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CORPORATE & INVESTMENT BANKING

Corridor Variance Swaps:

A Cheaper Way to Buy Volatility?

Overview

- Given recent volatile market conditions, it is likely that many investors are looking for cheaper ways to purchase volatility. Corridor variance swaps may just be the solution.
- A corridor variance swap is a type of variance swap that only takes into account daily stock variation when the stock is within a specific range.
- However, unlike conditional variance swaps, daily movements happening outside of the range are not discarded, but rather counted as zero-variance movements.
- As a result, **strike prices for the swaps are significantly lower** than for a regular variance swap or a conditional variance swap.
- For investors who have a range-directed view towards the SPX, NDX or other major indices, a corridor variance swap can be an excellent alternative for investors who wish to purchase volatility.
- Below are suggested trades and their indicative pricing.

Indicative Pricing for Suggested Trade

	SPX Corridor Variance Swaps (Offer)	
Corridor Swap	Dec-07	Jun-08
90-Up	20.31	17.95
95-Up	17.84	15.98
105-Down	23.90	21.78
85-115	21.80	18.82
90-110	19.70	16.56
Regular VS	25.35	23.78

***Indicative pricing; please contact your BNP Paribas sales representative for current pricing.**

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Please refer to important disclosures at the end of this report.

What is a Corridor Variance Swap?

■ A corridor variance swap is a type of variance swap that has a **range-limited exposure to vega**.

■ While regular variance swaps are replicated by purchasing out-of-the-money (OTM) options on the entire range of an index, corridor variance swaps are replicated by purchasing options only on a particular range.

■ Because they can be replicated by purchasing fewer options, the strike prices for the swap are significantly lower than traditional variance swaps. However, daily changes that occur outside of the pre-determined range count as zero variance observations.

■ A long up corridor variance swaps have the following payoff:

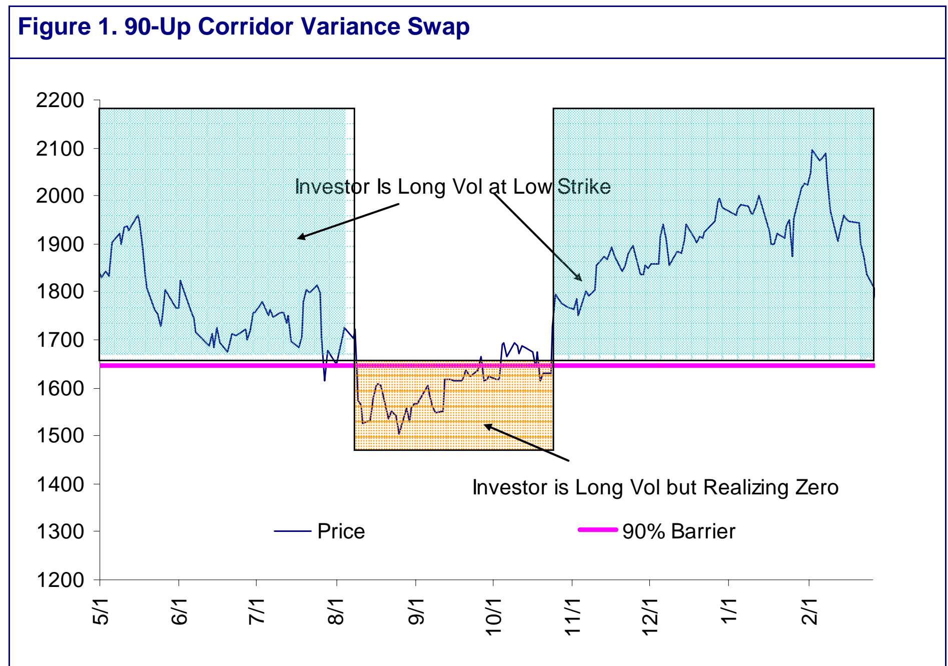
$$Payoff = K^2_{Upcorr} - K^2$$

Where K^2 is the initial strike price and K^2_{Upcorr} is described by:

$$K^2_{Upcorr} = \frac{252}{T}\sum_{i=1}^{T}(\ln(S_i / S_{i-1}))^2 x 1_{S_{i-1}>B}$$

■ Figure 1 illustrates a long 90-up corridor variance swap trade. The investor is long variance above the barrier, at a strike much lower than that of a vanilla variance swap. However, if the underlying falls below the barrier, the investor realizes zero variance for those observations.

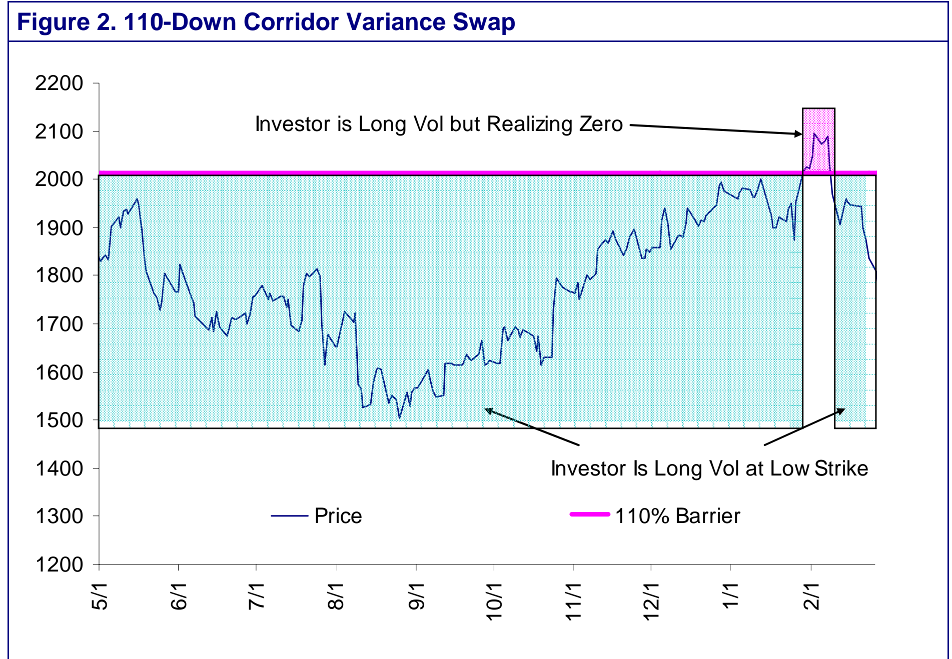
Figure 1. 90-Up Corridor Variance Swap



Source: BNP Paribas, Bloomberg LP.

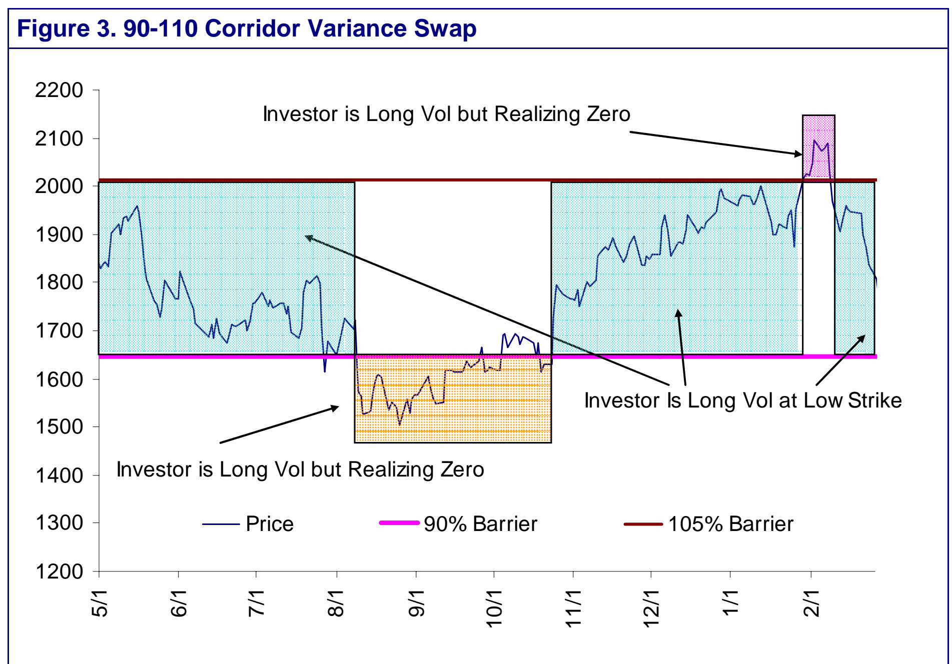
■ Figures 2 and 3 illustrate a 110-down corridor variance swap and a 90-110 corridor variance swap. They operate the same way, but just have different zero-vega ranges.

Figure 2. 110-Down Corridor Variance Swap



Source: BNP Paribas, Bloomberg LP.

Figure 3. 90-110 Corridor Variance Swap



Source: BNP Paribas, Bloomberg LP.

What Barrier(s) to Use?

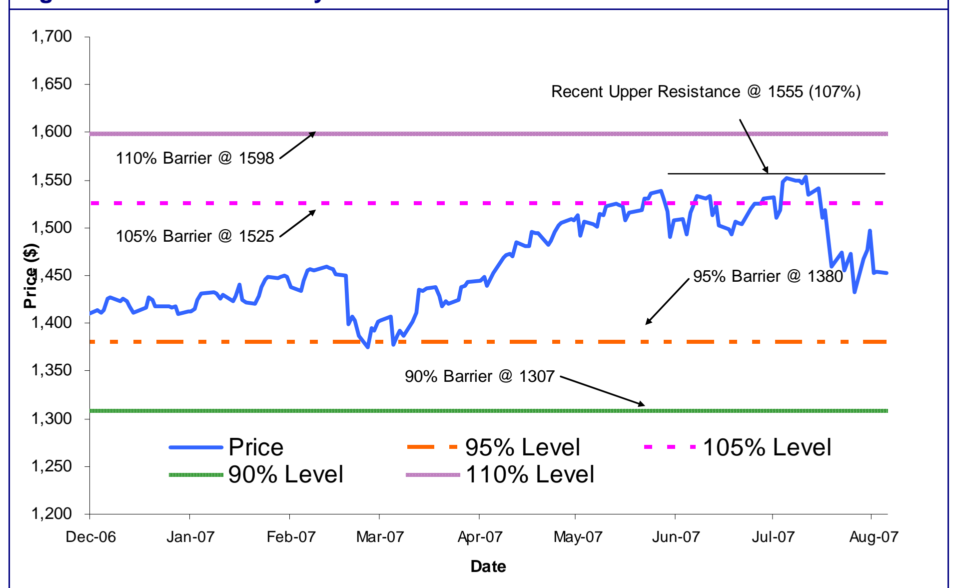
- These trades are particularly attractive when the investor wishes to be long volatility and has a range-bound view as to where the index will trade.

- In Figure 4 we chart the recent SPX price history, along with different potential barrier levels.

- **Bearish investors** should consider trades involving either no down barrier, or an 85% down barrier. The 85% barrier is 218 points below the low achieved after the fall in February. The June 08 SPX 105-down corridor variance swap is indicatively struck at 21.78.

- **Bullish investors** should consider trades involving a 95% lower barrier, such as the 95-110 and 95-up corridor variance swaps. The most conservative of these 95 barrier trades, the June 08 SPX 95-up trade, is indicatively struck at 15.98.

Figure 4. SPX Price History and Barrier Levels



Source: BNP Paribas, Bloomberg LP.

Why Use Corridor Swaps?

■ Corridor variance swaps appear quite risky because of the possibility of realizing zero variance outside of the specified range. However, there is a flip side to being long vega at a lower strike level.

■ Because of a lower strike level and **positive vega convexity**, the volatility breakevens are dramatically different from higher strike variance swaps. This is because in a variance swap, investors are trading variance, not volatility directly.

■ For example, consider a corridor variance swap struck at a volatility of 15. In an extreme worst case scenario, it can realize 0 variance for a loss of 225 variance units. **This trade experiences the same loss as a regular variance swap struck at 25 that realizes 20**. In addition, because the index generally begins in the chosen range, it is highly unlikely that 0 variance would ever be achieved.

■ Given that 3-month realized volatility is 17, and possibility that equity market volatility eventually mean reverts to its pre-February 2007 level (three year realized volatility is roughly 11), we feel the risk of taking on zero-variance losses is compensated for by the lower strike prices, and that it is an alternative worth considering.

■ In addition, investors who purchase corridor variance swaps have a less leveraged exposure to vega as they would with an ordinary variance swap, because they are purchasing fewer options in the options spectrum of strikes. They would be less exposed to loss if the market rallied, and implied volatility collapsed to pre-February 2007 levels.

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