

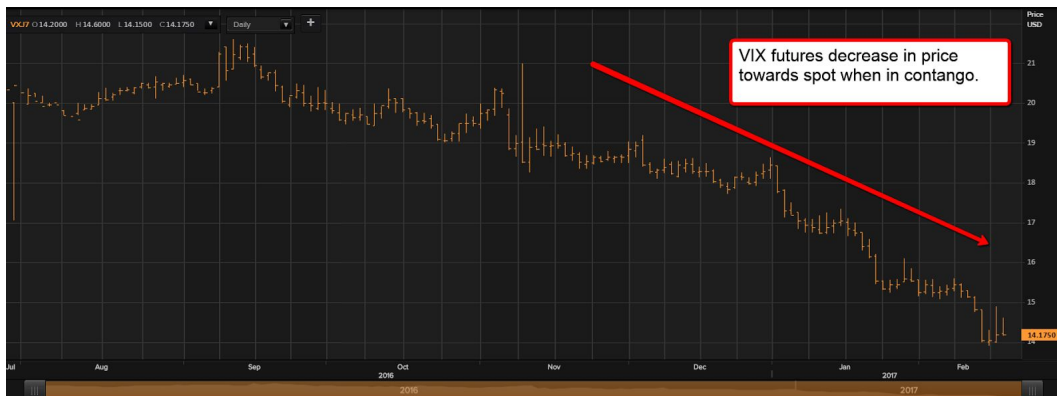
VIX Futures Carry Strategy

The VIX futures carry trade is a profit juggernaut when the markets are trendless. We trade this alongside our core macro strategy to smooth out returns.

Our version of the carry trade goes long and short volatility depending on the term structure. When the VIX term structure is in contango, we go short. When the VIX term structure is in backwardation, we go long.

When the curve is in contango the futures slowly roll down towards the spot price. This benefits shorts.

When the curve is in backwardation the futures slowly roll up towards the spot price. This benefits the longs.



Most of the time the VIX futures are in contango. So this strategy is primarily short volatility. During periods of market stress we'll switch to go long and try to profit from extreme vol events.

There are three steps to constructing and executing this trade.

First we have to figure out what part of the curve to trade, then entry/exit parameters, and finally position sizing.

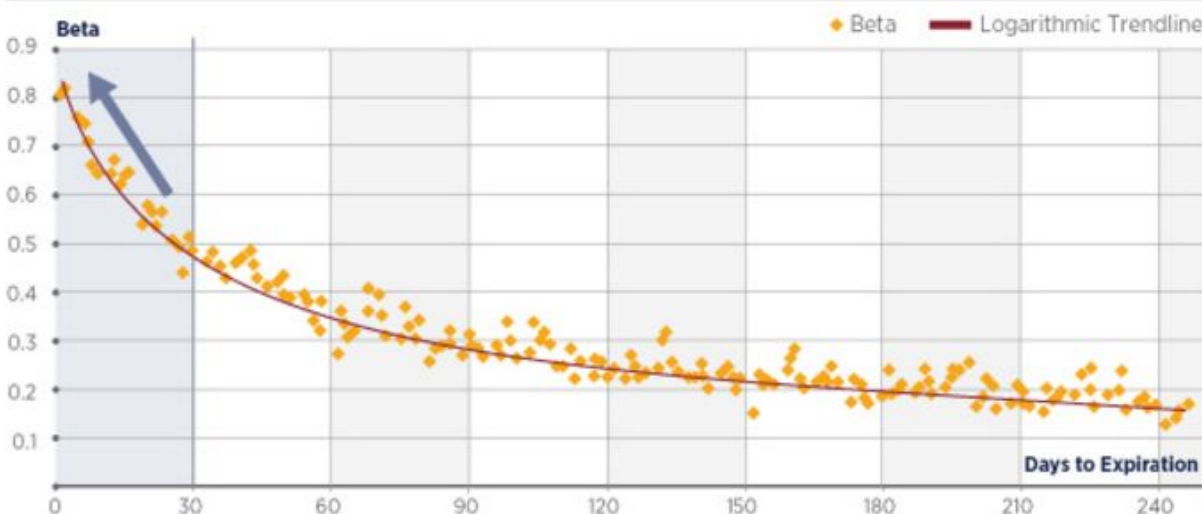
Where To Trade On The Curve

Where you trade on the curve determines how volatile the position will be. VIX futures move around a lot more as they approach expiration. The graph below shows the beta of VIX futures against their time to expiry.

Beta of VIX Futures to the VIX Index

Implications for beta as contracts near expiration, March 30, 2004 to July 19, 2016

Source: CBOE, 2016



The closer the future is to expiring, the higher the beta. So expect a bumpier ride the further in you sell.

To see how this affects the trade in more detail, we passively shorted 90 day VIX futures rolling at 30 days to expiry. We then repeated the passive short with 60 day futures rolling at 1 day to expiry.

The period studied was from 2008-2016.

90-30		60-1	
Profit	70.71	Profit	90.57
Max DD	32.13	Max DD	39.55
Profit/Max DD	2.20	Profit/Max DD	2.29
Stdev	5.97	Stdev	6.85
Profit/Stdev	11.8	Profit/Stdev	13.23

As expected, the closer you hold to expiration, the more volatility and jostling you have to endure. (Stdev is higher in 60-1.) But you earn more points in return for the increased volatility. Profit is 90.5 in the 60-1 versus 70.1 in the 90-30. This is consistent across all areas of finance. Riskier assets return more than safer assets. Stocks return more than bonds. More volatile VIX futures produce more returns than less volatile VIX futures.

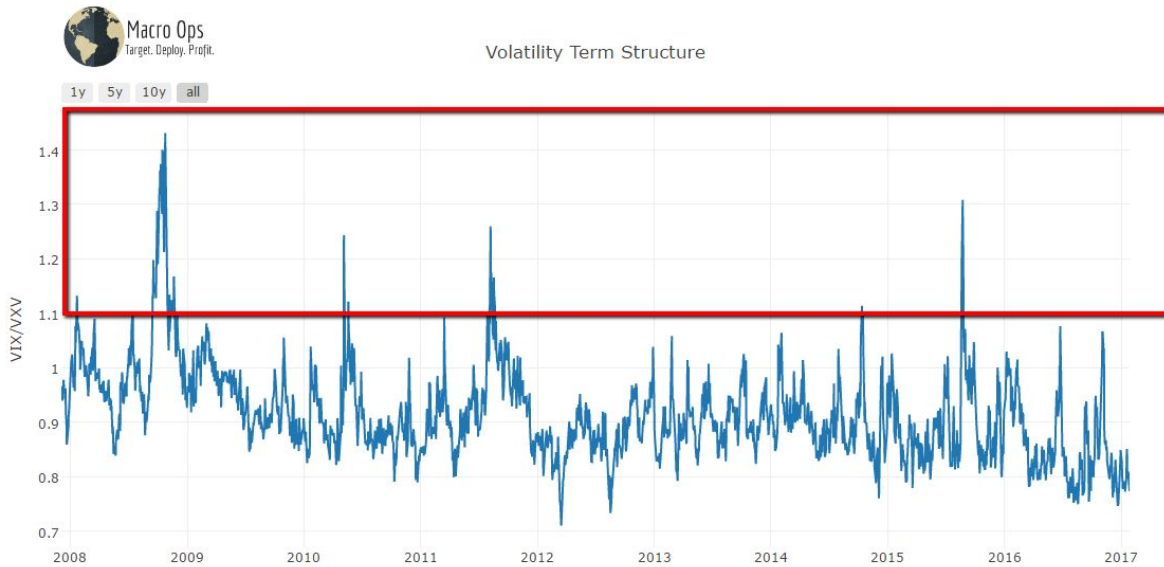
Even though the 60-1 trade earns more, we'll be using the 90-30 roll because it is easier to manage and much less prone to whipsaw. Some crazy things can happen to VIX futures as they near expiration. If the VIX has a large overnight move higher, the near dated future will take a huge loss because it tracks spot VIX very closely. Rolling when the future hits 30 days to expiry gives you some protection from that whipsaw. The swings are much easier to swallow.

The 90-30 trade is a smoother ride.

Entry/Exit Parameters

Now that we got our 90-30 window selected, we have to decide when we want to be short or long. The above study is a dumb baseline that stays short the VIX futures no matter what. Our strategy is dynamic and based off the slope of the term structure. We measure the term structure by looking at the ratio between VIX (1-month vol) and VXV (3-month vol).

When that ratio is below 1, we want to be short. And when the ratio is above 1.1, we want to be long. Take a look at the graph below and you can see that the term structure only exceeds 1.1 during extreme market stress. That's when it pays to be long vol. Otherwise the short side will make money.



We tested the 90-30 with market timing from 2008-2016. As you can see below, the results are drastically better than the passive “always short” 90-30 strategy from earlier.

90-30		90-30 with timing	
Profit	70.71	Profit	154.29
Max DD	32.13	Max DD	16.65
Profit/Max DD	2.20	Profit/Max DD	9.27
Stdev	5.97	Stdev	5.13
Profit/Stdev	11.8	Profit/Stdev	30.08

We also overlay our macro fundamental bias on top of the term structure indicator. If the indicator is blatantly against what the macro landscape is implying, then we’ll sit out or scale back leverage. We’ll start back up on the normal program once technicals and fundamentals align again.

Position Sizing

And now the last step is the sizing process. There are two schools of thought when it comes to futures: dollar notional sizing and vega notional sizing.

Dollar notional sizing is relatively straightforward. You decide on a target allocation, say 60%, and short however many VIX futures needed to match that amount. For example, say you had a \$1,000,000 account and you wanted to hold a 60% short position with the VIX futures trading at \$15.00. Each point in the VIX futures is worth \$1,000. Shorting one VIX future at \$15.00 would equate to \$15,000 in dollar notional exposure. Since we want to hold \$600,000 worth (60% of \$1,000,000) we would need to short 40 VIX futures.

With dollar notional position sizing you end up shorting more contracts when VIX is low than when VIX is high. It takes 40 contracts to short \$600,000 worth of VIX when the future is trading at 15. If the future was trading at 30, it would only take 20 contracts to generate \$600k of notional exposure.

The idea with this sizing scheme is to have less contracts in place when the VIX is going crazy at high levels. The downside to using dollar notional sizing is that when the VIX is high, it normally mean reverts. Taking off size when VIX is high will not fully capture the lucrative vol crush that follows a crisis event. Dollar notional sizing also leaves you prone to oversizing when the VIX is really low and likely to mean revert higher.

Account	\$250,000
Dollar Notional Exposure	50%
Future Price	Contracts Needed
60	2
50	3
40	3
30	4
20	6
10	13

Vega notional sizing on the other hand will short the same amount of contracts no matter where the VIX is trading. This avoids position whipsaw and keeps a smoother exposure across the life of the trade. But when VIX is high your account will take on a lot more volatility. A 20% drop on a VIX future trading at 30 is 6 points. A 20% drop on a VIX future trading at 15 is only 3 points.

Account	\$250,000
Vega Notional Exposure	2%
Future Price	Contracts Needed
60	5
50	5
40	5
30	5
20	5
10	5

We've tested both strategies. The vega notional position sizing outperforms by a small margin. So we use that sizing algo in the Vol Ops account while trading futures.

What If I Can't Trade Futures?

If you can't trade futures then you're forced to use a vol ETF or options.

VIX options are a poor choice for this trade since it requires you to continually roll exposure. The transaction costs are more intensive in options than they are in futures and ETFs. On top of that you'll have to worry about time decay eroding returns.

The better way to execute is through ETFs. It isn't a perfect match to the performance of the futures, but it's good enough and accessible to people who are constrained to only stock trades.

Luckily for us there are inverse vol ETFs so we never have to short anything. If we want to short volatility we can go long the inverse vol ETF, SVXY. And if we want to go long volatility we can go long the normal vol ETF, VXX.

When the term structure is in contango we want to buy SVXY. This is equivalent to holding a short VIX futures position.

When the term structure is in backwardation, we want to buy VXX. This is equivalent to holding a long VIX futures position.

You can't use vega notional sizing with SVXY and VXX. It has to be dollar notional sizing and rebalanced at each 60 day period when the futures strategy rolls. These ETFs are highly volatile

so it's rare to allocate more than 30% of the portfolio to them. When in doubt always use a smaller allocation than a larger one.

In our trade alerts we make sure to include a comparable dollar notional sizing in the ETFs that matches the leverage level we use in the futures strategy.

If you have any questions, don't hesitate to drop a comment in the Comm Center or email me at tyler@macro-ops.com

- Tyler