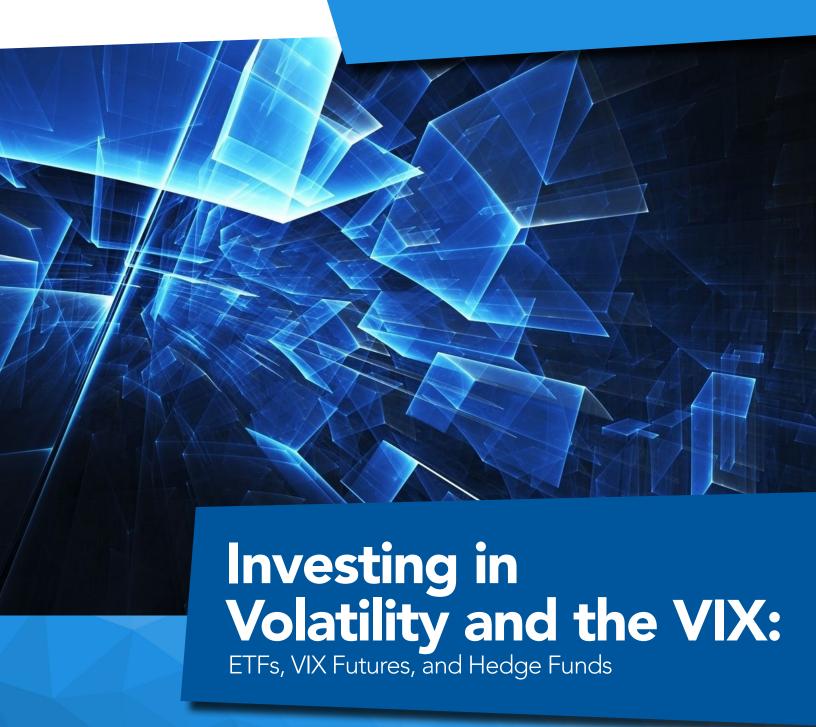


Stop fighting volatility, learn how to *do something about it*





Everything you need to know about the VIX

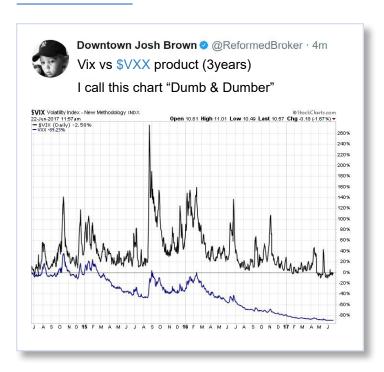
It's hard to imagine now, but we didn't used to see the VIX quoted in the Wall Street Journal, CNBC ticker, and Bloomberg terminals like we do these days. It's been 20 years in the making, and it's now common to hear reports of the VIX at multi-year lows on the news and hear investment managers speak about volatility regimes with the VIX above/below 20, for example. Yes, the VIX has cemented itself as the defacto volatility gauge just as the Dow (or S&P) is the defacto stock market gauge.

What's of infinitely more interest to investors, however, is how the VIX has become something much more than just an index. There are now VIX Futures and Options on VIX Futures, and a whole host of exchange traded products attempting to track the VIX to the upside, downside, levered, long dates, and more. And last, but not least, hedge funds, quants and algorithms that now use the structure of the VIX to find returns with or without the fear and volatility typically associated with the VIX.

Nobody ever accused the financial industry of lacking innovation (even if it is often tainted with a negative connotation and called financial engineering), and VIX products and ways of producing structural alpha out of those products are just the latest example of this. It's a world with incredible opportunity, but also a world pitfalled with danger. Just take a look at the VIX chart with the VXX tracking ETF overlaid onto it, in what blogger The Reformed Broker titles "Dumb and Dumber." The VIX is roughly where it started, while the VXX is down more than -80%.

So before tackling the VIX and the dozens of ways to get exposure – let's dig into how the VIX actually works and learn a little bit more on how the products using and tracking it are designed, so your tagline can be upgraded to 'Smart and Smarter' (which come to think of it would have been a better Dumb and Dumber sequel – where they take some intelligence potion or something).

Fig. 1: Dumb & Dumber



The History of the VIX

It's been nearly a quarter of a century since the CBOE launched the VIX. Like most inventions, the VIX was created out of necessity. As the Wall Street Journal puts it in this article:

The VIX was conceived after the Black Monday crash in 1987... The measure used stock-market

bets, known as options, to gauge expectations for the speed and severity of market moves, or what traders call volatility. Options prices rise and fall based on the perceived odds of a payoff.... [and]... options prices fluctuate constantly as traders react to news and reassess their risks. Those prices feed into the VIX.



Armed with all of this data of the option prices and their reactions to news, the largest options exchange – the Chicago Board Options Exchange – launched the VIX as an index in 1993. But there it stayed as just a way to gauge market sentiment for nearly 20 years, until Mark Cuban (yeah, that Mark Cuban...we weren't expecting him to be part of this story either) entered the picture in 2002.

... newly minted billionaire Mark Cuban called Goldman Sachs Group Inc. looking for a way to protect his fortune from a crash. Because the VIX typically rises when stocks fall, he wanted to use it as insurance. But there was no way to trade it.

Devesh Shah, the Goldman trader who fielded the call, says he instead offered him an arcane derivative called a "variance swap," but Mr. Cuban wasn't interested.

Goldman Sachs is many things, but one thing it seems to do well is realize that a billionaire wanting something is probably a good place to start when thinking of new products, and sure enough...

Lamenting the lost opportunity, Mr. Shah met up with Sandy Rattray, a Goldman colleague and erstwhile indexing buff with a knack for packaging investment products. What if, the pair speculated, they could tap the VIX brand and reformulate the index based on their esoteric swaps?

Shah and Rattray ran with the idea, coming up with a reformulated version of the VIX which could better be productized, and "handed it over" (that's all we can find on the deal, but surely they sold it for something... we hope) to the CBOE, who eventually launched VIX Futures in 2004, followed by VIX options in 2006. As an aside, Mr. Shah is now the CIO of Man Group, who knows a thing or two about futures markets via their purchase of AHL (see our History of Managed Futures for more on that).

Bring on the Volume

We're not sure if anyone at the CBOE would have imagined the runaway success VIX futures and options when it first launched, when the contract mostly languished unknown and unloved by investors and traders.

But then along came the biggest financial crisis since the Great Depression, sending the VIX screaming higher, reaching a peak in the 80s during the 2008-2009 financial crisis (representing a monthly move of 23% in the S&P), when markets were moving more than 5% a day and 20% monthly moves seemed like a realistic possibility.

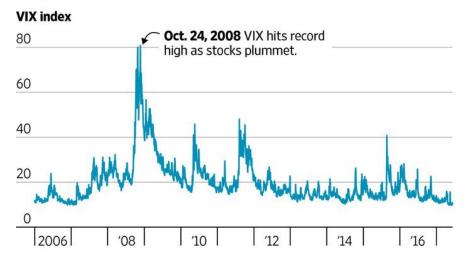
That spike in volatility led to more Cuban-like interest in protection, which led to some more financial product engineering/innovation/development in the form of Barclays PLC launching the first exchange traded VIX product in 2009. The flood gates had been opened, and the new era of VIX as not just an index, but as a product was born.





Fig. 2: Trading on Volatility

The CBOE Volatility Index, Wall Street's 'fear gauge,' soared during the financial crisis, which kicked off a surge in trading of VIX derivatives that has continued to this day.



Source: FactSet (index); CBOE Holdings (volume) The Wall Street Journal

How is VIX determined? What does a VIX of 10 mean?

Great question. Think about it like insurance (much like the way Mark Cuban was thinking about it). The price of an option goes up and down based on expectations of market price movement. If it were car insurance, imagine it like insurance re-priced in real time, with premiums going up when you get in the car, go faster, when it's raining, and so on, and going down when you pull into the garage, are asleep at night, and so forth.

But with the VIX, this isn't long term

insurance – the options prices that feed into the VIX calculations are only designed to be looking 30 days out. And to make it more confusing, the 30-day look is then annualized to arrive at the VIX number, which represents the annualized implied volatility of the S&P 500 stock index (over the next 30 days).

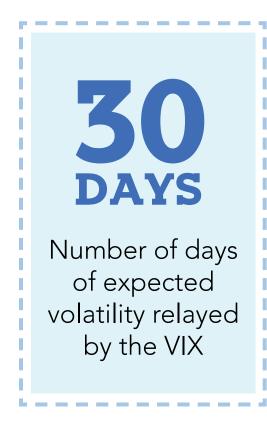
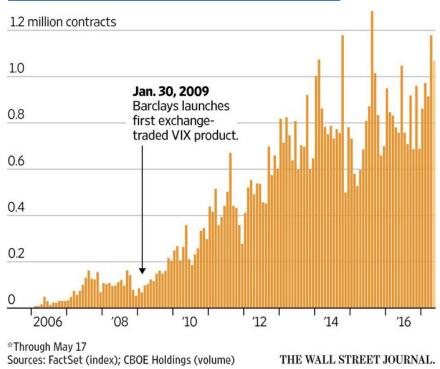


Fig. 3: Average daily volume of VIX futures and options*





Doing some math, we can then surmise what that means for daily or weekly implied volatility. For example, when the VIX is at its current level of around 10, it implies that traders believe the S&P 500 will have about 10% annualized volatility, which when calculated on daily moves represents the belief the market will move by less than 1% a day during the next 30 days. Here's a good explainer if you want to dig into the math some more.

Fig. 4: S&P 500 1% moves



Source: BofA Merrill Lynch Global Research

And for some real life examples, we can look towards the VIX moving between 9 and 11 for much of the end of the 2016 and into 2017. The S&P 500 did not fall more than 1% any day, for a near record 110 days in a row, during that span – showing that volatility was that low as perceived by the option pricing.

How are Investors Trading the VIX?

VIX ETPs/ETFs

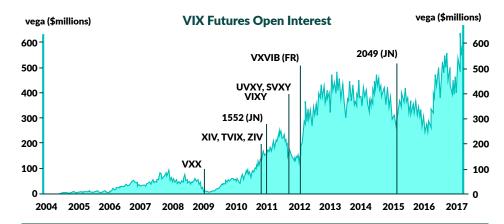
There's been a land grab/gold rush of sorts in the ETF space over the last few years, with investment managers flooding into VIX futures to capture some of this interest in

protecting portfolios following the huge spike in volatility during the financial crisis. VXX led the way, followed by the first inverse products, and then variations on the theme a few years later.

Here's the chart that keeps the folks at the CBOE smiling from ear to ear when they lay their option filled heads on their pillows at night, showing one of the best futures contracts success stories since the e-mini S&P.

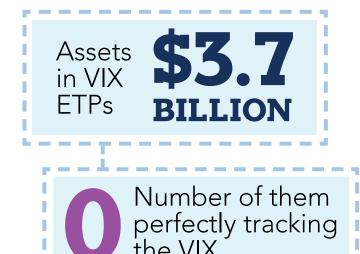
From next to nothing to over \$600 million in implied Vega for the VIX futures contract is in direct relation to the many strategy types: long, short, leveraged short, etc. productized via the futures. Here's just how much money is invested in both long and short VIX ETP strategies.

VIX ETPs have been a driving force behind the increase in VIX futures liquidity VIX futures open interest in vega (VIX contract open interest x1000). Inception dates of 10 largest VIX ETPs by AUM. As of March 31st, 2017



Source: Chicago Board Options Exchanage, Goldman Sachs Global Investment Research





% of VIX products "Long Vol" **56%**

36% % of VIX products "Short Vol"

Of course, only one side of the VIX trade has made any money for this nearly \$4 billion in investor bets on volatility – the short side, leading to more and more players entering the volatility trade on the short side, leading perhaps to a self fulfilling volatility dampening profile. As JPM's quant Marko Kolanovic put it via ZeroHedge.

Shorting volatility is a multi-year alpha generating strategy utilized by the largest pension funds, asset allocators, asset managers and hedge funds alike that has profited from selling into short-term vol spikes (similar to 'buying the dip'). It will be continue being done until it ceases working; it remains a +++ performance driver for now.

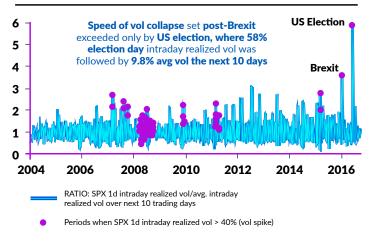
You can see this clearly with emerging managers specializing in volatility, like award winning <u>Goldenwise</u> Capital, and emerging Aleph Strategies.

What's happening here? Well, the general view is that there's a central bank put, which is essentially the Fed backstopping any stock market declines with more QE or promises of QE or other measures. This has led to any market retracement lower since the financial crisis not only being short lived, but also getting ever more short lived. As the chart below suggests, speed of recovery has been extremely quick, and getting quicker – since that grouping of orange dots in 2008.

So, even if there's a huge spike in the VIX from Brexit and the Presidential Election it appears the VIX collapses almost instantly after it jumps. It seems the VIX has grown out of its own definition of probabilities of risk. Despite being known as the "fear gauge," the VIX index has done very little to cause or reflect fear these days. What it's best known for these days is a consistent reversion to the mean trade.

Or said another way, as a wealth transfer mechanism between the cautious/fearful and the observant/risk acceptors. There's now around \$4 Billion "invested" (we'll use that term lightly) in VIX ETPs and ETFs.

The power of the buy-the-dip trade is most clearly seen through its impact on equity volatility, which now mean reverts historically quickly post shocks



Source: BofA Merrill Lynch Global Research. SPX intraday volatility is calculated using 5-minute returns of the front-month e-mini S&P 500 (ES) futures over their near 24hr trading period.



Goldman estimates that the "short vol" side has been the big winner in this trade, having produced massive returns via a pretty straightforward and simple trade.

The S&P 500 VIX Short-Term Futures Daily Inverse Index which tracks the return of being short a one-month VIX future was up 4364% from March 9, 2009 through 1Q 2017. The index has had a median daily return of 0.6% and an annualized return of 21.5% since December 2005.

Of course, it's never that easy, and it turns out the VIX-focused ETFs, whether they be long or short, and even VIX futures – aren't for the uninitiated. One recent Barron's article puts it bluntly:

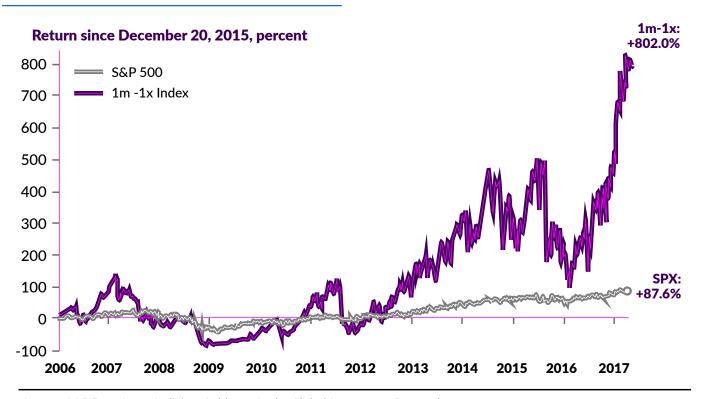
Can you trade the fear gauge that everyone quotes? If you answered yes, study the VIX and come back next year. If you know the fear gauge is a tracking index, onward to the next level. How are VIX options priced?

Fig. 5: Performance of the Inverse-Levered Futures Index

If you answered VIX futures, you know more about the VIX than most. Still, if you cannot see the VIX futures curve in your head, burning \$100 bills is probably more profitable than trading them.

if you cannot see the VIX futures curve in your head, burning \$100 bills is probably more profitable than trading them.

Barron's isn't wrong; it's not just about understanding the price curve but understanding the return drivers behind these ETPs. For example, while shorting volatility via VIX futures has been very profitable, it's never a mirror of long volatility strategies. Here's Goldman via Zerohedge again: Most VIX ETPs are rebalanced daily, which means they track the one-day return of an index.



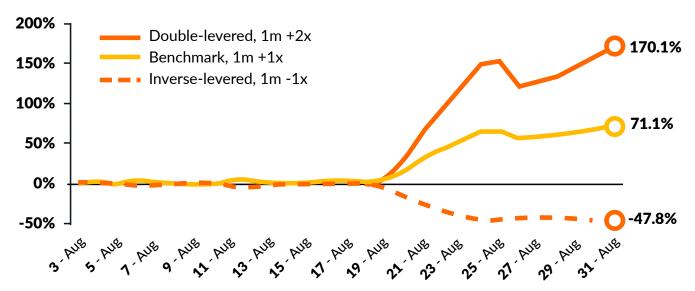
Source: S&P Dow Jones Indicies, Goldman Sachs Global Investment Research



Most VIX ETPs are rebalanced daily, which means they track the one-day return of an index. By construction, that means that a long and a short can track their respective benchmarks perfectly each day but they may not be mirror images of each other over longer holding periods due to the compounding of returns. August of 2015 was an interesting example in a tough market. The benchmark for a one-month VIX futures strategy was up 71%, the inverse was down [only] 48% and the double-levered was up 170%.

Fig. 6: August 2015 performance of single, double-levered and inverse VIX ETPs

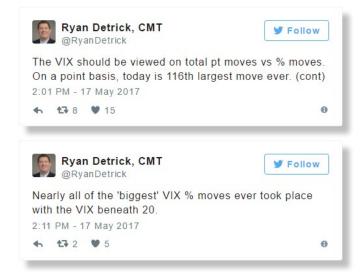
August 2015 performance of single, double-levered and inverse VIX ETPs July 31, 2015 - August 31, 2015



Volatility Comes Knocking

What's a volatility spike look like? It's hard to remember these days, but we did see one after months of barely a heartbeat in volatility on May 17th, 2017. The VIX spiked 45% as the Dow dropped roughly 2%. And while that sort of percentage move caused headlines – some cooler heads noted that it represented just a 5 point increase in the VIX.

All of a sudden the 45% move doesn't look so exciting when we consider what it actually means – traders adjusted their option pricing to assume the annualized volatility over the next 30 days would be 15.59% versus 10.65%...... or 5.5% vs 3.8% over the next 30 days. It was hardly the end of the world, but still the anticipation of a large VIX move and the billions bet on either side of that trade watched that day in nervous anticipation.





While a 5 point move doesn't mean much to most, a 1.5% move in implied volatility over the next month can be a big deal for someone like a hedge fund, which is levered, and trading derivative products with built-in leverage. That can mean a big gainer if selling into the move, or big loser if positioned on the wrong side of the spike.

A Short History of Volatility Trading

The short history of volatility trading in the managed futures space goes something like this: In the beginning, there were simple option selling strategies that sold out of the money calls or puts once a month until something bad happened. Then strategies got a little more dynamic, doing covered options, iron condors, protecting the wings, and so forth.



Then the CME came out with weekly options, opening up a new game board for traders who could collect premium without the extended time risk. And somewhere in there came the VIX futures traders, capturing the option decay via the structure of that futures market versus being short options, while also putting on hedges and even going long volatility from time to time. Yes, gone are the days of a steady diet of vanilla options selling in the volatility space. What was once a purely short volatility space is rapidly becoming more and more of a volatility trading space (VIX Futures strategies), able to profit from either increases or decreases in volatility, as well as the volatility of volatility itself. There's a bevy of new(er)

managers who have modelled their strategies around just this sort of thing and analyze all angles of volatility, including the relatively new world of VIX futures and options. There were more than a few VIX futures traders at the MFA conference down in Miami to start the year. But this isn't just a movement among individual programs. No, we're also seeing more than a few multi-strategy and traditional momentum/trend following type approaches add volatility trading to their overall models.

And can you blame them? One look at the VIX futures chart and each contract's uncanny ability to open higher, then revert lower throughout the month to close at the lows, before starting the whole process over again the next contract, and so on and so forth, rinsing and repeating – is enough to make any quant start to see a bit of a pattern there which maybe could be codified/captured in some way. And from our seat, this is becoming an ever more popular trade, with more assets under management and more understanding of the play on 'market structure' among investors. Our back of the napkin estimate of the managers we've worked with or done our due diligence on comes out to be roughly \$750m.

When you compare that to the entire Managed Futures space, it's still but a small speck among the entire industry, but with it being one of the only sectors producing positive returns in 2016, we have a feeling this space will continue to spread its roots and become a mainstream sector in the space.

And not just because of performance. Investors are also drawn to it because it can do well in periods when volatility is falling (when momentum strategies tend to struggle), as well as many being generally a low margin usage product with low correlations to the rest of an alternatives portfolio (especially CTAs); allowing investors to add it to current portfolios of managers with very little impact in terms of additional capital or additional portfolio level drawdowns and added volatility.

Yes, what used to be a conversation about volatility and avoiding potential spikes has become a more nuanced conversation also about the decay, the market structure, and the volatility of volatility – as well as the spikes.



Meet some Professional Volatility Traders

Which leads us to the professional traders making a living from the VIX and volatility (or lack thereof). We have three professional hedge fund managers on record sharing how they view volatility as an investment opportunity in a recent webinar (which you can download here).

tied to the same return drivers. So, we were led to the volatility space, and an instrument, the VIX - that has unique properties to it. The structure of the VIX is something that's very important to diversifying a portfolio."



And these aren't just any hedge fund managers; these are three of the first professional traders to offer volatility focused investment programs to investors on a standalone basis using VIX futures and VIX options. Here's what you should know about VIX Futures and the people and systems that trade them professionally.

Is VIX a hedge or an alpha generator?

While most see the utility of VIX Futures as a means to hedge a portfolio – many of our panelists don't view it as a hedge whatsoever. Mike Thompson of Typhon and Tim Jacobson both agreed that they see it mainly as an alpha generating tool, depending greatly on the market environment (ie. it's not as simple as just buying or selling the VIX, a more sophisticated strategy needs to be used).

Tim Jacobson: "We run a portfolio for family offices – and we were looking for a driver that didn't rely on the typical factors – because we felt like everything was being

Brett Nelson, of Certeza stood the question on its head, asking the audience to think of the S&P 500 as a hedge of the VIX, not vice versa.

Creating Alpha, Spike or no Spike

Lots of people pay attention to the VIX when it spikes – and it seems short term traders only see to care about the spike. Brett explains that these types of strategies don't need to wait around for a VIX move to find alpha.

"Brett Nelson: We may or may not catch the initial move – the thing about the spikes that make them so appealing in VIX is you don't necessarily have to be waiting around for them to be generating Alpha. You have a strong theta effect – and hopefully you have a high sustained period of volatility afterwards that cause massive amounts of inefficiencies in the term structure. Those tend to produce the best stat-arbitrage environments."



Questions from the Audience

We received lots of questions throughout the webinar and one worth mentioning is how the VIX movement works. The question was:

Why does the VIX always mean revert?

Brett Nelson: You've got an instrument that cannot indefinably trend one direction. mathematically. It could stay at a higher lever for a sustained period. If someone were to say the mean of the VIX is somewhere around 15. it doesn't have to revert to that 15 all the time. It can go down to 10 or below and it could hang around 20 for a while. But the idea that it would act like an equity index - that it would trend higher and higher with inflation and other market forces is mathematically impossible. We cannot be in a period where year after year after year, investors are bidding up the price of puts, because everyone would simply stop buying puts. It would no longer provide a protection for a portfolio.

Increased Players in the Volatility Space

A quick look at VIX Futures over the past couple of years and it seems that the VIX spikes, and within hours it's back at it's same levels. Matt Thompson explained that this isn't the way the market used to work. He thinks it has to do with the increased interest in short volatility selling.

The mathematical reason that the VIX must mean revert:

Matt Thompson: Over the past couple of years – The VIX Futures market has matured to a two-way market. I think you see far more participants on the short side of the volatility trade. \$XIV is a

very popular exchange traded note, that is a pure example of a short vol trade. I think that you see that manifest itself in the spikes that we had - whether it was Brexit or the election. Volatility now can spike up - as much as it has to spike down. In the past, volatility has taken multiple weeks to come off that spike. Now, you're seeing just as fast drawdowns as you are see draw-ups. I think the stability of VIX does create instability it the boat gets too loaded on one side of the trade. I think the true test of a mangers will be when we go through the next sustained period of high volatility, where the VIX is in a sustained period of backwardation - when they short trade stops being such a layup.

This is an important factor to consider, because it's not just about the VIX, but the volatility of various industry groups. ZeroHedge points out this very lopsided boat issue seems to be happening in the market right now:

The VIX US large cap tech stocks is up 45% over the last month, versus the 13% rally in the VIX. That's the largest jump in sector VIX across the entire S&P 500 and speaks to market concerns over sector valuations, earnings power and how "crowded" that trade has become.

Hold on tight – we may be seeing the pop earlier rather than later.





When Will The Trade Become Too Crowded?

The \$4 Billion dollar questions are how crowded can this short volatility trade get before the dam breaks? And will it amplify any such breaking? Here's the Commodity Futures Trading Commission with their chart of net positions by hedge funds and large speculators, which has been growing steadily since mid 2012 (and more and more negatively skewed).

Fig. 7: VIX Futures Positioning: Hedge funds and large speculators



We also wonder if there is a never ending supply of long volatility dupes, or if they will eventually wake up to the issue of giving up the 4,300% outlined by Goldman in their research? And at what point does the insurance become too costly to deploy day after day after day?

We've long been in an environment where demand outweighed supply for long vol protection and may be entering a new phase where those who want to sell insurance outnumber

those who want to buy it – causing an oversupplied market, where buyers require cheaper and cheaper prices in order to be enticed to buy. What would that look like in the VIX? It would look exactly like we have right now, with record low pricing on volatility. To twist the popular phrase... seller beware.

As Brett Nelson says, the VIX price isn't structured to continue to move up and to the right. It will revert. It fluctuates and it always will. The VIX will continue to make new lows – until it won't – until the trade is overcrowded – and there will be a whole lot of people caught with the short end of the stick. Mark Cuban wasn't looking to make money shorting the market – he was only trying to protect. But now there are specialty strategies that let you find returns from those seeking that protection - with or without a spike in the fear gauge. There's definitely something to be learned from them.

Questions? Comments?

Speak with one of our professionals today at:

855-726-0060



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For Investors



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