

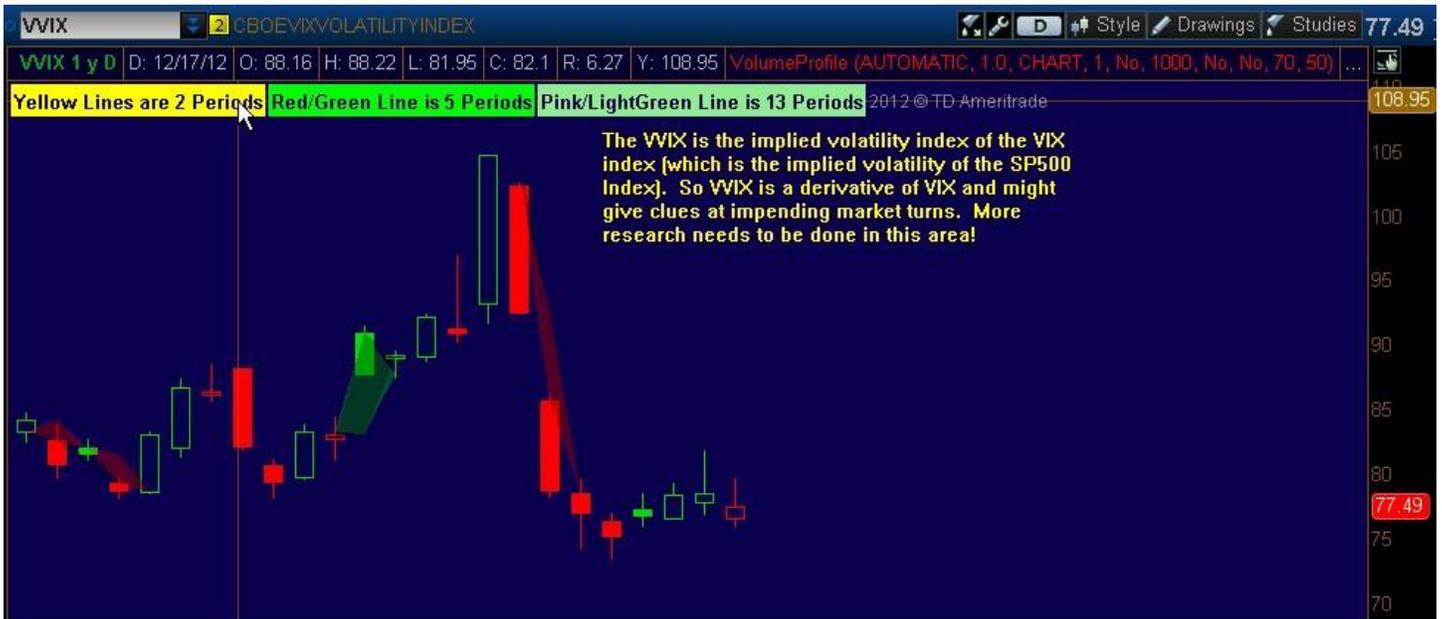
## VIX Tendencies at Option Expiration

**Definitions and Background:** The VIX is a measure of the Implied Volatility of the SP 500 index. Implied Volatility (or “IV”) is the *relative “expensiveness”* of the puts and calls of all 500 SPX stocks. I will use **VIX, IV** and the words “**volatility/implied volatility**” *interchangeably* throughout this article. As the word “implied” suggests, IV gauges (via option pricing) the *future expectation of movement* in the “underlying.” The underlying is whatever index, ETF, stock or future that underlies the option being traded. Since the IV is *implying movement*, it is considered forward looking, but it does tend to overshoot to the upside as well as the downside. When there is more demand to buy an option, the price goes up (causing higher Implied Volatility) while less buying demand yields lower option prices and therefore, lower Implied Volatility. Market makers in Chicago at the CBOE adjust pricing based on order flow which is strictly a function of supply and demand for each option. Market efficiency has improved immensely on highly traded underlyings with the advent of internet based trading platforms and cutting edge companies like Interactive Brokers and Thinkorswim (TD Ameritrade). The “edge” used to belong to the pit and floor traders in Chicago due to wide or excessive Bid-Ask spreads, but this is no longer the case with the major, liquid underlyings. I have traded options actively for the last 8 years and consider myself to have many advantages due to technology and liquid markets where I trade probability based option strategies for a living. I believe there is an edge in *understanding the tendencies* of Implied Volatility **either side of the monthly options expiration** since the VIX and the SP500 tend to move in opposite directions most of the time. Further, options pricing with the VIX as a proxy can help traders to understand when the selling options makes sense and when it does not. Although the article will highlight the VIX, much of the discussion applies to individual underlyings and their options.

**The VIX** is often described as the “Fear Indicator” of the stock market. I prefer to describe it as an *unpredictability* indicator, but perhaps that is simply semantics as unpredictability is what causes fear in people. Either way, when fear is present, people tend to pay up or even *overpay*, particularly for the Puts or downside options. Sometimes, there is a fear that an upside move will be missed and Call option implied volatility rises with buying demand for the Calls. Puts usually trade at a higher IV than Call IV, but Call IV rises in uncertain markets along with Put IV. IV of both Puts and Calls often rises on individual stocks in anticipation of company earnings coming out where players make their bets on either an upside or downside surprise. Studies have shown, however that more often than not, option pricing tends to *overstate* the actual movement going forward. This is why many successful option traders are **net sellers of options** and buy only when closing trades vs. opening trades. Net sellers of options look to benefit from the time decay built into options as well as volatility fade. With the VIX being an index of the IV of the SP500, it does not react to a single earnings event. VIX will rise if there is a pending news event such as the recent “Fiscal Cliff” fiasco. Again, it is all about perceived uncertainty! The VIX normally tends to fall when the SP500 rises and vice-versa.

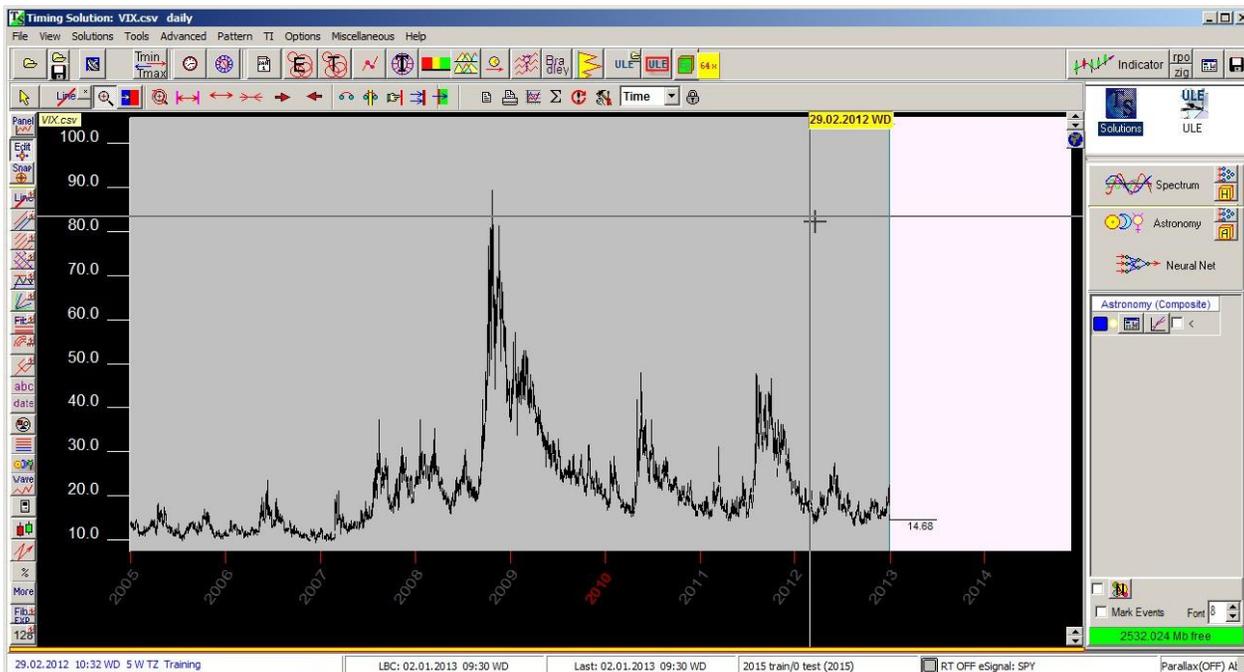
**History:** In the last decade the VIX has seen some huge movements in the context of market meltdowns, but it does tend to oscillate in **a relative range**. This past year (2012) the VIX oscillated between 14 and 26. In 2008 it went as high as 90 and stayed above 50 into the spring of 2009 with dramatic oscillations during those uncertain times. On October 16th to 19<sup>th</sup> 1987 the VIX rose to 150.

**Trading the VIX:** Can you even trade the VIX? As it turns out, you can trade options on the VIX or VIX futures. The options are liquid-meaning that there is not a lot of slippage with 'tight' Bid-Ask spreads. More important, **understanding VIX tendencies can help immeasurably when trading the SP500, options on SP500, SPY, or the larger components of SP500.** Another key index would be VXN which is the implied volatility of the Nasdaq 100. This would help with trading AAPL, AMZN, GOOG-the major components of Nasdaq 100/QQQ. Since VIX is heavily traded as an option, it should not be surprising that there is an index which tracks the implied volatility of the VIX itself. It is called the VVIX and it can give another clue at market turns. The CBOE website has detailed explanations of volatility products.



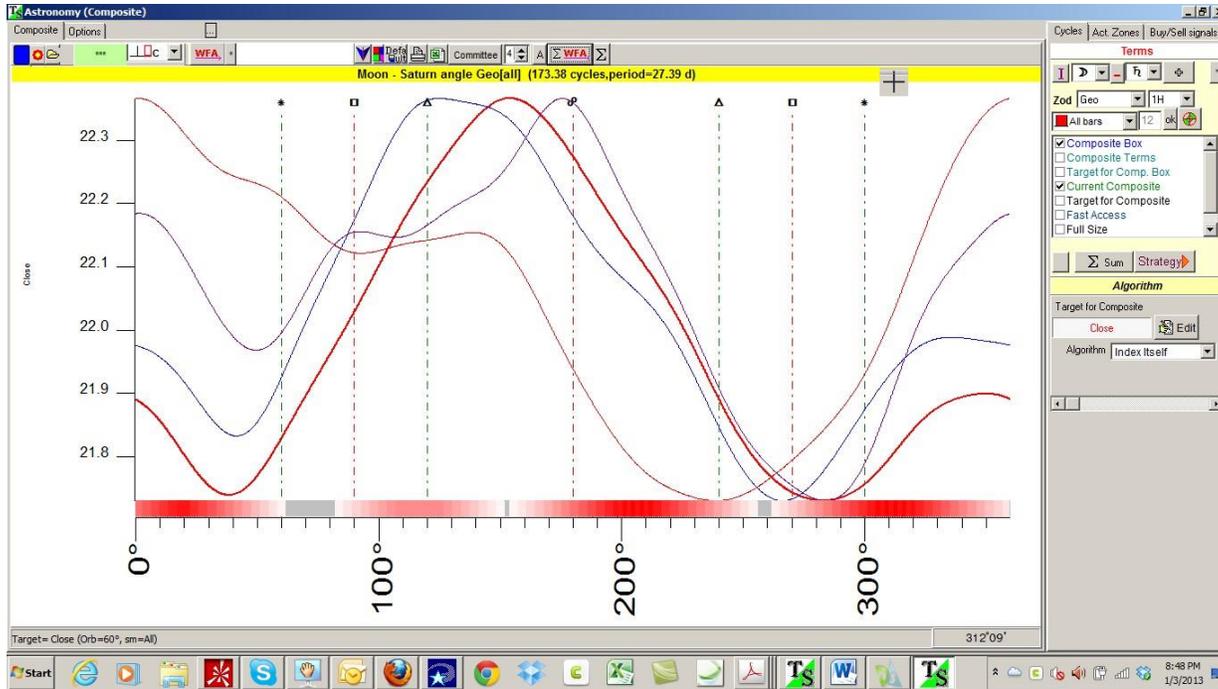
The bottom line is that understanding VIX tendencies can help traders in a wide variety of products including options strategies.

**Working with the VIX in Timing Solution:** In Timing Solution we normally *de-trend* the data in order to better analyze it. As a practical matter the VIX is already de-trended and I work with the VIX Close rather than an RPO or other de-trending mechanism.



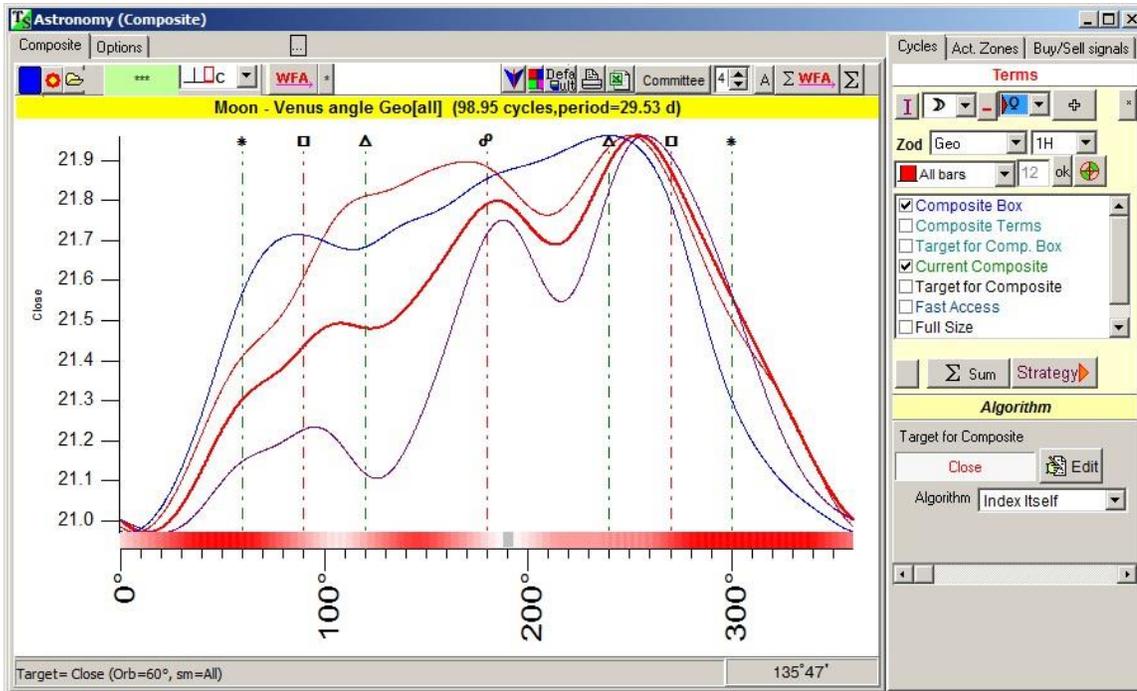
**VIX in Timing Solution-Astro Cycles:** I have worked with the VIX (Yahoo Finance Symbol= **^VIX**) in Timing Solution software and found some interesting correlations. But, the ones that were most interesting and the most practical for trading were the ones that happened in some a *similar orb as the expiration cycle*. Remember that the expiration cycle will have either **4 weeks or 5 weeks between events**. In Timing Solution-Astronomy I found a decent relationship to be the 28 day Moon Geo angle to Saturn. Note the red areas and consistency. It would appear that the VIX bottoms soon after Moon conjuncts Saturn and then rises into the opposition. After the opposition the VIX tends to fall until past the 270 Square.

Here in Composite we see this relationship:



The above data goes back to 2000 with 173 cycles-each lasting about 28 days so there are plenty of occurrences.

But, when I adjust my data “T-min” to 2005 (98 occurrences) the Moon angle Saturn is not as good while the Moon angle Venus is much better:



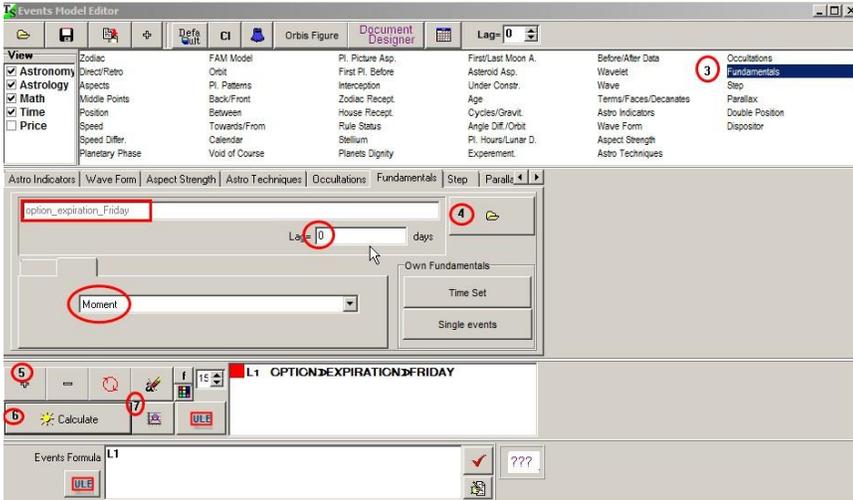
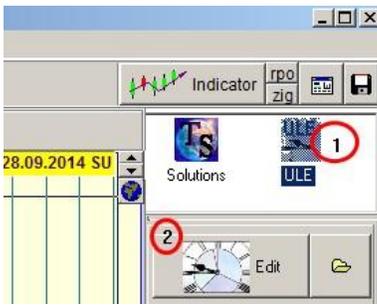
The Moon-Venus Composite is particularly intriguing given the *tight orb of turning points* and *consistency of four separate committees*.

So would I trade off either of these? The answer is, no...certainly not blindly. It could provide us with some context. But, the fact that a 27.4 to 29.5 day cycle yields the best results cannot be random. There is something here...but, what is it? I believe it ties in with **Options Expiration cycles**.

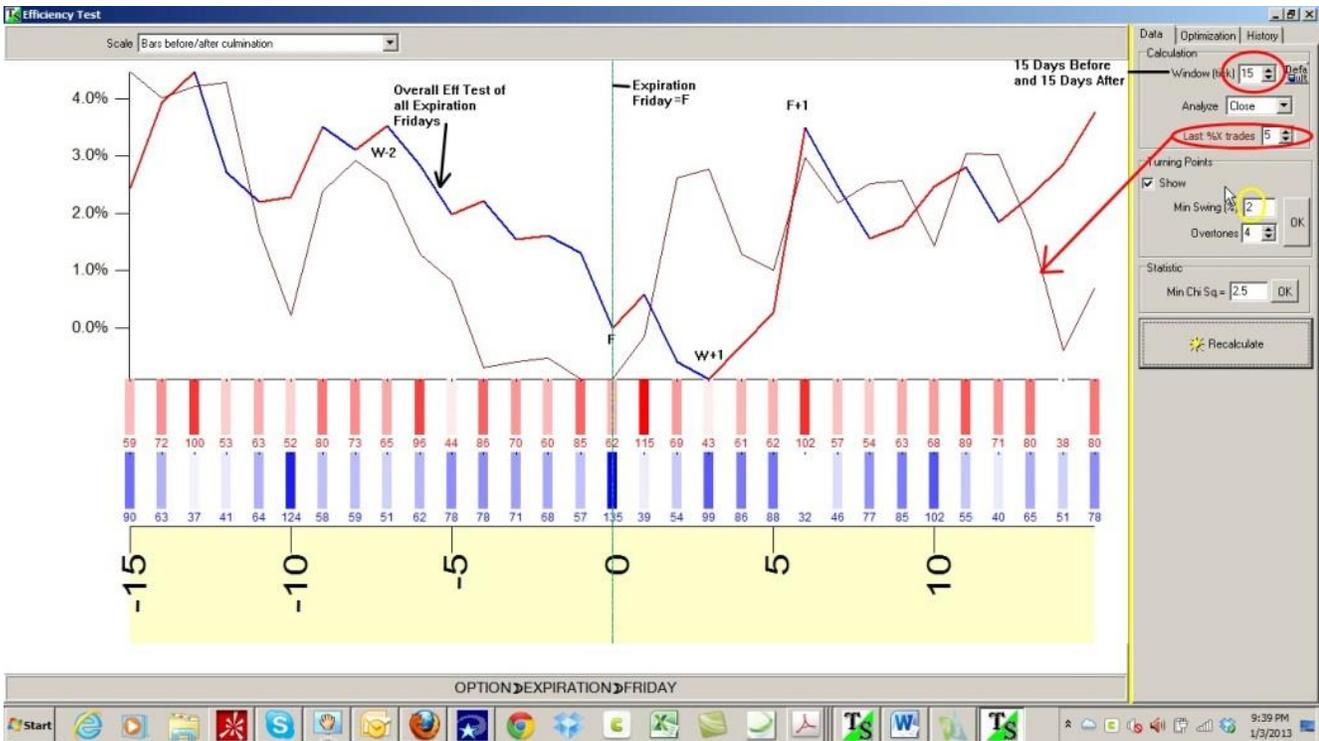
**Rolling of Futures and Options every Month:** I was listening to options “super-trader,” Tom Sosnoff, the founder of Tastytrade.com, speak about the tendency for Implied Volatility (options expensiveness) to fade (go down) into most Options Expiration weeks. *Option Expiration occurs on the third Friday every month and many people roll their futures and options positions from one month to the next--beginning the week prior to expiration through the actual expiration.* According to Sosnoff, a lifelong trader, this effect can be traded by favoring a long Delta (synthetic, long market positions ) and short IV as the rolling and unwinding occurs due to what he calls a tendency for stock prices to “mark-up” or rise and volatility to fade during the rolling process. The VIX typically (but not always) crushes/fades (goes down) as stock prices rise since traders are more comfortable when prices are rising. Comfort reduces fear and option prices fall. Sosnoff further stated that although this effect doesn’t occur every Expiration cycle, good traders can sense when it is *likely to occur* and do very well in their trading.

**ULE-Option Expiration and Efficiency Testing:** A while ago I asked Sergey to add Options Expiration to Timing Solution as a Fundamental in ULE. Recently with improvements in the Efficiency Test, I did some simple examination of Sosnoff’s theory on the VIX approaching Expiration week and Expiration Friday. The Efficiency Test allows the user to see the tendencies going into an event. If Sosnoff was right, the Efficiency test would be clear.

Here are the steps:



The initial testing results for VIX were as follows:



I used 15 Days for the Window (Tick) as this encompasses the whole event. I use 5 for Last %X trades to see how the last 5 cycles compare with the longer term tendencies. In fact, for trading purposes, I give a little more weight to the last 5 occurrences than I give to the full data Efficiency Test.

So the Efficiency Test above shows the 15 Days prior and after Expiration Friday. **W-2** would be **two Wednesdays** prior to expiration. **F** would be Expiration Friday. **W+1** would be the **first Wednesday after expiration** and **F+1** would be **the first Friday after expiration**. The tendency over about 84 expiration cycles was in line with Sosnoff's thesis: There was a clear tendency for the VIX to fade with 8 trading days to go to expiration which would be **W-2**. By shifting to the right side we can see a clear tendency for the VIX to go up soon after expiration. The Efficiency Test shows that the first Wednesday after (**W+1**) is the average day for the VIX to rise, but the last 5 occurrences shows that lately the rise occurred on the Monday following expiration (**M+1**).

If one simply uses Options Expiration on the SPX do we get an opposite result? The answer is: sort of. Remember that VIX movement is correlated to SPX movement, but it is not in lockstep. This article is examining the primary effect on IV since market direction is secondary to strategy based, net sellers of options.

The newest bars feature in Timing Solution Efficiency Test allows users to "put a microscope" on the data. It allows us to see the bars either side of each event for all occurrences in the data set. From my perspective, this allows us to see if we can actually trade off of the known event.

But, we need to find clues as to the "other conditions" which lead to good correlation vs. not-so-good correlation so that we don't give up on the VIX tendency with regard to expiration cycles. So let's look at both setups.

Here we have very nice correlation:



Note the rise near the initial 4 bars and then the overall fade into expiration. This is a very good setup for the fade to follow.

If it always looked like this we could print our own money! And the above picture isn't as closely correlated as many of the other examples I sampled. With the new Efficiency Test features and 5-8 years of data, anyone with Timing Solution software can see just how nice the correlation has been.

But, here we have poor correlation:



This is the conundrum of cycle analysis. Sometimes it simply does not *appear to work*. The question becomes is the effect/tendency/cycle gone forever or do other factors play a bigger role? Does the variation between 4 and 5 week expirations play a role? In the case of the options expiration, I don't believe that the tendency goes away because I do believe that it is a function of the rolling of positions from month to month which occurs during all expirations.

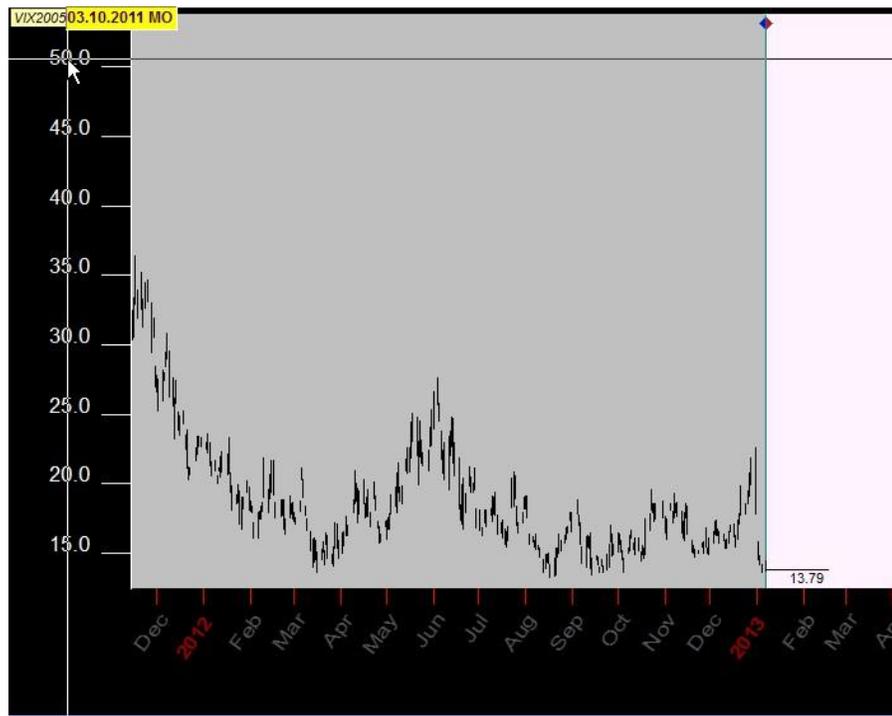
So what went wrong in the second example above? The VIX in late April of 2012 was already *relatively low*. It was at 15 which meant that options traders would have considered VIX to have been at the low end of the relative range (looking back, say a year). **It is tough to fall far off the first step of a staircase.** The VIX actually rose (when it should have fallen) into the May expiration, but the **context gave the VIX little probability** of falling into Expiration as it was *already at relatively low levels*. Experienced traders call this "reading the tape." Gamblers call it "pot odds." I would call it "context," common sense or "buying low and selling high." Some might point to the fact that VIX traded as low as 10 back on 2005 and 2006. But, it took about two years for those extremely low levels to *develop* in the VIX so **recent relative range** becomes important when deciding whether 15 is low or not. I suggest examination of the last 10 years of VIX data to see how it trades because the concept of recent relative range is a key element of this whole discussion.

Recent Relative Range of the VIX using a Regression Channel:



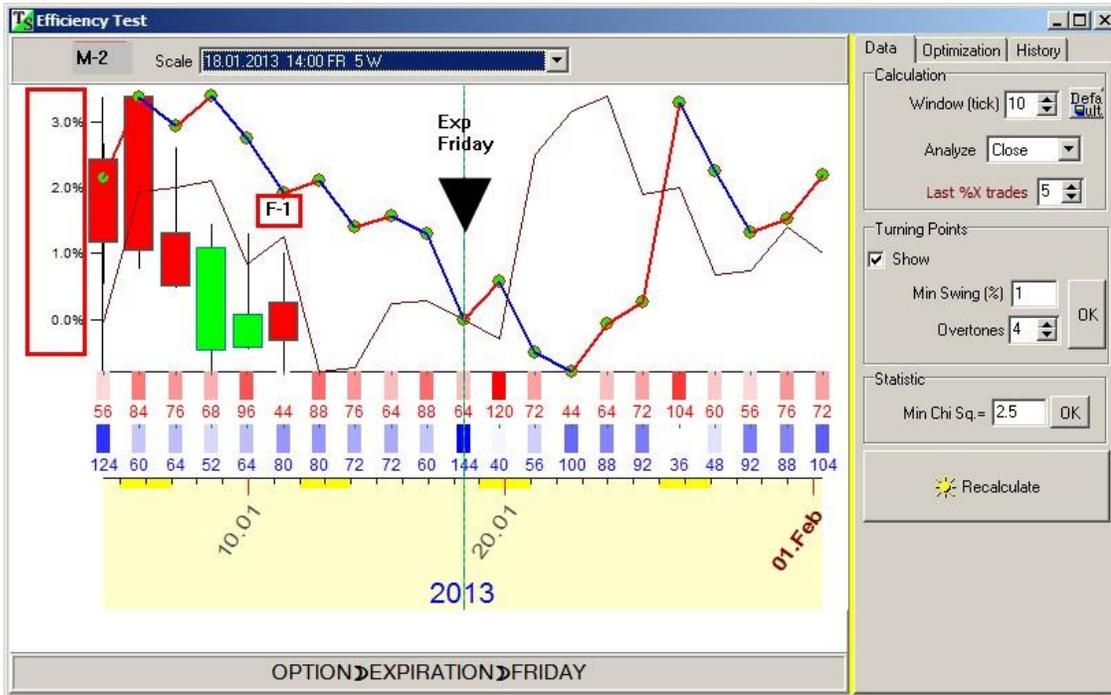
**Other Examples of Context:** I look at tape action (the way that a market moves) on a Monday differently than on a Friday. Similarly, the “market tells” before and after a ‘news event’ are examined from differing perspectives. Gaps are viewed differently when part of a clear market reversal vs. gaps in the direction of a *stale trend*. This is why most mechanical systems eventually fail. One must have “a wallet size version of the big picture” or better stated, **one must have a trader’s mentality**. A trader’s mindset always places context for the time-frame being traded and the context is variable and subject to change.

**Jan 2013 Expiration:** As of Tuesday, Jan 8<sup>th</sup> 2013 we were just about in the zone for VIX fade as the following day was two Wednesdays prior to expiration.



But, the VIX was at 13.79—very close to the last 12 months lows. **Were we not even on the first step?** In other words, were we on the floor as we hit W-2?

Fast forward to the end of the week and we have the following: The VIX *did* fall in percentage terms (M-2 to F-1) much in line with the Efficiency Test expectation:



So as of this writing, VIX has faded even lower-**signaling no fear**. The rising behavior of the SP500 this past week jibed with what we typically see about this time in the expiration cycle.

**Contentment to Complacency:** Remember that a low VIX *will get stale* as the lack of fear equals **complacency**. Complacency usually leads to selling which we would still expect after expiration as a result of what we have seen in the Efficiency Test.

Perhaps in this case we can look to the Moon Geo angle to Venus which points to a rise in the VIX this next (expiration) week:



Interested individuals can watch this unfold the week of Jan 14<sup>th</sup>, 2013.

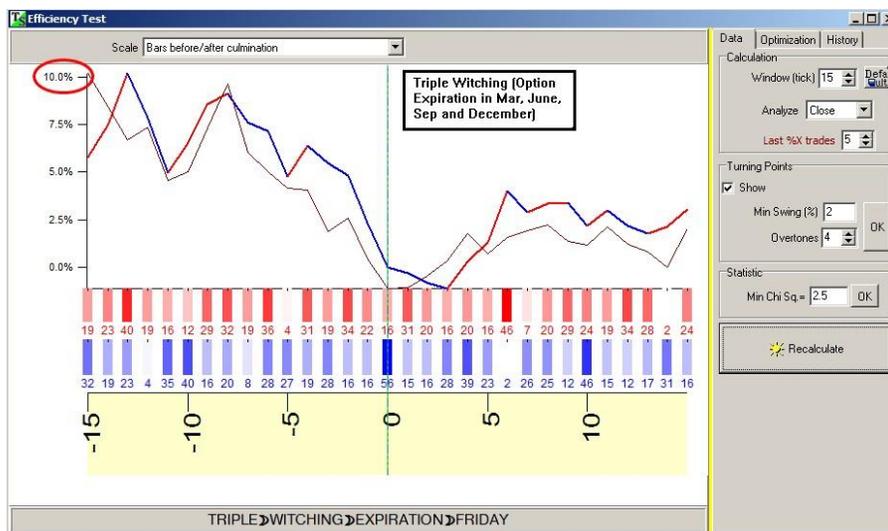
**Practical Usage for Trading:** My trading of SP500, AAPL and other highly liquid stocks/indices does benefit by selling options when the pricing of the options are high and hopefully peaking vs. low and rising. Net Sellers of options benefit from the time decay (Theta) built into all options. The benefits are magnified when the option pricing is high. I tend to sell naked options in a strategy called a “Strangle” or by selling “naked Put” options. The Strangles are fairly non-directional trades betting on stagnation to develop in the underlying while the naked Puts are bullish trades that I put on when the underlying stock or index has been falling and the Put prices have been rising (Implied Volatility increasing). After putting on these strategies, if the volatility or ‘expensiveness’ becomes cheaper I can make money simply from the loss in value of the options that I sold to open the trade—often regardless of being correct on directional movement of the underlying. In other words, unlike most other trading, you can be somewhat wrong (directionally speaking) or neutral and still make money. Again, the positive effect of “Volatility Crush” or “Volatility Fade” for net sellers of options can be dramatic especially if IV has spiked up just prior to the trade.

**Volatility is a mean reverting** phenomena although the mean can be different from time to time. This is what I mean when I say “relative range” of IV. A recent example of higher relative volatility as of this writing (Jan 2013) is AAPL. AAPL normally trades with an implied volatility in a range of 25-30. But, recent downside action in AAPL has caused AAPL volatility to rise toward a higher range of 35-40. Eventually the IV in AAPL will return to the lower range, when predictability is perceived in AAPL stock. AAPL has fallen from 700 to 500 in the last three months which has IV in AAPL rising in the same period. *BTW: AAPL is among the most heavily traded “underlyings” in the world of index and equity options. I personally trade AAPL more than all the other underlyings combined.*

**Fear is opportunity:** The *fear* that is often equated with the VIX (and option pricing in general) is something **that successful and proven options traders exploit**. Just to make a point as to the importance of volatility when it comes to options trading: Some underlyings like AAPL actually have their own VIX or Implied Volatility index-VXAPL is the average implied volatility of AAPL options. There are a few other such as VXGOG for GOOG; VXAZN for AMZN. Implied Volatility can be tracked for any underlying as an indicator and is available on state-of-the-art trading platforms such as Thinkorswim (by TD Ameritrade).

**Bonus Section-“Triple Witching”:** Sergey kindly added Triple Witching to the Fundamentals. Triple Witching is the Option Expiration occurring in Mar, Jun, Sep and Dec. When I requested this I said that I expected the tendencies to be magnified and that the percentage moves in the VIX prior to and after Triple Witching Expiration would be greater.

Here is the Efficiency Test which proves the thesis to be correct:



Individual Bar analysis reveals that two weeks from Triple Witching the same expiration tendencies occur and are more pronounced compared to 'normal' expirations (>10% vs. 4%). As before, when the VIX is low two weeks prior, the tendency fails or is muted. I will leave curious individual to examine the bars to see the setups and draw their own conclusions as to the tradability of this phenomena.

It is worth noting that the most recent Triple Witching event did not show the tendency at all. The ridiculous hype surrounding the Fiscal Cliff obviated the typical effect. Once, the "solution" was announced you can see that the "crush" ensued *afterward*.



**Conclusion 1:** This brings us to a point about cycle analysis that should be obvious if you actually trade. Things work until they don't work! But if we consider some **context in the case of the VIX**, we can perhaps filter out the *higher probability trade setups* from the *lower probability* ones. If the VIX has not risen at all into the zone or period that it is supposed to rise a little over 2 weeks before expiration, then a contrarian approach or neutral approach might be better than an aggressive approach that assumes it will fall into expiration despite an already low reading. Not to overstate the obvious: The market doesn't care what the Efficiency Test says it should do.

**Conclusion 2:** The VIX offers us a de-trended, real-time picture of the fear or unpredictability of the stock market. It tends to have a practical floor that it does not easily fall through. It has a tendency to overshoot-particularly to the upside-when there is a lot of emotion among market participants. Options traders can trade off the tendencies and then exploit perceived overshoot of the VIX. The 28 day Moon-Saturn/Moon-Venus strength of correlation suggests that there is an ebb and flow of the VIX that is somewhat predictable and wrapped around 27-30 days. The variability of the bottoms and tops predicted by the Moon/Saturn vs. the Moon/Venus Composite might be answered, in part, by the option expiration event which varies between 4 and 5 week expirations.

**Conclusion 3:** The VIX is normally correlated to opposite movement of SP500 so VIX tendencies can be utilized for trading. That said, it cannot be assumed that a falling VIX will always mean an instant rise in the SP500. The VIX can fade even when stock prices continue to fall. This can be a clue that stock prices are on the verge of rising. Similarly, a

rising VIX in the face of rising stock prices can sometimes lead to topping patterns. This is all a part of “reading the tape.”

**Conclusion 4:** Higher VIX values can be a signal to trade “naked” strategies with bullish, bearish or neutral leanings given the higher options premiums that fearful buyers are willing to pay for protection. Lower VIX values can be a signal to trade more conservative strategies or lower trade size (exposure).

**Conclusion 5:** Further research may provide better clues as to IV crush/market rise each month, but a completely mechanical approach may be elusive. Reading the tape likely provides the necessary context to trade the VIX tendency to fade into expiration week and rise soon after expiration.

I hope that others will find this research compelling enough to add to the discussion.

If you are interested in options trading, I highly recommend Tastytrade.com. It is the fastest growing financial network for good reason. I am not affiliated with Tastytrade (except as a satisfied customer).

Thanks to Sergey for providing such an elegant tool to test ideas.

Robert K.

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