S&P 500 Weekly Forecast 1/18

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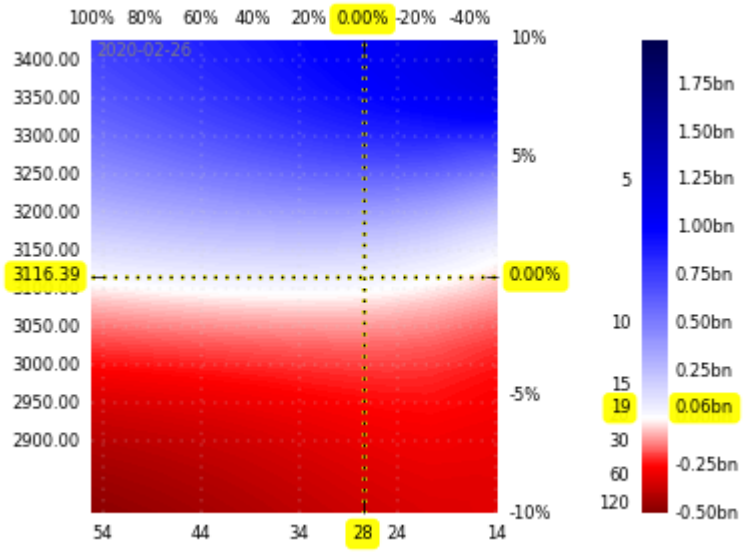
Hey everyone,

You may remember that, in The Implied Order Book, we referred to vanna as "gamma's evil twin." We described it as such because of how vanna has historically been the dealer delta sensitivity that turns option dealers into liquidity takers, and when option dealers become liquidity takers, that's when a crash occurs.

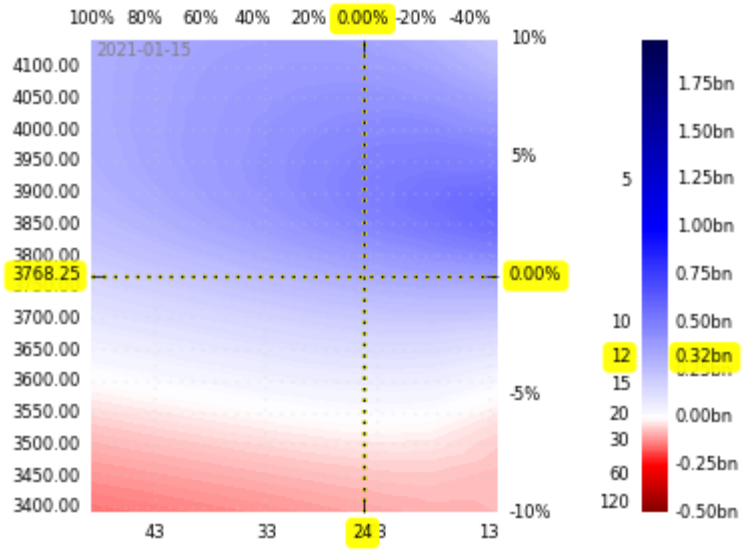
In last weekend's note, we referred to vanna as "meta-gamma." We said this because there is a weak, but *necessary*, relationship between IVs, gamma exposure, and vanna exposure. These things all have to move *proportionally* to each other, or else there is an arbitrage. But lest you think that this is some new realization... this proportional relationship between IVs, gammas, and vannas is the whole point of the GEX+ heatmap.



When we look at the GEX+ heatmap, we see the potential internal inconsistencies of the market. E.g., in the above, you can see that with just a tiny push lower, SPX enters the illiquid (red) zone, and that the situation rapidly deteriorates. In the bottom left of the map, you see GEX+ at -0.50bn (deep red! $500mm in liquidity-taking by SPX dealers per point), which is associated with greater than 120 vol. How high would VIX have to go to make that happen? 54. What happens when VIX is 54 but realized volatility is 120? Well... this map is from February 26th of 2020. The next month was nasty.

This meant that the market was truly offsides. Due to the sheer amount of customer-sold puts, it was a powder keg. Customers had taken on a whole bunch of unhedged short convexity, and they were going to get blown up (SPX had been flirting with this blowup since 2017).

Compare that to the situation right now, nearly a year later.



If you imagine SPX falling 10% here and VIX rising 100% (to 49), you can see that GEX+ would be only slightly in the red zone, with an associated vol of around 25. What would VIX have to be to achieve this realized vol of 25? It would have to be 49. (Which means that VIX will never get to 49 to begin with!)

This market is the *opposite* of what it was a year ago. Positioning *cannot* precipitate a crash.

But as we know from viewing the customer vanna-gamma ratio (VGR) and net put delta (NPD), there are undercurrents to be found in customer positioning and term structure that we're not seeing in this [merely] three-dimensional heatmap.

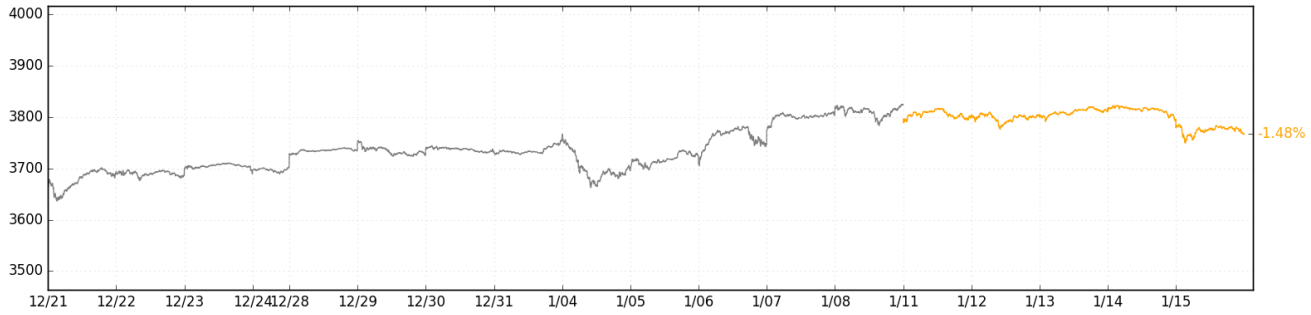
Which is why, last weekend, we were talking about doing a better job at modeling and predicting future IVs -- because if we can use market prices to build even a rudimentary "local vol surface," then we have a very useful tool for further comparing the gamma, vanna, and IV relationship. So let's talk a bit about what we did, and what we think we can do with it.

But first...

1. T-5
2. T+4
3. Surface tension

T-5

A combination of factors had us buying puts at the end of last week. There was Friday's closing above the center of the gamma hedging band, there was a weak NPD and VGR, and there was what appeared to be "fairly priced" near-term vols. Despite it being Gamma Week, and pinning being the norm, we anticipated VIX up, SPX down, and we bought puts.



Well, SPX went down (-1.48%) and VIX went up, but it was too little too late, and the movement was certainly muted by the expiring gamma. With the thesis largely unchanged, we rolled our ATM puts (now a 100-wide put *spread*) to next Friday. We also predicted that GEX+ would fall from $690mm per SPX point to $380mm, which would be a significant change, ushering in some more realized volatility. GEX+ ended up falling to $320mm.

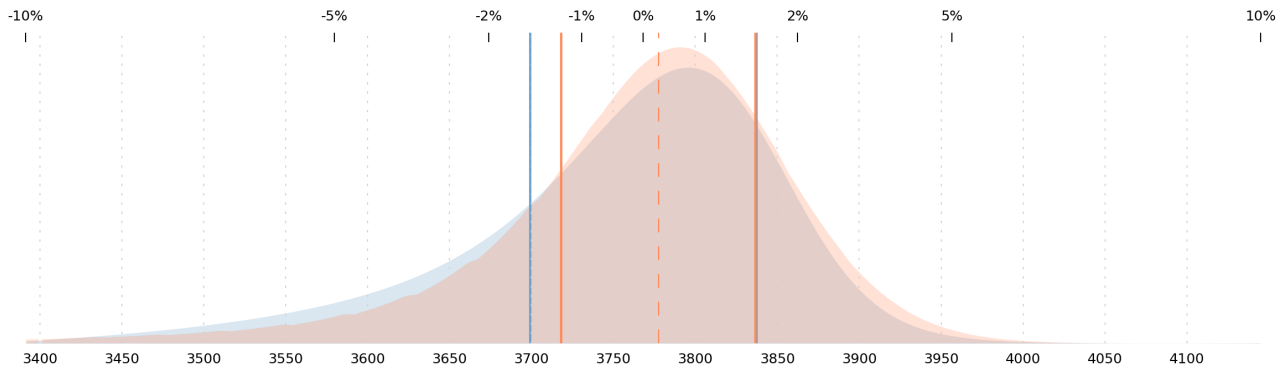
In other words, if there was a time for [temporary] weakness, we thought it should be now.

T+4
Holiday week.

With VGR at -3.19, and with NPD at -5.79, VIX is too low and/or SPX is too high (shallow negative VGR), but recent customer positioning doesn't predict *dramatic* moves (neutral NPD). With some subtle event risk on Wednesday (nowadays, inauguration is an "event risk"), we'd expect it to be difficult to get SPX to rally meaningfully, and that the natural move to begin the week is some flat chop or a measured decline. A put spread hopes to benefit from this.

SPX closed right in the middle of its hedging band by our calculation, so that shouldn't provide any immediate floor or ceiling -- but bear in mind that the OpEx brought average daily move expectations from 0.47% to 0.62%. That means wider bands, and that SPX could open up around +0.62% (the current direction) without meeting any resistance.

The 1-week probability density comparison is familiar -- options are "fairly priced" according to GEX+. That means near-term options are a wee bit cheap -- which dovetails with the VGR at -3.19.



Like last week, lots of things point down a *bit*, but not dramatically. Given that the OpEx is over with, we're hopeful that we can take a profit on our Friday ATM put spread early in the week.

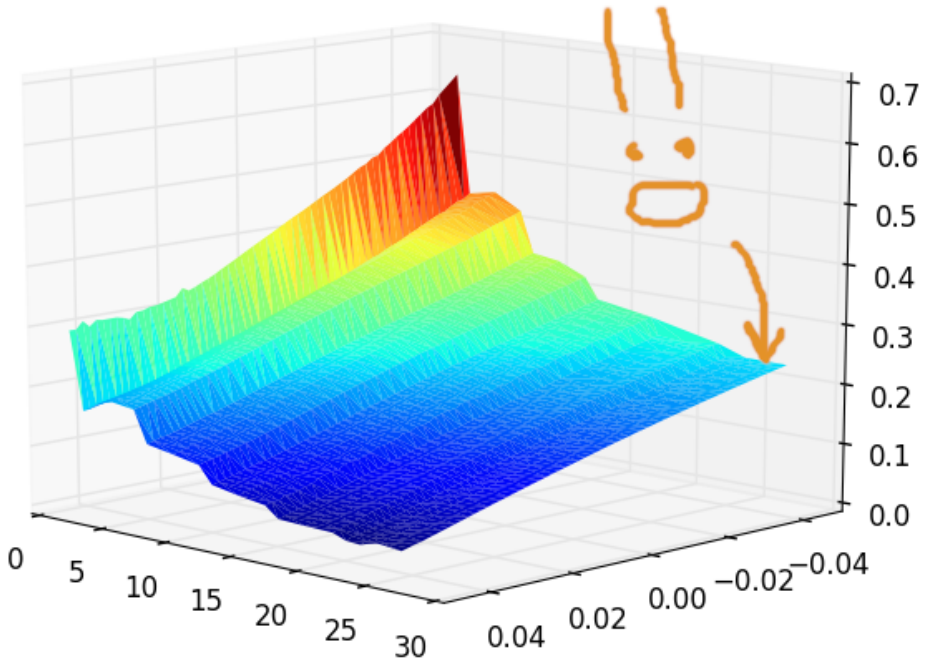
Surface tension

A lot of people spend a lot of time thinking about vol surfaces. We don't want to do that if we can help it, but we need to have an internally consistent way to extract market expectations of moves in implied volatility.

What we will do to accomplish that is apply the following assumption: The Black-Scholes volatility is the average of all possible paths that "instantaneous" volatility is likely to take from spot to strike at expiration. So, e.g., if 1-day ATM vol is 15 right now, and a 1-month 90% OTM put has a Black-Scholes volatility of 30, we arrive at a "local vol" for that strike/tenor of 45 by drawing a straight line between the current vol of 15, and whatever OTM vol would average out to the Black-Scholes vol of 30. In this case, 45.

When we take Friday's BSM vols and "localize" them like this, we get this surface (Friday EOD). This is, more or less, a map of liquidity by (log) strike from -5% to +5%, and as such, it is comparable to something like the GEX+ heatmap -- and it can be "plugged in" to find the actual spot-vol covariance that's priced into the market.

As an example of how helpful we think this could be, the below local vol surface is from February 26th of 2020 (same as the first GEX+ heatmap we showed you above). The implied local volatility at 5% *below* the market (-0.05) and around a month out in time (20-30) was just above 20 vol (0.2). Meanwhile, GEX+ was saying the "local volatility" (the gamma-implied volatility) at that strike would be more like 40-50 (because GEX+ would be substantially negative around there). Way off.



Being able to drill down to this level of strike/tenor detail with an internally consistent model will let us re-build Black-Scholes vol surfaces for given scenarios, and that means getting a better idea of the real vanna exposure of both dealers and customers, and how they are in fact sensitive, just as with gamma, to moves in

spot.

This brings us one step closer to being able to draw stupid "support-resistance" lines on a chart, but with really smart reasons for thinking they're real.

Nerd note #1: Yes, those are calendar day IVs on that surface, which is why days 0-20 "undulate" the way they do (weekend effect). A "real" local vol surface would smooth those out. We'll do that if we need to, but we don't think we'll need to, because the purpose of building a local vol surface here is to re-build a BSM vol surface for different scenarios (because remember, the point here is to model vanna, not to price some weird exotic).

Nerd note #2: So, like, you might wonder how a volatility surface can be really wrong if so much smart stuff is going into it. The answer is worth recapitulating again and again. It has nothing to do with how smart dealers are. Over the past couple months, we've been directly and indirectly making the point that what really destabilizes the market and drives volatility up is when customers are net short options in any capacity (and vice versa). As you know from GEX, dealers keep volatility in line with gamma exposure because they predictably delta-hedge that exposure; and as you know from VEX, dealers do the same with their vanna exposure (if they didn't, there wouldn't be such a strong correlation between GEX and VEX and volatility). The wildcard is the customer, because the customer sells options without hedging, and when he needs to cut or roll exposure, he does so in big chunks, and often all at once. Cue volatility. This is why when net put delta (NPD) is near zero, vol-of-vol (and by extension, volatility itself) is highest -- because the ultimate in predicting volatility is knowing that customers are increasingly on both sides of put options. When a customer is on both sides of a put contract, there will be no stabilizing long gamma hedging coming from a dealer, so volatility can increase uninterrupted, and when volatility increases, IVs rise, and when IVs rise, the customer who's short the option has to get the heck out. Without exaggerating, this seems to be the best illustration of why the market moves, directionally, the way it does, on both short and long timeframes. Customer vanna sensitivity is everything. So, why does the vol surface not reflect this stuff? Because a dealer has no reason to raise OTM IVs in response to customers selling puts, or in response to customers becoming more vanna-sensitive, even if that's what "should" happen. Heck, dealers (being long gamma!) generally benefit from the destabilization. So anyway, that's why it doesn't matter whether the surface is "smart," because even if it is smart, it isn't ever describing reality (and that's wonderful!).

Anyhow... we're expecting to be able to have some fun with this by next weekend.

Have a wonderful (short) week!

The SqueezeMetrics Team
