

END OF CHAPTER EXERCISES

Chapter 14 : Swaps

Financial Engineering : Derivatives And Risk Management

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1. If you are warehousing swaps what does this mean?
2. Why is the expected loss from a default on an interest rate swap, less than the expected loss from the default on a bank loan with the same principal?
3. Explain the difference between credit risk and market risk. Can these risks be hedged for a swap and for other positions?
4. Companies A and B have been offered the following rates per annum on a \$10 million, 7-year loan:

	Fixed Rate	Floating Rate
Company A	6.0%	LIBOR + 0.1%
Company B	7.4%	LIBOR + 0.6%

Company A requires a floating rate loan, while company B requires a fixed rate loan. Design a swap that will provide a bank, acting as intermediary, 0.1% p.a. and which divides the remaining gains in the swap equally between A and B. (Hint : Get the bank to pay and receive floating, at LIBOR).

5. A \$100 million interest rate swap has a remaining life of 10 months. In the swap, 6-month LIBOR (floating) is exchanged for 6% p.a. "fixed" (i.e. the fixed rate is 3% over each 6-month payment period). The yield curve is currently "flat" with all spot rates for all maturities being currently 5% per annum with continuous compounding. The 6-month LIBOR rate, 2 months ago, at the previous "fixing date" was 3.6% p.a. (expressed as simple interest rate). What is the current value (i.e. 2-months into the swap) to the party paying floating? What is its value to the party paying fixed?

Consider the swap as (i.) a combination of fixed and floating bond and (ii.) a series of forward contracts.

(Hint : Because the term structure is flat at 10% p.a. continuous compounding, then all future spot and forward rates equal 10%, continuously compounded.)

6. Suppose that the term structure of interest rates is flat in the United States and Euroland. The dollar interest rate $r_{us} = 6\%$ per annum while the Euro interest rate is $r_E = 3\%$ per annum. The current exchange rate is $S = 1.0$ Euros per \$. Under the swap agreement, a financial institution pays (a 'coupon' of) 3% per annum in Euros and receives (a 'coupon' of) 5% per annum in USDs. The principle in the two currencies

are \$100m and € 90m. Payments are exchanged every year with one exchange having just taken place. The swap will last 2 more years.

Consider the swap as a portfolio of (i.) bonds and (ii.) futures contracts. What is the value of the swap to the financial institution? Assume all interest rates are continuously compounded.

7. A currency swap with annual payments has a remaining life of 15 months. In the swap, interest payments are exchanged at a 'coupon' rate of 6% on 50 million Australian dollars (AUD) for coupon interest payments at 4% on 30 million US dollars (USD). The term structure of interest rates in both countries is flat with $r_{US} = 8\%$ and $r_{AS} = 10\%$ (both of these rates are continuously compounded). The current exchange rate is 0.65 USD per AUD.

Consider the swap as a portfolio of (i.) bonds and (ii.) futures contracts. What is the value of the swap to the party receiving dollars and paying sterling?