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EXPIRING MONTHLY

THE OPTION TRADERS JOURNAL

Weekly VIX Effect

Volatility Review and 2013 Outlook

An Event Theta Stage FRAMEWORK

Will the Binomial Market Stay with Us in 2013?

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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.

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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

WHILE 2012 WAS NOT without its drama (Greek elections, spiking euro zone debt yields, the fiscal cliff and constant central bank intervention) it ended up being a relatively quiet one in terms of volatility, with the VIX failing to get into the 30s for the first time since 2006. The lack of a big volatility spike also hurt options volume to some extent, with total contracts traded down 12% in 2012.

In *Volatility Review and 2013 Outlook*, Jared Woodard provides a summary of the year in volatility across geographies and asset classes and also peers into the future with the help of the implied volatility term structure.

Andrew Giovinazzi tackles some similar subjects in *Will the Binomial Market Stay with Us in 2013?* and in so doing recaps some of the key volatility events of 2012, as well as the trading opportunities they presented. Andrew discusses the likelihood that strategies which were successful in 2012 will work again in 2013 and also offers his thoughts on the coming year.

This month's tour de force is Mark Sebastian's *Weekly VIX Effect*. I say this not just because I am a VIXophile, but because Mark's article starts with some interesting history from the flash crash and the U.S. debt downgrade, then launches into a fascinating analysis of the potential impact that weekly options have had on the VIX. This is a thought piece that is sure to keep the wheels turning in your head for at least another expiration cycle.

I also went the thought piece route this month, with *An Event Theta Stage Framework*, which is an attempt to expand upon the "event theta" concept I introduced here in July 2011 in *Crises, Event Theta and Risk Assessment*. This time around I turn my focus to the stages that volatility events go through and discuss five recent crises in the context of the model.

Thanks to all who contributed to the success of Expiring Monthly in 2012 and a particular note of gratitude to Lauren Woodrow, who has been the lifeblood of this magazine for the past few years.

Happy New Year and have a good expiration cycle,

Bill Luby
Contributing Editor

An Event Theta Stage Framework

Bill Luby

IN THE JULY 2011 issue of Expiring Monthly, I introduced the concept of "event theta" in *Crises, Event Theta and Risk Assessment* as a means by which to describe whether or not the passage of time is expected to increase or decrease the risk (and potential volatility) associated with an event.

The purpose of this article is to extend and update that analysis, outline a stage model framework for thinking about event theta, and use that model to describe some of the salient factors of a select group of recent crises, including the fiscal cliff and the most recent round of the debt ceiling debate, from July and August 2011.

A Review of the Event Theta Concept

One of the central themes of the July 2011 article dealt with understanding the role time plays in event theta. In that article, I highlighted five critical elements that play a key role in determining the potential volatility impact of various volatility events:

- Contagion
- Duration
- Advance Notice
- Recurrence
- Reversibility

The last four of these elements are different ways of describing how time can directly influence an event. A volatility event that is long-lasting, has no advance notice, is a one-off event, and cannot be reversed is one that has the potential to inject a high degree of volatility into the financial markets. Throw in the contagion aspect, where time plays a more subtle role and one has a fairly good description of the 2008 financial crisis.

On the other hand, something like the nonfarm payrolls report occurs at a single point in time, with the timing known in advance, happens every month (so that data outliers can be identified with the passage of time) and can even be reversed, in the form of subsequent revisions to the original data. This economic report has almost zero contagion potential and while it can inject short-term volatility into the financial markets, the volatility impact is generally brief and relatively small.

While the five elements analysis is useful in thinking about the full timeline associated with a volatility event, I have also benefitted from thinking about volatility events across three different stages in their development. Think of the elements analysis as a vertical approach and the stage model approach as a horizontal approach if you will. While I believe these approaches are complementary, I will focus the balance of this article on the event theta stage model.

A Three-Stage Model for Volatility Events

I like to characterize volatility events as typically passing through three stages:

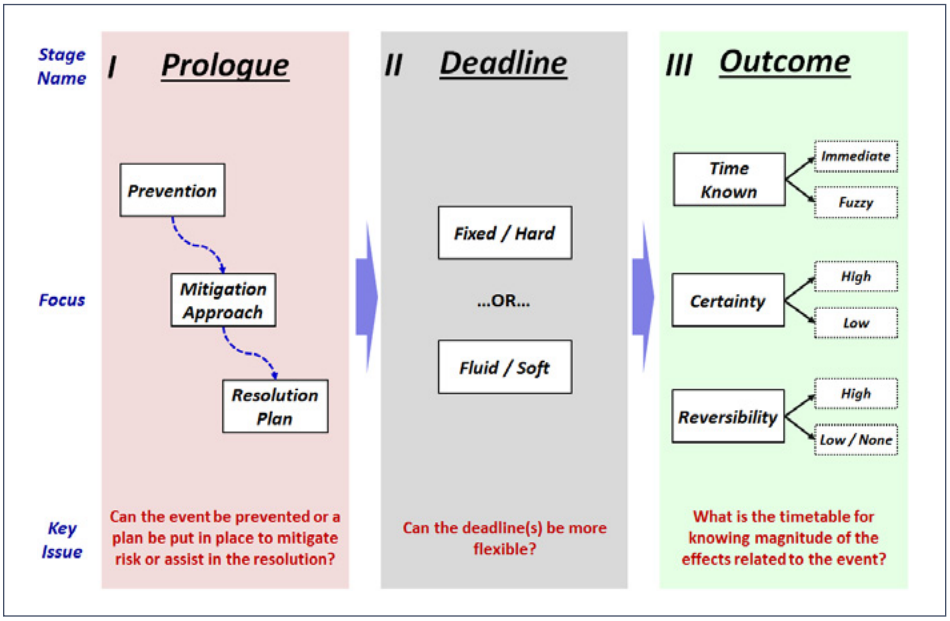
1. *Prologue*—The period of time in advance of the event where the focus is on preventing a volatility event, developing a plan to mitigate risk and also developing a plan to resolve any negative effects after the fact due to limitations of the prevention efforts and the risk mitigation.
2. *Deadline*—Once the deadline has been reached, the emphasis turns to extending the deadline so that additional prevention, mitigation and resolution efforts can be implemented. Here the deadlines are either fixed/hard or more fluid/soft.
3. *Outcome*—After the deadline has passed, the magnitude of the impact of a volatility event is not always known immediately. Sometimes the negative effects are only discovered with the passage of time; sometimes there is considerable uncertainty about what has happened and what the implications are; and sometimes that uncertainty is magnified by

The event theta stage model is a tool to help traders understand some of the important characteristics of volatility events.

the possibility that the impacts and perhaps even the event trigger itself can be reversed.

Figure 1 at right summarizes these three stages, the focus of attention and the key question to be asked in graphical form.

Some examples may help to illustrate how the stage model can differentiate between various volatility events and how these differences might be critical to the volatility equation.



VIX and More

FIGURE 1 *Event Theta Stage Model*

The Event Theta Stage Model and Some Recent Crises

In order to illustrate some of the differences between various volatility events, I have summarized some of the defining factors of the event in the context of the event theta stage model framework. The five volatility events are:

- Y2K (1999–2000)
- Emergency Economic Stabilization Act of 2008 (a reference to the original "TARP vote" in the House, September 2008)
- Fukushima Daiichi earthquake/tsunami/nuclear disaster (March 2011)
- US debt ceiling crisis (July–August, 2011)
- US fiscal cliff crisis (November–December 2012)

Figure 2 at right uses some high-level bullet points to outline some of the critical issues for each of the five volatility events as they relate to the event theta stage model.

To some extent, the features that make each of these events unique can help to explain the benefits of the model. In the case of the Y2K crisis, for instance, this is one of the very few volatility events in which there was a fixed/hard deadline could not be negotiated away. As such, a huge amount of effort was expended on prevention efforts, as well as risk mitigation plans and plans to address adverse effects that could be anticipated. Fortunately, the Y2K coding efforts were successful and the changing of the date from 1999 to 2000 had a very small impact on software and critical systems. Also,

	I Prologue	II Deadline	III Outcome
Y2K (1999-2000)	• Preemptive software coding to prevent problems and mitigate risk • Resolution plans	• Fixed / hard	• Immediate, certain and irrervisible
TARP Vote (2008)	• Congressional negotiations	• Fluid / soft • Accelerated by widespread economic fears	• Immediate and certain • Reversible
Fukushima Daiichi (2011)	• Architectural standards • Emergency response plans • Risk mitigation plans	• Fluid / soft	• Fuzzy, low certainty and generally considered to be difficult to reverse
U.S. Debt Ceiling (2011)	• Congressional negotiations	• Mostly fixed / hard • Some elements were more fluid / soft, due to "extraordinary measures"	• Immediate, yet somewhat fuzzy • Relatively high certainty • Reversible
U.S. Fiscal Cliff (2012)	• Automatic budget sequestration • Congressional negotiations	• Relatively fluid / soft • Perceived to be fixed / hard by general public	• Immediate, with high certainty • Some aspects reversible

VIX and More

FIGURE 2 *Event Theta Stage Model Analysis of Selected Crises*

the results of these efforts were known almost immediately following the turn of the calendar, with a very high degree of certainty and little chance that they could be reversed.

While the TARP vote (House voting down the September 29, 2008 bailout package) was a catastrophic failure that triggered an 8.81% one-day decline in the S&P 500 index, it had the important feature of being reversible. When Congress voted in favor of a $700 bailout package four days later, these actions prevented the financial crisis from spiraling out of control at an even faster rate.

The Fukushima Daiichi nuclear disaster was a focal point of *Crises, Event Theta and Risk Assessment* largely because there was so much uncertainty related to the deadline or critical deadlines, not to mention the tremendous amount of uncertainty about the outcome, even after the crisis appeared to be receding. The other interesting feature of the Fukushima Daiichi nuclear disaster is that high degree of effort and expense that went into preventive measures, from architectural and design issues to emergency response plans, risk mitigation plans and the like. Here the focus was on preventive measures because unlike some of the political-economic crises (TARP, debt ceiling, fiscal cliff, etc.), political maneuverings and policy changes cannot move the deadline or have much of an impact on the outcome.

Some readers might consider the US debt ceiling and the fiscal cliff to be two separate instances of the same underlying problem. They are listed here as separate line items to highlight the fact that while the debt ceiling deadline of August 2011 was largely a fixed/hard deadline, various Treasury department activities were employed to extend that deadline. On the other hand, the fiscal cliff deadline of January 2013 is much more fluid. The other key feature which differentiates the fiscal cliff from the debt ceiling negotiations of 2011 is the inclusion of the sequestration (automatic budget cuts) that came out of the settlement of the 2011 fiscal cliff negotiations. The intent of the sequestration was to increase the probability of a compromise solution in advance of another volatility event, the fiscal cliff. While the sequestration was not able to force a negotiated settlement in advance of the deadline, it certainly raised the stakes for both Democrats and Republicans in the event that negotiations were unsuccessful.

Conclusions

In this article and in *Crises, Event Theta and Risk Assessment,* my intent has been to take the first steps in developing a taxonomy of volatility events so that the differences across these events can be easier to identify, comprehend and apply to a global macro view of threats to the financial markets.

The event theta stage model is a tool to help traders understand some of the important characteristics of volatility events and to aid them in estimating the potential risk and impact on volatility. The event stage model is also helpful for understanding the timeline that is common to all volatility events and providing a context for the five critical elements that play a key role in determining the potential volatility impact of various volatility events (contagion, duration, advance notice, recurrence and reversibility.)

Last but not least, the event stage model should provide a framework for understanding the various future risks and potential magnitude of those risks as investors grapple with another debt ceiling debate in two months and evaluate other threats as they materialize on the horizon.

In my next article on this subject, I will take the existing framework and apply it more directly to the concept of event theta and drill down on how various aspects of the stage model and the five critical elements can help to flag potential high volatility events. EM

Further Reading

"Crises, Event Theta and Risk Assessment" *Expiring Monthly*, July 2011

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

"An (Almost) Free Disaster Protection Play" *Expiring Monthly*, July 2010

"Building a Swan Catcher: Part I" *Expiring Monthly*, December 2010

"Building a Swan Catcher: Part II" *Expiring Monthly*, January 2011

Will the Binomial Market Stay with Us in 2013?

Andrew Giovinazzi

Trading in 2012

The equity and option markets in 2012 had a solid roller coaster ride several times this year. That sounds like any year really but the nature of these rides was very severe. They had the feel of an all or nothing type of outcome as the market tried to handicap several systemic problems.

Those problems in order this year:

1) The Greek CDS event in the early spring
2) The Greek referendum of the Euro in early summer
3) The Spanish and Italian yield crisis in mid-summer
4) The QE expansions by the Fed
5) The 2012 US Presidential Election
6) The Fiscal Cliff

When I speak of equity and options markets I am really referring to the market for options volatility specifically. That is the world of VIX, SPX straddles, the volatility ETNs and ETFs (like UVXY and VXX), and the new slew of VIX-like indexes like the AAPL VIX (VXAPL). Since the overhang of unsolved issues still clouds the market, how does an investor use the volatility products to manage the seemingly endless series of political fumbles that are due to come our way? If an observer looked at the list above they would be hard pressed to call any of the problems solved. The market has rallied on the back of the larger issues all year. What I want to do is review how the market priced 2012 in between the issues that will no doubt revisit us to some degree in 2013.

What Binomial Means

In simple terms a binomial event is just a coin flip. A classic textbook definition for binomial is:

> *A discrete variable that can result in only one of two outcomes is called* ***binomial****.*

In market terms it is bad news or good news. 2012 was the year of bad news or good news. The unique thing this year was the nature of how the news and date was telegraphed in advance. The equity markets have had volatile years before. The 2008 Financial Crisis kind of snuck up on everyone except for a few savvy hedge fund managers. Ask the trading desks about the US downgrade in 2011 and I am confident they would say that was a surprise. The telling thing about 2012 was how the market sat and *waited* for the dreadful news that was sure to come. The beginning of the year started with a solid rally to recover 2011 only to *sit and wait* for the Greek credit event which participants knew was going to happen. The country with a population of just over 11 million people held a vote that was basically a referendum on the Euro which set the high VIX for the year. That date of the election was well known but the outcome was not. While I cannot catalogue all the events of the 2012, the idea starts to become clear. The market was waiting for solutions or answers and that causes certain things to happen in volatility markets. The problem is the options model has a hard time with binomial events.

The telling thing about 2012 was how the market sat and *waited* for the dreadful news that was sure to come.

What the Black-Scholes Model Wants

The Black-Scholes model really ushered in the age of the derivative contract. Options were in the financial space for years but really took hold after the financial professors started crossing over into trading. The basic problem with Black-Scholes (BS) is the same with any model really; it is only as good as the inputs that go into it and is built on assumptions. Options models like a smooth path with lots of data points, and a lognormal distribution of data is part of the options model character. For anyone who has used theoretical values during expiration week, they are versed in the limitations of the options model. Once the number of days starts to shrink, the model has a tougher time since it was not really designed for that in the first place. This is where traders learned to "fudge" by making adjustments to volatility to adapt the model output to the

market place. If an investor is looking at the next European or US default on a given day, the prices you see have a lot of "fudging" in them. Traders chuck the model and start to handicap the event.

Trading the Event

Normally option volatility will follow some path related to the realized volatility of the underlying security. When the two diverge, that makes for what I call a tradable event. Those strategies can fill a book but there are some simple ideas on how to trade these events in the future.

1. The implied volatility will stay bid no matter what the underlying (realized volatility) is doing. This makes for some much distorted markets and traders that fade this volatility rally early do so at their peril.
2. The at-the-money straddle on the expiration just following the event will handicap the expected value of the move. This is traders fudging by bidding up the implied volatility to cover the expected "gamma".
3. The implied volatility will crater after the event. Long vega is a loser post-event.

If you followed the binomial market event trading of 2012, this strategy worked pretty well. Either owning time spreads surrounding the event in the big indexes or short VIX-like contracts just into the announcements worked well. The idea is to take the "gamma" out of the trade. I think 2013 will afford fewer opportunities to trade this way.

FIGURE 1

Looking at the volatility market for the implied volatility and the realized volatility for the period just around the Greek Referendum in the early summer is instructive. The white line in the graph (Figure 1) is 10-day realized volatility for the SPY and the red line is 30-day implied volatility for the SPY. The yellow graph at the bottom shows the difference between the two and notice how wide the spread was in the difference between the two numbers. Just after the referendum, implied volatility plummeted just as the realized started to take off. By taking the short gamma out of the equation the trade setups work.

What Do I See For 2013?

Now we go back to our list. The calendar of events in 2013 is not as full as 2012. Besides the Fiscal Cliff talks now going on as I write this, 2013 is the year of murky waters. What is going to get the market will not be telegraphed in advance; it will be more of a surprise. The lingering issues will slowly seep out unless the policy makers can jump ahead of them. I would not want to handicap the chances of that happening. EM

Weekly VIX Effect

Mark Sebastian

WHEN I LOOK BACK at the past few years of trading, there are two significant events that stick out in my head. The Flash Crash and ensuing sell off in May of 2010, and the US debt downgrade in 2011. In many ways, as far as the SPX is concerned, the only similarity between the two events is the direction of the movement. However, when we look at the options prices, the peaks of the VIX during the two events are actually very similar. The absolute peak of the VIX during the 2010 crisis was just under 46%; in 2011, the peak of the VIX was exactly 48%. Does that make sense? I asked myself and the answer is, not really.

FIGURE 1

When I look at the panic of 2010, I could absolutely envision an intraday VIX at the peak of the Flash Crash being near 2008 realms. However, when we look at the overall scale of the two events, when the VIX was at 46 on May 20th 2010, was the market experiencing the same fear that it was experiencing in the crash of 2011? The answer is clearly no. The back and forth, up and down in August of 2011 was MUCH greater than the overall movement we saw in 2010, no matter how we slice up the move. The SPEED of the move and the rate at which the market continued to move during August of 2011 was MUCH greater than speed and rate of movement in 2010. In Figure 1 we can see that the 20-day average true range (ATR) of the market in 2011 peaked well above 30, and stayed above 30 for over 60 days.

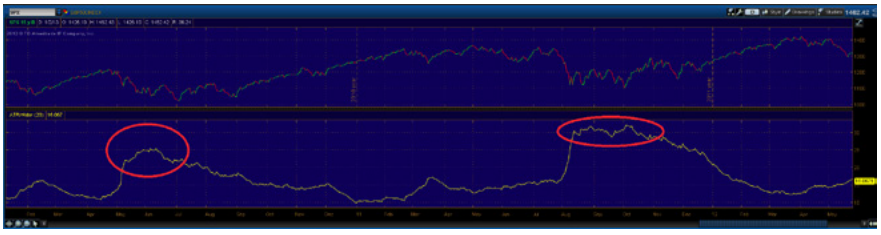


FIGURE 2

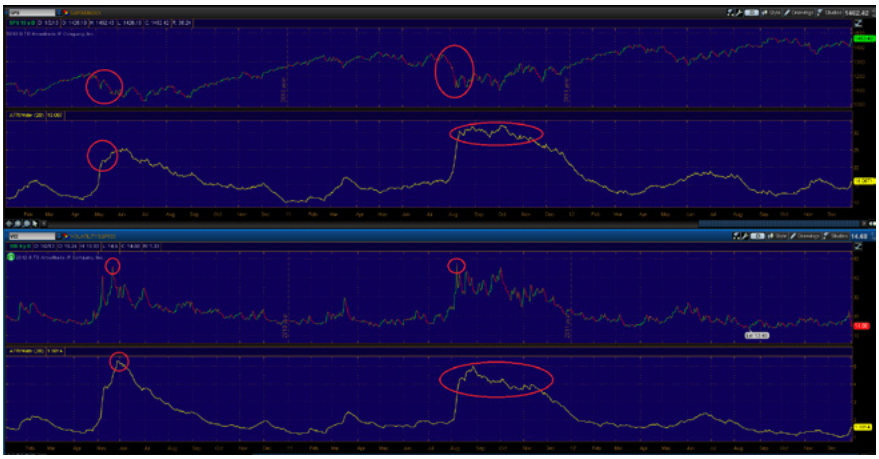
The 2010 ATR never got near 30 and only managed to stay above 20 for a short period of time, about 50% shorter a period of time than 2011. In 2011, for instance, the market moved a larger percentage term from beginning of sell off to peak of VIX in a much shorter period of time. If we look at the VIX relative to ATR, the peak of VIX traded at a 180% premium to the peak ATR in 2010. Meanwhile in 2011, VIX traded at only a 150% premium to peak ATR. Why? There are 2 possibilities:

1) The market got smarter.

2) Something else is going on that was keeping VIX artificially low in 2011.

Let's start with possibility number 1: the market did not get smarter, trust me.

So the answer must lie in number 2. There is something else affecting the VIX that is causing it to move less than we might expect. I think we see this 'dampening effect' when we look at the ATR of the VIX itself.



TD Ameritrade

FIGURE 3

When we compare ATR of VIX in the two events, the ATR of VIX actually peaked out at a higher level in 2010 than it did in 2011. While in 2011, VIX moved for a longer period of time. The duration of the elevated ATR is more a function of the SPX's peak ATR. However, I find it fascinating that the VIX's peak ATR in 2011 was less than the peak ATR in 2010. What could cause this?

Let's first discuss the VIX calculation itself. The VIX has a constant duration of 30 days. To keep this constant duration, as my co-writer Bill Luby explained in a VIXandMore blog post, the VIX actually breaks down into VIN and VIF: VIX near month and VIX far month. The calculation requires that the contracts be standard contracts, and as the VIN approaches 1 week to expiration, the calculation rolls VIF to VIN and adds a new VIF, which can produces some screwy VIX prices sometimes. This calculation makes a lot of sense, in a world where we only have regular contract trading months. However, in the last 2 years, there have been major changes in the trading of SPX options.

In mid-2010 the CBOE launched SPX weekly options with a PM settle (weekly options had actually been around a while but were not practical). Recently the SPX launched up to 4 weekly options contracts rolling back full 4 expirations. As I write this, there are contracts expiring in 2 days, 9 days, and 15 days 23 days, 30 days, and 43 days. Currently the VIX uses the contract that expires in 15 days and

43 days. In theory the 15 and 43 day options would give us great vision into how overall SPX options vol is moving right now. Academics and research folk will give this line:

> *"The Option expiring in 15 days represents daily market expectations between now at expiration. The option with 2 days to expire's IV is perfectly represented in the 15-day options price, otherwise traders will buy the option that is too cheap and sell the option that is too expensive. The market is efficient and will not allow markets to get out of whack."*

This is a load of bologna if I have ever heard it. While the above is true when we are in normal markets (about 90% of the time), when the market is going crazy, the VIX flying one way or the other, and traders are panicking, the options are almost NEVER in line. Traders in the pits and professionals are chasing gamma, trying to buy near term options and selling long term options to collect as much premium as possible. They are also UNLOADING on skew at those periods of time, typically in the back months. The key is these traders need to manage gamma. Thus very near term options actually get bid. Meanwhile, hedgers are buying longer term options and out-of-the-money puts (thus traders are selling vega and skew). This holds up the premiums in longer dated options. We end up with a situation where traders are able to hedge in different months against risk. Traders bid up near term options with 2 or 9 days to expire which allows them to sell longer term options, be it 15 days or 43 days.

Prior to weekly options, if traders were selling premium to the market there was really nowhere to go to get gamma. Thus, as the market moved, traders would need to find a way to hedge off their gamma. The only options were to buy long dated options (awful idea), or the front month contract (not preferable but better than buying long dated options). Since both hedgers and traders were buying the same month in an irrational market, and that market was a part of the VIX calculation, the VIX moved.

Moving back to our 2010 vs. 2011 scenario . . . Let's compare average daily weekly options volume traded during the month of May 2010, compared to the volume in August 2011.

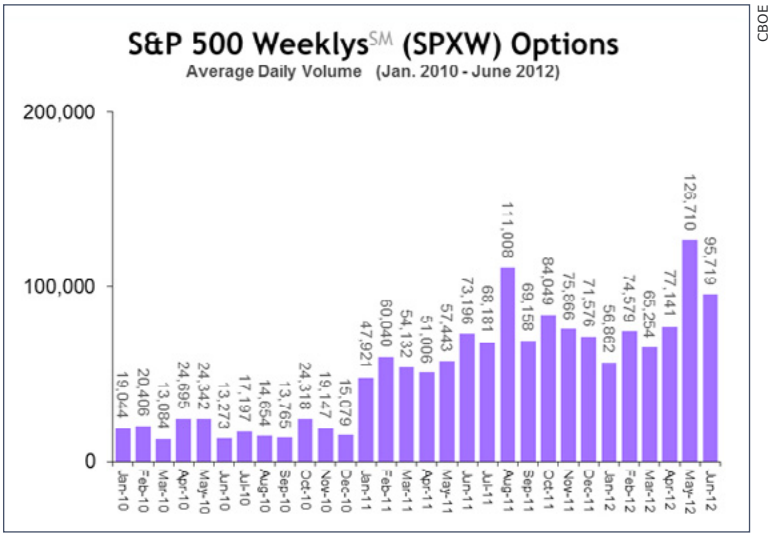


FIGURE 4

The difference is astounding. If we consider the average daily volume of SPX options is around 7–8 hundred thousand contracts, in both May of 2010 and August of 2011 that volume was closer to 1.3 million contracts. In May of 2010, the weekly volume was about 3% of total average daily volume for the year, and less than 2% of SPX option volume. In August of 2011, average daily volume was actually closer to 1.3 million contracts a day. That is an over 8% of daily average volume, nothing to sneeze at. Now, recall that at the time we only had 1 weekly contract, so this is concentrated in 1 contract; the other 1.2 million contracts are spread across a number of months. This makes a strong case that there was a serious footprint from weekly options from the August 2011 crash.

My conclusion: the VIX only touched 48, because during the true period of irrational trading, traders were buying gamma in the weekly options and selling premium to hedgers in the regular contract month. Essentially, weeklys allow traders to put on short time spreads against the buying habits of hedgers, rather than hedging in the contract month. This causes the VIX to underperform in times of panic. This is very difficult to prove, but the anecdotal and circumstantial evidence is clearly there.

We are now carrying so many weekly options contracts, and trading is so diverse from weekly options that the VIX—while never irrelevant—may have changed as an indicator. Take a look at how SPX options moved before and after the fiscal cliff.

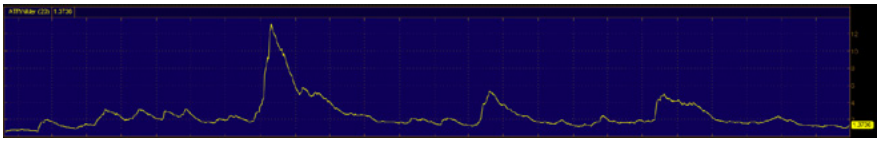
FIGURE 5

Notice how the Jan 4 contract whipped around VERY hard around the cliff. While one might argue that the IVs don't matter on a weekly, I would point out that ATM options in SPX—even after the announcement—carried about .50 of vega per contract. That is no laughing matter and is still 1/3 the vega of the regular Jan contract (that was being calculated). I would make an argument—that because the Jan 4 contract has been around for 30 days, and traders were piling in that contract to trade the actual cliff—that as recently as Dec 31, the weekly options were dulling the VIX peak. On December 28th we all saw what happened in the last half hour of trading. The SPX tanked and the VIX exploded . . . to a little over 22. Notice the volume in Jan 04 relative to regular Jan.

OI	Volume	Delta	IV	Bid	Ask	Strike	Bid	Ask	IV	Delta	Volume	OI
48	21	72.11	27.50	26.10	31.10	SPXW(W) Jan04 1375	12.50	17.40	27.03	27.57	3731	3381
39		69.05	27.16	22.90	27.90	SPXW(W) Jan04 1380	14.30	19.20	26.49	30.53	1252	350
33	1	66.04	26.32	19.80	24.80	SPXW(W) Jan04 1385	16.20	21.10	25.96	33.76	399	3024
111	33	62.67	25.64	16.80	21.70	SPXW(W) Jan04 1390	18.70	23.70	25.56	37.29	3540	3415
205	175	58.93	25.28	14.10	19.00	SPXW(W) Jan04 1395	20.90	25.90	25.14	41.03	446	1083
3617	2025	55.02	24.80	11.70	16.60	SPXW(W) Jan04 1400	23.20	28.20	24.73	44.97	11603	12695
338	480	50.92	24.25	9.40	14.30	SPXW(W) Jan04 1405	25.90	30.90	24.18	49.08	382	1563
586	5513	46.63	23.65	7.40	12.30	SPXW(W) Jan04 1410	28.90	33.90	23.64	53.37	965	4578
1149	422	42.23	23.21	5.60	10.50	SPXW(W) Jan04 1415	32.30	37.30	23.01	57.84	437	283
1740	1454	37.75	22.72	4.30	8.80	SPXW(W) Jan04 1420	35.90	40.90	22.65	62.28	111	2078
2006	459	33.29	22.27	2.80	7.20	SPXW(W) Jan04 1425	39.60	44.60	21.98	66.92	176	1748

Livevol

OI	Volume	Delta	IV	Bid	Ask	Strike	Bid	Ask	IV	Delta	Volume	OI
16474	2	67.16	21.59	32.80	37.70	SPX Jan19 1375	20.10	25.00	21.20	32.56	4229	88893
1686	12	64.89	21.03	29.70	34.60	SPX Jan19 1380	22.20	27.10	20.82	34.97	1774	32564
670	3	62.25	20.86	26.80	31.70	SPX Jan19 1385	24.20	29.10	20.45	37.54	22	23995
3947	26	59.59	20.51	24.00	28.90	SPX Jan19 1390	26.30	31.20	20.34	40.34	185	14918
916		56.80	20.14	21.30	26.20	SPX Jan19 1395	28.60	33.50	19.97	43.15	42	4209
108277	8018	53.88	19.74	18.70	23.60	SPX Jan19 1400	31.00	35.70	19.61	46.09	25329	147844
				0.44	0.59	BSZ Jan19 1400	0.41	0.56				
				1.70	6.60	SRO Jan19 1400						
						VSTRP Jan19 1400						
2756	38	50.84	19.42	16.40	21.00	SPX Jan19 1405	33.60	38.00	19.29	49.15	60	3081
16292	905	47.71	19.10	13.90	18.80	SPX Jan19 1410	36.30	41.20	18.71	52.37	3190	23534

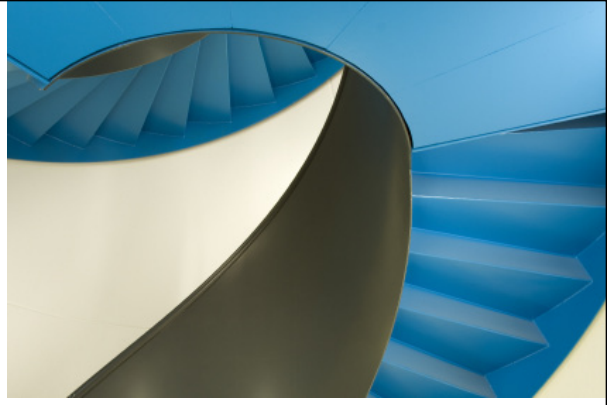


VIXCENTRAL, data: CBOE

FIGURE 6

Jan clearly has more volume, but the footprint from the Jan 4 contract should not be ignored, and clearly was a major player in the cliff trade. With the swinging of end of day IV, there is no way Jan 4 and Jan Regular were in line at any point at the end of the day.

IS this necessarily a bad thing? Maybe, if irrational paper has many places the trade, the VIX will give the market a better opinion of what the current rational 'fear' is in the market. Then again, maybe traders WANT to know how high irrational fear is. If that is the case, VIX is going to need to change as SPX weekly volume continues to explode higher. EM



Volatility Review and 2013 Outlook

Jared Woodard

IN THIS ARTICLE, we review the historical volatility and return distributions of several major asset classes and look at equity market expected volatility for the year ahead.

The series of rolling crises and periods of weakness since late 2007 have brought the concepts of volatility and correlation to the minds of investors who may never have traded options themselves. In that respect, information provided by options markets about likely return distributions and asset correlations is valuable even for investors who are not active in those markets, since implied volatility and implied correlation can inform asset allocation decisions and risk settings. Naturally, the same information is also of direct relevance to options traders.

In realized volatility terms, nothing in 2012 compared to the events of August and September 2011, which in turn were less severe than the 2008 crisis. Despite the bout of selling associated with the fiscal cliff late in the year, most world equity indexes closed at or below their mean levels for the year. The markets in this chart (Figure 1) were selected because they appear again in our trade ideas section.

In 2012, the mean 3-month realized volatility for the S&P 500 was 11.42%, and the same estimate was closer to 10.6% in the final week of the year.*

In absolute terms, the largest drop in volatility for the year among the markets shown above was Australia, whose 3-month estimate fell by 24 percentage points to 15.25%. The flattest y/y 3m volatility of these was in Japan, which declined eight points to 14.36%.

To gain some perspective on just how quiet markets became in 2012, consider the volatility histograms for several major assets since 2006 (Figure 2). Each histogram plots the number of daily observations of 6-month historical volatility at each threshold, giving an intuitive sense of where asset volatility lingered the longest over the last several years. The most recent obser-

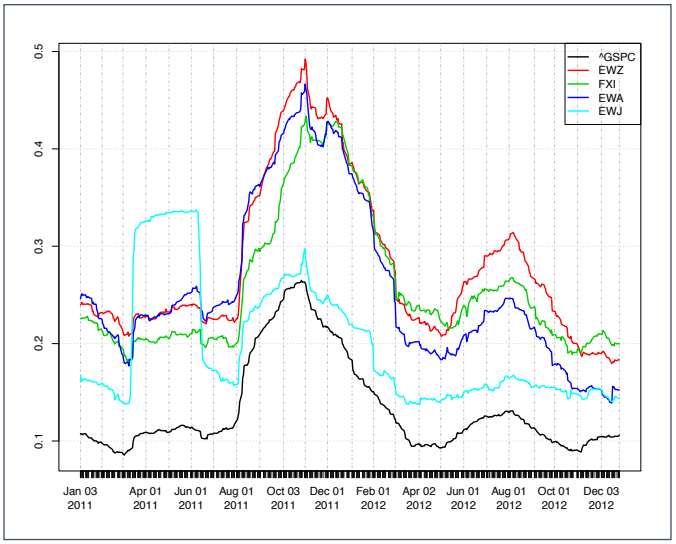


FIGURE 1 *Equity 3M Realized Volatility*

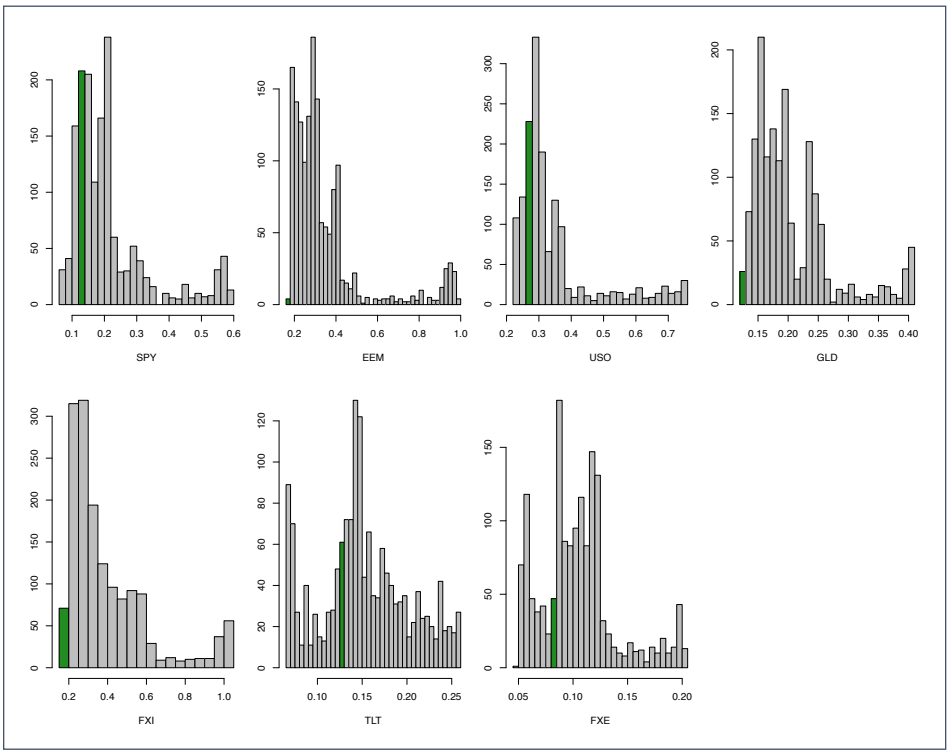


FIGURE 2 *6-Month Historical Volatility, 2006–2012*

vations are flagged in each graph in green.

Each asset closed out the year in the bottom half of the 7-year distribution, and equities and gold were near the lows.

Expectations of mean reversion might lead us to favor higher realized volatility in the future, especially for GLD, EEM, and FXI, but it is important to remember how much these distributions will change over time. The financial crisis obviously contributes more upside tail observations than we would normally expect to see (pun intended). For example, the mean 3-month YZ historical volatility in the S&P 500 was below 10% for each of the years 2004–2006, and was below 11% in 2007. So an expectation of continued low realized volatility is non inconsistent with the tendency of volatility to mean-revert over the short term.

Note the bimodal quality of the distributions of volatility in U.S. Treasuries (TLT) and the euro (FXE). For example, TLT spent quite a lot of time with sub-8% 6-month volatility and again lingered in the 15% range, without many observations in between.

Remaining focused on current market conditions relative to historical ranges, we turn now to the market implied volatility for the S&P 500 versus recent norms. Figure 3 shows the term structure of SPX option implied volatility, weighted using the familiar VIX-style methodology.

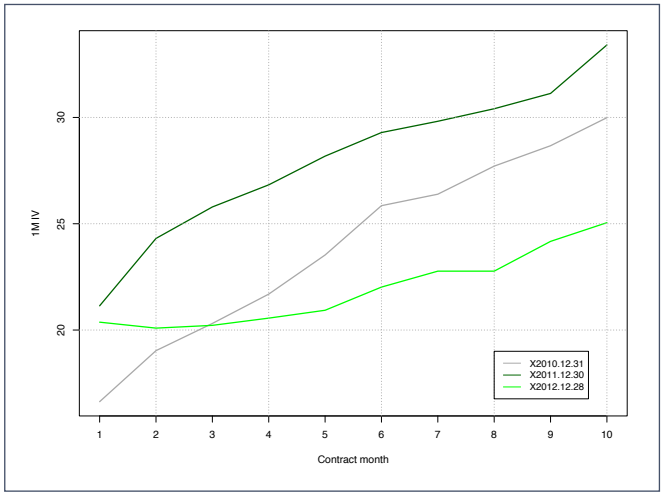


FIGURE 3 *SPX Implied Volatility Term Structure*

The current IV term structure is notable for several reasons.

1) The flatness in the short-dated part of the curve emerged only in the final sessions of 2012, and was the only significant period of the year in which there was not steep contango. Flatness and backwardation are relatively rare in SPX options, so the higher bids for short-dated implied volatility indicate the seriousness with which market participants took the prospects for a market selloff if politicians prove unable to resolve the budget dispute.

2) At the same time, expectations for market volatility did not shift appreciably in the rest of the curve. A 12% contango between six- and 24-month estimates is not historically remarkable. While the term structure shifted 1–2 points higher between November and December 2012, the shape of the back half of the curve did not change. We interpret this as an indication that markets are not repricing risk higher for 2H 2013 and beyond. The sell-side consensus is that budgetary naïveté and self-inflicted fiscal wounds may cause trouble in the first two quarters but that U.S. growth prospects afterward are very positive. Option market behavior is in line with this view.

3) The relative level of SPX IV confirms a positive outlook when compared with estimates one and two years ago. With the European banking crisis raging in late 2011, the two-year SPX IV estimate was near 35%; Christmas 2010 saw a two-year estimate at 30%; the current two-year level is 25%.

4) Finally, while implied volatility at medium and long horizons is relatively low, options are still aggressively overbid in absolute terms. One year SPX historical YZ volatility is 10.7%; compare the option-implied average of 23.7%. In other words, while long-term expectations have improved versus recent years, long-dated options still reflect a larger than normal risk premium.

This comparison shows that even as realized volatility has fallen into a range consistent with prior bull markets in equities, the implied volatility curve is still priced at the median of a very tumultuous economic period. In other words, with another year or so of stable market action, we would expect to see the IV curve shift several points lower. **EM**

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* We are using Yang-Zhang estimates of realized volatility as a more realistic alternative to the close-close formula, although the difference at longer horizons is less important.