

## S&P 500 Weekly Forecast 11/1

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Hey everyone,

Last weekend's note was a bit frenetic. So today let's *try* to slow down. Deep breaths.

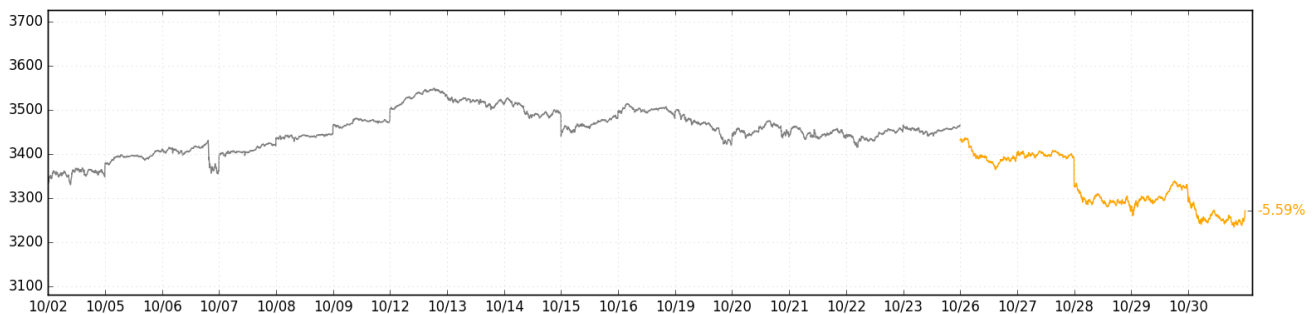
Over the past couple months, we've been trying to build a good directional "sentiment" indicator from SPX options and volatility. Guided by only the sense that there *must* be something in there, we first tried splitting historical volatility into "up" and "down" and comparing those individually to implied volatilities (er, that didn't work); then we tried looking at the daily composition of put option flows, denominated in "net delta" (this was promising); then, last weekend, we finally combined this idea with the idea of the vanna-gamma ratio of customer (*not* dealer) option positions.

And when we looked at these two things (net daily put deltas and the customer vanna-gamma ratio) together for the first time, we came to the conclusion that the market had fallen into a "ring of fire" -- where the two signals agree that things are profoundly unstable.

1. What happened
2. What will happen
3. WHY?!

### What happened

The S&P 500 fell **5.59%** on the week.



To boot, VIX rose over ten points (+38%). So just about any combination of long vega, short delta, "long vol," or whatever you had should have performed well. Our own November VIX futures and SPX/ES puts were pleased, and we were able to scale completely out of our long vol and short delta by end-of-day Friday.

### What will happen

Net put delta on Wednesday, Thursday, and Friday were -71, -8.0, and -6.8 (as opposed to the -2, -3 that we were seeing before). These suggest a marked increase in customer put-buying, which is stabilizing to the market. Currently, the customer vanna-gamma ratio is in the very high positives. This means that "customer

vanna" is slightly negative and "customer gamma" is rather positive. Recall that a high vanna relative to gamma is what's destabilizing -- no longer the case.

If you were to consult the Risk Report, you'd also note that "crash-risk" is presently 1.09x. That's low, and it means it'd be pretty hard to turn this "correction" into a "crash."

Since we still don't have a developed system for understanding what this all means, let's try to work through it, bit by bit. Because numbers without context are stupid.

### WHY?!

Ok first, let's try to draw the connection between net put delta (NPD) and the customer vanna-gamma ratio (VGR). If you recall last weekend, we saw that their impacts on subsequent market returns looked really similar when you plot them out -- but when you try to suss out their correlation with *each other*, you don't get much. The implication was that they were distinct signals.

And they *are* distinct signals, but they're certainly telling us about the same kinda stuff. So here's how we're thinking about it right now, with three examples:

1.

A customer buys a 30-delta put from a dealer. A dealer is now "long vanna" (negative VEX) and "short gamma" (negative GEX). These are nominally destabilizing forces to the market, but the reality is that the customer who bought the put fully intends on monetizing his position as it becomes closer to the money. Thus, as the put becomes ~50 delta (at its maximum gamma), the customer sells it. The dealer *may* have sold 20 shares as a delta-hedge up to now, but once the put is monetized, he has to buy back 50 shares all at once. In this scenario, net put delta was very negative (customer's net short delta) and the customer's put had much more gamma than vanna (customer vanna-gamma ratio was pretty negative). A stable situation!

2.

A customer buys a 30-delta put from a dealer. *Another* customer sells the 30-delta put to a dealer. The dealer is now out of the picture, not needing to delta-hedge. As the index goes down and IVs expand, the customer who sold the put will exit the position as it gains convexity/gamma, perhaps at the same time (or before) the long put customer exits. The flows even out, but the market is now lower, and staying there. No dealer is required to buy back shares, so no bullish flows occur. In this scenario, net put delta was ~0 (danger!) and "customer vanna" was pretty big relative to customer gamma (basically, one customer wanted long convexity, but the other didn't *really* want short convexity). This precipitates corrections, since the flows net out to a market that falls and doesn't immediately recover.

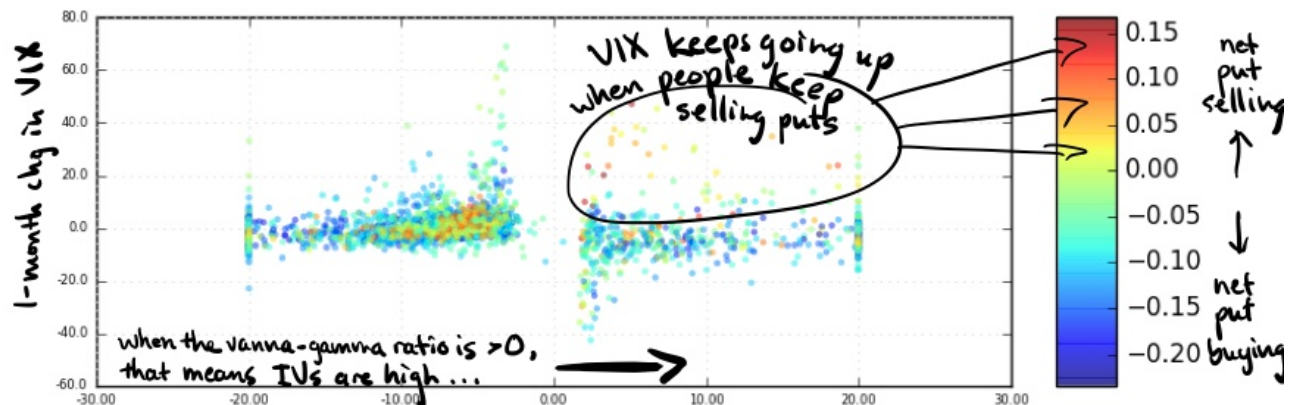
3.

Tons of customers sell puts to dealers. Nobody's buying puts. Dealers have short vanna (positive VEX) and customers have the inverse of that vanna, which causes them to rush to buy puts if things get hairy (IV expansion) -- in order to avoid the convexity of the puts they sold. (Nobody *actually* wants the payoffs of the options on their books.) But since dealers have positive VEX, any small increases in IV are quickly bought by dealers (as long as those sold puts are OTM). So far, so stable. But a few months later, customers start taking the other side of the sold puts. Slowly, the dealers pass on their existing long put positions to customers. Net put delta trends toward 0 and customers are paired off with each other. Now we're in a scenario like the one above, except that there's *tons* of customer vanna -- so when the market moves down, it's more violent, and dealers won't buy the index anymore when IVs rise. If there's not enough liquidity to get everyone out of the trade, the market crashes in earnest.

In this way, net put delta is telling about the "leading edge" of customer behavior (flow), while the vanna-

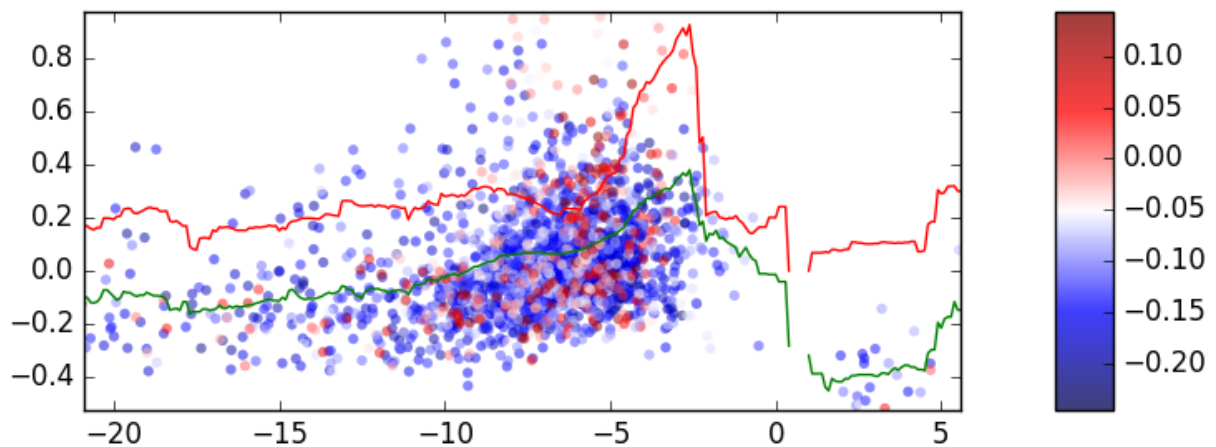
gamma ratio is telling us about the cumulative impacts (stock). Sometimes, when there's not much "stock," "flows" matter more. Other times, when there's a lot of "stock," "flows" only *slowly* impact "stock." When we combine a view of both, we get a full picture. And what a picture it is!

One crazy thing we can do by combining this picture of stock and flows is that we can tell if a correction is going to turn into a crash in real-time, because *if there isn't enough liquidity capacity, you'll see net put delta stay around zero or in the positives* (customers selling puts) as people desperately roll positions that they can't reasonably get out of (and this is when dealers end up with lots of long ITM puts, which is the foundation of the evil VEX feedback loop of 2008 and 2020. To see how profound this impact is, look at this plot.



In those high-volatility scenarios to the right of 0.00, flows dominate what happens next to VIX. If people keep net selling puts (yellow, orange, and red dots), the overwhelming tendency is for VIX to keep going *up* (counter-intuitively). If they cough up for protection (blue dots), VIX almost invariably goes *down* over the next month. These are cases where "flows" far outweigh "stock," and it's crucial to have a view of who's buying and selling what.

*Nerd note, as if the above wasn't dense enough: Two weeks ago we posted a plot of net put delta versus changes in VIX, instead of versus changes in SPX. We found that the relationship was "smoother," more well-behaved, and we posited that perhaps, perhaps the mechanism of these put delta flows has more to do with volatility somehow, than it has to do with spot prices. After reading and seeing the above, and after seeing the vanna-gamma ratio's impact last week, do you see why the relationship with IVs/VIX would be so tight? When vanna is a larger force, relative to gamma, that means that changes in IV have a relatively larger impact on customers' decision to roll or close their positions, and that means that people who sold puts (with the intention of collecting some or another risk premium, but not with the intention of "selling vega" like a vol trader) run afoul of the impact of IVs on their delta exposure to the underlying. Since so many put-sellers want to maintain a constant (within reason) delta exposure, the cascade-effect of a rise in IVs causing the deltas of sold puts to go off target, and the rolling of those positions that occurs, has a more predictable effect on the price of downside protection, and thus, broadly, on IVs. The actual return path of the S&P 500 can take many twists and turns, but the fact of the matter is that, when customer vanna exposure is too large relative to its gamma exposure, IVs are objectively too cheap, and the tendency will be for them to rise, even if no correction or crash occurs. In other words, when vanna becomes a larger force, that's when it has the directional meaning that we always thought that it should have on the market. Look at what happens when we view the VGR through the lens of 1-month VIX change!*



*Data from 1/2012 to present (to capture impact of higher SPX option volumes). When VGR is around -4, the standard deviation (red line) of 1-month moves in VIX is above 80%, and the mean 1-month move in VIX is up almost 40% (recall that VIX was up 38% this week after this signal!). And if you filter by net put delta near zero, it gets even more intense.*

Anyway, the point is, when we combine the "stock" view of customers' vanna-gamma ratio (eliminating dealers from the picture, instead of focusing on them like we usually do) and the "flow" view of day-to-day deltas in SPX options, we get a very clear picture of directional sentiment and risk.

Oh, and right now, VGR is over 200. The deep positives combined with an NPD of under 0.00 is associated with average 1-month decreases in VIX of around 20% or more. Like we said above (in that heavily-annotated plot), when VGR is above zero, flows matter more, and when people are net buying puts, that's bullish for the index and tends toward decreasing VIX.

As of Friday at the close, we're short some of the same November VIX contracts that we were long last weekend. We'll also likely be selling a wide-winged iron fly position expiring Friday (in small size). Gently scaling into some short volatility makes us feel warm and fuzzy.

Historical NPD and VGR data is attached.

Enjoy the week!

The SqueezeMetrics Team

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**NPD\_VGR.csv** 271 KB

