

# VelocityShares' Hedged Large Cap Indices

**V**elocityShares' **Volatility Hedged Large Cap Index** and **Tail Risk Hedged Large Cap Index** represent the next frontier in long equity investment and portfolio management. Recognizing the need for the long equity investor to seek a hedge to limit downside and the availability of such a hedge to *enable* long investing, these indices reflect exposure to S&P 500 Index-linked ETFs with exposure to volatility as well, specifically the VelocityShares Volatility Hedged Vol Component Index or the VelocityShares Tail Risk Hedged Vol Component Index, in an automatically rebalanced product.<sup>1,2</sup> Volatility reflects how turbulent the markets are over a specific period of time, and volatility tends to rise in periods of equity market decline. Exposure, therefore, to volatility may provide a downside hedge during equity selloffs. In this paper, we focus our attention on the Vol Component Indices, which reflect a dynamic exposure to volatility that seeks to provide a hedge in periods of equity market declines.

*VelocityShares' Volatility Hedged Large-Cap Index and Tail Risk Hedged Large-Cap Index are specifically designed with sophisticated portfolio hedging in mind.*

### *The 3 C's of Portfolio Hedging: Correlation, Convexity and Cost*

The key to long equity investing with downside hedging is three-fold: correlation, convexity and cost. First, the hedging instrument ought to generally have a negative correlation to the equity portfolio during times of significant stress. Second, a hedge ought to deliver

convexity—a nonlinear, outsized payout that grows disproportionately to the equity market move—so that a portfolio need not overweight the allocation to the hedge. Without convexity, the investor could cannibalize positive returns. Finally, the investor needs a hedge that is cost-effective so that embedded premiums don't erode capital to a point where the hedge is ineffective.

Standard schemes designed to protect equity portfolios in downturns, such as rolling puts, achieve correlation and convexity but at far too rich a cost. Rolling puts is a popular method of hedging equity portfolios from market risks by buying S&P put

options and maintaining such positions by selling expiring put options as they near expiry and buying the next expiry at the same time. When rolling puts, the investor pays an implied volatility premium embedded in the option price, which, over the long run, negatively impacts performance on the entire portfolio. Long volatility hedges (i.e. holding static long volatility futures positions) are negatively correlated to equity positions, but suffer from a lack of convexity and massive costs. While the VIX Index, which reflects a market expectation of volatility over the following thirty days, is not a tradeable instrument, the Short-Term VIX Futures Index (SPVXSP)<sup>3</sup>, is, and it lost 53% in 2006, 65% in 2009, 72% in 2010, and 78% in 2012; it has been down five of seven years since inception.<sup>4</sup>

VelocityShares' Volatility Hedged Large-Cap Index and Tail Risk Hedged Large-Cap Index are specifically designed with sophisticated portfolio hedging in mind. Each index is designed to track an exposure to the S&P 500 with a volatility exposure; this is reflected by a target allocation of 85% of assets with exposure to the S&P 500, obtained by an investment in S&P 500 ETFs and 15% of assets with an exposure to volatility, obtained by an investment in volatility ETFs and which is represented by each Volatility Component Index. The combination seeks to reflect how an equity portfolio is protected by an exposure to volatility in the event of an equity market downturn. The Tail Risk Hedged Large Cap Index targets a slightly longer position<sup>5</sup> in volatility relative to the Volatility Hedged Large Cap Index; it is designed to reflect an equity portfolio protected by a higher level of exposure to volatility.

The exposure to volatility in the indices seeks to exhibit

- Convexity, thanks to a dynamic allocation to volatility that takes advantage of volatility's trending nature
- Correlation during times of stress,
- Cost-efficiency: the strategy maintains a dynamic allocation to volatility so that when volatility is very expensive to hold, the volatility allocation can shorten

For more detail on the volatility allocation, please refer to [www.velocityindices.com](http://www.velocityindices.com).

<sup>1</sup> Here we focus on the Vol Component Index since the long equity exposure is straightforward. The Vol Component is described in the Methodology document, which can be found at [www.velocityindices.com/methodology/](http://www.velocityindices.com/methodology/).

<sup>2</sup> By rebalance, we refer to the process of bringing the index back to the target allocation between equity exposure and volatility exposure.

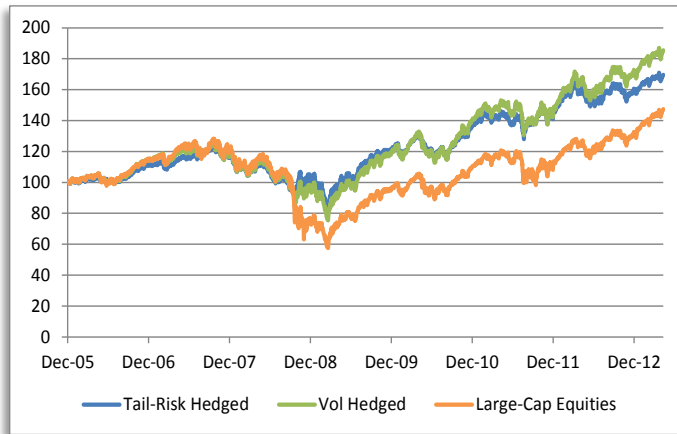
<sup>3</sup> The Short-Term VIX Futures Index (SPVXSP) tracks a constant maturity portfolio of VIX Futures by rolling front-month VIX Futures into second-month VIX Futures.

<sup>4</sup> Source: Bloomberg.

<sup>5</sup> The Tail Risk Vol Component Index targets 45% long volatility exposure whereas the Volatility Hedged Vol Component Index targets 33.33%.

**Performance**

In Figure 1 below we plot the performance of the VelocityShares Hedged Large Cap Indices using backtested, historical data from December 20, 2005 until the indices inception on April 30, 2012 and thereafter using actual data. We compare the performance to Large-Cap Equities, represented by SPDR S&P 500 ETF Trust (SPY) with reinvested dividends.



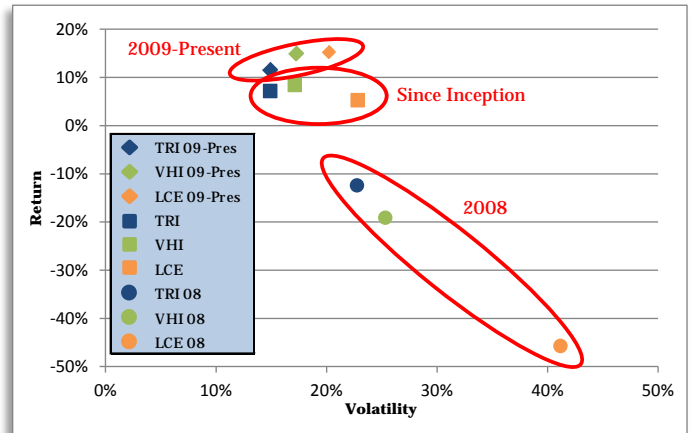
**Figure 1: Performance of the Volatility Hedged Indices versus the SPY with Reinvested Dividends.** (Data as of April 30th 2013. Charts and graphs are provided for illustrative purposes only. It is not possible to invest directly in an index. Past performance is not an indication of future results. The Indices were launched on April 30th, 2012, all data presented prior to the inception date is back tested. Please see the performance disclosure for more information on the Index and the inherent limitations associated with back-tested index performance.)

Based on historical data, on a per annum basis from December 20th, 2005 to April 30th, 2013, the indices' performance outstripped Large-Cap Equities by 1.9% and 3.1% respectively, while decreasing volatility by 5.7% and 7.9%; Figure 2 shows the volatility and return (annualized) for the VelocityShares Hedged Volatility Indices and the SPTR during various time periods:

- 12/20/05 – Present (full sample)
- 01/01/09 – Present
- 01/01/08 – 12/31/08

The risk-reward over the full sample (as measured by the return divided by volatility) is greater than twice the Large-Cap Equities ("LCE") benchmark for both Hedged Volatility Indices:

	Ticker	Volatility	Mean	Risk-Reward
Total	TRSK	14.9%	7.2%	0.48
	SPXH	17.1%	8.4%	0.49
	LCE	22.8%	5.3%	0.23
2008	TRSK	22.7%	-12.4%	-0.55
	SPXH	25.3%	-19.1%	-0.75
	LCE	41.2%	-45.7%	-1.11
2009 - Present	TRSK	14.9%	11.6%	0.78
	SPXH	17.2%	15.0%	0.87
Present	LCE	20.2%	15.3%	0.76



**Figure 2: Annualized Index Performance Metrics (TRI is Tail-Risk Hedged Large Cap Index; VHI is Volatility Hedged Large-Cap Index)**

**Why a Volatility Hedge?**

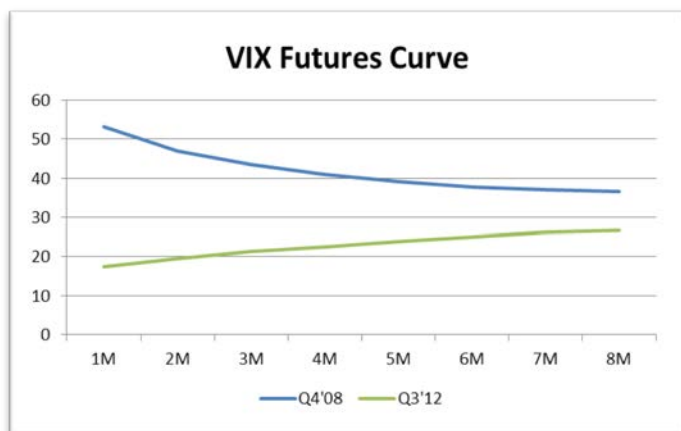
Historical data demonstrates that volatility has tended to spike during market sell-offs. The VIX Index, a widely recognized volatility indicator, hit its 10-year high in the fourth quarter of 2008, during the height of the financial crisis. While investors can't trade the VIX Index, they can trade strategies based on constant maturity VIX Futures portfolios.<sup>6</sup> If a strategy is well-constructed, it can take advantage of VIX Futures properties:

- Historically, in normal market environments VIX Futures have tended to have negative returns due to high cost of rolling VIX futures contracts (selling shorter-dated contracts and buying the next month's contract at a higher cost than the sale price).
- Historically in periods of extreme market stress, VIX Futures have tended to have positive returns due to the return from rolling VIX futures contracts (selling the contracts as they expire and buying the next month's contract at a lower cost than the sale price).

See, for example, Figure 3, which shows the average VIX Futures Curve during the fourth quarter of 2008 versus the third quarter

<sup>6</sup> Constant maturity VIX Futures portfolios hold a basket of contracts, typically front-month and second-month contracts, whose average expiry is a fixed number of days, weeks or months in the future. Most popular is the one-month constant maturity portfolio, which holds a basket of front- and second-month contracts in such a proportion that the average time to expiry is one month.

of 2012.



**Figure 3: Average VIX Futures Curve**

The tendencies of the VIX Futures Curve may or may not persist going forward, though historically the behavior of the VIX Futures Curve has provided the investor with powerful market dynamics with which to hedge equity using a position in VIX futures; historically, during market stress an increasing position in VIX futures has lent convexity to a positively trending underlying, and in calmer markets a declining position in VIX Futures has lent convexity to a negatively trending underlying. This is why a dynamic exposure to volatility in portfolio composed largely of equities can be an effective hedge: the investor can get longer volatility when it is potentially in the greatest need, and sell volatility when it's too expensive. However, past performance is no guarantee of future results.

### Managing the High Cost of a Volatility Hedge

Utilizing put options to protect an equity portfolio in volatile markets has historically been far too expensive, thanks to the embedded cost of implied volatility in such protective puts being generally considerably higher than realized volatility. In fact, it's been so expensive that the CBOE Put Index, which essentially tracks the price of selling portfolio insurance or put options on a rolling basis, is up almost 100% since its low point during the first quarter of 2009 (3/16/09 to 3/21/13).<sup>7</sup>

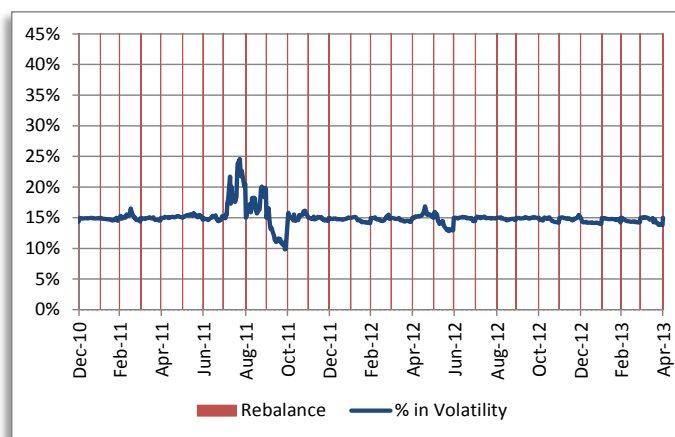
Part of the cost problem associated with S&P options is that the underlying—the S&P 500 Index—is fairly normally distributed. What that means is that even extreme market events aren't that large in magnitude. If you desire a significant return on your investment in the options premium paid, you need to significantly leverage your exposure to this underlying.

The S&P 500 VIX Short-Term Futures Index (SPVXSP), on the other hand, has a negative mean return but a very large positive skew. In other words, returns are asymmetrically distributed, with large increases more likely than large decreases. Thus, while the SPVXSP tends to decline on average, there are periods of strong

positive trending behavior in VIX Futures coinciding with tail events. It is a more suitable underlying for hedging.

### Built-in Portfolio Rebalancing

In addition, each Hedged Volatility Index maintains a monthly rebalance to the target 85%/15% allocation, so that the respective volatility allocation in each index is appropriately re-sized back to its goal ratio relative to the long equity position. In order to illustrate how rebalancing works, the month of Aug-11 is a good example of when the volatility position outpaces equity and rebalancing occurs. Figure 4 shows the rebalance dates (red lines) and the percentage allocation in the Volatility Component Index of the Tail-Risk Hedged Index. As the Figure shows the allocation may diverge from 15% intra-month but is rebalanced at the end of each month.



**Figure 4: Allocation to Volatility Rebalances Monthly**

<sup>7</sup> Source: Bloomberg.

## Disclosures

*It is not possible to invest directly in an index. Exposure to an asset class is available through investable instruments based on an index. There is no assurance that investment products based on the index will accurately track index performance or provide positive investment returns.*

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### **Performance Disclosure regarding the VelocityShares Indices**

*The inception date for these VelocityShares Indices is April 30th, 2012, and all data prior to this date is back tested. The back-test calculations are based on the same methodology that was in effect when the index was officially launched. Prior to October 4, 2011, the volatility ETFs used in the Index did not exist. Index calculations for these components are computed based off a similar exposure directly to VIX futures, and therefore do not reflect the management fees of the ETFs among other differences for the period prior to October 4, 2011. Had the volatility ETFs been available prior to October 4, 2011, the back tested index returns would likely have been lower. Prospective application of the methodology used to construct each of the indices may not result in performance commensurate with the back-test returns shown. Please refer to the methodology paper for these indices, available at [www.velocityindices.com](http://www.velocityindices.com) for more details about the indices, including the manner in which it is rebalanced, and the timing of such rebalancing, criteria for additions and deletions and index calculation. The indices are rules based, although the Index Committee reserves the right to exercise discretion, when necessary. The index performance has inherent limitations. The index returns shown do not represent the results of actual trading of investor assets. VelocityShares maintains the indices 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 would pay to purchase the securities they represent. The imposition of these fees and charges would cause actual and back-tested performance to be lower than the performance shown.*

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