



## **IS SHORT VOLATILITY A “CROWDED TRADE?”**

(...that will annihilate the volatility/VIX complex, and take down the equity market?)

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By

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## PART I: BACKGROUND

### THE PREMISES

Over the last several years, and on an increasing basis of late, a topic of debate has entered the realm of trading strategies involving buying and selling “volatility.” Namely, that there exists a condition whereby the popularity of selling “vol” has evolved to a point where there is an unusually large and disproportionate amount of vol sellers relative to buyers. It’s suggested that sellers of vol are, as a group, largely unprotected from the widespread damage that will result from the inevitable large spikes in volatility that occur from time to time. It’s postulated further, by some, that a volatility-driven reckoning event will cause reactionary behaviors on the part of vol sellers that will exacerbate the volatility to a point where it creates a material destruction of the volatility-related trading complex, based around the CBOE Volatility Index (“VIX”), the contagion effect of which will create wide-spread equity market damage.

This paper endeavors to primarily answer the question of whether the short vol trade is indeed “crowded” (as the term was intended to apply); and on that basis, to secondarily address the question of what the likely impact on the volatility derivative and equity complexes will be when volatility begins to exhibit sharp increases, as will happen from time to time.

### PERSPECTIVES

It’s important to note a few things before discussing the topic. The first is where the author is coming from. To be clear, I am an investment manager and run a firm that manages a strategy that is short vol. However, I also manage a different strategy that is indeed long vol. I, and my firm, have no bias to either strategy, in a philosophical or commercial sense. In that regard, you could say we are agnostic as to the preference of the direction of volatility. Our interest in exploring these issues is as a participant in the trading of volatility, with the hopes of providing objective and empirical information, drawing from our experience in this nuanced corner of investment management, for the benefit of the marketplace.<sup>1</sup>

The second perspective we need to consider is where the *short vol > crowded trade > calamity* contention is emanating from. A search online for the term “*short vol trade*” reveals many links to articles and blogs putting forth the *short-vol-as-crowded-trade/impending-vol-pocalypse* themes, mostly written within the year ending August 2017 (indeed we seem to be entering the piling-on stage of short vol bashing). Yet, many of these articles cite the same data and quotations from the same short list of parties associated with the *short vol > crowded trade > calamity* assertion. A few minutes spent looking into these oft-quoted sources (individuals and firms) reveals an identifiable reason for advancing concern around a short vol disaster: self-interest. Namely, that the people and firms behind the argument benefit professionally from a volatility-created disaster, or at least the fear of one.

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<sup>1</sup> This paper is not being submitted to financial journals for publication. It’s intended to be shared without the author’s permission. It was birthed on a ranch in California by an Oregonian avoiding the hoards that had come to his town to observe the solar eclipse of 2017. It has been self-proofread several times, but is most certainly riddled with grammatical errors and typos. The author begs your indulgence.

Specifically, there are three types of *short vol*>*crowded trade*>*calamity* thesis augmenters<sup>2</sup> (that seem to garner a disproportionate share of media coverage in the absence of rebutting voices):

- **Risk Mitigation companies** (that sell derivative overlays and strategies as protection)
- **Subscription-based Newsletter writers** (especially those that cater to the contrarian/fear-driven crowd)
- **Long Volatility strategists** (long vol fund managers or purveyors of subscription-based, long vol trade strategies)

We needn't harbor any ill will towards any practitioner for putting forth a scenario that is designed to illuminate the scenarios that call out the need for their expertise. It's commonplace. The manager of the Emerging Market stock mutual fund has a remarkable consistency on CNBC for putting forth the bullish case for the Emerging Markets—it's the nature of the business. We just need to be aware of the inherent bias of information providers so as to not treat all information objectively without first asking where the provider may be positioned in the benefit/loss equation of their postulation—a great practice to get into.<sup>3</sup>

That's what prompted this paper—I felt that the *short vol*>*crowded trade*>*calamity* scenario was being accepted at face value too easily (perhaps because it's such a compelling picture to paint), and as you will see, I believe the data behind the argument to be specious (although not necessarily being put forth to intentionally mislead). Investors have an insatiable thirst for information, but in the age of sound bites, heuristics, and “fake news,” it's imperative to think critically about the supporting data behind a thesis, biased or not. Often, otherwise conclusive-looking data can be recast differently resulting in an entirely alternative conclusion.

The final perspective is that of the reader. The topic of volatility dynamics is a complex one, and as such, this paper will be of most value to those well versed in the subject matter. While implications of the discussion are broad reaching, and potentially impactful on all equity investors, the paper cannot thoroughly explain the points/nomenclature/cast of characters to the level necessary to be equally educating to all readers of this paper.

## VOLATILITY AS AN ASSET CLASS

While the concept of volatility trading as a distinct asset class is a relatively new one (and not all agree that volatility trading should be afforded the title of “asset class”), volatility trading has been around as long as there have been futures and options available to trade. This seems to be lost in some of the discussion around vol today, as points about the growing popularity of short vol as a new trade idea seem to be owed largely to the focus on the relatively young volatility Exchange Traded Products (as will be discussed). In every trade involving an option or future, there is a buyer and seller of volatility. Long before the marketplace introduced volatility/VIX-related instruments (the “VIX complex”), investors were buying or selling vega (dollar exposure

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<sup>2</sup> I have elected not to single out individuals associated with these points, and am foregoing *ad hominem* attacks on the people on the other side of these arguments, instead focusing on introducing information heretofore not widely shared, to round out the dialogue for interested parties.

<sup>3</sup> It is interesting to note, however, the tone often used to convey the points about short vol. You encounter phrases like “short vol carry monkeys,” hear of hopes that short vol traders will have their “faces ripped off,” and other acerbic or patronizing references about vol sellers that seem all too familiar but still totally unnecessary. I prefer empirical support above hyperbole when arriving at an analytical conclusion of someone else's work.

to volatility) and vol sellers were those that wrote puts, calls, butterfly, condors, spreads, and straddles or sold futures or the wrote risk side of a variance swap. In fact, the vast majority of “short vol” dollars exist outside the VIX complex. Shorting vol is hardly a new idea.

## EQUITY VOLATILITY VS. THE VIX COMPLEX

*“The VIX story is written by SPX options, not by VIX options/futures/ETPs.”*

No in-depth discussion of volatility can take place without fleshing out two fundamentally simple, but often misunderstood, concepts as the basis for the rest of this paper:

- 1) You cannot trade the VIX. The complex of VIX derivatives cannot be arbitrated to VIX.
- 2) The VIX fully informs the VIX complex...but it does not work the other way around.

I said at the outset that this paper is not addressed to readers uninformed as to volatility and VIX. But I am constantly shocked to read things put forth by otherwise sophisticated sounding writers that make statements revealing that they don't fully understand those two points. When you truly “get” these two points, you'll start to see how often these concepts are bastardized in arguments around volatility.

Equity volatility can be projected *ex ante* and measured *ex post*. The VIX is a measure of projected (implied) volatility (“IV”) derived from option prices on the S&P 500 (“SPX”). IV is proxy for (but not measure of) option demand, be they call or puts. It is a prediction of how much up-and-down movement the market is likely to experience over the option's term. The greater the expectation of movement (volatility), the more option strike prices that may prove profitable to the option buyer. The more chances of profitability, the more desirable the option. The greater the desirability, the higher the premium. Thus, demand pushes premium pushes IV.

Because the interest in S&P 500 options (the source of the VIX calculation) is biased towards hedging—trading in long puts (the SPX Put/Call ratio is ~1.75:1)—the demand for protection against market declines dominates the behavior of VIX.<sup>4</sup> Thus, more often than not, the IV of the SPX is a tied to the probability for downside volatility—why VIX is called the “fear gauge.”

The term “VIX complex” describes the vast and growing list of instruments that derive their price from VIX. Each of these securities provides a profit/loss profile tied to the level of VIX measured at some point of time. This includes most notably VIX options, futures, and ETPs.

In conclusion, and at the risk of sounding pedantic, VIX is:

- **A measurement of equity implied volatility, mathematically derived entirely from the behavior of SPX options.**
- **Not tradable nor arbitragable.**
- **Not in any way driven by changes in any instrument within the “VIX complex.”**

Throughout the rest of the paper, I will contrast Equity Volatility vs. the VIX complex in making various points, since they are two different sides of the vol coin.

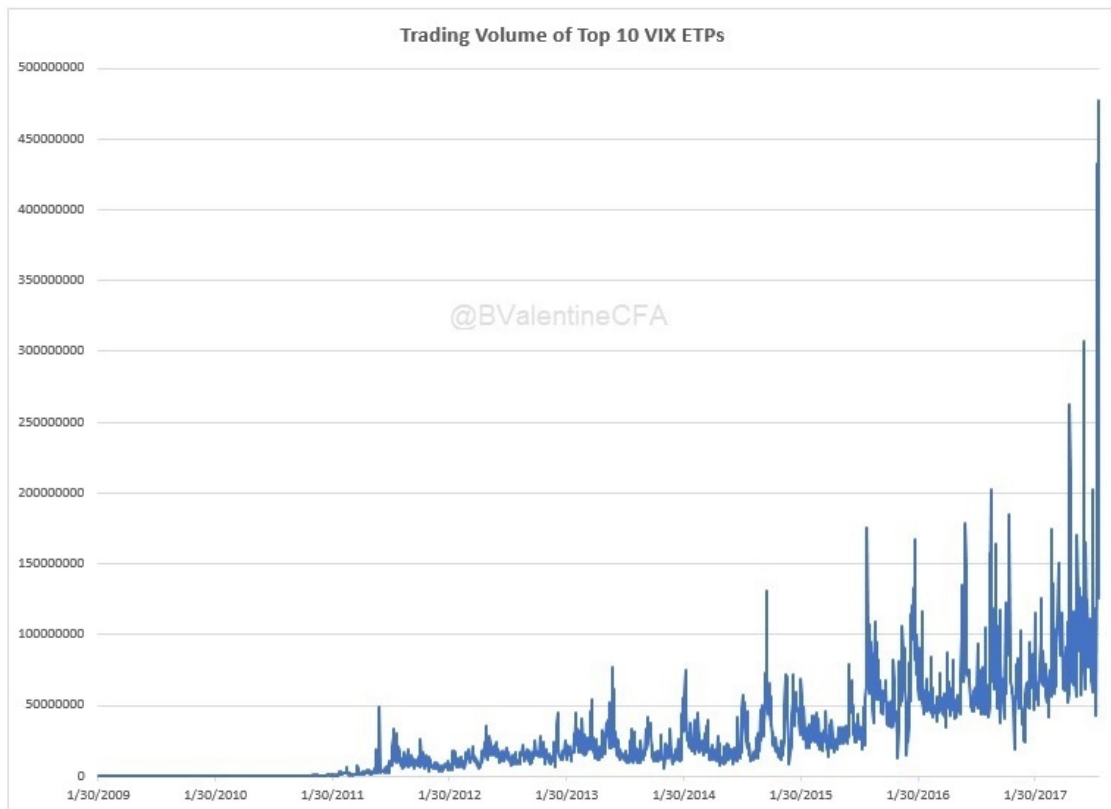
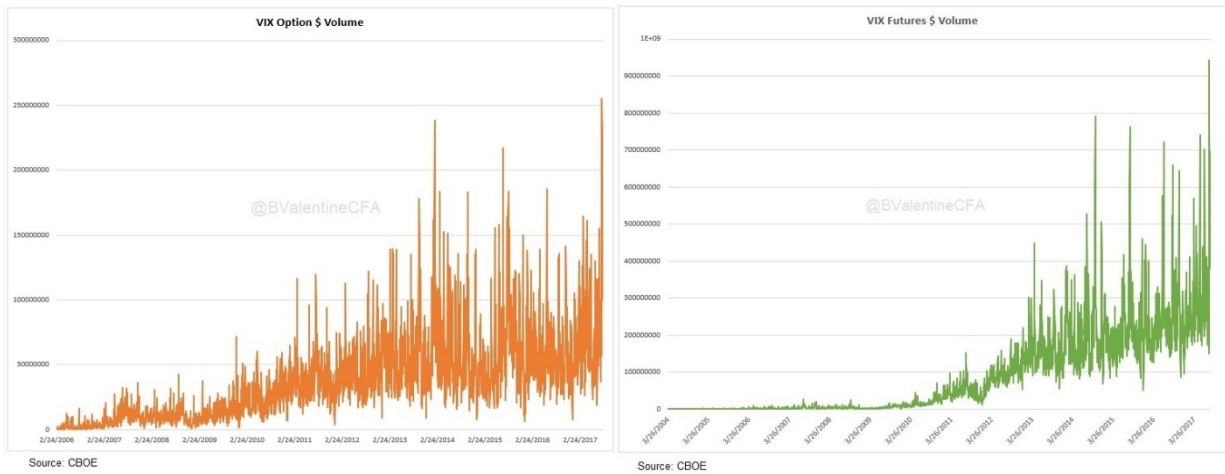
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<sup>4</sup> Though that's not always the case. The post-Trump election saw an inordinate interest in upside speculation via record setting volume in SPX calls, and a drop in the Put/Call ratio to 0.91, leading to the otherwise confounding, but short lived, positive daily correlation between the SPX and the VIX. But in general, the most important tenet of behavioral finance says fear is twice as motivating as greed, so option bias will always tilt towards hedging.

## THE PROBLEM WITH PRESENTING DATA NOT TO SCALE

Largely to the credit of the efforts of the CBOE, the popularity of the VIX complex has grown exponentially. The daily trading volume of VIX options, futures, and ETPs continues to grow by leaps and bounds, and shows no sign of slowing. This fact alone is alarming to some, but when compared to the notional value of the rest of the over-the-counter derivative markets, the VIX complex is still relatively small and is unlikely to ever come close to eclipsing the equity/index derivative complexes.

Nevertheless, the hyperbolic growth of VIX derivative trading creates a dilemma when trying to put current patterns and trading loads into historical context. To get an idea of the growth trajectory of VIX derivatives, consider the charts below of VIX options, futures & ETPs:



Source: Yahoo! Finance

The explosive growth of the VIX complex has clearly not gone unnoticed, especially the popularity of the ETPs, whose growth is the most extreme, and the most visible. Indeed 25% of all the volume ever traded in VIX ETPs has taken place in the first eight months of 2017.

Thus, comparisons between today and the dawn of the VIX complex are statistically hollow, unless properly scaled to account for the change in the base over time.

To help illuminate the point, we can draw a corollary to the Dow Jones Industrial Average. In the summer of 1982, the Dow Jones traded at around 2172. Today, it trades at 21,722. A 200-point move in the Dow back then was a 9% change—today a 200-point move is less than a 1% change. If, for whatever reason, I was motivated to “prove” to you that the stock market fluctuated 10 times as much today versus 1982, I would show you a chart comparing the average daily *point* change by the Dow in 2017 vs 1982. You’d have the impression that the Dow is ten times more volatile today than it was back then. But that’s a scale problem. The Dow was much more volatile, by *percentage* change, the measure that is relevant, in 1982 than in 2017.

As you will see, much of the data intending to alarm, put forth by the *short vol>crowded trade>calamity* supporters, becomes unalarming when properly scaled.<sup>5</sup>

## PART II: IS SHORT VOL “CROWDED?”

### WHAT IS A “CROWDED TRADE?”

*“Short Vol is popular, not ‘crowded.’ Know the difference...”*

The notion that the short vol trade was “crowded” appears to have originated out of the contrarian camp. Naturally. That’s what contrarians do—look for trade ideas that have become overly popular, to be thus avoided or indeed traded against. But as a contrarian myself, I have to be cautious not to confuse trade idea popularity with a true “crowded trade,” for the opportunity is much easier to extract from the latter as opposed to the former. Lots of trade ideas start hot, then become less popular over time as the perceived opportunity gets diluted away. They weren’t crowded and don’t blow up spectacularly—the contrarian bet against is left wanting.

Shorting vol today isn’t crowded—it’s popular—and that’s provable, as I’ll show in a moment.<sup>6</sup> Some of the disagreement around the “crowded” notion arises from the fact that a “*crowded trade*” doesn’t have an exact definition. But as a long-time investment manager, that knows a lot of other long-time managers and traders, and as a professional short-seller of stocks and derivatives, I can tell you that you’ll find plurality of agreement around the following notions as stages and components of a “crowded trade”:

- **Begins with the illusion of a low-risk/high-reward opportunity.** Every true “crowded trade” starts by flying in the face of Modern Portfolio Theory—that the relationship between risk and reward has broken down. This typically advances from a trade idea that originally does quite well, with limited drawdowns, for enough time to attract a growing number of participants.

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<sup>5</sup> “How to Lie with Statistics” by Darrell Huff is required reading for any neophyte investment analyst.

<sup>6</sup> In fact, just based on how often the *short vol>crowded trade>calamity* argument appears in the press and online, referring to short vol as ‘crowded’ is anything *but* the contrarian call these days.

- **A disproportionate number of investors on one side of the trade, relative to the other.** As the trade opportunity ages, an imbalance is created. Since every trade has a buyer and a seller, how can there be more on one side than the other? In a crowded trade, a proportionately small number of investors take up the other side of the trade. They are enticed to do so as the “opportunity” gets diluted away, so that the balance of demand is shifted to the other side of the trade.
- **The squeeze.** A crowded trade always involves leverage, be it in the form of margin on the long side, or massive short interest on the short side. As the trade opportunity disappears, the crowd begins to leave the trade—but not in an orderly fashion. There is a liquidation panic that creates its own feedback loop resulting in massive destruction to traders, collapse of the related trading complex, and often contagion to other markets.

By contrast, popular (or “consensus”) trades are those that shine brightly for a while, but are ultimately short-lived and end badly for the invested; but they don’t involve a system-wide short squeeze/margin call, they don’t collapse their complexes, and don’t create a contagion effect.

There are many popular trades over time, but few true “crowded trades.”<sup>7</sup> The term “crowded trade” gets bandied about far too casually today. A Google search for “crowded trade” reveals, in addition to “*short vol*,” references to the FANG stocks, the NASDAQ stocks in general, and, would you believe, “*passive investing*”? Long tech stock positions (without high margin levels), and index funds, hardly rise to the true meaning of a “crowded trade.” But these areas have done well, and seem to draw the ire of the contrarian crowd (given their single-stock and value biases).

It is clear that as of August 2017, short vol meets the first criteria of a “crowded trade”—it’s done well for last several years, appears to be low-risk/high-return, and has become pedestrian. But absent the other criteria, it must be regarded as popular, not crowded.

So, is short vol disproportionately imbalanced and subject to a squeeze? Would you believe we can measure those things? Let’s do so, starting with the equity volatility side of the equation.

### SHORT VOL – EQUITIES (THE VOLATILITY RISK PREMIUM)

The Volatility Risk Premium (VRP) represents the difference between the level of implied volatility and realized volatility of options. VIX is a measure of implied volatility. Historical (realized) volatility (HV) is based on the lognormal standard deviation of returns. The spread between IV and HV represents the compensation that sellers of volatility (option writers) received relative to buyers of volatility (via options).

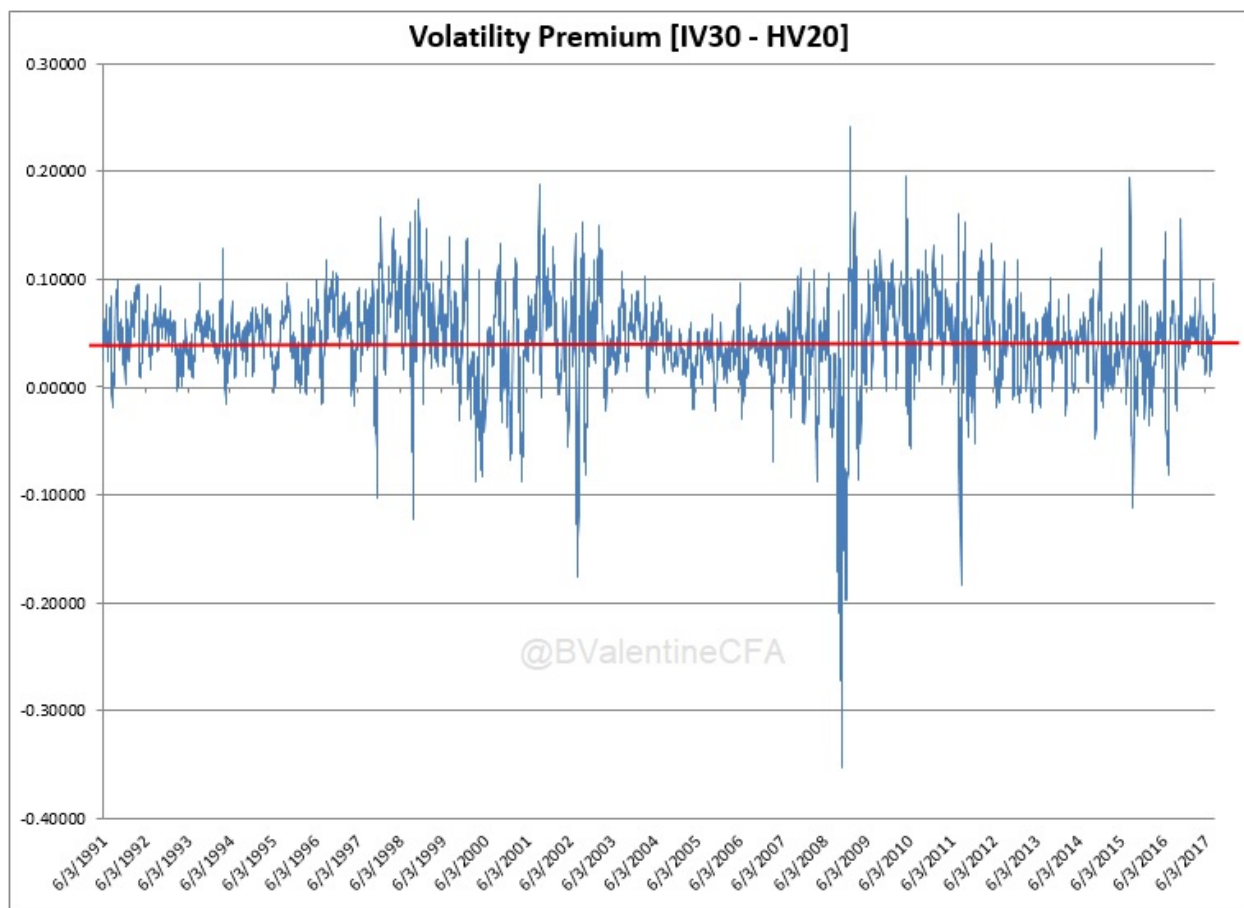
The risk profiles are different between buyers and sellers of options. The total loss that an option buyer endures is the option premium. The total loss of an option writer is unlimited. Thus, option sellers demand, and receive, compensation for that asymmetric risk. That is manifest in

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<sup>7</sup> Examples of crowded trades include the Collateralized Debt Obligation/Financial Crisis, junk bonds that led the S&L crisis, Internet stocks in 2000, Emerging Market currency in 1997, and Russian debt in 1997, among others.

the VRP. The VRP changes over time, and represents, after the fact, how richly priced options were compared to the resultant options variability—in other words, their “expensiveness.”<sup>8</sup>

Below is a chart of the VRP, comparing implied (projected) 30-day volatility (using VIX) to realized (historic) volatility (HV20).<sup>9</sup> The red horizontal line represents the long-term average VRP level: about 4%.



Source: Yahoo! Finance

As discussed earlier, the IV of an option is a proxy for (but not a direct measure of) option demand because of the unique relationship between expected volatility and option desirability. The greater the option demand relative to supply, the higher the IV; thus, the more option buy-pressure relative to sell-pressure, the greater the IV—and *vice versa*.

The VRP is a measure of balance, then, between long vol and short vol. If the *short vol > crowded trade > calamity* thesis was true, there would be a disproportionate amount of option supply relative to demand (options writers versus buyers, or short vol versus long vol). And that would be reflected in falling IV compared to HV.

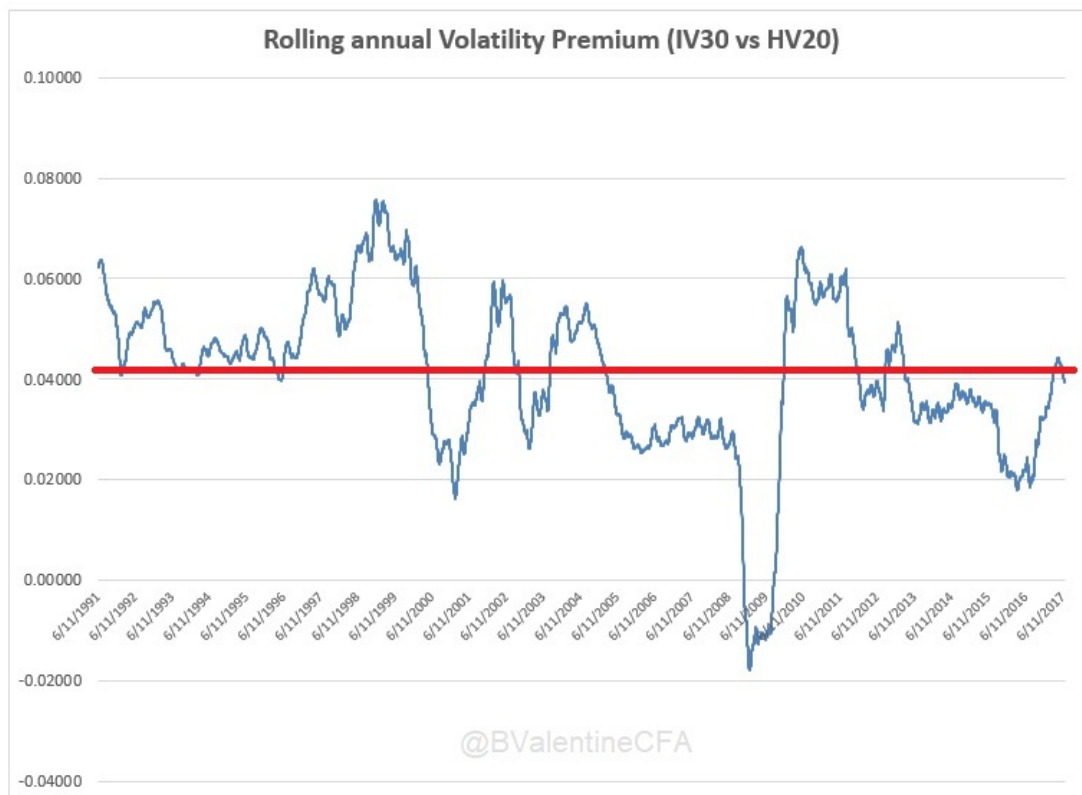
<sup>8</sup> For much of 2017, the VIX has been low, leading some to conclude that all options are “cheap.” But realized volatility has been even lower, and viewed from a VRP perspective, options have been rather expensive, despite the low level of VIX. This losing proposition drives option buyers away, and contributes to the high elasticity of options as will be discussed later around the “new VIX.”

<sup>9</sup> Implied Volatility here is VIX, not IV30 of ATM SPX options. VIX is typically higher than ATM IV30 because it gives greater weight to OTM options which have higher IVs. Implied vol is measured in calendar days, while Historical (realized) vol is measured in actually trading days. Thus, IV30 and HV20 represent about one calendar month.



In other words, **if short vol had become truly crowded, the VRP would have disappeared, and perhaps gone negative.** This one concept wholly refutes the notion that the short vol trade is crowded, at least within the equity market (*we'll discuss short vol in the VIX complex next*).<sup>10</sup>

While you can visualize in the chart above that there has not been a material erosion in the VRP, the chart below makes it a bit clearer by creating a trend for the VRP. Below, it's the rolling-annual, 30-day VRP. You'll see that the trended VRP is at normal levels, and notably positive.



Source: Yahoo! Finance

### SHORT VOL – VOL COMPLEX (ETPs)

Discussing short vol within the VIX complex affords us an opportunity to review the most often-referenced data (charts), used in support of the *short vol*>*crowded trade*>*calamity* claims. In making their case, VIX ETPs are often used as evidence of short vol interest overtaking long vol interest. Charts like the one below imply as much:

<sup>10</sup> Nearly all of the *short vol*>*crowded trade*>*calamity* arguments are based on what's going on within the VIX complex, not the equity market. If "short vol" were truly crowded, it would be happening in equity derivatives (VRP<0). For many, a more accurate description of their point might be: "*Short-VIX-future-trading is crowded*" — but that doesn't exactly roll off the tongue.



It is meant to suggest that XIV (the short [or “inverse”] vol ETP) is more widely held than VXX (the largest long vol ETP). But the trick here is the word “traded” above—which means daily trading volume--not net vega, or assets under management. Who cares about trade velocity? Clearly it bounces around. For all you know, those are shorted shares of XIV (*we’ll get to shorted ETPs next*). The reality is that on a dollar basis of assets under management (table below), VIX ETPs are more than *twice* as long VIX futures, as they are short.

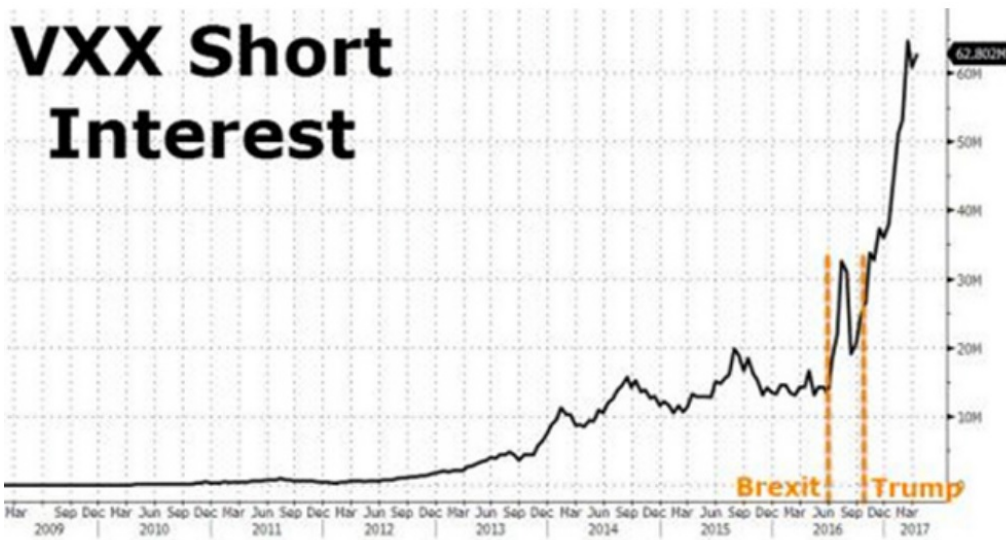
#### VIX ETP Assets under Management

8/7/2017			71%	29%
	@BValentineCFA	\$ 4,933,421,474	\$ 3,497,490,229	\$ 1,435,931,245
			Long Vol \$	Short Vol \$
VXX	iPath® S&P 500 VIX Short-Term Futures ETN	\$ 1,519,024,870	\$ 1,519,024,870	
UVXY	ProShares Ultra VIXShort-Term Futures ETF	\$ 525,840,000	\$ 1,051,680,000	
TVIX	VelocityShares Daily 2X VIXShort-Term ETN	\$ 306,410,000	\$ 612,820,000	
XIV	VelocityShares Daily Inverse VIX Short-Term ETN	\$ 652,420,964		\$ 652,420,964
SVXY	ProShares Short VIXShort-Term Futures ETF	\$ 580,900,000		\$ 580,900,000
ZIV	VelocityShares Daily Inverse VIX Medium-Term ETN	\$ 180,420,000		\$ 180,420,000
VIXY	ProShares VIXShort-Term Futures ETF	\$ 160,748,780	\$ 160,748,780	
XIVH	VelocityShares VIX Short Volatility Hedged ETN	\$ 60,496,700	\$ 56,261,931	\$ 4,234,769
VXZ	iPath S&P 500 VIX Mid-Term Futures ETN	\$ 34,599,540	\$ 34,599,540	
VIXM	ProShares VIXMid-Term Futures ETF	\$ 28,567,080	\$ 28,567,080	
XVZ	iPath S&P 500 Dynamic VIXETN	\$ 16,452,240	\$ 11,516,568	\$ 4,935,672
VIIX	VelocityShares Daily Long VIXShort-Term ETN	\$ 14,886,020	\$ 14,886,020	
VMIN	REX VolMAXX Inverse Weekly Futures Strategy ETF	\$ 13,019,840		\$ 13,019,840
VMAX	REX VolMAXX Weekly Futures Strategy ETF	\$ 3,110,000	\$ 3,110,000	
TVIZ	VelocityShares Daily 2X VIXMedium-Term ETN	\$ 2,137,720	\$ 4,275,440	
VIIZ	VelocityShares Daily Long VIXMedium-Term ETN	\$ 1,029,110	\$ 1,029,110	

Source: nasdaq.com

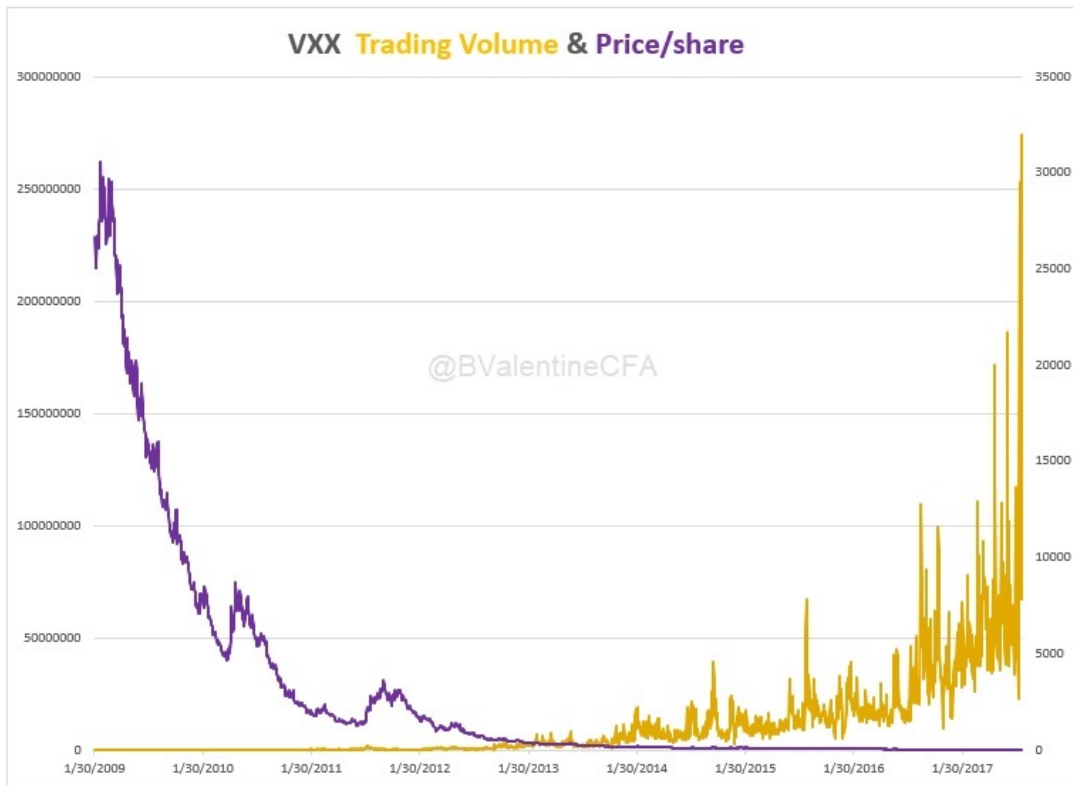
**Like the VRP point, this is irrefutable. You cannot make that case that the VIX ETP exposure is crowded-short-vol—just like you can’t make the case that equity option traders are crowded-short-vol.**

“Yeah but the VXX is heavily shorted! If you’re short the VXX, that has to be considered short vol!” Agreed. It is a well-known fact that VXX is heavily shorted. Here’s a chart of it:



Source: Zerohedge

Seems pretty stunning, huh? But remember what I said about scale? Let's look at the change in VXX's total daily-shares-traded, and on a price-per-share basis, since VXX's inception:



Source: Yahoo! Finance

Whoa, right? VXX has been reverse-split several times and so its shares/trading volume continue to grow exponentially. And its stock price has fallen famously. Scale problem! We can recast it as notional short exposure (shares x price), as in this chart from @kevinmuir that show VXX to be much less sold-short compared to its own past.



Scaling again, we need to look at VXX’s short position relative to daily trading volume (below). Days-to-cover are just 1.4. If you know anything about shorting stock, you know that a short position that can be covered in under two days of trading volume is anything but a pending short squeeze (*there’s that word again*). By comparison, Intel (INTC) currently has 92MM shares short (four times as many dollars short as VXX) and its days-to-cover is 4. No one is calling Intel-shortening a “crowded trade.” But there’s more. Check this out fully:

\$ Short - Short Vol ETPs> \$ 2,556,190,022  
 \$ Short - Long Vol ETPs> \$ 1,281,674,962

	Shares short	Price	Short	Days to Cover
VXX	76,558,100	\$ 12.10	\$ 926,353,010	1.4
UVXY	5,109,200	\$ 33.61	\$ 171,720,212	0.3
TVIX	10,011,000	\$ 18.34	\$ 183,601,740	1.1
XIV	15,432,685	\$ 83.11	\$ 1,282,610,450	1.8
SVXY	16,023,900	\$ 79.48	\$ 1,273,579,572	4.1

Source: nasdaq.com, shortsqueeze.com @BValentineCFA

That’s right: the market is TWICE as short the short (inverse) VIX futures ETPs [XIV & SVXY] as it is short the long VIX future EPSs [VXX, UVXY, TVIX]! So yes, there are a lot of shares of VXX sold short—but not in comparison to its trading float, its past, and not compared the shares short position of the inverse VIX future ETPs. **This is not what crowded short vol looks like.**

## SHORT VOL – VOL COMPLEX (FUTURES)

*“There is no such thing a ‘net short.’”*

The following chart has made the rounds of late. It purports to show a massive/record-setting “Net Short” position in VIX futures:



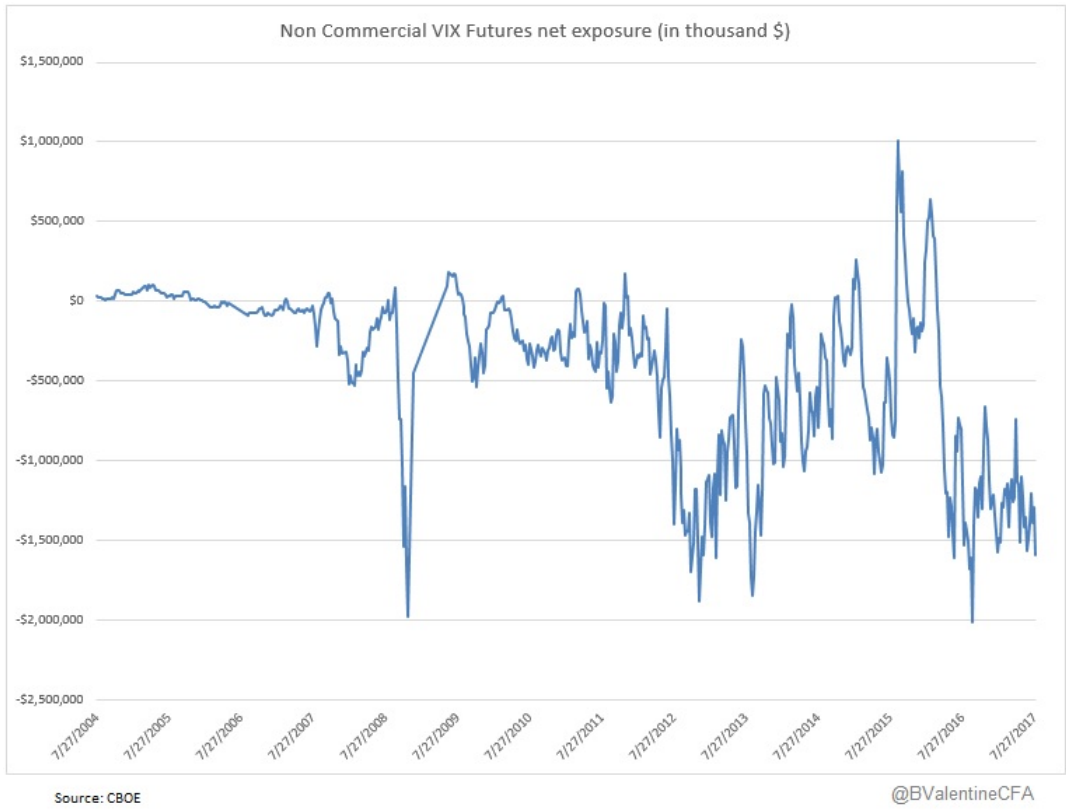
Two important things to note.

First, there's a buyer for every seller so there is no such thing as “net short” in futures. This chart shows the “net” positions of a subset of VIX traders: “Non-Commercial” traders. The other side (that are equally long the same number of VIX contracts) are “Commercial” traders.<sup>11</sup> Commercial traders trade VIX options and futures for a living, typically delta-hedging to harvest VIX option premiums. Non-Commercial traders are large, professional firms including hedge funds and other institutional trading desks. We will talk later about how each of these parties behaves in the face of changing futures prices, but suffice it to say that the chart says nothing about the wisdom or stupidity of this positioning. I have followed Commitment of Trader reports over the years and I can tell you that they offer zero insight into the future direction of a commodity, based on the trading positions of any group of traders—the “smart money vs. dumb money” signal is a myth.<sup>12</sup>

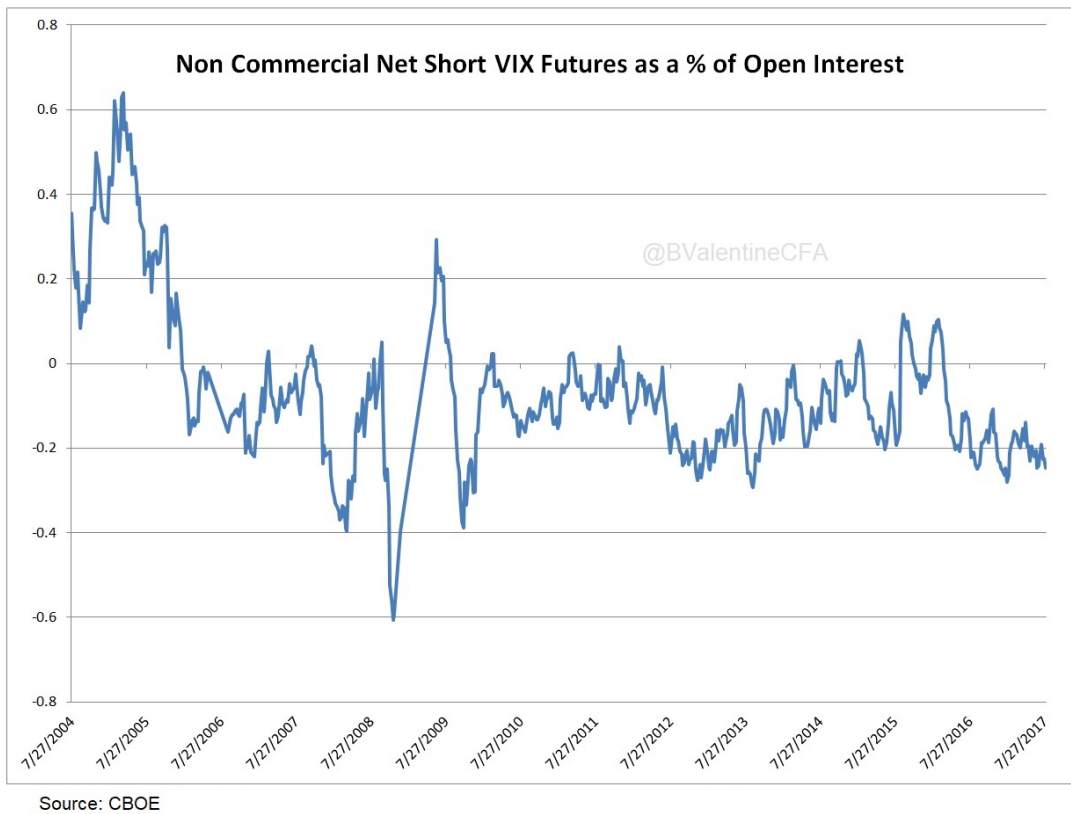
The second thing to note is, again...scale. The chart is used by some to alarm us to a powder keg that is the “net short” position. You will recall from page five (the green chart) that VIX future contract volume has been on a convex/hyperbolic/exponential growth curve. And any follower of VIX knows that the VIX level has recently been abnormally low. So, let's scale this chart two ways: first in dollar terms (contracts x VIX), and then let's look at Non-Commercial contract exposure relative to Open Interest to see how they're postured today relative to the past.

<sup>11</sup> Also, there are “small speculators” that get included in the total contract position count, but as a group the small traders are nearly insignificant in size/impact.

<sup>12</sup> Some commentators refer to Non-Commercial traders as the “dumb money” (I've never understood how someone with no skin in the game is in a position to call those that manage billions of dollars “dumb.” As a group, the “dumb” money certainly isn't always on the losing side of the trade. The concept plays well, but is a myth.



This says that while there are a lot of dollars bet by Non-Commercial traders short the VIX futures, it's not a record-setting position—and it moves around. They've been more dollars-short in the past. Let's recast it again, this time showing the position relative to Open Interest:

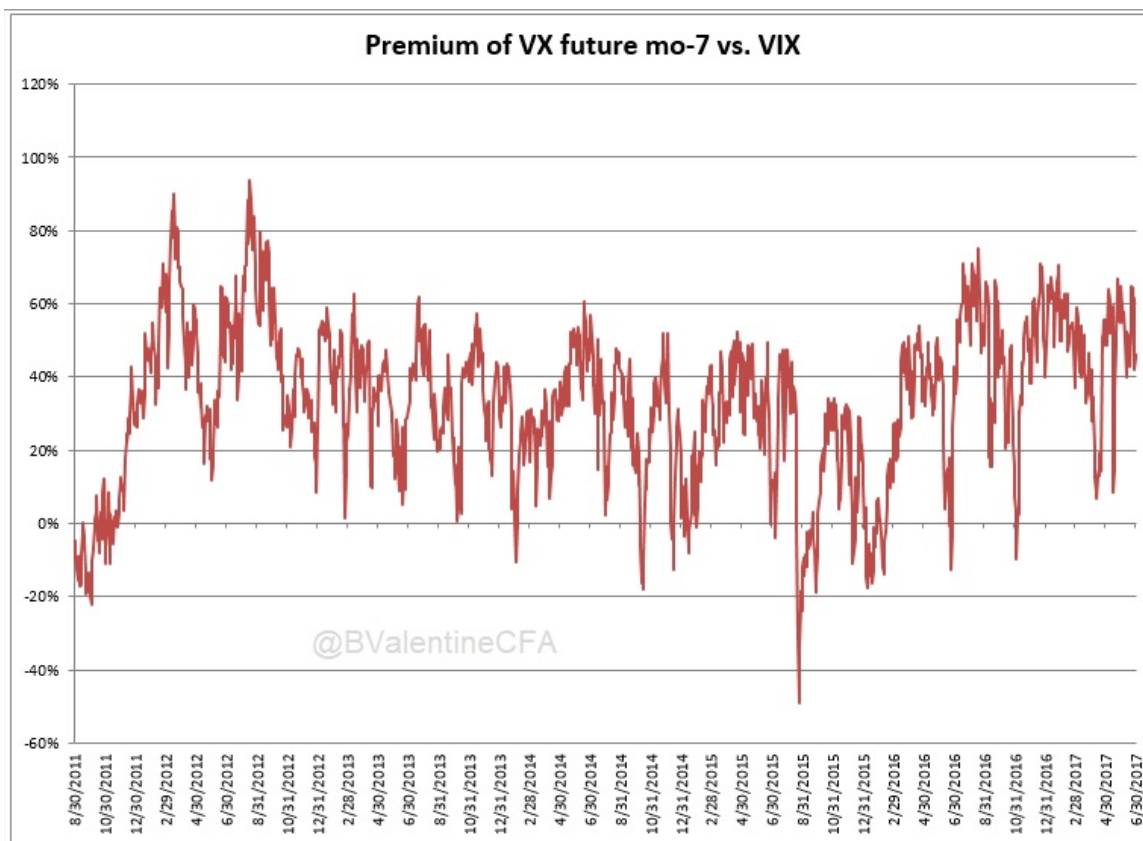


Here we can see that the posturing of Non-Commercial traders is indeed net short, but within its normal range.

But if the point that the *short vol > crowded trade > calamity* group is trying to make is that there's a huge amount of contracts short, again I would remind: there's an equal amount long...further, as we'll discuss in a minute, 150,000 contracts is a small percentage of the daily trade volume.

One rather outlandish argument I've heard, tied to the supposed "net short" futures chart, is that "*Net short vol (the posturing of Non-Commercial traders) is suppressing the VIX.*" Ah, no.

As mentioned, the VIX complex does not at all inform the level of VIX. The VIX level is based on option behavior in the SPX pits. Sellers of VIX futures aren't suppressing anything. Similar to the VRP argument, if there were more sell than buy pressure of futures contracts, there would be no premium afforded sellers of contracts, nor any premium afforded for time (no contango). The seller of a long-dated futures (or the VIX options that trade off those contracts) would not be harvesting a premium. Below is a chart that compares the price level of the seven-months-out VIX futures to the level of spot VIX. The premium remains intact and big—no seller imbalance.



Source: vixcentral.com

To wrap up this section, I'd have you understand the following:

- **Whether looking at equity options implied vol (VIX) or at the VIX complex, the short vol side is popular, but not crowded, as the demand bias remains long vol.**
- **The size of the VIX complex continues to grow exponentially, so all conclusions about short posturing today must be scaled to size. When doing so, the extremeness goes away.**

- **There is tremendous liquidity in the VIX complex driven by long vol demand.**

And I will introduce a fourth concept, germane to the next section;

- **No evidence has been put forth (that I have encountered) to suggest that short vol traders *aren't* hedged against rising vol.**

### **PART III: WHAT WILL A VOLATILITY RECKONING LOOK LIKE?**

Whether short vol is a “crowded trade,” or merely a trade idea of growing popularity, might be a purely academic/semantic argument were it not for the contemplation of what will happen to sellers of vol in periods of rising volatility. At issue is what damage rising volatility will do to vol sellers, the VIX complex, and by extension, the overall equity market.

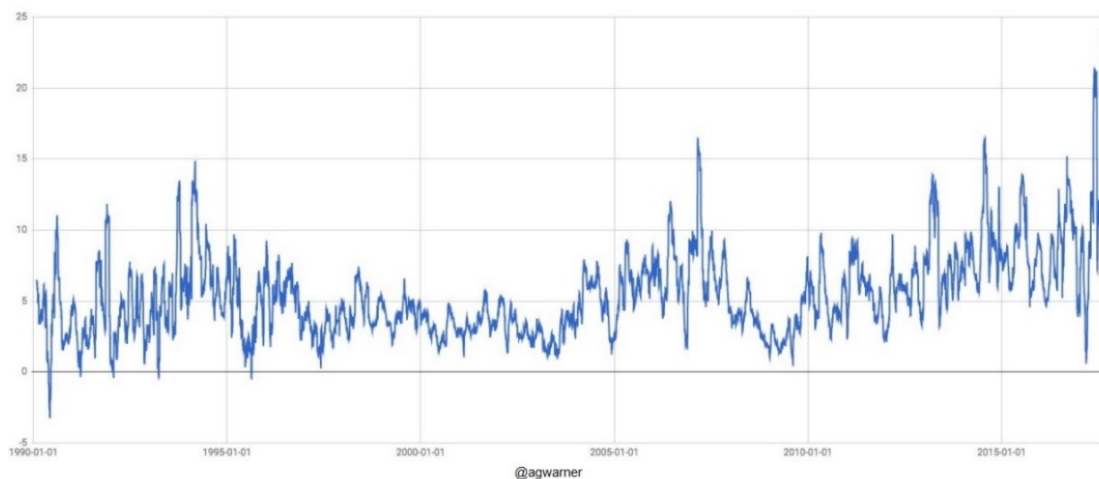
If an abrupt spike in the level of implied and realized volatility causes a material disruption in the VIX complex that spills over and causes significant losses for stocks and/or requires intervention on the part of Federal regulators, then the *short vol > crowded trade > calamity* group will most certainly have been correct in their foreboding warnings. And I will have been wrong.

However, if a large volatility spike causes pain to short vol sellers, but does not implode the VIX complex, and has no systemic impact on the equity market, via contagion, then my contention was correct, and the *short vol > crowded trade > calamity* group overstated their case, erroneously.

Let's start by breaking it up, again, by equity volatility/VIX, and then look at the VIX complex.

#### **EQUITY VOL - THE NEW BEHAVIOR OF VIX**

The negative beta of VIX relative to the stock market has been expanding recently. In other words, these days, relatively small declines in the stock market are creating bigger and bigger moves in VIX. If you follow the market, and have been around long enough, you have picked up on this observation. Below is a chart of the one-month move in VIX per SPX from a recent tweet by Adam Warner (@agwarner) that shows bigger moves than normal recently:





Here's another supporting data point about the highly-sensitive "new VIX."<sup>13</sup> If I asked you what the highest VIX level was, from inception (1990) to-date—excluding the worst four months of the Financial Crisis (10/08-1/09)—and when and why it happened, could you tell me? The first part of the answer is a VIX reading of 53.29 (intra-day). When? August 24, 2015. Remember the horrible events that were happening to cause the "fear gauge" to go through the roof in August of 2015? Me neither. There weren't any! Something about China. The point is that the VIX made a massive move (from 16-53 in two days) on an 8% dip in stocks—the "new VIX."

So, is the new, sensitive VIX indicative of short vol behavior in the VIX complex? No, again, there is nothing to suggest that anything from the VIX complex has anything to do with the elasticity of SPX options. We'll discuss how VIX complex participants lay off risk in a minute, but little of it ends up on the back of SPX options (it mostly flows across derivatives within the VIX complex). Ultimately, it's impossible to know and measure what each group of investors is doing, spanning the equity and derivative markets. We know how some funds and strategies are postured, and how their exposure is tied to market moves, at least in the abstract, but it's impossible to deconstruct 100 Dow points or 10 VIX points to their dollar-weighted derivations and impacts. That said, speaking from 30 years of market experience, I can tell you that the new hypersensitivity of the VIX to the market is likely explained by some combination of:

- **Unusual investor skittishness** – The Financial Crisis is still a fresh memory to anyone who took it on the knee caps. Additionally, the Bull Market is long in the tooth—everyone is anticipating its death. Not wanting to relive the Financial Crisis experience, it doesn't take much of a sell-off in stocks to cause investors to pounce on options for hedging (*hair trigger*). And investors are under-hedged because VRP has been costly.
- **Computer trading and the velocity of transactions** – High frequency trading, algorithmic ("program") trading, and "flash crashes" all increase the velocity of transactions, and price changes, leading to exaggerated volatility.
- **Low VIX and low volatility of volatility (VVIX)** – The chart below shows the sensitivity of VIX to the market, starting from different levels of VIX:



A low level of VVIX is also responsible for outsized moves in VIX.<sup>14</sup>

<sup>13</sup> Ironically, over the last two years, there's been a loudening chorus of suggestion that the VIX is "broken" because it has been too *low*, despite its increasingly larger spikes.

<sup>14</sup> See Andrew Thrasher's piece: "Forecasting a Volatility Tsunami" <http://www.athrasher.com/forecasting-volatility-tsunami/>

- **Institutional rebalance** – Risk parity, annuity rebalance, and institutionally-driven portfolio re-allocation policy leads to abnormally rapid shifts in equities, driving vol.

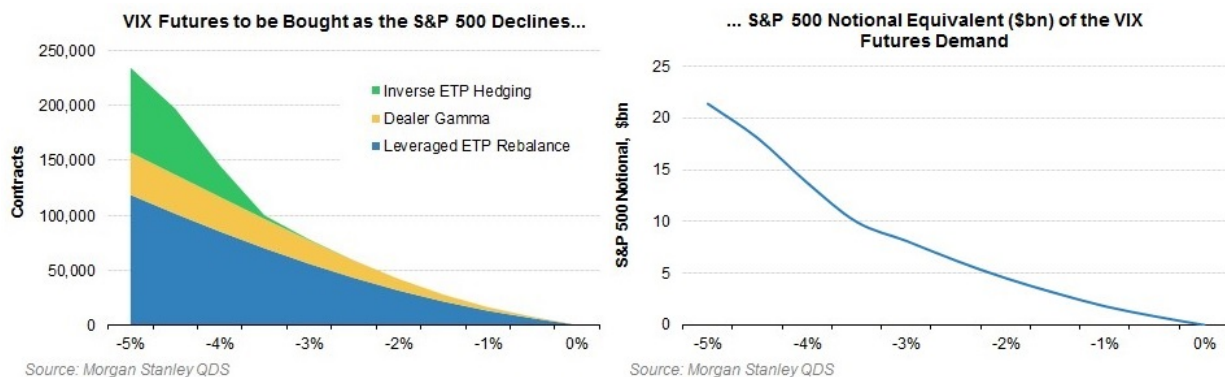
Note that none of this has to do with the VIX complex. And none of it has anything to do with an abundance of sellers of option volatility.

## CHAOS AND THE EFFECT ON THE VIX COMPLEX

The short vol unwind from a material VIX spike will likely proceed on a relatively orderly basis, and stay contained among parties transacting in VIX derivatives, for three reasons:

- 1) **Arbitrage** - Various parties provide benefits including liquidity and price parity between VIX derivatives that are all tied to VIX—most notable are Commercial traders of futures/options and ETP Authorized Participants (firms with the power to create/redeem shares of ETPs that ensure price equalization). Dislocations within the VIX complex disappear quickly because...
- 2) **Everything settles to VIX** – As mentioned *ad nauseum* by now, the VIX trades independent of the complex. In VIX melt-up, where VIX futures spike, they can't stay above the VIX past expiration—they settle to the VIX SOQ. It all gets reconciled.
- 3) **Size and liquidity** – The VIX complex is much less important than most other OTC derivative markets, by size and impact, for the foreseeable future; but it's very liquid with a tremendous amount of daily trading of all its derivatives that prevent liquidity pinches.

In one of the more insightful pieces about the VIX complex,<sup>15</sup> Christopher Metli, Director/Equity Derivative Strategies at Morgan Stanley, pondered the effect of a sharp one-day decline for stocks (and the resultant VIX spike) as to its impact on the VIX complex. He makes an (educated) estimate as to the impact on VIX futures (contracts and notional dollars) from the groups that need to buy futures in a spike: delta-hedged dealers, ETP managers (as part of their daily reset), hedge funds that are short futures, etc. Those figures are below:



Against this exacerbated demand for VIX futures in a VIX futures spike, there will be a lot of futures selling on the other side including long vol investors selling to take profits, financially

<sup>15</sup> <http://www.zerohedge.com/news/2017-07-25/if-vix-goes-bananas-what-it-might-look>

strong short sellers pulled in from the sidelines, dealers with liquidity, etc. Further, ~230,000 contracts are a small part of the daily volume of VIX contracts—900,000 traded a few days ago.

It's important to note the short vol sellers are not as unhedged as some would have you believe. Remember the earlier chart about the supposed “net short” futures position of the “dumb money?” Drilling deeper into the COT report, we see that these sellers of vol are actually hedged to some unmeasurable degree—the “spreading” number (below) represents the number of contracts that have an offsetting pair—38% of the leveraged funds contracts.

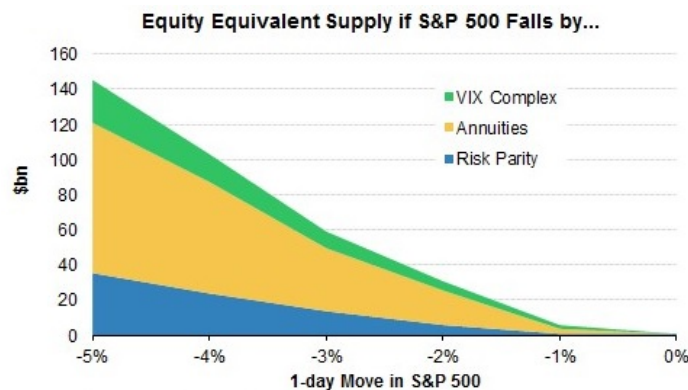
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Traders in Financial Futures - Futures Only Positions as of August 15, 2017  
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Dealer			Asset Manager/			Leveraged		
Intermediary			Institutional			Funds		
Long	Short	Spreading	Long	Short	Spreading	Long	Short	Spreading
VIX FUTURES - CBOE FUTURES EXCHANGE (\$1000 X INDEX)								
CFTC Code #1170E1						Open Interest is 603,600		
Positions								
125,371	44,546	46,517	66,223	80,250	80,974	106,037	176,519	106,287

Source: CFTC

And this does not include hedging that doesn't involve futures (like options, equities, swaps, etc.). It's naïve to think “dumb” funds would be massively, nakedly exposed to billion dollars of vega. Every short vol position we take is hedged—there will be nary a face ripped off at my firm.

Let's visit the concept of scale again. From Metli's report, we see the projected dollar amount of rebalance caused by a material one-day stock decline. You can see that the VIX complex is a small fraction of the dollar movements necessitated by a sharp drop in stocks, compared to Annuities and Risk Parity schemes. And this is by no stretch a complete list of selling-incited by a sharp one-day drop. It gets ugly, but the VIX complex is not at the core.



Borrowing again from Metli, on the prospect of a one-day crisis vis-à-vis VIX (emphasis mine):

“Investors have been crying wolf about the VIX complex for years, and have been wrong so far. And it's important to note that the odds are still heavily stacked against the above scenario playing out and **the most likely scenario is still a graceful unwind of the short vol trade:**

- If volatility is just a little bit higher, the unwind potential is much less – there needs to be a shock when volatility starts at these very low levels
- The unwind in VIX only happens in a 1-day gap lower in stocks – a slow bleed would not create as much supply

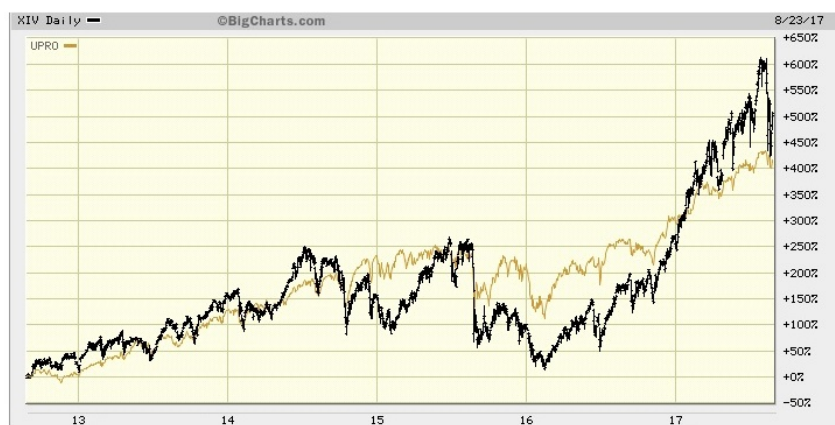
- History suggests a gap from low vol levels is unlikely: the biggest selloff in S&P 500 when VIX was less than 12 was -3.5%, and -2.2% when VIX was less than 11, not enough to trigger this type of unwind. That -2.2% selloff occurred on Feb 4<sup>th</sup>, 1994 when the Fed raised interest rates – bond volatility remains the major risk factor.
- Investors are still not all-in on stocks, with exposures moderate and many hiding out in defensives and Tech – raising the bar for a big selloff in stocks
- Active manager performance this year has been strong, meaning funds are less likely to become forced sellers of positions, which helps keeps volatility tame and can limit the speed of a selloff
- Correlation remains low due to both fundamentals and positioning, and for the index to sell off sharply it would need to rise”

No one is saying it can't get ugly. But the probability of a vol-pocalypse is very low, and problems in the VIX complex are likely to remain contained among traders there.

### THE “XIV PROBLEM”<sup>16</sup>

Much has been made of a disclosure within the prospectus of the VelocityShares Daily Inverse VIX Short-Term ETN (“XIV”) that calls for an “acceleration event” if the XIV declines 80% or more in one day, making XIV the “most dangerous trade in the world”. The event in this case is the termination of trading of XIV at the discretion of its underwriter, Credit Suisse. Since XIV is a note, CS would accelerate the maturity and pay out its holders the value of the adjusted note—which may or may not be anything, based on how much the VIX futures went against it.

This is not only not unusual nor sneaky, it's what I would do if I ran XIV. XIV is 100% short the front two months of VIX futures<sup>17</sup> and if your futures position moves against you by 80% (*more accurately an 80% decline per the Indicative Value of the index based on the weighted-average maturity of 30 days between the front two months VIX futures*), you're pretty much toast whether you are in the ETP or owning the futures directly. That's not just a feature of XIV—it would likely apply to any leveraged ETP undergoing such a loss via leverage or a short position. In fact, you can think of XIV as similar to a 3x leveraged S&P 500 ETP, for how it behaves. Below is XIV compared to the ProShares UltraPro S&P 500, an ETP that gives 3x the daily performance of the S&P 500.

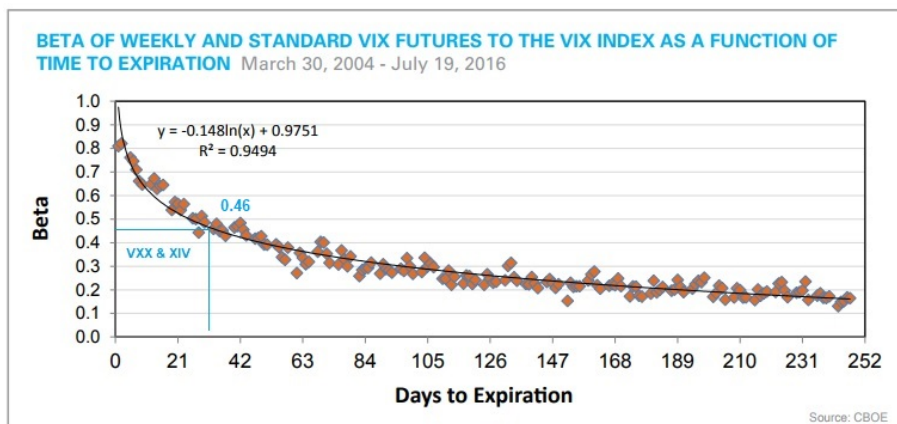


<sup>16</sup> The XIV has been called the “most dangerous trade in the world.” That’s a stretch.

<sup>17</sup> Technically, XIV is not short any futures. It’s a note, backed by Credit Suisse (CS) whose payout is based on an index that tracks a short 30-day VIX futures weight position. But CS may or may not directly hedge the XIV—it also underwrites long VIX ETNs, and could consider the net position in hedging—or not—adding to the opacity of the total gega picture of all investors/traders and who they represent.

The behavior is not identical, but the total return profile is close. UPRO, too, is susceptible to a one-day massive market correction. In fact, there are all sorts of leveraged and inverse ETPs that could go bye-bye in a crash (as is true for naked option writers, stock buyers on margin, etc.). Lots of things can just disappear on the outer reaches of the risk spectrum in a market crash.

Yet, the chances of an 80% decline are quite remote...but possible. Per the chart below, the XIV (and SVXY) have betas of about -0.46 relative to the VIX since their exposure is short the 30-day future (VXX has a beta of .46 for the same reason—but it's in the other direction).<sup>18</sup>



For the XIV to fall 80%, the VIX would have to rise 173% in one day. Since the VIX has been followed, dating to 1990, the biggest single-day move was about 65%. A 65% VIX spike *should* move the XIV down by only 30%. However, the recreated VIX would have jumped 316% on Black Monday, October 19, 1987. So, we should allow for the possibility of a 173%-or-more VIX spike, and at the same time not over-assign the probability to it. It's very unlikely.

The -80% one-day move isn't your foil, if you own XIV—it's a repeat of the Financial Crisis, or something like it. XIV didn't exist during 2006-2008. If it had, this is what would've happened:



<sup>18</sup> You can track how the VIX complex is behaving relative to VIX by watching the beta of VXX to the VIX—if, during a VIX spike, the VXX is up about 46% as much as VIX, things are normal. If VXX is up a lot more than 46%, then chaos has over taken the complex. If VXX is up less than 46% of VIX, there's an exaggerated VIX move.

## PART IV: THE TAKE AWAY

While using VIX derivatives (options, futures, ETPs) to short vol has become pedestrianized, and makes up more dollars than ever before, it has not disrupted the long-standing investor balance which is tipped towards using vol instruments to get long vol. By the nature of being short, an upward move in VIX will require damage mitigation steps that will do real harm to sellers of vol, but this will likely be contained within the VIX complex, and the risk to the equity market has been overstated.

In other words, **Short Vol is popular, not “crowded,” and the inevitable moves against vol sellers does not pose a systemic risk to the entire VIX complex or the equity market.**

### WHAT I HAVEN'T SAID

I expect exactly 0% of the *short vol > crowded trade > calamity* supporters to concede any ground or change their tune as result of this paper—I've been around way too long to harbor that illusion. But that's not to whom this paper is addressed. Lest my words be used against me, let's be clear on what I haven't said, so it can't be hung around my neck later. I did *not* state:

- **...that VIX will stay low and selling vol will remain lucrative.** VIX will rise (and fall) with much greater magnitude in the future than in the past.
- **...that sellers of vol won't get hurt much in the inevitable VIX spikes.** There is a lot of participant involved in the various forms of selling vol—from the responsibly-hedged to those in over their head (financially and sophistication-wise). Blood will be shed when VIX spikes. It just won't upend the apple cart.

### HOW TO HEDGE A SHORT VOL POSITION

**The point of this paper is not to give vol sellers permission to continue to play the low vol/futures contango/rich VRP game with reckless abandon.**

It was to counter a two-part argument put forth (with insufficient empiricism and questionable motives). But the best outcome for the author would come from knowing that the paper helped sellers of volatility mitigate their own risk so as to feel less pain during the reversals of fortune that are always just around the next corner.

### OPTIONS

Whether you are short equity, index, VIX, or VIX ETP options, the solutions are simple. If you're selling options, hedge them. Instead of shorting a straddle, turn it into a butterfly. If

you're thinking of selling a strangle, think condor. If you're short puts or calls, turn them into spreads<sup>19</sup>.

## FUTURES

If you're short index, equity or VIX futures (or for that matter and commodity, currency, or any other tradable instrument that has a future), spread them, or delta-hedge with options. It's that simple.

## VIX ETPs

Whether you're short a long, or long a short—you have two choices.

- 1) Keep the position small enough that you don't lose too much were the ETP to go to \$0. An investor with a 5% position<sup>20</sup> in XIV will not have their life turned upside down by the evaporation of that position and can probably get away with it being unhedged.
- 2) If you're short futures via ETPs, in a meaningful dollar way, hedge with ETP options. While there are several ETPs that offer options, the VXX options are the most liquid and have the smallest bid/ask spreads and may be best suited for hedging different ETPs.<sup>21</sup> You *can* use VIX options, but they don't correlate to VIX ETPs the way some hope.

There are many new VIX ETP trading strategies out there that purport to limit drawdown by giving you exit points before most of the damage is done. Some are well thought out, and look great in a backtest and during this current period of sanguinity for VIX. But a trading strategy that's supposed to get you out of the way of the steamroller should not be relied upon to work as efficiently in the future as it would have appeared to do so in the past. If you follow a trading strategy to trade short vol, you should still hedge your trades (this is uniformly applicable to any high-risk strategy). It will eat into the return, but you'll live to see another day when vol spikes.

## THE FUTURE OF VOL TRADING AND VOL PRODUCTS

I think it's safe to say that the demand for, and bias towards, volatility, whether traded for profit or hedging, will always lean to the long vol side. Sellers of volatility will always be afforded some premium, and this will be a necessary across increasing numbers of asset classes as more and more opportunities evolve to hedge and speculate. ETPs will probably continue to provide a conduit to entice more and more buyers and sellers of vol. This is a very good thing for the markets. Two sides of every trade ensure that prices reach their natural equilibrium, and there's no reason to think this won't continue. The market takes care of itself.

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<sup>19</sup> Obviously, there's a role skew plays in the profitability analysis of naked vs. protected option writes, but here we're just talking risk mitigation.

<sup>20</sup> I chose 5% arbitrarily—everyone's risk tolerance is unique. I am not giving anyone permission to buy 5% of any ETP and not hedge it. I'm just saying if you're not going to hedge, don't bet what you can lose (entirely).

<sup>21</sup> If you're not hedging VXX, XIV, or SVXY, you'll need to adjust your VXX option contract count to best approximate the ETP you're hedging. For example, if you're short UVXY, you'll need about twice as many out-of-the-money call dollars as you would if you were hedging VXX.

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