The level of volatility, as measured by the VIX index, can help identify periods when a diversified portfolio may benefit or hinder investors. Volatility can be measured across the investment landscape covering stocks, bonds, currencies, and commodities. Our analysis focuses on the VIX index, a measure of implied volatility based on S&P 500 Index options, as a leading indicator of when diversification may work.

Specifically, the 24-month moving average of the VIX index can help forecast when a diversified portfolio of stocks may outperform, or underperform, a portfolio consisting solely of large company stocks as represented by the S&P 500. Overlaying the VIX 24-month average onto our diversification benefit gauge from part one of our series [Figure 1] illustrates how the level of volatility can help explain when a diversified equity portfolio may be beneficial. The diversified equity portfolio consists of large, midsize, and small company stocks, as well as international stocks—both developed and emerging markets. An allocation to real estate, via real estate investment trusts (REIT) is also included in our hypothetical diversified equity portfolio.1

Source: LPL Research, FactSet 08/17/15

The benefit vs. penalty shows the hypothetical behavior of a diversified portfolio. The performance of the diversified portfolio is for illustrative purposes only and is not a reflection of an particular fund or portfolio.

1 The diversified equity portfolio consists of the following asset classes/indexes: 30% large cap (S&P 500), 20% small cap (Russell 2000), 20% mid cap (Russell Midcap), 10% foreign stocks (MSCI EAFE Index), 10% emerging market stocks (MSCI Emerging Markets), 10% REITs (FTSE Nareit Equity REITs).
Figure 1 shows how a higher level of volatility (on a rolling basis) generally leads to diversification benefits, while a lower level of volatility can lead to a diversification “penalty.” Drilling down into the numbers, our analysis revealed:

- Following a reading of 24 or higher on the 24-month VIX moving average, a diversified equity portfolio outpaced the S&P 500 by 5.7%, on average, over the subsequent 1-year period. As impressive, the diversified portfolio outperformed the S&P 500 in 88% of the periods that met this criterion. A reading above of 24 or higher occurred 26% of the time.

- Following a reading of 15 or lower on the 24-month VIX moving average, a diversified equity portfolio underperformed the S&P 500 by 3.7%, on average, over the subsequent 1-year period and the diversified equity portfolio outperformed the S&P 500 only 38% of the time. A reading of 15 or below occurred 29% of the time.

As of July 31, 2015 the VIX 24-month average stood at 15.0, which is on the borderline of flashing caution for diversification, but has also trended higher in 2015 and on the verge of crossing into a neutral territory reading.

### Confidence Gauge

A reading above 24 indicates a sustained period of elevated volatility that may indicate depressed valuations among small and midcap company stocks. This occurs as investors tend to gravitate toward more stable large company stocks during times of stress that may better endure economic downturns or market pullbacks. Buying small and mid cap companies at these depressed valuations may help explain subsequent outperformance when volatility drops, likely due to economic improvement.

Conversely, a sustained level of low volatility, a 24-month reading of 15 or lower, can suggest investor complacency. Such an environment can lead to overvaluation of asset classes as investors become less discerning about risk. As volatility rises, investors pay a premium for the stability of large company stocks compared to small, mid, or even international stocks, as the rising volatility may signal economic uncertainty ahead.

While assessing volatility trends has provided helpful signals for determining when diversification may provide benefits, there are times when any signal fails. Figure 1 shows that diversified equity portfolios benefitted investors during 2005 and 2006, despite a period of low volatility. Low, although rising, volatility has persisted for much of 2015, but diversified portfolios benefitted investors through the first half of 2015. This suggests other factors, such as currency exposure of international stocks, may influence results.

Furthermore, when the VIX 24-month moving average ranges between 15 and 24, which occurs 45% of the time, diversification benefits are inconclusive. For example, as the subsequent 1-year performance for diversified equity portfolios has lagged that of the S&P 500 on average by 0.1%, a diversified equity portfolio outperformed large cap stocks only 47% of the time. In other words, whether or not diversification provided benefits was essentially a coin flip. Due to the longer-term benefits of diversification (see series part one) we would argue for remaining diversified, but volatility alone may not always explain when diversification may work.

### DURING THE LAST 23 YEARS (THE COMPLETE HISTORY OF THE VIX), WHEN THE 2-YEAR VIX MOVING AVERAGE IS:

<table>
<thead>
<tr>
<th>Average Forward Performance</th>
<th>Above 24</th>
<th>Below 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Year Diversification Benefit (Diversified Equities vs. S&amp;P 500)</td>
<td>+5.7%</td>
<td>-3.7%</td>
</tr>
<tr>
<td>Batting Average (% of Periods That Met the Performance Average)</td>
<td>88%</td>
<td>38%</td>
</tr>
</tbody>
</table>

Source: LPL Research, FactSet 08/17/15

Indexes are unmanaged and cannot be invested into directly. Unmanaged index returns do not reflect fees, expenses, or sales charges.

Index performance is not indicative of the performance of any investment. Past performance is not guarantee of future results.
CORRELATION CULPRIT

Correlations, the degree to which various investments move in tandem, are often cited as a culprit when diversification does not work, but the data do not fully support this. The S&P 500 pairwise correlation is a metric created by the Chicago Board of Options Exchange (CBOE), which aggregates correlations of all stocks in the S&P 500 into a single estimate. This can be interpreted as the degree to which the stocks in the S&P 500 are moving with one another. Since its creation in 1993, the pairwise correlation has been gradually trending up. However, periods of heightened correlations, such as 2009 and 2010 [Figure 2], still resulted in diversified equity portfolios outperforming large cap only stock portfolios. Correlations remained elevated over 2011 and 2012, but diversification penalized investors those years; and declining correlations in 2013 and 2014 also failed to boost diversification benefits [Figure 3].

2 CORRELATION DOES NOT EXPLAIN DIVERSIFICATION RESULTS

![Implied Pairwise Correlation](chart)

Source: LPL Research, FactSet 08/17/15

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3 DECLINING CORRELATIONS DID NOT BOOST DIVERSIFICATION BENEFITS IN 2013 AND 2014

<table>
<thead>
<tr>
<th></th>
<th>Mid Cap Stocks</th>
<th>Small Cap Stocks</th>
<th>International Developed Stocks</th>
<th>Emerging Market Stocks</th>
<th>Commodities</th>
<th>Real Estate</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002–2012* Correlation to S&amp;P 500</td>
<td>0.89</td>
<td>0.94</td>
<td>0.89</td>
<td>0.79</td>
<td>0.42</td>
<td>0.71</td>
<td>0.77</td>
</tr>
<tr>
<td>2013–2014** Correlation to S&amp;P 500</td>
<td>0.80</td>
<td>0.91</td>
<td>0.81</td>
<td>0.61</td>
<td>0.33</td>
<td>0.38</td>
<td>0.64</td>
</tr>
<tr>
<td>2002–2012 Batting Average vs. S&amp;P 500</td>
<td>56%</td>
<td>53%</td>
<td>45%</td>
<td>58%</td>
<td>50%</td>
<td>61%</td>
<td>54%</td>
</tr>
<tr>
<td>2013–2014 Batting Average vs. S&amp;P 500</td>
<td>54%</td>
<td>46%</td>
<td>46%</td>
<td>25%</td>
<td>17%</td>
<td>33%</td>
<td>37%</td>
</tr>
</tbody>
</table>

Source: LPL Research, FactSet 08/17/15

Data shown are as of 12/31/14. Asset class data shown are represented by the indexes listed in the Disclosure section.

* This period is associated with higher correlation among asset classes.

** This period is associated with lower correlation among asset classes.

Because of their narrow focus, specialty sector investing, such as small cap, mid cap, or International stocks, will be subject to greater volatility than investing more broadly across many sectors and companies.
CURRENCY CAUSATION?

The first half of 2015 witnessed impressive U.S. dollar gains, but diversification benefited investors. Therefore, trying to anticipate when diversification into international—either developed or emerging market stocks—may add diversification benefits over the near term from currency movements is extremely challenging. Like correlation, analyzing currency movements provides a mixed bag of results [Figure 4]. In 2000 and 2001, a strong U.S. dollar did not offset the benefits of being diversified both domestically and internationally. From 2010 through 2013, U.S. dollar fluctuation was negligible, but the period witnessed diversification benefits as well as two calendar years of a notable diversification penalty.

Over long periods, we believe currency movements tend to even out and find traditional fundamental, valuation, and technical analysis more beneficial in assessing whether to invest in international stocks—rather than trying to anticipate currency movements that may influence international stock returns and therefore diversification benefits.

CONCLUSION

Analyzing volatility trends may be investors’ best tool to assess when diversification may provide a benefit or penalty. Knowing whether volatility has been high or low for an extended period can help identify periods of opportunity or potential complacency. Both correlations and currency movements (for international stocks) are often cited as drivers of diversification benefits, but our analysis of the data shows inconclusive results. For inconclusive mid-range readings on volatility, we still err to the side of diversification, and the benefits historically accrued over long periods, as described in part one of our series, “Is Diversification Dead?”
IMPORTANT DISCLOSURES

The opinions voiced in this material are for general information only and are not intended to provide specific advice or recommendations for any individual. To determine which investment(s) may be appropriate for you, consult your financial advisor prior to investing. All performance reference is historical and is no guarantee of future results. All indexes are unmanaged and cannot be invested into directly.

Investing in stock includes numerous specific risks including: the fluctuation of dividend, loss of principal and potential illiquidity of the investment in a falling market.

Investing in foreign and emerging markets securities involves special additional risks. These risks include, but are not limited to, currency risk, geopolitical risk, and risk associated with varying accounting standards. Investing in emerging markets may accentuate these risks.

Investing in real estate/REITs involves special risks such as potential illiquidity and may not be suitable for all investors. There is no assurance that the investment objectives of this program will be attained.

Currency risk is a form of risk that arises from the change in price of one currency against another. Whenever investors or companies have assets or business operations across national borders, they face currency risk if their positions are not hedged.

Commodity-linked investments may be more volatile and less liquid than the underlying instruments or measures, and their value may be affected by the performance of the overall commodities baskets as well as weather, geopolitical events, and regulatory developments.

Alternative strategies may not be suitable for all investors and should be considered as an investment for the risk capital portion of the investor’s portfolio. The strategies employed in the management of alternative investments may accelerate the velocity of potential losses.

All indexes are unmanaged and cannot be invested into directly. All discussion of composite returns and the impact of diversification are hypothetical and do not reflect the actual performance of any particular strategy or investment.

Asset classes represented: Large Cap Stocks: S&P 500 Index; Mid Cap Stocks: Russell Midcap Index; Investment-Grade Bonds: Barclays U.S. Aggregate Bond Index; Small Cap Stocks: Russell 2000 Index; High-Yield Bonds: Barclays U.S. Corporate High-Yield Bond Index; Foreign Bonds: Barclays Global Aggregate ex-USD Index; Emerging Market Stocks: MSCI Emerging Markets Index; International Developed Stocks: MSCI EAFE Index; Commodities: Bloomberg Commodity Index; Real estate: NAREIT All Equity REIT Index