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MUSINGS FROM HARLEY BASSMAN:

The Convexity Maven

Value Concepts from the BofA Merrill Trading Desk
December 8, 2010

"The Positive Carry Hedge, A Reprise"



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 the past, 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 go 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 identify 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 a similarly 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 could logically deduce that the most “expensive” asset in an environment where the Yield Curve is steep and Implied Volatility is high would be a put (payer) option. Since a put option exhibits both Negative Duration (it profits if interest rates rise) and Positive Convexity (limited loss versus unlimited gain), markets should charge a high cost to own this risk profile. And usually such is the case. This cost tends to be born via exceedingly large time decay, as measured by its reduction in value over time. However, for reasons to be detailed below, we have found an investment that seemingly provides both Negative Duration and Positive Convexity, all the while producing a small positive return in the early years.

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. Similarly, the shape of the Implied Volatility surface is NOT by itself a prediction of how calm or risky the markets will be in the future, but instead are a function of various spot market supply::demand components. Currently, there are overwhelming market forces that are twisting and flexing both the Rate Curve and the Volatility Surface to extremes. This is the source of the opportunity.

Our discussion continues with reference to the table below. Yes, there are a lot of numbers, 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 payer swaption with the strike noted in Column (5). Column (4) is the Forward 10yr swap rate. Column (5) is the Strike yield used. Column (6) is the mid-market option price using the inputs of the previous columns. This grid is taken directly from our unified pricing system.

1 Expiry	2 ATM Vol	3 OTM Vol	4 Fwd Rate	5 Strike Yield	6 Put Price
<i>2yr</i>	111nv	136nv	4.04%	6.00%	<i>130bp</i>
<i>3yr</i>	110	129	4.42	6.00	<i>246</i>
<i>4yr</i>	109	122	4.69	6.00	<i>344</i>
<i>5yr</i>	107	117	4.86	6.00	<i>410</i>
<i>6yr</i>	104	112	4.95	6.00	<i>441</i>
<i>7yr</i>	101	108	4.99	6.00	<i>459</i>
<i>8yr</i>	98	104	5.01	6.00	<i>454</i>
<i>9yr</i>	95	100	4.99	6.00	<i>445</i>
<i>10yr</i>	92	97	4.97	6.00	<i>433</i>

Notes:

Spot = 3.11%
Mid-Market Levels

All charts, unless otherwise noted, are sourced from BofA Merrill data

Funny Rates

In a world with a steep spot Yield Curve, the forward rates produced tend to be higher than spot rates. This differential is the Net Present Value of the Carry not earned by owning the spot instrument. However, notice the Forward rates in Column (4) for the years eight to ten. These rates are basically unchanged. The reason for this is the anomaly that the slope of the Yield Curve from years ten to twenty is not proportionally as steep as the slope from years zero to ten. This exists because of investment demands driven by the regulatory/accounting needs of long liability managers. (A symptom of this is the positive swap spread of about 15bps in the ten year sector versus the negative 30bps swap spread in the thirty year sector.) But whatever the reason, the end result is that the cost of negative duration in forward space, when measured via the street standard of "roll down", is almost costless.

Funny Volatilities

It is no surprise that the peak of the Implied Volatility surface occurs near the three year expiry. This is because it is this point that most closely matches the risks inherent in the MBS market. What is surprising to those not deeply involved in the derivatives market is the steep negative slope for ATM options from the three year point to the ten year point. (See Column (2))

The reason for this is the large supply of ultra long-dated options created by the issuance of Trust Preferred bonds. The beauty of these bonds, from the issuers standpoint, is that while the coupon payment is treated like Debt and is tax deductible, the principal proceeds can be treated as Equity Capital. This bifurcation of treatment is a powerful incentive for many financial institutions and rationalizes their effective sale of ten year options at presently a 17% discount to three year options (92Nvol vs. 111Nvol.)

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 with no tricks or crazy conditions, the prices in Column (6) are produced. Using the standard Wall Street analysis of pure "roll down", the expected heavy time decay occurs in all the options with expiries within five years. For example, the four year to three year "roll down" cost is 98bps (344bps to 246bps) or fully 28% of the value of the option. But notice the cost profile of a ten year swaption. Its initial mid-market value of 433bps actually rises over the first three years.

Now I will stipulate that fully unchanged markets for three years are beyond a fairy tale. Nonetheless, one has to start the analysis someplace and pure "roll down" is not the worst. This trade carries at a positive 26bps over its first three years 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 slightly twisted and the Swaption Surface is so completely inverted.

The Exit Strategy

Long-time 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 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. As such, there is plenty of time for our idea to work.
- 2) An inverted swap spread curve (22bp for 2s, 15bp for 10s, and -30bp for 30s) is dampening the "Forward Effect". Normalization will move distant forward rates higher.
- 3) Regulatory changes may dampen the ability to issue Trust Preferreds; this will reduce the "inversion" of the Volatility Surface.
- 4) Expansion of QE2 would apply more pressure to long rates

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 fair bid::offer that must be paid at inception.
- 2) You are long Vega. However, Implied Volatility is near its long term average. (The MOVE index at 103 equals its 20 year average.
- 3) The "Cassandra" pundits are correct and we do 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.

We repeat: Since inflation is the ONLY solution, it will be the solution. It is just a matter of time. This low dollar cost investment offers superior hedge value at what is analytically zero cost. Take advantage of today's twisted risk Vectors to protect yourself now.

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