

1st Question

Assume that an investor holds an ICON (i.e., index currency option note) with face value \$1,000 that pays at the maturity an amount that depends on the exchange rate S_T . If the exchange rate at the maturity exceeds \$100, it then pays the full value of the bond. If the exchange rate at the maturity is below \$50, it then pays nothing. If $50 \leq S_T \leq 100$, it pays

$$1000 - \max\left(0, 1000 \frac{100 - S_T}{S_T}\right).$$

Show that this ICON is a combination of a regular bond with two options.

2nd Question

A stock is expected to pay a dividend of \$1 per share in two months and in five months. The stock price is \$50, and the risk-free rate of interest is 8% per annum with continuous compounding for all maturities. An investor has just taken a short position in a six-month forward contract on the stock.

- What are the forward price and the initial value of the forward contract?
- Three months later, the price of the stock is \$48 and the risk-free rate of interest is still 8% per annum. What are the forward price and the value of the short position in the forward contract?

3rd Question

A company enters into a forward contract with a bank to sell a foreign currency for K_1 at time T_1 . The exchange rate at time T_1 proves to be $S_1 (> K_1)$. The company asks the bank if it can roll the contract forward until time $T_2 (> T_1)$ rather than settle at time T_1 . The bank agrees to a new delivery price, K_2 . Explain how K_2 should be calculated.

4th Question

A company that is uncertain about the exact date when it will pay or receive a foreign currency may try to negotiate with its bank a forward contract that specifies a period during which delivery can be made. The company wants to reserve the right to choose the exact delivery date to fit in with its own cash flows. Put yourself in the position of the bank. How would you price the product that the company wants?