

The options markets are all about volatility. If you're going to use these powerful and liquid derivative products to manage your risk or speculate, you need to understand the language of volatility.

## Managing equity market volatility

BY PAUL B. STEPHENS

One day after a recent market close, a professional market maker who trades options on the S&P 500 index (SPX) was asked how his day went. His response was something like this: "The day was really great. Throughout the morning, volatilities ran up. Around midday, volatility premiums were sucked out and then during the last hour they ran up again."

When asked what the underlying S&P 500 market did, he replied, "Uh, I don't know."

For professional options market makers, volatility is a big part of the options business. Changes in volatility have a great effect on market makers' profitability even when, because of hedging, their exposures to directional changes in the underlying stock or stock index may be quite low.

For other market participants, volatility is still extremely important. The investor who buys puts against his stock position tries to buy volatility premium to protect against volatility in his stock. The investor who sells calls against his stock position profits when the underlying stock experiences lower

than expected volatility. The investor who buys calls outright profits when the stock or stock index on which the option is based becomes more volatile — all else equal.

To further underscore the importance of volatility in options trading, consider basic futures and options fair-value pricing theory. The fair value of a stock index futures contract is determined by cost-of-carry through time, but the fair value of an option on a stock index is the cost-of-carry (that is, interest rates minus dividend yields) through time plus a volatility component through time. It is that volatility component that makes options fundamentally different from futures.

So, how can investors use volatility-related ideas in their trading? Let's consider investors looking for ways to protect their stock positions from volatility.

### GETTING OUT

Not to overlook the obvious, the simplest strategy for investors to protect themselves from worries about equity market volatility is simply not to hold so damn much stock! So, a prudent investor might simply sell stock to diversify into

cash, bonds, real estate, commodities or other asset classes.

Alternately, the investor can sell equity index futures or exchange-traded funds (ETFs) as potentially more efficient ways of "shooting Novocain" into a stock position and diminishing some of the potential pain (or gain). This tactic may have the advantage of cheap execution costs relative to disrupting the stock portfolio, but the disadvantage of basis risk between the stock index and the stock portfolio being hedged can be considerable.

To short ETFs, such as Standard & Poor's Depository Receipts (known as "SPDRs" with the ticker symbol "SPY"), would in this case be a similar way of accomplishing the same goals as selling futures, but it might be more transaction cost advantageous for some, especially smaller, stock portfolios.

### INSURANCE STRATEGIES

However, there is a great risk in selling stock, futures or ETFs. That is, the stock market might rise and outperform the asset classes diversified into. Also, the other assets might behave just as poorly as or worse than the stock markets, pro-

viding no hedging advantages. So there is a need to consider other alternatives for protecting stock portfolios but still maintaining stock exposure.

The purchase of puts is a common strategy that investors use to try to limit downside risk while maintaining upside exposure at the cost of an insurance-like premium. Investors can choose to use options on stocks or indexes depending on whether they want to trade execution cost disadvantages versus basis risk. More specifically, if an investor is most concerned about the risk of a limited portion of their stock portfolio, certainly he can use options on individual stocks to implement his hedges.

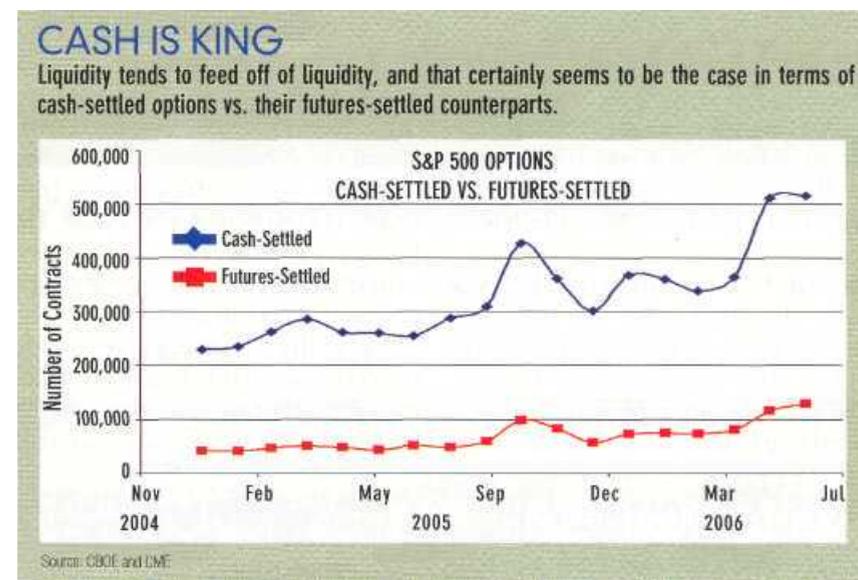
As an alternative to using options on many of their individual stocks, investors can buy index-related puts. This has clear transactional cost advantages simply because the investor is executing in one product instead of many.

Less clear is that index-related options tend to trade at lower premiums than do individual stock options. Simply stated, this is due to a portfolio effect. Consider the construction of a hypothetical five-stock portfolio. Assuming the volatility premium implied in each of the individual stocks' options was exactly 30%, would the options on the index also trade at a 30% premium? Probably not. Due to investors' perceptions of offsetting risks between the stocks, the index options would likely trade at a discounted volatility premium.

#### TRADING TACTICS

If an investor decides that index option products make the most sense, which one should he choose? Based on anecdotal information from investors, the two most important determinants are product fit and liquidity.

"Product fit" refers to the match of an investor's portfolio hedging needs to an index. For example, if a portfolio seems to track the S&P 500 index sufficiently, then there are many S&P 500 options products that can be used, such as cash-settled index options, futures-settled



options and ETF-settled options. Such availability also is true for the S&P 100, the Dow Jones Industrial Average, the Nasdaq 100, the Russell 2000 and other popular indexes.

Cash-settled index options are economically similar to futures-settled options and ETF-settled options on the same indexes. For example, cash-settled put options, on the S&P 500 (SPX) or on futures on the same index or on the SPY ETF would all have similar performance in a downward market move.

Some ETF options, such as the QQQQ and the IWM (Russell 2000) trade more actively than cash-settled options but this is due in large part to contract size differentials. Many investors with holdings in ETFs that they want to hedge directly prefer ETF options, while investors with holdings in futures that they want to hedge prefer futures-settled options, and investors with stocks and individual stock options that they want to hedge prefer cash-settled options.

The key factor after product fit, therefore, is liquidity. "Liquidity" can be defined as tight bid/ask spreads for sufficient contract quantities. If the old saw in the real estate business is "location, location, location," the old saw in the options business is "liquidity, liq-

uidity, liquidity." On S&P 500 products, in particular, (before and after adjusting for contract size differentials) and also across global indexes, cash-settled index options tend to trade much more than index futures-settled options (see "Cash is king," above).

Other determinants of product choice tend to be dominated by product fit and liquidity. Transaction speed is important, especially for some active traders, but most traders are willing to wait at least a few minutes if they think this will mean a better fill. Those who need electronically traded contracts can electronically trade SPY options and E-mini S&P 500 futures options, and they can also trade cash-settled mini-SPX options (ticker: XSP) electronically.

#### COVERED CALLS

An alternative way of obtaining protection, albeit more limited protection, for equity portfolios is the strategy of selling calls against one's stock position. This strategy, known as a "covered call sale" or "buy-write," has been common for decades but has been increasingly popular in the last few years.

For stock pickers with targeted sale prices in mind, buy-writes are an easy to understand way of adding income to

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stocks that they are willing to part with at higher levels. However, what if an investor wanted to know the long-term performance of these strategies?

To gauge this, consider the performance of the CBOE S&P 500 BuyWrite Index (ticker: BXM). Historically, this index has had similar performance to the S&P 500 index but with substantially less risk. The reason this strategy has been so successful is that index options have been sold at volatility premiums higher than the volatility experienced in the underlying index.

### VOLATILITY AS AN ASSET

Other more recent alternatives for hedging equity portfolios can involve the use of VIX futures and options. These products offer ways for investors to treat volatility itself as an asset by enabling investors to benefit directly from changes in equity market volatility. This is true because the VIX index is a measure of S&P 500 index volatility as expressed in options pricing.

Especially because we are on the subject of protecting equity portfolios, it is important to note many market participants have found interest in

buying VIX futures or VIX call options to hedge equity portfolios. As shown in "Volatility hedge" (below), the price of the VIX index often moves in the opposite direction of the S&P 500 index. For example, when stock prices drop, the VIX often rises. Investors may forecast that if equity markets go down significantly, the VIX index and VIX futures and call options may go up.

During very turbulent markets in May and June of 2006, VIX futures and options volumes soared. While there were many happy customers who had bought VIX futures and call options, new investors need to understand some of the theory of how VIX derivatives are priced.

Operationally, VIX futures are similar to stock index futures (for example, S&P 500 index futures or DJIA futures) in that if you go long the futures contract and at expiration the cash index is higher than your entry point, you make money. If at expiration the index is lower, you lose money.

However, unlike stock index futures, the fair value VIX futures price is not determined by a simple cost-of-carry relationship. VIX futures settle to an index calculation that is made up of SPX options prices. Therefore, pre-settlement VIX futures prices can differ substantially from the underlying VIX index. VIX options have both a forward price component and a "volatility of volatility" component (see "VIX on VIX?" left).

There are many ways to use listed equity derivative products to manage volatility. Some use these products to try to protect themselves from volatility. Others use them to try to profit from volatility. But no matter how you use these products, you can't disagree with the modern refrain of the options trader: "It's all about the volatility, baby." FM

Paul B. Stephens is the director and department head of institutional and international marketing at the Chicago Board Options Exchange. You can reach him at [stephens@cboe.com](mailto:stephens@cboe.com).

