

EVOLUTION CAPITAL

Liquid Alternative Strategies

Volatility: A New Return Driver?

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Investors have traditionally relied upon equities and bonds to drive the majority of portfolio returns. Future returns of bonds and equities have become less certain; bonds have enjoyed a 30 year bull market and US equity markets are priced to deliver sub-par returns over the next 7-10 years. As a result, investors are seeking new avenues to generate returns. Volatility is an asset that does not rely on interest rates, dividends or rising stock prices which makes it an attractive opportunity for investors as a new return driver and portfolio diversifier. This paper highlights the benefits of utilizing an active directional volatility approach to investing in volatility.

What is volatility?

From a statistical standpoint, the volatility of an asset is the standard deviation of the asset's returns over a certain interval of time. In finance, volatility is viewed as the risk or uncertainty of an asset's return.

Volatility comes in two flavors - realized and implied. **Realized volatility** is based on the actual historical returns and is defined as the standard deviation of these returns for a given interval. **Implied volatility** is the level of volatility the market expects for the future.

Figure 1 - Two Types of Volatility: Implied and Realized

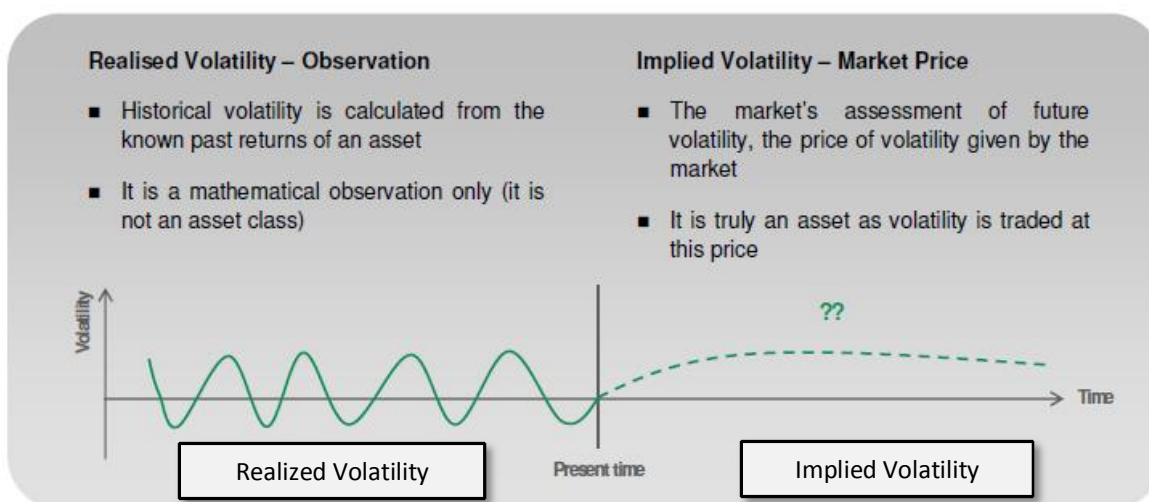


Chart Source: BNP Paribas, April 2012, Volatility as an Asset Class

The most popular measure of implied volatility is an index published by the CBOE Futures Exchange called the Volatility Index or VIX. In general, implied volatility tends to be higher than realized volatility. We will delve into why later in the paper. Figure 2 (below) shows historical changes in both implied volatility (blue) and realized volatility (red) since 2005. Although it appears as if implied and realized volatility are highly correlated, there are instances where they deviate in a meaningful way.

Figure 2 - Implied and Realized Volatilities

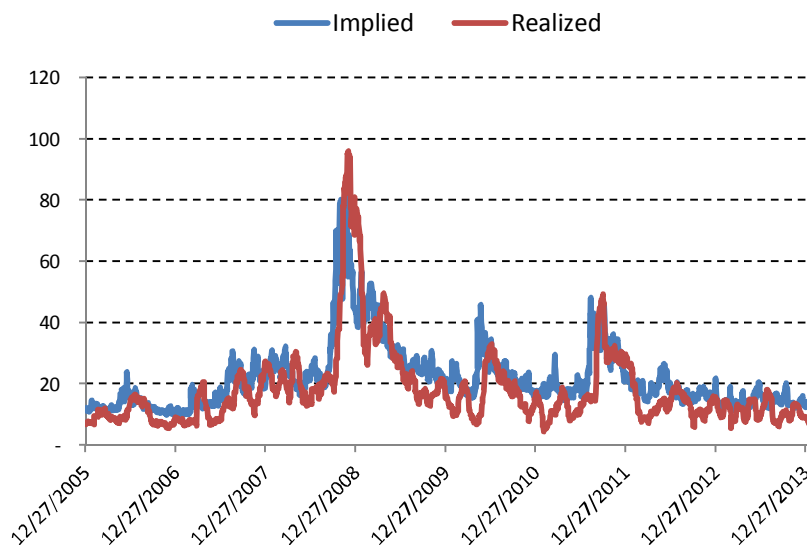
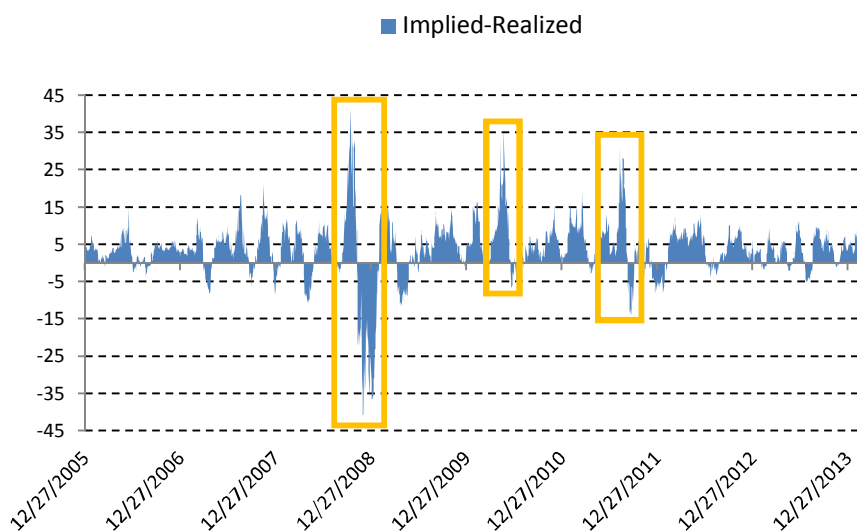


Figure 3 (below) shows the difference between implied and realized volatility. It is easy to see that realized volatility is usually lower than implied volatility (shaded area above zero), but there are times when implied volatility “spikes.” These spikes are usually followed by a slow progression of volatility reverting to “normal” levels.

Figure 3 – Difference between Implied and Realized Volatility

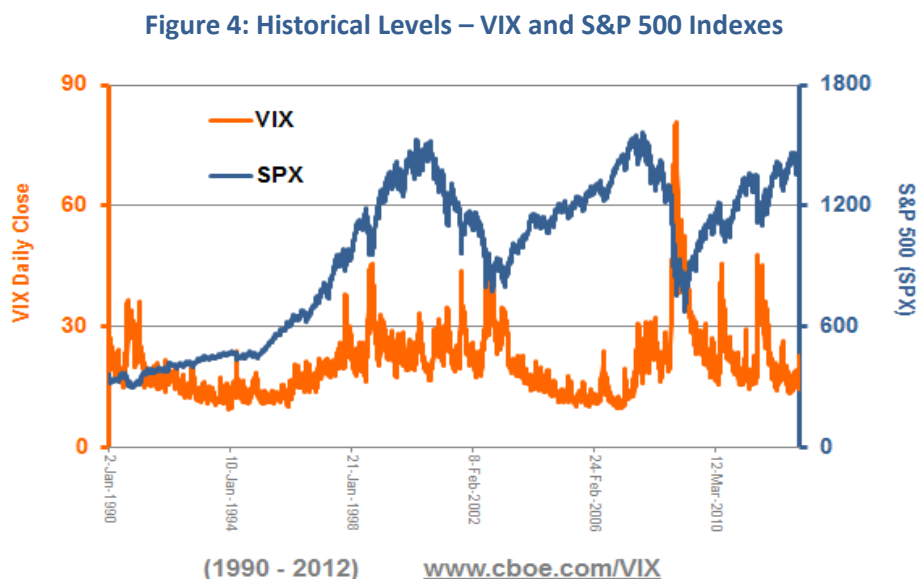


Market participants become fearful about the future and volatility “spikes” (realized volatility greater than implied). After the market re-adjusts to this new level, realized volatility generally falls below implied volatility.

What is the VIX?

The VIX is often referred to as the “fear index.” It is a forward looking index that measures the implied volatility investors are expecting. The VIX is constructed by the current prices of S&P 500 index options and represent implied future market volatility over the next 30 calendar days. The daily levels of the VIX have been calculated from January 1, 1990 onwards by the CBOE Futures Exchange. **The VIX itself is not an investible index**; it’s a mathematical statistic based on options prices.

As Figure 4 below demonstrates, the VIX has historically been negatively correlated to the S&P 500. As the S&P 500 moves lower, the VIX tends to move higher and with frequent spikes.



How to trade volatility?

As noted above there is no direct way to invest in the VIX on a cash or “spot” basis. There are four primary ways to obtain exposure to volatility:

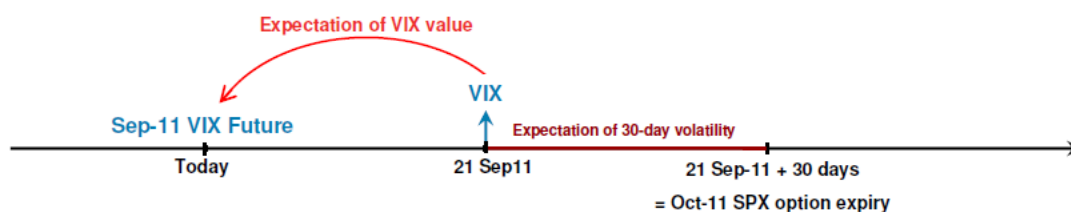
1. Options
2. Variance swaps
3. VIX futures
4. Exchange Traded Products (ETPs) based on the VIX futures (XIV, VXX)

For many investors, options and variance swaps are not viable alternatives, therefore we will refrain from including them within the scope of this paper.¹ Instead, we will focus on VIX futures and related VIX ETPs, which are exchange traded, highly liquid, transparently priced and provide the cleanest volatility exposure.

VIX Futures

Futures on the VIX, trade electronically on the CBOE Futures Exchange, with the futures contracts being settled in cash. You can't actually physically deliver the VIX at expiration, so cash is substituted. VIX futures are contracts on forward 30-day implied volatilities. For example, in September, the front contract is a forward on what 30-day implied volatility will be on the September expiration date.

Figure 5 - Illustration of the September 2011 VIX futures contract



Since the VIX is not investible, there is no “cash and carry” strategy to link the VIX spot and VIX futures prices. Cash and carry means the ability to physically buy, hold and deliver the asset at expiration like you could do with a barrel of oil. At settlement, a “Special Opening Quotation of VIX” is computed using a specific auction on the listed options of the replacing VIX portfolio. This provides the “print” that is used to cash settle the futures contract.

Futures contracts have a unique characteristic known as **roll yield**. Each month when the current contract expires, an investor is required to purchase the “new” contract – this process is referred to as “rolling.” The new contract may be higher or lower than the current expiring contract price. The difference between the current price of the new contract and the expiring contract price is known as the roll yield. The roll yield may be positive or negative. A negative roll yield is referred to as **contango** and a positive roll yield is referred to as **backwardation**. Figure 6 illustrates the concepts of contango and backwardation.

¹ For investors looking for a detailed analysis of options, variance swaps and VIX futures please see Investment Insights (June 2013) from BlackRock by Thomas McFarren

Figure 6 - Contango Term Structure and Backwardation Term Structure

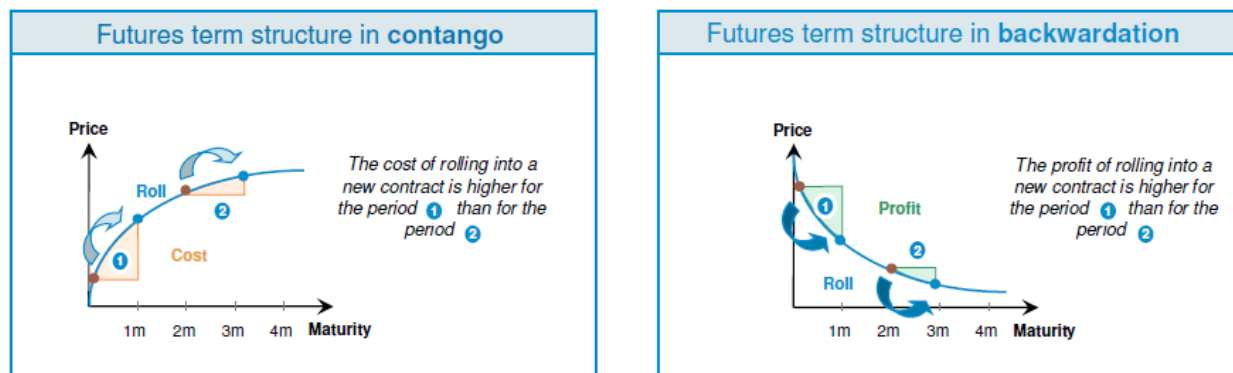


Chart Source: BNP Paribas, April 2012, Volatility as an Asset Class

The market structure for VIX futures contracts tends to be in **contango**. As a result, a rolling position in contracts with shorter dated maturities during sustained low volatility periods may decline significantly in value over time due to negative roll yield. Think of this as the insurance premium an investor must pay to protect the current value of their portfolio. It can be a high cost for investors seeking protection.

For example: Spot VIX is 18.00 and the nearest futures contract is purchased at 20.00. Let's assume the VIX is the same price at expiration, theoretically the future contract should equal the spot price of 18.00 and the new contract to be purchased is now 20.00. This results in a **loss of 10% in a single month**. $[(20 - 18)/20 = 10\%]$ Over time this can be a tremendous head wind for long based VIX futures strategies.

Since 2005, the VIX term structure has been in contango approximately 75% of time.

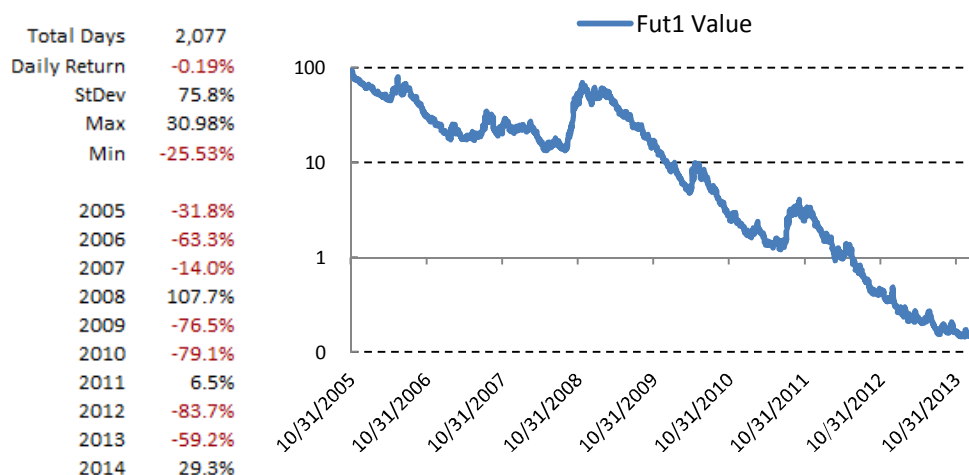
Why is the VIX futures contract typically more expensive than spot VIX?

Global investors are generally exposed net long to risky assets, such as equities. Insurance for these assets should come at a price. Volatility sellers need a sufficient incentive in the form of a positive expected return that competes with other risk assets expected returns, in order to provide this protection to hedgers.

If there wasn't a risk premium for selling volatility, then more investors would buy volatility for its insurance-like properties. Such buying pressure would increase the price of volatility-sensitive derivatives and options contracts, until their expected returns became significantly negative for long positions (and therefore positive for short positions). A significant negative return expectation is needed

to dissuade some investors from being constantly long volatility. If the market is typically in contango and implied volatility generally exceeds realized volatility, a consistent short volatility position can be effective. Let’s examine the returns of holding the front month contract and rolling the day before expiration to the next contract.

Figure 7 - Value of Front Month VIX Futures Contract and Summary Statistics (11/1/2005 to 2/3/2014)



The returns are simply abysmal with an average daily loss of 0.19%. While investors can catch the rare massive spike in volatility, such as the one in 2008, consistently holding the VIX Futures is not a practical hedging mechanism. However, there are potential alternative strategies which we will discuss in a moment.

What are VIX related ETFs or ETNs?

In order to appeal to a broader class of investors, several ETFs and ETNs have been created that are based on the previously discussed VIX futures. We will focus on the two most popular ETNs in the marketplace:

VXX – iPath S&P 500 VIX Short Term Futures ETN

XIV – VelocityShares Daily Inverse VIX Short Term ETN

Both ETNs are based on an index created by Standard & Poor’s, which is called the S&P 500 VIX Short Term Futures Index. VXX seeks to replicate the index, while XIV seeks to replicate its inverse.

The index description from S&P:

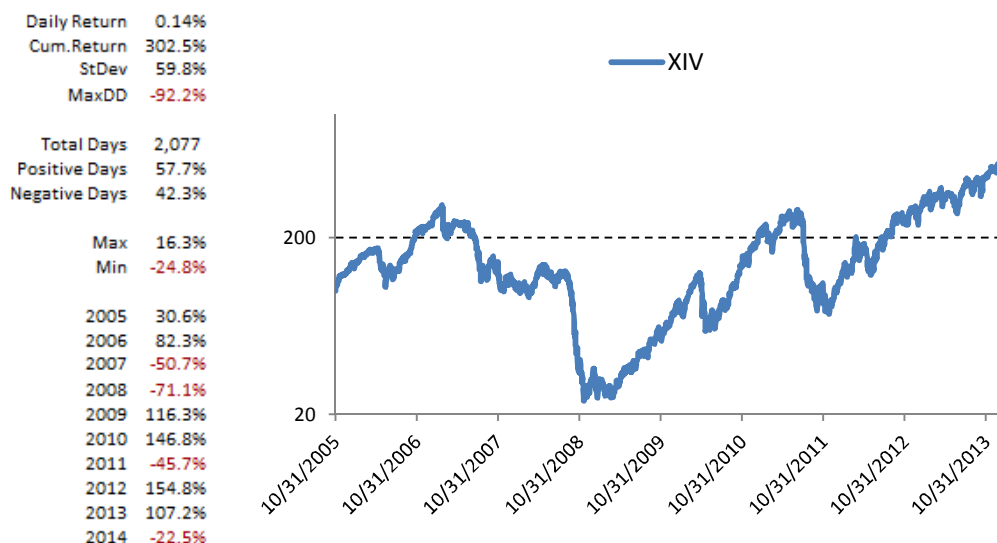
The S&P 500 VIX Short Term Futures Index utilizes prices of the next two near term VIX futures contracts to replicate a position that roll the nearest month VIX futures to the next month on a daily basis in equal fractional amounts. **This results in a constant one-month rolling long positions in first and second month VIX futures contracts.**²

- XIV is highly liquid - over 11 million shares traded per day and net assets over \$500 million
- VXX is highly liquid - over 29 million shares traded per day and net assets over \$900 million

Investment Strategy Research

A popular strategy is to be short volatility. Let’s look at the returns of a simple XIV (short volatility)³ buy-and-hold strategy:

Figure 8 – Performance of XIV and Summary Statistics (11/1/2005 to 2/3/2014)



² For more detailed information on the S&P 500 VIX Short Term Futures Index please visit: <http://us.spindices.com/indices/strategy/sp-500-vix-short-term-index-mcap>

³ Please note that we have re-created theoretical returns of XIV prior to it actually being launched by VelocityShares

While being short volatility does have compelling long term returns, the large price swings could be too much for some investors to bear. The maximum drawdown is a heart stopping -92%. However, we believe that shorting volatility may be an excellent investment strategy under the right conditions. In addition, we believe ***an active strategy may achieve positive returns when volatility is both decreasing and increasing***. Why? Because our proprietary research as well as other outside research have demonstrated the following key characteristics of volatility:

- Long term volatility does not maintain extreme high or low levels; it tends toward a medium level. It has a tendency to revert to the mean. (i.e. mean reversion)
- Volatility does not show long term upward trends like equities.
- Volatility typically shows periods of high volatility occurring within a short period of time (spikes or jumps) and then a downtrend to return to the long term medium level.

Directional Volatility Investment Goals

1. Capture the positive attributes of a short volatility position.
2. Participate in the appreciation of volatility during a market correction (15% - 20% loss in equity markets).
3. Participate in the appreciation of volatility during bear markets (losses greater than 20%).

Three Ways to Profit from Directional Volatility

1. **Mean Reversion** – High volatility spikes generally lead to a downtrend and return to the long term level.
2. **Momentum** – The VIX has a tendency to demonstrate momentum over very short multi-day time frames.
3. **Term Structure** – Negative and positive roll yield of futures contracts, movements of the term structure and slope of the term structure all present opportunities for investors.

No single factor drives our investment process. Our approach to volatility investing depends on the dynamic interaction of mean reversion, momentum and term structure. Furthermore, our position sizes vary depending on the dynamic relationship of these factors. Different environments present different opportunities and probabilities. Each day we determine whether to be short, long and/or in cash.

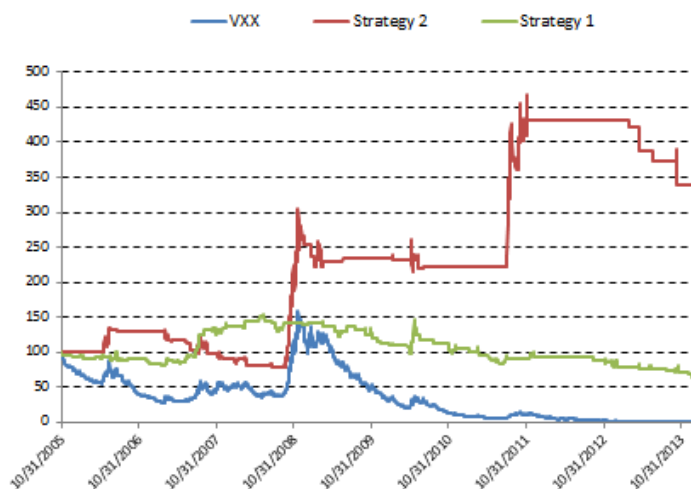
For example, can we improve on the returns of a long term hold (long volatility) of VXX? What happens if we take into account the relationship between the VIX, the front month contract and the second month contract? We tested two long only strategies (Figure 9 below):

Strategy 1 (green line) - Buy the VXX when the VIX is greater than the front month contract and the front month contract is less than the second month contract: (VIX > Futures Contract #1 < Futures Contract #2).

Strategy 2 (red line) - Buy the VXX when the VIX is greater than the front month contract and the front month contract is greater than the second month contract: (VIX > Futures Contract #1 > Futures Contract #2). This is a classic example of backwardation.

**Figure 9 - Summary Statistics
(11/1/2005 to 2/3/2014)**

| | VXX All Days | Strategy 1 VIX>Fut1<Fut2 | Strategy 2 VIX>Fut1>Fut2 |
|----------------|-----------------|-----------------------------|-----------------------------|
| TotalReturn | -99.0% | -34.3% | 293.5% |
| MaxDD | -99.6% | -59.3% | -42.1% |
| Days In Market | 2077 | 273 | 255 |
| Total Days | 2077 | 2077 | 2077 |
| % in Market | 100.0% | 13.1% | 12.3% |
| Positive Days | 42.4% | 45.1% | 51.0% |
| Negative Days | 57.6% | 54.6% | 48.6% |
| Max | 24.80% | 14.14% | 20.70% |
| Min | -16.31% | -11.82% | -14.26% |
| 2005 | -24.1% | -5.4% | 0.0% |
| 2006 | -53.3% | -10.8% | 29.5% |
| 2007 | 35.2% | 63.6% | -29.9% |
| 2008 | 121.8% | 1.1% | 178.5% |
| 2009 | -65.0% | -18.2% | -6.8% |
| 2010 | -72.4% | -6.9% | -5.6% |
| 2011 | -5.5% | -10.9% | 94.3% |
| 2012 | -77.6% | -5.3% | 0.0% |
| 2013 | -66.6% | -27.7% | -21.6% |
| 2014 | 24.6% | 1.5% | 16.1% |

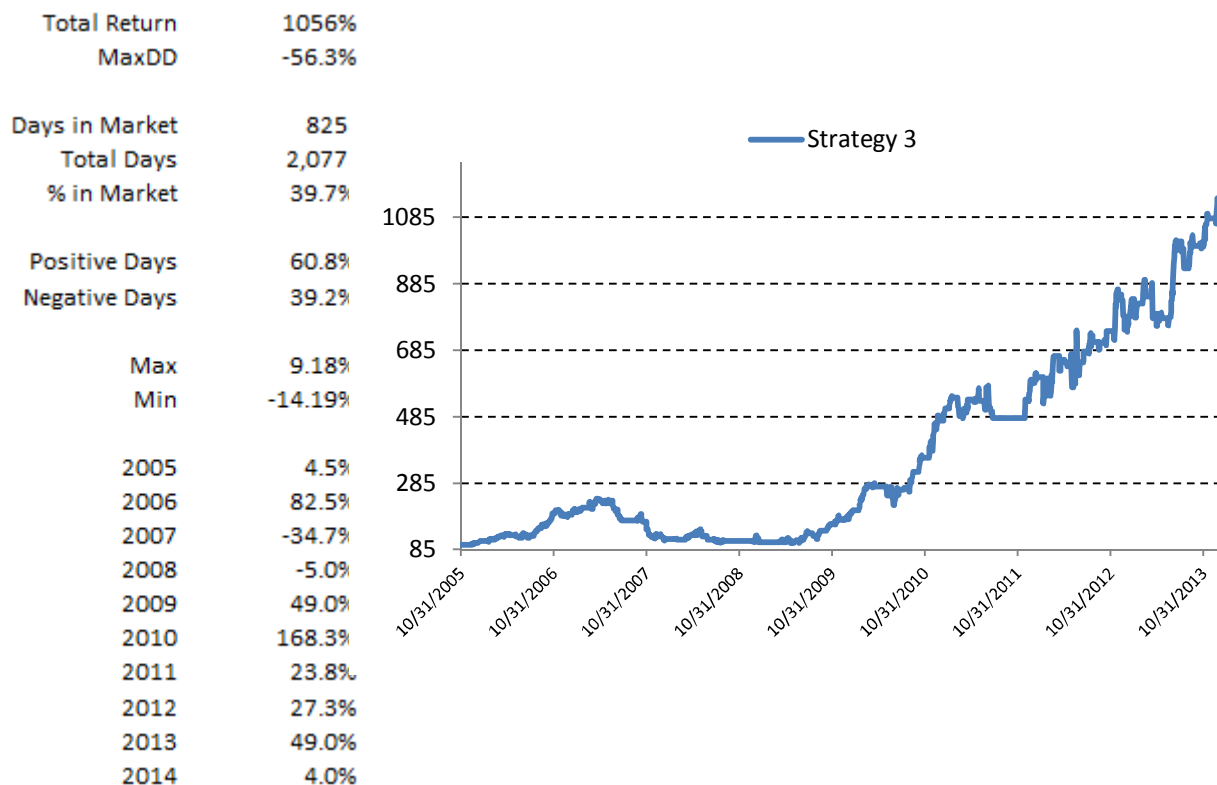


By taking into account the relationship between the VIX and the first two futures contracts, we see a significant improvement in the ability to capture upward movement in volatility. Strategy 2 (backwardation) is clearly the superior to Strategy 1 with a 293.5% total return compared to -34.3%. With Strategy 2, an investor would have captured significant returns during stressful market environments. Is it perfect? No. While Strategy 2 is superior to simply buying and holding the VXX and Strategy 1, it does miss the profit opportunity during the market stress of 2007.

Next, (Figure 10 below) we examined whether we can improve on long XIV (short volatility) strategy. We looked the relationship between the VIX and the front 2 futures contract, but we will also include the roll yield in our strategy. Our goal is to identify when the current roll yield is greater than the average roll yield for the previous 20 days.

Strategy 3 - Buy XIV when the VIX is less than the front month contract and the front month contract is less than the second month contract AND the current roll yield is greater than the roll yield for the previous 20 days: (VIX < Fut1 < Fut2 AND current roll yield > 20 day average of the roll yield).

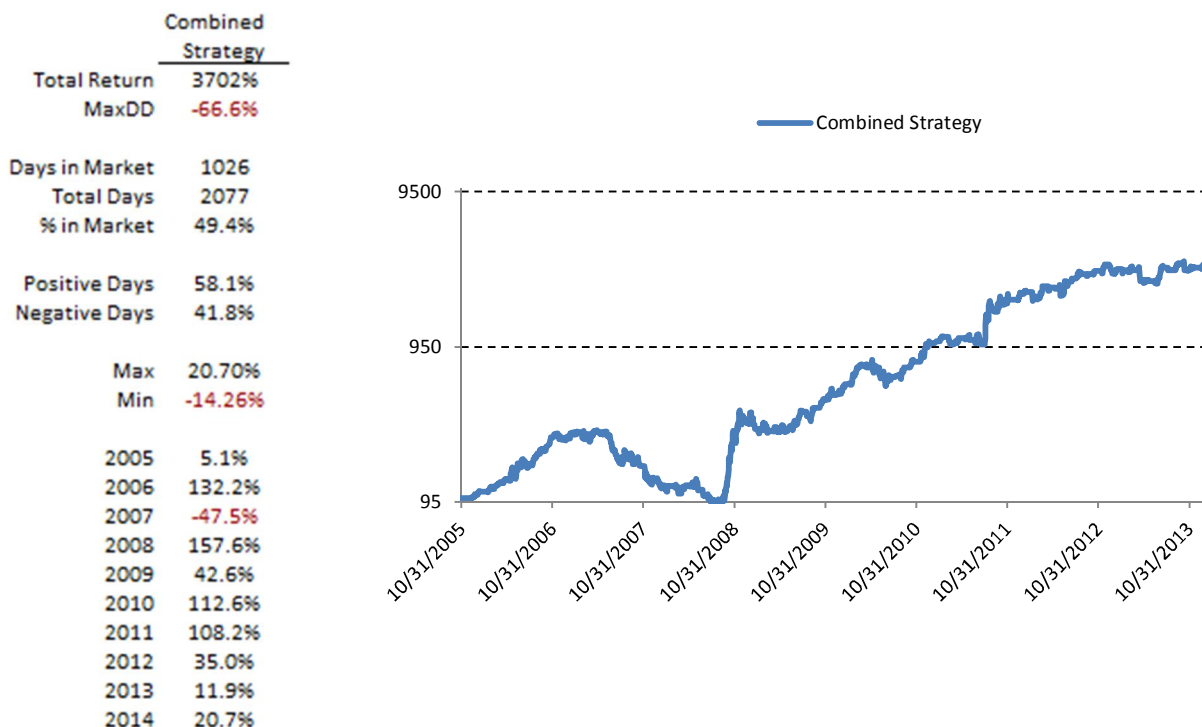
**Figure 10 – Strategy 3 Performance and Summary Statistics
(11/1/2005 to 2/3/2014)**



Clearly, Strategy 3 demonstrates an even better return profile than Strategy 2, with an 866% total return and even more investment opportunities, as evidenced by the 772 trading instances.

Next, (Figure 11 below) we combined Strategy 2 (VXX) and Strategy 3 (XIV) to create a simple long and short directional volatility strategy.

Figure 11 – Combined Strategy 2 and Strategy 3 Performance Charts and Summary Statistics (11/1/2005 to 2/3/2014)



The combined Strategies (2 and 3) offer an even greater return profile, with a total return of 3702%. Almost as important, the combined Strategies are not simply focused on a few rare occurrences, but offer an investable opportunity 49% of the days observed.

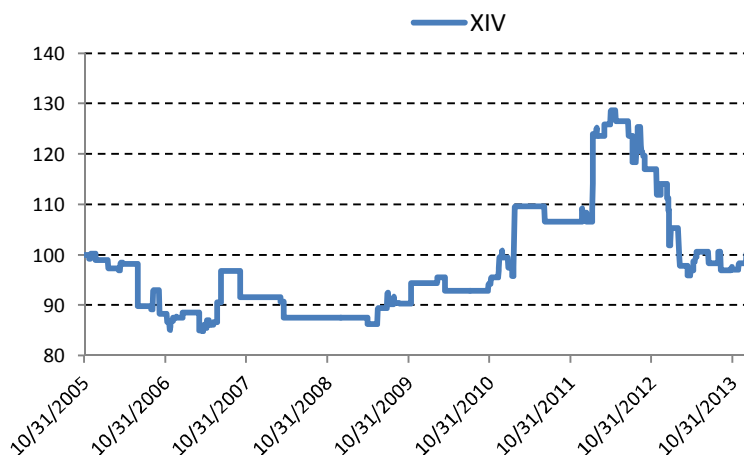
Another important concept is understanding when NOT to trade volatility. Let’s look at when the market is giving conflicting signals. Normally when the SPY (S&P 500 ETF) has a positive return, we would expect the VIX (and VIX futures contracts) to decline in value, so we examined what happens when the SPY has a positive return, but the front month VIX futures contract also has a positive return while the term structure is contango: (VIX < Fut1 < Fut2).

Buy XIV when SPY return > 0 AND VIX Fut1 return > 0 AND VIX < Fut1 < Fut2

| | |
|----------------|-------|
| Total Return | 0.9% |
| Days in Market | 102 |
| Total Days | 2,077 |
| % in Market | 4.9% |
| Positive Days | 52.0% |
| Negative Days | 48.0% |

In this example there are 102 days when we would normally want to be long XIV (short volatility). This XIV position only has a **total return of 0.90% on these 102 days**. In these environments investors are better off eliminating exposure.

| | |
|------|--------|
| Max | 12.13% |
| Min | -8.50% |
| 2005 | -1.1% |
| 2006 | -11.5% |
| 2007 | 4.6% |
| 2008 | -4.4% |
| 2009 | 7.9% |
| 2010 | 5.4% |
| 2011 | 8.9% |
| 2012 | 5.3% |
| 2013 | -13.8% |
| 2014 | 2.7% |



To be clear, we would not use these strategies in isolation, but in combination with other factors – some of which we have discussed in this paper. These examples provide an insight into the concepts we employ in our directional volatility investment strategy. To summarize:

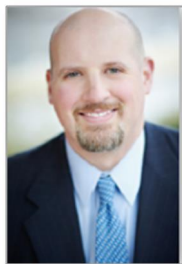
Our directional volatility investment strategy utilizes VIX futures and ETNs to seek to profit from increasing and decreasing volatility through mean reversion, momentum and term structure analysis. In normal market environments profits tend to come predominately from short volatility positions. The strategy also seeks to participate in volatility appreciation during equity market corrections of 10 to 15% and bear markets.

Where does the strategy fit in my portfolio?

Allocating to a directional volatility strategy as an equity substitute is compelling because the strategy seeks to achieve positive returns in bear markets. It can also be viewed as a portfolio diversifier because of reduced correlations to other major asset classes. It may also result in an improved risk reward ratio.

The Directional Volatility Strategy can be utilized as an equity substitute or an alternative complement to a diversified portfolio.

About the author



Greggory J. Flinn, Managing Director – Gregg Flinn is a Managing Director of Evolution Capital Strategies LLC and is currently the Portfolio Manager of the Evolution Portfolios.

Gregg has over 18 years of investment and wealth management experience helping individuals protect, maintain and grow their net worth.

Prior to Evolution Capital, Gregg was an Independent Trader focused on domestic and international equity, fixed income and commodities futures markets. Gregg developed quantitative based strategies that traded long and short over multiple time frames. These concepts form the core philosophy behind Evolution Capital.

Mr. Flinn began his career with Goldman Sachs, in Philadelphia, working as an Analyst within the Private Client Services Division. After completing the 2 Year Analyst Program, Gregg joined the Fixed Income Group of Goldman Sachs as a Sales Trader and was promoted to an Associate in 1999. Gregg focused on High Net Worth Individuals, Family Offices and Small Institutions developing and managing fixed income portfolios with a primary focus on the Municipal Bond Market. Gregg participated in developing investment strategy, sourcing and managing portfolios as well as contributing to monthly publications covering research and strategy.

Mr. Flinn is a Schreyer Honors College graduate with a Bachelor of Science (Magna Cum Laude) in Finance from the Pennsylvania State University.

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