The Active Manager's Conundrum

"…They well deserve to have,
That know the strong'st and surest way to get."

– Shakespeare, "King Richard the Second"

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EXECUTIVE SUMMARY

- **Below-average market volatility is typically associated with above-average returns.** Given a choice, therefore, most investors would prefer low volatility to high.

- For active managers, however, the choice is less obvious: **lower market volatility is associated with lower correlation and lower dispersion**, both of which make active management harder to justify.

- Active portfolios are typically more volatile than their benchmarks; how much more volatile depends in part on correlations. Active managers pay an implicit cost of concentration, which rises when correlations decline.

- Low dispersion makes it harder for active managers to add value, and reduces the incremental return of those who do.

- These perspectives highlight the **conflict between the goals of absolute and relative return generation.**

Exhibit 1: Returns and Volatility Are Inversely Related
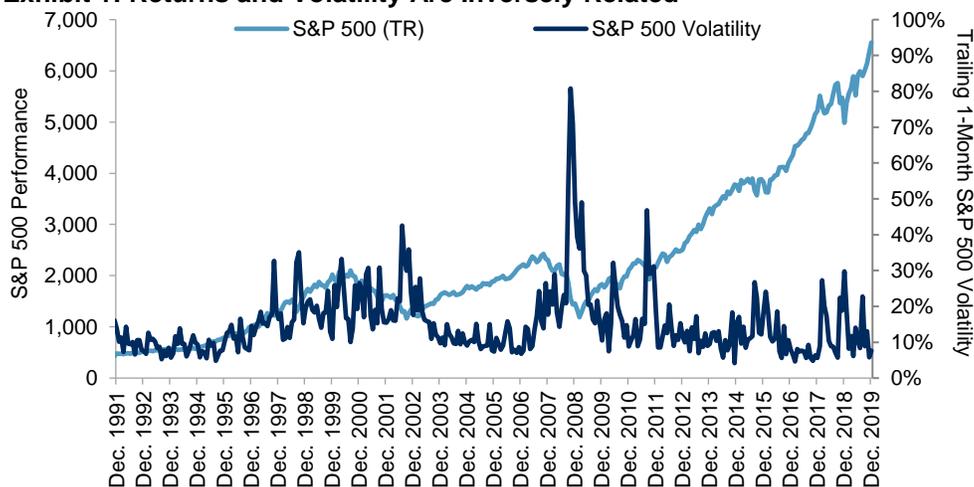
Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1990, through Dec. 31, 2019. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

A SIMPLE QUESTION

Should an active manager prefer to operate in a low volatility environment or a high volatility environment? What factors should influence this decision?

At first glance, the choice seems fairly easy. Exhibit 1 reminds us that volatility and returns are inversely related. Rising volatility typically penalizes results and vice versa.

We can see this more directly in Exhibit 2. Here, we separated the months in our database by intra-month volatility and examined return data in each set of months.

Volatility and returns are inversely related.

Exhibit 2: Higher Volatility Implies Lower Returns for the S&P 500®			
INTRA-MONTH VOLATILITY	**AVERAGE RETURN (%)**	**STANDARD DEVIATION (%)**	**RETURN/RISK**
Above Median	-0.04	3.51	-0.01
Below Median	1.84	2.04	0.91

Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1990, through Dec. 31, 2019. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

These exhibits make the manager's choice look obvious: if volatility is high, returns tend to be negative; if volatility is low, average returns are substantially positive. Positive returns mean that the manager's clients are making money, which they usually appreciate, and that the manager's fees (if asset-based) are also rising. Attracting new assets is easier in a rising market, whereas "investors do not reward outperformance in down markets with higher subsequent flows."[1]

Lower volatility means that managers and clients enjoy a smoother return path with fewer surprises.

Lower volatility means that managers and clients alike enjoy a smoother return path with fewer surprises. The manager should obviously wish for low volatility, both for its own sake and because of its connection to higher returns. **What could go wrong?**

PARSING VOLATILITY

At the definitional level, market volatility is simply a statistic. In Exhibit 1, we computed volatility by taking the standard deviation of monthly returns for rolling 12-month horizons. However, market participants experience volatility in two ways that relate to the magnitude and timing of market moves.

- Other things equal, higher *market* volatility means higher volatility in the market's *constituent stocks*. When stocks are more volatile, the stakes are higher; winners win by more and losers

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[1] From a marketing perspective, in other words, it may be better to underperform a rising market than to outperform a falling market, although obviously outperforming a rising market is the best of all possible worlds. See Gottesman, Aron, Matthew Morey, and Menahem Rosenberg, "Do Active Managers of Retail Mutual Funds Have an Incentive to Closet Index in Down Markets?" *The Journal of Investment Consulting*, 2013 and Hartzmark, Samuel M., and Solomon, David H., "Reconsidering Returns," 2019.

lose by more. In other words, higher volatility results in a wider *range* of single stock performances.

- Other things equal, higher volatility implies that more stocks move in the same direction. If every stock in the market goes down, the market will be more volatile than if half the stocks go down and the other half go up.

We can express these two aspects of volatility in two metrics—*dispersion* and *correlation.* Dispersion measures the *range of outcomes* among the components of an index during a discrete period of time.[2] Correlation measures the degree to which the components of an index *fluctuate in the same direction* at the same time.[3]

A skillful active manager can add more value when dispersion is high than when it is low.

We would expect a stock picker to want large gaps between the best- and worst-performing stocks in his universe; large gaps imply high dispersion. A skillful active manager can add more value when dispersion is high than when it is low.[4] So active managers, or at least that subset of active managers who have faith in their stock selection ability, should prefer high dispersion to low dispersion.

The role of correlation is more subtle. We typically think of low correlation as an advantage; *for a given set of assets and weights*, lower correlation means lower volatility and better risk-adjusted returns. But assets and weights are not given when we compare active and passive management. The essence of the active manager's job is to choose a *different* set of assets and weights from those of his passive benchmark. Much more often than not, that choice results in an active portfolio with higher volatility than its benchmark.[5]

Active managers willingly assume more volatility in pursuit of higher returns.

Active managers, in other words, willingly assume more volatility in pursuit of higher returns. **To choose active management is to forgo a potential reduction in volatility.** How large a volatility reduction is forgone? If correlations are high, moving from a diversified passive benchmark to a concentrated active portfolio may occasion a relatively small increase in volatility. If correlations are low, the same move may cost the investor much more incremental volatility.

We can illustrate this point with a simple example. Exhibit 3 shows the volatility of a 100-stock, equal-weighted portfolio for varying levels of correlation, assuming each stock has a volatility of 25%. If the

[2] Edwards, Tim and Craig J. Lazzara, "Dispersion: Measuring Market Opportunity," S&P Dow Jones Indices, December 2013.

[3] Edwards, Tim and Craig J. Lazzara, "At the Intersection of Dispersion, Volatility and Correlation," S&P Dow Jones Indices, April 2014.

[4] Chan, Fei Mei and Craig J. Lazzara, "Degrees of Difficulty: Indications of Active Success," S&P Dow Jones Indices, May 2018. The same relationship also applies to factor indices; the differential performance of factors relative to the S&P 500 rises dramatically as dispersion increases. See Chan and Lazzara, "Gauging Differential Returns," S&P Dow Jones Indices, January 2014.

[5] Edwards, Tim and Craig J. Lazzara, "The Volatility of Active Management," S&P Dow Jones Indices, September 2016.

correlation of the assets is 1.00, the volatility of the portfolio will simply be the average volatility of each individual asset. With the realistic assumption that the assets are not perfectly correlated, the portfolio will be less volatile than its average component. How much less depends on the correlation of the assets in question. As Exhibit 3 illustrates, portfolio volatility falls as correlations fall. **The benefit of diversification is less when correlations are high.**

Exhibit 3: Portfolio Volatility Rises as Correlations Rise
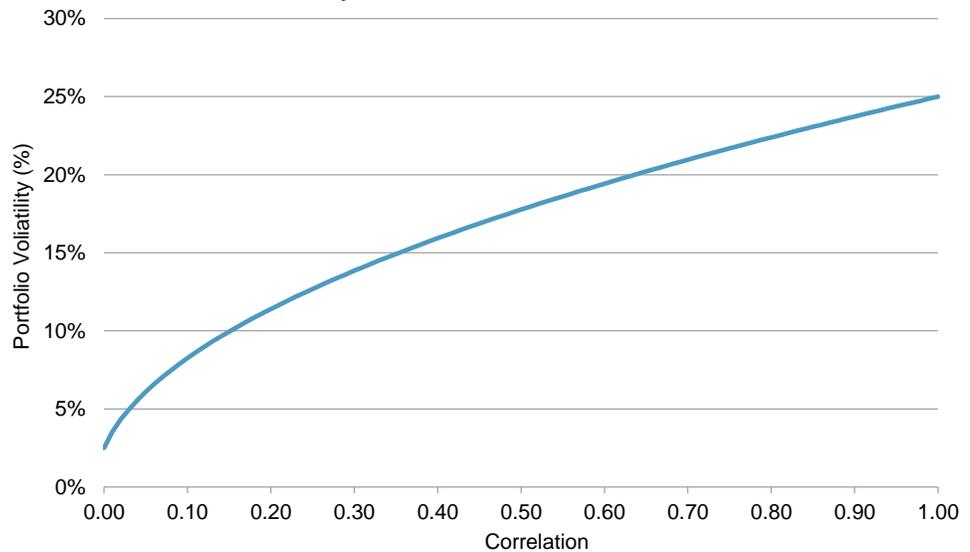
Source: S&P Dow Jones Indices LLC. Assumes an equal-weighted portfolio of 100 stocks, each with 25% volatility. Chart is provided for illustrative purposes.

Active managers approach this problem from the opposite direction. Rather than receiving a benefit from diversification, active managers incur a **cost of concentration**. Exhibit 4 illustrates the cost of concentration, following the same assumptions as Exhibit 3. **We define the cost of concentration as the ratio of the average volatility of the component assets to the volatility of the portfolio.** Exhibit 3 shows us, for example, that if the correlation among the portfolio's assets is 0.20, the volatility of the portfolio would be 11.4%. The average volatility of the component assets is 25.0%. The cost of concentration is the ratio of these two volatilities, or 2.19. Otherwise said, under these assumptions, the average single-stock investor will experience 119% more volatility than a diversified investor.

The cost of concentration is an opportunity cost—it represents the incremental volatility a manager accepts in order to pursue an active strategy. If correlations are high, the incremental volatility associated with being less diversified and more concentrated declines. For this reason, **we argue that active managers should prefer high correlations to low correlations.**

Exhibit 4: High Correlations Reduce the Cost of Concentration

An active manager will tend to prefer below-average volatility but above-average dispersion and correlation.
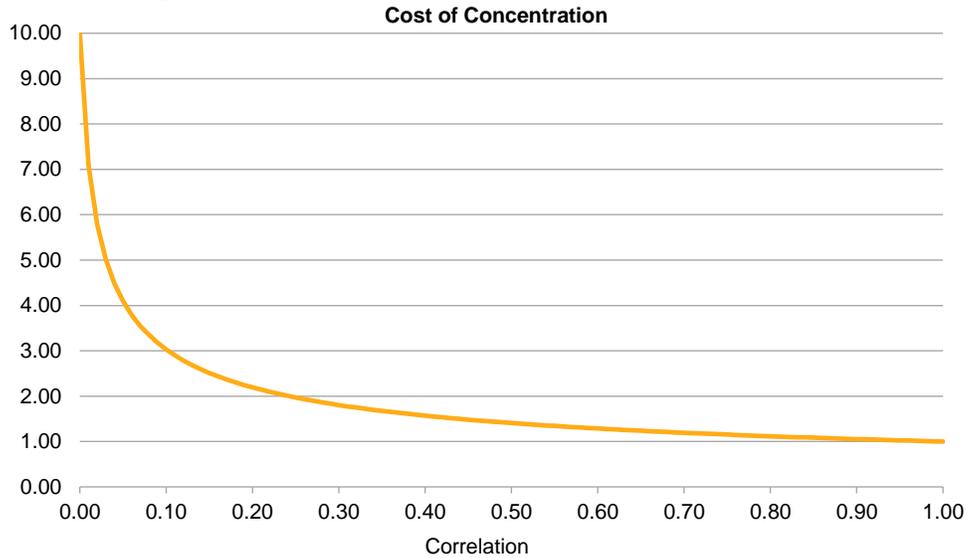
Source: S&P Dow Jones Indices LLC. Assumes an equal-weighted portfolio of 100 stocks, each with 25% volatility. Cost of concentration = ratio of average individual stock volatility to portfolio volatility. Chart is provided for illustrative purposes.

THE CONUNDRUM

In sum, we posit that most managers would prefer:

- Below-average volatility, because of its association with higher returns, higher fees, and easier asset gathering;
- Above-average dispersion, because stock selection skill is worth more when dispersion is high, and;
- Above-average correlation, because the cost of concentration associated with active management will be lower when correlations are high.

The active manager's conundrum arises because these things almost never occur at the same time.

The active manager's conundrum arises because these things almost never occur at the same time. Exhibit 5 illustrates the point by revisiting Exhibit 2, in which we separated the months in our database by the S&P 500's intra-month volatility. When volatility is below median, both dispersion and correlation are well below their average levels when volatility is above median.

Exhibit 5: Higher Volatility Implies Higher Dispersion and Higher Correlation

| INTRA-MONTH VOLATILITY	AVERAGE VOLATILITY (%)	AVERAGE DISPERSION (%)	AVERAGE CORRELATION
Above Median	20.99	27.1	0.33
Below Median	9.11	19.8	0.17

Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1990, through Dec. 31, 2019. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

Exhibit 6 amplifies the point by observing the frequency with which volatility, dispersion, and correlation are above or below their median levels. For example, in 26% of all months between 1991 and 2019, all three variables were below median; in 25% of months, all three were above median. **Our most desired outcome—low volatility, high correlation, and high dispersion—occurs in only 2% of the observations.**

Exhibit 6: Below-Median Volatility Typically Means Below-Median Dispersion and Correlation
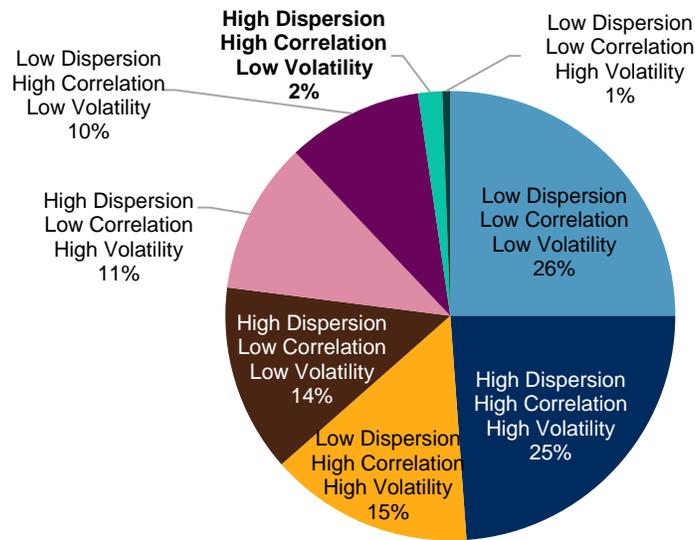
A manager who hopes for low volatility will likely also get low correlation and low dispersion.

Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1990, through Dec. 31, 2019. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

A manager who hopes for low volatility should recognize that he's likely also to get low correlation and low dispersion. Low correlation implies an above-average diversification benefit forgone and therefore a relatively high cost of concentration. The cost of concentration reminds us that **an investor who opts for active rather than index management forgoes part of the benefit of diversification**. Forgoing an above-average diversification benefit raises the opportunity cost of active management; low dispersion means it will be harder to generate enough return to justify that cost. **Relative return is hardest to produce when absolute return is easiest**—and therein lies our conundrum.

Relative return is hardest to produce when absolute return is easiest.

DIVERSIFICATION AND THE COST OF CONCENTRATION

We noted above that we can think of market volatility in terms of both the *magnitude* and *timing* of single stock moves. Dispersion is a measure of magnitude; correlation is a measure of timing. **Increases in either dispersion or correlation are apt to accompany higher volatility readings**. Exhibit 7 illustrates each pair of relationships, confirming what we observed in Exhibits 5 and 6. **There is a strong relationship between volatility and dispersion, and between volatility and correlation, but the relationship between dispersion and correlation is relatively casual.**

Exhibit 7: Pairwise Relationships: Dispersion, Correlation, and Volatility for the S&P 500
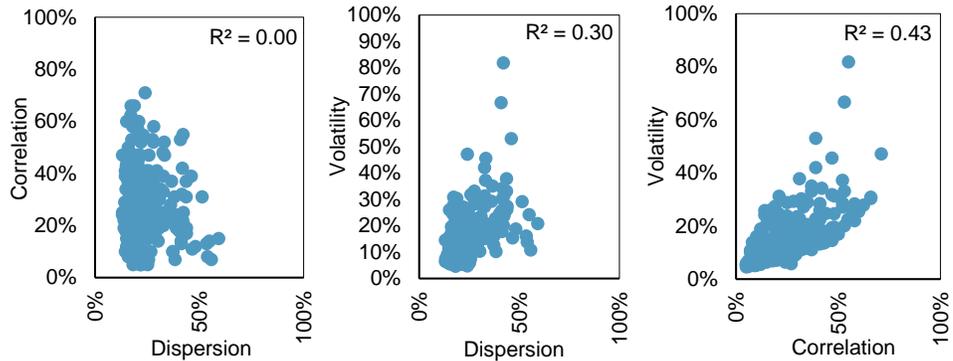
Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1991, through Dec. 31, 2019. Past performance is no guarantee of future results. Charts are provided for illustrative purposes.

Dispersion is a measure of magnitude; correlation is a measure of timing.

In Exhibit 4, we used a simple example to compare the volatility of a portfolio to the average volatility of its components. Exhibit 8 applies the same principle to the real-life example of the S&P 500. The top panel of the exhibit compares the average volatility of S&P 500 constituents to the volatility of the index itself (both measured over a trailing 12-month interval); the bottom panel shows the ratio of the two volatilities. The reader will recognize that **this ratio is conceptually the same cost of concentration** that we encountered in Exhibit 4.

A higher cost of concentration tells us that the potential diversification benefit was relatively large.

This cost waxes and wanes, as Exhibit 8 shows. The ratio always exceeds 1.0; average constituent volatility is always greater than index volatility, meaning that there is always a volatility-reducing benefit to be had from diversification. However, **the magnitude of that benefit fluctuates dramatically**, with the peak more than double the trough. The ratio peaked in the 12-month period ending Dec. 31, 1995; the trough came in August 2009. A higher cost tells us that the potential diversification benefit was relatively large.

Exhibit 8: The Diversification Benefit Fluctuates
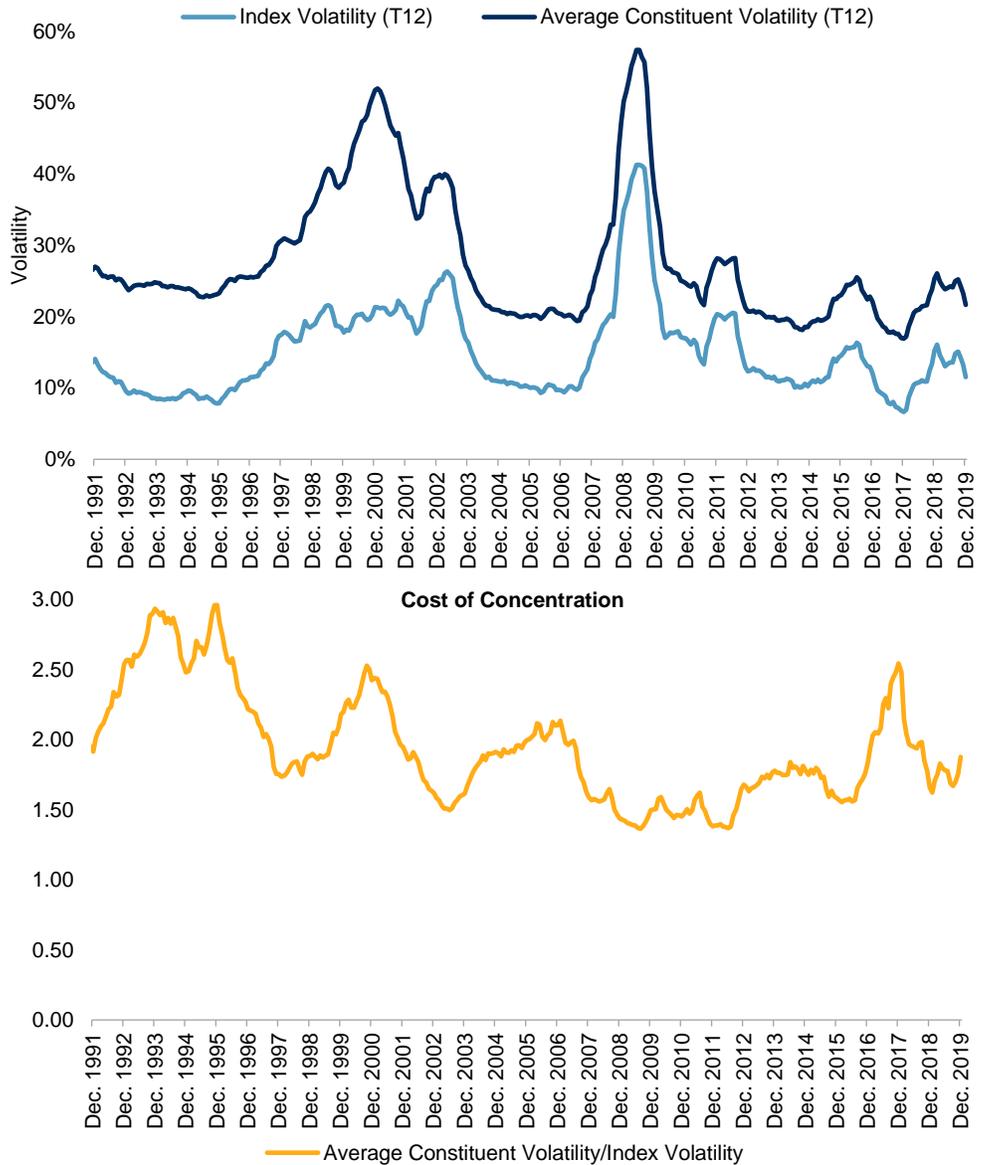
How much higher do an active manager's returns have to be in order to justify the incremental volatility he bears?

Of course, our hypothetical active investor sacrifices some of the benefit of diversification for a reason; he thinks that by so doing he'll earn higher returns. How much higher do his returns have to be in order to justify the incremental volatility he bears?

Making some simple assumptions will help answer this question. Let

Ri = the return on an index

σi = the standard deviation of index returns

Then the return/risk ratio for the index is $Ri/\sigma i$. We can think of this as the price of risk; the investor expects to be paid ($Ri/\sigma i$) for every unit of risk he bears.

Now assume that the investor owns a relatively concentrated active portfolio, with standard deviation σp. The incremental risk of this portfolio relative to the index is ($\sigma p - \sigma i$). How much incremental return should the investor demand in exchange for bearing this incremental risk? Assuming that the price of risk is as described above:

$$\text{Required return} = (Ri/\sigma i) * (\sigma p - \sigma i) \qquad (1)$$

$$= Ri * (\sigma p/\sigma i - 1) \qquad (2)$$

The second term in equation (2) is analogous to the cost of concentration in Exhibit 8. In fact, equation (2) lets us move from the relatively abstract ratio of two volatilities to a more concrete required rate of return, as shown in Exhibit 9.

Exhibit 9: Required Incremental Return Peaked in the Early 1990s

In the early 1990s, correlations were low, providing a large volatility reduction to investors who opted for diversified index management.
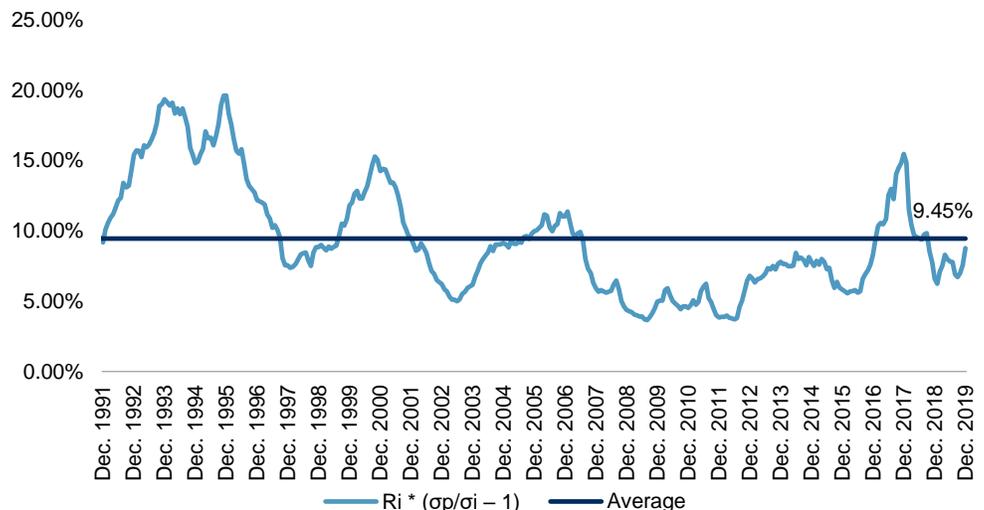
Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1991, through Dec. 31, 2019. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Constructing Exhibit 9 requires an assumption about the market return—the Ri term in equation (2)—which we set at an arbitrary 10%. (This is not far off the historical average.[6]) We can then observe that the required incremental return, which averaged 9.45% over the entire period, peaked in the early 1990s at 19.6%, and reached a trough (3.7%) in mid-2009, paralleling our observations of the cost of concentration.

- In the early 1990s, correlations were low, providing a large volatility reduction to investors who opted for diversified index management.

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[6] Although we estimated the volatilities in Exhibit 7 using trailing 12-month data, this approach will not suffice for estimating returns. There will be some 12-month intervals when the market's return is negative, leading to the nonsensical conclusion that there should be a negative premium for assuming incremental risk.

Overcoming this reduction would have required a large incremental return (peaking at close to 20%).

- In mid-2009, as the market recovered from the global financial crisis, correlations were high. Investors in concentrated portfolios paid a low price in terms of incremental volatility. This lowered the required incremental return.

How much incremental return should an investor require to forgo the benefits of diversification?

OPPORTUNITIES FOR ACTIVE MANAGERS: THE ROLE OF DISPERSION

Exhibit 9 shows us how much incremental return an investor should require to forgo the benefits of diversification. How difficult is it to earn that return? The answer depends, in part, on the level of dispersion. Exhibit 10 divides the required incremental return in Exhibit 9 by dispersion.

Exhibit 10: Current Required Incremental Return Approximates Its Long-Run Average

Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 1991, through Dec. 31, 2019. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

The incremental return required to justify a concentrated active portfolio averaged 0.43 dispersion units.

On average, the incremental return required to justify a concentrated active portfolio amounted to 0.43 dispersion units, with considerable variation over time. We again notice a high in the mid-1990s and a low in the summer of 2009. What's particularly notable in Exhibit 10 is the local maximum at the end of 2017. The year's below-average correlation meant that the incremental volatility associated with active management was unusually high. Below-average dispersion in 2017 meant it was unlikely that many managers would be sufficiently skillful to earn the required increment.[7]

Exhibit 10 is longitudinal; it measures the change in required incremental return for S&P 500-based active portfolios *over time*. We can do a similar

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[7] The evidence of our SPIVA reports makes it hard to argue that there is ever a "good" time to be an active manager. Most active managers underperform most of the time; between 2001 and 2018, an average of 64 percent of large-cap funds underperformed the S&P 500. See Chan, Fei Mei and Craig J. Lazzara, "Degrees of Difficulty: Indications of Active Success," S&P Dow Jones Indices, May 2018.

analysis by comparing different indices *at the same time*. This may give us some insight into the relative difficulty of active management cross-sectionally.

Over the complete history, the S&P 500 ranks as one of the more challenging markets for active managers.

The bars in Exhibit 11 indicate the average value of the required incremental return in dispersion units for a number of indices.[8] (For the S&P 500, this value is 0.43 dispersion units, as shown in Exhibit 10.) Over the complete history, the S&P 500 ranks as one of the more challenging markets for active managers—unsurprising given its relatively low dispersion level. Indices such as the S&P Pan Asia BMI or the S&P Latin America BMI, which are substantially more disperse than the S&P 500, seem historically to have been more promising venues for active management.[9]

Exhibit 11: Active Management Is Currently More Challenging than Usual

Source: S&P Dow Jones Indices LLC. Data from Dec. 31, 2006, through Dec. 31, 2019. Past performance is no guarantee of future results. Chart is provided for illustrative purposes. Please refer to Appendix for return assumptions used.
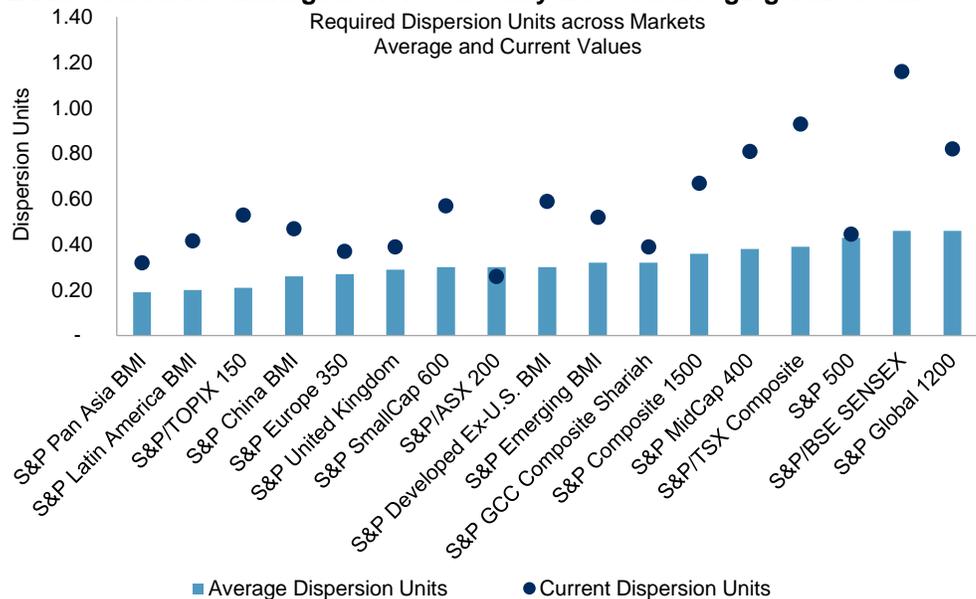
Indices that have historically been more disperse than the S&P 500 seem to have been more promising venues for active management.

What is particularly noticeable in Exhibit 11 is that, for every market other than the S&P/ASX 200, **the most recent level of required incremental return was higher than the historical average**. That's consistent with the observation that dispersion levels in 2019 were generally below average. It's also consistent with an expectation that **2019 will be another difficult year for active management performance**.

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[8] Alert readers will recognize these indices from our monthly Dispersion, Volatility & Correlation dashboard. This and other dashboards can be accessed here. Please refer to Appendix for return assumptions used.

[9] Note that "more promising" does not equate to "easy." SPIVA results are just as daunting outside the U.S. as they are for the S&P 500.

FINAL THOUGHTS

Low volatility is an unalloyed benefit to asset owners.

Viewing market volatility through the lenses of correlation and dispersion helps explain historical results, and may provide some guidance for identifying the least unfavorable markets for active management going forward. Since below-average volatility and rising stock markets typically go hand in hand, **it's arguable that low volatility is an unalloyed benefit to asset owners. For active managers, however, the verdict is more subtle and complex.** Low market volatility typically means that the correlations among index constituents are below average; below-average correlations mean that the manager forgoes a larger volatility reduction than would be the case in a high-correlation environment. Low market volatility thus makes the cost of concentration higher, and typically means that the dispersion of returns among index constituents will be below average; below-average dispersion means that it's harder for active managers to generate value added. Hence the active manager's conundrum: **the environment most conducive to generating positive absolute returns is least conducive to producing positive relative returns.**

The environment most conducive to generating positive absolute returns is least conducive to producing positive relative returns.

APPENDIX

Exhibit 12: Return Assumptions for Exhibit 11

INDEX	LONG-TERM RETURN (25-YEAR ANNUALIZED, %)	RETURN ASSUMED (%)
S&P Pan Asia BMI	3.8	4.0
S&P GCC Composite Shariah***	6.3	6.0
S&P Developed Ex-U.S. BMI	6.3	6.0
S&P Emerging BMI	6.9	7.0
S&P United Kingdom	7.7	8.0
S&P/ASX 200**	8.0	8.0
S&P/TOPIX 150***	8.1	8.0
S&P Europe 350	8.3	8.0
S&P/TSX Composite	8.3	8.0
S&P Global 1200	8.7	9.0
S&P Latin America BMI	8.8	9.0
S&P China BMI	10.0	10.0
S&P 500	10.2	10.0
S&P Composite 1500	10.4	10.0
S&P SmallCap 600	11.2	11.0
S&P MidCap 400	12.1	12.0
S&P/BSE SENSEX*	12.9	13.0

*20 year annualized, **15 year annualized, and ***10 year annualized.
Source: S&P Dow Jones Indices LLC. Data as of January 2020. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

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