S&P 500 Weekly Forecast 10/24

From: SqueezeMetrics <info@sqzme.co>
To: SqueezeMetrics <info@sqzme.co>
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Hey guys,

Anticipating that this would be a slower week, we reserved this Sunday to "recap and clarify some stuff." I.e.,

> What's PIVT again? Why does it make sense to use? How does Robot Jim actually do what he does? And, like, what are we even doing with this data; and why do we expect it to work? And what's the Overarching Theory?

So let's answer these first four questions right now at length, and then talk about the Overarching Theory after the jump.

1. What's PIVT again?
Path-Implied Volatility Tension (PIVT) is the oddly simple conclusion to our months-long search for the mythical "volatility triangle." It's designed to draw the historical connection between changes in price and changes in volatility, so we can get a sense of how a stock's future returns respond to past moves in price and volatility. When we say "volatility," we mean "realized volatility" here, not implied—so PIVT can be applied to *any* asset, even if it has no options.

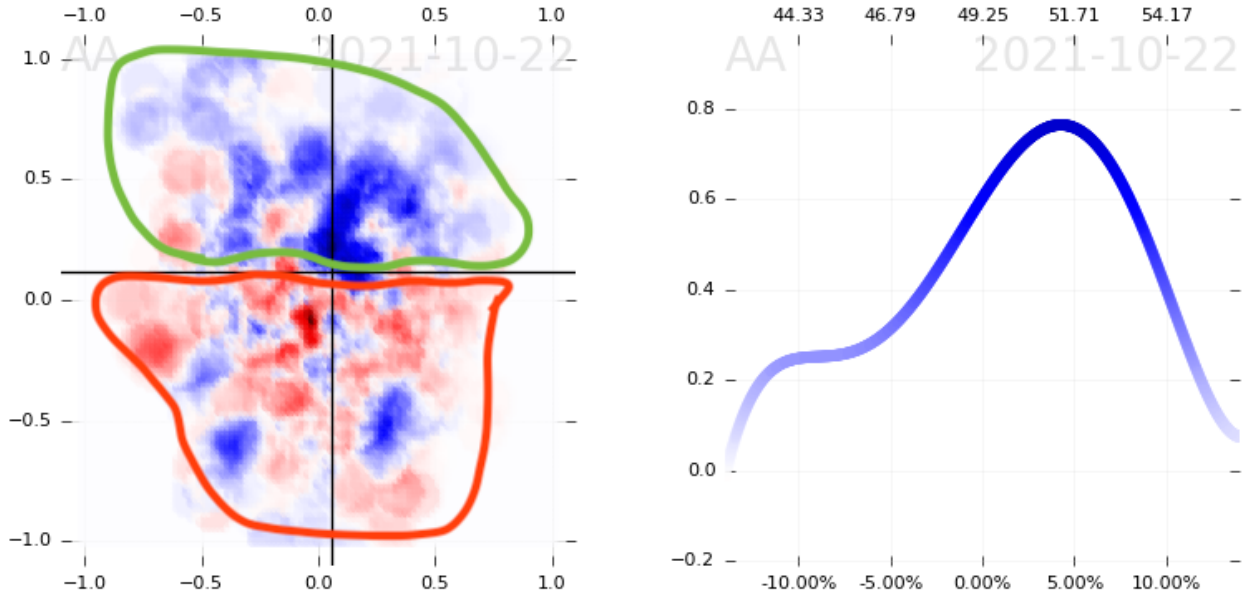
Thus, if the price of an asset increases over the course of the prior month, we will be positive (toward the right) on the "price" axis (the x-axis) of the PIVT plot. However, the degree to which we're positive depends on volatility. E.g., if a stock goes up, on average, 1.00% every day for a month, but historical volatility was averaging 2.00% per day, then that would be 0.5 on the x-axis (the gain was 0.5 * the expected volatility). The degree to which we consider a price gain significant depends *entirely* on volatility, which is why we want to express it this way.

Similarly for the y-axis, any given level of realized volatility is only really interesting in context of prior volatility. E.g., if realized volatility goes from 2.00% average daily moves up to 4.00% average daily moves (volatility doubled), that's comparable to if realized volatility went from 0.25% to 0.50% average daily moves. So, if the average daily moves in an asset over the past month are 1.00% per day, but over the next few days there are *really* big moves, raising the monthly average to 1.50%, that would be a +0.50 reading on the y-axis.

So... on the x-axis is the 1-month average of daily price returns, *in proportion to rolling volatility (average daily moves);* and on the y-axis is the 1-month average of daily volatility (average daily moves), *in proportion to past 1-month average volatilities.* The result is a view of rolling vol-adjusted returns on the x-axis, and a view of rolling change in volatility itself on the y-axis—both normalized in such a way to be compared readily across any asset.

2. Why does it make sense to use PIVT?

Because when using this framework, we can easily ascertain an asset's price relationship with its price path and its volatility. E.g., if you go to the PIVT page and click on Alcoa (AA) (because it's up there at the top), you'll see at a glance that AA has excellent 1-week returns (blue blobs) when its volatility is significantly rising (>0.25 on the y-axis), and *poor* 1-week returns when volatility is falling (<0 on the y-axis)—but that whether price has gone up or down (x-axis) seems less important to future returns.



This is a really big deal, because it means that Alcoa's returns are strongly related to its realized volatility! Could this be because an increase in volatility tends to call more attention to AA? Maybe. Is it because of existing vol-sensitive positioning, kind of like dealer vanna? Maybe. How about AA's link to commodity prices? Maybe. But really, who cares—there's no denying that it's a bullish signal, historically, for volatility to be rising.

3. How does Robot Jim do what he does?
See the PIVT heatmap above? Imagine if you added another axis to that plot, and there were a three-dimensional heatmap of future returns: A 3-D cube filled with puffs of blue and red smoke. If you were to supply an X, Y, and Z coordinate, you would be able to see whether a given part of the cube has more blue or red in it.

The hard part is when we add *another* axis. Suddenly, it's a 4-D object, and our brains can't handle that. But think of it this way: Imagine ten different 3-D cubes—as in the above—but each of them represents a "slice" of another dimension/axis of data. E.g., there's one 3-D cube that represents all of the returns for a 4th axis, but *only* where that axis is between -1 and -0.9. And there's another cube that represents the returns between -0.9 and -0.8, etc. It's a bit stilted, but we're thinking in four dimensions when we do this.

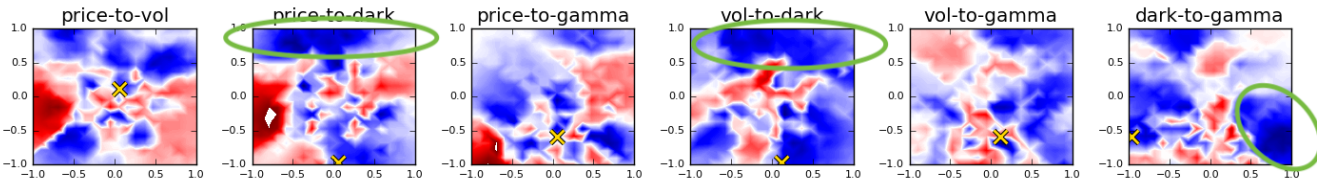
Robot Jim doesn't have a brain, so he doesn't have an issue with drawing a heatmap in four, five, or twenty dimensions. From our point of view, though, he's just looking at lots and lots of heatmaps and combining all of their historical returns information. So we can basically query Jim, asking, "What was the historical distribution of returns when X was 0.5, Y was 0.25, Z was -0.75, and Z1 was 0.00?"

And he tells us. And that's helpful.

4. What are we even doing with this data; and why do we expect it to work?
When we combine the PIVT data with data that we already know and love, like dark pool short volume and gamma exposure, we increase our chances of figuring out what drives a stock's returns. E.g., in the above, we found that Alcoa (AA) has a strong forward returns relationship with its change in volatility, as described by PIVT—but it has not as strong a relationship with the price component of PIVT.

Similarly, some stocks will respond only to price, or to both price and volatility. Or maybe returns are especially interesting only when price and vol are *both falling*. And the same goes for DPI and GEX! It is quite common for extremely high GEX to be bullish in the near term—but you're more likely to increase your probability of positive returns if both DPI and GEX are high. Now imagine every possible combination of DPI, GEX, and PIVT's price- and vol-axes!

Here's a representation of what Robot Jim sees when he looks at Alcoa's data. Circled in green are some great returns associated with high DPI.



If you'd simply looked at a chart, you may not have noticed this—but there it is.

Having backtested this method on a number of tickers already, we're really pleased with the "ensemble" capability that the method allows for, and the pretty awesome returns. And so we could just say that "the data speaks for itself," but that's lame, because each of these data axes was deliberately chosen, developed, tested, and traded over months and years.

Why?

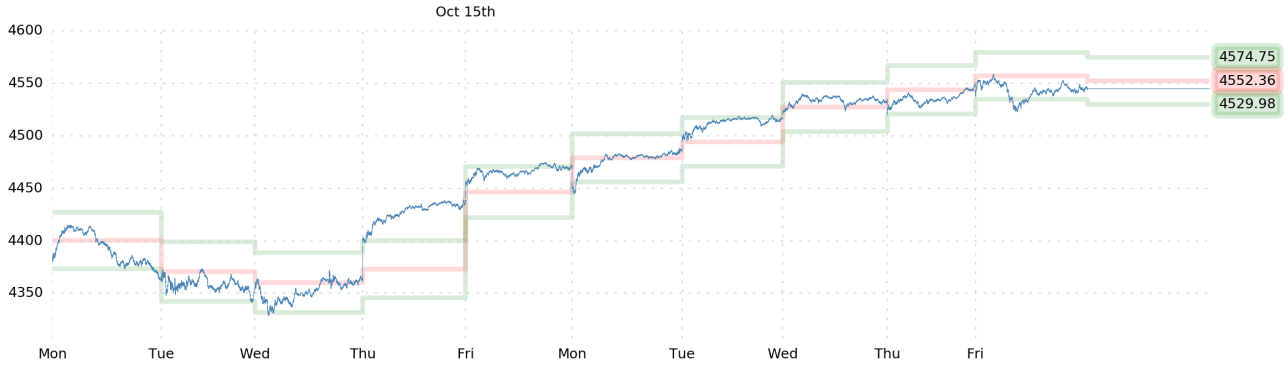
Because they all have one thing in common.

But first...

1. The Week In Review
2. The Stuff That's Gonna Happen
3. The Theory

The Week In Review
Last weekend, we had this to say:

> So our bet is on an uninspiring week. What'd be *perfect* is a quick "bear trap" early in the week, which would bring VGR lower, and back into bullish territory by default. I.e., a buyable dip. Then, after that, a frustrating, low-volatility drift through to Friday, leaving SPX only marginally higher on the week.



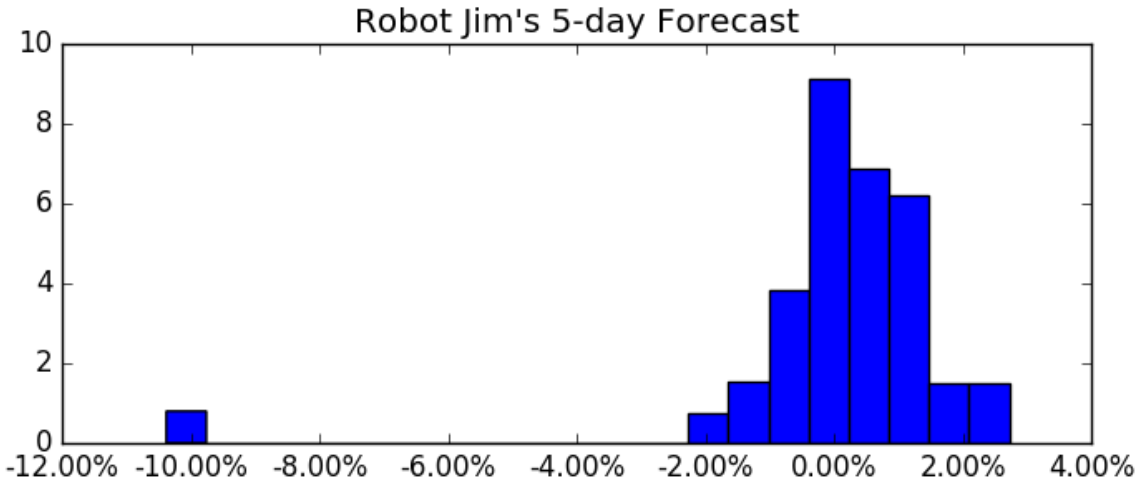
Not much of a "bear trap"—only a quick dip on Monday morning. Then the week was up 1.64% through Friday. In the context of our weekly expectations, that's a big gain, so we feel like we were a bit off on this one.

That said, we did get short VIX on Wednesday, since the futures contango was huge, and tail risk was non-existent. And that's been profitable so far, actually, though we've been hanging on for more.

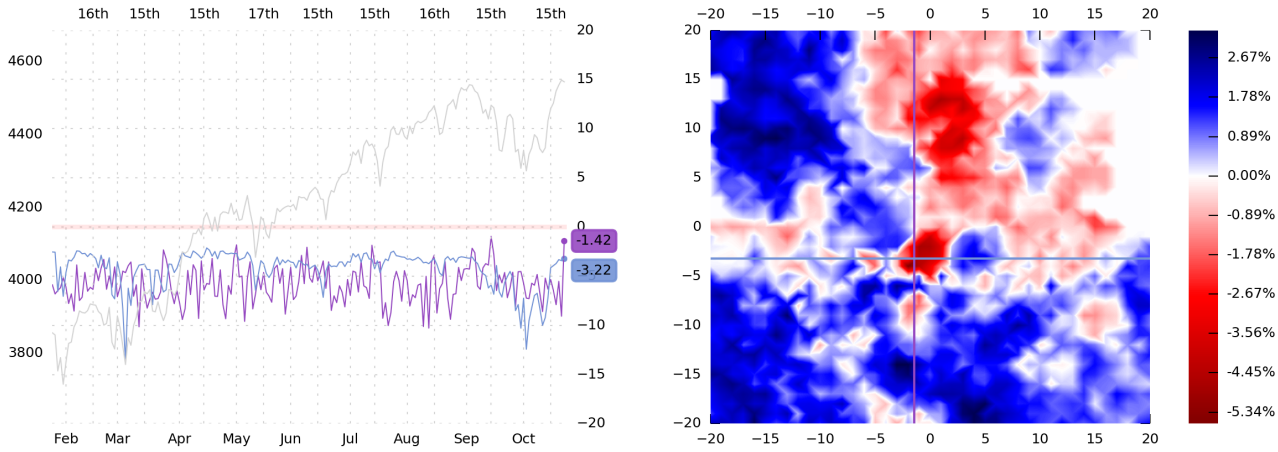
By Friday, that short VIX position was a short VIX plus short SPX position, as we lost confidence in a continued SPX rally—but still saw the VIX term structure as very meaty, again, given the lack of tail risk.

The Stuff That's Gonna Happen

So for all of last week's positioning being predicated on a lack of tail risk, it's kind of funny to see Robot Jim's weekly forecast throw us a curveball.



If you've already looked at the Sentiment Sheet PDF, you won't be surprised by this, because the NPD/VGR heatmap looks like this:



Apparently, there was *no* net put-buying on Friday (NPD -1.42). That data, combined with a VGR of -3.22, brings us back into the Ring of Fire—predicting one-month SPX declines, and an increase in volatility.

But maybe we ought to hold our horses: It's only one day of data, and the day prior indicated pretty strong put-buying. To boot, there was a pretty strong DIX print on Friday, and GEX+ is high and stabilizing.

This is where Robot Jim's data synthesis really shines: On the 1-week timeframe (see above), he agrees that there's now suddenly a HUGE tail, but that mean and median returns are still modestly positive, at 0.06% and 0.17%, respectively. So yes, while there's undeniably some weakness thrown into the mix from Friday's flows, it's probably not going to impact this week's returns in a nasty way. More likely is that, if there's going to be volatility, it'll all fall apart more slowly. And we'll be on the lookout.

But right now, we're hanging on to our short VIX, short SPX position. Best-case for us is a flat-to-down week in SPX, and the November VIX future moving interminably toward a significantly lower spot VIX.

The Theory
- The most important concept for traders to predict is changes in liquidity.

That's not very controversial.

- Another word for "changes in liquidity" is "volatility of volatility." This is a "change in expected change."

This is a bit harder to express, but it should make sense.

- "Volatility of volatility" is a function of "intermediation."

Huh? Now we're going off the deep end.

What we're saying here is that *intermediation* is the single most important concept to understand in markets. Intermediation is the degree to which there is *one-sidedness*. A one-sided market is a market where the "customers," or the "investors," or the "end-users," are all positioned and trading in the same direction. For example, it's a market where corn futures are being sold by corn producers, where equities are being bought by investors, or where currencies are being bought by businesses and investors with currency risk. And in the case of an option market, it's where convexity (the product for sale in an option market) is being bought

by the end-user.

A market where dealers and market-makers are supplying the end-user with the product—or where the end-user is adjusting that exposure as expected—is an "intermediated" market. Dealers are present and acting as intended. There is an active intermediary.

But sometimes a market becomes two-sided. Sometimes a corn farmer speculates in the other direction, buying futures. Sometimes short-sellers show up in a stock, supplying shares to the usual buyers. Sometimes an "income"-geared investor starts selling options to other investors, taking the convexity risk upon himself. This is a "disintermediated" market. The usual intermediary, the "specialist," is made to be less active in handling risk.

As such, a two-sided, disintermediated market is a market with high vol-of-vol, i.e., high liquidity uncertainty. The unpredictable whims, preferences, and fears of "non-specialists" takes the forefront. We talked about this back in January, regarding GameStop (1/31), and then regarding OTC stocks (2/7). But just a few months prior, we were making the same points with regard to Net Put Delta (NPD) (11/1). It all amounts to the same thing—disintermediation drives liquidity uncertainty, and liquidity uncertainty is what we want to know about.

Why are we so gung-ho about intermediation?

Because all of our data is meant to measure intermediation. A high DIX/DPI means market-makers are definitely intermediating; a low DIX/DPI means they're probably not. A low GEX means *option* market-makers are intermediating (dealer short gamma); a high GEX means they're not. In both of these instances, the highest degree of intermediation tends to result in low vol-of-vol / high liquidity certainty, which means volatility goes down, and prices go up. But also in both of these instances, it's not the "really high GEX" or the "really low DIX" that's concerning. I.e., it's not the theoretical "maximum disintermediation" that's really interesting...

Rather, it's somewhere in the middle.

In the case of GEX, zero—or a little bit above zero—is "somewhere in the middle." In the case of DIX/DPI, "somewhere in the middle" is usually around 40% or something. These are where prices tend to get jumpy, and weird, and problematic.

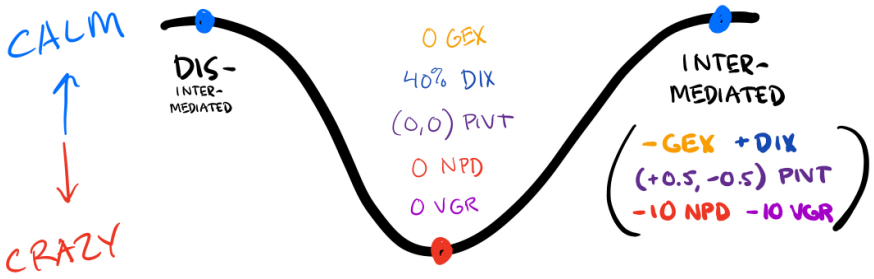
And the same goes for NPD and VGR. You already know where the scariest part of the NPD/VGR heatmap is—it's right in the middle of the map, where NPD and VGR are both still negative, but very near to zero.

And do you remember how, when we first started looking at the "volatility triangle," it was *not the extremes* in realized vol, implied vol, past implied vol, or spot price that gave us interesting data, but it was rather the *equilateral triangle*—where all the prices and volatilities were lined up in an equilibrium—that was interesting. It's the same exact thing with PIVT, where (0, 0) is "equilibrium." Where "path-implied volatility tension" is around zero.

[Look again at AA's PIVT data way above and note that the most intense blue and most intense red are both near zero.]

This "middle," this "unstable equilibrium," this "soft disintermediation" is what we've *always* been looking for when we look for signal in data (starting with dark pool short volume, and what it tell us about dealer

positioning), and after all this time, we feel like we've found a number of well-articulated processes for extracting this information from price, volatility, option, and volume data—each of them distinct and quite capable of being paired with the others. That's it. That's the whole point. *Everything* is about increases and decreases in *intermediation*, along several different axes—because we think this is the single most useful way to look at the market.



Now, the way we see it—if each of these data points are sufficiently helpful, and sufficiently distinct—all we have to do is overlay each "axis of intermediation" on top of the other. And with the help of Robot Jim, we will see what different combinations tend to result in what distribution of returns—for every stock, and for every sector/industry/index/commodity/bond ETF, etc.

And then we ride off into the sunset.

Does that help to tie some things together? Let's try to get some real data to you guys next weekend.

Enjoy the week!

The SqueezeMetrics Team
