S&P Dow Jones Indices

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Research

Degrees of Difficulty: Indications of Active Success

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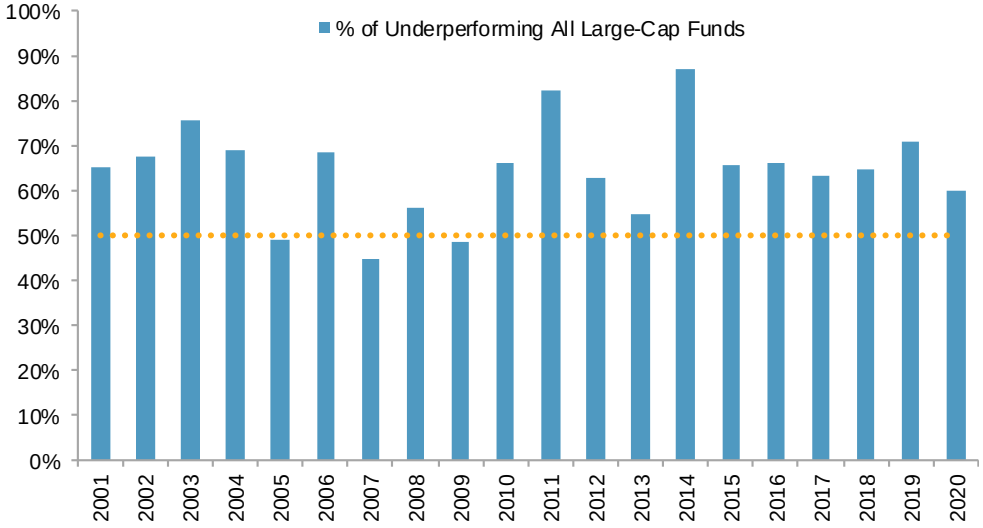
"It is better to be lucky. But I would rather be exact. Then when luck comes you are ready."

- 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 rose, and market leadership came from extremely large stocks.
- Active managers seemed to perform less poorly in years when the low volatility factor underperformed. This suggests that active managers, as a group, have a tilt against low volatility stocks.

Exhibit 1: Most Active Managers Underperform Most of the Time



Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2020. Chart is provided for illustrative purposes.

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.

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:

- 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] and
- 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]

While active managers as a group do not outperform, there is 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 is 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 F., "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 Judgment," *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] To cite a recent example, see Liu, Berlinda and Gaurav Sinha, "SPIVA® U.S. Scorecard," Year-End 2020, S&P Dow Jones Indices .

[9] Although in practice, consistent outperformance is tough to come by. See Liu, Berlinda and Gaurav Sinha, "U.S. Persistence Scorecard," Year-End 2020, S&P Dow Jones Indices.

typically underperform, theory does not tell us whether the underperformers will be 51% or 91% of the total. It is 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 2001 for the U.S. market.[10] The 20-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 20 years. The SPIVA database gives us a way to evaluate regimes that might present greater or lesser degrees of difficulty for active managers. We will 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?

Our conclusions should be regarded as indicative rather than definitive. Twenty 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.

Dispersion is a measure of the *spread of returns* within an index. In a high-dispersion environment, there is a wide 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 remains is value added for the client. **In a low-dispersion environment, it**

[10] See https://www.spglobal.com/spdji/en/research-insights/spiva/#/.

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

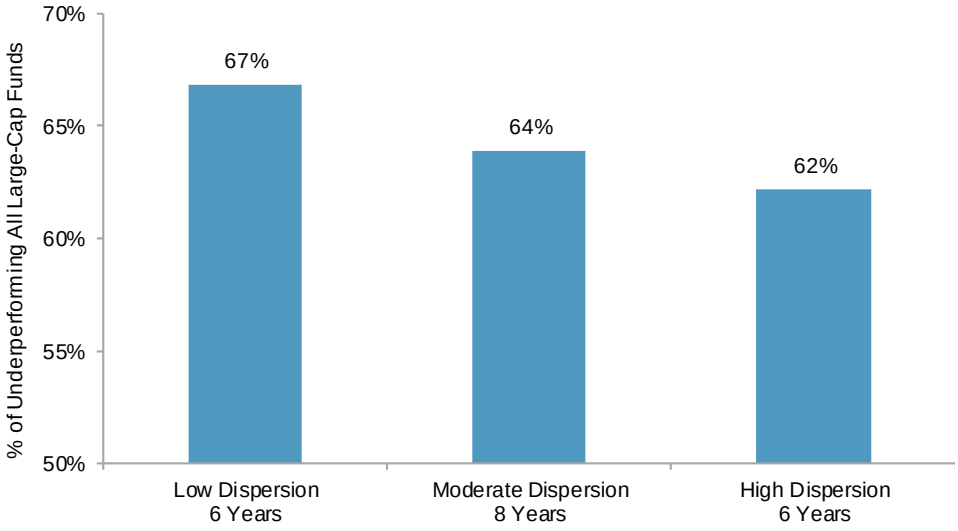
[12] Chan, Fei Mei and Craig J. Lazzara, "Gauging Differential Returns," S&P Dow Jones Indices, January 2014.

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.

In a high-dispersion environment, there is a wide spread among constituent returns; in a low-dispersion environment, the spread is modest.

Our SPIVA data validate both of these hypotheses. We divided our 20 yearly observations into three categories: the six lowest-dispersion years, the middle eight years, and the six highest-dispersion years. Exhibit 2a validates our intuition that low dispersion years are particularly challenging for active managers. In the years with low dispersion, 67% of active managers underperform, versus 64% and 62% underperformers in the moderate- and high-dispersion categories, respectively.[13]

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



Low dispersion poses particular challenges for active managers.

Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2020. 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 does not convey an analogous benefit. A manager's skill is what it is, regardless of the level of dispersion; **once fixed costs are covered, there is no reason to expect more managers to outperform**.

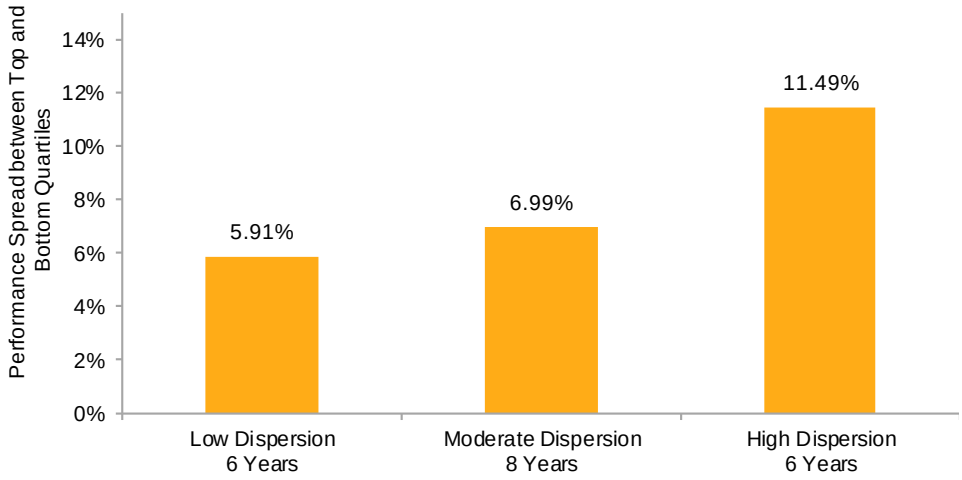
On the other hand, Exhibit 2b shows that the performance gap between the best- and worst-performing managers widens monotonically as dispersion increases.[14] This is to be expected given our understanding of dispersion.

[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.

[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.

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

The performance gap between the best- and worst-performing managers widens monotonically as dispersion increases.



Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2020. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Correlation, the degree to 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 to 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 have long argued that dispersion, rather than correlation, is the superior indicator,[16] and the SPIVA database gives us a way to test this view.

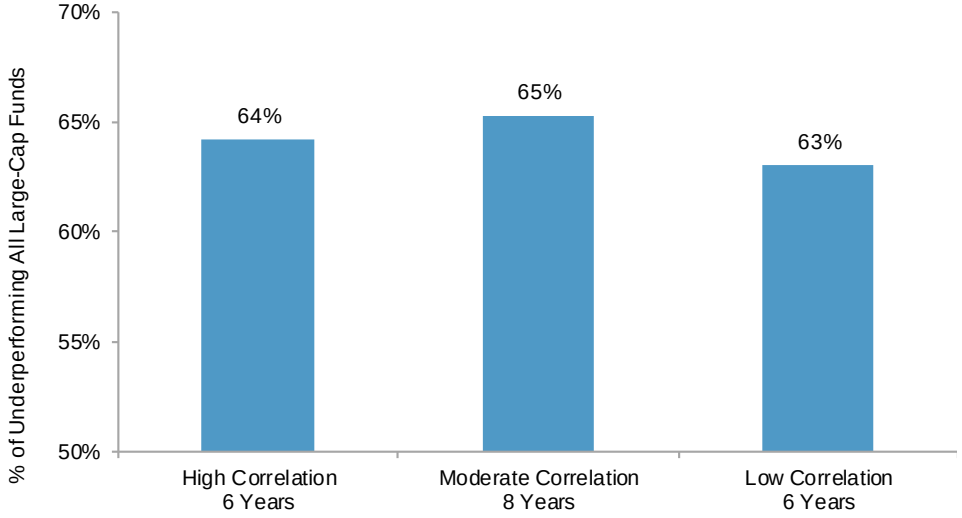
Exhibit 3a shows that the percentage of managers underperforming the S&P 500 varies insignificantly as correlation changes, in contrast to the larger impact of dispersion.

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

[16] Lazzara, Craig, "Dispersion and Correlation: Which is 'Better?'" S&P Dow Jones Indices, Jan. 30, 2014.

Low correlation produces a bigger spread than we find in periods of high correlation…

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



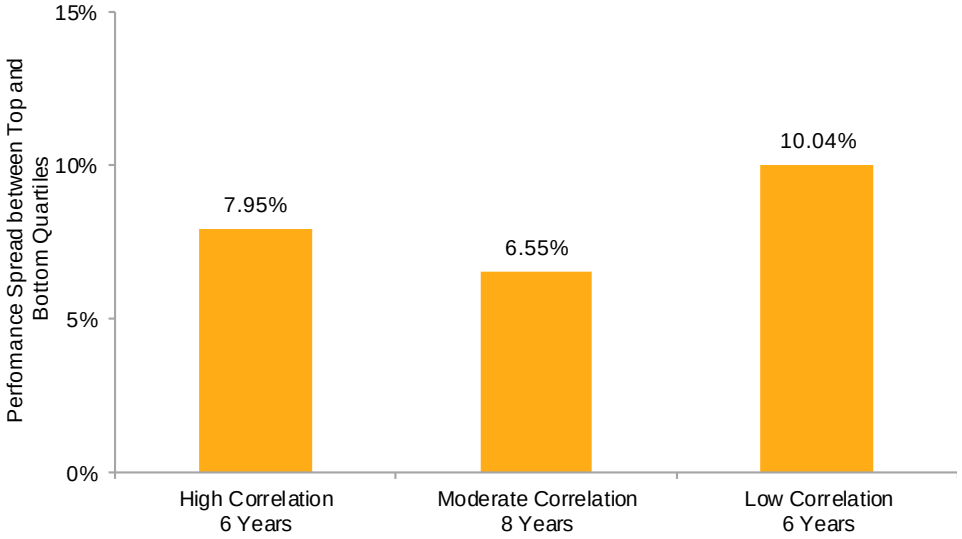
Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2020. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

…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.

A falling stock market might plausibly augment active managers' performance.

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, 2020. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

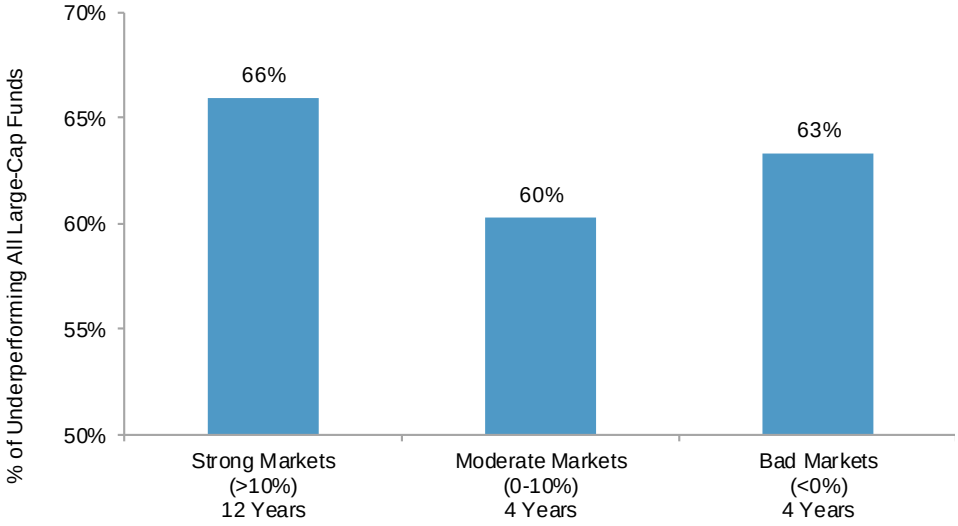
If the market declines, active managers can hold cash, gaining an advantage over a fully invested index benchmark.

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; in a

strong market, active funds' cash positions might be a drag on performance. 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 is up strongly (66%). But the argument would be more convincing if the relationship between manager performance and the market's direction were monotonic, and if the gap between active results in strong markets and bad markets were greater than 3%.

Exhibit 4a: Fewer Active Managers Underperformed in Moderate and Bad Markets Compared with Good Markets



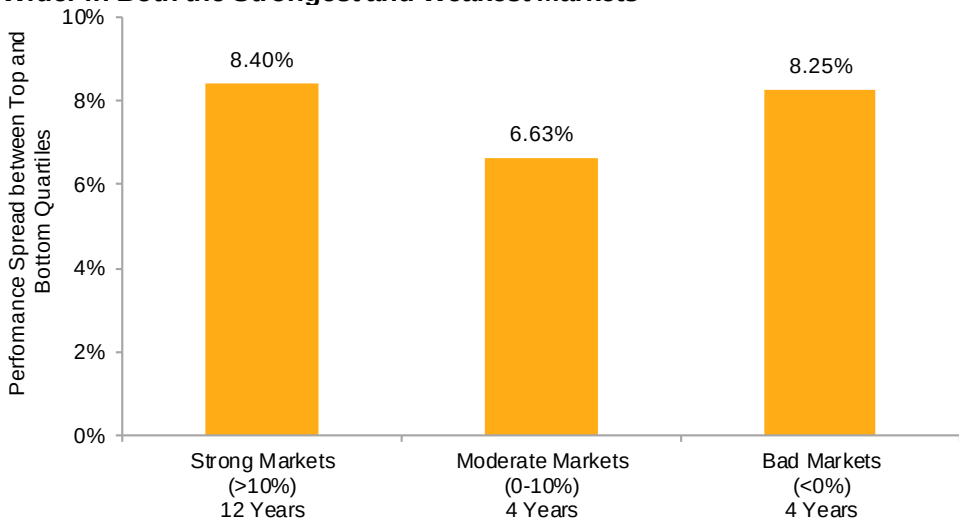
Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2020. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Dispersion tends to rise in bad markets, increasing the range of outcomes in the equity portion of a manager's portfolio.

Managers who successfully manage their cash levels in declining markets might arguably reap a bigger advantage over their less nimble peers. They might, but Exhibit 4b suggests that they do not. The interquartile range shows little variation with the level of market performance. This is somewhat surprising, since dispersion tends to rise in bad markets.[17] But dispersion only tells us something about the range of outcomes in the equity portion of a manager's portfolio, not about whether the manager is skillful at varying his cash holdings.

[17] Chan, Fei Mei and Craig J. Lazzara, "The Best Offense: When Defensive Strategies Win," S&P Dow Jones Indices, March 2015.

Exhibit 4b: Gap between the Top and Bottom Performance Quartiles Was Wider in Both the Strongest and Weakest Markets



Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2020. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Influence of Large Stocks

The S&P 500 is skewed toward its largest members.

Like most capitalization-weighted indices, the S&P 500 is skewed toward its largest members. As of Dec. 31, 2021, for example, the largest five stocks accounted for 20% of the index's value. Only 15 stocks had more than a 1.0% weight in the index, and those 15 composed 33% of the S&P 500's capitalization.[18] This means, obviously, that a relatively small number of large stocks have a significant influence on the market's return.

It's possible for a large stock to appear in an active portfolio yet still be underweighted.

Actively managed funds tend to be closer to equal weighting than to cap weighting in their portfolio construction.[19] All other things equal, this implies that if an active manager holds a relatively small stock in his portfolio, then **that stock is virtually certain to be substantially overweighted**. For a large stock, on the other hand, overweights will typically be smaller, and it is entirely possible for a large stock to appear in an active portfolio yet still be underweighted.[20]

If smaller stocks are highly likely to be overweighted in active portfolios, then it follows that when the largest stocks in the index underperform, active management performance might improve. In periods when the largest stocks dominate, active management is likely to be more challenged. The S&P 100, comprising the largest 100 stocks in the S&P 500, provides a convenient proxy for the relative performance of the largest stocks.

[18] In contrast, the smallest 100 names in the S&P 500 accounted for less than 3% of the index's value.

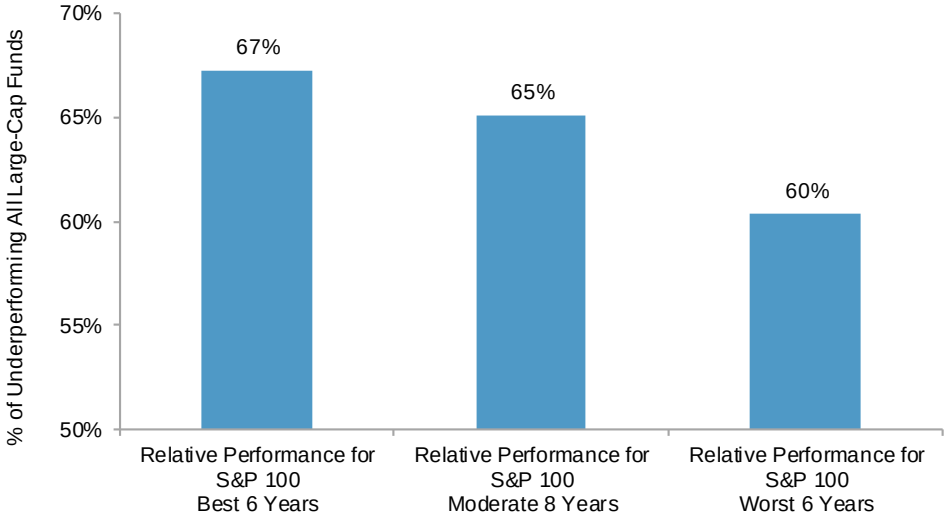
[19] Ganti, Anu, "Mutual Fund Portfolios: Equal Weight or Cap Weight?" S&P Dow Jones Indices, July 27, 2017.

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

Exhibit 5a confirms that more managers underperformed when the S&P 100 outperformed—suggesting that active managers as a group tend to be underweight the largest stocks.

More managers underperform when the S&P 100 outperforms…

Exhibit 5a: Fewer Active Managers Underperformed When the S&P 100 Underperformed the S&P 500

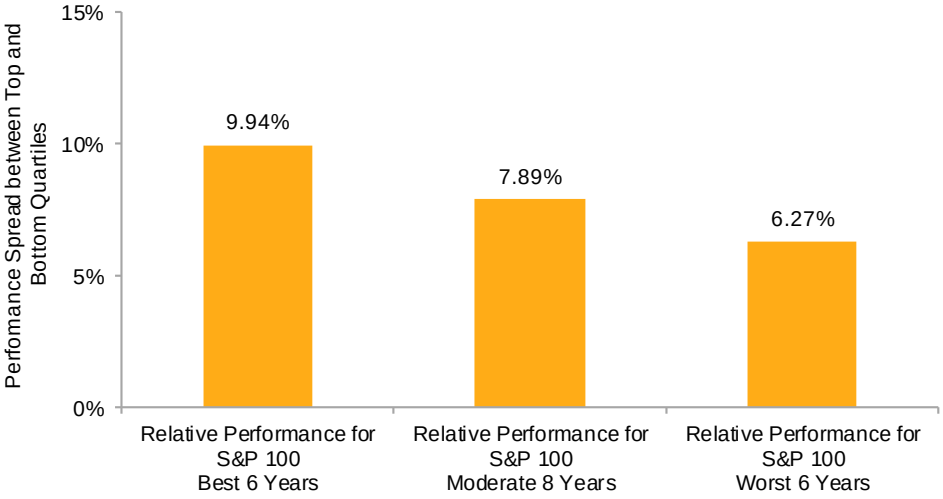


…suggesting that active managers as a group are underweight in the largest stocks.

Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2020. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

On the other hand, the minority of managers who own a more significant weight in the largest names might benefit disproportionately when the S&P 100 outperforms. 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 the S&P 100 Did Well



Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2020. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

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[21] outperforms the cap-weighted S&P 500, smaller companies are outperforming larger.[22] (This is a general statement; our analysis using the S&P 100 is a more specific instance of the same phenomenon.)
- **Value.** We measure whether the value factor was in or out of favor by measuring the relative returns of the S&P 500 Pure Value Index.[23]
- **Low Volatility.** The S&P 500 Low Volatility Index[24] tells us whether the index's least volatile stocks are leading the market.
- **Momentum.** The S&P 500 Momentum Index[25] 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.[26]

The SPIVA database suggests that active managers did not have a particularly strong tilt to any particular factor with the exception of low volatility.

We examined manager performance as a function of relative performance for each of these five factors. Most of the results are uninteresting, suggesting that the active managers in our SPIVA database did not have a particularly strong tilt to any particular factor. The exception is the low volatility factor.

As Exhibit 6a shows, active underperformance was significantly less widespread when the S&P 500 Low Volatility Index's relative performance was weak. An average of 67% of active managers underperformed the market in both the best and moderate performance years for the S&P 500 Low Volatility Index. In Low Volatility's worst relative performance years, an average of only 58% of active managers underperformed.

[21] The index includes the same constituents as the market cap-weighted S&P 500, but each company in the S&P 500 Equal Weight Index is allocated a 0.2% weight. For more details, see the complete methodology.

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

[23] The index is designed to measure the performance of the most undervalued constituents of the S&P 500. Valuations are measured using ratios of book value to price, earnings to price, and sales to price. For more details, see the complete methodology.

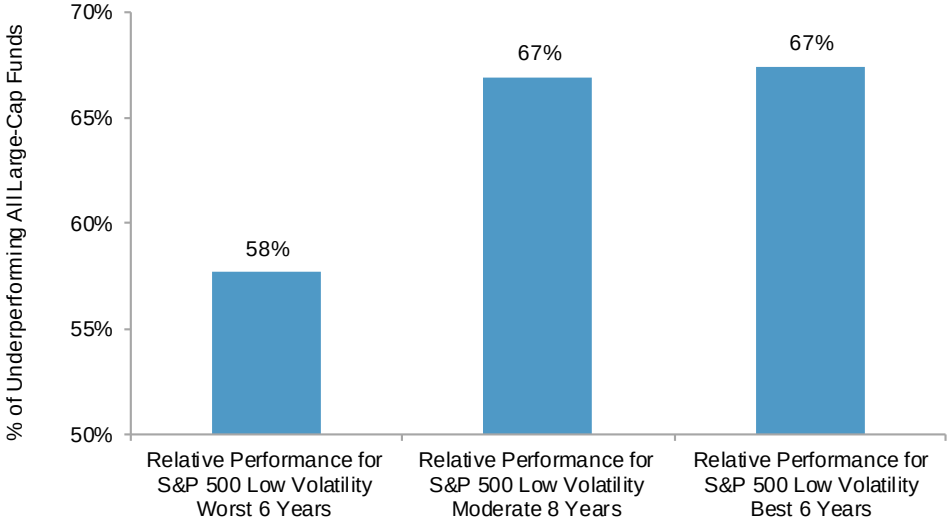
[24] The index is designed to track the least volatile stocks in the S&P 500, as measured by their historical standard deviation. For more details, see the complete methodology.

[25] The index is designed to measure the performance of securities in the S&P 500 universe that exhibit the strongest recent relative performance. For more details, see the complete methodology.

[26] The index is designed to track S&P 500 members with the highest quality scores. The score is calculated based on the return on equity, accruals ratio, and financial leverage ratio. For more details, see the complete methodology.

Active underperformance was significantly less widespread when the S&P 500 Low Volatility Index's relative performance was weak…

Exhibit 6a: Fewer Active Managers Underperformed in the Worst Environments for Low Volatility



Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2020. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

…suggesting that active managers as a group are tilted against low volatility.

Exhibit 6a suggests that active managers as a group are tilted *against* low volatility. This is not surprising if we posit that most active portfolios have a beta greater than 1.0. While beta is not synonymous with volatility, higher beta stocks tend to be more volatile. Moreover, an active tilt toward higher beta and higher volatility would be consistent with the behavioral explanation for the existence of the so-called low volatility anomaly.[27] This argument—sometimes summarized as the "preference for lotteries"—holds that some investors are willing to buy volatility *for its own sake*, thus bidding up the prices of the market's most volatile stocks.

While beta is not synonymous with volatility, higher beta stocks tend to be more volatile.

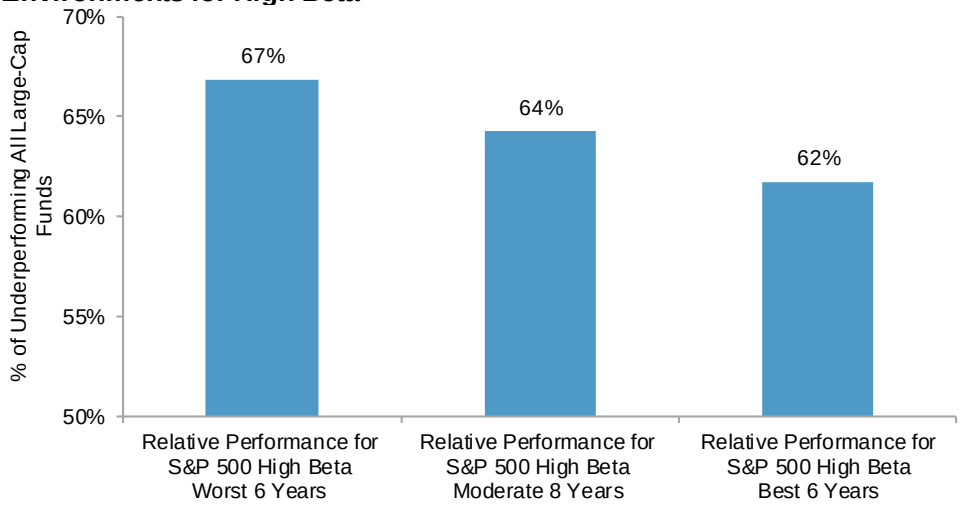
Since fewer active managers underperform when the S&P 500 Low Volatility Index underperforms, and since low volatility stocks typically have lower betas, it follows that there might also be a relationship between manager performance and the relative performance of the S&P 500 High Beta Index.[28] Exhibit 6b offers further confirmation of active portfolios' tilt toward higher beta. More managers underperformed in periods of the worst relative performance for the S&P 500 High Beta Index, and as the index's performance improved against the benchmark, more managers outperformed the market.

[27] See Baker, Malcolm, Brendan Bradley, and Jeffrey Wurgler, "Benchmarks as Limits to Arbitrage: Understanding the Low-Volatility Anomaly," *Financial Analysts Journal*, January/February 2011, pp 40-54.

[28] The index is designed to measure the performance of the 100 constituents in the S&P 500 that are most sensitive to changes in market returns. For more details, see the complete methodology.

More managers underperformed in periods of the worst relative performance for the S&P 500 High Beta Index…

Exhibit 6b: More Active Managers Underperformed in the Worst Environments for High Beta



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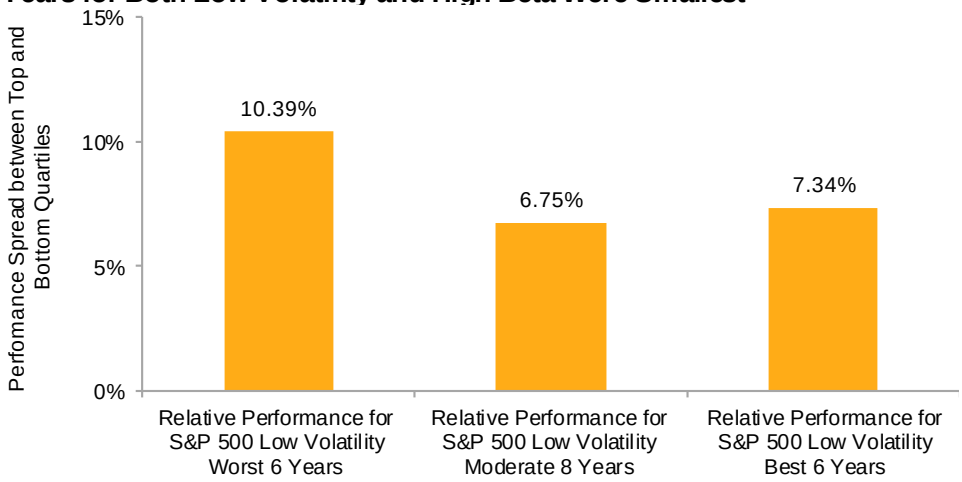
…and as the index's performance improved against the benchmark, more managers outperformed the market.

Exhibits 7a and 7b examine the interquartile range in manager performance spreads. Regardless of whether we sort years by low volatility or high beta (or other factors, for that matter, as in Appendix A), manager performance spreads in the eight years of moderate relative performance were always lowest. This is unsurprising—in part because moderate performance spreads correlate with low dispersion environments. It is also true that even if managers as a group are tilted toward a particular factor, in years when the factor does not perform particularly well or particularly poorly, the spreads among manager performances are likely to be relatively subdued.

If managers as a group are tilted toward a particular factor, the spreads among active performance are likely to be subdued in years when the factor's performance is indifferent.

Exhibit 7a: Manager Performance Spreads in Moderate Relative Performance Years for Both Low Volatility and High Beta Were Smallest



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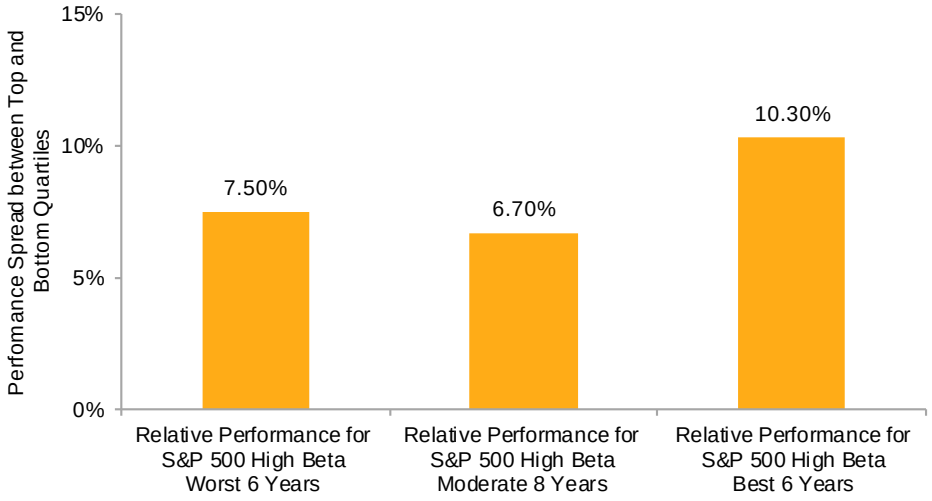
Regardless of whether sorted by low volatility or high beta (or any other factor), manager performance spreads in the eight years of moderate relative factor performance were always lowest.

Exhibit 7b: The 8 Years of Moderate Performance Spreads for Low Volatility and High Beta Were among the Lowest Dispersion Years



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This is unsurprising—in part because moderate performance spreads correlate with low dispersion environments.

CONCLUSIONS: NEAR- AND LONG-TERM

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

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

Their limited scope notwithstanding, 20 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 were relatively 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 and rising markets—both of which may present particular difficulties for active managers.

What might this analysis tell us about likely SPIVA results in 2021? For the active management community, there are both positive and negative signs:

- Dispersion began the year at a relatively modest level, before rising noticeably in the last months of the year and closing at 24%, well

above the median of its historical range.[29] Although dispersion tells us relatively little about the success of active managers as a group, heightened dispersion suggests that the range of active outcomes will be greater than usual. The best performers should shine.

The years since the global financial crisis have generally been characterized by low dispersion and rising markets…

- The S&P 500 finished 2021 with a total return of 29%. Despite a strong finish, low volatility (24%) underperformed in 2021, while high beta (41%) outperformed.[30] Since SPIVA data suggest that most active managers are underweight lower volatility, low beta stocks, their underperformance augurs well for active management.
- On the other hand, strong markets have historically been challenging for active managers, since their cash holdings make outperforming a fully invested index more difficult.
- This is particularly true when the strong market is driven by some of the largest names. In 2021, the 15 largest stocks rose a weighted average of 33%, outpacing the S&P 500's 29% performance.

Readers can form their own opinions about the balance of these observations; our estimate is that active underperformance is likely to persist when SPIVA results for 2021 become available.

…both of which may present particular difficulties for active managers.

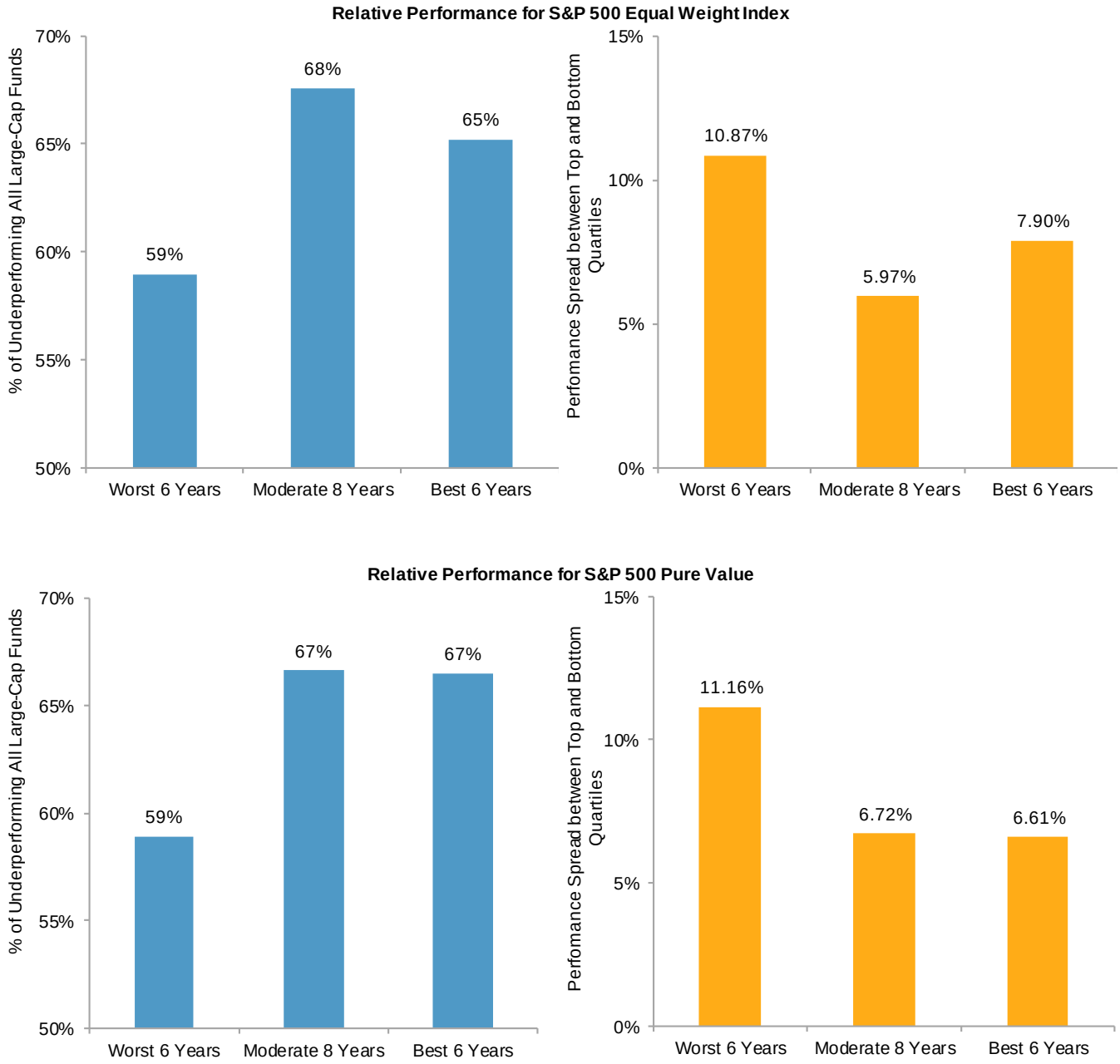
It is important to recognize that the forces that make active management relatively more difficult can change. If, for example, 2022 sees a declining market, with large caps and lower volatility names leading the way down, it is conceivable that active underperformance would become less prevalent. That may be cold comfort to the active management community and its customers—but **sometimes cold comfort is all the comfort there is**.

[29] Index Dashboard: Dispersion, Correlation & Volatility, S&P Dow Jones Indices, December 2021.

[30] Index Dashboard: S&P 500 Factor Indices, S&P Dow Jones Indices, December 2021.

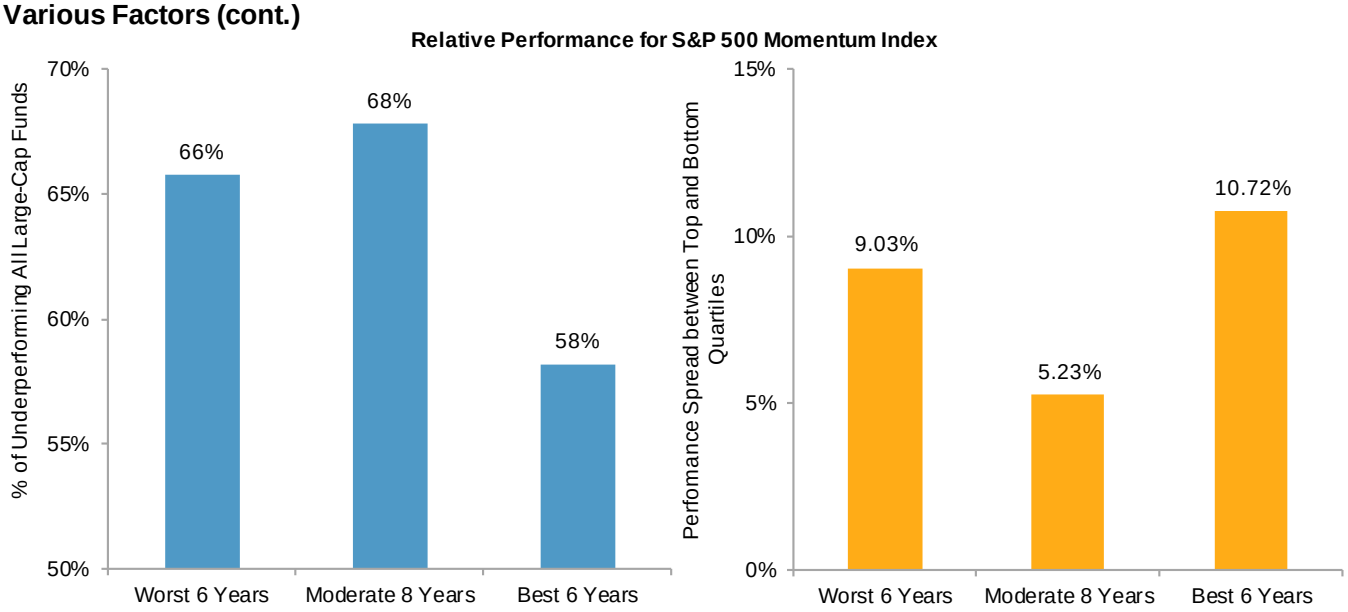
APPENDIX A

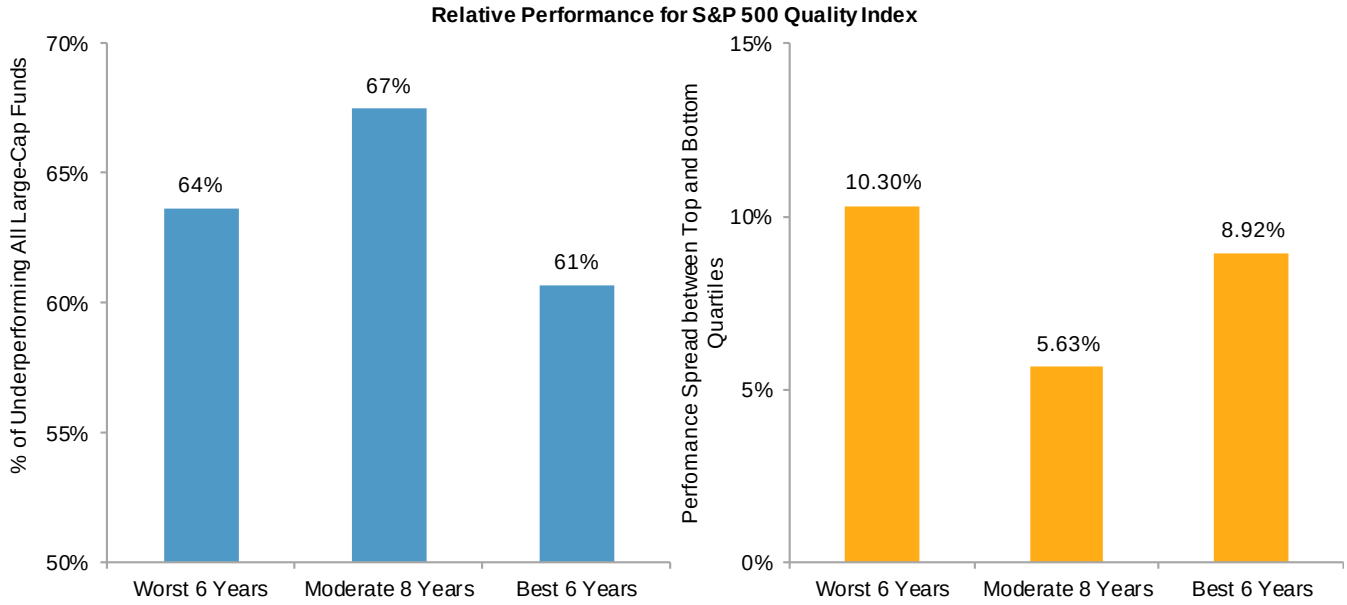
Exhibit A: Percent of Funds Underperforming and Fund Spreads Contingent on Relative Performance of Various Factors



Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2020. Past performance is no guarantee of future results. Charts are provided for illustrative purposes and reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Exhibit A: Percent of Funds Underperforming and Fund Spreads Contingent on Relative Performance of Various Factors (cont.)





Source: S&P Dow Jones Indices LLC, CRSP. Data from Dec. 31, 2000, through Dec. 31, 2020. Past performance is no guarantee of future results. Charts are provided for illustrative purposes and reflect hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

PERFORMANCE DISCLOSURE/BACK-TESTED DATA

The S&P 500 Low Volatility Index and S&P 500 High Beta Index was launched April 4, 2011. The S&P 500 Equal Weight Index was launched January 8, 2003. The S&P 500 Pure Value was launched December 16, 2005. The S&P 500 Momentum Index was launched November 14, 2014. The S&P 500 Quality Index was launched July 8, 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. However, when creating back-tested history for periods of market anomalies or other periods that do not reflect the general current market environment, index methodology rules may be relaxed to capture a large enough universe of securities to simulate the target market the index is designed to measure or strategy the index is designed to capture. For example, market capitalization and liquidity thresholds may be reduced. Complete index methodology details are available at http://www.spglobal.com/spdji. Past performance of the Index is not an indication of future results. Back-tested performance reflects application of an index methodology and selection of index constituents with the benefit of hindsight and knowledge of factors that may have positively affected its performance, cannot account for all financial risk that may affect results and may be considered to reflect survivor/look ahead bias. Actual returns may differ significantly from, and be lower than, back-tested returns. Past performance is not an indication or guarantee of future results. Please refer to the methodology for the Index 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. Back-tested performance is for use with institutions only; not for use with retail investors.

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 to a fixed value for calculation purposes. The Launch Date designates the date when 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 data feed 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.

Typically, when S&P DJI creates back-tested index data, S&P DJI uses actual historical constituent-level data (e.g., historical price, market capitalization, and corporate action data) in its calculations. As ESG investing is still in early stages of development, certain datapoints used to calculate S&P DJI's ESG indices may not be available for the entire desired period of back-tested history. The same data availability issue could be true for other indices as well. In cases when actual data is not available for all relevant historical periods, S&P DJI may employ a process of using "Backward Data Assumption" (or pulling back) of ESG data for the calculation of back-tested historical performance. "Backward Data Assumption" is a process that applies the earliest actual live data point available for an index constituent company to all prior historical instances in the index performance. For example, Backward Data Assumption inherently assumes that companies currently not involved in a specific business activity (also known as "product involvement") were never involved historically and similarly also assumes that companies currently involved in a specific business activity were involved historically too. The Backward Data Assumption allows the hypothetical back-test to be extended over more historical years than would be feasible using only actual data. For more information on "Backward Data Assumption" please refer to the FAQ. The methodology and factsheets of any index that employs backward assumption in the back-tested history will explicitly state so. The methodology will include an Appendix with a table setting forth the specific data points and relevant time period for which backward projected data was used.

Index returns shown do not represent the results of actual trading of investable assets/securities. S&P Dow Jones Indices maintains the index and calculates the index levels and performance shown or discussed but does not manage actual assets. Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities underlying the Index or investment funds that are intended to track the performance of the Index. The imposition of these fees and charges would cause actual and back-tested performance of the securities/fund to be lower than the Index performance shown. As a simple example, if an index returned 10% on a US $100,000 investment for a 12-month period (or US $10,000) and an actual asset-based fee of 1.5% was imposed at the end of the period on the investment plus accrued interest (or US $1,650), the net return would be 8.35% (or US $8,350) for the year. Over a three-year period, an annual 1.5% fee taken at year end with an assumed 10% return per year would result in a cumulative gross return of 33.10%, a total fee of US $5,375, and a cumulative net return of 27.2% (or US $27,200).

GENERAL DISCLAIMER