



April 21, 2015

Weekly Post **Estimating the Likelihood of Rate Scenarios**

Challenge

ALM decisions should consider the **likelihood** of significant losses due to interest rate risk exposure not just the expected profits. Generating the NII or EVE under rate shock scenarios without estimating their likelihood is clearly inadequate for our risk and return analysis. For example, if there is a small 5% chance of rates going up 100 bpt over one year, then maybe we are not concerned with that scenario which may result in losses.

- How to determine the probability distribution of the yield curve?

Solution

“Great strides have been made in the science of term-structure modeling... following the pioneering work of Ho and Lee” Ani Sanyal, Huntington National Bank.* This ALM approach proposes to make decisions **relative** to market consensus. Capital markets have already aggregated market information to determine the values of market instruments, and so our ALM decisions are basically “betting against the market.” For example, my Post last week discusses using the forward curve to benchmark your interest rate views. Likewise, the yield curve uncertainty, called *implied volatility*, can be measured from market swaption prices. You can find out what the market is thinking about rate uncertainties via THC models.

- Implied volatility can be estimated from swaption prices via the Ho Lee model

*Anthony Cornyn and Elizabeth Mays [Interest Rate Risk Models](#)

Numerical Example

Using the one year forward curve explained last week, the implied volatilities estimated on 3/31/2015 is a 68% probability for the yield curve to stay within the upper and lower bounds presented in the table below. The upper and lower bounds are depicted in the graph below. The implied volatilities change continually, and they have been rising this year. Perhaps the current Fed interest rate risk policy has increased the perceived rate uncertainty in the market.

	2y	3y	4y	5y	7y	10y
up scenario	2.440	2.577	2.755	2.852	3.072	3.128
forward curve	1.212	1.432	1.667	1.822	2.042	2.197
down scenario	0.215	0.411	0.579	0.792	1.012	1.266



Conclusion

Your ALM model can provide you with the probability distribution of the projected yield curves. This probability distribution can assist you in deciding on the risk and return tradeoff in your interest rate risk exposure.

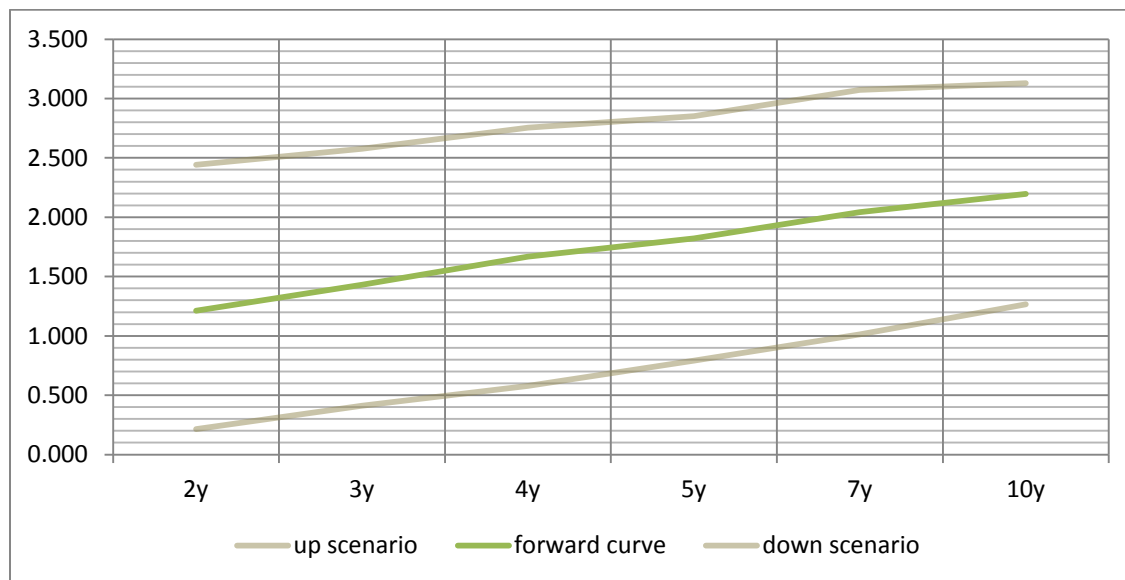


Figure 1. The yield curve has 68% probability that it stays within the upper and lower bounds over the next 12 months

THE THC CONTENT IS PROVIDED AS IS, WITHOUT REPRESENTATIONS OR WARRANTIES OF ANY KIND. TO THE MAXIMUM EXTENT PERMISSIBLE UNDER APPLICABLE LAW, THC HEREBY DISCLAIMS ANY AND ALL WARRANTIES, EXPRESS AND IMPLIED, RELATING TO THE THC CONTENT, AND NEITHER THC NOR ANY OF ITS AFFILIATES SHALL IN ANY EVENT BE LIABLE FOR ANY DAMAGES OF ANY NATURE WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, DIRECT, INDIRECT, CONSEQUENTIAL, SPECIAL AND PUNITIVE DAMAGES, LOSS OF PROFITS AND TRADING LOSSES, RESULTING FROM ANY PERSON’S USE OR RELIANCE UPON, OR INABILITY TO USE, ANY THC CONTENT, EVEN IF THC IS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR IF SUCH DAMAGES WERE FORESEEABLE