S&P Dow Jones Indices

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Degrees of Difficulty: Indications of Active Success

"It is better to be lucky. But I would rather be exact. Then when luck comes you are ready."

- Ernest Hemingway, *The Old Man and the Sea*

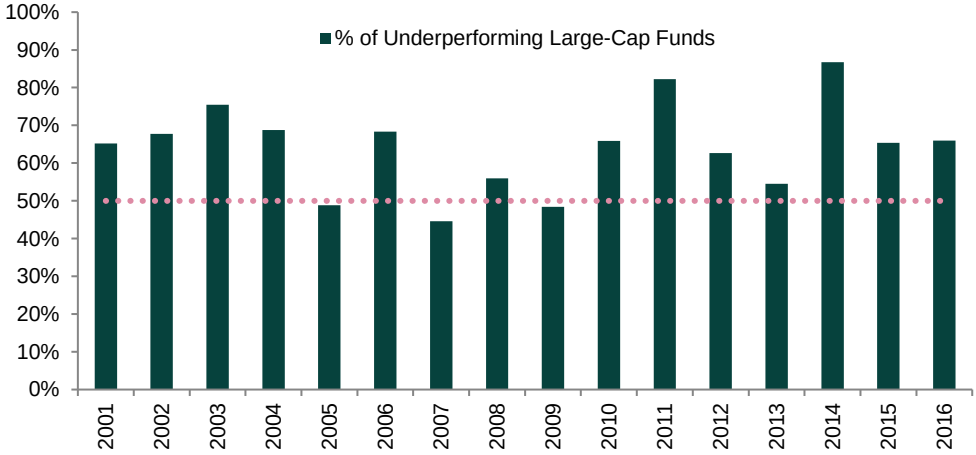
EXECUTIVE SUMMARY

- Strong theoretical arguments and extensive empirical data support the view that we should expect most active managers to underperform most of the time. But *most of the time* is not *all of the time*, and *most active managers* are not *all active managers*. So it is reasonable to ask whether active performance tends to wax and wane.

- We examined fund performance in various market environments to see whether certain conditions correlate with better active performance. We found that active managers were particularly challenged in periods when dispersion was low, stock prices were rising, and market leadership came from extremely large stocks.

- Active managers seemed to perform less poorly in years when value and momentum factors outperformed. This suggests that managers, as a group, tended to include cheap valuation and historical outperformance in their stock-selection processes.

Exhibit 1: Most Active Managers Underperform Most of the Time



Source: S&P Dow Jones Indices LLC, CRSP. Data as of Dec. 31, 2016. Chart is provided for illustrative purposes. Past performance is no guarantee of future results.

INTRODUCTION: PASSIVE VERSUS ACTIVE

The debate between passive and active investing has a long history, but in recent years it has escalated to the forefront of investor awareness. A summary of the arguments advanced by the advocates of passive investing would include the following.

- Alfred Cowles' (1932) paper on the unimpressive predictive power of stock market forecasters[1]
- William Sharpe's introduction of the Capital Asset Pricing Model (1964)[2] and Eugene Fama's random walk hypothesis (1965),[3] providing a theoretical underpinning for owning the market portfolio rather than relying on active stock selection
- Pleas from Burton Malkiel (1973)[4] and Paul Samuelson (1974)[5] that someone (anyone!) launch a prototype capitalization-weighted index fund
- Charles Ellis' (1975) argument that the professionalization of the investment management business made consistent outperformance unlikely[6]
- Sharpe's (1991) simple demonstration that "after costs, the return on the average actively managed dollar will be less than the return on the average passively managed dollar."[7]

However, while active managers *as a group* cannot outperform, there's no theology to say that *individual* managers cannot outperform, or do so consistently.

In addition, numerous observers, prominently including our own firm, have followed in Cowles' footsteps in accumulating empirical data on the performance of active managers.[8] **The results confirm what theory predicts: most active managers underperform most of the time.**

However, while active managers *as a group* cannot outperform, there's no theology to say that *individual* managers cannot outperform, or do so consistently.[9] Even if we expect that more than half of active managers will

[1] Cowles, Alfred, "Can Stock Market Forecasters Forecast?" *Econometrica*, 1933, Vol. 1, Issue 3, p. 309-324. See also Edwards, Tim, "Eighty-one years later…," Dec. 19, 2013.

[2] Sharpe, William F., "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk," *Journal of Finance*, September 1964, p. 425-42.

[3] Fama, Eugene, "Random Walks in Stock-Market Prices," *The Journal of Business,* 1965, Vol. 38, No. 1, p. 34-105.

[4] Malkiel, Burton G., "*A Random Walk Down Wall Street*" first edition, 1973, p. 226.

[5] Samuelson, Paul A. "Challenge to Judgement," *Journal of Portfolio Management*, 1974.1.1: p. 17-19.

[6] Ellis, Charles D., "The Loser's Game," *Financial Analysts Journal*, July/August 1975.

[7] Sharpe, William F., "The Arithmetic of Active Management," *Financial Analysts Journal*, January/February 1991.

[8] See, to cite only the most recent example, Soe, Aye M. and Ryan Poirier, "SPIVA® U.S. Scorecard," Mid-Year 2017.

[9] Although in practice, consistent outperformance is tough to come by. See Soe, Aye M. and Ryan Poirier, "Does Past Performance Matter? The Persistence Scorecard," June 2017.

typically underperform, theory doesn't tell us whether the underperformers will be 51% or 81% of the total. It's reasonable to ask if there are some market conditions that are conducive to relatively favorable (or, more precisely, relatively less unfavorable) active results.

The SPIVA database gives us a way to evaluate regimes that might present greater or lesser degrees of difficulty for active managers.

S&P Dow Jones Indices has published its SPIVA® (S&P Indices Versus Active) Scorecard since 2002 for the U.S. market.[10] The 16-year period for which we have SPIVA data has been challenging for active managers; a majority of large-cap U.S. managers outperformed the S&P 500® in only three years, and an average of 64% of managers underperformed across all 16 years. The SPIVA database gives us a way to evaluate regimes that might present greater or lesser degrees of difficulty for active managers. We'll examine several possible variables along two dimensions:

- Are active managers as a group more likely to outperform (or less likely to underperform)?
- Is the spread between the most and least successful active managers likely to widen?

All of our conclusions should be regarded as indicative rather than definitive. Sixteen years of data are not a lot, and we should be circumspect about drawing too many conclusions from too few observations.

WHEN MIGHT ACTIVE PERFORMANCE IMPROVE?

"Ability is of little account without opportunity."

- Napoléon Bonaparte

Dispersion

Dispersion is a measure of the *spread of returns* within an index. In a high-dispersion environment, there's a large spread among constituent returns; in a low-dispersion environment, the spread is modest.[11] Dispersion is of more than just academic interest. When dispersion is high, e.g., the incremental value added (or lost) by factor indices is much larger than in low-dispersion environments.[12]

Dispersion is relevant to our study because active managers begin with a handicap. Before they can add value for their clients, they must first overcome a set of fixed costs—management fees, research expenses, transaction costs, etc. After these fixed costs are covered, whatever return

[10] See https://spindices.com/spiva/#/.

[11] See Edwards, Tim and Craig J. Lazzara, "Dispersion: Measuring Market Opportunity," December 2013, and "The Landscape of Risk," December 2014.

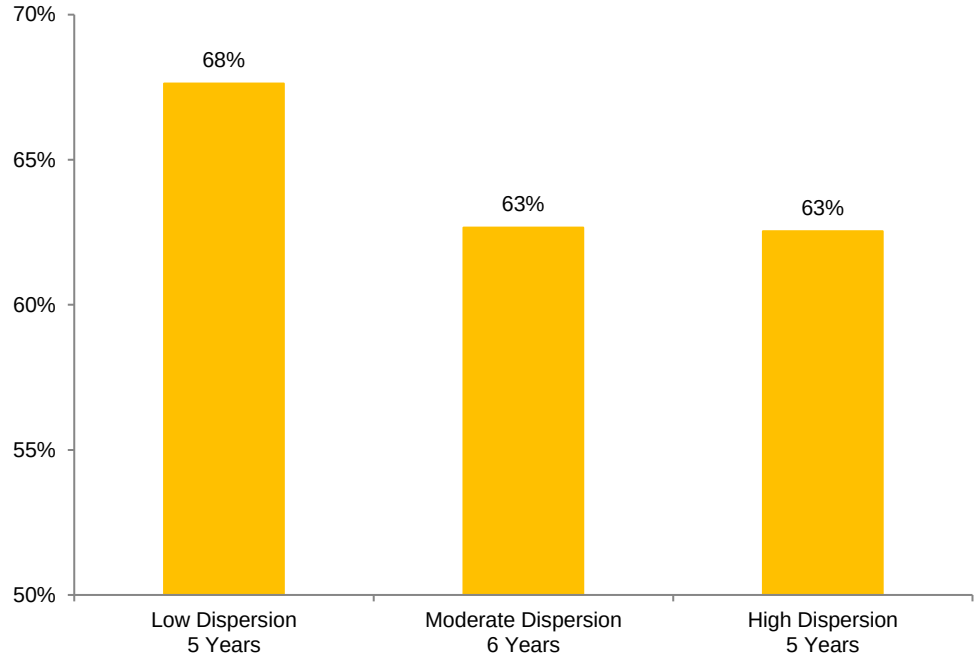
[12] Chan, Fei Mei and Craig J. Lazzara, "Gauging Differential Returns," January 2014.

is left over is value added for the client. **In a low-dispersion environment, it is harder to cover the fixed costs.** We might therefore hypothesize that more active managers will underperform when dispersion is low, and that the spread between the best and the worst managers will increase as dispersion rises.

Low dispersion poses particular challenges for active managers.

Our SPIVA data validate both of these hypotheses. We divided our 16 yearly observations into three categories: the five lowest-dispersion years, the middle six years, and the five highest-dispersion years. Exhibit 2a validates our intuition that low dispersion poses particular challenges for active managers. In the low-dispersion years, 68% of active managers underperform, versus 63% underperformers in the moderate- and high-dispersion categories.[13]

Exhibit 2a: More Managers Underperformed in Low-Dispersion Environments



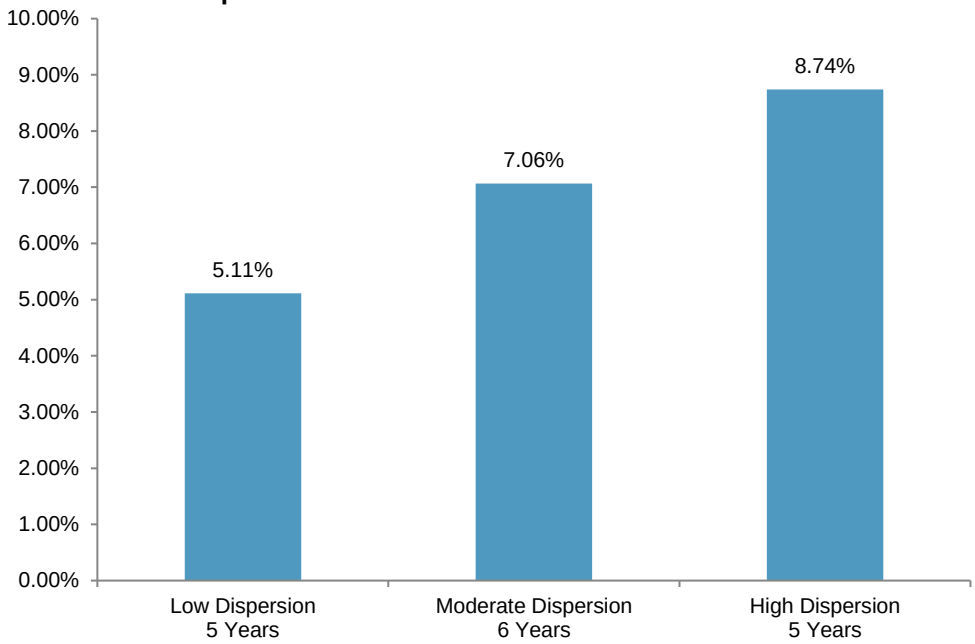
Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2016. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

The pattern of Exhibit 2a is consistent with our expectations. Low dispersion increases the challenge for active managers, but high dispersion doesn't convey an analogous benefit. A manager's skill is what it is, regardless of the level of dispersion; once fixed costs are covered, there's no reason to expect more managers to outperform.

[13] This is an apples-to-apples comparison, or at least apple trees to apple pie. We measure dispersion using the S&P 500 and evaluate its effect on large-cap active U.S. managers.

On the other hand, Exhibit 2b shows that the performance gap between better- and worse-performing managers widens monotonically as dispersion increases.[14] This is what we expected given our understanding of dispersion.

Exhibit 2b: Gap Between the Top and Bottom Performance Quartiles Broadened as Dispersion Increased



Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2016. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Correlation, the degree which stocks in an index move together, is cited frequently—and in our view, incorrectly—as a determinant of active management's success.

Correlation

Correlation, the degree which stocks in an index move together, is cited frequently—and in our view, incorrectly—as a determinant of active management's success.[15] The argument, for those who make it, is that when co-movement is high, stock selection becomes more difficult, so that stock pickers benefit from low correlation. We've long argued[16] that dispersion, rather than correlation, is the superior indicator, and the SPIVA database gives us a way to test this view.

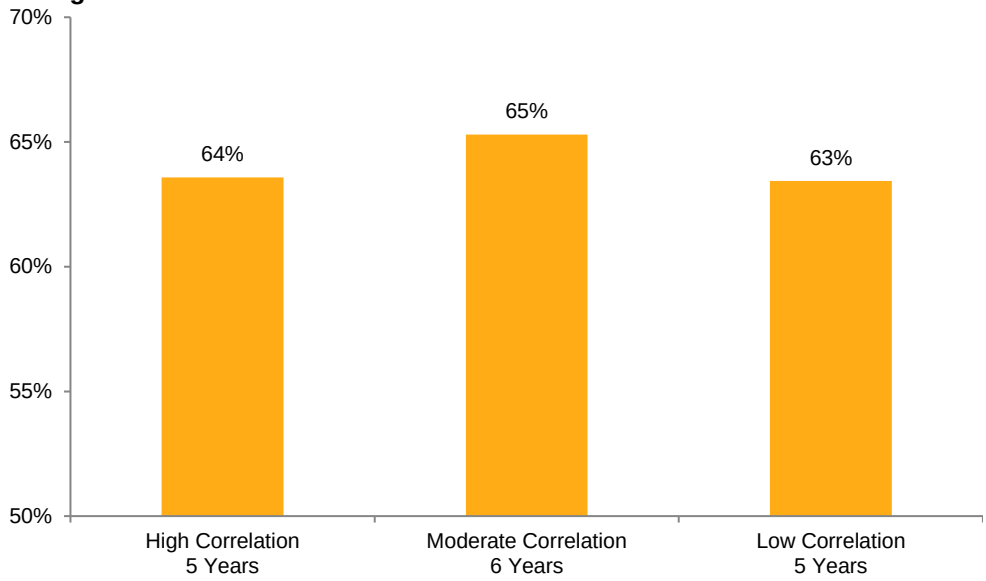
Exhibit 3a shows that the percentage of managers underperforming the S&P 500 varies insignificantly as correlation changes, which is in contrast to the relatively larger impact of low dispersion.

[14] Specifically, we measure this performance difference by the interquartile range in our large-cap active manager database—the difference between the 25th percentile and the 75th percentile of the distribution.

[15] For a recent example, see Shah, Alap, "According To One Metric, This Could Be The Best Time For Stock-Picking In A Decade," July 11, 2017.

[16] Lazzara, Craig J., "Dispersion and Correlation: Which is 'Better?'" Jan. 30, 2014.

Exhibit 3a: Correlation Had No Significant Influence on the Outcome of Manager Performance

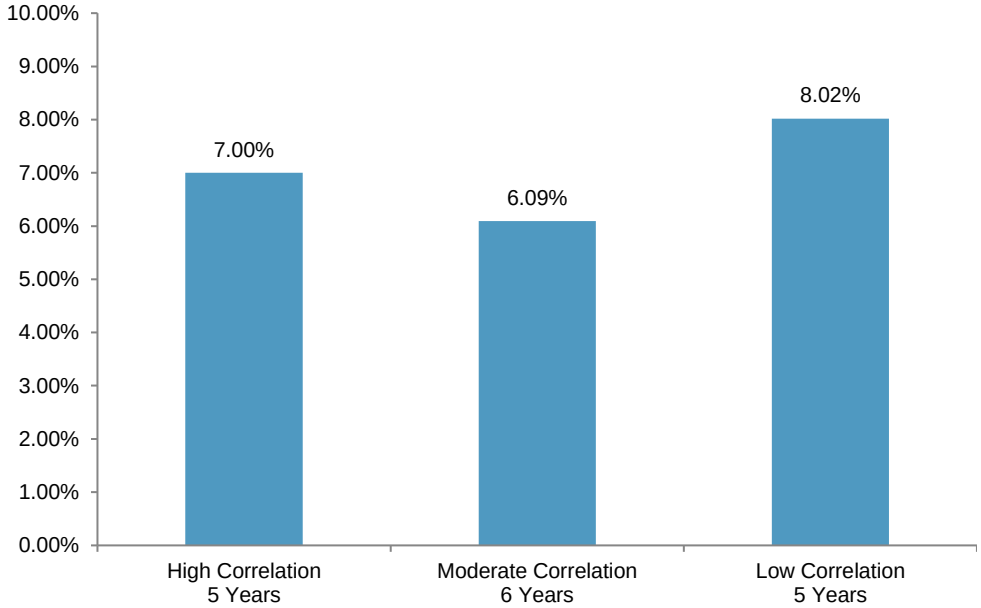


Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2016. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Low correlation produces a bigger spread than we find in periods of high correlation—but the relationship is not monotonic and is therefore less persuasive.

Similarly, Exhibit 3b shows a weak relationship between correlation and the spread between top- and bottom-ranked managers. Low correlation produces a bigger spread than we find in periods of high correlation—but the relationship is not monotonic and is therefore less persuasive.

Exhibit 3b: Correlation Had a Weak Relationship to the Difference Between Top and Bottom Quartile Managers



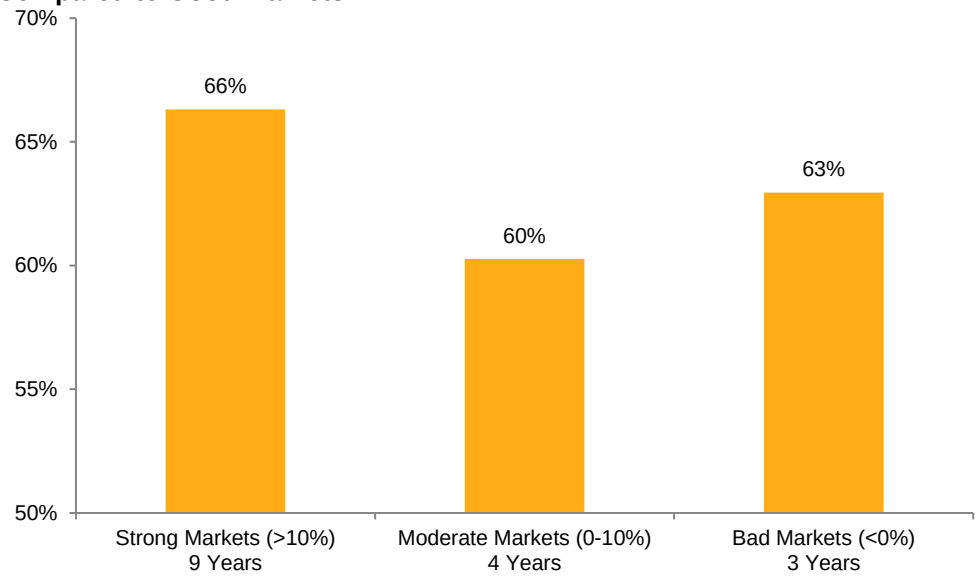
Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2016. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Market Direction

A falling stock market might plausibly augment active managers' performance. If the market declines, active managers can hold cash and thereby gain an advantage over a fully invested index benchmark. Exhibit 4a seems to reflect this, although to a modest and arguably inconsistent degree. Fewer managers underperform when the market declines (63%) than when it's up strongly (66%). But the argument would be more convincing if the relationship between manager performance and the market's direction were monotonic.

Dispersion tends to rise in bad markets, which also helps explain the range of manager performance when the market declines.

Exhibit 4a: Fewer Active Managers Underperformed in Moderate/Bad Markets Compared to Good Markets

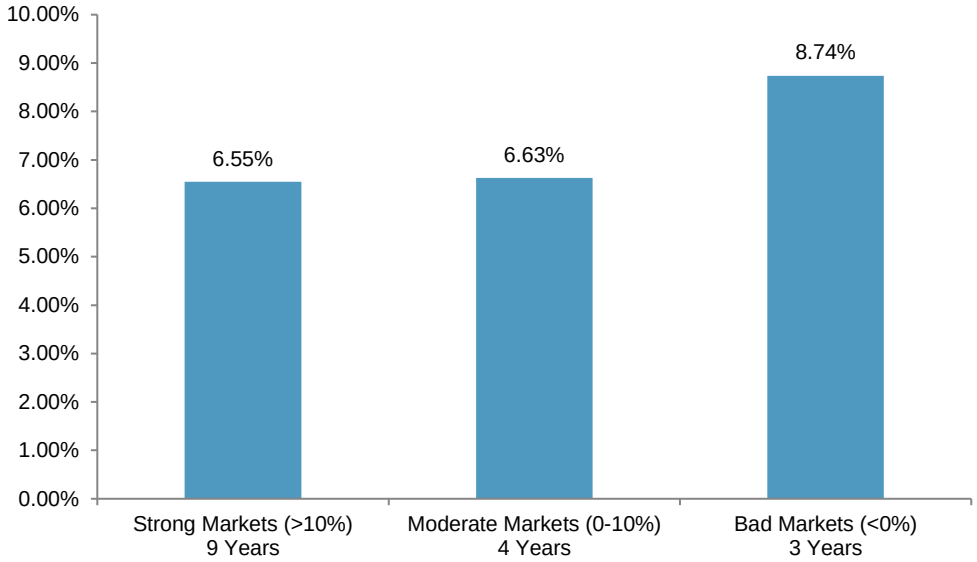


Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2016. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Managers who successfully manage their cash levels in declining markets might arguably reap a bigger advantage over their less nimble peers. That's one possible interpretation of Exhibit 4b, which shows that the performance differential between top- and bottom-performers was widest when the market declined. Importantly, however, dispersion tends to rise in bad markets, which may also help explain the range of manager performance when the market declines.[17]

[17] Chan, Fei Mei and Craig J. Lazzara, "The Best Offense: When Defensive Strategies Win," March 2015.

Exhibit 4b: Gap Between the Top and Bottom Performance Quartiles Was Widest in the Worst-Performing Markets



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Influence of Megacaps

In periods when the megacaps dominate, active management is likely to be more challenged.

Like most capitalization-weighted indices, the S&P 500 is skewed toward its largest members.[18] For purposes of this paper, we defined a "megacap" stock as one that accounts for more than 1% of the total weight of the S&P 500. As of Sept. 30, 2017, there were 15 such stocks making up 25% of the index's capitalization, which is fairly typical of the years for which we have SPIVA data.[19]

Actively managed funds tend to be closer to equal- than to cap-weighting in their portfolio construction.[20] This means that, other things equal, **a non-megacap stock, if held, is virtually certain to be substantially overweighted**. For a megacap, on the other hand, overweights will typically be smaller, and it's entirely possible for a megacap to appear in an active portfolio while being underweighted.[21]

If smaller stocks are highly likely to be overweighted in active portfolios, then it follows that when smaller names outperform the megacaps, active manager performance might improve. In periods when the megacaps dominate, active management is likely to be more challenged. Exhibit 5a confirms this—more managers underperform when the megacaps

[18] As of Sept. 30, 2017, the weighted average capitalization of the constituents of the S&P 500 was USD 160 billion. Only 29 stocks were that large.

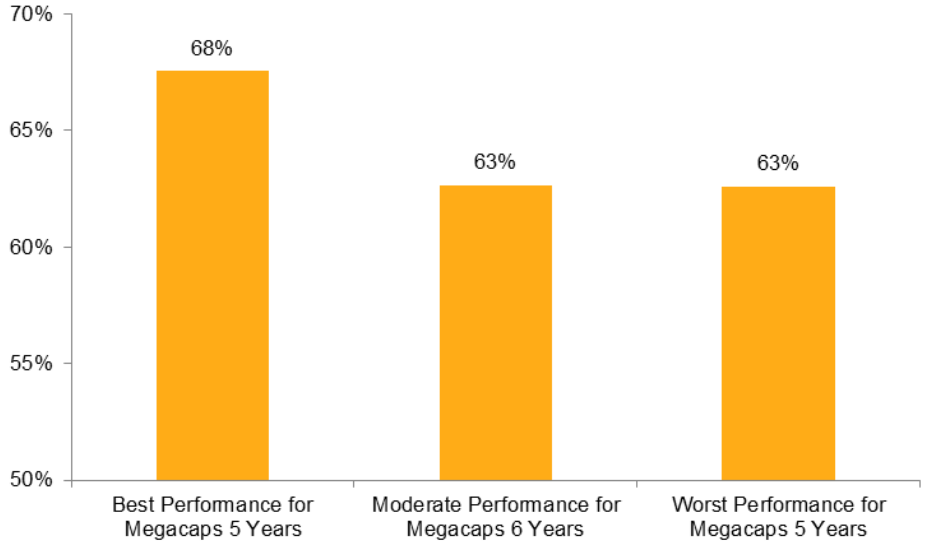
[19] From 1991 through 2016, there were, on average, 17 megacap stocks totaling 28% of the S&P 500.

[20] Ganti, Anu, "Mutual Fund Portfolios: Equal Weight or Cap Weight?" July 27, 2017.

[21] One of the authors is old enough to remember when IBM, at that time the S&P 500's largest component, accounted for 6% of the index's value. The stock was widely held in institutional portfolios—and virtually never with a weighting greater than 6%.

outperform—suggesting that active managers as a group are underweight in the largest stocks.

Exhibit 5a: Fewer Active Managers Underperformed When Megacap Stocks Underperformed Smaller Companies

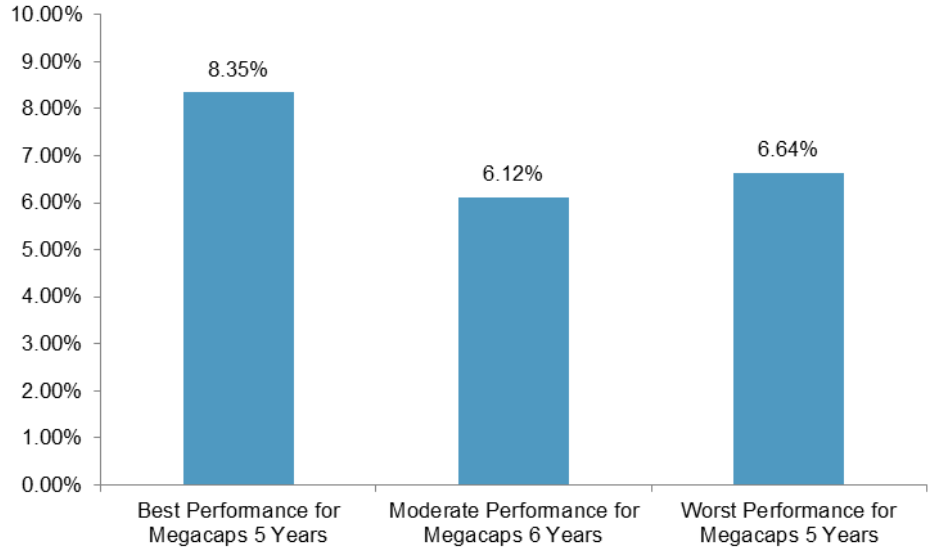


Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2016. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

More managers underperform when the megacaps outperform—suggesting that active managers as a group are underweight in the largest stocks.

On the other hand, the minority of managers who own a more significant weight in megacap stocks might benefit disproportionately when the megacaps outperform. We see that in Exhibit 5b; the spread between top and bottom quartile managers peaks when the largest companies lead the market.

Exhibit 5b: Gap Between the Top and Bottom Performance Quartiles Was Widest When Components With Greater Than 1% Weight Did Well



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Factoring in Factors

We also analyzed manager results based on factor performance. We were interested in the performance of five factors, which we captured by reference to the relative performance of five indices.

- **Size.** When the S&P 500 Equal Weight Index outperforms the cap-weighted S&P 500, smaller companies are outperforming larger.[22] (This is a general statement of which our megacap analysis is a specific instance.)
- **Value.** We measured whether the value factor was in or out of favor by measuring the relative returns of the S&P 500 Enhanced Value Index.
- **Low Volatility.** The S&P 500 Low Volatility Index tells us whether the index's least-volatile stocks are leading the market.
- **Momentum.** The S&P 500 Momentum Index lets us judge the performance of the momentum factor.
- **Quality.** We measure the performance of high-quality stocks using the S&P 500 Quality Index.

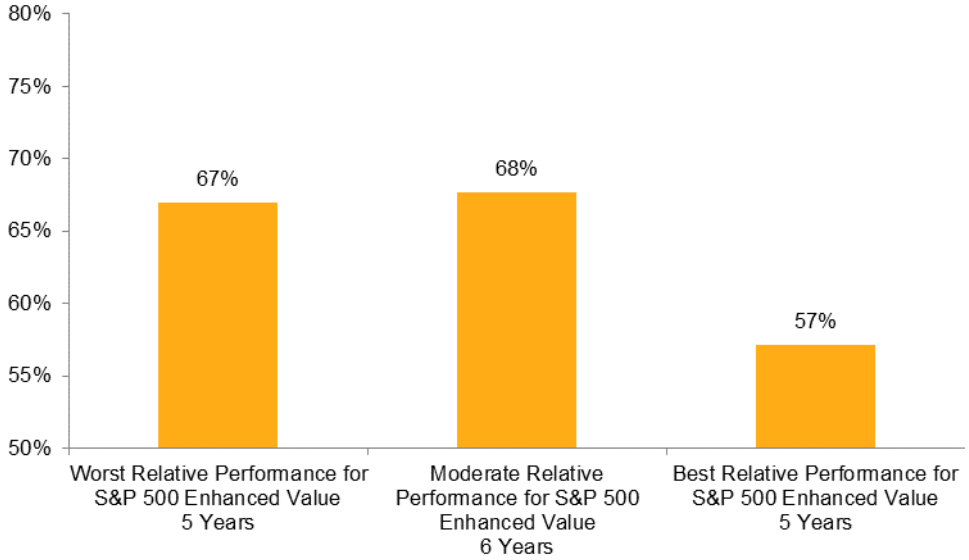
When value did well, only 57% of managers underperformed, roughly a 10 point spread relative to years in which value lagged.

We examined manager performance as a function of relative factor performance for each of these five factors. Some of the results were uninteresting, suggesting that the active managers in our SPIVA database did not have a particularly strong tilt to that particular factor. Two exceptions were value and momentum.

If managers as a group have a value bias, or if more of them tilt toward value than tilt against it, we would expect fewer of them to underperform when value does well; if their bias is away from value, the expected result is the opposite. Exhibit 6a suggests that many active managers are tilted toward cheaper stocks. When value did well, only 57% of managers underperformed, roughly a 10 point spread relative to years in which value lagged.

[22] See Edwards, Tim and Craig J. Lazzara, "Equal-Weight Benchmarking: Raising the Monkey Bars," May 2014.

Exhibit 6a: Fewer Managers Underperformed in the Best Environments for Value



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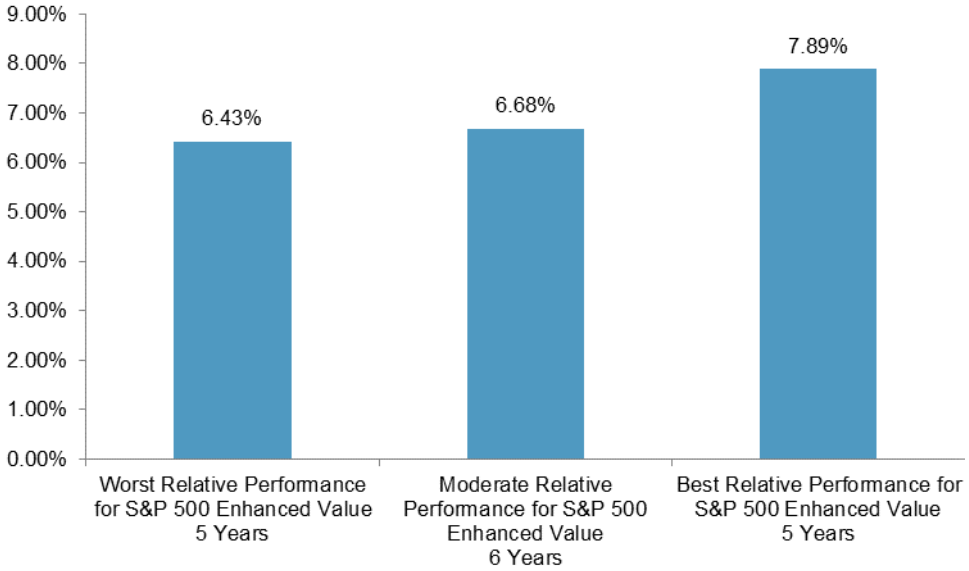
Although impressive, the effect of value on the interquartile range is less than that of dispersion or megacap performance.

The range between top and bottom quartile managers was significantly wider in the years corresponding to the S&P 500 Enhanced Value Index's best relative performance (Exhibit 6b). Although impressive, the effect of value on the interquartile range is less than that of dispersion or megacap performance.

Exhibit 6b: Manager Performance Widened in the Best Environments for Value



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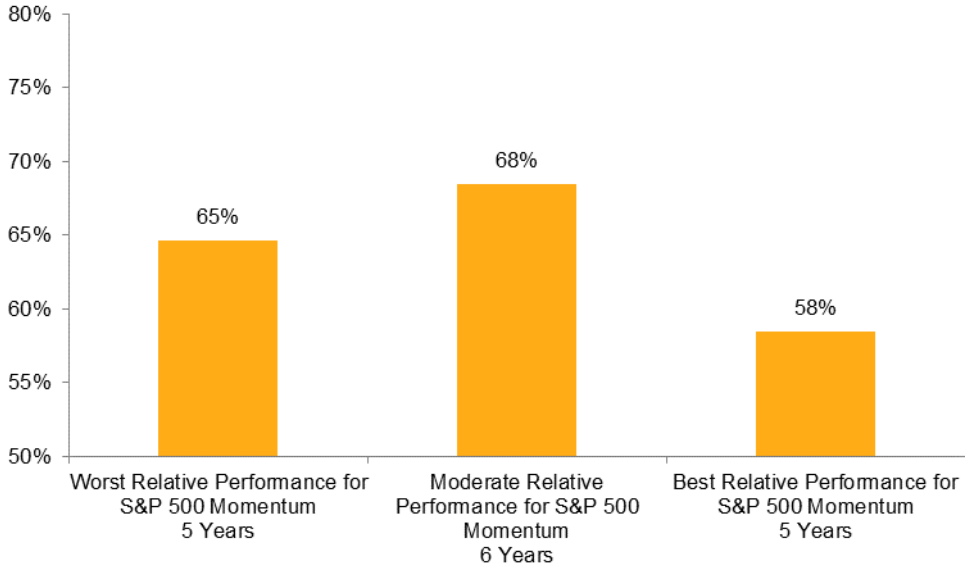
document for more information regarding the inherent limitations associated with back-tested performance.

Finally, we note the impact of the momentum factor on SPIVA results. Exhibit 7a shows that in the five best-performing years for momentum, 58% of managers, on average, underperformed versus 65% in momentum's worst years. This suggests that more managers were tilted toward momentum than were tilted against it.

In the five best-performing years for momentum, an average of 58% of managers, underperformed, versus 65% underperformers in momentum's worst years.

Exhibit 7a: Fewer Managers Underperformed in the Best Environments for Momentum



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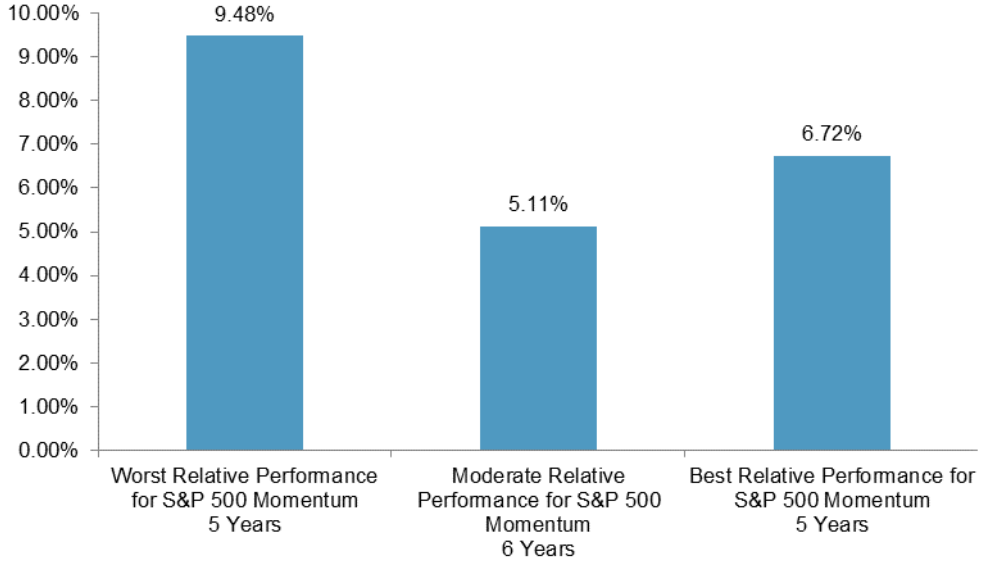
On the other hand, when momentum did poorly, the spread between top and bottom quartile managers skyrocketed (see Exhibit 7b), and the spread between top and bottom managers was the smallest in the window of moderate momentum performance. On an intuitive level, given the nature of momentum stocks, this makes sense. There might be a wider gap between performance chasers and the remaining managers, *both when momentum does well and when the trend reverses*, as managers in the top quartile when momentum does well find themselves in the bottom quartile when momentum does poorly.

Exhibit 7b: Performance Gap for Managers Was Most Narrow in Periods of Moderate Relative Performance for Momentum



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CONCLUSION

"We should all work on the assumption that we do not know what will happen next."

- John Authers, *Financial Times*, Sept. 23, 2017

Analyzing SPIVA data through the lens of factor performance offered insight into the possible biases of managers.

Their limited history notwithstanding, the 16 years of SPIVA data give us a way to evaluate active performance through the prism of various investment environments. Higher dispersion was demonstrably more favorable for the skilled (or lucky) subset of active managers. Likewise, markets led by stocks other than those at the top of the capitalization spectrum proved to be auspicious for active funds. Analyzing SPIVA data through the lens of factor performance offered insight into active managers' possible biases.

These insights can help market participants frame their expectations of active management. The years since the global financial crisis, for example, have generally been characterized by low dispersion, rising markets, and the underperformance of value—all of which may present particular difficulties for active managers. If those trends reverse in the future, it's possible that active underperformance will become less prevalent. That may be cold comfort to the active management community and their customers—but **sometimes cold comfort is all the comfort there is**.

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PERFORMANCE DISCLOSURE

The S&P 500 Enhanced Value Index was launched on April 27, 2015. The S&P 500 Momentum was launched on November 18, 2014. All information presented prior to an index's Launch Date is hypothetical (back-tested), not actual performance. The back-test calculations are based on the same methodology that was in effect on the index Launch Date. Complete index methodology details are available at www.spdji.com.

S&P Dow Jones Indices defines various dates to assist our clients in providing transparency. The First Value Date is the first day for which there is a calculated value (either live or back-tested) for a given index. The Base Date is the date at which the Index is set at a fixed value for calculation purposes. The Launch Date designates the date upon which the values of an index are first considered live: index values provided for any date or time period prior to the index's Launch Date are considered back-tested. S&P Dow Jones Indices defines the Launch Date as the date by which the values of an index are known to have been released to the public, for example via the company's public website or its datafeed to external parties. For Dow Jones-branded indices introduced prior to May 31, 2013, the Launch Date (which prior to May 31, 2013, was termed "Date of introduction") is set at a date upon which no further changes were permitted to be made to the index methodology, but that may have been prior to the Index's public release date.

Past performance of the Index is not an indication of future results. Prospective application of the methodology used to construct the Index may not result in performance commensurate with the back-test returns shown. The back-test period does not necessarily correspond to the entire available history of the Index. Please refer to the methodology paper for the Index, available at www.spdji.com for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations.

Another limitation of using back-tested information is that the back-tested calculation is generally prepared with the benefit of hindsight. Back-tested information reflects the application of the index methodology and selection of index constituents in hindsight. No hypothetical record can completely account for the impact of financial risk in actual trading. For example, there are numerous factors related to the equities, fixed income, or commodities markets in general which cannot be, and have not been accounted for in the preparation of the index information set forth, all of which can affect actual performance.

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