

Valuation Commentary – November '07

Happy Holidays! + A Few Recommendations

By Alex Levin

Happy Holidays, dear friends, clients, and supporters! Like me, you probably prefer to read an article on a single topic that is presented simply and systematically. This month, however, I feel it is important to reflect on a few different topics. For those who use or plan to use the AD&Co. valuation and interest rate modeling products, the following discussions should be of interest:

[SATO Tuning for TBAs](#)

[More on Interest Rate Model Selection](#)

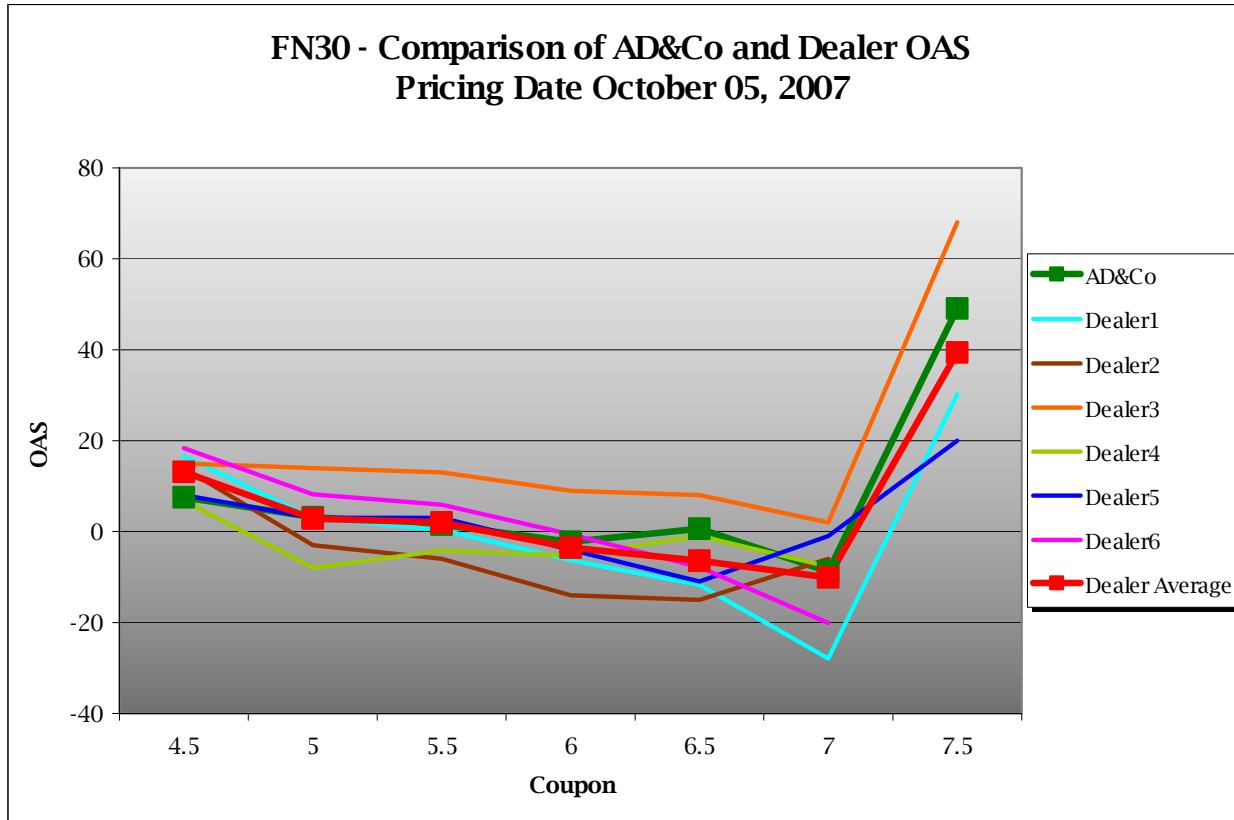
[Practical Monte-Carlo Recipes](#)

SATO Tuning for TBAs

In the [July 2006 Pipeline article](#) I advocated the use of a lower SATO tuning (0.33) for fixed rate TBAs. This tuning reflected the general trend which started in 2002 and lasted throughout 2006: SATO was becoming less of a factor for agency pools. Alt-A borrowers had no trouble getting a mortgage or to improve it quickly by flowing into one of the many products offered by originators. One can't claim this anymore: due to the ongoing mortgage crisis, refinancibility has shifted down. Furthermore, since July of 2006, the age assumption for 6.5s and 7.0s (the ones we view as gauges of the refinancing risk) have extended from 4-5 to 9 months.

As a result, we found it reasonable to raise the SATO tuning significantly. To simplify, we will be using the SATO tuning of 1.0. Below we plot OAS graphs against a collection of dealers and their averages, as of October 5 of 2005; median WAC and WAM were employed for the AD&Co. results.

Exhibit 1. AD&Co. and dealer OAS (market assumptions for 10/05/2007)



Although AD&Co. is not aiming to replicate the market, it is clear that the AD&Co. OAS model operating with a SATO tuning of 1.0 is close to the market's average.

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More on Interest Rate Model Selection

The [“Conscientious Choice”](#) paper celebrated its 5th anniversary earlier this year. The paper was reproduced by the *Journal of Portfolio Management* in 2004; the subject was revisited again last year and submitted for one of upcoming Frank Fabozzi's publications. The main outcome—“Stay Normal!”—still seems very relevant (it is advisable for other purposes too). The normal model does not have to be a single-factor one though, and this is the current message.

Please re-read the [February 2005 Pipeline article](#) on the role and importance (or lack of it) of two-factor modeling. Provided that both the one-factor normal model (AKA the Hull-White model) and a normal multi-factor model are calibrated to the same set of vanilla options, the difference in value will only be measured for MBS that are convex to the curve's twist. In option theory jargon, we say that instruments have a “curve option.”

The February 2005 paper showed that most MBS will be priced within a close range, no matter how many factors are employed. This paradox stems from the fact that AD&Co., as well as others, model prepayments as a sequence of European payoffs. Pass-throughs' values are almost

“nailed” by rates and volatilities. However, some CMOs present notable exceptions. Here is a short list that investors and analysts should be concerned about:

(A) CMO classes that are much shorter or much longer than their collateral carry the curve option

- Short fixed-rate CMOs: induced curve put (+)
- Long fixed-rate CMOs: upsized curve call (-)

(B) Capped amortizing floaters carry the curve option (-)

(C) Many IO and inverse IO tranches contain features (A) or (B) above

In the above abbreviation, (+) means that a two-factor model increases the value, (-) means it decreases the value of CMO, for the same OAS and market conditions. If a CMO class is much longer than its collateral, the curve’s steepening (without change of the MBS current rates) extends the tranche’s life and impairs its value relative to the collateral. When the curve flattens or inverts, gains in discounting are limited by a shorter life. Therefore, on average, the CMO’s price profile will exhibit negative convexity to twist. Short classes behave in the opposite way and are positively convex. Similarly, valuation of caps found in floaters relies on the interaction between prepay speeds and the odds of hitting the cap. When the curve steepens, the cap moves into the money and applies to a larger surviving balance. The losses on resets won’t be offset by much smaller gains induced when the curve flattens or inverts.

Here is the action guide: When selecting the number of factors in an interest-rate model, ask yourself what type of instruments represents your main investment focus. If it is MBS pass-throughs (including ARM pools, IOs, POs, and MSRs), use the Hull-White model with confidence. And, if you license AD&Co.’s OAS model, you will take advantage of the blazing speed of backward induction. If most of the instruments are CMOs, I recommend you think and learn more about AD&Co.’s two-factor normal model. Calibrated to the same swaption matrix, this model may shed light on the true value hidden by single-factor modeling. And it won’t increase your processing time because, with CMOs, you are bound to Monte-Carlo anyway. AD&CO.’s OAS system supports 4 term structure models and lets you conduct your own tests and compare results.

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Practical Monte-Carlo Recipes

1. Gauge the accuracy. The AD&Co. OAS system reports an estimate of pricing accuracy. If you quote price and compute OAS, “RMSE” is the OAS accuracy. Otherwise, it is the price accuracy. The actual achieved accuracy is somewhat better; RMSE stands for simple sampling standard deviation of values, but it suits the purpose. Review your accuracy and processing time and adjust your set-up accordingly. Reduce the number of paths if the accuracy is redundant. Increase it if the accuracy is deficient.

2. Set a different number of paths for different Intex instruments. Run more paths for agency CMOs, less paths for non-agencies - not because of accuracy, but because of ability. In a typical

portfolio batch, setting 100 Monte-Carlo paths for non-agency CMOs may be the most one can afford. More paths can be used, say 500, for agency CMOs. The main reason for long processing is the nature of non-agency collateral and its heterogeneity. Even under the weighted averaged collateral aggregation mode, input fields like prepay penalty details or rate resets are not clustered. It leads to hundreds or even thousands of pieces of collateral.

Our OAS users can vary the path numbers and change them when going from one CMO to the next. This position-level assignment improves the efficiency of batch processing.

3. Shuffle the seeds. The AD&Co. OAS system lets you apply the same or different set of paths to various position lines. As pointed out in the [May 2007 Pipeline article](#), starting each position run from random seeds is a powerful and simple recipe. And if all we are interested in is compiling an aggregate report, we can reduce the workload by using just a few Monte-Carlo paths per position.

Random shuffling of path sets between consecutive positions creates enough randomness in the overall run. To illustrate this point, let us consider a portfolio made up of 1,000 identical positions. Running 2 random paths per position seeded randomly is equivalent to running 2,000 random paths, from the portfolio stand-point. In contrast, running 2 random, but the same, paths per position, is no different than running only 2 paths for the entire portfolio. The May 2007 *Pipeline* article shows that using this method when computing the expected losses in a sub-prime pool leads to an accuracy exceeding 1%. This is an improvement by a factor of 20 to 50 compared to the traditional method that employs the same set of paths for each position. Of course, for each instrument, computing the Greeks must employ the same seed as running OAS.

Unless positions need to be accurately valued against each other (e.g. asset versus hedge, specified pool versus TBA), using the same set of paths for every position is never advantageous. Even if positions are somewhat heterogeneous, using random seeding will be as accurate for each position and more accurate for the portfolio's summary than using the same-seeding.

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