

# The VIX reality check

There are many ways to hedge with VIX options, but there are also many traps you can fall into if you don't know how these contracts work.

BY JEREMY WIEN

**O**ver the past 18 months many esoteric financial products have stepped into the limelight — mortgage-backed securities, collateralized debt obligations — but no tradable product has gone from such obscurity to such prominence as options on the CBOE Volatility Index (VIX), in which average daily volume has increased 191 percent

since November 2008.

Often referred to as the “fear” index, the VIX measures the expected volatility in the S&P 500 index (SPX) over the next 30 days (see “The VIX”). Essentially, the VIX tracks what investors are willing to pay to hedge their equity portfolios with S&P 500 options. Unlike most discussions that focus on the VIX’s supposed predictive power, the following discus-

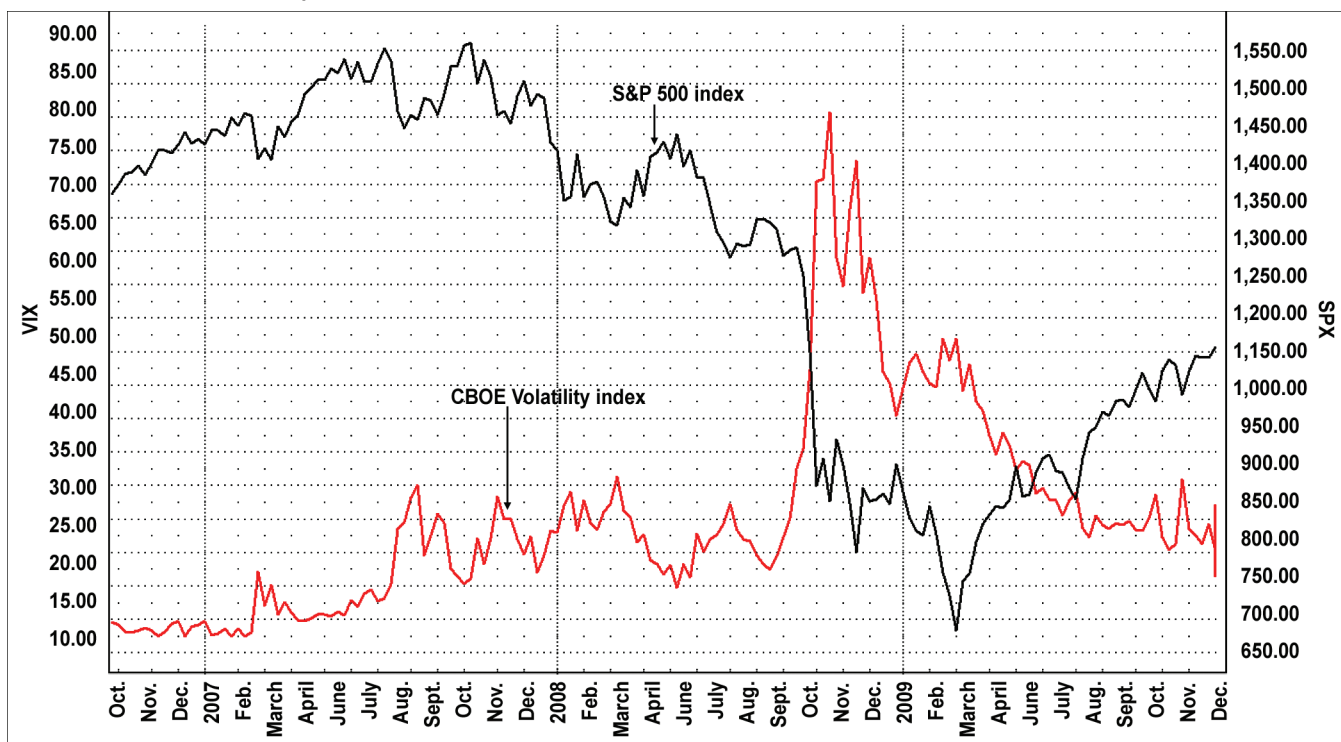
sion examines cheap and creative ways you can use options on the VIX index to offset losses in a stock portfolio.

However, there are several potential pitfalls to trading VIX options without experience, including two potentially costly misconceptions.

### Mistaken assumptions

First, the VIX doesn't have any predictive

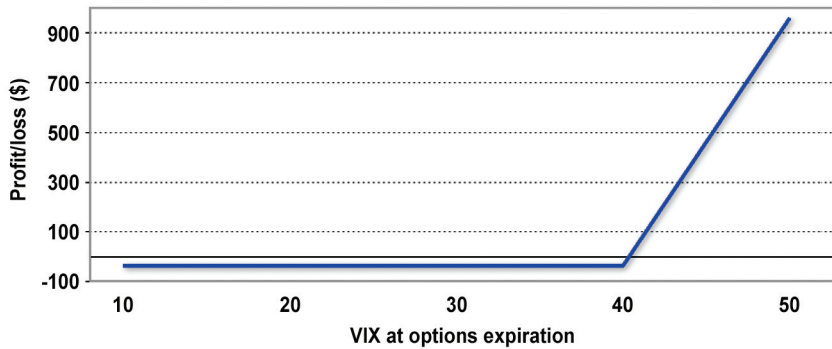
FIGURE 1: S&P 500 & THE VIX, 2006-2009



The S&P 500 tends to move in opposite directions as volatility rises as stocks fall and vice versa. However, the VIX fell sharply in late 2008 as stocks continued to slide, a sign that no concrete relationship holds.

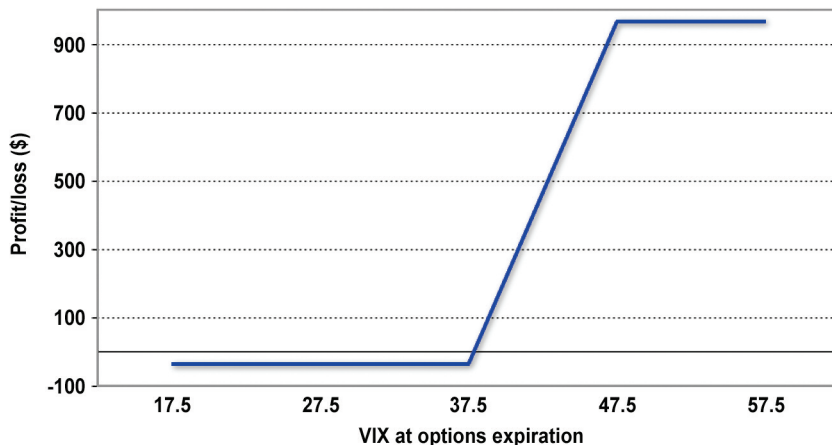
Source: eSignal

**FIGURE 2: LONG VIX CALL**



Buying a VIX call offers a high degree of protection against a stock-market crash.

**FIGURE 3: VIX BULL CALL SPREAD**



To reduce hedging costs, you could enter a bullish vertical spread on the VIX. The position will protect an equity portfolio, but not as completely as buying a call outright.

power regarding the direction of the stock market. Each day various articles and blog posts tout supposed VIX-stock market relationships — e.g., “The VIX and the SPX have risen in tandem for two consecutive days; nine out of the last 13 times that happened, the SPX was down the following day by an average of 1.3 percent.”

At best, the VIX is a confirming or coincident indicator, but even that connection is tenuous. Look no further than the financial meltdown from late 2008 to early 2009 when the equity markets continued to plunge while the VIX dropped dramatically. Don't be fooled into trying

to time your equity trades based on VIX movements.

More importantly, although options settlement is based on the cash (spot) VIX value, VIX options are priced using the VIX futures (VX). If you buy a February 35 call option, your potential gain at expiration is the greater of zero and the VIX's expiration value minus 35, while your potential loss is limited to the amount paid for the option.

However, mark-to-market pricing is a different story because VIX option values are based on the February VIX futures. The futures can trade near the cash VIX value, as they did in early 2008 when the

spot index and all the futures contract months traded consistently in the low to mid-20s. But sometimes the difference between the futures and the spot VIX can be quite large, as it was during the credit crisis, when the spot VIX was near 75 and the second-month futures were trading in the 60s. Intuitively, this makes sense, as one would expect the VIX to be lower two months forward than at that moment. If not, then someone could have bought a six-month 40-strike put for pennies — far too cheap.

The relationship reverses when the spot VIX is historically low, as it was in 2006. The spot VIX hovered around 10, but the six-month futures traded quite a bit higher, because one would expect the VIX to revert toward its historical mean over time.

Like all options on futures, VIX options are valued based on the underlying futures rather than the spot-market price, but they cannot be exercised into VIX futures positions — the options are cash-settled. That detail is often overlooked because the spot VIX value is so prominently reported in the financial media.

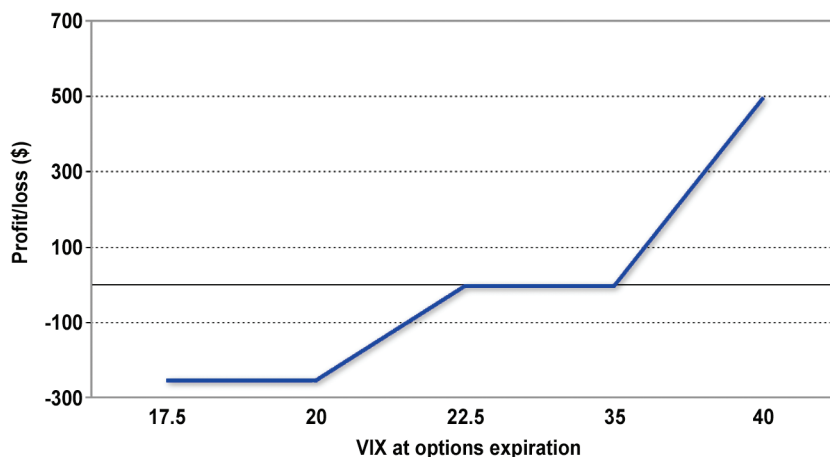
### The VIX as portfolio hedge

Historical volatility is the underlying market's actual fluctuation over a defined period — say, the past 30 days. Implied volatility (IV) is the market's estimated future volatility and is reflected in options premiums — the higher the expected volatility, the higher the premium.

The relationship between IV and the VIX can be roughly calculated as follows: VIX divided by 16 should equal the S&P 500's expected daily percentage change. For example, if the VIX is at 24, the options market is pricing in an expected daily move of roughly 1.5 percent. The direction of the move is irrelevant, although given that volatility normally increases when the market is falling, as it did in the fall of 2008, the VIX does tend to rise as the market falls and vice versa (Figure 1).

Because of the highly negative correlation between the VIX and the S&P 500

**FIGURE 4: BULL PUT SPREAD + LONG CALL**



This VIX options position combines a 22.5-20 bull put spread with a 35-strike call. The purpose is to gain upside exposure to the VIX while paying virtually nothing for it.

and other global stock indices, investors primarily use VIX futures and options to gain upside exposure to the VIX as a hedge against a stock market downturn.

One of the most common ways to hedge and gain upside exposure to the VIX is to buy call options. When the VIX closed at 21.50 on Dec. 4, 2009, you could have bought a January 40 call for 0.40. The position offers unlimited upside exposure to the VIX while risking only the 0.40 premium and provides a high level of protection against a severe stock-market downturn. Figure 2 shows the long 40 call's potential gains and losses at expiration.

A cheaper but less rewarding way to hedge is to enter a VIX bull call spread by purchasing a January 37.5 call and selling a January 47.5 call for a total cost (and risk) of 0.35. Again, the goal is to gain upside exposure to the VIX, but in this case it's accomplished less expensively than buying calls outright. The spread's potential profit is the difference between its two strike prices (10) minus its premium (0.35), or 9.65.

The spread's level of protection is moderately high. Figure 3 shows the bull call spread's potential gains and losses at options expiration.

An even cheaper hedge combines a

credit bull put spread (short put, long lower-strike put) with a long call well above the put strike prices. On Dec. 4, you could have sold a January 22.5 put while purchasing a January 20 put and a January 35 call for a total cost of 0.05.

This trade gains upside exposure to the VIX while paying virtually nothing for it. Figure 4 shows the risk profile for this position at expiration. Risk is limited to the premium plus the difference in the strike prices of the put spread (0.05 cost + 2.5 strike-price difference = 2.55). The position's potential gains are unlimited if the VIX surges, offering a high degree of equity portfolio protection. However, this position adds some downside risk as a way of lowering the hedge's cost.

When market participants panicked in September 2008, the VIX climbed much higher and faster than anyone had previously thought possible. Low-premium trades that provide upside VIX exposure can literally save a job, a portfolio, or even an entire fund.

For example, a Société Générale customer in early September 2008 bought 15,000 November 50 VIX call options for 0.15 each. As the market continued to collapse, the premium rose to more than \$20, so at one point the \$225,000 investment was worth more than \$30,000,000

## The VIX

The Volatility Index (VIX) measures the implied volatility of S&P 500 index options traded on the Chicago Board Option Exchange (CBOE). The VIX is designed to reflect the market expectation of near-term (in this case, 30-day) volatility and is a commonly referenced gauge of the stock market's "fear level." The original VIX, launched in 1990, was derived from eight near-term at-the-money S&P 100 (OEX) options (calls and puts) using the Black-Scholes options pricing model.

The VIX underwent a major transformation in late 2003. The current index is derived from both at-the-money and out-of-the-money S&P 500 (SPX) calls and puts to make the index better represent the full range of volatility. At the same time, the CBOE applied the new calculation method to the CBOE NDX Volatility Index (VXN), which reflects the volatility of the Nasdaq 100 index. Other VIX indices have followed, including ones for the Dow Jones Industrial Average, Russell 2000, crude oil, gold, and the Euro.

The exchange still publishes the original VIX calculation, which can be found under the ticker symbol VXO. For more information about the VIX and its calculation, visit [www.cboe.com/vix](http://www.cboe.com/vix).

(15,000 contracts \* \$20 premium \* \$100 multiplier).

### The most interesting trade of 2009

The trades discussed so far are fairly "vanilla" in that they have a single purpose and a fairly straightforward directional view. The most interesting trade from 2009, and one that has been copied a few times since a multi-strategy fund originally entered it around Labor Day, is

much more complex.

The trade is to sell a strangle (short an out-of-the-money call and short an out-of-the-money put in same month) while also buying higher-strike calls at a ratio of 1:3 or 1:4. For example, you would sell one January 25 put and one January 26 call while buying three January 35 calls. This trade would allow you to collect a premium of roughly 2.20.

Figure 5 shows the position's potential gains and losses at the Jan. 20 expiration. The purpose of this trade is twofold: First, you are betting the VIX will trade in a fairly narrow range between Dec. 4, 2009 and Jan. 20, 2010. However, if the VIX breaks out to the upside during a steep market correction, past a certain point (in this case the 35 strike), you are long three VIX calls, which are in the money (ITM) and offer more leverage than just one contract.

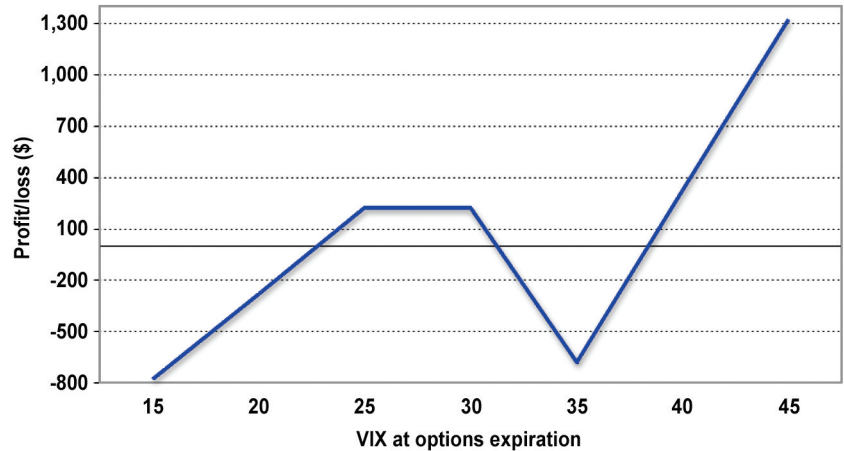
Figure 5 shows there is a risk of losing money if the VIX grinds slowly higher into the upper 20s or low 30s — but the VIX doesn't usually grind higher. Historically, when the VIX moves higher, it does so rather quickly. If this pattern repeats, you would make money as the VIX approached and exceeded 40. But this trade also leaves some downside risk in the VIX.

The VIX traded in a fairly narrow range from late July through early December 2009, and this trade allowed traders to take advantage of that continued trajectory while simultaneously being protected in a crash. Given those seemingly contradictory goals, and that the strategy made money in the second half of 2009, it is the most interesting VIX trade of the year.

**Cover your tail**

Liquidity in VIX options has increased substantially during the past 18 months. Not only has average daily volume nearly doubled since November 2008, but the size of a given trade that can be priced reasonably without disrupting the market also has grown. Early in 2008, a 5,000-contract trade was considered large. Now, trades of 50,000 or even 100,000 contracts are more common. These large trades attract more players (banks, hedge funds, etc.) to the market. More players

**FIGURE 5: VIX STRANGLE WITH BULLISH LEG**



By combining a 25-26 strangle with three 35-strike calls, this trade will profit if the VIX trades in a fairly narrow range, but it also will gain ground if the stock market tanks.

will undoubtedly mean tighter markets, which will allow you to trade positions cheaper than before.

A common refrain these days is that Wall Street has a short memory. Perhaps, but it will take quite a while for anyone — on or off Wall Street — to forget the fall of 2008. Lawyers supposedly spend 90 percent of their time preparing for events that happen only 10 percent of

the time, and only 10 percent of their time preparing for events that occur 90 percent of the time.

This attitude, which should have been more prevalent on the Street before 2008, is certainly omnipresent today. It will continue to drive demand to protect against so-called “tails” — extreme, unlikely scenarios that cause the most problems. 📌

**Related reading**

**“The VIX and the financial crisis,”** *Active Trader*, March 2010.

The relationship between the CBOE Volatility Index and the stock market isn't as clear as it appears at first glance.

**“The VIX and market capitulations,”** *Active Trader*, May 2009.

It takes more than a VIX spike to identify a market bottom.

**“The VIX fix,”** *Active Trader*, December 2007.

A synthetic VIX calculation can be used in any market to reproduce the performance of the well-known volatility index.

**“Tracking VIX swings,”** *Active Trader*, January 2006.

The VIX has been a widely discussed stock market barometer, but how reliably does it identify market turning points? This study turned up a few surprises in analyzing how the S&P 500 tracking stock (SPY) responded to VIX highs and lows.

**“Trading System Lab: VIX-based system,”** *Active Trader*, January 2006.

This test uses a system described by Larry Connors in the TradingMarkets.com blog. The system tries to find oversold situations in the S&P by identifying VIX spikes.