

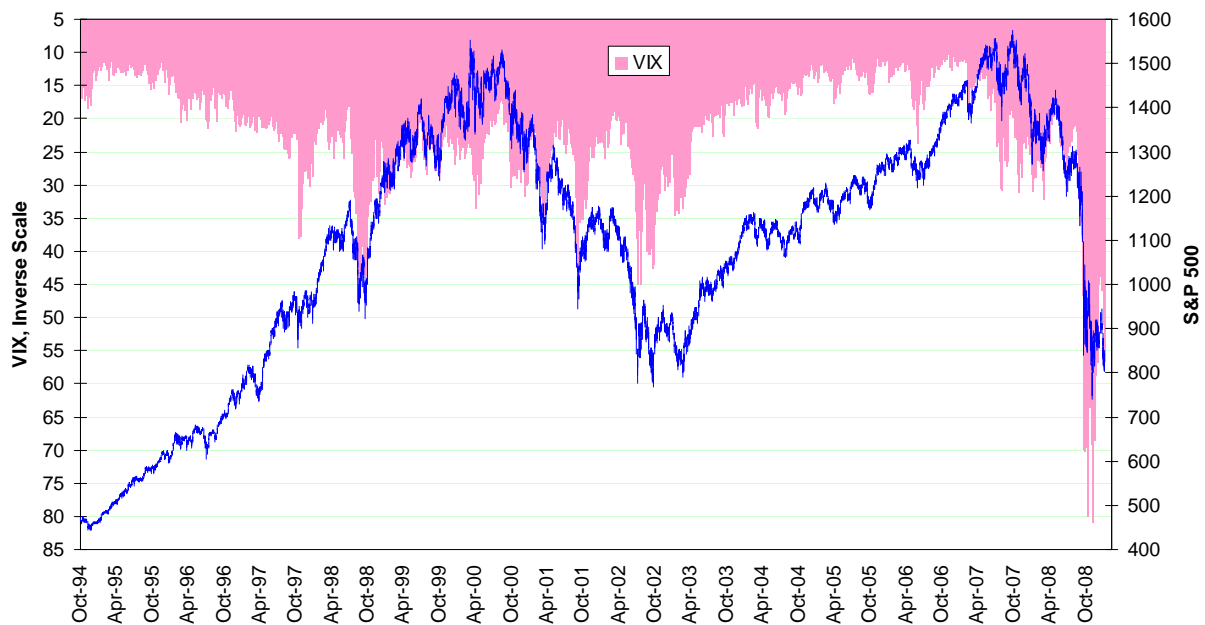
The VIX And Market Capitulations

Hang around markets long enough and you will learn to associate key words and phrases with market structures. If, for example, you hear someone blathering about the gold-silver ratio, you know we are in a bull market for precious metals. The opposite holds true for terms such as “earnings visibility” and “capitulation.” Both come out of the woodwork only when we are in a major bear market for stocks.

Associated with market capitulations are those who use the Chicago Board of Options Exchange’s Volatility Index (VIX) to define when we, much like the wino awakening in the gutter on a Sunday morning, have hit rock-bottom. The general premise here is quite valid: As most investors are net long stocks and buy put options for insurance, they tend to bid the price of put options higher as the market declines. At some point, put option volatility surges to the point where the price of put option insurance incorporates a worst-case loss and option buyers cease and desist. In addition, nervous shareholders who hold these put options now have less incentive to sell their stocks. Both factors contribute to a dissipation of selling pressure.

The key phrase above is “at some point.” If we take a look at the VIX’ history, plotted inversely, going back to the late 1994 breakout of the stock market we can see numerous points where a spike in the VIX corresponded to an upside reversal in the S&P 500 (SPX). These include the onset of the Asian crisis in October 1997, the Russian/Long Term Capital Management crisis of October 1998, the September 2001 terrorist attacks and, most prominently, the September-November 2008 collapse.

The VIX And The S&P 500



Each of these spikes in the VIX occurred at very different absolute levels. And the VIX itself exhibits does not look so much as a long-term white-noise process wherein spikes revert back to a static mean, but rather a set of long-term trends wherein spikes revert back to different levels.

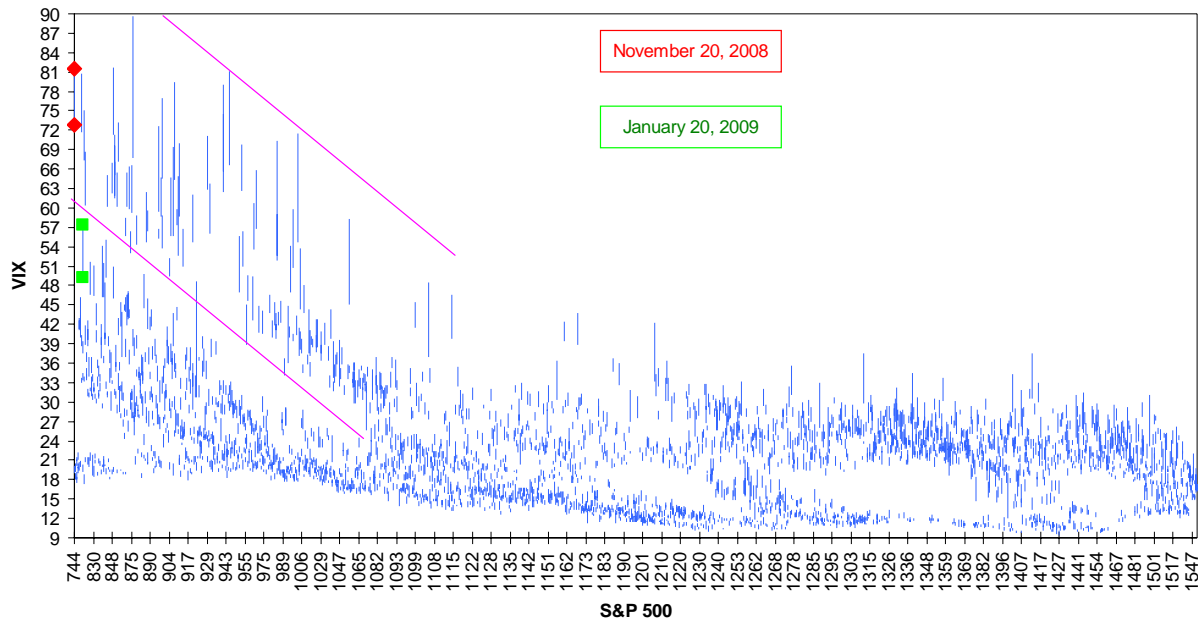
Moreover, the two long bullish periods in the SPX, the late 1990s and 2003-2007, occurred during opposite trends in the VIX. The 1990s rally occurred during a period of steadily rising volatility while the 2003-2007 rally occurred within a period of steadily declining volatility. As an aside into a much deeper topic, both trends had good fundamental reasons. The 1990s rally was disbelieved by many and occurred during an environment of uncertain global monetary policy and currency management; the 2003-2007 rally occurred during an environment of very stable and predictable global monetary policy and currency management.

We can or should agree any trading indicator based on the *absolute* level of the VIX has to be the product of either data-mining, over-parameterized back-testing or both. Neither approach ever produces a robust system going forward.

Moving Beyond Absolute

Let's rearrange some of the VIX and SPX data from mid-April 1997 through late January 2009. The 1997 date was chosen because, sadly, that was the crossing point to the upside for SPX prices revisited recently on the downside. The daily high-low range of the VIX will be mapped against the level of the SPX. The VIX high-low ranges during the 2008 collapse occurred largely within the confines of the magenta channel and are markedly higher than seen during the 1997-1998 bull market. The high-low range of the bear market low to-date, November 20, 2008 is marked in red diamonds; the financial sector crash on January 20, 2009 is marked with green rectangles.

VIX Shock & Regress Since April 14, 1997



The chart confirms John Maynard Keynes aphorism, “The market can stay irrational longer than you can stay solvent.” Not only did the VIX rise from record levels, its ranges expanded as well. Anyone who marched in to sell volatility encountered not only an absolute loss on instruments such as short VIX futures or long VIX put or short VIX call options, they encountered lower liquidity levels and higher spreads by virtue of the increased volatility of volatility.

Those losses still might be preferable to those involving short straddles. There the increased volatility was compounded by the delta and gamma losses created by the SPX’ price collapse. Even worse would be a floating-rate payor position in SPX variance swaps. Variance tends to rise as the square of volatility, and as volatility rises on the way down, those who are short variance are forced to sell ever-greater quantities of stock at ever-lower prices to hedge their positions. The last time such “sell in the hole” trading was tried on an industrial scale was with portfolio insurance during the October 1987 crash. Every generation has to invent a new self-immolating trade.

Skew And You

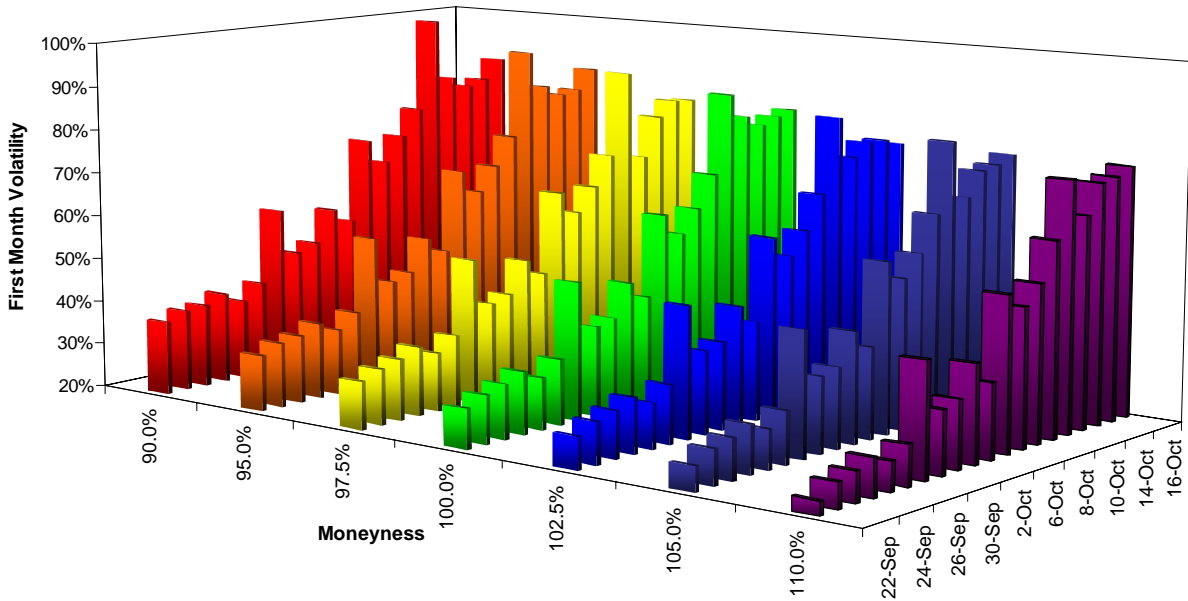
Did the nature of volatility change during last fall’s credit crunch? It did not really change so much as it unveiled another aspect of itself during the extreme market conditions. We must remember a put option buyer should never pay more than the present value of the strike; otherwise, the buyer is over-insuring the maximum loss. As most option buyers, call or put, tend to buy out-of-the-money (OTM) strikes that offer incomplete protection but cost less, the volatility of those strikes tends to get bid higher than that of the at-the-money option (ATM). This produces the characteristic “smile” of option volatility where the wing volatilities are lower than the ATM volatility.

As an aside, the purchase of lower-cost, lower-gamma OTM options is contrary to the option strike selection algorithms discussed in *The Dynamic Option Selection System* (Wiley, 1999).

As noted above, the asymmetric nature of stock ownership places maintains put options in relatively high demand even at higher volatility; this skews the smile toward strikes lower than the ATM. As an aside, that systematic skewing creates a trading opportunity for put-write strategies relative to buy-write strategies (see “Putting The Put-Write Right,” August 2008).

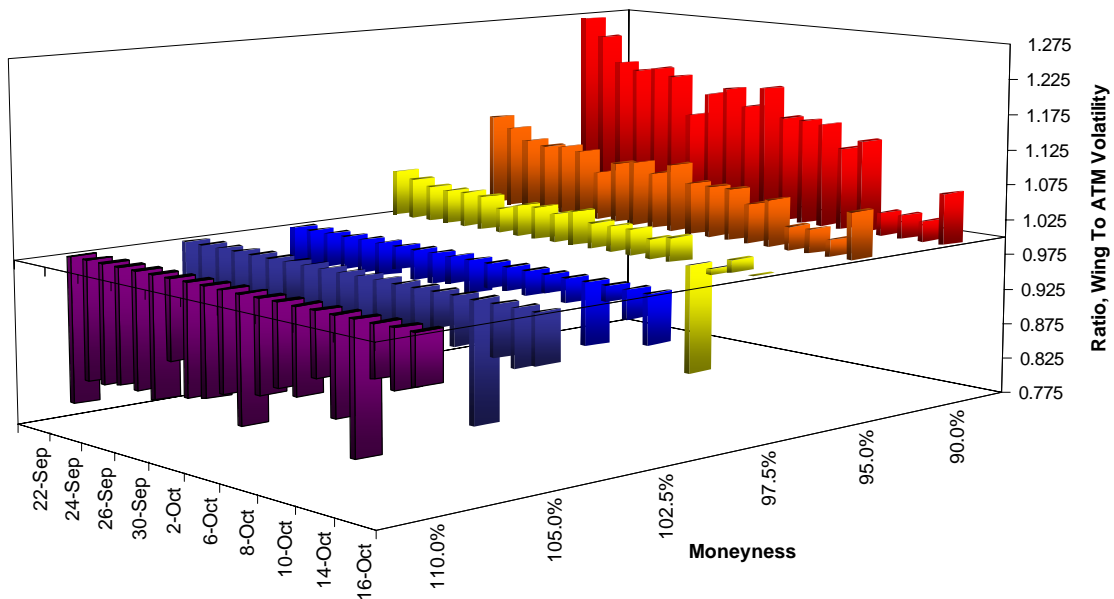
How did the SPX skew change during the September-October 2008 crisis? Let's map the daily SPX option volatility for the SPX between the September and October 2008 option expirations against "moneyness," or a level at a percentage of the ATM strike.

S&P 500 Volatility After September Expiration



As the huge rise in SPX volatility at all strikes is the dominant feature of this chart, we should rearrange the data and display the readings as a percentage of the ATM volatility for each day.

S&P 500 Volatility After September Expiration



Here a pattern emerges. As volatility in general rose, the higher-priced strikes' volatility increased as a percentage of the ATM volatility, and the opposite occurred for the lower-priced strikes. The pattern for the lower-priced strikes suggests put option buyers became more willing to buy the higher-cost, higher-gamma near-ATM strikes as volatility rose. Whether they should have engaged in that behavior in the first place is a moot point.

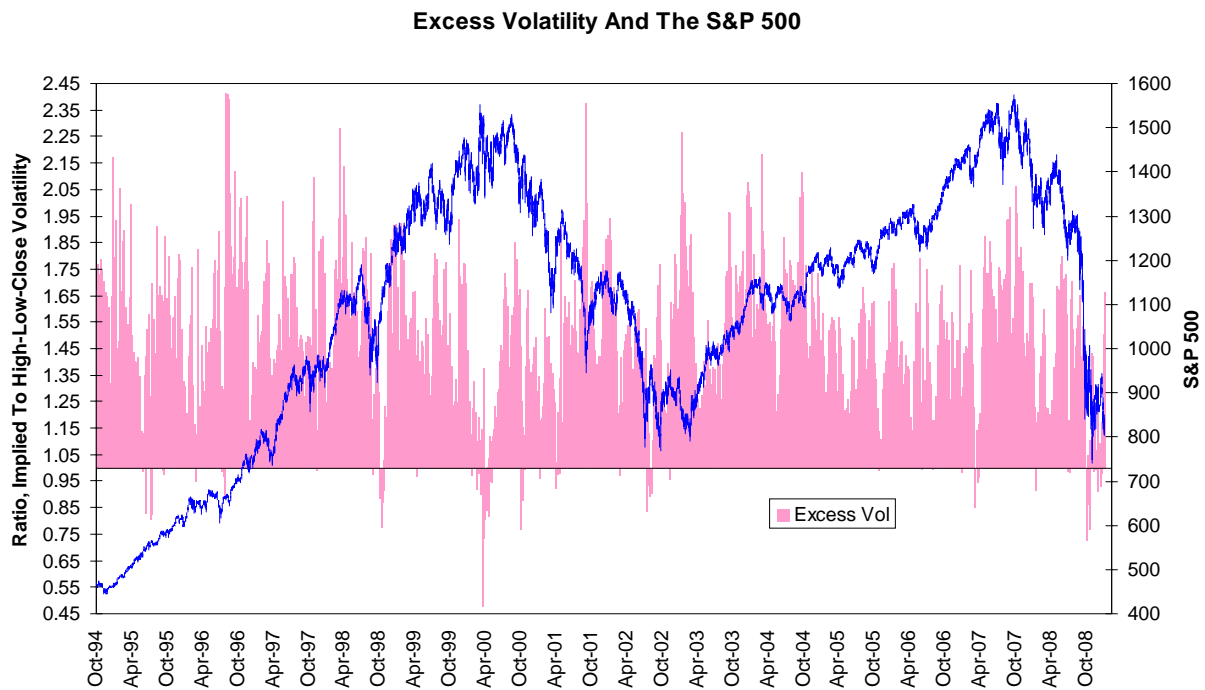
As yet another aside, the mechanics of VIX construction places a greater weight on the ATM strikes. Even if nothing occurred in overall volatility levels, the VIX would have risen by virtue of higher ATM volatility relative to OTM volatility during this particular time period.

What can explain this change in strike preference? The answer in this case is simple and grim: The put option buyer is not buying a floor price underneath a stock or index so much as protection the likelihood a stock is going to go to or near zero quickly. That happened to a number of financial stocks during September-October 2008; think of Lehman Brothers, Fannie Mae, Freddie Mac and Washington Mutual, just for starters.

The volatilities for individual financial stocks were indeed pricing in the risk of ruin during this period. Volatility on Morgan Stanley reached 495% when its capital infusion by Mitsubishi UFJ came into question during October 2008. An October \$12.50 put expiring in a week closed at \$4.80 while the stock itself closed at \$9.68. If that is not evidence of a binary bet on whether Morgan Stanley was going to stay in business, what was it?

Relative Volatility

If such a bet on an individual stock is a bet on capitulation, what does an index environment replete with such stocks look like? Let's compare the ATM implied volatility of the SPX, not the same thing as the strike-weighted VIX, to the SPX' high-low-close volatility. This measure incorporates the effects of intraday price range as well as interday price change.



Excess volatility readings less than 1.00 in the SPX are uncommon, but they have occurred during market bottoms such as October 1998, April 2000, October 2002 and March 2007. Several of these periods were characterized by high absolute volatility.

We can conclude, therefore, that when absolute implied volatility is high but is less than absolute high-low-close volatility the market is walking away from options as insurance. It is this *relative* low volatility, not the high *absolute* volatility, which defines a capitulation bottom in a non-parameterized fashion.