

END OF CHAPTER EXERCISES

Chapter 15 : Interest Rate Derivatives

Financial Engineering : Derivatives And Risk Management

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1. What is the key difference between a forward swap and a swaption ?
2. How do mortgage pass-throughs differ from collateralised mortgage obligations?
3. What is the key difference between an FRA and a caplet?
4. A firm plans to borrow \$10 million in 180 days time and the loan will be for 90 days at the then prevailing LIBOR rate. What are the risks involved if the firm merely does nothing and then takes out the 90-loan in 180 days time, if 90-day LIBOR turns out to be either 12% or 7%? If the firm takes out a FRA at a rate of 10% what would then be the outcome? (In each case show the annualized cost of the loan assuming a 360-day year).
5. It is 1st June 2000 and a US multinational takes out a floating rate loan of \$10 million, with interest to be paid every 90 days, over the next year. The current LIBOR rate is 10%. At the same time the firm buys an interest rate cap for with a strike rate $K = 10\%$ and a premium of \$15,000. Determine the cash flows over the life of this loan if LIBOR turns out to be 10.5 percent on 1st September (+ 92 days) 10.8% on 1st December (+91days), 11% on 1st March 2001 (+90 days) and 11.1% on 1st June 2001 (+92 days). The cap payoff is based on the exact number of days and a 360-day year. Find the interest cost (i.e. internal rate of return IRR) with and without the cap. (You may find it useful to use Excel for the calculations.)
6. It is 1st January 2001 and your firm is taking out a loan of \$1 million, with interest to be paid on 1st April, 1st July, 1st October and 1st January 2002. The floating loan rate is based on LIBOR, which is currently 10% p.a. To insure against interest rises you buy a cap with a strike of 10 percent and a premium of \$3,500. If LIBOR turns out to be 11% on 1st July (+92 days), 11.5% on 1st October (+94 days) and 12% on 1st January 2002 (+90 days) determine the cost of the loan with and without the cap. Assume the cap payoff is based on the "actual/360" day count convention. (The calculations can be easily done in Excel)
7. It is the 1st of January 2001 and you take out a floating rate loan of \$10,000 with reset dates every 90 days, over the next year. At the same time you buy a cap with a strike of $K_c = 10\%$ at a cost of $C = \$14$ and a floor with $K_{FL} = 8\%$ at a cost of \$8. The 90-day LIBOR rate on 1st January is 9% and over the succeeding 90-day periods interest rates fluctuate wildly being 10% (after 90 days), 11% (after 180 days), and 7% (after 270 days).

Show the payments in each period both with and without the cap and the collar and calculate the interest cost of the loan for these three cases.