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Drilling Down on VIX Mean Reversion

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Minimizing the Cost of Tail Risk Insurance

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CONTACT INFORMATION
Editorial comments: editor@expiringmonthly.com
Advertising and Sales
Expiring Monthly President
Mark Sebastian: marks@expiringmonthly.com
Phone: 773.661.6620

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About the Expiring Monthly Team

Bill Luby

Bill is a private investor whose research and trading interests focus on volatility, market sentiment, technical analysis, and ETFs. His work has been has been quoted in the Wall Street Journal, Financial Times, Barron's and other publications. A contributor to Barron's and Minyanville, Bill also authors the VIX and More blog and an investment newsletter from just north of San Francisco. He has been trading options since 1998.

Prior to becoming a full-time investor, Bill was a business strategy consultant for two decades and advised clients across a broad range of industries on issues such as strategy formulation, strategy implementation, and metrics. When not trading or blogging, he can often be found running, hiking, and kayaking in Northern California.

Bill has a BA from Stanford University and an MBA from Carnegie-Mellon University.

Jared Woodard

Jared is the principal of Condor Options. With over a decade of experience trading options, equities, and futures, he publishes the Condor Options newsletter (iron condors) and associated blog.

Jared has been quoted in various media outlets including The Wall Street Journal, Bloomberg, Financial Times Alphaville, and The Chicago Sun-Times. He is also a contributor to TheStreet's Options Profits service.

In 2008, he was profiled as a top options mentor in Stocks, Futures, and Options Magazine. He is also an associate member of the National Futures Association and registered principal of Clinamen Financial Group LLC, a commodity trading advisor.

Jared has master's degrees from Fordham University and the University of Edinburgh.

Mark Sebastian

Mark is a professional option trader and option mentor. He graduated from Villanova University in 2001 with a degree in finance. He was hired into an option trader training program by Group 1 Trading. He spent two years in New York trading options on the American Stock Exchange before moving back to Chicago to trade SPX and DJX options For the next five years, he traded a variety of option products successfully, both on and off the CBOE floor.

In December 2008 he started working as a mentor at Sheridan Option Mentoring. Currently, Mark writes a daily blog on all things option trading at Option911.com and works part time as risk manager for a hedge fund. In March 2010 he became Director of Education for a new education firm OptionPit.com.

Andrew Giovinazzi

Andrew Giovinazzi started his career in the financial markets after graduating from the University of California, Santa Cruz with a B.A. in Economics in 1989. He joined Group One, Ltd. and quickly became a member of the Pacific Stock Exchange (and later the CBOE), where he traded both equity and index options over a 15 year span. During that period he never had a down year.

At the same time, Andrew started and ran the Designated Primary Market Marker post for GroupOne on the floor of the CBOE. It became one of the highest-grossing posts for the company in 1992 and 1993. While actively trading, Andrew was instrumental in creating and managing an option trader training program for Group One.

He left Group One, Ltd. to co-found Henry Capital Management in 2001. Andrew then joined Aqumin LLC (2008–2011) to help bring 3D quoting and analysis to financial data. He is Chief Options Strategist at Option Pit.

Editor's Notes

Bill Luby

WITH THE FISCAL CLIFF behind us—or at least morphed into a less menacing debate about sequestration and long-term budgetary issues—2013 has kicked off with the promise of less volatility and less expensive options prices across the board. Whether this promise will be fulfilled during the course of the year or whether some nasty surprises are lurking just below the surface remains to be seen, but there is no doubting that the playing field for buyers and sellers is different than anything we have seen for the past five years or so.

This month Jared Woodard takes this theme and runs with it in an article which examines various volatility hedging strategies that dynamically adjust long volatility exposure and in so doing actively manage the costs associated with those hedges. With a VIX that seems comfortable in the low teens, this article should give you some ideas to chew on.

I address a tangential issue in Drilling Down on VIX Mean Reversion, where I examine the mean reversion tendencies of the VIX across all volatility levels and in time frames ranging from day to one hundred days.

While stock volatility appears to be going through a transition, volatility in gold has already been compressed by historical standards for over a year. Andrew Giovinazzi offers up some thoughts about what is going on with GLD and the trading opportunities it presents in the current market environment.

Mark Sebastian has a very different focus this week, musing about some possible future developments for the CBOE and the CME, including some of the benefits that might arise from a combination of these two exchanges.

As always, readers are encouraged to send questions, comments or guest article contribution ideas to editor@expiringmonthly.com.

Have a good expiration cycle,

Bill Luby
Contributing Editor

Gold Volatility Is Cheap but Is It a Buy?

Andrew Giovinazzi

A COUPLE OF ISSUES AGO I discussed AAPL and how to fit a trade around current market conditions. From a concept point of view, creating a position suited to underlying conditions is a fundamental when it comes to trading options. Investors should at least look at what the market is giving them right now. Looking at the greeks there are different levels of how to put on a particular position. For example, selling gamma to collect theta is one thing, but how to sell it is the key to any position success. Part of the problem is when a name goes through a transition and investors miss the inflection point. It is what I call "change in personality" in the underlying. Is the name now what it once was? MSFT used to be a 100% IV earnings stock back in the day. For most investors that is hard to fathom now. Gold seems to be going through something similar so let's examine what has happened in the recent past and how to position using options going forward.

Volatility History of GLD

A position in a name starts with a volatility summary of the product. That is not how everyone does it but that is how I do it. Looking at the underlying fundamentals is fine if you want to own or sell the name but that is not what we are trading here. It is not that it should be discounted but in this case it is not the genesis of the trading idea. The fact that GLD is putting in some record low volatilities is the reason. The fundamental outlook for GLD will color the way the position is shaped.

Looking at the last five years, the movement is instructive. The fundamental case is the Treasury is printing money, the dollar declining and gold is rising. The volatility case is interesting. GLD had higher ranges of movement as the price of GLD kept getting higher. The range hit full stride in 2011 which was the bubble year for gold and GLD in particular. Then something happened in 2012. With gold as a safe haven during the Euro crisis the metal did not make new highs. GLD was up year-to-date in 2012 but could not recapture that magic retail interest like 2011. Volatility begets volatility and in 2012 that number started to shrink even when the currency printing presses went as hard as ever. It looks like the market is stuck between inflation and the potential for deflation. Usually equal numbers of buyers and sellers end up with a tempest in a teacup battle. That is what it looks like as 2013 rolls along. The end of the 2008 Financial Crisis could be playing out in the volatility of gold. For now the volatility trend is clearly down and the law of big numbers is catching up. Those same absolute moves of 3 years ago don't mean as much with gold almost twice the value.

Buying Vega

Moving to the trade idea is matter of steps. Low volatility sets in motion the idea at minimum I don't want to be short vega here. Readers would say you want to buy it but I think at least don't sell it. Looking at the 90-day HV below selling it does not look like a bad idea on a relative basis. Implied volatility has remained at a premium to realized volatility for some time. That creates a conflict in position structure. HV is so dead for the last 90 days that it is hard to buy anything and make money. To solve this problem separate the gamma and the vega. The low volatility is interesting but the gamma is not paying. I used 90-day volatility because a longer time frame makes a better vega purchase. If the

google.com/finance

FIGURE 1

Livevol.com

FIGURE 2

volatility is going to start to tick up the position needs to be vega sensitive.

Creating a Position

The position structure is going to take the shape of short gamma and long vega. The good thing about the advent of the tiered Weeklys is that the shorter term option has a lot less life and can be rolled easily. When there is more than 90 days between the front and back month in a position, the greeks start to disconnect. I don't want that distance between the terms to be too much. Guessing from what I wrote above the time spread using the 2nd Weekly expirations will fit what I see the best. This way a position will generate some theta but will not be too exposed to a sudden shift in volatility if things start to get hopping again.

What To Do Now?

Now that some conditions are set up, it is time to construct the position. Creating a time spread with an OTM call spread is what fits best since it is still essentially a front spread. Use the 2ND Weekly as the short option and the 60-day duration for the long option. I picked the 60-day to collect enough vega but not yet commit to a longer (higher) vega trade. That is the long delta side of the trade. Now buy an OTM put time spread to balance the deltas. Feel free to tweak the setup for a particular delta bias. There should be enough room between the strikes to manage a decent sized move. The idea is not to get too committed as gold makes this transition, if indeed it is moving into a lower volatility state. Just trade what the market is giving us now and don't load the boat. The double time spreads will help with that. EM

The CME's Next Move?

Mark Sebastian

2012 WAS AN ABYSMAL year for trading. Across just about every product, on every exchange, volume fell. It fell in stocks, in futures, and in options. Growth in trading has all but stopped, except on one exchange: The CBOE Futures Exchange, the CFE. The CFE's VIX future is now reaching volume levels that put it up there with a lot of the 'big boys.' It does more volume than the grains and precious metals, it has volume on par with energy, and equity based futures. About the only contracts that are really much larger than VIX futures are S&P futures and the interest rate complex. That said, all of the products that trade more, or are on par with VIX futures saw volume declines. The VIX futures set a record. That is great news for CBOE and the CFE.

The CBOE's stock price is now doing well, and along with SPX options and VIX options, the CBOE has separated itself from the other exchanges in terms of revenue and product growth. Yet, the picture is not all rosy. The CBOE's CFE has tried to jump on the back of VIX futures by launching other VIX-based products. The OVX, the GVZ, VXEEM and EWZ. All have basically failed. Not one has managed to eclipse 1000 contracts a day on a regular basis. There is some potential for the new incarnation of the Variance Swap future, but that is surely in doubt. The point is that the CBOE has growth that is wonderful for the exchange. The problem is the CBOE is like a car company that has 1 car making it a lot of money, and 9 other cars they can't sell.

There are good reasons for this problem though, most notably, the underlying. OVX, GVZ and the like are all based on ETFs, not the contracts used by big institutions (for the most part). Essentially, if I am looking to hedge WTI volatility, the only future that I can use to hedge is based on USO, a crappy product. ETF-based products also do not work well with OTC structured products and swaps—something that has helped the VIX become a success.

On the options side, the CBOE also has problems. While the company is seeing great success with VIX and SPX, its SPXPM has not been much of success on C2; and, C2 itself has been a bit of a flop. Another issue is that the CME holds a strong position over the SPX product going forward. This is a serious problem for CBOE, who is already seeing completion from CME on the futures-based option.

I think the CBOE, with its current rally, is in a position of strength. (Figure 1)

The rally in the stock price now gives them some serious ability to negotiate a sale of it to the right partner, which should absolutely be the CME group. The CME Group and CBOE/CFE could really help each other in multiple ways that would actually produce shareholder wealth and profit growth.

Let's start with CBOE; we all know that the SPX issue is going to be a problem. They also have been unable to put lightning in a bottle again with a VIX contract. In order to actually grow their products, having true CME-listed products that CFE could list vol

Livevol.com

FIGURE 1

products on could be a huge harbinger of growth. VIX contracts listed on a joint CME/CFE exchange for corn, soy products that have HUGE OTC trades. A true Crude and Gold Contract, and most importantly a VIX contract based on the interest rate products.

One thing we know is that pensions and annuity funds are all scared to death of volatility in interest rates right now. If the CME/CFE listed a VIX-based, or volatility-based futures contract on the Eurodollar, 2-, 5-, 10- and 30-year bond, one of those contracts would take off (my guess is the 10-year or Eurodollar). A contract like that could potentially explode beyond S&P vol. Let's not forget, the volume on interest rate contracts exceeds even that of the S&Ps.

Access to basically every tradable asset would allow the CBOE's research department (if they listen) to build some of the best exchange-listed products that ever existed, which could be designed around CME-listed products.

To the CME's benefit would be several things. In simple terms, getting the SPX and VIX options under its umbrella would help it corner the market as the top equity-hedging exchange. The CBOE's hybrid system could potentially be used to CME-listed products improving access and trading in the products. It would also help the trading firms become more efficient as they would have one system to deal with in Chicago. This could help move equity volume to the CBOE and would certainly help futures options volume.

Getting the SPX and VIX options under its umbrella would help it corner the market as the top equity-hedging exchange.

The CFE's product could be cleared by CME instead of OCC, as well. Traders would love this as they could get cross-margining on S&P and VIX futures and options spreads. This would help the CBOE's already successful product reap more profit in clearing and they could potentially lower trading fees. Getting all of these S&P products under one roof could really boost volume in both products. It would certainly make customers happy, and might finally force all brokers to list VIX futures (there are several one that do not for some silly reason).

I am not going to get into cost-cutting benefits and overlaps in those departments, but I am sure they exist. Certainly, the CME could sell the CBOE's building and trading floor to someone, moving the floor back over across the street (talk about full circle).

I am not sure on price, I think the CBOE is pretty fully priced here. We all know the CME tried to buy CBOE for around 18.00 a share prior to the IPO; they will probably have to pay a little more than double that now. If the CME wants to grow its business, it needs to move into a new space, something ICE did recently. Getting the fastest growing product in the US would be a huge coup. Getting the other parts of the CBOE could be a huge plus for CME. Everyone clearing under one roof would be a win for all trading firms. EM

Minimizing the Cost of Tail Risk Insurance

Jared Woodard

INVESTORS WHO INSIST on not forgetting the lessons of 2008 face a difficult choice in rallying markets. Traditional diversification measures proved unhelpful during the financial crisis as asset correlations increased. Buying put options or trading option collars on a constant basis imposes major costs in terms of lost premium and foregone upside. Even newer, volatility-based products inflict serious carrying costs when employed as a permanent part of a portfolio.

In a 2011 paper, Chasing Your Own Tail (Risk): Five Alternatives to the High Cost of Tail-Hedging, Adam Berger, Lars Nielsen, and Daniel Villalon of AQR Capital Management argue that investors should avoid the costs of puts and collars by employing some alternative approaches. They review the following approaches:

1. Diversify by risk, not just by assets
2. Actively manage volatility
3. Embrace uncorrelated alternatives
4. Take advantage of low-beta equities
5. Have a crisis plan before you need one

Each of these deserves detailed attention and critique. For instance, the authors point out that managed futures trend-following, tactical asset allocation, and global macro strategies were uncorrelated alternatives to equities both before and during the financial crisis. Given the scope of this journal, we want to look more deeply, though, at the second approach.

Given the costs of traditional options hedging strategies, investors have continued to search for less burdensome alternatives for trading volatility, and several new strategies and exchange-traded products (ETPs) were launched in 2011 and 2012 to meet this demand.

The last twelve months provided an excellent proving ground for these strategies, particular along the dimension of cost minimization. The histogram at Figure 1 shows daily returns for the S&P 500 with a normal distribution fitted for reference. The peaked nature of those SPX returns (leptokurtosis) is intuitively consistent with the experiences of equity holders: there were far more quiet days, with returns around 0%, than big swings in either direction, and there were more quiet days than we would expect to see in a normally distributed series. The worst single-day 2012 return was -2.49%, the biggest gain was 2.46%, and the median return was 0.00019%. The worst peak-to-valley drop was -10% and it took a full month (May). The maximum one-month historical volatility was just over 20%. All of this is to show that, in 2012, it was more important for hedging strategies to minimize costs than to keep heavy protection constantly in place.

How, then, did alternative volatility strategies fare? The equity curves in Figure 2 show the performance of four such strategies, with bracketed 2012 returns:*

- **VXH** (8.9%): the VIX Portfolio Hedging Strategy consists of tactical VIX futures positions allocated dynamically in response to changing market volatility regimes. Performance is shown here hedging an SPX equity portfolio. The strategy is available by subscription or in individual accounts with a 2.5% management / 5% performance fee.
- **VQT** (1.8%): the Barclays S&P VEQTOR ETN consists of SPX expo-

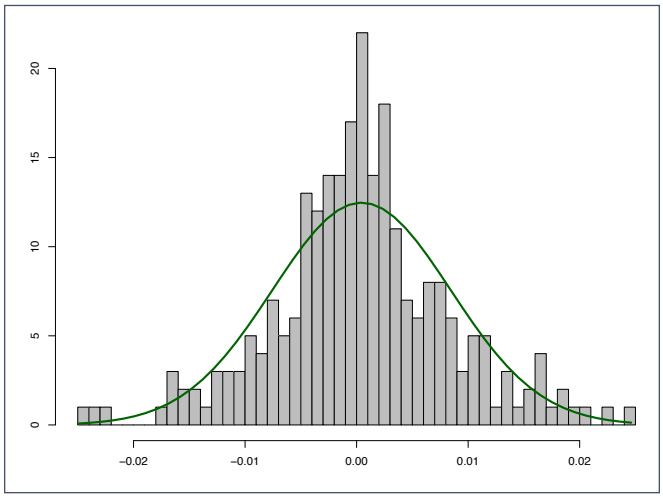
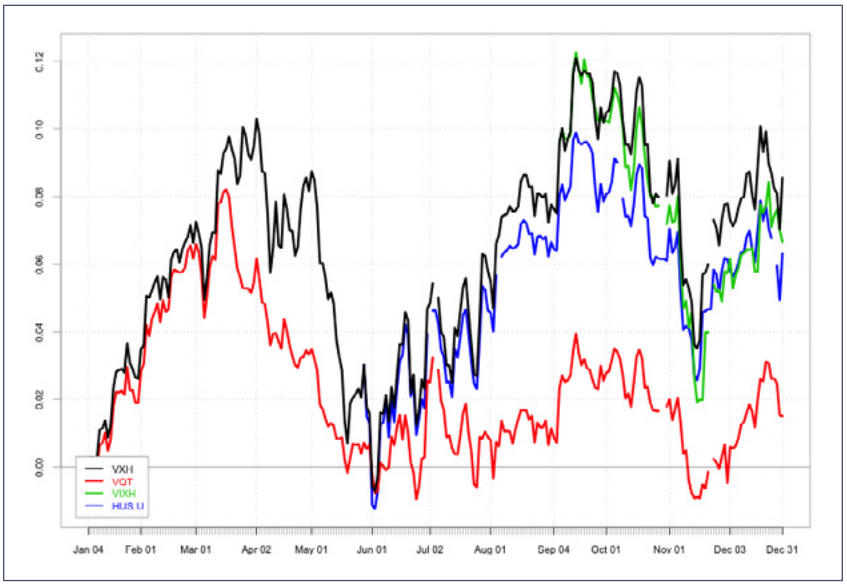


FIGURE 1 *SPX 2012 Daily Returns*

sure with tactical VIX futures positions (matching VXX weights), a 2% daily stop loss rule, and a 0.95% annual expense ratio.

- **VIXH** (-2.5%): the First Trust CBOE S&P 500 VIX Tail Hedge Fund consists of SPX exposure with semi-tactical purchases of short-term VIX call options. The expense ratio is 0.60%.
- **HUS.U** (3.5%): the Horizons Universa US Black Swan ETF is a product listed in Toronto that consists of SPY exposure and options on S&P 500 products. As of December 31, 2012, the HUS.U portfolio was invested 94% in the SPY ETF, with a February 1000/500 SPX long put vertical financed by the sale of February 130 SPY calls. There is a 0.95% management fee plus a 20% performance fee.



CBOE, Horizons, Condor Options

FIGURE 2 *VXH, VQT, VIXH, and HUS.U Returns, 2012*

As readers would expect, any equity portfolio hedged with long volatility positions underperformed an unhedged stock portfolio in 2012. The relevant question is which strategy imposed the smallest costs, net of fees? The performance rank was VXH, VIXH, HUS.U and VQT, but there was a noticeable gap between the first three and the fourth. The weaker performance of VQT is not due to a fee disparity, either, as the HUS.U product charges the same annual management fee and a performance fee besides.

The distribution of risks is dependent, naturally, on broader economic and political forces, and as central banks and fiscal authorities continue working for economic stability, investors should continue to focus not just on the effectiveness but also on the costs of portfolio hedges. Whether we are on the cusp of a generational bull market or at the edge of some new, unknown crisis, profits made in volatile times are of little consolation if they are squandered on excessive insurance after the storm has passed. EM

* Returns shown for VIXH and HUS.U in Figure 2 are artificially raised, as they are plotted against contemporaneous VXH performance to enable comparison.

Drilling Down on VIX
Mean Reversion

Bill Luby

IN THE AUGUST 2012 issue of Expiring Monthly, I examined the history of sharp increases in the CBOE Volatility Index (VIX) and the tendency for the VIX to reverse direction following those spikes in *VIX Spikes and Mean Reversion*. While the focus on that article was on the tendency of the VIX to decline following an upward spike, lately there has been a considerable amount of talk about expectations related of a rising VIX in the future based on the fact that the VIX has recently been at 5½ year lows. This time around my intent is to address both upward and downward VIX mean reversion, using data and graphics that I have not seen published elsewhere.

Mean Reversion and the Absolute vs. Relative VIX

First, while most traders will reflexively say that the VIX is mean-reverting, that general statement encompasses two very different approaches to mean reversion: measuring the absolute or the relative VIX. With a VIX at 40, this would be considered a very high reading and one that is presumably ripe for downward mean reversion, at least on an absolute VIX level. On the other hand, if the VIX had just spent six months above 40, as was the case from October 2008 through April 2009, a VIX of 40 might appear to be at a historically low level and potentially ripe for some upward mean reversion. The distinction is based upon whether one measures the VIX in terms of a lifetime of values (absolute) or with respect to recent values (relative).

Before diving headlong into the data, I will go one step further and propose that it is worth challenging the idea of mean reversion in general. It is not that I am challenging the idea of the VIX tending toward a middling value over time, but rather that median reversion might be a better concept to consider than mean reversion. The distinction is not a trivial one, with the lifetime arithmetic mean of the VIX at 20.42 and the median (middle value of the series) at 18.83. If I am trading distant month VIX options at a strike of 20, it certainly would be helpful to know whether that value is above or below the historical record—but a detailed discussion of this subject will have to wait for another time.

The VIX Mean Reversion Data

In Figure 1 below, I have aggregated VIX data into buckets at two-point intervals from 10 through 50 and also included a category of extreme values for a VIX under 10 and a VIX over 50.

Note that in the table, the ROI +1 through ROI +100 columns represent the net change in the VIX over the course of 1, 3, 5, 10, etc. trading days.

There is clearly lots of noise and randomness in terms of the change in the VIX one day later (ROI +1), but much stronger themes emerge when looking at the performance of the VIX over the course of 20, 50 and 100 trading days.

In a classic mean reversion scenario, one can see that when the VIX is under 16.00, there is a strong tendency for the VIX to rise in any subsequent period, with this tendency more

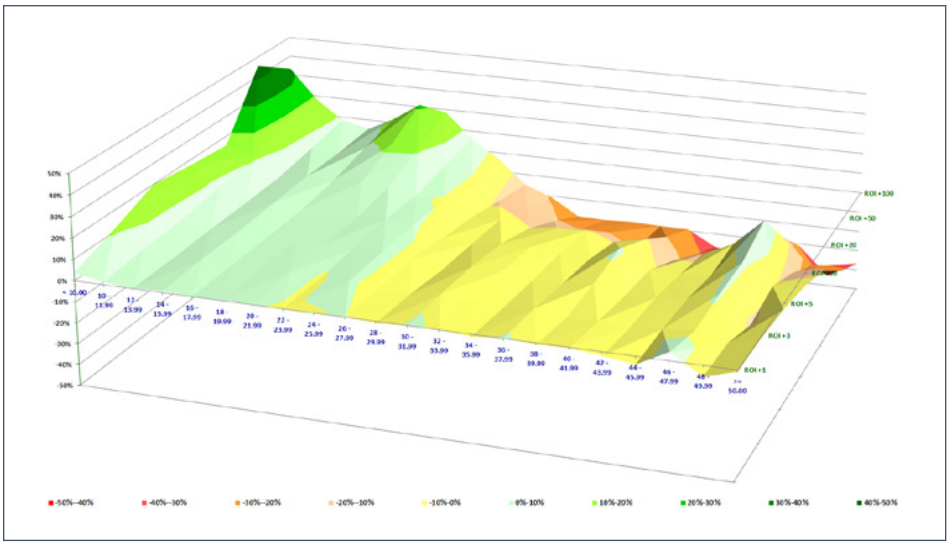
VIX	ROI +1	ROI +3	ROI +5	ROI +10	ROI +20	ROI +50	ROI +100	n =	cum n	cum %
< 10.00	3.87%	11.39%	19.89%	17.29%	15.34%	45.26%	33.28%	9	9	0.15%
10 - 11.99	1.34%	3.38%	4.48%	7.20%	11.44%	18.35%	18.37%	481	490	8.43%
12 - 13.99	0.20%	0.47%	1.25%	1.59%	2.36%	5.22%	8.41%	745	1235	21.25%
14 - 15.99	0.83%	1.74%	2.04%	3.15%	4.11%	3.96%	5.01%	661	1896	32.62%
16 - 17.99	0.10%	0.46%	0.64%	1.20%	3.66%	8.20%	11.90%	745	2641	45.43%
18 - 19.99	0.23%	0.42%	0.66%	1.09%	4.39%	11.51%	21.06%	624	3265	56.17%
20 - 21.99	0.18%	0.74%	0.65%	1.06%	3.58%	11.00%	18.37%	611	3876	66.68%
22 - 23.99	-0.22%	-0.16%	0.47%	1.70%	0.68%	3.67%	5.80%	495	4371	75.19%
24 - 25.99	-0.09%	0.48%	0.77%	0.99%	-0.55%	-0.12%	-3.40%	411	4782	82.26%
26 - 27.99	0.08%	-1.11%	-0.88%	-4.39%	-6.92%	-11.45%	-15.37%	247	5029	86.51%
28 - 29.99	-0.83%	-2.04%	-4.62%	-5.39%	-6.42%	-14.07%	-20.82%	206	5235	90.06%
30 - 31.99	0.09%	-0.11%	-1.00%	-3.57%	-9.36%	-18.60%	-29.21%	159	5394	92.79%
32 - 33.99	-0.07%	-1.51%	-1.45%	-3.42%	-7.52%	-20.92%	-29.47%	95	5489	94.43%
34 - 35.99	-1.12%	-2.92%	-4.21%	-4.90%	-6.94%	-21.08%	-28.79%	62	5551	95.49%
36 - 37.99	0.26%	-1.08%	-3.78%	-5.79%	-10.71%	-26.96%	-29.18%	55	5606	96.44%
38 - 39.99	-0.69%	-3.80%	-2.01%	1.19%	-7.98%	-19.87%	-29.25%	39	5645	97.11%
40 - 41.99	-0.32%	-3.26%	-6.04%	-7.55%	-16.70%	-27.47%	-36.88%	29	5674	97.61%
42 - 43.99	-1.81%	-4.23%	-4.82%	-7.79%	-11.58%	-23.54%	-38.25%	39	5713	98.28%
44 - 45.99	-3.63%	-2.96%	-3.35%	-6.57%	-4.91%	-18.37%	-36.72%	26	5739	98.73%
46 - 47.99	3.92%	-1.57%	0.65%	1.47%	8.48%	-12.90%	-31.48%	10	5749	98.90%
48 - 49.99	-5.02%	-5.28%	-11.88%	-7.91%	-15.50%	-26.22%	-44.78%	8	5757	99.04%
>= 50.00	-0.73%	-1.01%	-2.69%	-6.40%	-12.58%	-26.81%	-36.69%	56	5813	100.00%

CBOE, VIX and More

FIGURE 1 *VIX Performance through 100 Days Based on Current Level of VIX*

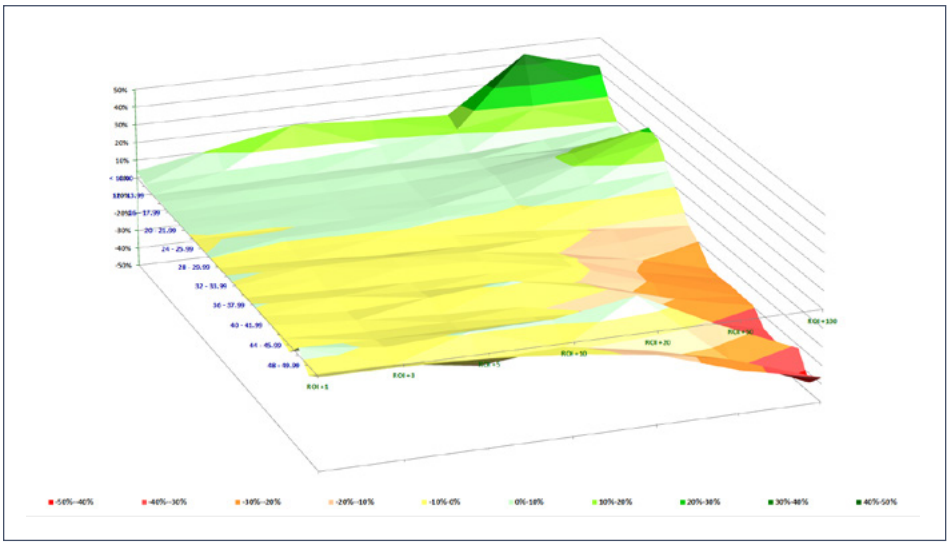
pronounced over longer time frames. What might be surprising to some is the tendency for the VIX to rise from current levels for VIX readings all the way up to the low 20s. Figure 2 shows the same data and the same tendency for the VIX to rise from historically low levels in graphical form, with the blue x-axis representing the current VIX level in buckets of two-point increments and the green surface area representing the mean percentage rise over various time frames, which are indicated by the green z-axis.

At the other end of the spectrum, Figure 3 shows a graphical overview of that same data rotated almost 90 degrees clockwise, so that the viewing perspective is more focused on the time frame than the VIX buckets. Here one can see evidence of a lower level of mean reversion activity (the yellow shading indicates a mean decline in the VIX of 0-10%) at all levels of the VIX when looking ahead 10–20 days. In contrast, VIX mean reversion of 10% or more (indicated by the orange and red values) does not become apparent until one looks at time frames of 20, 50 and 100 trading days and evidence of sharp downward moves is reserved for a VIX of 26.00 or more.



CBOE, VIX and More

FIGURE 2 *Graphical Overview of VIX Performance — VIX Bucket Perspective*



CBOE, VIX and More

FIGURE 3 *Graphical Overview of VIX Performance — 1–100 Day VIX ROI Perspective*

Conclusions

While it is tempting to take this data at face value when jumping to conclusions, it is important to remember that with the exception of the 2008–2009 financial crisis, there are no instances of the VIX exceeding the 50.00 level in the 23 years of VIX data. Further, if this same analysis had been done in the middle of 2008, there would have been even more impressive evidence of mean reversion for high levels of the VIX, as a VIX in the 40s had always reversed sharply, with that one glaring exception.

It is partly due to the 2008–2009 data that we see some strange statistical anomalies, such as a VIX of 46–48 as pointing toward further increases in the VIX, at least looking out for the period of a month or so.

That being said, a VIX of below 16.00 or above 28.00 shows a strong

Only at ten days or more does VIX mean reversion begin to show a strong pattern.

historical tendency toward mean reversion over all time frames.

Perhaps even more important for options traders, VIX mean reversion is a tricky bet if we are talking about the next 1, 3 or 5 days. Only at ten days or more does VIX mean reversion begin to show a strong pattern. For this reason, traders who are tempted to trade VIX mean reversion with weekly options are probably facing longer odds than they realize, with high probability trades more likely to be found at least two monthly expiration cycles out.

The other lesson worth remembering is that traders who looked at this same data five years ago and created what looked like slam dunk trading strategies at that time probably had to struggle to make it to the end of 2008 with most of their trading capital intact. As always, risk management should be handy to temper any trading strategies that look too good to be true. EM

Further Reading

"Exploring the VIX Futures Term Structure, Part I" *Expiring Monthly*, August 2010

"An Interpretive Framework for VIX Futures (Second in a Series)" *Expiring Monthly*, September 2010

"VIX Futures: Putting Ideas into Action (Third in a Series)" *Expiring Monthly*, October 2010

"Volatility During Crises" *Expiring Monthly*, August 2011

"Calculating the Future Range of the VIX" *Expiring Monthly*, February 2012

"VIX Spikes and Mean Reversion" *Expiring Monthly*, August 2012