

## S&P 500 Weekly Forecast 3/29

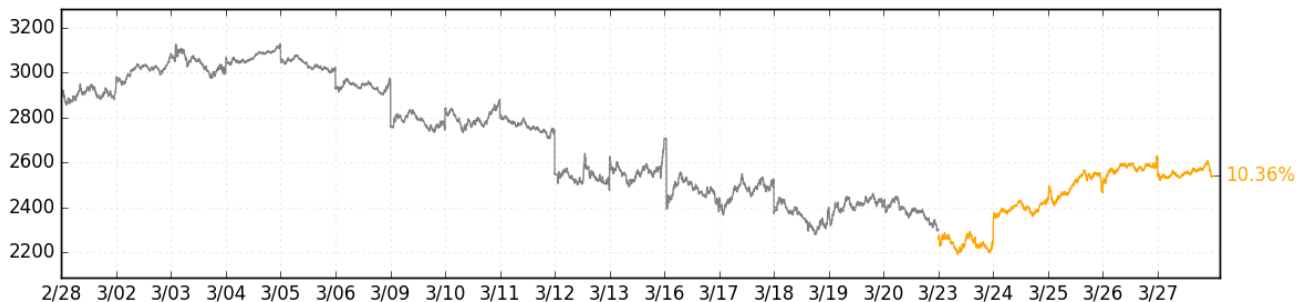
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Hey guys,

Last weekend, we spent most of the time talking about how we expect dealer option exposures and implied volatilities to play a large role in SPX movement. Specifically, we posited that SPX and VIX would not anti-correlate in the way that you might usually expect -- due exclusively to the vanna of a bunch of put options above the market that we believe were held long by customers (\*deep breath\*).

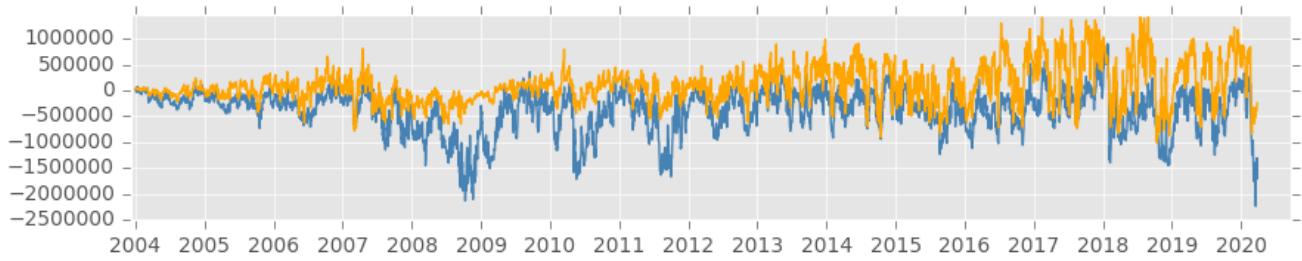
If we had the time (and we will be able to do this in the future), we'd be interested in whether some of those put positions were closed this past week, causing some of the bullishness we saw -- but that's an aside. What we really found interesting is that VIX *didn't fall* even though SPX went up **10.36%**. And that was pretty cool to see, because it somewhat validated the effects that we were anticipating.



Whether this specifically validates the idea of vanna as a large factor in SPX movement is moot. Even if we were "right," we were only sort of right.

What matters is that, after generating modified open interest numbers for SPX options *that we believe better reflect option dealers' positioning* (direction) and the size of those positions, we were finally able to stick vanna and gamma together this week, one-to-one, to see how they work in tandem to influence market volatility (recall that gamma, right now, isn't enough to explain what's going on in the market -- which is why we're going crazy trying to bring GEX 2.0 to light).

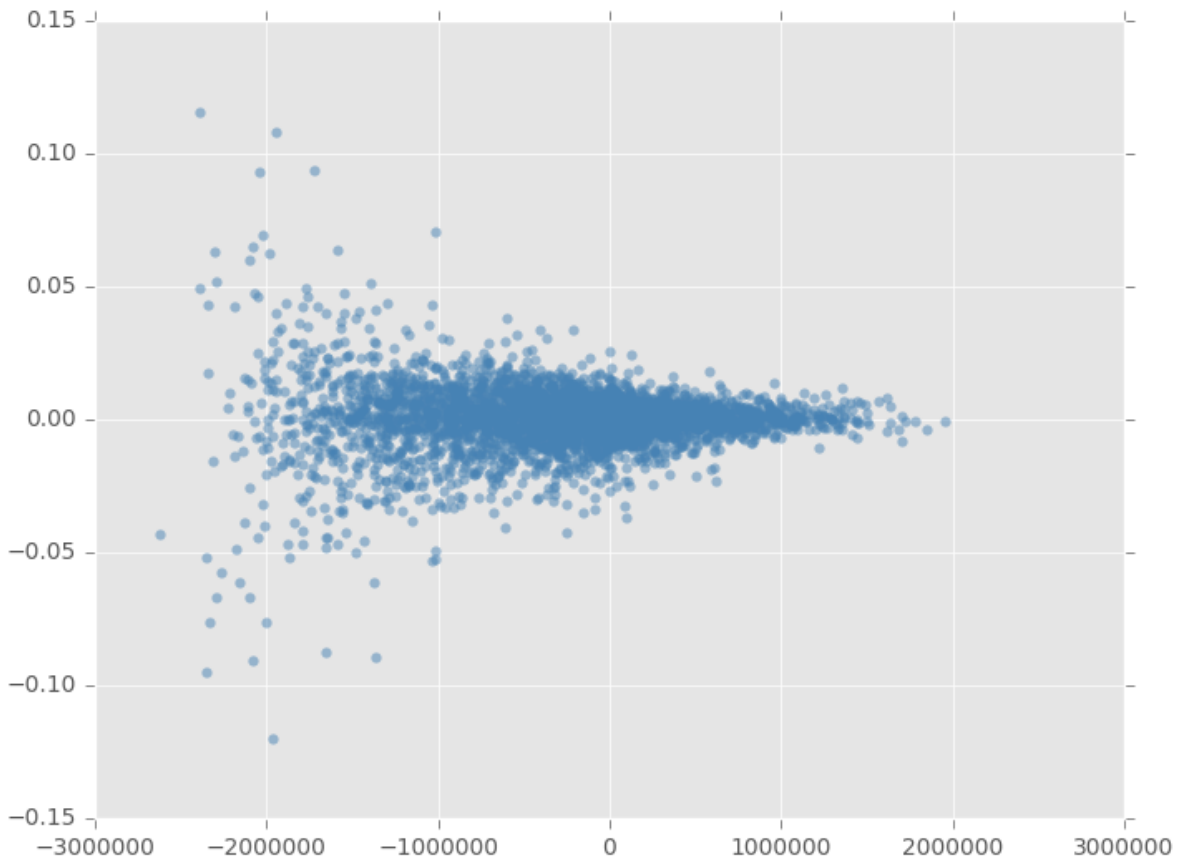
So, here's the full history that we now have of gamma exposure (GEX) and vanna exposure (VEX?). Vanna is in blue. Seeing how negative VEX is right now (and how it compares to 2008), you should begin to understand why we need to have this in our toolkit.



The x-axis is in thousands of dollars per SPX point. With our new dealer-directional open interest (DDOI) numbers, we see that there's only about *half* as much dealer long call gamma out there as the GEX assumptions said there was, which means that GEX only ever gets a bit higher than \$1bn (rather than the \$2bn that you've gotten used to).

But... and here's where it gets interesting, VEX stifles volatility when it's positive too (positive VEX means that SPX is being bought when VIX spikes, which has a stabilizing effect very similar to positive GEX). Indeed, many of the effects that we ascribed to GEX in the past were not GEX at all, but vanna-related. The combination of GEX+VEX ultimately brings the peak value of GEX 2.0 back up to about \$2bn in buying/selling power per SPX point.

With a better handle on these effect, we derive the below scatterplot of GEX 2.0 (GEX+VEX) to 1-day S&P 500 returns. It should look pretty familiar -- but it's a very different beast under the hood.



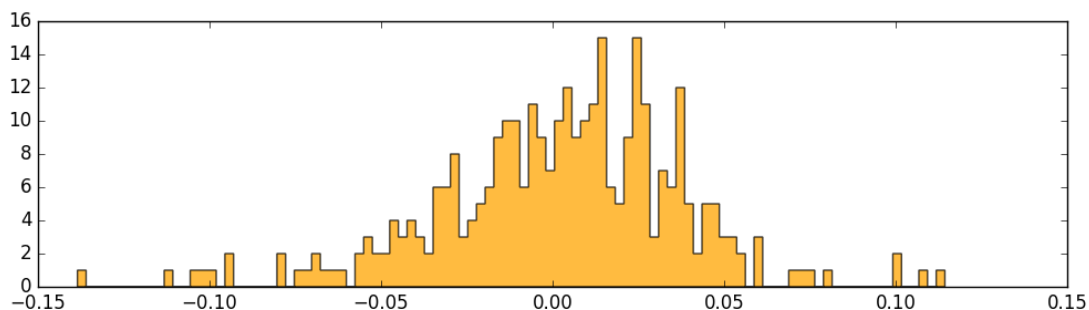
Regardless of what powers it, what we care about is that the association between positive GEX (x-axis, \$1000s) and low SPX variance (y-axis, 0.05 = +5%) appears even stronger than before, and now the association between negative GEX and *high* SPX variance is just as strong. That's a huge step for forecasting, and it's exactly what we were hoping to do by tempering the effects of gamma, picking apart SPX option volume, and adding vanna to the picture.

*(Nerd note: See how the rightmost dots on the plot are mostly <0% return? That's because when vanna exposure gets really high and IVs are really low, if IVs continue to creep ever-so-slightly lower like they sometimes do, that actually causes a bit of selling from option dealers. Not aggressive selling, but persistent selling nonetheless. This is really interesting because knowing this can help us figure out when rallies are long in the tooth -- better than GEX alone was able. Ooh, also, take a look at the end of 2017 in the line plot above -- that was when the market was melting up. You can sort of tell how high VEX was when that was happening -- this was because tons of people were buying calls and selling puts, which created even *\*more\** stability than high GEX alone, making it so that it was nearly impossible to sell off, because if VIX rose, SPX would get bought *\*hard\**. And that's exactly what happened -- VIX went up and the rally got even crazier. Ok, we'll stop now.)*

Next week, we'll have a more forecasting ability, but for this week, here's what we could pull from the raw data:

Right now, GEX (2.0) is **-\$1.56bn** per point. The great majority of that volatility-enhancing delta-hedging obligation is coming from vanna. And if you look at the cross-section of returns in the scatterplot above (-1560000), you'll get an idea of where that means we are.

Here's a slice of those returns on a 1-week basis:



You can see, approximately, that it's a volatile situation. A 5% return for the week is easily in reach (again). The 1-day ATM volatility associated with this distribution, however, is a fairly modest **29.3%**. That gets you around a 1-standard-deviation return of **1.85%**. On a 1-week timeframe (with mean-reverting behavior factored in), it's an even more modest 25.82%.

But that's just an ATM volatility.

We're going to start deriving OTM volatilities as well, and skews, and mashing them together to give an even better comparison to the market's volatility, and to VIX. To give you a sense of what that will mean, a 5% OTM 1-day put should have a **43%** IV right now according to this data. That is priced for a **2.70%** standard deviation of returns. The reason for that is that vol-of-vol is high here -- if SPX falls a bit, volatility potential rises significantly.

So if we were to derive a pseudo-VIX from this, it'd probably be more like 35. Which is still a whole lot lower than VIX right now, which is pricing in a lot more movement at 65. In any case, our advantage here seems to

be that we believe that volatility potential is lower than the market suggests -- though we believe that there's a very very steep skew. Taken together, short 1-week ATM options, with long OTMs (another iron fly scenario) seems reasonable.

This is a lot at once. If you have questions, please let us know.

More next week. We appreciate your patience.

The SqueezeMetrics Team

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