

S&P 500 Weekly Forecast 1/10

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Hey guys,

So, last weekend, we started talking about option dealers' intraday hedging bands, and how they inevitably inform how much the market moves, and which way it leans. Specifically, we found that when the index closes well *above* the center of the hedging band, next-day returns are lower; and when the index closes well *below* the center of the hedging band, next-day returns are higher. This makes sense, because it tells us that there is nearby buying or selling pressure coming from dealers.

Subsequently, we saw SPX open above its upper hedging band on Monday morning, predicting lower returns. The index proceeded to sell off around 90 points before catching a bid (the natural bid is always the lower hedging band, and it was far away). We didn't really understand this last weekend, but we should have.

The other thing we should have understood was that a VGR at -2.74 *in tandem with* an open above Friday's upper hedging band would mean that the market support afforded by gamma was much more easily overwhelmed by excessive customer vanna positioning (-2.74 VGR tells us that IV is a very large proportion of option customers' delta sensitivity, which is historically fragile).

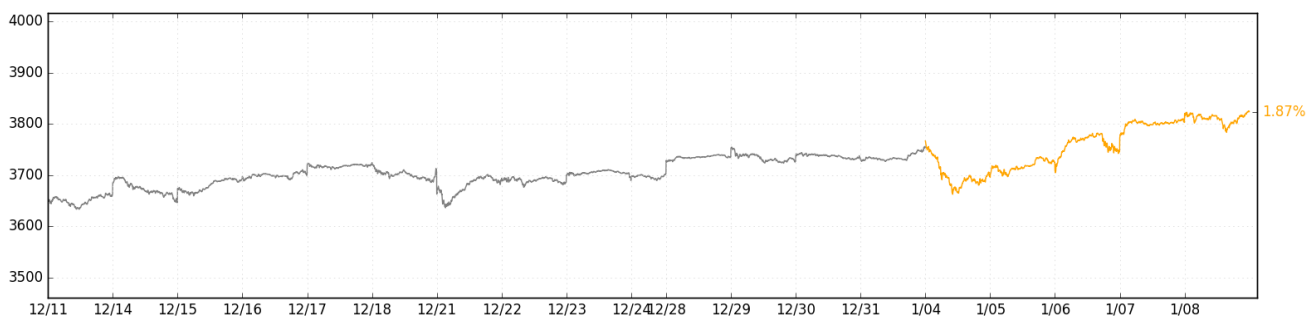
And what's tantalizing is that we're looking at a pretty good shot at a repeat of that behavior this week.

Let's talk about that. But first...

1. That was then
2. This is now
3. Friends are forever

That was then

According to The News, there was an attempted coup or something. That's the tiny dip toward the end of Wednesday the 6th. More importantly, though, is the fragility that you see on Monday, which we were oblivious to last Sunday, even though (see above) we shouldn't have been.



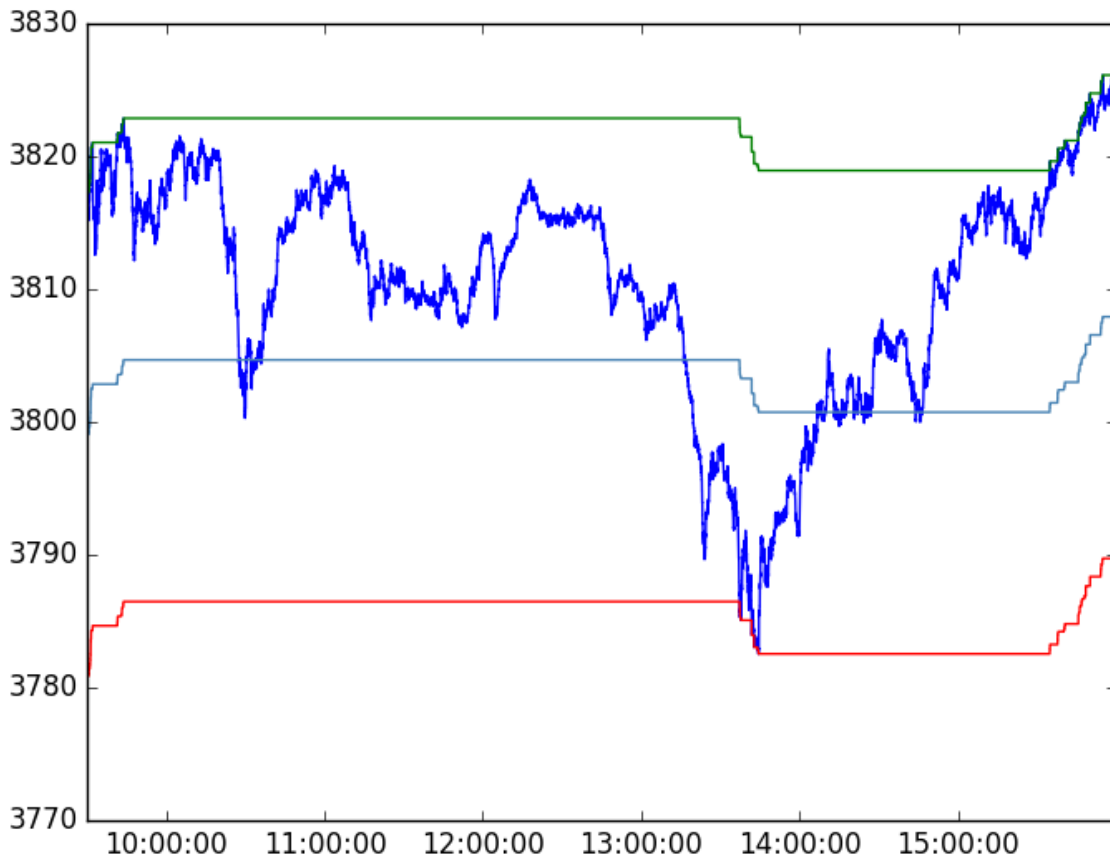
Then, to compound error, we took a little straddle position for Friday, centered at 3700, after IVs expanded.

The index closed at 3824. That was a loss. If you took the easy way out and shorted some VXX as your short-vol flavor instead, you did great. Hopefully you did that.

The only thing we did that we're still happy-to-neutral about is, on Friday, taking an OTM put position for next Friday. And that's because...

This is now

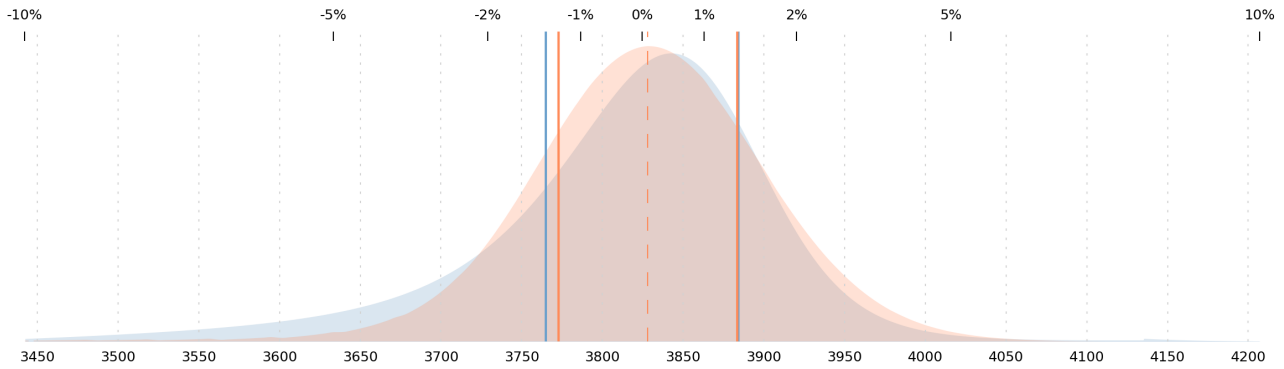
You know how, last weekend, we were talking about SPX closing at the top of its hedging band, and how that's bad for next-day returns? Here's this past Friday's gamma bumpers. We're at the top again, thanks to that gnarly afternoon rally.



This predicts worse returns for Monday.

A current VGR of -2.24 also predicts worse returns. And a current NPD of -2.93 predicts higher vol-of-vol (because there are more customers paired off against each other in their put positions without a dealer in-between).

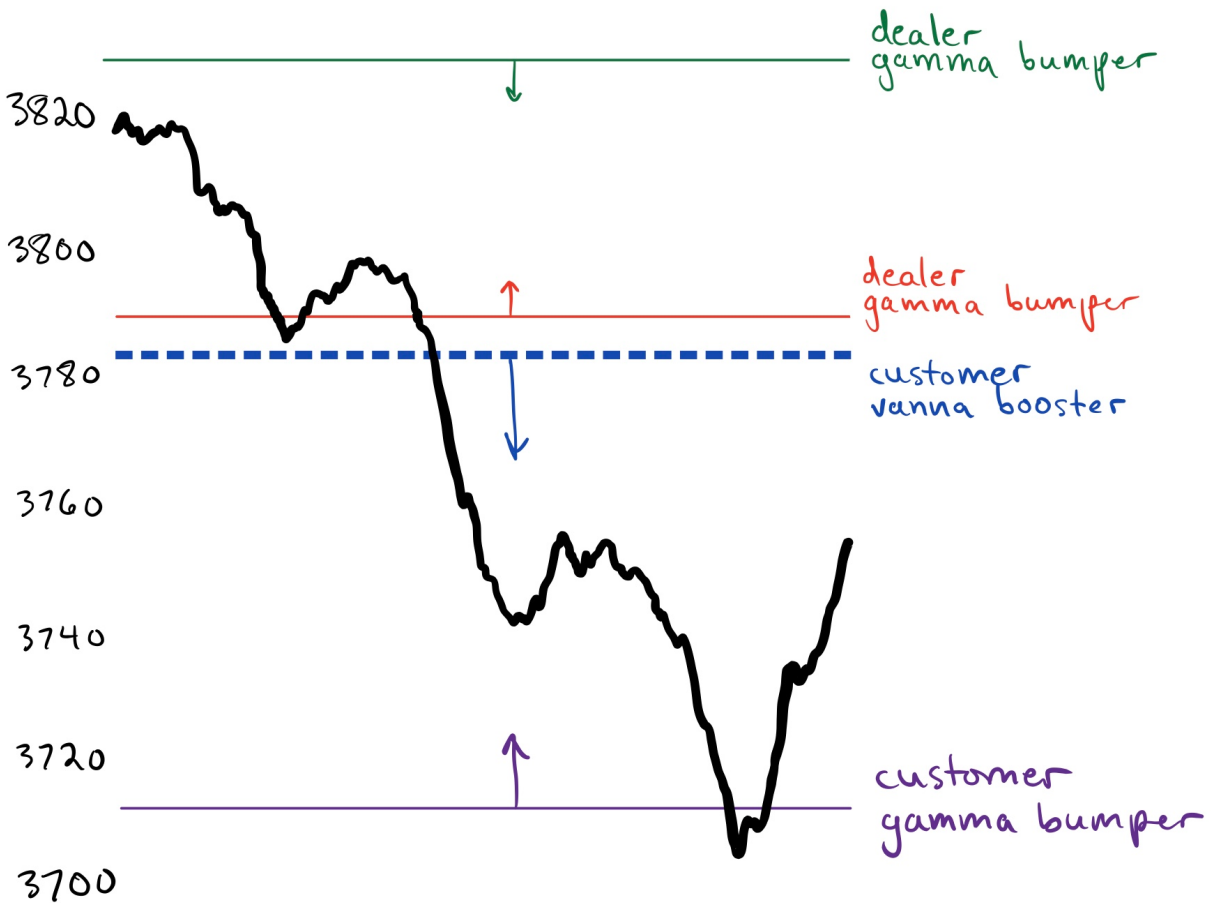
And when the Probability Page has its 1-week densities looking like this...



...that also tends to predict an increase in vol, because it means the market (blue) isn't pricing in enough of a buffer. In a stable market, the blue density is noticeably wider than the orange.

So that's why we like our put position! Of course with that said, it seems nigh impossible that VIX achieves and stays above 30 for any measure of time. Even though there's technical instability here, there's no "crash" on the horizon. So we'll stand at the ready to monetize those puts this week.

What we're *hoping* the situation looks like right now is this:



If the index is weak right now, as we think it is, the reason for that weakness is due to how close the bearish "customer vanna booster" is to the "dealer gamma bumper," such that support gives way very easily to selling -- and SPX only gets "caught" when customers start monetizing their long put gamma, which is always

a large source of positive deltas.

Get the idea? Generally, anyway?

Friends are forever

Ok, see how we drew a bunch of stupid lines on a chart up there to illustrate a point? We like the lines on that chart, but we drew them without quantitative rigor. If possible, we'd like to be able to do the same thing, but with some actual numbers. Stupid lines on charts, *but this time with meaning*.

The gamma bumpers aren't too hard to understand. Option dealers hedge long gamma to scalp a bit of profit, and that profit will probably be taken somewhere between the mean absolute deviation and the standard deviation -- which means that you should probably see some "resistance" around there, and that subsequent returns have at least a slight affinity toward mean-reversion.

But the vanna bumpers, and vanna boosters, are a lot harder to understand. They're harder to understand because vanna is a change in delta in proportion to a change in implied volatility, and in order to really understand how implied volatilities ought to change with spot price, we're really going to need to map out how they move together. Because they *do* move together in somewhat predictable ways, and even if they *part* ways, it's always temporary. They aren't married, but they *are* friends.

Mapping out their friendship, though, isn't something we thought we'd need to attempt (ugh) until now. But how do you find out if vanna impacts have the potential to overwhelm gamma impacts unless you find out exactly how much IV is "supposed" to change across the vol surface for any given move in spot? (And by extension, how some customers are likely to be squeezed out of certain vanna-heavy positions at certain spot prices.)

So here begins our journey toward understanding the spot-vol "friendship."

sighing deeply

You already know that an implied volatility skew purports to tell you about spot-vol covariance, and usually, having a vague understanding of the shape of that skew is good enough. But the problem is that an OTM put IV isn't *actually* telling you about what IV would be if spot price moved down to that level -- it's telling you the current "weighted average" (weighted by probability) of ATM IVs. If spot price suddenly ker-plunked 5% down, the new ATM IV would inevitably be higher than what was previously implied by the -5% IV -- because now there's a *higher probability of spot price hanging around at that new strike*, and the weights of the *higher* (lower-IV) strikes are now less pronounced.

As a first -- and hopefully intuitive -- stab at the problem, imagine a 1-month put option struck 5% below spot ($S=100$, $K=95$). Its IV is 30%, and as such, it has a delta of ~ 26 , which means that it's pricing a 26% chance of moneyness by expiration. The daily implied average spot move (MAD) of a 30% IV is 1.25%. Since 1.25% is the "average move," if spot falls 1.25% right away (in a single day), we shouldn't expect IVs to "outperform" by too much, since they were expecting something like that. If spot falls 2.50% right away, though (2x "average") we should expect IVs to rise more substantially. If spot falls 5.00% (4x!), IVs were definitely "wrong," and should re-adjust substantially.

If we use change in delta as a simple proxy for the change in the probability weight of the strike in the ATM IV, we find that...

- If spot falls 1.25% in a day, the delta of the 95-strike put rises from 0.26 to 0.31, which would multiply the IV by 1.19x. I.e., the IV of the strike should rise from 30% to 35.7%.

- If spot falls 2.50% in a day, the delta of the 95-strike put rises from 0.26 to 0.36, which would multiply the IV by 1.34x. I.e., the IV of the strike should rise from 30% to 41.5%.
- If spot falls 5.00% in a day, the delta of the 95-strike put rises from 0.26 to 0.48, which would multiply the IV by 1.84x. I.e., the IV of the strike should rise from 30% to 55.3%.

Again, this is just a silly heuristic we came up with, but we think it's getting at the right idea (we'll try cleaning it up this week -- and if any of the real vol nerds who read this have a preferred model or heuristic, we'd love to hear it). Where this all gets interesting is if you compute how many customer deltas get meaningfully adjusted by a 1.25% move down in spot and an attending 5.7-point rise in an 1-month OTM put strike's vol. E.g., if there are a bunch of customers short puts at that strike, the dollar delta of a 5.7-point rise in vol (vanna) could be yuge. If that 5.7-point rise in vol is enough to "cancel out" the dealer gamma bumper at -1.25%, then we have our vanna booster!

So, what we expect to find is that, in keeping with our vanna-gamma ratio (VGR) there are certain times when the market is inherently more fragile than others, and (of course) that there is a bit of irony to it. Specifically, we wonder if you can think of vanna as a sort of "meta-gamma," and that "mismatches" between market-wide gamma and vanna exposures amount to a fundamental mispricing of variance risk. Or maybe we're just getting ahead of ourselves.

Long Friday OTM puts.

Have a lovely week!

The SqueezeMetrics Team
