

Sell Memorial Day, Buy All-Star Break ?

CBOT Old Wives' Tale - circa 1990

As long-time readers know, our mantra with respect to fixed-income risk analytics boils down to only three vectors: Duration, Credit and Convexity. As such, it is the job of the portfolio manager to allocate his risk across asset classes to optimize the return profile relative to these three dynamics. Us "propeller heads" (Remember, I am a U. Chicago geek) like to think of it as a three dimensional Capital Markets Efficient Frontier. Presently, it seems that the "Convexity" component is way too rich versus the other risk buckets. This may be solely a coincidence, but it is possible the Old Wives' may soon be proven correct.

Black - left - Fed Funds rate
Purple - right - MOVE Index
Orange - left - T10yr minus T2yr



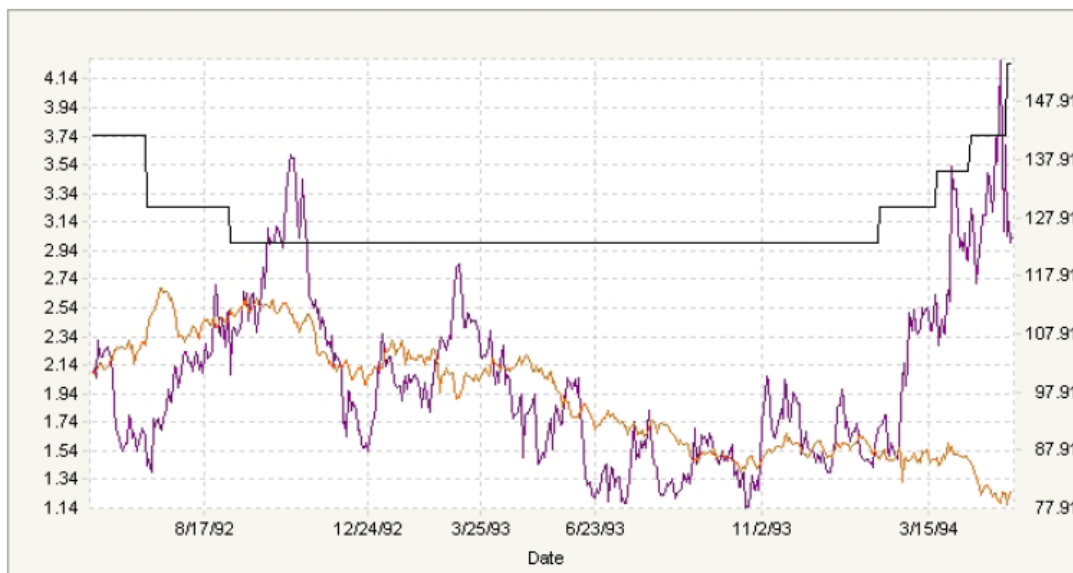
All charts, unless otherwise noted, are sourced from BAC/MER data

Today we seek to weave a fundamental story to support the seemingly cyclical concept of selling Implied Volatility into the early months of summer. And whether we convince you or not, we do want to wish you a sunny and happy BBQ season.

In the chart above, the **black line** is the Fed Funds rate, the **purple line** is our old favorite, the MOVE index, and the **orange line** is the shape of the yield curve as represented by the T10yr rate minus the T2yr rate. Although we will hit upon the correlation of the Yield Curve to Implied Volatility shortly, here we want to look at the relationship of FED policy to Implied Vol. Notice how the MOVE reached record lows while the FED held their benchmark rate steady in 2006. However, as soon as a change in policy was perceived to be imminent, the MOVE started to rise. From late 2007 to 2008 the MOVE rose sharply as the FED became active. But now that we could be entering an extended period of rate stability by the FED, one would expect Implied Vol. to begin to decline.

Volatility declining into FED stability is not new. Let's look at a period quite similar to this one. In the early 1990's, the country went through a severe real estate led banking mess. If you recall, the RTC was created (similar to TARP, etc) to save the Financial System. The FED cut rates by over 500bps and then held steady to steepen the Yield Curve to allow banks to "earn their way out" of their problems. (Sound familiar ?) The chart below, set to different dates but with identical labels, shows the MOVE declining to the mid 80s during the FED's 17 month "hold period".

Black - left - Fed Funds rate
 Purple - right - MOVE Index
 Orange - left - T10yr minus T2yr



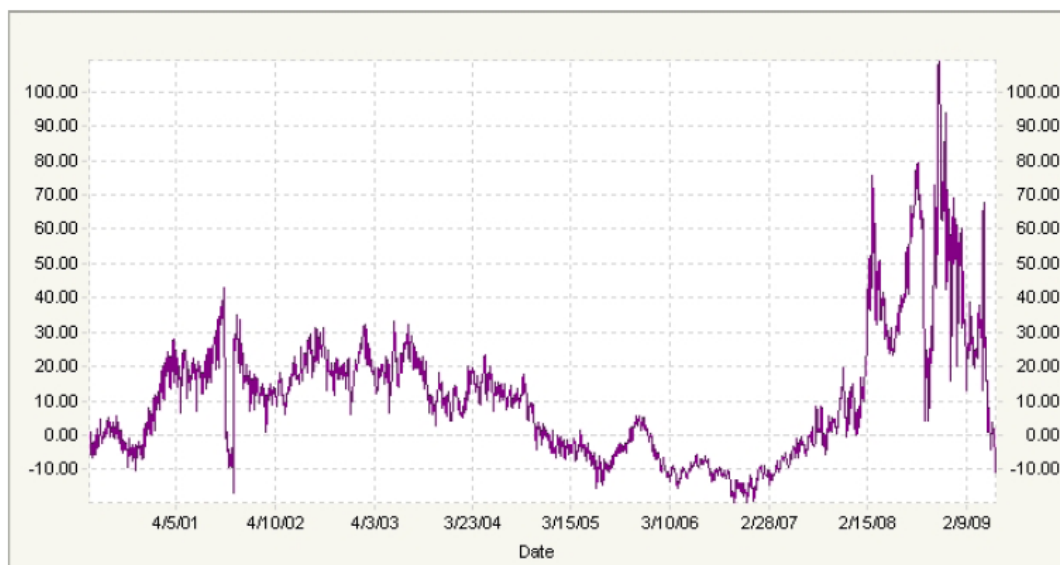
Can we reach the low 80's in the MOVE this time; I do not think so. But 140nv is surely too high for a quiescent FED. This chart is instructive as to the impact on Implied Volatility when the FED stabilizes their rate for an extended period of time.

Portfolio Substitution

The key consideration one needs to make before selling options is whether a superior portfolio structure can be created by selling convexity embedded in securities at a higher value. This is the genesis of Option Adjusted Spread (OAS) analysis. In theory, if properly modeled and ignoring all the caveats such liquidity, bid/offer spread, balance sheet, etc., a security with an OAS equal zero can be perfectly replicated via a portfolio of fixed-rate swaps and swaptions. Since there are certainly imperfections in modeling and often a structured or credit product will be less liquid, investors tend to demand an added premium over the vanilla derivatives market. Hence, securities tend to trade to some positive OAS.

The ~~purple line~~ below is our OAS calculation for the constant Par MBS bond. Notice how it ranged about the +20bps level during the last ReFinance boom in 2002 to 2003. It pierced zero during the low production/low volatility halcyon period of 2006 to 2007. The massive risk introduced into the mortgage market after the Sub-Prime debacle unfolded in early 2008 widened out this risk premium to over +80bps until the FED initiated their “buy program” late last year. The process of the Government buying up to an announced \$1.25 Trillion has now tightened this OAS premium back to the all time tights of -10bps. It seems clear that the market is betting that FED action in this market may limit losses and make MBS, at least temporarily, out perform the models. But over the long-term, banking upon a “Bernanke” put is a suspect strategy.

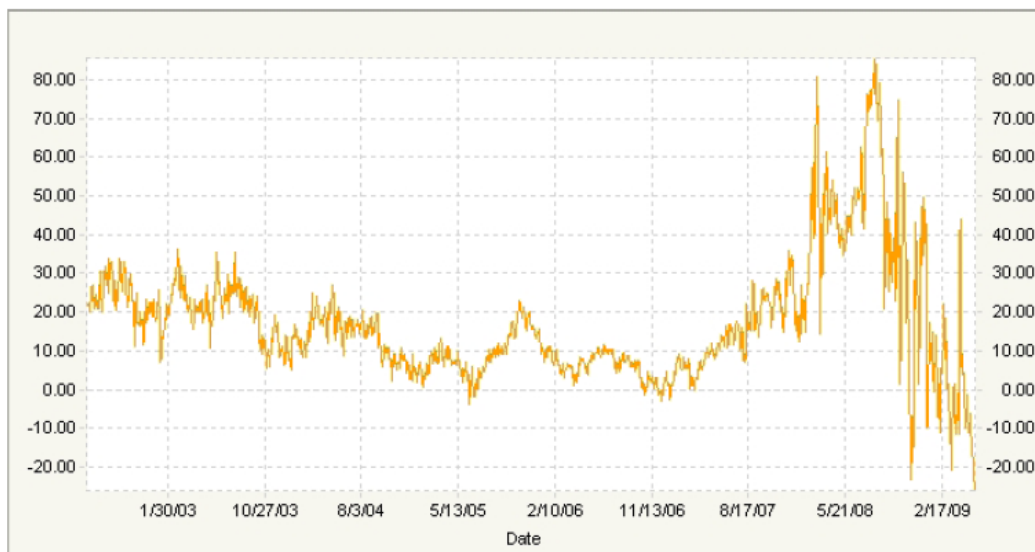
Par MBS Libor OASpread



Now one may argue that since most buyers of MBS are not arbitrageurs and are likely restricted from trading a portfolio of derivatives, maybe we should examine this topic from a different angle ?

In this chart, the **gold line** is the effective OAS experienced by the second largest buyer of MBS in the market: FNMA and FHLMC. We create this value by substituting the standard Fixed-rate Swaps curve with the rate the GSE's pay to issue Debt via the Agency Debenture market. Notice that during the peak of the 2002 to 2003 ReFinance boom the effective "Agency OAS" was in the mid-20s. Take that times a Trillion and you can see how they produced such large earnings. Presently, the Agency OAS is -25pbs. As such, it is not profitable for them to buy MBS and hedge the various risks. Certainly, if the Government were not pressing them into public service, as a quid pro quo for "TARP" funds, it is doubtful they would be buyers of conventional MBS. They could earn a superior "hedged return" by just selling options and managing the risk.

GSE "Agency" OAS



What is driving the collapse in relative valuation ? The next chart captures most of the divergence. The **green line** is the Nominal Yield of the Par MBS rate minus the yield of the Sw10yr rate. Ignoring the slight detail that MBS have buckets of risk across the entire Yield Curve, this spread is basically the cost of the embedded PrePayment option. Notice how it has been compressing from a high of 180bps to its present 60bps. Since this spread captures the essence of the embedded option, it should come as no surprise that it tracks the **orange line** which is the

Implied Normal Volatility of a 3yr into 10yr swaption. Over the past few weeks, Implied Volatility has increased while the Nominal MBS spread of has declined. In a nutshell, this summarizes why the OAS of MBS has collapsed. Sans Government activity, MBS would have nominally widened with rising Volatility. The point here, once again, is that a superior return can be created via selling a package of options rather than owning MBS over a long period of time.

Green - right - Par MBS rate minus Sw10yr rate
Orange - left - 3yr into 10yr Implied Normal Vol



So the question must be asked: Which market is wrong ??

The Par MBS spread has been as tight as +50bps as recently as mid-2007. So it is not obvious that MBS are rich. Maybe Government buying has only pushed them back from cheap to fair. Maybe it is the swaptions that are too expensive ?

Impact of the Yield Curve

It is well known that there is a strong correlation between the shape of the Yield Curve and Implied Volatility. In the next chart, the **blue line** is the difference between the Sw10yr rate and the Sw2yr rate while the **red line** is the Implied Normal Volatility of a 3m into 10yr swaption.

Blue - right - Sw10yr rate minus Sw2yr rate
 Red - left - 3mth into 10yr Implied Normal Vol



In case you think we are tricking by showing the Yield Curve versus only short-dated “Gamma options”, the chart below replaces the three month expiry with a three year expiry “Vega option”. These charts look almost identical. (There are many reasons for this correlation, most of which have been detailed in previous RateLabs.)

Blue - right - Sw10yr rate minus Sw2yr rate
 Maroon - left - 3y into 10yr Implied Normal Vol



Examining OAS and the Yield Curve is fine for a primary analysis. But to find the answer, we need to dig a bit deeper.

The shape of the Volatility surface displays information to market participants in the same way the Yield Curve does. A steep Yield Curve creates higher Forward Interest rates. Without delving into the Chicken and Egg discussion of whether Spot rates move toward the Forwards or Forwards slide to the Spot, suffice it to say that traditionally, the Front-end leads the market. As such, the Yield Curve tends to flatten (and eventually invert) when rates rise and steepen when rates fall. This has the mathematical impact of reducing the realized Volatility of distant Forward rates. (This is one of the reasons ultra long-dated options trade at lower Implied Vols.) In many respects, what is happening here is that the Spot Yield Curve twists and flexes in a manner that makes Forward rates hover around some mean-reverting long-term average.

This same sort of phenomenon occurs in the Volatility markets. When Implied Volatility rises, it is led by the one month to three month Gamma options. At some point, this inverts the Volatility surface relative to the longer-dated Vega options. When Implied Vol. declines, the gamma options lead and the surface becomes steep. Using some advanced math, one can create a Forward Volatility matrix. And similar to interest rates, these Forward volatilities tend to circle around some mean reverting long-term average.

Pink - right - 1yr into 10yr Implied Normal Vol
Green - left - Ratio of 3m-10yr to 1y-10y Implied Normal Vol



The long-term average Implied Normal Volatility for a 1yr into 10yr swaption, the **pink line**, is about 105bps. Compare this to the **green line** which is the ratio of

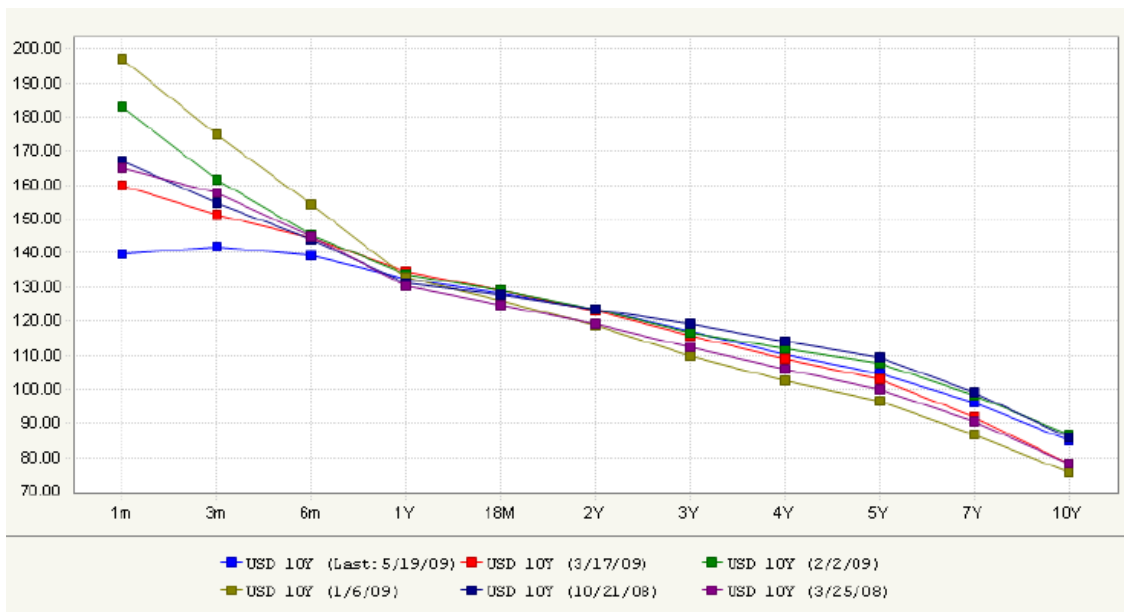
the Implied Volatility of a 3m into 10yr divided by a 1yr into 10yr. Notice how the ratio dips below unity when Vols are low and rises over 1.0 when Vols are high. This has the effect of lifting Forward Vols in a low Vol. world and depressing them in a high Vol. environment. The result is that Forward 1yr into 10yr swaptions rotate around some longer-term mean reverting level.

A Totally New World ?

But look what has happened in the past few weeks. The Implied Vol. of 1y-10yr is rising while the ratio is declining. This anomaly is jumping Forward Vol. to much higher levels than we have seen before.

What can explain this ? More buyers than sellers is always a good first guess. But the more likely answer is that the market fears the ultimate denouement of the FED's massive Quantitative Easing experiment will come sooner than we think. Hedgers are extremely concerned as to what will happen after the FED is done buying MBS. Of course, the other much simpler answer is that the long-term mean reverting Implied Volatility for 1yr into 10yr is just higher.

The chart below is instructive as to this possibility. Notice how the one year expiry is more or less unchanged over the past fourteen months while the shorter expiry one month and three month options are nearly 25% lower.



What is the Answer ?

It may be as simple as which way do you stand on: “Don’t fight the FED”.

The FED has stated their intention to buy \$1.25 Trillion MBS. Since this will be about 80% of Gross production, over \$1 Tr of PrePayment proceeds will be returned to investors. This will most likely be reinvested in some sort of fixed-income product. So despite the relatively small size of the \$300 Billion Treasury bond “buy program”, the massive MBS buy program should bleed through enough to help mostly offset the \$2 Trillion of new issuance by the Treasury.

More critically, the FED has indicated through words and past deeds that it will keep their rate pinned to a low level until the economy is clearly out of the woods. This will certainly last well into next year. As such, it is difficult to believe that we will realize 9bps a day for the duration of the FED’s “hold period”.

Finally, the all-time steep for FED Funds versus T10yr rate is 390bps. That would imply a maximum Ten year rate of about 4.00% until mid next year. Presently, a 6m into 10yr swaption straddle is 725bps (152nv) mid-market. That creates a +/- 85bps terminal breakeven. With cash 10s at 3.35%, the implied range is 4.20% to 2.50%. This seems extremely unlikely if the FED is truly on “Perma-hold”.

The other side of the argument is that “something has got to give”. Between the shape of the curve insisting on higher rates in the future and the negative OAS of MBS bonds, there will certainly be some sort of “snap back” event in the future.

Ultimately, this is the precise definition of Cognitive Dissonance: *An uncomfortable feeling caused by holding two contradictory ideas simultaneously.*

We are not going to bet the ranch, but the FED and the Treasury have demonstrated the ability to “take on all comers” to accomplish their goals.

As such, since the markets are already priced for the worst, I am going to sell a few options and catch the early train out to the beach to enjoy the start of summer with the old wife !!!

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May 22, 2009

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