

CAPSTONE TAIL HEDGING REVIEW

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INTRODUCTION

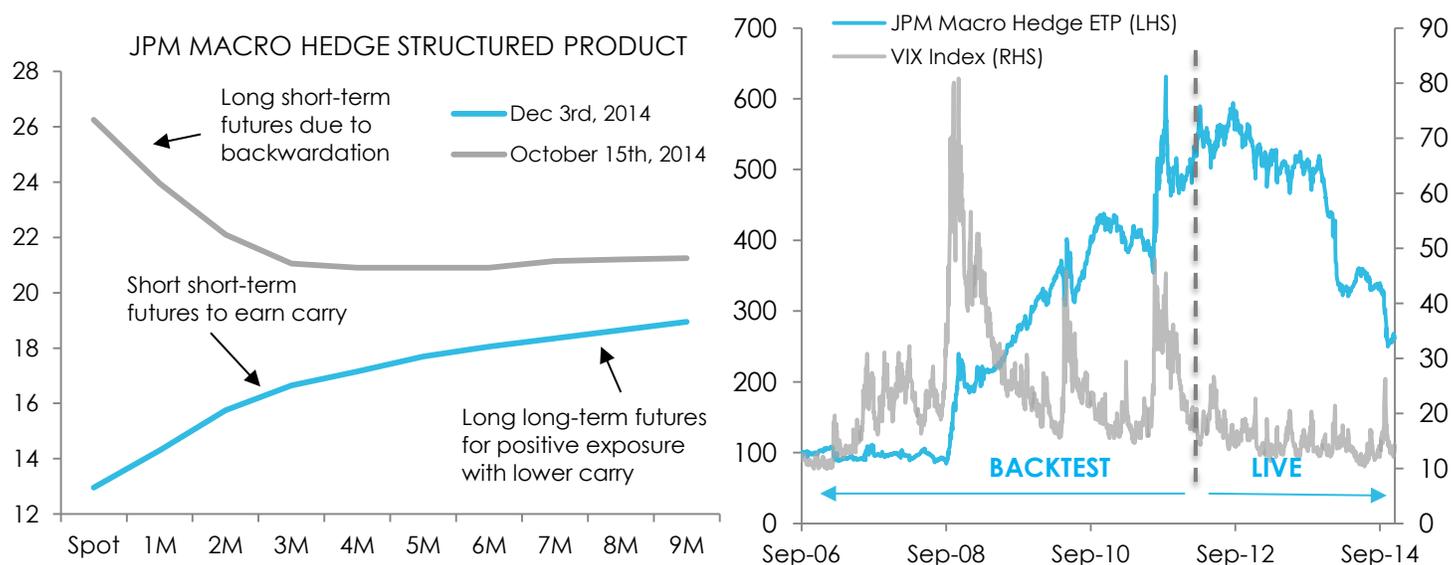
Since the start of 2014, we have witnessed increasing interest in tail hedging with large global institutions looking to develop tail hedge mandates. Recent bouts of turbulence since October 2014 have intensified that interest, especially since volatility levels have continued to fluctuate rapidly, sometimes reverting back to depressed pre-October levels, creating interesting entry points for hedges.

We have reviewed and analyzed the tail hedging landscape in 2014, along with a forward looking view for 2015, with specific focus on the drivers of tail risk, 2014 events and how they have impacted the pricing of tail hedging, as well as the current opportunities in this space.

VIX RELATED PRODUCTS: A SOURCE OF MARKET TAIL RISK

Structured Products. Of the numerous VIX structured products, many have triggers that result in accelerated movements in the VIX. For example, when the VIX futures curve becomes inverted, some structured products buy front-month VIX futures, which amplify the inversion. Alternatively, when the curve moves back into contango, the structured products result in wholesale selling of front month VIX futures.

FIGURE 1: STRUCTURED PRODUCTS



Source: Bloomberg, Capstone

Levered/Inverse ETPs. Levered and inverse VIX ETPs' assets under management have reached all-time highs at just under \$2.5 billion. The daily rebalancing flows required to maintain the desired exposure of the ETPs has reached record highs. VIX ETPs exacerbate moves, buying as volatility rises and selling as volatility falls.

Disappearing Liquidity. Substantial flows into VIX products did not exist before 2012. Today, however, when hedge funds and CTAs cut or modify their positioning, it often occurs at the same time as VIX flows, which causes there to be an excessive amount of positions that need to be exited at the same time. We have witnessed disappearing liquidity in VIX futures/options during volatile days.

VIX as a Universal Hedge. Market participants are increasingly using the VIX as their hedging mechanism. This includes credit and macro fund managers, as well as other hedge funds. Rather than buying, holding, and rolling

exposure, the ease of the VIX market has caused players to heavily and quickly buy or sell volatility. This has caused volatility to become more reactive to market events, such as headlines, broker statements, and traders' views. Instead of being priced on realized volatility plus a risk premium, volatility is trading on flows, intuition, and speculation.

Speaking to the reactivity and focus on the VIX market, we have witnessed a number of trading days where the movement of the VIX was not justified by the magnitude of the S&P 500. One example is October 15th, in which SPX opened down 0.19% but the VIX opened up 3.57 volatility points (+15.66%), a percentage move 439 times the size of the SPX move, showing that the VIX may be where the action is occurring. In fact, it has appeared that the tail has been wagging the dog on eventful days as the VIX actually impacts SPX. On the back of news, there has been a flood of demand for VIX futures. The rise in the level of the VIX then pushes SPX lower as traders react to the higher VIX level.

VIX Universe Volume. VIX trading has skyrocketed, especially in comparison to SPX. The vega volume trading through VIX futures, options, and ETPs far outpaces that of SPX options volume. This is especially true of months during which volatility increases, such as January and October 2014. If OTC volume was included, this imbalance would likely be multiplied. This relationship is not true of other indices, such as EuroStoxx versus VSTOXX (V2X). According to Barclays, the volume of vega exposure flowing through VIX futures, options, and ETPs daily spiked to about \$1.1B in mid-October, whereas the rise in listed SPX and SPY volume was to about \$300m vega per day.

Overnight VIX Futures. The recent advent of overnight VIX futures trading has the potential to incite a panic in the rest of the market, given its lower degree of liquidity, if an event were to occur overnight and VIX futures were bid up into a thin overnight market.

The size, market focus, and systematic flows of the VIX product universe, contribute to the VIX universe's potential to either directly be, or to intensify, the cause of liquidity drying up, thereby exacerbating market gyrations. October 2014 was a historic period with respect to how rapidly and sharply volatility spiked and subsequently fell. The movements in December 2014 were further evidence. There appears to be gap risk in the VIX, perhaps in both directions. Given a large move up in the VIX, the rest of the market might take its cues and sell off even more sharply. Additionally, the increased amount of VIX trading has led to a higher turnover of volatility, rather than buying and holding, which could further exacerbate a move in either direction.

HOW HAVE TAIL RISK PRODUCTS PERFORMED RECENTLY AND WHAT IS THE CURRENT ENVIRONMENT?

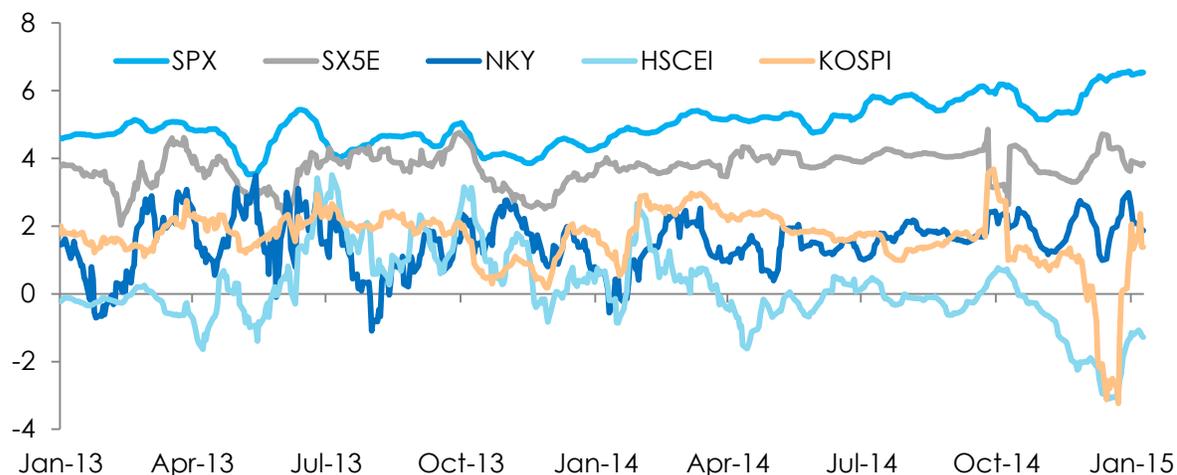
Though asset prices did not fall particularly far in October 2014, the price of volatility increased fairly quickly, resulting in decent mark-to-market gains for tail hedge programs. To the extent that some gains were able to be monetized despite a quick snap back, the profits from October did help partially offset the options decay suffered in 2014. This is helpful because 2014 was a year that was generally characterized by extremely low realized volatility, which is a difficult environment for tail hedge programs. December 2014 was a similar story. Although volatility levels did not spike as high as October, as oil's sell off accelerated, December did bring another jump in volatility despite a less than 5% decline in US equities. This jump resulted in mark-to-market gains for tail hedge programs. The profits that could be monetized again helped to defray the premium spent on protection for 2014.

Market turbulence in mid-October caused the price of volatility and convexity to move higher. However, from that time until the beginning of December, we witnessed a reversion of levels below even the extreme September lows. 20-day SPX realized volatility even hit a 45-year low at the end of November. The market was pricing in very little chance of near-term difficulties and the entry point for hedges was roughly back to where it was before the October correction. Since the beginning of December, though, realized volatility has remained in a higher range, more in line with implied volatility, and has yet to revert back to those depressed levels. This has occurred while implied volatility has been erratic, climbing again in the first half of January before moderating.

WHAT ARE CURRENT OPPORTUNITIES IN THE VOLATILITY SPACE GLOBALLY?

Downside hedges in Asia and Europe appear interesting due to a confluence of macroeconomic factors and pricing. Structured product issuance in Asia and Europe has pushed the cost of downside protection lower, making it attractive on an absolute and comparative level versus the S&P 500. Such indices include EuroStoxx (SX5E), the Nikkei (NKY), the Hang Seng China Enterprises (HSCEI), and the Kospi 200.

FIGURE 4: 3-MONTH 95/105% SKEW SPREAD (10D ROLLING AVG)



Source: Bloomberg, Capstone

Arguably, there are macroeconomic rationales that cause hedges in Asia and Europe to make sense. Europe is facing serious economic headwinds that have necessitated further intervention in the near term. The Eurozone is also facing the prospect of a deflationary environment, which could affect investment into the economy and add pressure to Europe's debt situation. Some are also concerned over slowing of China's growth and believe that Asia could be in the spotlight of financial difficulties. Some would also point out that China is also on the precipice of a demographic shift towards an older population. China has also taken on a very large amount of debt in the last five years in order to finance housing development. The pricing makes these European and Asian hedges particularly attractive and it appears that both regions could be involved and react strongly during a potential tail event.

CONCLUSION

In early 2014, Capstone witnessed a sharp rise in interest in tail hedging among large institutions in the face of large equity gains that have resulted in higher valuations, as well as due to the institutions' macroeconomic concerns. Others have more confidence taking additional market risk knowing that they also have a tail hedge in place. The rise in turbulence witnessed in Q4 of 2014 and January 2015 has further amplified the interest in tail hedging as the environment for risk assets has become less certain.

In October, December, and January, despite only small declines in the equity market, the price of volatility rose sharply. Volatility-based tail hedge programs did benefit from the mark-to-market gains from that move. Levels moved back quickly, but trading around those hedge positions provided some income. That income helps offset some of the cost of running the tail hedge programs during 2014, which was largely an extremely low volatility year. Since October, as volatility levels have continued to be choppy, we witnessed some periods of reversion of the volatility market back closer to the lows, opening up opportunities for more attractive entry points once again for hedges.

The list of potential systemic tail risks to the market is long, but we feel strongly about the risks posed by the growth of the VIX universe. These VIX products have become more reactive and volatile and have grown larger than the underlying SPX options universe. More and more investors and institutions are relying on these products and it is unclear how they will react and how much liquidity there will be in larger market events. These VIX instruments have the potential to amplify moves and put pressure on the rest of the market and thus are a tail risk that must be considered.

We continue to explore which hedges provide the best value in terms of affording convexity but with lower cost of carry. As an example, currently, hedges in Europe and Asia have become more interesting as structured product issuance, whereby investors supply downside volatility to the market, has depressed the cost of hedging. Some of the more attractive index underlyings are EuroStoxx, Nikkei, mainland China (HSCEI), and Korea (Kospi 200).

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