



Subject: Financial Engineering II

Chapter: IRD and Hedging I &
Exotic Options

Category: Practice questions

1. Explain why an FRA is equivalent to the exchange of a floating rate of interest for a fixed rate of interest?
2. A Eurodollar futures price changes from 96.76 to 96.82. What is the gain or loss to an investor who is long two contracts?
3. An investor is looking for arbitrage opportunities in the Treasury bond futures market. What complications are created by the fact that the party with a short position can choose to deliver any bond with a maturity of between 15 and 25 years?
4. Suppose that a bond portfolio with a duration of 12 years is hedged using a futures contract in which the underlying asset has a duration of four years. What is likely to be the impact on the hedge of the fact that the 12-year rate is less volatile than the four-year rate?
5. Assume that a bank can borrow or lend money at the same interest rate in the LIBOR market. The 90-day rate is 10% per annum, and the 180-day rate is 10.2% per annum, both expressed with continuous compounding. The Eurodollar futures price for a contract maturing in 91 days is quoted as 89.5. What arbitrage opportunities are open to the bank?

6. :

Companies A and B have been offered the following rates per annum on a \$20 million five-year loan:

	<i>Fixed Rate</i>	<i>Floating Rate</i>
Company A	5.0%	LIBOR+0.1%
Company B	6.4%	LIBOR+0.6%

Company A requires a floating-rate loan; company B requires a fixed-rate loan. Design a swap that will net a bank, acting as intermediary, 0.1% per annum and that will appear equally attractive to both companies.

7. :

Companies X and Y have been offered the following rates per annum on a \$5 million 10-year investment:

	<i>Fixed Rate</i>	<i>Floating Rate</i>
Company X	8.0%	LIBOR
Company Y	8.8%	LIBOR

Company X requires a fixed-rate investment; company Y requires a floating-rate investment. Design a swap that will net a bank, acting as intermediary, 0.2% per annum and will appear equally attractive to X and Y.

8. A company caps three-month LIBOR at 10% per annum. The principal amount is \$20 million. On a reset date, three-month LIBOR is 12% per annum. What payment would this lead to under the cap? When would the payment be made?
9. Explain why a swap option can be regarded as a type of bond option.
10. Explain the difference between a forward start option and a chooser option.
11. Consider a chooser option where the holder has the right to choose between a European call and a European put at any time during a two-year period. The maturity dates and strike prices for the calls and puts are the same regardless of when the choice is made. Is it ever optimal to make the choice before the end of the two-year period? Explain your answer.
12. Explain why a down-and-out put is worth zero when the barrier is greater than the strike price.
13. Is a European down-and-out option on an asset worth the same as a European down-and-out option on the asset's futures price for a futures contract maturing at the same time as the option?
14. Does a floating lookback call become more valuable or less valuable as we increase the frequency with which we observe the asset price in calculating the minimum?
15. Does a down-and-out call become more valuable or less valuable as we increase the frequency with which we observe the asset price in determining whether the barrier has been crossed? What is the answer to the same question for a down-and-in call?
16. Explain why a regular European call option is the sum of a down-and-out European call and a down-and-in European call. Is the same true for American call options?
17. What is the relationship between a regular call option, a binary call option,

and a gap call option?

- 18.** Describe the payoff from a portfolio consisting of a floating lookback call and a floating lookback put with the same maturity.



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