Interest Rate Swaps*

FNAN 421   Case 3

Given the following information about a “plain vanilla” fixed-floating rate swap and using your text, answer the following questions:

a. Compute the present value of the fixed and floating rate legs of the swap.

b. Are these present values equal? If not, what should be the fixed rate in order for these present values to be equal?

c. Suppose after the second year of the swap, the current 6-month LIBOR rate rises to 6 percent from 5 percent and the entire zero-coupon term structure rises by the same amount, which receiver gains and which loses?

d. How might the floating rate and fixed rate payers hedge a potential rise in LIBOR from a shift upward of the entire yield curve? Show such hedges in terms of caps and floors? Price a cap that would have its first payoff on November 3, 2008 and would be contracted at the same time the swap is contracted, November 3, 2006.

Notional : $200 million

Maturity: 5 years, originating November 3, 2006
Reset Dates: 6 months, beginning in 6 months (May 3, 2007)
Fixed Rate: 5.90 percent (based on 30-day month and 360-day year)
Floating Rate: Commercial Paper (CP) 30-day
Expected Cash Flows (%) From the Swap as of November 3, 2006
(Approximate and based on Eurodollar (ED) forward quotes)

Reset Date	Fixed Rate (%)	Implied Forward Floating Rate (%)	Difference (%)
May 3, 2007	**5.9**	**3.8**	**2.1**
November 3, 2007	**5.9**	**4.5**	**1.4**
May 3, 2008	**5.9**	**4.9**	**1.0**
November 3, 2008	**5.9**	**5.2**	**0.7**
May 3, 2009	**5.9**	**5.5**	**0.4**
November 3, 2009	**5.9**	**5.9**	**0.0**
May 3, 2010	**5.9**	**6.1**	**-0.2**
November 3, 2010	**5.9**	**6.4**	**-0.5**
May 3, 2011	**5.9**	**6.5**	**-0.6**
November 3, 2011	**5.9**	**6.7**	**-0.8**

The implied forward floating rate is the expectation of the spot rate that will prevail at each of the dates.

e. Comment why each of the critical assumptions stated below are necessary for pricing the swap and caps and floors:

CRITICAL ASSUMPTIONS IN PRICING Fixed/Floating Swaps

1. Swaps are priced at par, where par is the notional amount.

2. The "fair" fixed and floating rates are set such that expected present values (PV) of the cash flows are the same for both counterparties.

Expected PV(Fixed) = Expected PV (Floating)

3. If the swap is not priced as in point 2, upfront payments are made by either party to ensure this "no arbitrage" condition.
4. Swaps are generally priced off of the Treasury bond par yield curve. This means that the floating rates are derived from the Treasury bond par yield curve to develop implied zero-coupon forwards to value the floating coupons (see T-bill example above).

   The Treasury Bond Par Yield Curve is the yield curve based on T-bonds selling at par ($100) -- usually those most recently issued. It can also be constructed since T-bonds are usually issued at par.
5. Implied forward, zero-coupon interest rates can be derived from the Treasury par yield curve.
6. Implied forward rates are unbiased estimates of future spot rates. This assumption also implies that the volatility of forward interest rates (forward volatility) is constant.
7. Default risk is constant at each period of the swap.
8. Interest rates are assumed to be lognormally distributed.