Portfolio Hedging Strategies

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CBOE

Optimising Portfolio Hedging Strategies
• The case for Consistent Hedging

• Optimizing Hedging Strategies

• Sizing initial trades and managing positions over time

• Cross Asset Hedging

• Conclusions
The Case for Consistent Hedging

Hedging adds convexity to your portfolio

Mitigating the effect of adverse market moves justifies hedging across strategies
The Case for Consistent Hedging

Buying puts simply won’t do the trick

Consistent hedging requires a more structured approach

Source: Bloomberg, Bank of America Merrill Lynch
The Case for Consistent Hedging

Hedging issues are multi-dimensional

<table>
<thead>
<tr>
<th>The Term</th>
<th>The period over which one wishes to be protected</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Strike</td>
<td>The level from which one wishes to be protected</td>
</tr>
<tr>
<td>Ranges</td>
<td>The structure with which one wishes to be protected</td>
</tr>
<tr>
<td>The Premium</td>
<td>The optimal size of the hedge(s) versus the size of the portfolio</td>
</tr>
<tr>
<td>The Frequency</td>
<td>How often do you re-strike?</td>
</tr>
</tbody>
</table>
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Optimising Hedging Strategies
The avoidance of market timing risk

The complexity of the payout increases the predictability of the hedged strategy

- Straight Puts
- Put Spreads
- Calendars
- Collars

COMPLEXITY

PREDICTABILITY
Optimising Portfolio Hedging Strategies

In order to optimise portfolio hedging strategies, we need to be able to compare them:

Q : How do you compare different strategies?

A : Look at their volatility

By evaluating the VaR of the hedged portfolio we are able to size different strategies by evaluating their impact on the risk of the portfolio.
Optimising Portfolio Hedging Strategies

Sizing initial trades requires a four step process:

I. Compute VAR of Hedges
II. Compute VAR of Portfolio & Hedges
III. Size the Trade by Reducing Hedged Portfolio VAR
IV. Sanity Check !!
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Sizing Initial Trades and Managing Positions Over Time
Using the S&P 500 as our proxy portfolio we target a 10% risk reduction via a 3m 95%/85% put spread

- Sizing the put spread to 118% of its notional VaR goes from 0.42 to 0.38.
- The Sharpe ratio improves from 0.13 to 0.15
- The high correlation between the portfolio and the hedged strategy indicates the ability to include hedging as part of portfolio management
Sizing Initial Trades and Managing Positions Over Time

VaR Equivalent Hedging Strategies

Sharpe Ratio and Notional Hedge Ratio of SPX portfolio hedged with different strategies

<table>
<thead>
<tr>
<th></th>
<th>SPX</th>
<th>1m95p</th>
<th>3m95p</th>
<th>12m90p</th>
<th>1m95-85ps</th>
<th>3m 95-85ps</th>
<th>1m95p-12m90p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharpe Ratio</td>
<td>0.134</td>
<td>0.16</td>
<td>0.16</td>
<td>0.15</td>
<td>0.15</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>Multiplier</td>
<td>0.55</td>
<td>0.40</td>
<td>0.33</td>
<td>1.14</td>
<td>1.18</td>
<td>VaR can't be improved</td>
<td></td>
</tr>
</tbody>
</table>

Source: Bloomberg, Bank of America Merrill Lynch, Bluebay

- Hedge ratios diminish with longer time horizons for single put trades
- Long Calendar put spreads additive to risk
Sizing Initial Trades and Managing Positions Over Time
Impact of Re-Hedging over time

Notional Hedge Ratio of SPX portfolio hedged with different strategies, Daily vs. Monthly Roll

<table>
<thead>
<tr>
<th>Hedge Ratio Monthly Rolls</th>
<th>1m95p</th>
<th>3m95p</th>
<th>12m90p</th>
<th>1m95-85ps</th>
<th>3m 95-85ps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hedge Ratio Daily Rolls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.20</td>
<td>0.20</td>
<td>0.15</td>
<td>0.40</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>0.55</td>
<td>0.40</td>
<td>0.33</td>
<td>1.14</td>
<td>1.18</td>
<td></td>
</tr>
</tbody>
</table>

Source: Bloomberg, Bank of America Merrill Lynch, Bluebay

- Lower frequency dramatically reduces the hedge ratios
- For shorter maturities, option strategies can be additive to VaR
Sizing Initial Trades and Managing Positions Over Time
Re-hedging frequency and the impact on returns

• Lower frequency dramatically differentiates returns among strategies

Percentage Cumulative Returns of SPX hedged portfolios for a VaR reduction of 10%, using monthly rolls

Source: Bloomberg, Bank of America Merrill Lynch
Sizing Initial Trades and Managing Positions Over Time

Can hedging become an integral part of your investment process?

Percentage Cumulative Returns of SPX hedged portfolio using zero cost risk reversals

<table>
<thead>
<tr>
<th></th>
<th>Return</th>
<th>Risk</th>
<th>Sharpe</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPX</td>
<td>1.18%</td>
<td>16.05%</td>
<td>-0.07</td>
</tr>
<tr>
<td>95% Zero Cost Collar</td>
<td>2.78%</td>
<td>10.71%</td>
<td>0.05</td>
</tr>
<tr>
<td>85%-95% Put Spread Collar</td>
<td>4.38%</td>
<td>12.48%</td>
<td>0.17</td>
</tr>
</tbody>
</table>

Source: Bloomberg, Bank of America Merrill Lynch

Zero Cost Collars can be used to improve Sharpe ratios and returns
Hedging becomes part of the investment process
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Cross Asset Hedging

For cross asset hedging regression analysis is used to compare the variables

VIX vs SPX returns over the past year give a Beta of 7.7

This is not a stable relationship over time
Rolling correlations need to be monitored

Source: Bloomberg
Cross Asset Hedging

Using a 2m 100/150% call spread on the VIX we obtain a hedge ratio of 51% using a Beta of 7.7. The Sharpe ratio moves from 0.65 to 0.78.

• Cross asset hedging can be used in a systematic manner to improve the Sharpe ratio.
• Changes in correlation across variables make comparisons across hedging strategies more complex.

Source: Bloomberg, Bank of America Merrill Lynch, Bleubay
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CONCLUSIONS

• Hedging can become an integral part of the investment process
• VaR methodologies can be used to compare hedges, including cross asset hedges
• Frequency of re-hedging is a key factor sizing and comparing trades
• Systematic hedging requires more complex payoff
• Correlation changes affect cross asset hedges
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