higher average active share during 2009–2011 have significantly better performance during 2012–2014.

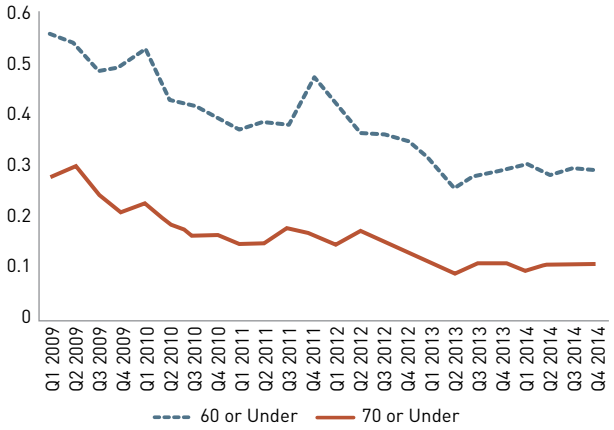
CLOSET INDEXING IN EMERGING MARKET FUNDS

Recall that Cremers and Petajisto (2009) and Petajisto (2013) define a fund with a 60-percent or lower active share as a closet indexer. These actively managed funds follow a practice of holding a portfolio close to that of the benchmark index yet charge fees similar to those charged by truly active managed funds. To measure the closet indexing effect in emerging market equity funds we first find, for each quarter from 2009–2014, the number of funds using the MSCI Emerging Markets Index as the prospectus benchmark; note that this is a different sample than used in the previous analysis. We calculate, for each quarter, the percentage of these funds that had an active share of 60 percent or less and therefore are closet indexing according to Cremers and Petajisto (2009) and Petajisto (2013). The results are shown in figure 1. We also show the percentage of funds with an active share of 70 percent or below (dotted line in figure 1). Figure 1 shows that during initial periods of the sample a large percentage of all active funds were closet indexing (30 percent in the second quarter of 2009). However, over time, this percentage falls significantly. By the end of 2014, the percentage of funds with active share below 60 percent is only about 11 percent. Over the entire 2009–2014 period, the average percentage of these funds that are closet indexing is 16 percent.

Figure 1

CLOSET INDEXING IN DIVERSIFIED EMERGING MARKET FUNDS (2009–2014)

For each quarter from 2009–2014, we take all the diversified emerging market funds in the Morningstar database with the MSCI Emerging Markets Index as the prospectus benchmark. For each quarter, we calculate the percentage of funds that had an active share of 60 percent or less (solid line) or 70 percent or less (dotted line).



Such closet indexing is particularly problematic for investors because of the high fees associated with emerging market funds. Investors in these funds pay significantly more than an emerging markets equity index and yet receive similar performance.

This trend toward less closet indexing is consistent with Cremers et al. (2016), which finds a general reduction in closet indexing for all funds over the time period 2008–2010.[12] As noted earlier, Cremers et al. (2016) does not specifically focus on emerging market funds, and our paper is the first to specifically and solely focus on emerging market funds.

CONCLUSIONS

Emerging equity markets should offer some of the best opportunities for active managers because these markets are subject to greater political and economic risk than developed markets. Because of this relative market inefficiency, a skilled investor that has access to local information should be able to consistently outperform a non-informed, passive investor in these markets. Yet, until now, there has been only mixed evidence that active fund managers outperform in these markets.

In this paper we re-examine the link between active management and fund performance in diversified emerging market equity funds by using active share, a measure that identifies how active a fund is compared to its benchmark index. This is the first known use of active share to specifically and solely examine the performance of emerging market equity funds. Using a sample that is robust to the prospectus benchmark, different performance metrics and survivorship bias, and a six-year performance window that is more consistent with investor holding periods, we find a positive and significant relationship between active share and fund performance. More-active funds significantly outperform less-active funds. Indeed, we find that about 70 percent of the actively managed funds outperform the benchmark index exchange-traded fund depending upon the performance metric used.

We also find compelling evidence that funds that alter their active share over time (as proxied by the standard deviation of active share) have significantly worse performance. However, this effect seems to be mostly in funds that are highly active. Funds that are not as active do not seem to suffer as much in performance if they vary the level of activeness over time.

Our result that consistency of activeness is positively related to fund performance is similar to that found in Cremers and Pareek (2016), i.e., that manager conviction—the ability to buy and hold a consistently active portfolio—is a strong predictor of fund performance. Intuitively these results also make sense. If managers have the ability to outperform, why wouldn't they want to exercise this ability by having a consistently active portfolio? One can theorize that managers who lack conviction in their ability to outperform are probably more likely to change the level of activeness and therefore perform more poorly. Finally our findings are broadly similar to the investment approaches of superior investors such as Peter Lynch and Warren Buffett: Buy companies that you like and hold them for very long periods. Trying to time the market is difficult if not impossible, and instead managers should buy and hold portfolios that they believe in.

We also find, similar to much of the mutual fund literature, that expenses matter. In every regression we run, expenses are negatively and significantly related to performance.

Finally, we find that closet indexing in diversified emerging market funds is present. On average about 16 percent of the actively managed funds are closet indexing over our sample period. These funds charge fees that are much greater than true index fund fees. On a positive note, we find that during 2009–2014, closet indexing in diversified emerging market funds seems to have decreased.

We believe our results are meaningful to prospective investors. Our results indicate that emerging market equity funds that are consistently highly active have significantly better performance than other emerging market equity funds. Because active share data are now readily available on Morningstar and other major providers, investors can easily find these data for themselves and thus make, we believe, better decisions about which funds may outperform in the future. And if nothing else, by investors and advisors examining active share, they can better avoid active funds that are closet indexing.

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ENDNOTES

1. According the Investment Company Institute 2015 Handbook (p. 99), the average actively managed U.S. equity fund had an expense ratio of 0.86 percent in 2014. The expense ratio for the Vanguard Total Stock Market Index Fund (which invests only in U.S. equities) is 0.05 percent. In our sample, the average diversified emerging market fund had an expense ratio in 2014 of 1.51 percent. The Vanguard Emerging Markets Index Fund has an expense ratio of 0.15 percent.
2. This method of following the funds over time has been used in the mutual fund literature:, e.g., Elton et al. (1996) or Blake and Morey (2000).
3. In several cases, funds were missing one active share observation in the middle of the six-year sample period. As long as the fund had active share data on both sides of the missing quarter we continued to classify the fund as a surviving fund. If the fund had more than one consecutive quarter of active share data missing we consider the fund a non-surviving fund.
4. See Cremers et al. (2016) table 7, which shows that all explanatory variables in the regressions are lagged one year.
5. The MSCI Emerging Markets Equity Momentum Index launched on December 11, 2013. The MSCI Emerging Markets Equity Value-Weighted Index launched on December 7, 2010. The MSCI Emerging Markets Equity Equal-Weighted Index launched on January 22, 2008. Note that data before the launch date is back-tested data, i.e., calculations reflect how the index might have performed over that time period had the index existed. For more information on these indexes, see Bender et al. (2013).
6. We also used fund flows as an additional control variable. However, because the fund flows variable was consistently insignificant in all our regressions we dropped the variable.
7. We substituted average active share with average tracking error and tried the same regression. The results were similar when using tracking error; i.e., there was a significant and positive relationship between tracking error and performance. More-active funds (as measured by tracking error) significantly outperformed other funds.
8. In general funds with higher levels of active share have lower standard deviation in the active share.
9. For more information on the VIF test, see Allison (2012).
10. Using a sample of only surviving funds (those that survived the entire period 2009–2014), we find very similar results to those reported in table 4C. These results are available upon request.
11. We do not report the results of table 4E using the sample of surviving funds; nevertheless, the results are similar to those reported using all the funds.
12. See Cremers et al. (2016) figure 2.

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