Working Draft December 2, 2014

The **Predictive Power** of Portfolio Characteristics

Applying the Fundamental Law of Active Management to Portfolio Characteristics in Order to Rank Prospective Information Ratios

Authors*
Barry Gillman, CFA
Erianna Khusainova, CFA
Juan Mier, CFA

Abstract

In order to predict future relative results within a universe of equity portfolios, the authors hypothesize that it is possible to use selected portfolio characteristics as opposed to relying on past performance. This research uses Active Share and Concentration Coefficient data for universes of US, international, and global equity mutual fund portfolios to develop a method of predicting the future relative ranking of the portfolios' information ratios. The predictive power of this approach appears statistically significant for the five-year period of 2009–2013, but not during the financial crisis years of 2007–2008. The authors believe these results are indicative of the usefulness of this approach, but not conclusive due to the limited time frame (seven years of data) and universe (174 funds). The authors invite collaboration for further research.

* The authors: Erianna Khusainova, CFA and Juan Mier, CFA work for Lazard Asset Management; Barry Gillman, CFA consults to the Brandes Institute and GWA's Wealth Allocation Council.

A. Introduction

The goal of this paper is to develop a practical method of ranking the prospective information ratios of the constituents of an equity portfolio universe. We base the methodology on concepts used in the Fundamental Law of Active Management (Grinold 1989). The approach uses measurable portfolio characteristics, Active Share ("AS") and Concentration Coefficient ("CC") and does not rely on past returns to predict the future.

Despite the ubiquitous warnings that past performance is not a predictor of the future, the prominence and availability of performance history influences many investors to rely excessively on such data. Past performance is the result of a combination of luck and the manager's skill (including decisions on portfolio selection, construction, and characteristics). The longer the period measured, the more that skill should dominate luck. But in our opinion many investors use too short a time horizon (e.g., three years) in evaluating past performance to allow for sufficient evidence of skill to prevail.

Rather than rely on past performance outcomes to predict future results, our hypothesis is that it is possible to improve the ability to predict future long-term success by identifying and measuring selected portfolio characteristics that are embedded in each manager's process. Assuming these characteristics are relatively stable over time, this approach complements long-term performance and attribution analysis and should increase an investor's ability to identify portfolios with future performance potential.

Recent research studies that have focused only on Active Share as a portfolio characteristic provide a first step, but may have limitations in applicability. These studies have indicated that funds with high AS tend to have outperformed their benchmarks, the logic being that this measure reflects a manager's confidence in its skill and hence willingness to diverge from a benchmark. However, these AS studies typically provide no indication on how to distinguish within the high active share group. An investor is interested in not only outperforming a benchmark, but also in selecting the best managers from a peer group. In addition, AS tends to be correlated with tracking error given that both metrics increase as portfolio holdings vary more significantly from the benchmark. However, it is possible to have high AS and low tracking error by selecting stocks and weights different from the benchmark while matching the benchmark's systematic exposures such as sector and region weights. To quantify the risk of selecting high tracking error funds, many investors focus on the Information Ratio (excess return over benchmark divided by tracking error against that benchmark).

We believe our approach can be a useful next step. To use the Fundamental Law concepts of skill and breadth, we combine AS and CC. CC is a measure of diversification that shows how broadly a manager's skill is applied across a portfolio. Based on these measurable characteristics we derive an approach that we believe can provide investors with improved predictive power for prospective information ratios when evaluating equity portfolios within a peer group universe.

This research and its results are indicative, but not yet conclusive. We aim to stimulate debate and further research on this topic through partnering with academics and other practitioners to carry out more in-depth research, covering broader universes of portfolios and other past time periods (our research data covers 174 US and international/global equity portfolios from 2007 to 2013). The goal is to provide investors with a methodology that enhances their ability to make statistically valid comparisons of the prospective potential of competing equity investment products.

B. Background

This work builds on previous work including Grinold (1989, Fundamental Law), the Brandes Institute/GWA joint research on Concentration Coefficient (2004), and Lazard Asset Management research (Taking a Closer Look at Active Share; Khusainova, Mier, 2013). The Grinold paper provides a theoretical framework. AS and CC provide two key components of the analysis. The Lazard research paper looks at the topic from the basis of benchmark selection and portfolio construction considerations for evaluating Active Share. It also examines past returns in a global equity universe, and the data gathered for that research provides a good starting point for this project.

C. Developing the Application of the Fundamental Law

1. The Fundamental Law of Active Management

This formula provides a method to compare different active investment approaches, against each other, and against passive methodology.

$$IR = IC * \sqrt{BR}$$
$$where\ IR = information\ ratio$$
$$IC = information\ coefficient\ (\text{skill})$$
$$BR = independent\ bets\ per\ year\ (breadth)$$

In Grinold's research, the information ratio (excess return per unit of risk) is determined by skill (information coefficient "IC") and breadth (number of "independent bets"). The IC represents the correlation of the manager's forecasted returns against the actual returns. An ex-ante IC can be a subjective input or based on measured experience. In some applications of Grinold's Law, the number of independent bets is taken to refer to factor bets in a quantitative sense, such as value, momentum, size, etc. However, we argue that the Grinold approach can also be used to assess the likely information ratio when comparing "stock selection bets" (i.e., portfolio weight versus benchmark weight for each stock) in a stock-picking equity approach. The assumption of independent bets then requires that there is a process that assesses the weight of each holding separately even if the process by which stocks are selected and weighted is consistent across all stocks (which is normally the case in an investment process).

This application of the Fundamental Law is illustrated in Zhuanxin Ding's 2010 paper (The Fundamental Law of Active Management: Time Series Dynamics and Cross-Sectional Properties). His assertion for stock selection portfolios is that the information ratio is proportional to "skill times the square root of breadth" (as opposed to being equal to it). This can then be applied to make valid comparisons between different stock selection approaches (as we do later in this paper), assuming the proportionality is constant. Using a proportional formula, rather than an equation, means that we are not developing a method to forecast specific information ratios, but rather are able to rank a universe of portfolios. Our goal is to provide an approach that has predictive power regarding the prospective relative ranking of information ratios within a universe of portfolios. We believe this is consistent with investors' needs in manager selection.

2. Size of Bets is Important

The original Law assumes the independent bets are same size; there is no weighting by the size of the bet. When using the Law in a stock-picking context for a portfolio that is measured against a benchmark, the size

of each bet needs to be considered, and we believe it is a key determinant of the result. The size of the bet is the portfolio weight in that stock above or below the benchmark.

For example: if the manager has high skill (IC) but places many bets, and each bet is very small then excess return is constrained and will likely also be small.

The size of bets in an active manager's process is generally related to that manager's level of confidence that their skill (IC) for that bet is high. Note that this is not conditional on whether the manager is right, just on whether they believe they are right. There is an implicit assumption in the manager process that a bigger bet on a stock's weight relative to a benchmark is backed by the manager's confidence in the IC leading to that decision. Therefore in any adaptation of the Fundamental Law to stock selection approaches, we believe that breadth must include not only the number of bets but also the size of these bets.

3. Active Share and the Concentration Coefficient

There are two measures that can separately determine the size of bets and the number of bets.

AS measures the aggregate size of bets at the portfolio level, summing the absolute values of the difference between actual and index weights for each stock in the benchmark. This measure was introduced by Cremers and Petajisto in their 2009 paper "How Active is Your Fund Manager? A New Measure That Predicts Performance."

AS varies between 0% for a portfolio that exactly replicates its benchmark, to a maximum of 100% for a portfolio that owns no stocks in common with its benchmark. High AS is generally associated with high tracking error (unless the portfolio's systematic exposures resemble the benchmark), and is typically used to measure how big an overall bet the manager is making.

CC measures the degree of concentration in a portfolio. The CC takes into account both the number of stocks in a portfolio and their weights. This concept was introduced in a paper written jointly by the Brandes Institute and GWA in 2004. The goal was to develop a better measure of concentration than was then typically used, such as just counting the number of stocks. CC is defined by the following formula:

$$CC_t^P = \left(\sum_{i=1}^{N} (w_{i,t}^P)^2\right)^{-1}$$

The CC of any portfolio is equivalent to the number of stocks in an equally weighted portfolio that provides the same degree of concentration.

For example, a portfolio with 50 stocks would be most diversified if all 50 stocks were equally weighted at 2% each. A 50 stock portfolio could also be structured with one stock representing 51% of the assets, and the other 49 stocks each weighted at 1% each. Both portfolios have a stock count of 50, but the latter one is clearly much more concentrated in reality. The equally weighted portfolio has a CC of 50, but the "one stock dominated" portfolio's CC is only 3.8.

AS and the CC both measure aspects of a portfolio manager's "bets", but they are identifying different aspects. To illustrate this, consider a manager that constructs two different equally weighted 100 stock portfolios from a hypothetical benchmark universe with 1000 stocks. The first portfolio consists of the top 100 stocks in the index by size, which account for 50% of the index market capitalization. The second

portfolio is composed of the smallest 100, which account for 2% of the total index market capitalization. Both portfolios by definition have the same CC (100) as they are equally weighted. But the AS of the portfolio with the largest stocks is 50% and that of the portfolio with the smallest stocks is 98%.

4. Applying Active Share and the Concentration Coefficient in the Fundamental Law

Determining the Information Coefficient ("IC") in practice is not easy. Managers believe they have a high level of skill, and their clients hope that this is the case. But "belief" and "hope" are not measurable statistics! Our hypothesis is that managers organize their investment approaches to maximize the impact of their skills on the portfolios they manage. Thus managers with high confidence in their stock selection will tend to make substantial "size" bets against the benchmark, and those with lower confidence in their specific stock selection will make more moderate bets. Under this hypothesis, AS is a partial proxy for IC ($IC \propto AS$), in that it reflects the manager's own implicit confidence in its stock "bets."

CC provides a consistent and comparable measurement of breadth of portfolios.[1] Breadth is the "number of bets" and by definition CC calculates the number of stocks ("bets") in the portfolio if each stock's weight was equal.

This leads to a revised equation for the application of the Fundamental Law to stock selection processes.

The Fundamental Law of Stock Selection (revised):

$$\text{Information Ratio} \propto \text{Active Share} * \sqrt{\text{Concentration Coefficient}}$$

Note that because we have used Active Share as a partial proxy for IC the formula has become proportional, not an equality. This provides us the ability to rank the various constituents in the fund universe. While AS is an objectively measured proxy for IC, a prospective client may have a subjective opinion that one or more specific managers should be given a higher IC than competitors. The ranking methodology makes this easy to apply in practice, with the model providing an objective starting point onto which the client perspective can be overlaid as noted in item 2 below.

For any portfolio with holdings information available, it is possible to calculate both AS and CC at any point in time. The practical result is that portfolios that share a benchmark can be ranked against each other in terms of expected information ratio.

We note three important caveats:

1. AS is quite sensitive to market-cap size. A small-cap portfolio will generally have materially higher AS than a large-cap portfolio with a similar number of holdings as the number of stocks in the small-cap benchmark is much higher, and the benchmark weight of each holding is low, as noted in research by Lazard Asset Management (Taking a Closer Look at Active Share; Khusainova, Mier 2013). Therefore to make useful comparisons using our formula, it is critical that the universe of portfolios is homogeneous in regards to market-cap size.
2. It is feasible to compare universes of portfolios that have different benchmarks but broadly similar universe characteristics. We have done as much in this research, combining EAFE, ACWI, and ACWI ex-US universes in order to gain an adequate sample size. This is feasible as we are examining relative returns, and the average market-cap size for each of three sub-universes is similar. However, an interesting new research paper from SEB (Expected Active Share, September 24, 2014) shows that changing the benchmark alters the expected (or typical) AS for funds using that benchmark, depending on the index's

degree of concentration and number of constituents. As such we know that there is a distortion in the rankings of our global/international universe. We comment on this in the results section, and on the effect of making a simplistic adjustment for this factor. A more rigorous adjustment must wait for the next stage of our research.

3. The formula has used the managers' AS as a partial proxy for IC (supported by them actually putting money "on the line" as evidence of their level of investment confidence) but this does not mean their judgment of their own IC is correct. In practice, a client (or prospective client) also should have a view on the manager's IC. Nobody can know exactly what the prospective IC will be. However, this approach allows a client to start from a baseline assumption (built into our formula) that assumes the manager's implicit IC (i.e., AS) is valid, and then modifies it accordingly relative to the other products in the relevant universe.

Industry research suggests caution in attributing too high a prospective IC, even for managers where the client has high confidence in the manager. For context, an article by Siegel and Scanlan (*Journal of Investing*, Fall edition 2014) suggested even for good active managers, it has been difficult to achieve an IC of over 0.05 for the long term (i.e., 20 years). As such, we believe that most subjective adjustments to our objective formula should be within 10% (up or down).

With these constraints and caveats in mind, we can now examine the results of applying the formula to specific investment universes.

D. The Fundamental Law as a Predictive Measure

Data and Methodology

The data are based on US-domiciled mutual funds from the Morningstar database. The funds' objectives were global, international, and US equities, which we then grouped into two samples: 1) international and global equity; and 2) US equity.

We included funds with inception dates sufficiently old to cover the period 2007 to 2013 and at least $100 million in assets. Index funds, sector funds, and fund of funds were excluded. Morningstar provides some broad categorization by objective, so we ensured the funds were within the US and Global Equity groups. However, to eliminate funds deviating from pure equity holdings we decided to look at the funds' reported asset allocation. We calculated the average equity allocation for the period under review and filtered those below a 90% equity allocation. In addition, we excluded funds that had an average market cap below $10 billion, as these would be potentially biased to higher AS given their smaller-cap holdings while using a large-cap benchmark.

The funds' primary prospectus benchmark was used for the AS and relative performance measurements. We selected funds which disclosed the following prospectus benchmarks: MSCI ACWI ex US, MSCI ACWI, MSCI EAFE Index, S&P 500 Index, and Russell 1000 Index. We excluded funds benchmarked to style or size-specific indices. As further selection criteria we used the institutional share class for all data.[2]

In all, our aim was to construct a homogeneous sample consisting of active, large cap, broad equity mutual funds.

The full time period was also divided into two segments: the "crisis years" (2007–2008), and the "recovery years" (2009–2013) to examine whether there were material differences in how the predictive measure

performed. At year-end 2006 and 2008 we obtained individual holdings for every fund to calculate CC. At these same dates we calculated AS for all funds from Morningstar and FactSet based on data availability.

Performance was measured in both absolute and relative return terms. While both are valid ways of comparing and ranking portfolios, we have used relative return measures (i.e., information ratio) which enable us to aggregate funds from different universes.

To form the international/global universe we aggregated 11 global equity funds (benchmarked against MSCI ACWI), with 25 funds benchmarked to MSCI ACWI ex-US, and 52 funds benchmarked to MSCI EAFE Index, for a total international/global universe of 88 funds. The underlying assumption behind this aggregation is that by using relative return, the excess return and tracking error characteristics of each "sub universe" were relatively homogeneous.

The US equity universe comprised 86 large-cap funds, of which 77 were benchmarked to the S&P 500 Index, and the other 9 to the Russell 1000 Index. This could then also be aggregated with the 88 international and global funds to provide an aggregate universe of 174 funds with data covering the seven years (2007-2013). Exhibit 1 compares the international, global, and US universe characteristics.

Exhibit 1
International and Global, and US Universe Characteristics (2007–2013)

	Median	Average	Standard Deviation
International and Global Universe Characteristics			
Active Share (%)	81.4	77.6	13.4
Concentration Coefficient	67.2	74.5	41.9
Asset Allocation, Average % equity	96.3	95.2	4.9
Average Market Cap ($B)	27.2	26.5	8.4
US Universe Characteristics			
Active Share (%)	71.5	69.4	17.2
Concentration Coefficient	60.4	62.2	31.8
Asset Allocation, Average % equity	97.6	95.5	6.7
Average Market Cap ($B)	37.6	39.5	15.2

The Predictive Measure (Based on Percentile Rank)

The hypothesis suggests that, based on the AS and the CC at the beginning of any period, a better-than-random prediction of the information ratio (IR) should be possible for the subsequent period. This was tested using a ranking approach to the universe of funds. At the beginning of each test period, the fund universe was ranked according to the predicted IR. At the end of the test period, the fund universe was re-ranked according to the actual IR for that period. These two rankings (predicted and actual) were then compared for each fund in the universe, and the average change in absolute percentile ranking was calculated for the funds. If the methodology had no predictive power, the average change in percentile rank would be 33 1/3 %.[3] Numbers below that indicate predictive power, all the way to a perfect prediction which would result in a number of zero percent.

When considering a valid time period, we note that (like most other performance-related measures) a sufficiently long time period is needed to draw indicative conclusions. Thus we give more credence to predictive results over five-year periods than for periods of two or three years. In addition, the characteristics of the market environment are also relevant. The 2007–2008 crisis period was highly volatile, and as well as being short, may not be representative of future market behavior. The recovery period (2009–2013) was less volatile and may be a more appropriate comparison. We are somewhat constrained in our conclusions by the characteristics of the data we are able to gather, and we reiterate that any conclusions reached are only indicative.

Results

International/Global Universe

Over the recovery period (2009–2013), the method provided an 11% improvement over random in predictive power for the international/global universe (Exhibit 2). However, for the crisis years of 2007-2008, the results were not predictive at all, with no meaningful difference from random. In addition to the unadjusted results, we show an adjusted version.[4] The adjusted scores show a modest improvement in predictive power.

Exhibit 2
International and Global Universe Results 2007–2013

	2007–2008	2009–2013	2007–2013
Predictive score, unadjusted (%)	34.4	29.6	31.5
Predictive power, unadjusted (% improvement over random 33.3%)	-3.3	11.3	5.5
Predictive score, adjusted* (%)	33.8	29.6	30.7
Predictive power, adjusted* (% improvement over random 33.3%)	-1.3	11.2	7.9

* Active Share for funds in the two ACWI universes were adjusted to take into account the differences in average active share between EAFE, ACWI, and ACWI-ex US universes.

US Universe

The US universe exhibited more extreme variation between the crisis and recovery periods in terms of predictive power (Exhibit 3). The recovery period in 2009–2013 exhibited predictive power of 15%. But for the crisis years of 2007–2008, the results are not predictive at all, in fact the reverse, with a score 12% worse than random. While the full period exhibited minimal predictive power, this was the combination of poor predictive results in the crisis years, followed by good predictive results in the recovery.

Exhibit 3
US Universe Results 2007–2013

	2007–2008	2009–2013	2007–2013
Predictive score (%)	37.3	28.4	33.1
Predictive power (% improvement over random 33.3%)	-11.8	14.8	0.8

The pattern of results was consistent across the US and international/global universes: predictive power appears to be present for the five-year recovery period, but absent for the two-year crisis period. By calculating the correlation of implied and actual rankings for both universes, we established that the

correlation for 2009–2013 was statistically significant at the 1% level in the US universe, and at the 5% and 7% levels respectively for the global/international universe unadjusted and adjusted. (The correlations were 0.30 for US funds, 0.21 for global/international funds, and 0.19 for the adjusted case in global/international.)

We also tested the Fundamental Law approach against the use of AS only, to explore whether this is more effective. In the 2009–2013 recovery period, using AS alone was less effective. However in the two-year crisis period of 2007–2008, use of AS alone was more effective than the combined AS and CC method. These observations are summarized in Exhibit 4. Overall however, we do not put too much reliance on the 2007–2008 data sample, as the period is short and in our view is more likely to be an aberration than the five-year 2009–2013 recovery period. Nevertheless, these variations reinforce our view that our results are indicative, not conclusive, and we will explore the concept further, possibly in collaboration with others with the goal of testing this methodology across broader universes and more extended time periods. This may enable us to validate these preliminary conclusions and find ways of improving this predictive model.

Exhibit 4
Active Share Only, Predictive Power, US and International/Global Universes

(% improvement over random 33.3%)	2007–2008	2009–2013
International/Global		
Predictive power, adjusted*	-1.3	11.2
Predictive power, adjusted*, Active Share ONLY	14.3	8.6
US		
Predictive power	-11.8	14.8
Predictive power, Active Share ONLY	-10.5	4.8

* Active Share for funds in the two ACWI universes were adjusted to take into account the differences in average active share between EAFE, ACWI, and ACWI-ex US universes.

E. Conclusion

In the Introduction, we outlined our goal to develop a practical method of ranking the prospective information ratios of the constituents of an equity portfolio universe, based on concepts used in the Fundamental Law of Active Management, as opposed to relying on past returns to predict the future.

We believe our findings are evidence that such an approach is feasible, and that use of the Fundamental Law in this context does provide some predictive power in ranking equity portfolios by prospective information ratio.

These preliminary conclusions suggest a modification of a presumption that seems to be common in the investment industry: that fewer, bigger "bets" will generally lead to a better outcome (and this presumption has been reinforced with the emergence of AS as a widely used metric). We find that a better approach may be to increase the combination of AS and CC (as long as this does not diminish the manager's stock-selection skill). This is not easy. It typically requires the manager to own a wider selection of stocks, but maintain or increase the weighting differences of those stocks from the index. The question for investors is whether the managers have the resources to do this effectively, maintaining the same level of stock-picking ability.

In summary, rather than rely on past performance outcomes to predict future results, our hypothesis is that it is possible to improve the ability to predict future long-term success by identifying and measuring selected portfolio characteristics that are embedded in each manager's process and which tend to be relatively stable over time.[5] This approach may thus complement long-term performance analysis, attribution analysis, and other processes used to identify and select suitable managers. Summary results are in Exhibit 5.

Exhibit 5
Summary Table of Predictive Power, Improvement Over Random (%)

	International/Global*	US
2007–2008	-1.3	-11.8
2009–2013	11.2	14.8

* Active Share for funds in the two ACWI universes were adjusted to take into account the differences in average active share between EAFE, ACWI, and ACWI-ex US universes.

Our key points are:

- Active Share has some predictive power in ranking prospective information ratios of funds in an equity universe
- Based on the Fundamental Law of Active Management, combining AS and CC appears to improve the Law's predictive power. (The evidence is indicative, rather than conclusive, and needs additional research over extended periods and broader equity universes.)
- For investors and managers, this approach may provide a useful complement to their current methods of manager comparison.
- These preliminary conclusions suggest that achieving high AS by constructing increasingly concentrated portfolios (i.e., reducing the CC) may be counterproductive in terms of a prospective peer ranking. Instead, managers may do better by seeking to increase both.
- The implication is that making fewer but larger "bets" (increasing AS, reducing CC) may only be justified if the manager has (or at least believes it has) increased skill in making each of those bets.
- The corollary is that if a manager can maintain or increase its skill across a wider number of stocks (for example through additional analytical coverage), then it should benefit by increasing the portfolio's CC (diversification) as long it also maintains its AS.

As noted, given the limited scope of the data, these results are indicative, not conclusive. To build on this research, we invite other researchers including academia and practitioners to contact us and explore this concept further on a collaborative basis. The goal is to test this methodology across broader universes and more extended time periods, with the expectation of improving the model and its predictive power.

Acknowledgment: Special thanks to Kyle Rehm of Lazard Asset Management for assistance with research and data on the Morningstar database.

References

Brandes Institute and Global Wealth Allocation (GWA). "Concentrated Portfolios: An Examination of Their Characteristics and Effectiveness." *Brandes Investment Partners*, September 2004.

Cremers, K.J. Martijn and Antti Petajisto. "How Active Is Your Fund Manager? A New Measure That Predicts Performance." *Review of Financial Studies*, September 2009.

Ding, Zhuanzin. "The Fundamental Law of Active Management: Time Series Dynamics and Cross-Sectional Properties." February 2010.

Grinold, Richard C. "The Fundamental Law of Active Management." *The Journal of Portfolio Management*, Spring 1989.

Khusainova, Erianna and Juan Mier. "Taking a Closer Look at Active Share." *Lazard Investment Research*, March 2013.

Petajisto, Antti. "Active Share and Mutual Fund Performance." *Financial Analysts Journal*, July/August 2013.

SEB (Skandinaviska Enskilda Banken). "Expected Active Share: Models and Model Differences." September 2014.

Siegel, Laurence and Matthew Scanlan. "No Fear of Commitment: The Role of High-Conviction Active Management." *The Journal of Investing*, Fall 2014.

Notes

[1] In cases of extreme values in the number of holdings across a sample, CC could present issues of comparability. But in the case of homogeneous investment universes the number of holdings remains in reasonable and practical bounds to use CC.

[2] Mutual funds frequently add new share classes. As such, inception dates of share classes differ. Morningstar has created extended performance statistics to fill the gap between the inception dates of more recent share classes and the original portfolio when both are based on the same pool of money.

[3] To determine the random change in percentile rankings we used a ranking list from 1% to 100% in 1% increments. We then computed the absolute change between this list and a randomly generated list using the RAND() function in Excel. This process was repeated 10,000 times and we computed the average of the ranking changes.

[4] As explained in section C4, a small distortion is introduced by combining the ACWI, ACWI-ex-US, and EAFE benchmarked universes, because the average active share differs for each of these universes. The adjusted scores are calculated after normalizing the AS for each fund outside the EAFE universe by multiplying its AS by the ratio of its universe average AS divided by the EAFE universe average AS.

[5] Barring any significant investment strategy or mandate changes in a mutual fund, active share and CC are stable over time. This makes intuitive sense as it is unlikely that, for example, a high active share manager could suddenly become an indexer. This property also enabled us—and could enable future users—to fill any missing AS or CC data point with averages where data were available (e.g., if the 2006 CC data point was missing from a particular fund, we averaged the 2008 and 2013 data). However, the effect on our sample was minimal: overall only five data points out of 1,050 were filled this way.

Important Information

Information and opinions presented have been obtained or derived from sources believed by the authors to be reliable. The authors make no representation as to their accuracy or completeness. All opinions expressed herein are as of the date of this presentation and are subject to change.