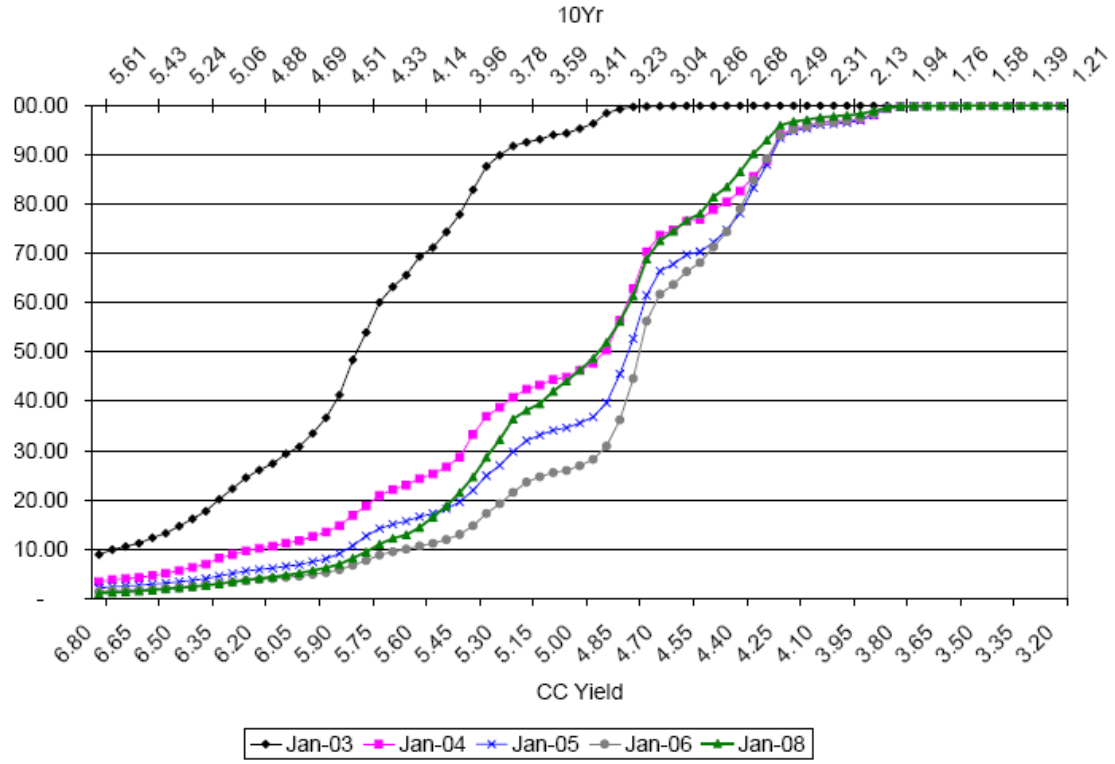
RATELAB

MERRILL LYNCH US RATES STRATEGY

Value Concepts from the ML Trading Desk

The Convexity Vortex Returns

That giant sucking sound you hear can only be the return of *Merrill Lynch's Economic ReFinancability Chart*, more commonly known as **The Convexity Vortex**. Below we re-introduce the fundamental concept the Vortex that we believe is currently the key risk driver for the rates market.



The Theoretical Background of the Vortex

The Convexity Vortex is NOT a prediction of when or where prepayments will occur given a rate level, as such, it is NOT a prepayment model. Rather, it is a straight-line tabulation of the cumulative percentage of 30year Fixed-Rate Passthru securities that have a Gross Weighted Average Coupon (GWAC) of 110bps higher than the Constant Current Coupon secondary market yield. This is also known as the Constant Par MBS Yield which is mathematically similar to the Spot CMM rate. It can be found, real time, on Bloomberg as: {MTGEFNCL Index GPO <go>} [Note: There is a small calculation difference between the Bloomberg rate and Dealer CMM rate.]

The main purpose of this analysis is to identify the locations where the *embedded prepayment strikes* are concentrated. Although the 110bp is somewhat arbitrary, it is probably close the long-term historical reality. We chose it by assuming an average 40bp Servicing cost + Guarantee Fee spread between the primary and secondary MBS rates. We then added a 70bp ReFinance incentive to cover the homeowner's costs of time and money. The sum of these is the 110bps spread. So in a nutshell, we assume that once a homeowner's mortgage is 110bps "in-the-money" versus the Secondary (MBS Passthru) Rate, it can be Economically ReFinanced. To repeat, this does NOT mean it will be ReFinanced.

Merrill Lynch created the Economic ReFinancability concept during the 2002 to 2004 MBS boom. We noticed that rates had declined significantly and then stabilized near 4.00% on the US Treasury 10 year. The subsequent long period of stability enabled nearly a Trillion dollars in Fixed-Rate MBS to refinance into what became FNMA and FHLMC 5.5s. The ReFinancing of a disparate variety of loans into a single Fixed-Rate coupon increased the concentration of PrePayment risk around a single point.

This is made clear in the chart above. **-The black line-** represents the state of the market in January 2003. Notice how it ascends smoothly from a 6.80% to a 4.80% MBS rate. This is because there was an even distribution of mortgages with roughly 8% to 6% GWACs. As rates declined, the market reshaped to **-the pink line-** by January 2004. Notice the "kinks" that occur, especially at the 4.90% level. This represents the concentration of loans around a single strike. It is the critical concept: The creation of a few ultra-steep slopes instead of a smooth incline. This is what we refer to as the ***Convexity Vortex***.

Why is this important? As any options dealer will tell you, the key to managing risk is to have a diversified portfolio of positions. In this way, the Gamma, Theta, Vega of the book stays relative constant over time and over rate structures. However, if the book develops a concentration near a single strike or date, the book quickly becomes unbalanced and significant daily hedging is required to maintain stability. What effectively happened in the MBS market is that all the various strikes and dates were converted (ReFinanced) into a single option. Recall from your Options 101 class that convexity reaches its zenith as you near strike. Since the entire market is short this single option (remember, the homeowner doesn't delta hedge) there is no way to truly offset this risk. As such, instability is created whenever the market comes near this location (strike). The MBS segment of the Fixed-Income market is its largest component; consequently, any instability in MBS will quickly spill over into the other related markets.

Three Years Later

Until recently, the Convexity Vortex had not been that impactful. The primary reason was that rates had been relatively high so the Vortex had been rather distant. However, a careful look at the chart above shows that the location of the Vortex has slowly been rising in rate level (shifting left). From January 2005 **–The blue line-** to January 2006 **–the grey line-** to January 2008 **–the green line-** the "kink'' in the curve has migrated left as ARMs have ReFinanced into FNMA and FHLMC 6s. The recent increase in Fixed-Rate production combined with the migration of the "kink" has prompted us to dust off and re-introduce the Convexity Vortex.

Back into the Teeth of the Vortex

The recent rally in the market to the 3.80ish% level on T10yrs and the concurrent reduction in the MBS rate to 5.30ish% has placed the market squarely into the middle of the Convexity Vortex. With FN/FH 5.5s nearing a 101-handle, FN/FH 6s with a GWAC of 6.50ish% are becoming Economically ReFinancable for Prime borrowers. Moreover, the next "kink", the massive FN/FH 5.5s cohort, is a mere 25bps away from becoming economically "in-the-money".

The Implications

The customer base most impacted by the Convexity Vortex is the MBS Servicer. Recall that Servicing is mathematically similar to an IO. Furthermore, the risk profile mimics that of a short call option position, i.e., short Duration and short

Convexity. Since the Servicer is short *MBS-rate Duration*, their best initial hedge is to purchase MBS Passthrus. However, since Passthrus are also negatively convex, this doubles up their *Gamma* and *Vega* risk. This is why Servicers are such large buyers of options – they need to flatten out their convexity profile.

Ideally, they would love to buy longer-dated Volatility on the MBS rate. However, MBS options are only liquid out three months (and even then, it could be difficult to buy $5 billion at a clip like they do in swaptions and CBOT options). This is also why the CMM product has flourished; it is implicitly a way to buy longer-dated MBS rate volatility. As such, they are routinely "gamma-ed" into a basis trade that requires constant management.

As noted, Convexity risk maximizes near the strike. So as we near the concentrated strike zone of the Vortex, the MBS Duration risk becomes more unstable. Since the entire market is short, everyone needs to buy duration on a rally and needs to shed duration in a back up. The quantity needed increases as the Convexity increases. This is why the market realizes greater Volatility around the Vortex and why Implied Volatility increases in tandem.

As long as the market is within the Convexity Vortex, one should expect increased Realized Volatility and elevated Implied Volatility. As currently configured, there is a bi-modal Convexity Vortex located at the T10year equivalent rates of about 4.00% and 3.50%.

The Trade

The trade is quite simple – own options struck near the Vortex and sell options that are further away, either higher or lower in rate. Period.

NOTE: We are especially fond of selling -100bp receivers/calls because the Servicing profile becomes positively convex at this rate level, but we will save that for another RateLab !!!

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