

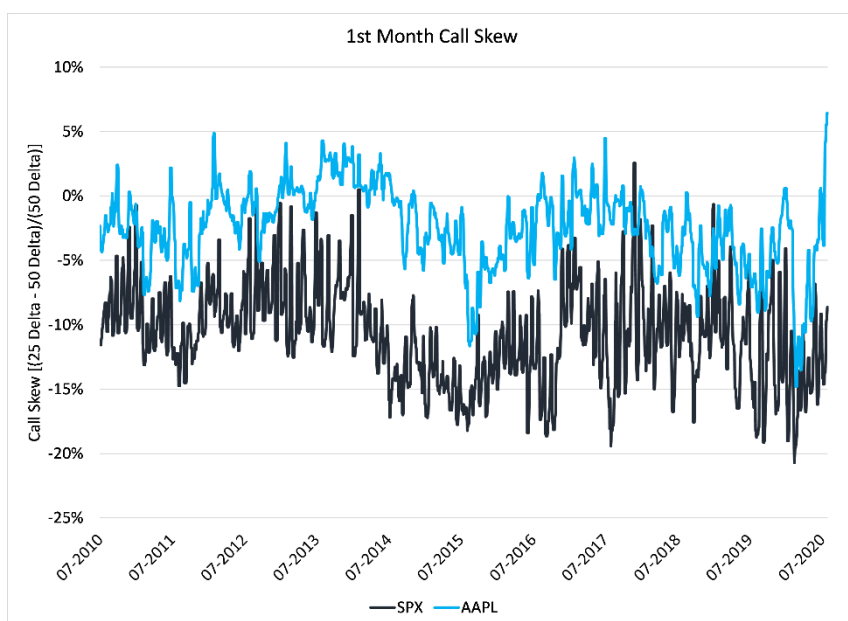
## Let's Talk About Skew, Baby...

*"Ce qu'il y a de certain c'est que moi, je ne suis pas Marxiste."*

*("What is certain is that I myself am not a Marxist.")*

*Karl Marx, 1882*

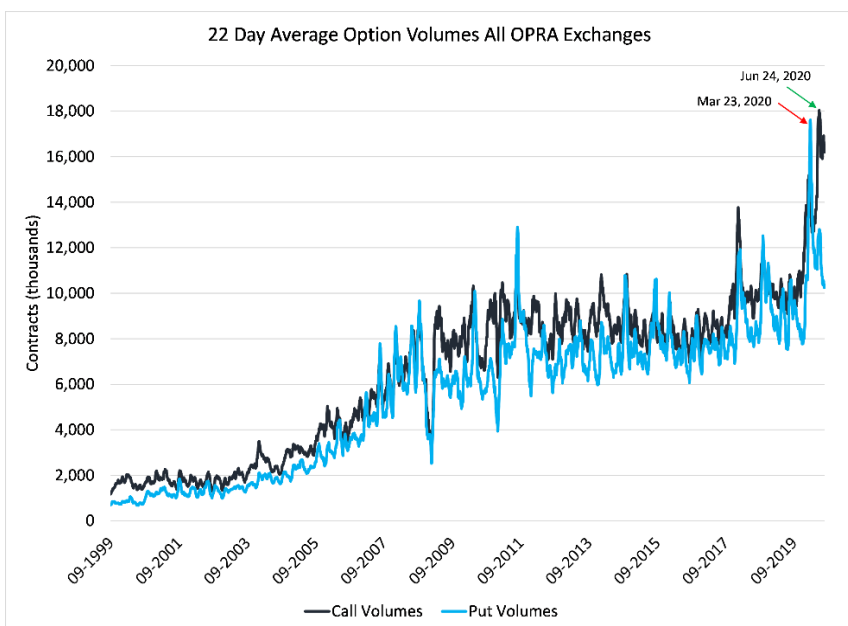
**Summary:** The bullish narrative of aggressive retail call buying driving markets higher conceals an important market dynamic of decreasing liquidity and an increasing mismatch between buyers and sellers as option volatility selling strategies, like call overwriting, retreat in the aftermath of poor performance. These dynamics drive a scenario of increased fragility that raises prospects for extreme moves in both directions.



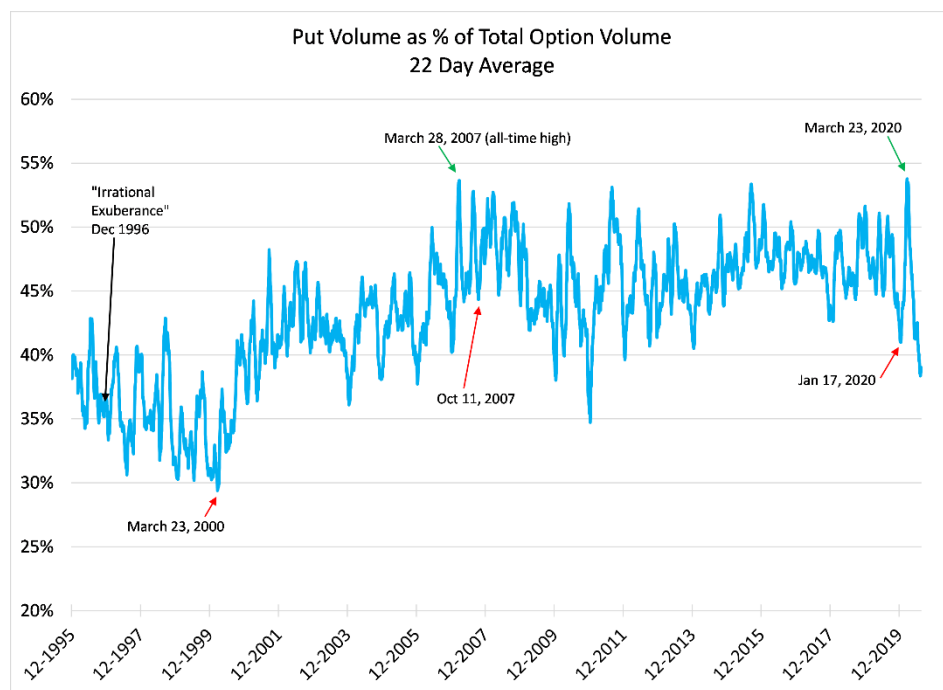
This is going to be short, but sweet. Over the past few weeks, media chatter has been steadily increasing with breathless comparisons to the DotCom bubble as many of the momentum favorites have churned higher and higher, and alongside their relentless rise, a consistent rise in the pricing of their Out Of The Money (OTM) call options. For starters, it is important to emphasize that this is a single stock rather than an index phenomenon. As a simple example, Apple (AAPL) 25 delta – 50 delta front month call option implied volatility skew has risen to decade highs while the S&P's is hanging out in normal territory.

Concurrently, a chart has been making the rounds highlighting explosive call option volumes. While this is true, what is not represented is that just a few months ago we experienced record high put volumes. This market has truly been an equal opportunity offender in just the span of a few months. Given the extraordinary moves we have seen in stocks like AAPL, the obvious question becomes "Are we seeing a replay of DotCom mania?" Well, "yes, but..."

If we utilize a longer time frame to compare the current exuberance for calls to the heady DotCom era, we come nowhere close. The current fraction of option volume for calls, at 62%, remains below the average of 65% for the entire period from Greenspan's "Irrational Exuberance" speech to the crashing of the Nasdaq on March 23, 2000. What does appear



unusual is the near record share of puts as a fraction of option volumes (53.7%) on March 23, 2020 (the day before the recent trough in equity prices and almost exactly 20 years to the day from the record low reached in the DotCom cycle when only 29% of option volume went to puts).



The unfortunate answer appears to be that the behavior we are seeing is not tied to massive speculation in calls, but rather a predictable dynamic driven by increased dealer hedging costs given an increasingly illiquid market.

This is the source of the subtitle of this piece – the well-known disclaimer by Marx that if he were to listen to the Marxist rants of his followers, he would not consider himself to be a Marxist. At the core of the error in Marxism is the belief in the Labor Theory of Value; that cost determines price. This is only true in a monopolistic

environment, which could only happen if option market making were becoming increasingly dominated by a few large players. We have seen no evidence of this. (Narrator: there is evidence for this<sup>2</sup>)

### Liquidity vs liquidity

THE STRIKING PRICE

## Market Makers in Equity Options Are Vanishing

By Steven M. Sears June 2, 2017 11:09 pm ET

That headline sprouted roughly one year after a protest on a proposed rule change to Rule 15b9-1 of the Exchange Act of 1934 that would require significant regulatory hurdles for equity option market makers. The text of that letter is illuminating:

*“Unfortunately, we believe that the Commission did not fully consider the disproportionate impact that this Proposal will have on the options markets and investors in those markets. Specifically, we believe that the Commission did not take into account the role and obligations with regard to firms engaged in options market making in drafting this Proposal.” – July 13<sup>th</sup> comment to Exchange Act Release No. 34-74581<sup>3</sup>*

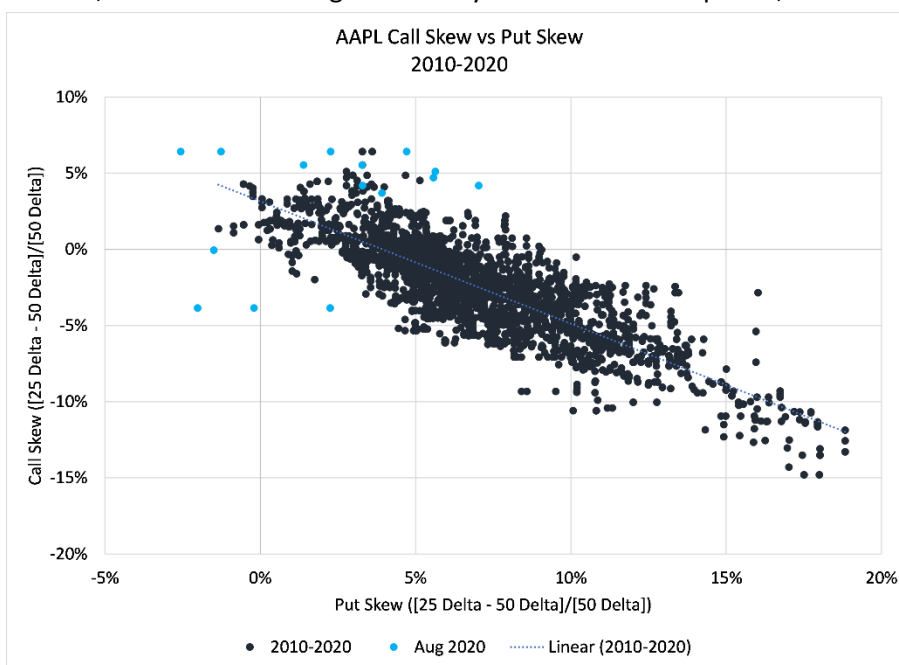
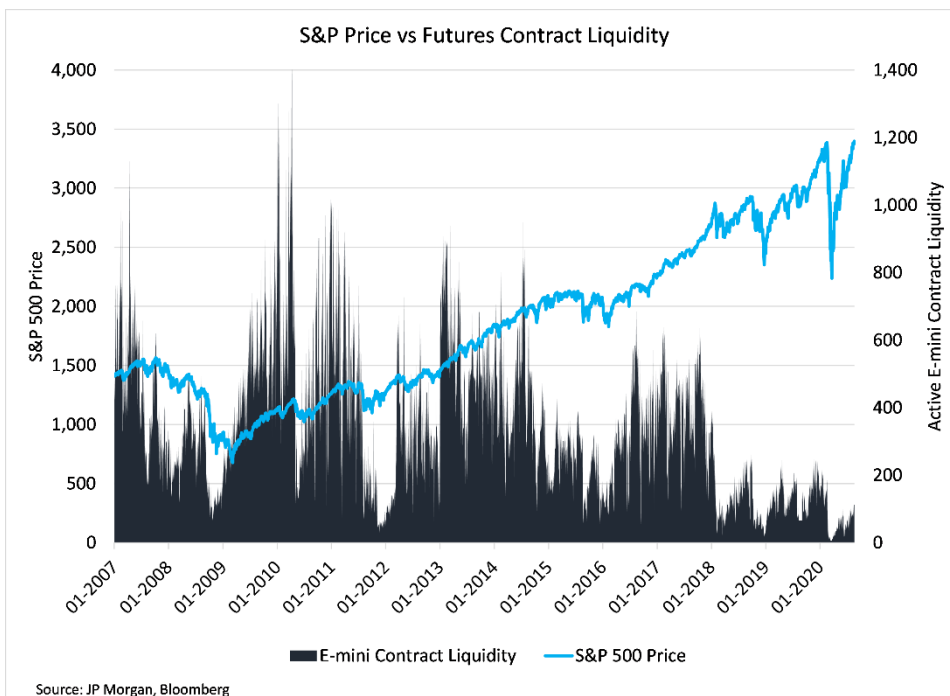
Well if that is not a shout out to Citadel and Goldman Sachs, I do not know what is. Fortunately, this proposal did not take effect, but this decision merely forestalled the continued march of industry market making concentration<sup>4</sup>. Meanwhile, the BIS investigated trends in market-making and prop trading in 2014. Their conclusion:

*This report presents the Group’s findings. It identifies signs of increased liquidity bifurcation and fragility, with market activity concentrating in the most liquid instruments and deteriorating in the less liquid ones. Drivers*

*are both conjunctural and structural in nature, and it remains difficult at this stage to provide a definitive overall assessment. – CGFS Papers No 52, November 2014<sup>5</sup>*

While the market is ablaze with theories of the Fed flooding the market with capital “L” liquidity (note this is increasingly untrue), this liquidity is nowhere to be found in futures markets. The lack of liquidity is troubling given the price recovery of the S&P 500. At the same price level today as February 2020, we see roughly half the order book depth.

Order book depth is critical for option market making activities as market makers must either match natural buyers with natural sellers or else create new option contracts synthetically to match the “other side” by delta hedging with futures. It’s in this simple “either/or” that we find the secret to the very exciting “explosion in call option buying.” A careful review of the option volume data on the OPRA exchanges (Chart 2) highlights that we saw step functions in option contract volumes in the aftermath of February 2018 Volmageddon, December 2018 and then March 2020. In each vol spike situation, the provision of options via volatility selling strategies fell markedly. As a result, instead of matching natural buyers and sellers of options, market makers were forced to create options and hedge these positions with futures/single stocks. Step in the low liquidity melt-up environment that makes this more difficult and, as a result, the monopolistic market makers must extract the increased cost of hedging from market participants by raising the “price” of these options which Black-Scholes models interpret as an increase in implied volatility. Importantly, if we look at the pricing of call skew relative to put skew over the past month, there is little evidence of an unusual divergence providing further support to the hypothesis that this is market structure rather than raging demand for calls from day traders. How can decreasing liquidity spur a big upside move? It is technical, but basically there is “increased inelasticity” when markets are illiquid. A simple analogy – imagine you are a tourist on a cruise to Morocco. You show up to port late and passengers rush to



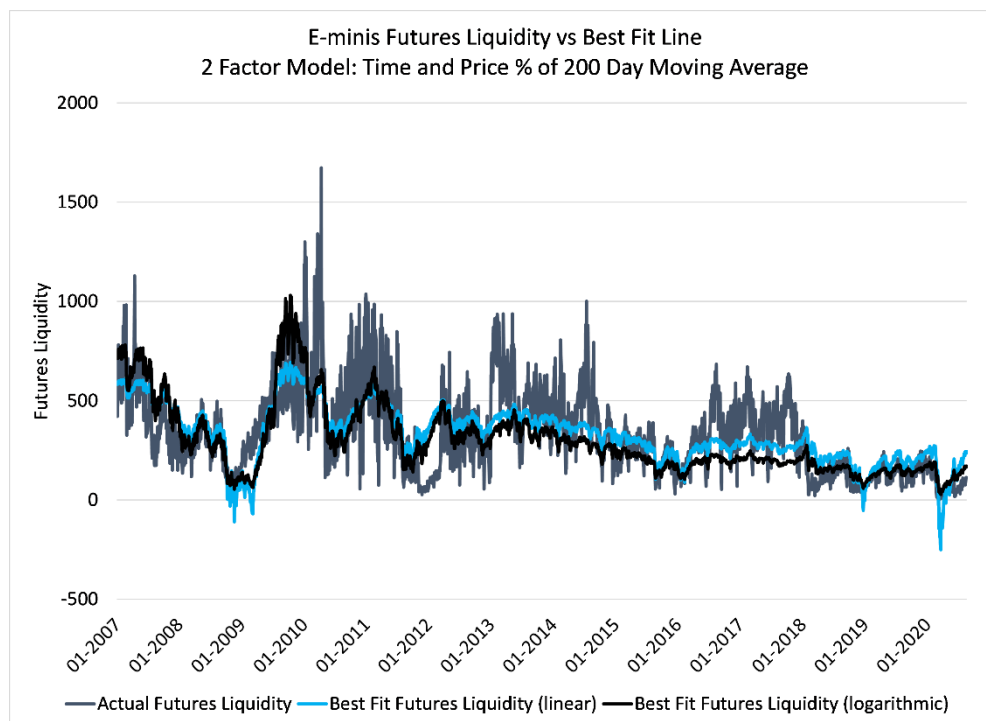
the Souk to buy a rug, only to discover most merchants are closed already. This would drive prices higher on reduced liquidity as merchants are less likely to bargain with you and instead simply raise prices given reduced competition.

### Charting a Path Forward

Careful readers of the Price vs Liquidity chart will note that market liquidity falls during corrections and rises during rallies. Unfortunately, there is also a clear pattern of declining liquidity over time. Combining these two variables, with price vs its 200 day moving average as a proxy for corrections and rallies, we get a remarkably high confirmation via regression analysis. Note the zero P values and high t-stats:

| SUMMARY OUTPUT: Ln(Futures Liquidity) vs Time and Price/200 Day MA |             |                |                 |             |                |           |             |             |  |
|--|-------------|----------------|-----------------|-------------|----------------|-----------|-------------|-------------|--|
| <i>Regression Statistics</i>                                       |             |                |                 |             |                |           |             |             |  |
| Multiple R   | 0.715284    |                |                 |             |                |           |             |             |  |
| R-sq   | 0.511631    |                |                 |             |                |           |             |             |  |
| Adj R-Sq   | 0.511347    |                |                 |             |                |           |             |             |  |
| Std Err  | 0.554922    |                |                 |             |                |           |             |             |  |
| Observatio   | 3434        |                |                 |             |                |           |             |             |  |
| <i>ANOVA</i>   |             |                |                 |             |                |           |             |             |  |
|  | df          | SS             | MS              | F           | Significance F |           |             |             |  |
| Regression   | 2           | 1106.864       | 553.4322        | 1797.216269 | 0              |           |             |             |  |
| Residual   | 3431        | 1056.537       | 0.307939        |             |                |           |             |             |  |
| Total  | 3433        | 2163.402       |                 |             |                |           |             |             |  |
|  |             |                |                 |             |                |           |             |             |  |
|  | Coefficient | Standard Error | t Stat          | P-value     | Lower 95%      | Upper 95% | Lower 95.0% | Upper 95.0% |  |
| Intercept  | 18.90082    | 0.278344       | <b>67.90443</b> | 0           | 18.35508       | 19.44655  | 18.35508    | 19.44655    |  |
| Price vs 200 Day MA  | 5.056487    | 0.11511        | <b>43.92758</b> | 0           | 4.830797       | 5.282177  | 4.830797    | 5.282177    |  |
| Date   | -0.00032    | 6.7E-06        | <b>-48.3745</b> | 0           | -0.00034       | -0.00031  | -0.00034    | -0.00031    |  |

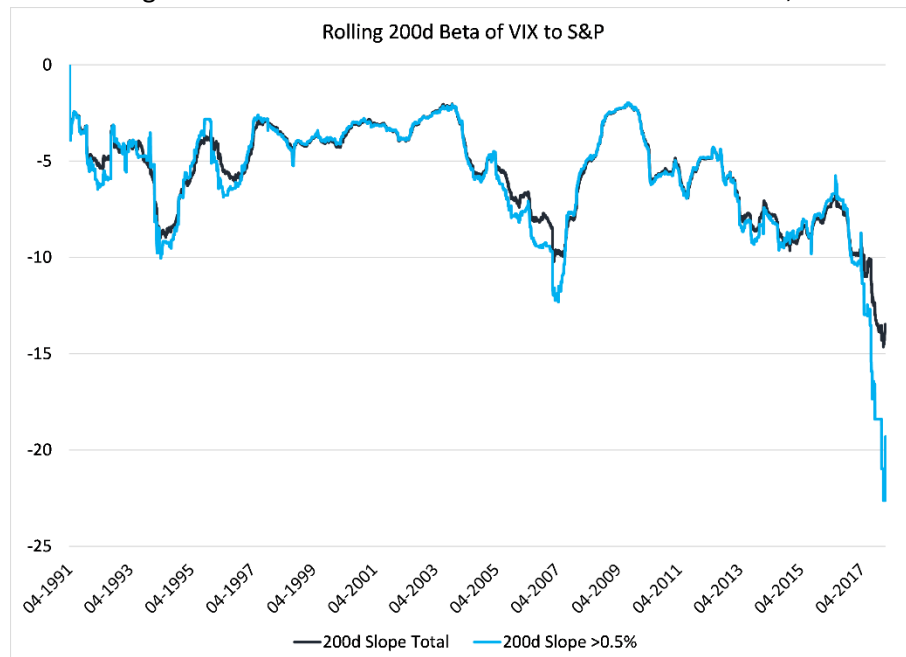
Graphically, we can see the continuous decline in liquidity implied by this simplistic model fits closely with the observed outcomes with one notable caveat – since the Volmageddon events of February 5<sup>th</sup>, 2018 (collapse of the inverse VIX ETF complex) the models have nearly continuously over-estimated available liquidity. This is not the direction of the error we would hope for.



This helps us understand the dynamics we are seeing and highlights the outsized risks that exist. Using a linear model, we should expect zero liquidity on any decline greater than 10% below the 200 day moving average. Using the less volatile logarithmic model, a 10% decline in price below the 200 day moving average would reduce liquidity by two-thirds. Unfortunately, these risks are likely understated.

### **Accelerating Beta**

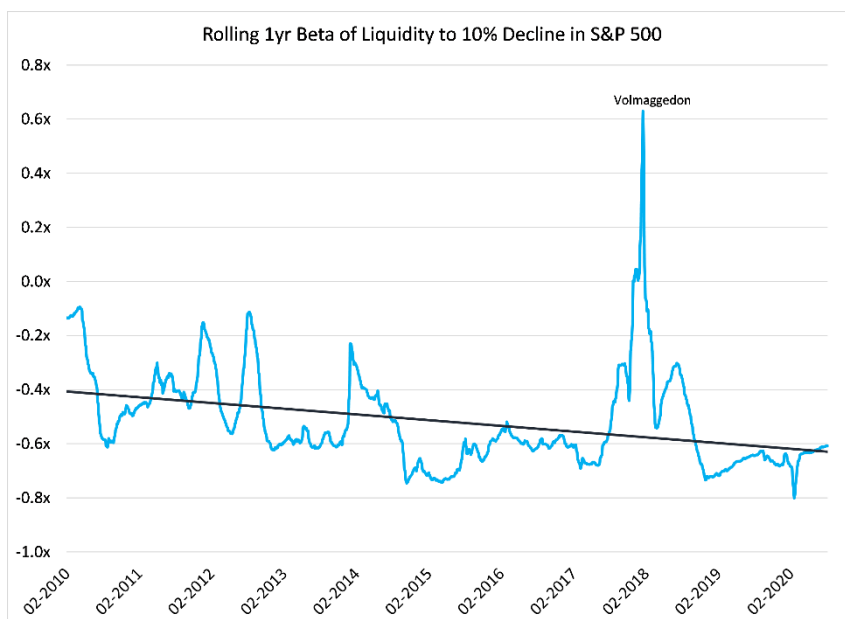
Prior to the collapse of the XIV ETN in February 2018, it was clear that the VIX complex was experiencing an accelerating beta to the S&P. When XIV was introduced in 2010, the beta of the VIX to the S&P was roughly -5.5x.



Each -1% move in the S&P 500 resulted in a +5.5% move in the VIX. As VIX futures trading tied to ETNs accelerated, this beta rose as the crowded market began to creak under the load of the trading volume. By April 2017, the beta broke below prior extremes and began to accelerate. Prior to the events of February 5<sup>th</sup>, 2018, the beta had risen to 22x! It was this analysis that made it clear that all that was required to destroy the XIV was a single day 4% decline in the S&P 500. An event with much higher probability than reflected in options on VIX ETNs.

We are seeing something similar with S&P 500 futures and their liquidity. While the beta has not yet moved into an acceleration phase, the dynamic of increasingly negative beta is clear.

We are also provided a clue as to the feedback loop from the VIX ETNs as S&P futures liquidity expanded leading into the Volmageddon events as the end of day rebalancings from the VIX complex began to leak into the S&P futures. Once the VIX ETN complex ended, the potential for cross-market liquidity evaporated and S&P futures liquidity began to increasingly disappear. There is no guarantee that a similar dynamic will occur this time, but a



clear warning is in place. While markets are making all-time highs, the lack of liquidity rather than a wall of Liquidity (capital “L” from the Fed) is the driver. Markets are increasingly fragile in both directions as our models of passive penetration would suggest is likely.

### **Don't Worry, Buy Vol**

Fortunately, the story does not have to end badly for those who are prepared. While markets have certainly exceeded even our optimistic forecasts from March, the colossal retreat of index volatility has created an opportunity for those who are willing to consider a narrative other than “Fed printer goes Brrr!” We look forward to feedback.



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Follow Michael on Twitter @ProfPlum99

### **End Notes**

- 1) As a pedant, it's necessary to provide a link to monopolistic production [functions](#).
- 2) <https://www.barrons.com/articles/market-makers-in-equity-options-are-vanishing-1496459364>
- 3) <https://www.sec.gov/comments/s7-05-15/s70515-34.pdf>
- 4) <https://alphacution.com/ranking-of-select-us-option-market-makers/>
- 5) <https://www.bis.org/publ/cgfs52.pdf>