



CrossBorderCapital
Implementing Insight

Hedging Overlays for Global Balanced Portfolios

November 2013



Overview

- **In the current environment, cross-asset correlations are generally rising and institutions are incentivised to add to risky assets**
- **In this context, hedging overlays are becoming increasingly important**
- **We describe various strategies for hedging market and liability risk**
- **While hedging generally comes at a cost, we describe various ways to reduce the drag, based on statistical analysis**
- **Finally, we perform a simple case study that shows the impact of hedging a portfolio of risky assets**



Background

- **CrossBorder Capital is a London-based investment manager, founded in 1996**
- **We have roughly USD 300 million under management in systematic macro and options (volatility) strategies**
- **In particular, we manage the following strategies**
 - **a global TAA fund that uses an options overlay to shape portfolio returns**
 - **a long duration strategy that protects against a sharp rise in yields**
 - **a long volatility strategy that adapts to the current risk regime**

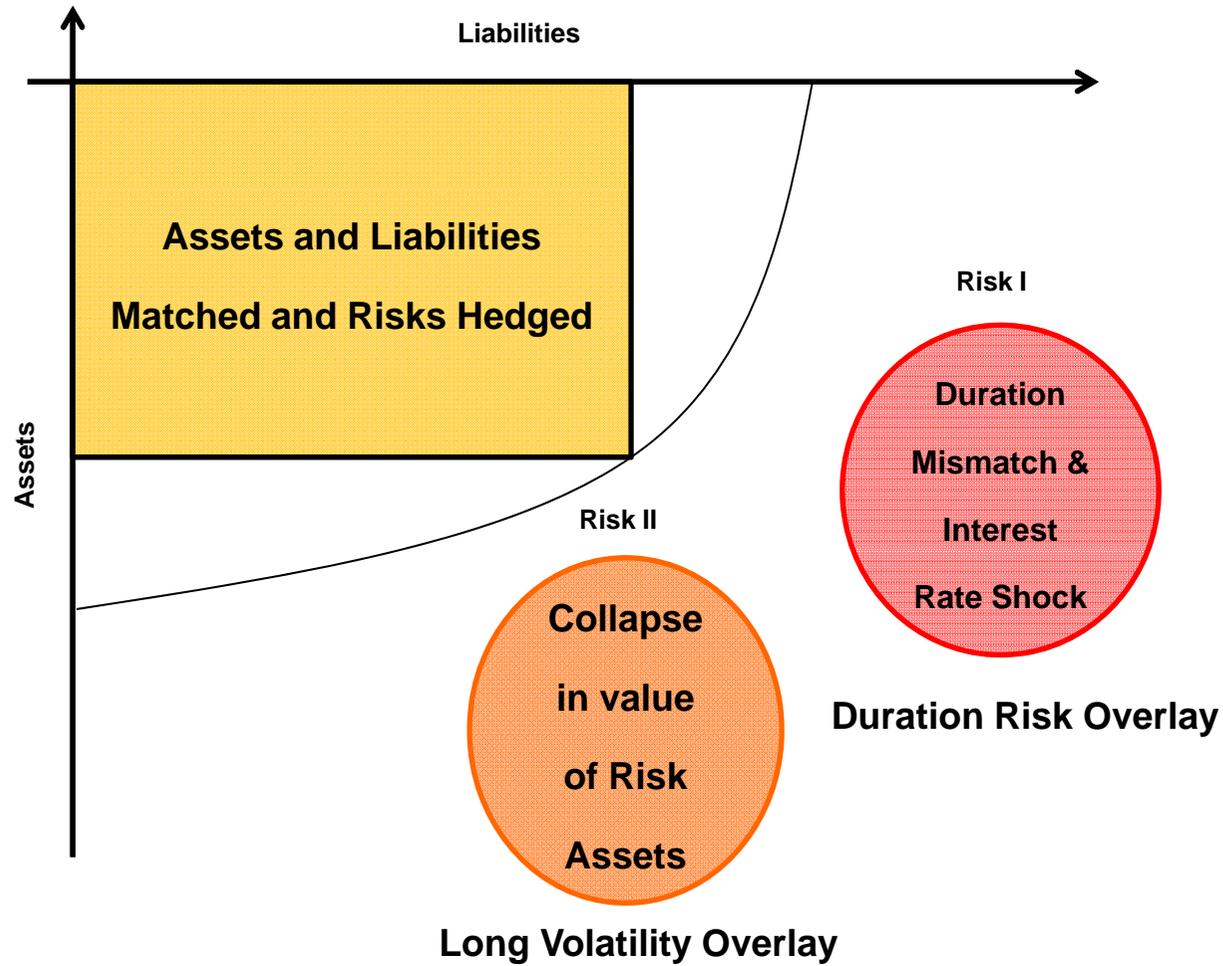


Our Skill Set

- **Our areas of expertise are**
 - **macro research, with an emphasis on analysing global liquidity flows**
 - **systematic model development**
 - **options trading**
- **We take a modular approach, allocating different weights to each sub-strategy dependent on the fund**
- **This allows us to create customised solutions for clients with a specific risk profile**



Major Risks to Avoid





Collapse in Value of Risk Assets

- **Equity and credit indices typically go “up the stairs and down the lift”, i.e. returns tend to be negatively skewed**
- **Credit-fuelled markets tend to have negative feedback: a large enough drop in risk assets will force liquidations, causing further drops**
- **Hence, investors aiming to meet return targets by taking more risk are subject to timing risk**
- **A -50% initial drop (as in the GFC) requires a +200% gain to break even**



Liability Risks

- **The key input to liability-driven management is the *discount rate*, which determines the present value of liabilities**
- **A scheme becomes progressively less funded as the discount rate decreases**
- **If the discount rate is derived from a “risk free” yield, Central Bank bond buying programmes can push a scheme underwater**
- **Alternatively, as asset prices rise, the equity risk premium should drop**
- **Hence, investors adding to risky assets after a rally should not expect much benefit to the NPV of liabilities, under reasonable assumptions**

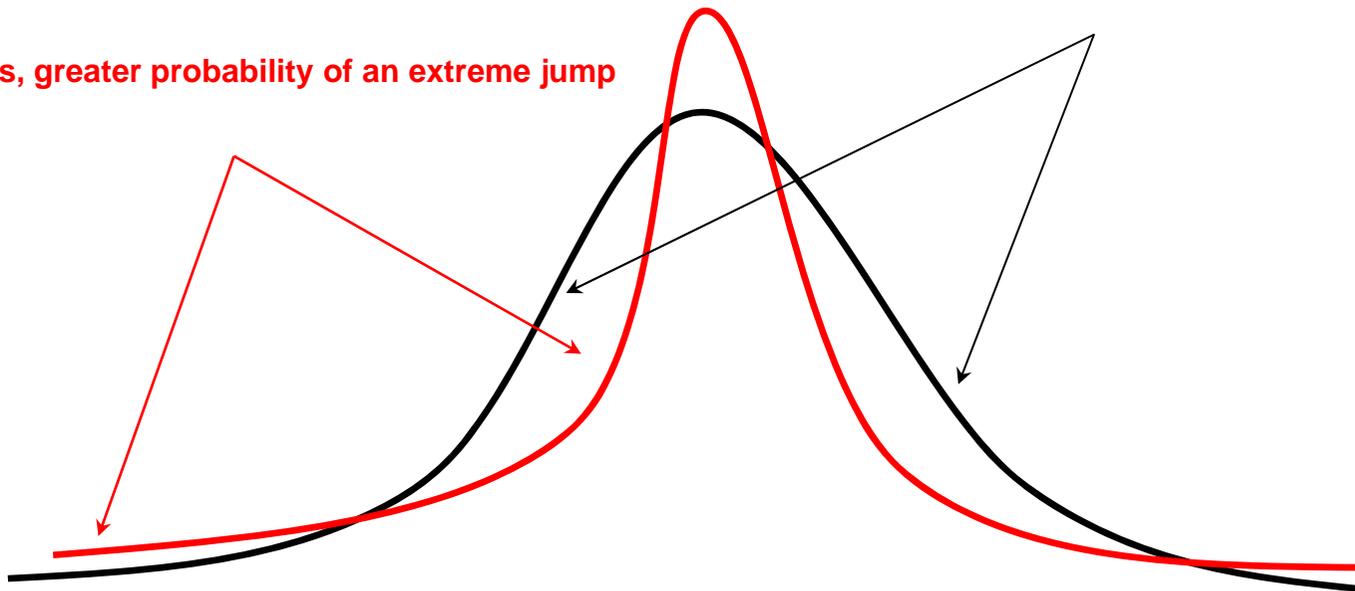


Qualitative Description of Long Volatility Overlay

on average, the market over-estimates
the probability of moderate size drops ,
hence the cost of hedging these is too high

true distribution: more small

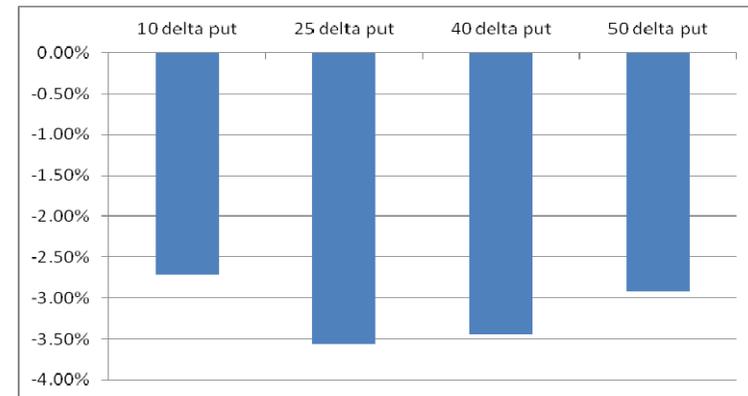
returns, greater probability of an extreme jump



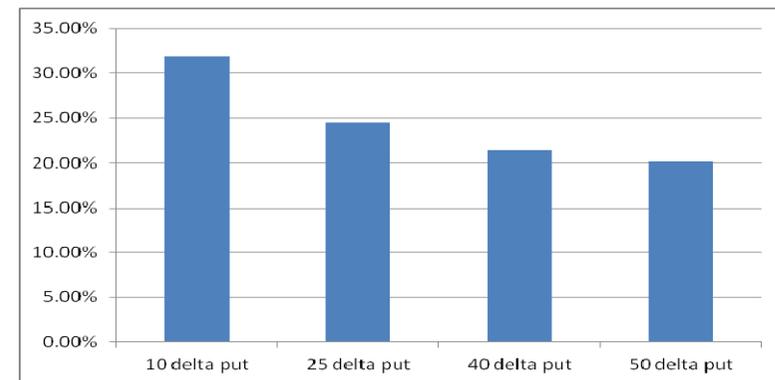


Empirical Justification

- Here, we simply tabulate the average performance of 1 month S&P 500 puts of various deltas, rolling weekly
- In a period where the index has returned roughly +50%, all put strategies have a negative return
- However, the 10 delta put was the least expensive as a function of premium paid, with the best return in 2008
- By contrast, the 25 and 40 delta puts seem the most over-priced
- This suggests that institutions are over-paying for hedging “reasonable” scenarios and that we should avoid these options



2005 to 2013: Average Performance of 1 Month Put Options as a % of Premium Paid (Data Source: Bloomberg)



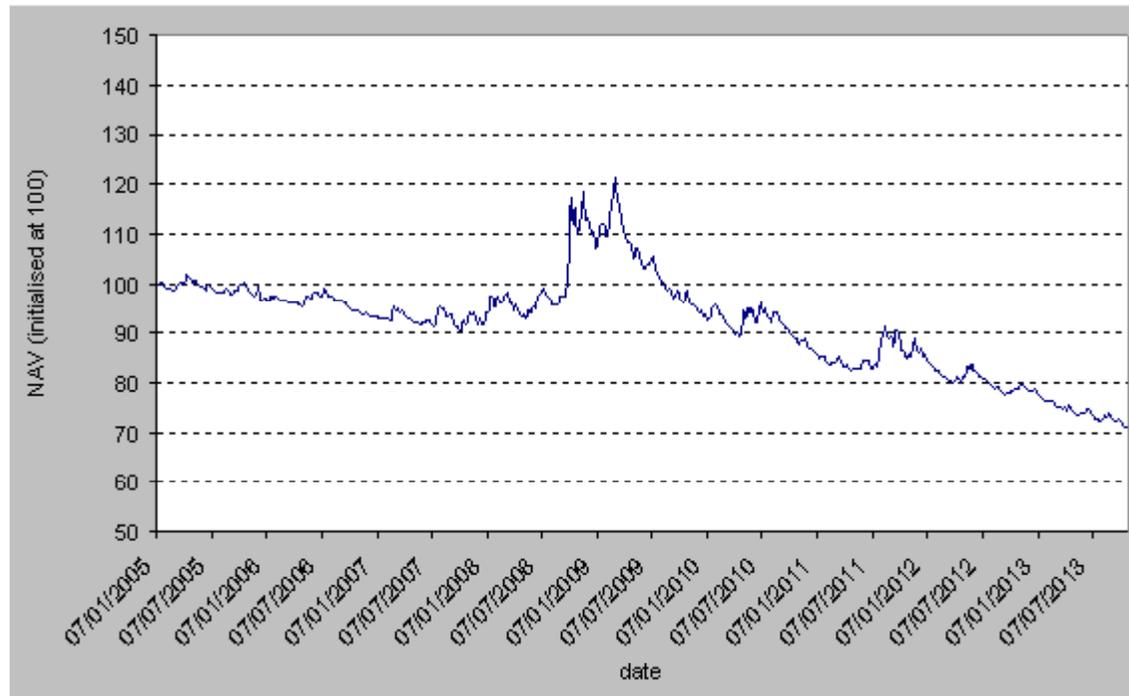
2008: Average Performance of 1 Month Put Options as a % of Premium Paid

Data Source: Bloomberg



Hedging Comes at a Cost

- There is no getting around the fact that hedging can be expensive
- The graph to the right shows historical performance for a strategy that involves rolling a 1 month at-the-money put every week
- Even during the Q4 2007 – Q3 2013 period, where the S&P return was relatively flat, the put-buying strategy lost nearly -20% gross of costs (un-gearred)
- A reasonable goal is to minimise time decay and other costs while maintaining protection

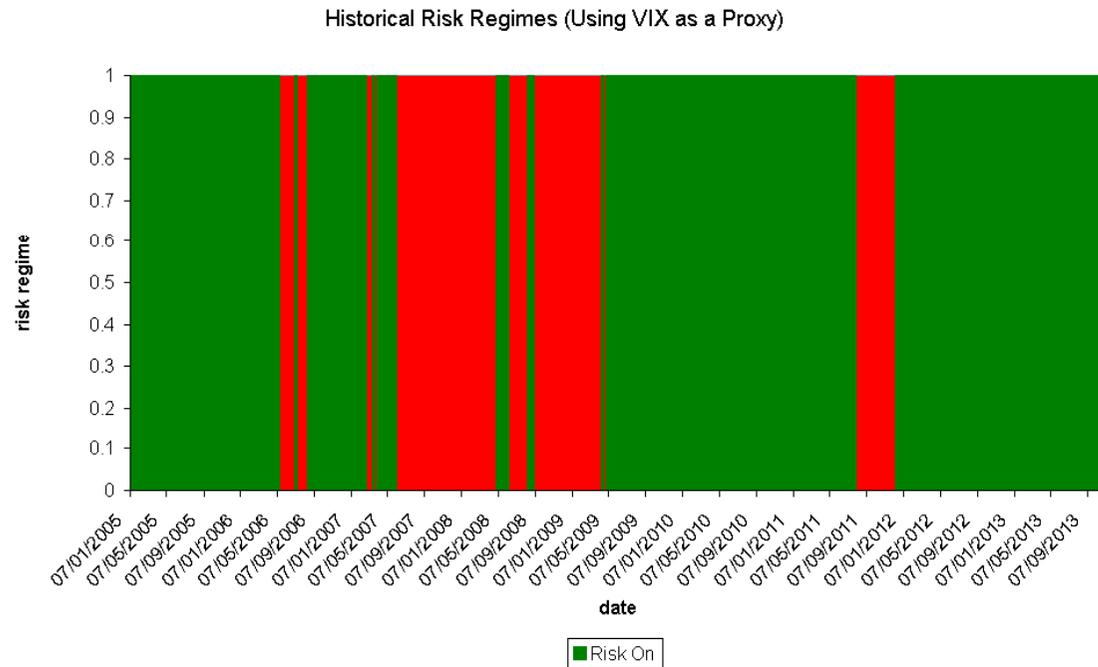


Data Source: Bloomberg



Sample Risk Regime Indicator

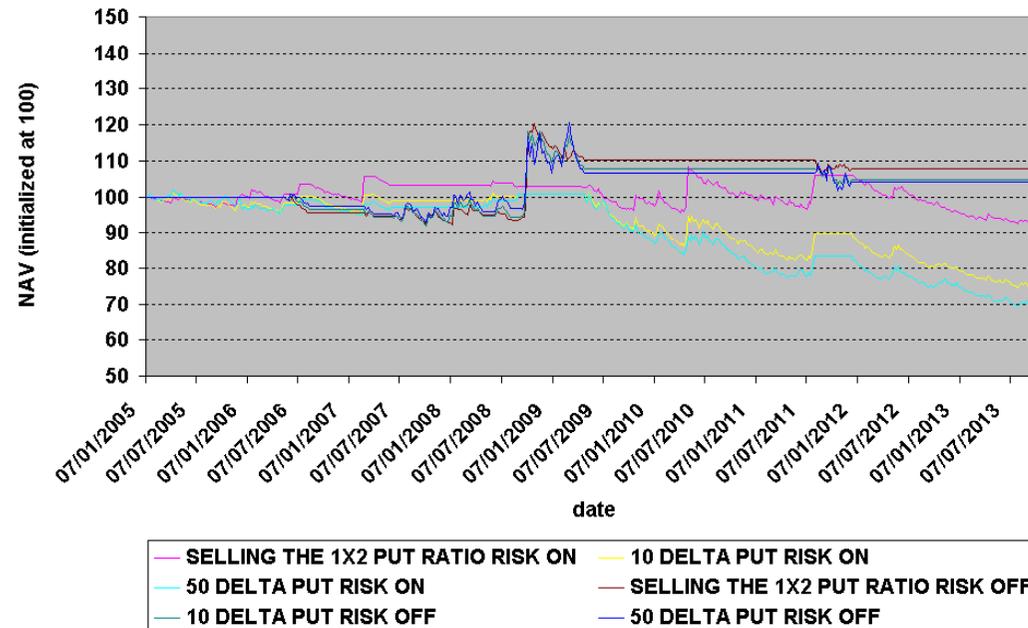
- Hedging costs can be reduced by analysing the performance of various strategies in different risk regimes
- The chart to the right is based on a simple risk indicator
- When the trailing Z score of the VIX is below (above) a threshold, the chart is green (red)
- In green, “risk on” phases, risky assets tend to perform well while hedging is a performance drag
- In red, “risk off” phases, the reverse is true
- Since each phase is persistent over time, we want to select the best hedge given the current risk regime



Data Source: Bloomberg

Conditional Performance of Various Sub-Strategies

- Here, we show the performance of various extreme event hedging strategies in risk on and risk off periods (i.e. the return is assumed to be 0 if we are not in a given regime)
- We can see that each strategy generates roughly similar performance in risk off phases, such as 2008
- However, the short put ratio spread (selling a 25 delta put and over-buying the 10 delta put) has the lowest downward drift in risk on periods
- Hence, we would select this sub-strategy over the other 2 in the current environment

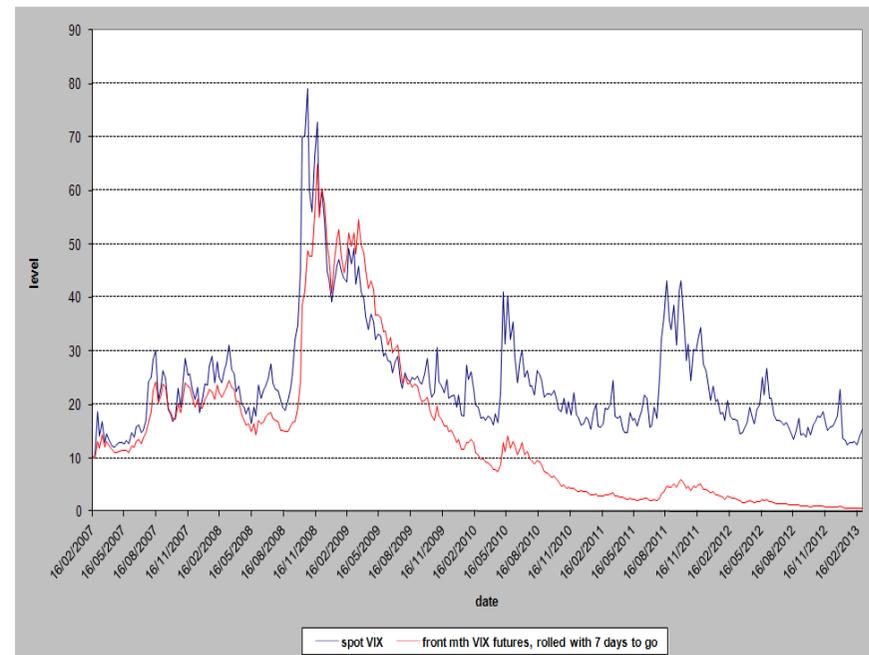


Data Source: Bloomberg



Spot VIX vs VIX Futures

- When volatility is low, it is tempting to hedge using the VIX, e.g. relative to an equity index
- The spot VIX holds its value more than an out-of-the-money equity index put
- This is especially true if the index rallies before falling sharply
- However, the futures roll down is typically so severe that this strategy must be weighed against the time decay in a traditional put-buying strategy



Data Source: Bloomberg



Roll Yield Mechanics

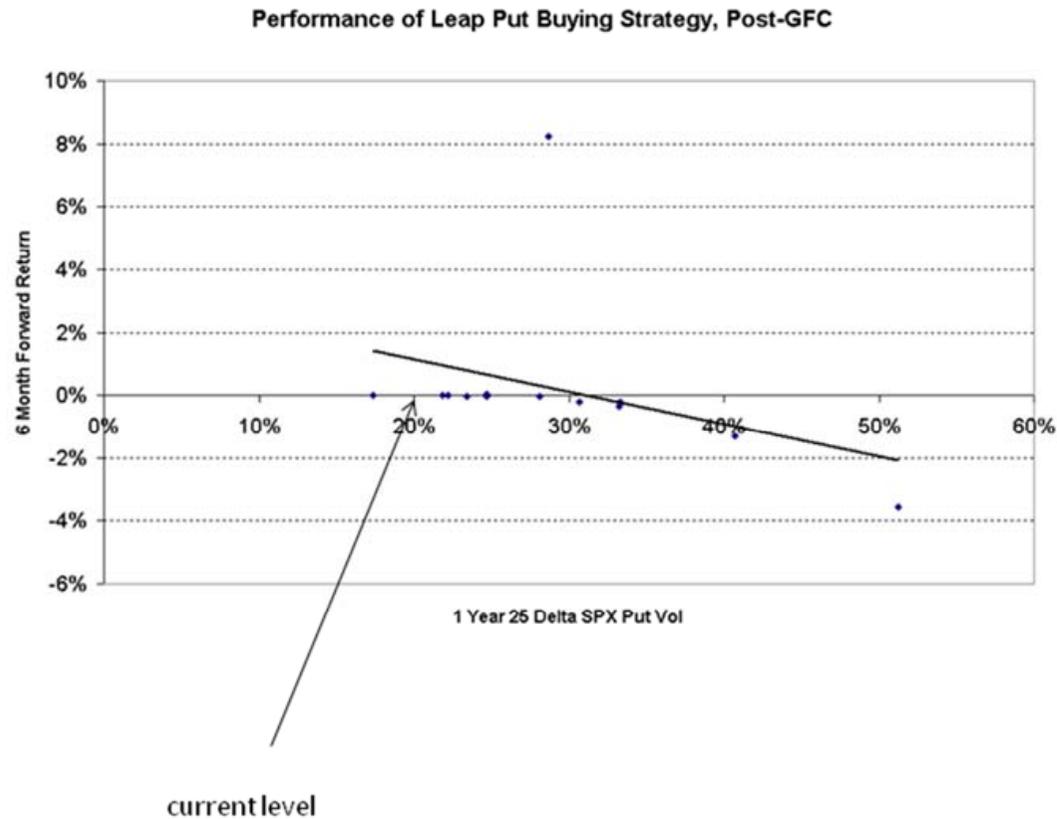


Source: Bloomberg



Volatility as a Value Investment

- The scatter plot to the right shows the relationship between volatility and the performance of a long-dated hedging strategy
- Every 6 months, we roll a 1 year to maturity fixed delta put on the S&P 500
- We then compare the return of the put to the implied volatility it was bought at
- We can at least tentatively conclude that it is more attractive to buy the put when volatility is low than when it is high



Data Source: Bloomberg



Case Study

- **A public pension fund decides to increase the expected return of its asset pool by allocating to risky assets (e.g. equity and credit)**
- **The basket has an estimated beta of 0.5 to a benchmark equity index (simple 1 factor model)**
- **However, the fund cannot tolerate a large drawdown in the basket**
- **A sharp drop may lead to under-funding issues, possibly compounded by the necessity of switching to a more conservative discount rate**



Hedging Strategy 1: Options Overlay

- One way to construct a hedge is by explicitly capping the downside, at minimal cost
- Recall from slide 12 that selling a put ratio reduces time decay in 'risk on' regimes
- The hedge is sized to eliminate losses beyond a -7.5% threshold for a USD 250 million portfolio with a beta of 0.5
- Note that the hedge costs nothing up front (i.e. no premium outlay) and provides full protection against an out-sized down move



Source: Bloomberg



Hedging Strategy 1: Combined Position

- The true “cost” is that the hedge actually detracts from performance for moderate downside moves in the index
- We are selling 1 SPX 25 delta put and buying 2.5 10 delta puts
- Hence, we need the results on slide 9 to persist in the future for the hedge to be efficient



Source: Bloomberg



Hedging Strategy 2: Combined Position

- Another way to construct a hedge is to target a hedge-adjusted risk premium
- Suppose our portfolio has a beta of 0.5 to the Eurostoxx 50 index and we assume a 3% annualised risk premium for the index
- We can then spend ½ of the premium on protection, buying 1 year to maturity 10 delta puts
- Slide 15 shows that, in a ‘risk on’ phase, buying long-dated puts is a reasonable value proposition



Source: Bloomberg

Hedging Strategy 2: Long Volatility Exposure

- At first glance, Strategy 1 seems much more attractive than 2, as losses are only capped around -27.5% below the spot
- However, long-dated options tend to have lots of vega (their value is very sensitive to changes in volatility)
- Hence, if we enter in a low volatility regime and 1 year vol increases by 15 points, the hedge increases dramatically in value, with no explicit reference to changes in the spot



Source: Bloomberg



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Implementing Insight

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REGULATED BY THE FSA
96 BAKER ST
LONDON W1U 6TJ
TELEPHONE 44 20 7908 2800
FACSIMILE 44 20 7908 2835
E-MAIL: Hari Krishnan hpk@liquidity.com

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