Derivatives
Revisions 2
Questions

B. Questions

B1. Explain what happens when an investor shorts a certain share.

B2. What is the difference between the forward price and the value of a forward contract?

B3. Suppose that you enter into a six-month forward contract on a non-dividend-paying stock when the stock price is $30 and the risk-free interest rate (with continuous compounding) is 125 per annum. What is the forward price?

B4. A stock index currently stands at 350. The risk-free interest rate is 8% per annum (with continuous compounding) and the dividend yield on the index is 4% per annum. What should the futures price for a four-month contract be?

B5. A one-year long forward contract on a non-dividend-paying stock is entered into when the stock price is $40 and the risk-free rate of interest is 10% per annum with continuous compounding.
a. What are the forward price and the initial value of the forward contract?
b. Six months later, the price of the stock is $45 and the risk-free interest rate is still 10%. What are the forward price and the value of the forward contract?

B6. The risk-free rate of interest is 7% per annum with continuous compounding, and the dividend yield on a stock index is 3.2% per annum. The current value of the index is 150. What is the six-month futures price?

B7. The 2-month interest rates in Switzerland and the United States are, respectively, 2% and 5% per annum with continuous compounding. The spot price of Swiss franc is $0.8000. The futures price for a contract deliverable in 2 months is $0.8100. What arbitrage opportunities does this create?

B8. The spot price of silver is$9 per ounce. The storage costs are $0.24 per ounce per year payable quarterly in advance. Assuming that interest rates are 10% per annum for all maturities, calculate the futures price of silver for delivery in 9 months.

B9. When a known future cash outflow in a foreign currency is hedged by a company using a forward contract, there is no foreign exchange risk. When it is hedged using futures contracts, the marking-to-market process does leave the company exposed to some risk. Explain the nature of this risk. In particular, consider whether the company is better off using a futures contract or a forward contract when:
a. The value of the foreign currency falls rapidly during the life of the contract.
b. The value of the foreign currency rises rapidly during the life of the contract.
c. The value of the foreign currency first rises and then falls back to its initial value.
d. The value of the foreign currency first falls and then rises back to its initial value.

Assume that the forward price equals the futures price.

C. Problems

C1. A stock is expected to pay a dividend of $1 per share in 2 months and in 5 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 6 month forward contract on the stock.

a. What are the forward price and the initial value of the forward contract?

b. 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?

C2. A trader owns gold as part of a long-term investment portfolio. The trader can buy gold for $550 per ounce and sell it for $549 per ounce. The trader can borrow funds at 6% per year and invest funds at 5.5% per year (both interest rates are expressed with annual compounding). For what range of 1-year forward prices of gold does the trader have no arbitrage opportunities? Assume there is no bid-offer spread for forward prices.