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Some Implications of Sector Dispersion

It's no surprise that active equity management, a challenging enterprise at the best of times, suffered a difficult 2014.¹ Although it's common for a majority of active managers to underperform an unmanaged benchmark like the S&P 500®, the percentage of underperformers in 2014 was extraordinarily high. A significant contributor to these results was the U.S. market's record-low dispersion.²

Although dispersion was low in 2014, it wasn't uniformly low. The purpose of this paper is to examine dispersion at the sector level and to suggest its implications for U.S. investors. We'll begin by reviewing the impact of dispersion and correlation on broad market indices.

DISPERSION

Dispersion measures the degree to which the components of a market index perform similarly. If the component returns are grouped tightly around the index's return, dispersion will be low; if the spread among component returns is wide, dispersion will be high.³ Dispersion is a single-period metric—to compute it for a month, we need only that month's index and component returns. Conceptually, dispersion measures the spread among the returns of the securities in an index; economically, dispersion tells us something important about the potential opportunities for adding value through stock selection. If dispersion is high, the opportunity to add (or lose) value through active stock selection is relatively high; if dispersion is low, the opportunity is commensurately lower. This is not primarily a reflection of manager skill; the problem is that **in a low-dispersion environment, the value of skill goes down.**

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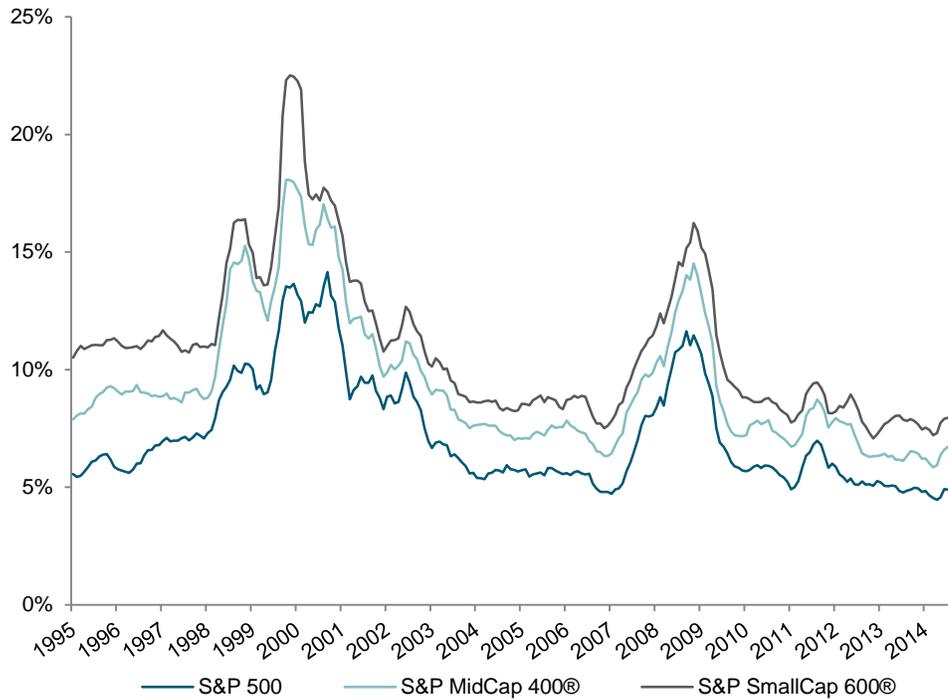
¹ See Soe, Aye M., [SPIVA U.S. Scorecard](#), Year-End 2014.

² Edwards, Tim and Lazzara, Craig J., "[Dispersion: Measuring Market Opportunity](#)," December 2013, and Lazzara, Craig, "[The Value of Skill](#)," March 2015.

³ Computationally, dispersion is the weighted standard deviation of returns, so it tells us how far from the index's return a one-standard deviation return falls. To calculate dispersion, we need to specify both *periodicity* and *granularity*. See Edwards and Lazzara, op. cit.

Exhibit 1: 6-Month Rolling Average Dispersion Across Market Caps

Dispersion is a single-period measure of magnitude.



Source: S&P Dow Jones Indices LLC. Data from 1995 to 2014. Charts and tables are provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 1 shows the dispersion of the S&P 500[®], the S&P MidCap 400[®], and the S&P SmallCap 600[®] between 1995 and the end of 2014. Not surprisingly, dispersion has typically (if not invariably) been higher for small caps than for mid caps, and higher for mid caps than for large caps. This tells us that **the greatest opportunity for active managers to outperform has been within the small-cap space**, relative to other capitalization ranges in the U.S equity markets. Otherwise said, if you could be blessed with perfect forecasting abilities in only one capitalization segment, choose small caps.

CORRELATION

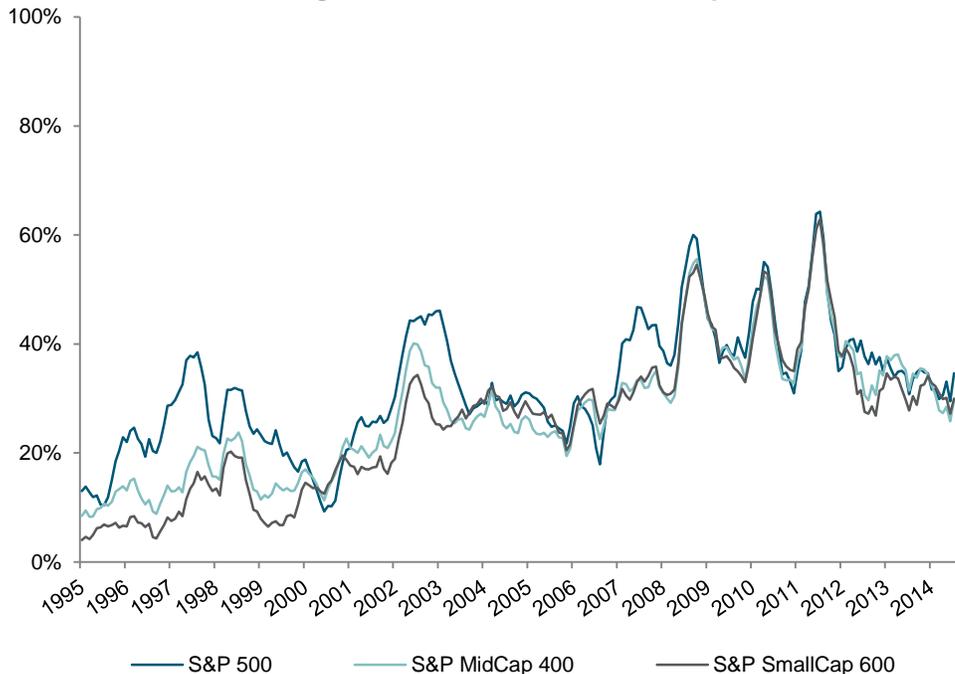
Dispersion is a *single-period* measure of *magnitude*; it tells us, for a given period, by how much the return of the average stock in an index differs from the index's return. Correlation is a *multi-period* measure of *timing*; it shows, for the interval measured, the degree to which stocks moved up or down together. Correlation is thus often used as a measure of diversification potential. Other things equal, a stock with a low correlation to an existing portfolio will be a better diversifier than a stock with a high correlation. Importantly, correlation is *not* a measure of the potential value added by stock selection, a role much better filled by dispersion.⁴

⁴ Lazzara, Craig, "[Dispersion and Correlation: Which is 'Better?'](#)" January 2014.

Exhibit 2 displays the average correlation of the stocks within the S&P 500, S&P MidCap 400, and S&P SmallCap 600 indices since 1995. The exhibit measures the average correlation of every index component with every other index component, weighted by their importance in the index.⁵

Intra-index correlations peaked in the aftermath of the financial crisis and have declined subsequently. Unlike dispersion, where there's a clear tendency for higher dispersion in lower-capitalization indices, there does not seem to be a clear tendency for the constituents of one index to be more correlated than the constituents of another.

Exhibit 2: 6-Month Rolling Correlation Across Market Caps



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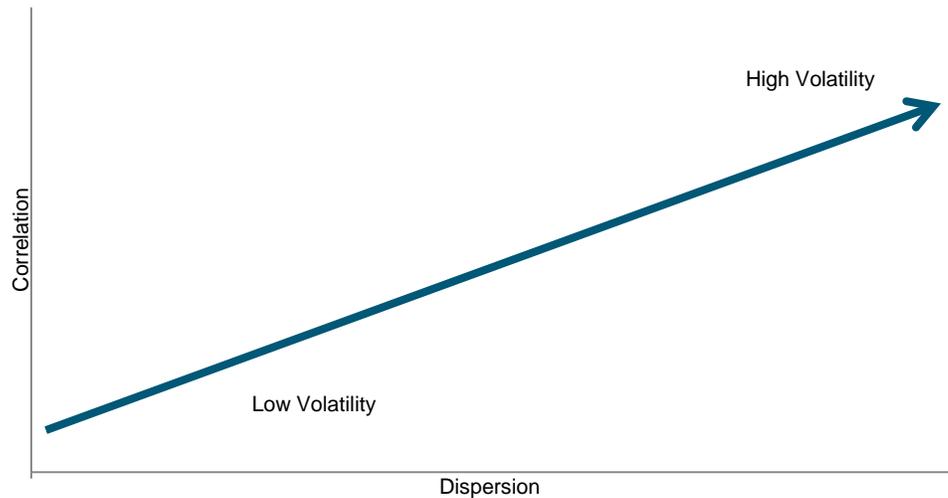
DISPERSION + CORRELATION = ?

Volatility is a function of both dispersion and correlation.⁶ Other things equal, for a given level of dispersion, higher correlation leads to higher index volatility. Similarly, for a given level of correlation, higher dispersion typically leads to higher volatility. Exhibit 3 illustrates the concept.

⁵ For a 500-stock index, this requires computing 124,750 separate pairwise correlations, and then calculating the weighted average of those. See Edwards, Tim and Craig J. Lazzara, "[At the Intersection of Diversification, Volatility, and Correlation](#)," April 2014.

⁶ See Edwards, Tim and Craig J Lazzara, "[The Landscape of Risk](#)," December 2014.

Exhibit 3: Dispersion + Correlation = Volatility

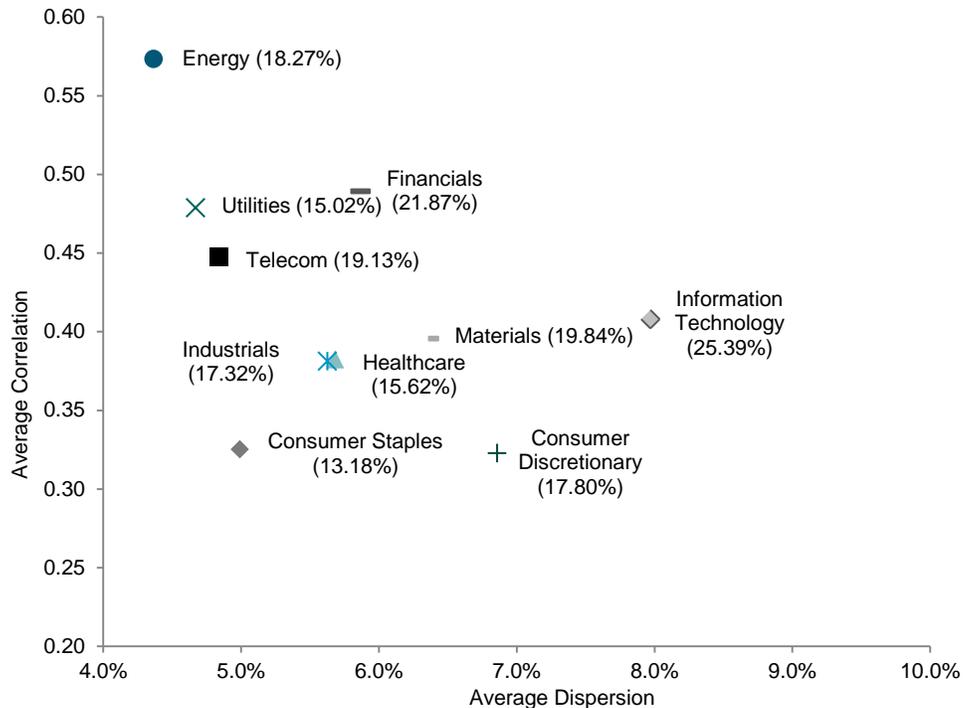


Source: S&P Dow Jones Indices LLC. Charts and tables are provided for illustrative purposes.

The concepts of dispersion and correlation extend naturally to subindices.

The concepts of dispersion and correlation extend naturally to subindices (such as sector indices), and these subindices give us a convenient way in which to test Exhibit 3's schematic. If Exhibit 3 is conceptually accurate, then when we plot actual sector dispersion and correlation data, we should find that the farther away from the origin a sector lies, the higher its volatility.

Exhibit 4: S&P 500 Sector Average Correlation and Dispersion



Source: S&P Dow Jones Indices LLC. Data from 1991 to 2014. Charts and tables are provided for illustrative purposes. Past performance is no guarantee of future results.

Mid- and small-capitalization stocks tend to be more volatile than large-capitalization stocks.

As Exhibit 4 demonstrates, the highest-volatility sectors tend to be the farthest from the origin, indicating that **sector volatility is well-predicted by sector dispersion and correlation**. For example, the technology sector, which has been the most-volatile sector historically, is the most distant sector from the origin; consumer staples, historically the least-volatile sector, is the closest.

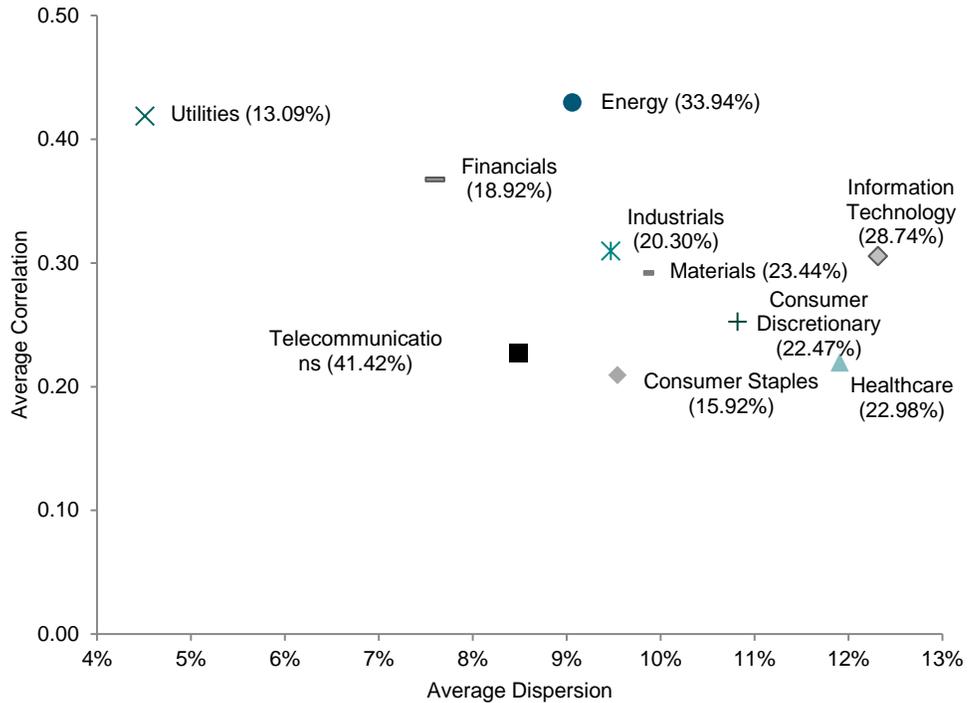
Exhibit 5: Sector Dispersion, Correlation, and Volatility			
Sector Index	Average Monthly Dispersion (%)	Average Monthly Correlation	Annualized Volatility (%)
S&P 500 Information Technology	8.04	0.41	25.39
S&P 500 Financials	5.93	0.49	21.87
S&P 500 Materials	6.39	0.39	19.84
S&P 500 Telecommunication Services	4.92	0.44	19.13
S&P 500 Energy	4.36	0.57	18.27
S&P 500 Consumer Discretionary	6.89	0.32	17.80
S&P 500 Industrials	5.67	0.38	17.37
S&P 500 Health Care	5.71	0.38	15.62
S&P 500 Utilities	4.71	0.47	15.02
S&P 500 Consumer Staples	5.01	0.32	13.18

Source: S&P Dow Jones Indices LLC. Data from 1991 to 2014. Charts and tables are provided for illustrative purposes. Past performance is no guarantee of future results.

Mid- and small-capitalization stocks tend to be more volatile than large-capitalization stocks. As we demonstrated in Exhibit 2, however, the correlation of stock returns within the S&P MidCap 400 and S&P SmallCap 600 has historically been close to the correlation of stock returns in the S&P 500. Exhibit 1 showed that mid- and small-cap dispersion has been consistently higher, indicating that **the higher volatility of the S&P MidCap 400 and S&P SmallCap 600 has been primarily driven by dispersion**.

This higher dispersion is reflected in the sectors of the S&P SmallCap 600, as shown by Exhibit 6.

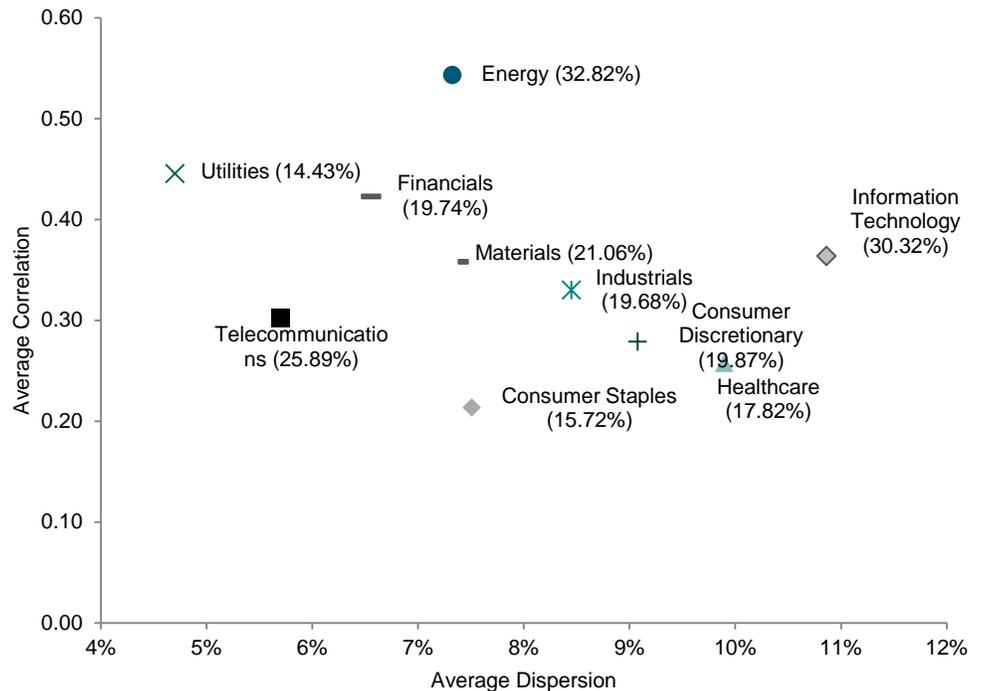
Exhibit 6: S&P SmallCap 600 Sector Correlation and Dispersion



Source: S&P Dow Jones Indices LLC. Data from 1995 to 2014. Charts and tables are provided for illustrative purposes. Past performance is no guarantee of future results.

Similarly, the dispersion of mid-cap sectors is larger than for the S&P 500's sectors (see Exhibit 7.)

Exhibit 7: S&P MidCap 400 Sector Correlation and Dispersion



The average historical correlations of mid- and small-cap sector indices are actually lower than their large-cap counterparts, while their average dispersions and annualized volatilities are higher.

Source: S&P Dow Jones Indices LLC. Data from 1995 to 2014. Charts and tables are provided for illustrative purposes. Past performance is no guarantee of future results.

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Exhibit 8: Average Monthly Dispersion of Sector Indices			
Sector	S&P 500 (%)	S&P MidCap 400 (%)	S&P SmallCap 600 (%)
Information Technology	7.91	10.86	12.31
Consumer Discretionary	6.92	9.08	10.82
Materials	6.51	7.39	9.82
Financials	5.92	6.56	7.60
Healthcare	5.85	9.90	11.91
Industrials	5.66	8.45	9.47
Telecommunications	5.13	5.70	8.48
Consumer Staples	5.03	7.51	9.54
Utilities	4.86	4.70	4.51
Energy	4.56	7.33	9.06

Source: S&P Dow Jones Indices LLC. Data from 1995 to 2014. Charts and tables are provided for illustrative purposes. Past performance is no guarantee of future results.

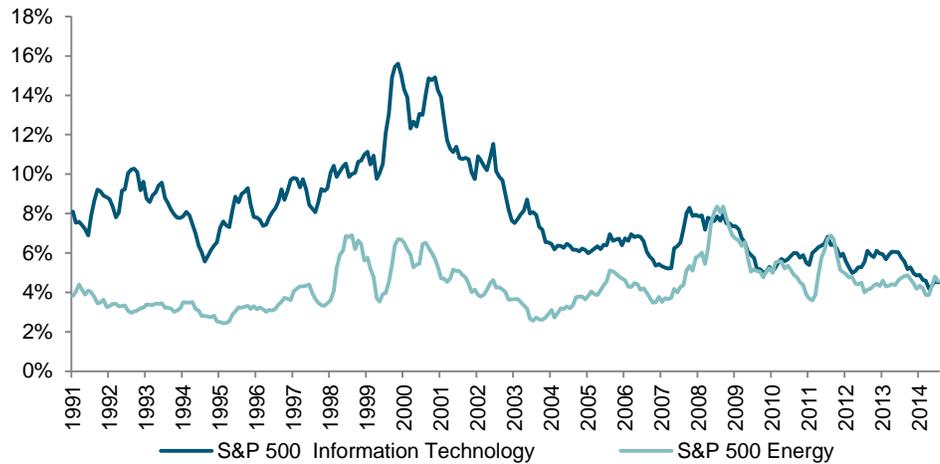
IMPLICATIONS

An active stock picker should concentrate his or her efforts on high-dispersion sectors.

Oddly enough, these data—entirely derived from passive benchmarks—provide some useful insight for active investors. First, since dispersion measures the potential benefit of stock selection, **an active stock picker should concentrate his or her efforts on high-dispersion sectors.**

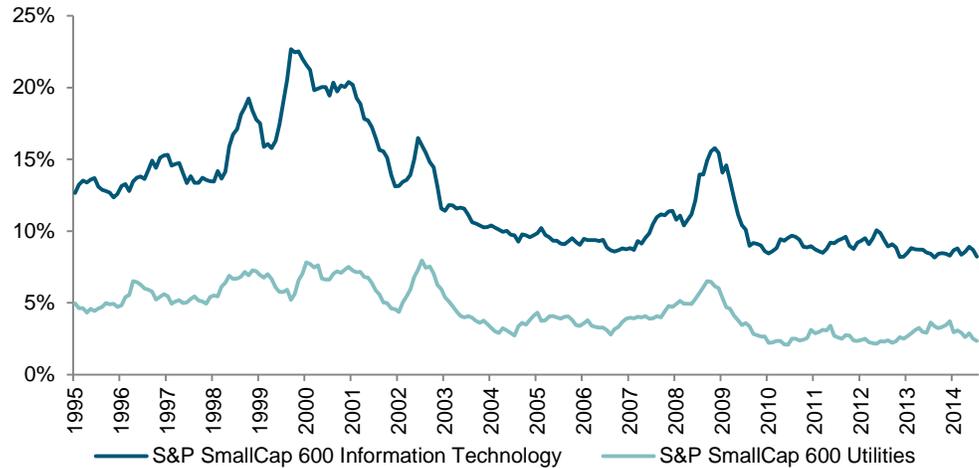
Exhibits 9 and 10 contrast the highest- and lowest-dispersion sectors in the S&P 500 and S&P SmallCap 600. In both cases, there is more potential gain in choosing among technology stocks than in selecting within a low-dispersion sector like utilities or energy. This is a double-edged sword, however, as high dispersion will also magnify the impact of poor stock selection. **If analytic resources are scarce, in fact, there's an argument to be made for simply indexing the low-dispersion sectors,** limiting active selection to the higher-dispersion sectors.

Exhibit 9: 6-Month Rolling Average Dispersion



Source: S&P Dow Jones Indices LLC. Data from 1991 to 2014. Charts and tables are provided for illustrative purposes. Past performance is no guarantee of future results.

Exhibit 10: 6-Month Rolling Average Dispersions



Source: S&P Dow Jones Indices LLC. Data from 1995 to 2014. Charts and tables are provided for illustrative purposes. Past performance is no guarantee of future results.

Dispersion and correlation provide insight into the volatility of sector returns.

Second, the nature of the most relevant analytic input differs across sectors. **For low-dispersion, high-correlation sectors, the most important decision is the sector call, rather than individual stock recommendations.** The returns of the constituents of these sectors tend to cluster around the sector’s return, so stock selection is of relatively little value. On the other hand, where correlations are relatively high, it means that most stocks in the sector move up and down together. A correct sector call will be reflected relatively consistently across all stocks in the sector. Otherwise said, an analyst who follows utilities or energy would be well advised to spend most of his time and effort deciding whether to be in or out of the sector. An analyst who follows technology or healthcare may be better off trying to separate the sectoral wheat from the sectoral chaff.

Dispersion and correlation provide insight into the volatility of sector returns. They may provide guidance for active analysts, as well.

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