RATELAB
MERRILL LYNCH US RATES STRATEGY
Value Concepts from the ML Trading Desk

# The "Positive Carry" Hedge

Almost by definition, a "hedge" is supposed to cost you some sort of value. The cost can be measured in Dollars, Total Return, Net Interest Carry, or Credit Quality, but it is expected that one will give up something for the Hedge benefit. So it is quite interesting that presently one can acquire both "negative duration" (in a steep curve) and "positive convexity" for what seems to be positive carry.

Let me detail those two risks before we go any further. As we have spoken about in past RateLabs, there are three main risk vectors available in the Debt Markets: Duration, Credit and Convexity. Duration is a bond's price risk given a change in rates. In a steep Yield Curve, bonds with longer Durations yield more than bonds with shorter Durations. As such, these bonds exhibit "positive carry" when one owns them. One earns extra yield to be exposed to the risk that interest rates will rise. Conversely, one would have to pay via "negative carry" to benefit if rates went higher. This is usually transacted by being short bonds. Thus, we say that being short the market is "negative Duration". And the steeper the curve, the greater the cost via negative carry.

Mathematically, Convexity is the second derivative of some rate of change. But practically, we indentify Convexity as some sort of unbalanced return. So if some asset or investment venture earns 10% under one set of circumstances and loses only 5% in an opposite situation, we would call this "Positive Convexity". If some other venture created a 15% return in one direction but lost 25% in the other, we would say this is "Negative Convexity". In short hand, we say Positive Convexity is "long options" and Negative Convexity is "short options". This is because a long option position can only lose the fee paid while the profit potential is unlimited – consequently, this is the ultimate in Positive Convexity. Of course there is a cost associated with Positive Convexity. In a vanilla options example, that cost is time decay, also known as Theta.

Placing both of these concepts together one can logically see that the most expensive asset in an environment where the Yield Curve is steep and Volatility is high would be a put (payer) option. A put option exhibits both Negative

Duration (it profits if interest rates rise) and Positive Convexity (limited loss versus unlimited gain). And we would measure this cost via its exceedingly large time decay as measured by its reduction in value over time.

## A Discounted Present Value, Not a Prediction

The derivative rates market operates under the principles of Arbitrage-Free conditions and Discounted Present Value. As such a Forward Rate is NOT the market's best guess (prediction) of the future but rather the DPV of the spot rate curve. Currently, there are overwhelming market forces that are twisting and flexing both the Rate Curve and the Volatility Surface to extremes.

With respect to the Curve, as detailed in the June 11, 2008 "RateLab - Another Fine Mess", the hedging of Daily Accrual Inversion Notes has not only inverted Sw30ry vs. Sw10yr, but also at times has inverted the Sw30yr vs. the Tsy30yr. With respect to the Volatility Surface, market forces have inverted this shape also. Huge demand for short-expiry gamma hedges from the MBS Servicers has weighed against long-expiry selling via Trust Preferred issuance.

The result: Despite a 169bps positive slope for Sw10yr vs. Sw2yr, the Sw10yr rate Ten years forward is actually LOWER than the spot Sw10yr rate by a few basis points. And the lofty 141nv for a 1yr-10yr straddle is 70% higher than the 83nv for a 10yr-10yr straddle. Let's see what prices pop out of the calculator after you DPV these twisted rates and vols.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| **Expiry** | **ATM Vol** | **OTM Vol** | **Fwd Rate** | **Strike Yield** | **Put Price** | **Strike Yield** | **Put Price** |
| *2yr* | 130nv | 138nv | 4.88% | 7.88% | *38bp* | 7.25% | *80bp* |
| *3yr* | 125 | 133 | 4.94 | 7.94 | *73* | 7.25 | *137* |
| *4yr* | 117 | 125 | 4.93 | 7.93 | *94* | 7.25 | *161* |
| *5yr* | 110 | 118 | 4.88 | 7.88 | *107* | 7.25 | *171* |
| *6yr* | 104 | 113 | 4.79 | 7.79 | *119* | 7.25 | *174* |
| *7yr* | 98 | 108 | 4.69 | 7.69 | *125* | 7.25 | *168* |
| *8yr* | 93 | 103 | 4.58 | 7.58 | *127* | 7.25 | *158* |
| *9yr* | 88 | 99 | 4.48 | 7.48 | *128* | 7.25 | *149* |
| *10yr* | 83 | 95 | 4.39 | 7.39 | *127* | 7.25 | *139* |

Yes, there are a lot of numbers above, but let's take it one column at a time. Every item in the table is either an input or an output to calculate a Put Option (payer swaption) on a Ten year tail. Column (1) identifies the time to expiry of the option; they range in rows from two years to ten years. Column (2) is the mid-market At-the-Money Implied Normalized Volatility for a vanilla straddle.

Column (3) is the Implied Nvol for a 300bps Out-of-the-Money put. Column (4) is the Forward 10yr swap rate. Column (5) is the Strike yield used to calculate the option price in column (6). Notice that these are all 300bp OTM. Column (7) is a fixed 7.25% strike yield used to calculate the option price in Column (8).

## Critical Observations

1) The spot Sw10yr rate associated with this table is 4.41%. As such, the 10yr forward rate is 2bps LOWER than the spot rate.
2) The OTM put "skew" is a about a constant 8 Nvols. However, because the ATM Volatility declines as expiry extends, the relative skew is actually increasing.
3) Despite the inverted Volatility Surface, the constant 300bp OTM options prices (6) rise uniformly over time. This is consistent with the notion of a long option position exhibiting negative time decay or theta.
4) The shape of Forward Rates is such that a constant 7.25% strike option actually decreases in price as the expiry extends.

## The Positive Carry Hedge

As noted at the outset, Rate derivatives are the Discounted Present Values of the spot Yield Curve and Swaption Surface. So to the extent that the market does not move a blip for the next five years, a ten year put option struck at 7.25% will actually increase in value from 139bps to 171bps. Now I will note that unchanged markets for five years are beyond a fairy tale. Nonetheless, this trade carries at a positive 6.5bps a year in a static analysis while having the properties of Negative Duration (in a positively sloped Yield Curve) and long Convexity. Contrast this to most positive carry trades that almost uniformly include selling options or trading against the forwards. This trade is NOT magic; in fact you will certainly pay a Princely bid/offer to enter into it. It is available because the Spot Yield Curve is so massively dislocated and the Swaption Surface is so completely inverted.

## The Exit Strategy

RateLab readers know that we are supremely bearish on long USD interest rates. We know that Inflation is the ONLY solution to our current Financial Crisis and this will eventually steepen the curve and substantially increase long Rates.

Consequently, we do not need to wait the full ten years to profit on these trades; the Yield Curve and the Volatility Surface can do the heavy lifting for us.

1) There will be little time decay during the first few years of this trade. Notice in Column (6) how the "roll up" on the surface combined with the discounting of the option premium leaves the +300bp option price almost unchanged over the first three years.
2) An ultra inverted swap spread curve (117bp for 2s, 48bp for 10s, and 8bp for 30s) is dampening the "Forward Effect". The Sw10yr is +48bp two years forward while it is almost +80bp for the Tsy10yr. As the FED fixes the "Libor Problem" and flattens the spread slope, long tail Swap forwards will zoom higher.
3) As the FED "helicopters money" and the Treasury issues debt, Inversion Note hedging needs will be satisfied and the Yield Curve will steepen.
4) When the Curve does steepen and the Digital Yield Curve options "flip" out-of-the-money, all the "receive Sw30s" hedges will be reversed.
5) Financials have issued almost all the Trust Preferred they can. The recent issuance will not be called until at least 2012. As such, supply will be limited and the pressure on long-dated expiries will decline.

I expect this trade to coast along for six to eighteen months and then kick in hard. At least that's the plan.

## The Risks

1) Let's be clear, these are NOT cash tens that trade like water. There is a substantial bid::offer that must be paid at inception.
2) You are long Vega. However, while short expiries such as the MOVE Index are more than double the long term average, ATM 10yr-10yr at 83 is only 6% above its long-term trend level.
3) Dave Rosenberg is right and we become Japan. Well, losing your small option premium will be the least of your worries !!!
4) This is NOT a "relative value" trade; it is a Macro investment with a two to three year horizon.

ML US Rates Strategy
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