Futures On Variance And Deviance

"Don't look back. Something might be gaining on you." - Satchel Paige
"Want to sell more window insurance? Learn how to throw rocks." - Howard Simons

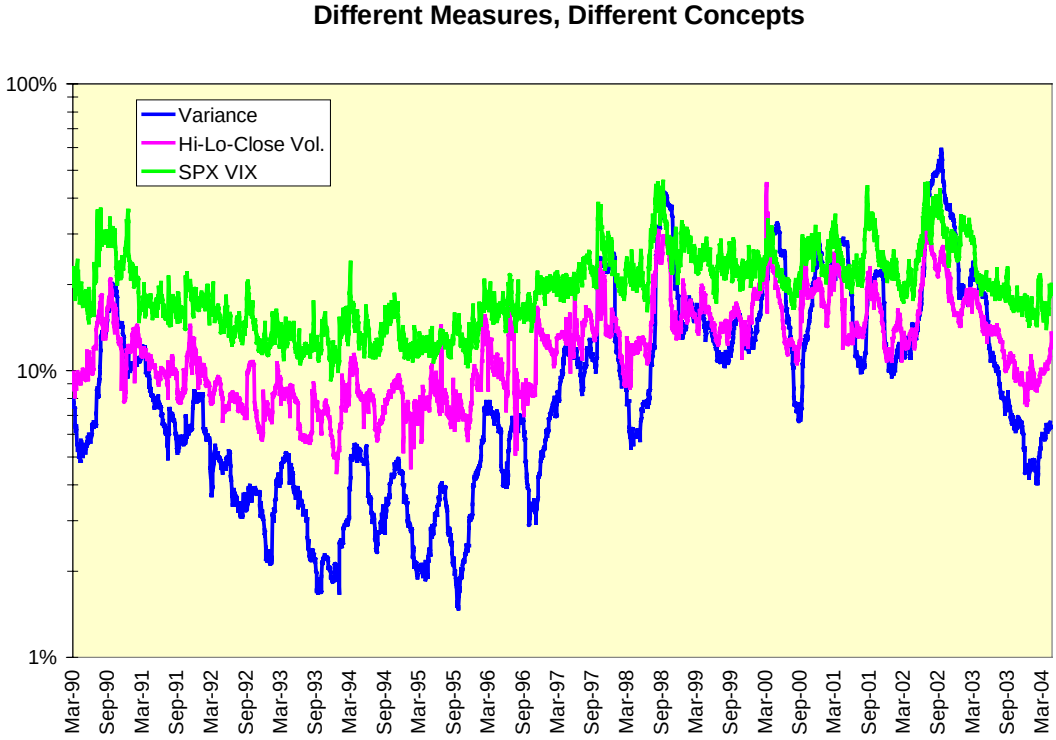
Economic decision-making has been compared to driving at 80 miles per hour while looking solely at the rearview mirror, and we economists certainly have the results to prove it. But historic data are far more available than future data, and in a ratio inversely proportional to their actual utility.

Risk and uncertainty enter into this equation as well. We are no longer at risk to past events, only to future developments. However, as anyone who has ever bought insurance is aware, actuarial tables have to be based on past events; they, too, live in the rearview mirror.

The insurance industry, particularly its reinsurance segment, revels in pricing esoteric risks; not only are the spreads richer than those available for mundane risks, but they present intellectual challenges greater than those associated with you driving the family chariot into the garage door. Both futures and options have insurance components, and an over-the-counter market has grown around realized price variance, so it was no doubt a matter of time before an exchange-traded futures contract on variance arose, in this case at the Chicago Board of Options Futures Exchange. The specifications of these futures and the methodology behind them can be found here.

Implied Versus Historic Volatility
The world of options trading is based on a market-derived assessment not of past events, but rather of future events. The standard Black-Scholes model contains five variables, four of which - current price, strike price, time to expiration and the risk-free interest rate - are known exactly at all times. The fifth, implied volatility, can be derived from the market price of options to allow for the model's solution.

Implied volatility and the historic variance of returns, or daily percentage price changes, measure different things, the market's price of future uncertainty and a relative frequency distribution of events, respectively, and so we have no reason whatsoever to expect them to be equal. Indeed, a long-term comparison of variance, the CBOE's new volatility index based on the S&P 500 index and Parkinson's high-low-close volatility, a measure that incorporates intraday range as well as interday change, shows significant differences.



Variance Drawbacks

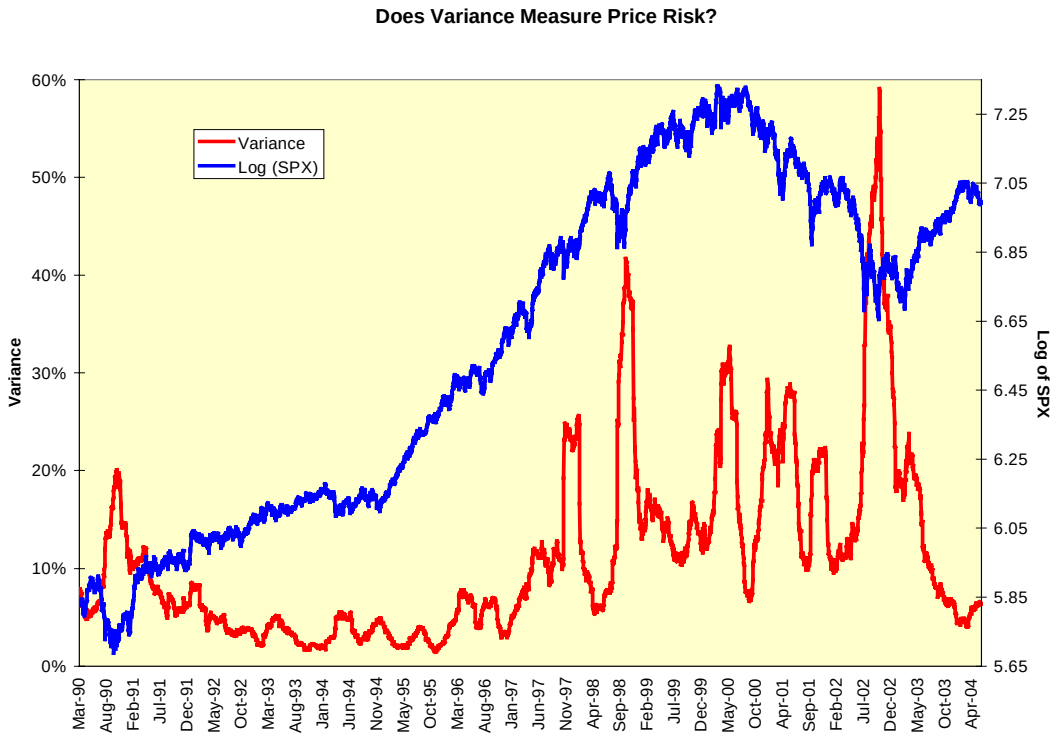
The mechanics of constructing variance restrict its scope to the daily percentage changes of closing prices. A market environment wherein 20 SPX index point daily ranges are common would be classified as having low variance if the settlement prices were close to one another. This is intuitively incomplete: We all know that the wider the daily range the lower the probability of any one price in the range representing the fair value of the index, however defined. The closing price may be more important for cash flow reasons - positions are marked to this price for account valuation purposes - but it has no greater economic importance than other points in the range and indeed may be subject to manipulation by index arbitrageurs, especially around expirations.

The Parkinson measure incorporates the effects of intraday range, and for this reason will exceed variance in all but the most strongly trending markets, such as the bear market collapse in 2002. The Parkinson measure produces a lower volatility during strong trends for the straightforward reason that such markets, while producing big price changes, are actually fairly certain about the direction in which they are moving.

Variance falls far below implied volatility as measured by the VIX during protracted trading ranges, such as January-March 2004. While the backward-looking measure is falling, uncertainty about the magnitude and even direction of the eventual breakout is increasing. To which measure do you feel more exposed?

Variance And Price

The relationship between the VIX and price has been discussed here previously; it is not as simple as the price collapses/VIX surges word association embedded in the public's mind. The relationship between price and variance is even less direct.



Yes, it is true variance rose quite sharply during the Asian and Russian/LTCM crises of 1997-1998, and even more rapidly during 2002, but these were markets in obvious distress on all other measures. We could say that the low variance of the early and mid-1990s was associated with the general bull market, but it was also associated with the yearlong trading range of 1994. The big market top of 2000 saw an oscillating variance measure that, as in 1997-1998, added no further analytic value. Does the present upturn in variance from a low level presage an impending collapse, or is it more analogous to similar moves in the early 1990s? Finally, and most important, are we better off using forward-looking measures, such as the VIX, than we are using the backward-looking variance? I will go with the VIX, and only on an either-or basis.

Self-Imposed Risk

If investors are not exposed to further damage from past events and if variance is poorly related to both other measures of volatility and to price, then what market do variance futures serve? The answer, as mentioned above, is those dealers who have entered into OTC derivatives on variance. This seems a little circular, but since it is difficult to manipulate the underlying variance of the S&P 500 index itself without employing astronomical sums of trading capital for no other reason, this market is probably harmless to bystanders.

In a September 2003 column on the then-impending VIX futures, I noted a number of operational considerations I believed would make trading those instruments difficult if not impossible. These included an underlying index that switched composition eight days prior to expiration, no forward curve, no defined cost of carry, no way for market makers to offset their risks and the inability to hedge both price (gamma) and volatility (vega) risks simultaneously.

Many of the same considerations apply to variance futures, particularly the difficulty in making a market for which there is no actively trading underlying and no forward curve. Perhaps this explains the 10-point wide bid-ask spreads seen during the first few days of trading; with each point worth $50, this translates to a $500 transaction cost per contract.

Many consider volatility and variance to be a new asset class, and this may yet be true. For now, however, future hopes do not create present reality.