Vol. 25, No. 3
March 2009

Bank Asset/Liability Management

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Pricing Swaps: Once Upon a Time…

It is a common aphorism that the value of any derivative instrument should be equal to the present value of expected future cash flows. While this principal certainly has appeal, different analysts will likely generate different value estimates, depending on their choice of discount rates and methodologies for determining forward rates. At one point in time, there seemed to be a consensus as to which rates to use, but that consensus appears to be breaking down.

Consider the case of a plain vanilla, pay fixed/receive floating interest rate swap. It is well-understood that cash flows generated under this type of swap contract can be replicated by the cash flows of two, back-to-back loans between parties A and B. Party A loans to party B an amount equal to the swap notional value with a fixed interest rate equal to the swap fixed rate; and B loans to A this same amount but at a variable rate equal to the swap's variable rate. The price of the swap, thus, should be equal to the difference between the present values of the two, respective loans.

In the olden days, it was common practice to assume that the present value of the variable rate was par – at least on the payment dates. (On days other than the payment days, the present value of the variable rate debt would simply be the present value of any accrued interest.) The par result, however, rests on the assumption that the same yield curve used to generate forward rates is used for discounting purposes. Moreover, the assumption that the fixed rate debt also has a starting value equal of par also requires this same set of discount rates to be applied when valuing the fixed rate debt.

Typically, practitioners would derive forward rates and discount rates from some combination of LIBOR-

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based swap yield curves and/or futures contracts. Differences in the mix would create differences in valuations, but these differences have, historically, been of limited magnitude. No more. This condition seems to be much less robust of late. Sometimes, these valuations may end up being close, but we cannot necessarily count on that outcome. It is more difficult today to achieve consensus about valuation than it has been in the past — and it is even worse for non-standard instruments or option contracts.

Undoubtedly, a contributing factor to this development has been the fact that the *standard* swap design is not as dominant as it once was. A standard, plain vanilla, interest rate swap has historically assumed quarterly resets to three-month LIBOR with semi-annual settlements; but this design is often modified. Most companies in the U.S., for example, tailor these terms to make them correspond more closely to the debt that they are hedging. For example, when hedging variable interest rate exposures, hedgers have taken pains to apply the same reset and settlement schedules to their swaps as they have on their variable rate obligations. Thus, more and more, we are seeing quarterly resets and quarterly settlements or monthly resets and monthly settlements.

At least in theory, yield curves should be constructed with yields that rely on common conventions. Put another way, the yield curve built, assuming standard settlement assumptions, would be different from the yield curve built with fixed rate quotes that reflect, say, monthly settlements or quarterly settlements. While intuition might lead us to expect these differences to be inconsequential, in fact, these differences have started to become more substantial.

As an example, Exhibit 1 compares the fixed rates on five-year swaps transacted on the first of December 2008 and, for comparative purposes, a five-year issued a year earlier on December 1, 2007. Two different swap designs are shown for the variable leg of the swaps —one with six-month resets using six-month LIBOR and semi-annual settlements and the other with one-month resets using one-month LIBOR and monthly settlements. Clearly, over the prior year, the differences between the fixed rates associated with different market conventions have gotten larger – even as interest rates have fallen sharply. At the end of 2007, the difference between the two respective fixed at-market fixed rates was three basis points, but at the end of 2008, the difference expanded to 18 basis points. Critically, the all fixed rates shown reflect the same semi-annual compounding, semi-annual settlements, and application of the actual/360 day-count conventions.

Exhibit 1. Comparison of Fixed Rates on Five-Year Swaps

Trade Date Frequency	*Reset and Settlement Frequency*	*Reset Rate*	*At-Market Fixed Rate*
12/1/08	Semi-annual	Six-month LIBOR	2.67%
12/1/08	Monthly	One-month LIBOR	2.49%
			18 b.p difference
12/1/07	Semi-annual	Six-month LIBOR	4.13%
12/1/07	Monthly	One-month LIBOR	4.10%
			3 b.p. difference

A Good Practice? Clearly, differences in the settlement and reset conventions matter, and those who bear responsibilities for generating valuations should work with yield curves that employ the same settlement and reset conventions as the swap being priced. The unsettling thing about this practice, though, is that different yield curves might yield different zero-coupon rates and thus different sets of present value factors, such that we may no longer be able to agree as to the *correct* or at least *preferred* present value estimate.

The real lesson here is that we need to understand the limitations of fair value estimates. They are just that — estimates. And it may be worth pointing out that value may just be in the eye of the beholder. Different analysts will likely employ somewhat different methodologies. We should appreciate that different valuation estimates do not necessarily mean that one result is wrong and the other is right. They are just different.

Such is life in 2009.

— Ira Kawaller, President
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