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- We attempt to quantify how far VIX can drop from current levels (12.55) to structure a low-premium long VIX structure
- Backtesting a strategy of selling VIX 1M OTM puts to buy VIX call spreads, only initiating when VIX < 15 increases the strategy's Sharpe Ratio by 1.2 and reduces max drawdown by almost 10%
- The VIX sub-15 seagull strategy also outperforms SPY put spreads deployed under the same volatility constraints, with good carry for a hedge

Derivatives Strategy
212-287-2640



Trade Idea:

- **Sell VIX July 11.5 put to Buy 17-22 call spread for 0.25 (ref. 12.55, 34d)**

On Tuesday, our CEO Dean Curnutt [went on Bloomberg](#) to discuss a species of options spreads known as a “seagull”, which involves selling a VIX out-of-the-money put to buy a VIX OTM call spread. [We discussed this “seagull” strategy on our note from Monday](#), where we identified it as a way to express a long VIX view.

We referred to the 14.1 “valuation” of VIX from the MRA Macro Model and the relatively small spread between implied and realized volatility to wonder whether VIX (currently at 12.55) could be at a floor.

How low can VIX go from here?

In the trade structure above, we profit nicely off spikes in vol; the main risk from the trade above is the short out-of-the-money put expiring deep in-the-money).

We sought to quantify the probability of VIX falling below the strike of this OTM VIX put. Using VIX prices from 2000 until May 2018, we evaluated the historical hit rate of VIX falling below a strike (we used 5% as our conservative benchmark) in 1M (22 trading days).

Probability (Hit Rate) of 5% UX1 drop in 30 days, bucketed by starting UX1

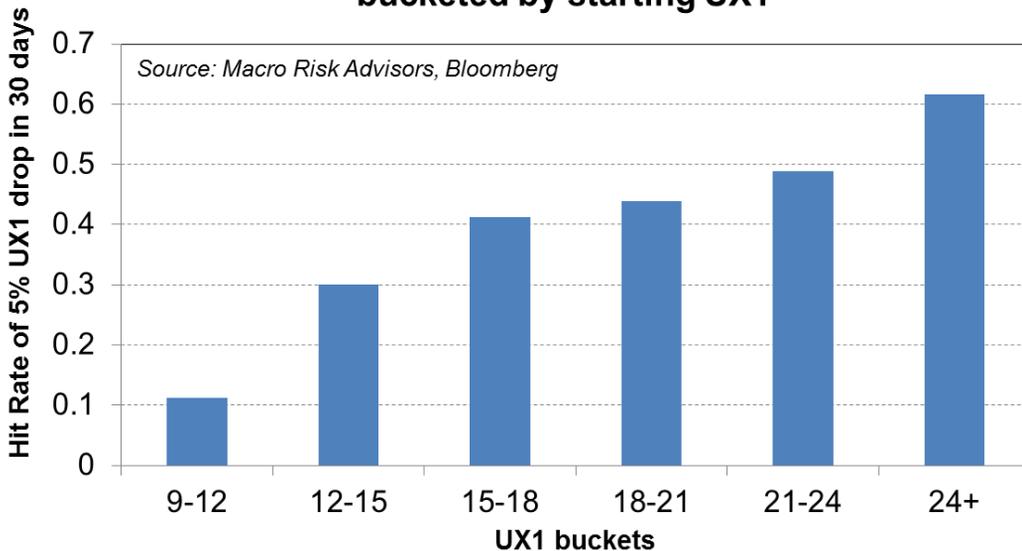


Figure 1: Hit rates of VIX 1M 5% moves by (bucketed) starting VIX

Figure 1 shows the changes in “hit rates” of a 5% put expiring ITM in 30 days (struck at the current spot VIX price) based on the initial strike. Visibly the hit rate increases as VIX increases, reflecting the mean-reverting nature of implied volatility.

The global average hit rate from March 26th, 2004 through May 14th, 2018 is 43.6%. By contrast, that hit rate is 0% when VIX has gone below 10 (even in the low vol doldrums of late 2017) and 23.8% when VIX starts between 9 and 12 (highlighted below in **Figure 2**).

	9-12	12-15	15-18	18-21	21-24	24+
Hit Rate of 5% Drop in 30 days	11.2%	30.1%	41.3%	43.8%	48.9%	61.7%
Average 30-day UX1 change	1.41	0.29	0.23	-0.09	-0.36	-1.89
Median 30-day change in UX1	0.83	0.11	-0.43	0.07	-1.04	-2.66

Figure 2: Table of historical UX1 30-day change statistics

The average/median leading 30-day moves for 1M VIX futures (UX1) are visualized in **Figure 3** below. By nature of the strong right skew of VIX returns as discussed on Monday (VIX up moves tend to be more dramatic than VIX down moves), the median of the VIX future 30-day change is consistently lower than the average regardless of the starting VIX future value. For reference, the current UX1 value is 12.85 (higher than spot VIX whenever term structure is upward sloping).

Probability (Hit Rate) of 5% VIX 1M Future (UX1) drop in 30 days, bucketed by starting UX1

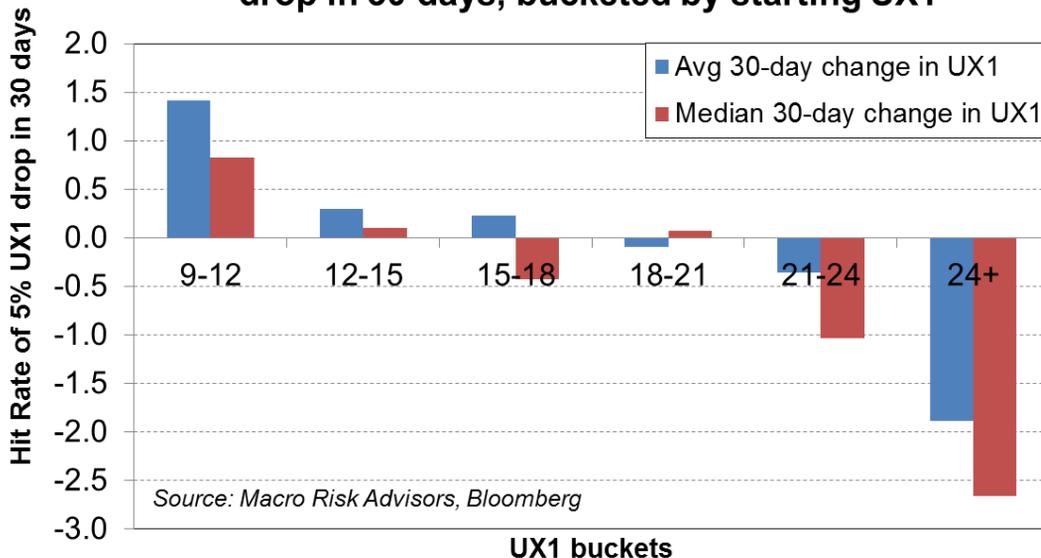


Figure 3: Average/median UX1 point changes 30 days later (bucketed by initial UX1 level)

The typical 30-day increase (mean reversion) of UX1 starting between 12-15 bodes well supports the short OTM put strategy in the present 12.55 VIX scenario.

Smart Seagulls

On Monday we flagged the largest drawdowns in employing this long VIX seagull strategy being when the trade was initiated during a high VIX period and vol came in dramatically. We modified our basic backtest, which was constructed using historical implied vol data from Bloomberg to use real listed prices (which exacerbate the real effect of rolldown).

In this iteration we also tested a “Low Vol Strategy”, where we initiate the trade only if 30-days before the expiration VIX was below 15 (the median between 2000 and today is **15.06**). Otherwise, we kept our portfolio in cash until the next time we were 1-month before an expiration.

Figure 4 shows that only deploying the strategy during periods where VIX was below 15 avoided most major drawdowns. The strategy effectively kept all assets in cash following the 2011 European Debt Crises and Feb 5th XIV-blowup because VIX > 15, instead of selling a put with a high strike.

We also showed the performance of SPY put spreads (one of the most common hedges many of our customers employ), both deployed at all times and only under the same “Low Vol Strategy” as above.

VIX Seagull Backtest (Normal and Low Vol Strategies):

Backtest: VIX Sell Put (15d) Buy Call Spread (15d-35d) vs SPY Put Spread (15d-35d)

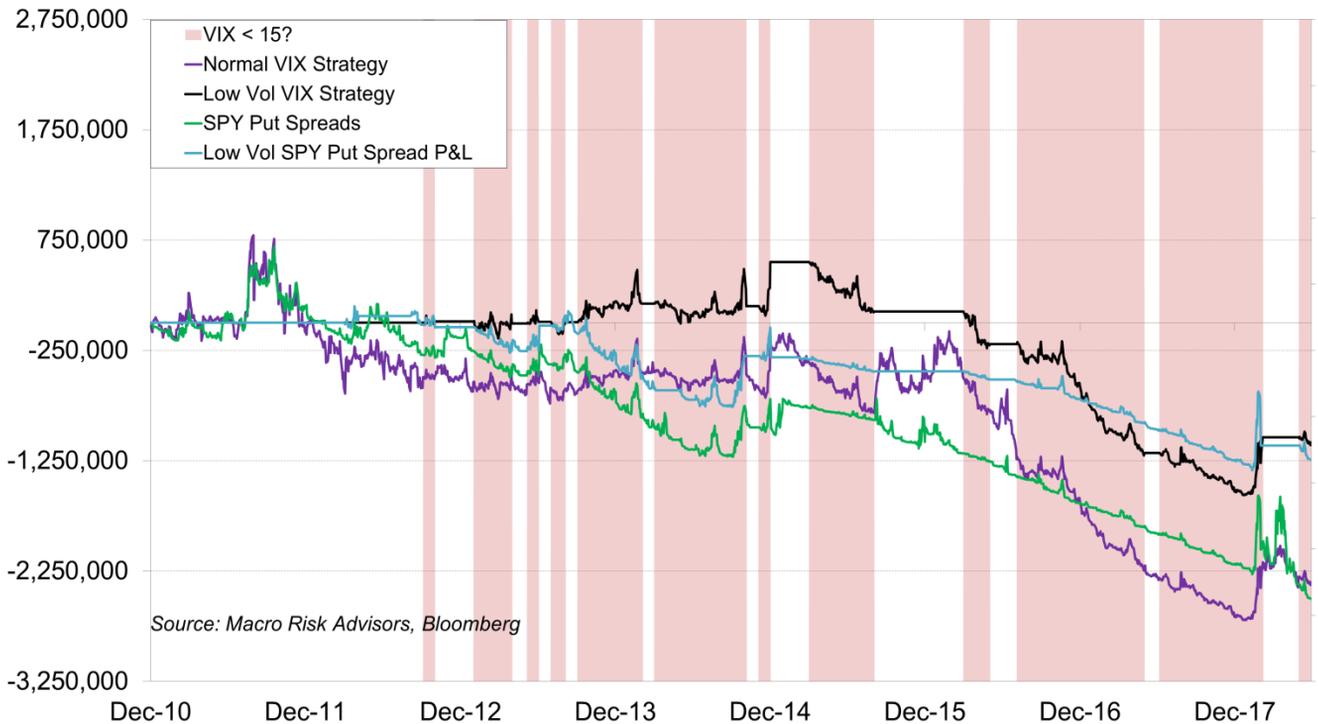


Figure 4: Seagull and SPY put structure backtest (low vol strategy = only initiate when VIX < 15)

Unlike the simulation from Monday, we ran this analysis on UX1 which is a more accurate representation of the P&L one would experience. We sized both the VIX and SPY trades based on the width between the strikes of the call spreads (the higher the width, the greater the sizing), scaled over 1,000 contracts.

To calculate the portfolio statistics in **Figure 5** we conservatively modeled our portfolio as initially having \$20.4 mil in cash (the maximum 1-year loss on the VIX seagull based on the initial the short put strike, 17; the max loss on the SPY put spreads is naturally just the cost of the spread in premium terms). For both VIX seagulls and SPY put spreads, the remaining portfolio balance not deployed on the options is kept as cash.

	VIX Seagulls (Normal Strategy)	VIX Seagulls (Low Vol Strategy)	SPY Put Spreads (Normal Strategy)	SPY Put Spreads (Low Vol Strategy)
Annualized Return	-2.37%	-0.73%	-1.73%	-0.84%
Yearly Standard Deviation	1.58%	2.29%	1.32%	1.17%
Sharpe Ratio	-1.50	-0.32	-1.31	-0.71
Max Drawdown (Rolling 1M)	-3.42%	-1.15%	-1.38%	-1.38%
Max Portfolio Gain (Rolling 1M)	3.96%	2.72%	3.93%	3.74%

Figure 5: Strategy statistics for VIX seagulls vs SPY put spreads

The VIX seagulls perform more effectively over time than the other three strategies. Unsurprisingly, buying either VIX seagulls or SPY put spreads during sub-15 VIX scenarios only was much more profitable than deploying them constantly. SPY put spreads with the Low Volatility strategy performed ~20 bps worse in the corresponding VIX seagull strategy but did have a higher peak gain (during the week of February 5th, 2018).

We re-iterate the general trade structure for our Monday note based on our findings, except widening our strikes to give us a higher maximum gain to the upside.

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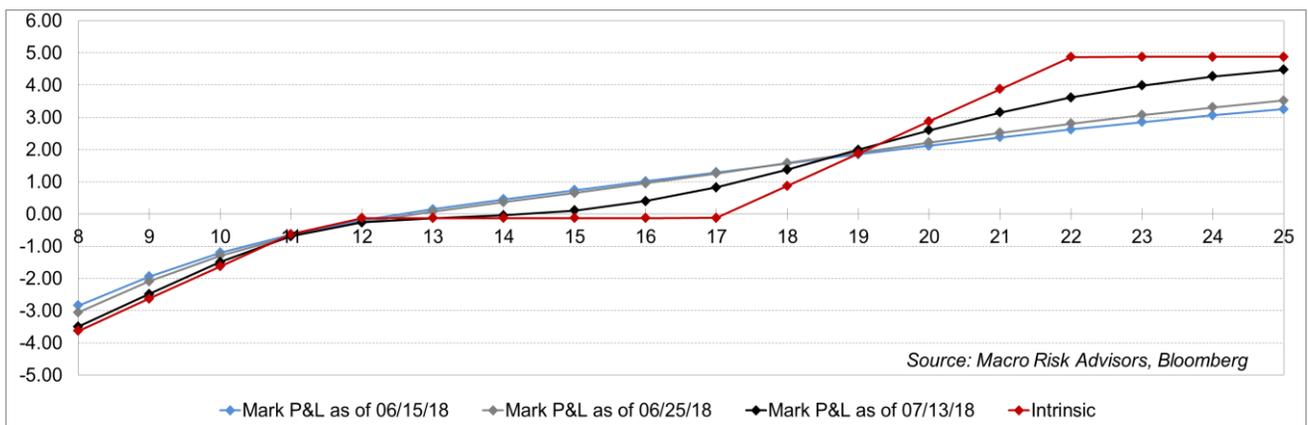


Figure 6: P&L of VIX July 11.5-17-22 Seagull