Mini-case 13: Using Option Contracts and Currency Swaps to Manage Interest-Rate Risk

CONCEPTS IN THIS CASE

options
strike price
premium
American option
European option
stock option
futures option
call option
put option
swaps
currency swaps

Your previous presentations on risk management and hedging with financial derivatives and your recent promotion to senior risk manager have made you very happy. The senior management team considers you one of the most valuable assets of the firm, and you are seeking a new opportunity to demonstrate your potential for even greater responsibilities. As designated risk manager for the firm's portfolio, you are continually trying to find ways to manage risk without the problems of futures contracts (liquidity, basis risk, accounting requirements). Bob R. Smart continues to be your outside consultant on such matters, and he is now suggesting that the firm consider other financial derivatives being used by larger banks: options and swaps. He has set up a meeting to discuss these alternatives, and he hopes you are as successful as you were under his previous coaching. You recognize that your success started with a lot of hard work, creating definition sheets, setting up scenarios, and answering anticipated questions in advance. You decide to continue your previous success by repeating the same process in the study of options and swaps.

You begin by defining the terminology commonly used in trading options and swaps: option contract, call option, put option, exercise or strike price, option premium, American and European option contracts, stock options, swaps, currency swaps, and interest-rate swaps. Once you understand these terms, you gather information that would be useful in the practical testing of these new strategies.

Total assets: $150 million
Interest-rate-sensitive assets: $90 million
Interest-rate-sensitive liabilities: $120 million
Duration gap: 2.20 years
Primary holdings of concern: $7 million in 6% Canada bonds at par with 5 years to maturity; $12 million in stock, with an average beta of 0.90

Obtain information from the financial press on the most recent call and put contracts on Canada bond futures options (six-month maturity). The response of Canada bonds to a 1% rise in interest rates is 7% of par, while the change in the price of the futures option contract is 6%. The interest rate on Canada bonds on average changes by 1.10 percentage points when the interest rate on the Canada bonds futures contract changes by 1%.

1. To protect against a rise in interest rates and a decline in the value of bonds held, how many Canada bond futures put options (where the strike price is close to the current price) must the firm purchase?

2. If the forecasted rise in interest rates does not occur, can the bank still profit from its position in the Canada bond futures options purchased in Question 1?

3. What is the most significant accounting principles difference between futures and options?

4. Given the gap of the bank, how large an interest-rate swap does the bank need to arrange to hedge interest-rate risk and prevent a decline in profits when interest rates increase?

5. You are offered an interest-rate swap in which you would receive interest payments of 1% over the one-year Canada bill rate for the next five years in exchange for a 7% fixed-rate payment.

a. If the effective duration of the 7% fixed-rate payment over the next five years is 6.3, what is the duration of the swap?
b. What is the notional principal of the swap?
c. What will be the change in net worth as a percentage of assets if interest rates rise 1%?
d. What will be the percentage change in the value of the swap if interest rates rise 1%?
e. What will be the net change in the value of the firm as a result of a 1% increase in interest rates?

6. Explain the difference between hedging foreign exchange risk with currency options and currency swaps and doing so using futures contracts.