RATELAB

MERRILL LYNCH US RATES STRATEGY

Value Concepts from the BAS/ML Trading Desk

Nessie, Yetti and CMM

The Search for Costless Positive Convexity

The Quants will tell you that "Convexity" is measured by the scale of the second derivative. The Engineers will describe it as a non-linear function. And the Bookie next door will probably tell that it is his profit in the deal. But no matter your definition, low-cost Positive Convexity is the Holy Grail of the high performance money manager.

We like to describe Positive Convexity as the payout function where you can make more than you can lose given equal opposing moves in the market. In the simplest example, a cash Treasury Ten-year note will go up by 9 points if rates decline by 100bps but will only decline by 8 points if rates rise by a similar 100bps. The most powerful way to buy or sell Convexity is via options. Since the cost is usually only the (relatively) small upfront premium and the potential gain is unlimited, the measured Convexity will be quite large.

Securities that exhibit large Convexity profiles usually have some sort of embedded option. Since positive Convexity is inherently good, bonds that are positively Convex tend to trade to lower yields, all else equal. Similarly, negatively Convex securities tend to trade to higher yields to adjust for the inferior payoff profile. MBS bonds are the most well known Convex bonds. They offer yields, on average, of 125bps greater than Ten year Treasuries in exchange for absorbing the call (pre-payment) risk. Corporate bonds are structurally similar to being long Treasuries and short an embedded "default option" to create the extra yield. Unfortunately for much of the Financial World, risk managers discovered too late that there is no "closed form solution" for Corporate bonds versus CDS.

Most money managers prefer to invest in negatively Convex securities (via selling embedded options). They receive a slightly higher coupon/yield in exchange for the downstream risk of poor Total Return performance if markets become volatile. It is NOT necessarily that they believe the options they are selling are rich, it is

more that they fear that their investors will be unwilling to accept the lower current yield associated with the purchase of positively Convex bonds (by buying embedded options). Superior money managers are the ones who can find the best performance for the highest yield. They effectively buy cheap options and sell rich ones. As such, the dream investment is the purchase of some sort of financial option for zero; receiving all the upside with no cost.

Now, no rational person will directly sell an option for zero. However, there are some packages of investments that we believe, under reasonable circumstances, will perform in a positively Convex manner at no cost. As a matter of fact, we believe we can presently create an investment that is both Positively Convex with Positive Carry !!!

CMM – The Constant Maturity Mortgage

The Constant Maturity Mortgage (CMM) product was created specifically for the MBS Servicer. Since over 80% of the risk in the Servicing asset is the Mortgage rate, a product that could purely isolate this risk with no management had a wide audience. CMM eliminated the costly alternative hedge of trading and financing MBS TBAs to maintain a constant dollar exposure to the Mortgage rate. When combined with the "hedge accounting" allowed for the Servicing asset, CMM created a way for large banks to almost totally control short-term Income Statement variance. This is the under pinning of the huge demand for the CMM product.

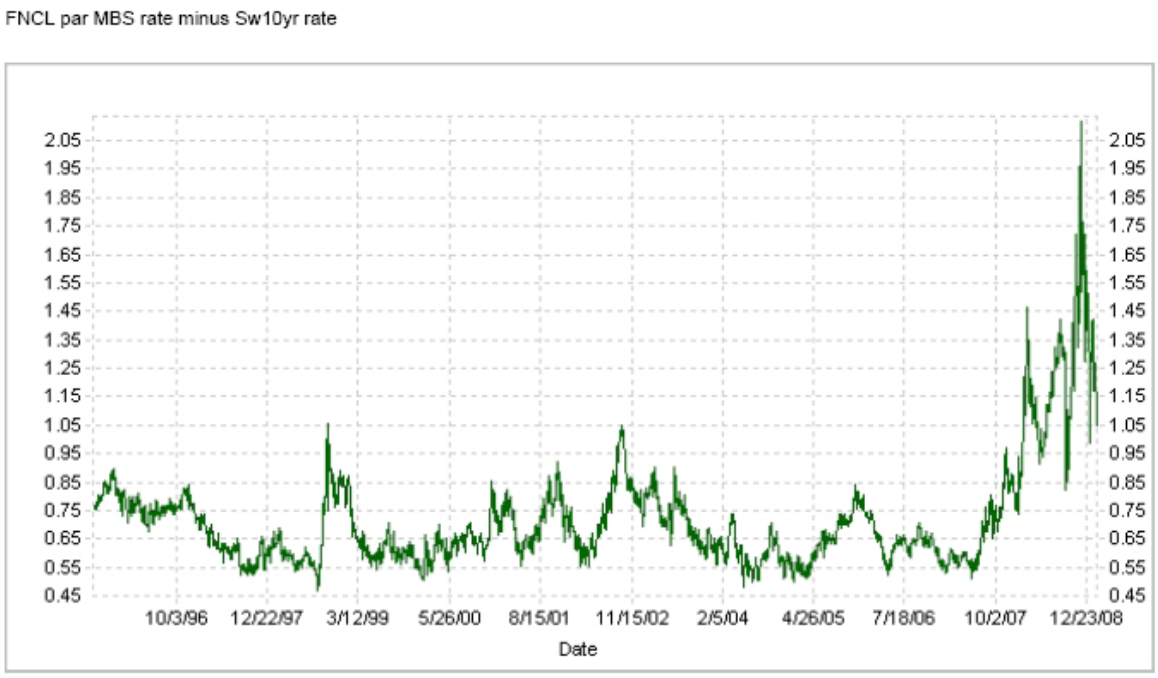
In a nutshell, CMM is similar to CMS (Constant Maturity Swap). A rate is fixed for sometime in the future, usually one month to one year. The payout is often a cash settled $10,000 per basis point per $100mm notional, although physical delivery of TBAs can also be used to terminate a transaction. There is no cash-flow carry, convexity or other vagaries to manage. **One rate, no tears.** You are always either long or short the Par MBS Rate. *(For a detailed write up, please contact Li Chen, our CMM trader.)*

Although the description and payout formula for CMM is quite simple, an analytical framework to value the product is not so clear cut. As stated above, CMM is almost identical to the CMS product. Since there is a relatively transparent market for swaptions of various maturities and strikes, the difference between a simple forward starting interest rate swap and a forward starting CMS can be defined within a small band. However, since there is no transparency or agreement upon the embedded convexity and long-term financing (six month to one year dollar rolls) of TBAs, it is much more difficult to say definitively what the "right price" is for CMM, especially long-dated CMM.

Stability No More……

Although CMM is a tad more complicated, it can be roughly approximated via the Bloomberg function: {MTGEFNCL Index GPO <go>}

The –green line- below is the spread between this approximated CMM rate and the Spot 10 year Swap rate. Notice that for quite some time it was extraordinarily stable between 55bps and 85bps. It has been the huge increase in realized spread volatility that has driven the demand for the CMM product from MBS Servicers. What is critical to notice here is that this nominal spot spread has never closed below 50bps on a monthly basis. This is almost a requirement in a rational market since a callable bond should never trade to a lower yield than a similar bullet bond. We calculate that a 3yr into 10yr swaption straddle would need to consistently trade below an Implied Volatility of 70 Nvol to compress this spread under 50bps.



Confounded Pricing Intuition

In general, the difference between the spot spread and the forward spread of two securities tends to be equal to the present value of the net carry between the two securities. So if two five year bonds are 100bps apart in yield in spot space, they should be about 120bp apart one year forward (all else equal).

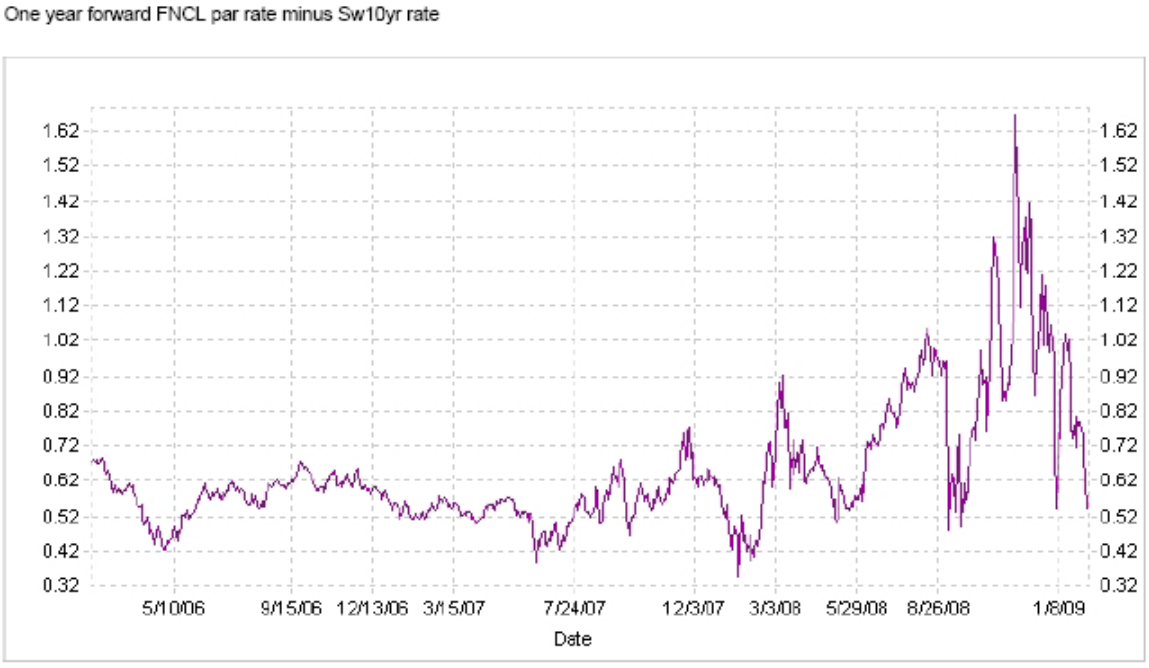
Presently, the spot CMM vs. 10CMS spread is about 105bps. Applying the logic from above, one would naturally expect that same spread quoted one year forward to be greater than 105bps. However, all else is NOT equal here. This is because both the CMS and CMM products contain embedded options.

With respect to valuing a one year forward 10CMS, you can break it down into two components. The pure "carry" component is worth about 28bps given the current shape of the yield curve. The optionality is worth another 10bps. Together, the one year forward 10CMS rate is about 38bps higher than the spot rate.

The calculation for CMM is much more difficult. The carry is worth between 40bps to 60bps depending upon prepayment assumptions and funding levels. However, the cost to buy back the embedded Convexity to create a constant $10,000 per basis point more than offsets this value. As such, the one year forward CMM rate is presently 10bps LOWER than the spot rate.

Placed together, the one year forward spread between CMM and 10CMS is currently about 60bps.

While we know of no database that stores the one year forward CMM vs. 10CMS spread, the -purple line- below should be a fairly accurate estimate of how this spread has performed over the past few years. Notice how it seems to bottom out near 50bps, which coincidentally marks the "forever low" of the spot spread.



The Brilliant Opportunity

If we still have your attention, the trade should now be obvious:

Pay CMM vs. Receive 10CMS (buy the spread) one year forward under 60bps !!!

We define this structure as "Positive Carry" via the concept that if all spot markets remain unchanged, the value of the position increases in value over time. This characteristic is frequently referred to as "positive roll down". And although this structure may analytically be diagnosed as negatively Convex, the cold reality is that having a risk exposure that profits from wider MBS spreads can only be thought of as being long "Event Risk". You simply must be long "the tails" since a true shock to the system almost certainly does NOT tighten "risk spreads". This trade is the polar opposite of what speculators, i.e. Hedge Funds, often engage in which involves selling tails for a rich premium and hoping for the best. (See "The Black Swan" by Nassim Taleb)

Not only is this trade superior in it own right, but it is also a fabulous overlay for a strategy that subsequently sells correlated tails in other markets, such as a long position in First Pay Sub-Prime bonds or "True Triple AAA" Residential or Commercial bonds.

What is the risk ?

Obviously that the spot spread is below 50bp a year hence. Can this occur ? We doubt it. It would probably require Ten year Swap spreads to widen past 100bp while MBS remains inside 125bps to Treasuries. However, to widen the Spread this much would probably entail a crumbling of the banking system. If that were to occur, cash MBS bonds would finance at greater than Libor+100bp which would then rip the support for these bonds out from under them.

Anything is possible, but this particular risk seems quite unlikely. If there is a risk, it is that the Government cannot support the financial system and that balance sheet becomes even dearer. With the CMBS/CMBX basis north of 400bp and the 30yr Swap Spread south of -25bp, it is obvious that cash securities are difficult to hold. As such, a position that is effectively short Cash securities while long Derivatives should not be at risk of an inversion.

Final Thoughts

This trade is the essence of simplicity. <u>There is no cash-flow carry or rebalancing required</u>. $100mm notional is $10,000 per basis point. If you execute $1bn notional now at 60bps and cash settle one year hence at 80bps, we write you a

check for $2mm. (Standard ISDA terms apply.) Fundamentally, you are short a Negatively Convex underlying instrument versus long a Positively Convex one. As such, you are certainly long mathematical Vega. (Higher Implied Volatility correlates strongly with wider nominal MBS spreads.)

The timing seems perfect. We have tightened dramatically with the commencement of the FED "buy program". We should widen out over the next six months as the mortgage ReFinance machine kicks into high gear to process the $2.5 Trillion mortgages that are economically eligible. Finally, you are entering the trade near the forever lows in the spread in a world that still has tremendous uncertainty.

If you do desire to do this transaction, we urge you to pick a level and give us an order. That will ensure an optimal execution since the effective bid//offer is between 5bp to 10bps. If your horizon is not at least three to six months, this trade, while potentially profitable, is probably not for you. If you hope to "delta hedge" the risk with spot TBAs and Swaps, then once again, this trade is probably not for you since the fundamental creation of this opportunity derives from the uncertainty of MBS Durations and Convexity. Finally, this trade must be sized according to your ability to take significant daily mark-to-market volatility. Daily variance can easily be 5bp to 15bps.

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