Futures - Questions

1.
   a. The S&P 500 contract expiring in March is priced at 1491.80. If the margin requirement is 10% of the futures price times the multiplier of $250, how much must you deposit with your broker to trade the March maturity contract?
   b. If the March futures price were to increase to 1,498, what percentage return would you earn on your net investment if you entered the long side of the contract which is priced at 1,491.80.
   c. If the March futures price falls by 1%, what is your percentage return?

2. OneChicago has just introduced a single-stock futures contract on Brandex stock, a company that currently pays no dividends. Each contract calls for delivery of 1,000 shares of stock in 1 year. The T-bill rate is 6% per year
   a. If Brandex stock now sells at $120 per share, what should the futures price be?
   b. If the Brandex price drops by 3%, what will be the change in the futures price and the change in the investor's margin account?
   c. If the margin on the contract is $12,000, what is the percentage return on the investor's position?

3. The S&P portfolio pays a dividend yield of 1% annually. Its current value is 2,000. The T-bill rate is 4%. Suppose the S&P futures price for delivery in 1 year is 2,050. Construct an arbitrage strategy to exploit the mispricing and show that your profits 1 year hence will equal the mispricing in the futures market.

Solution

1 a. The closing futures price for the March contract was 1,491.80, which has a dollar value of:

$250 × 1,491.80 = $372,950

Therefore, the required margin deposit is: $37,295.

b. The futures price increases by: $1,498.00 – 1,491.80 = $6.2

The credit to your margin account would be: 6.2 × $250 = $1,550

This is a percent gain of: $1,550/$37,295 = 0.04 = 4%

Note that the futures price itself increased by only 0.4%.

c. Following the reasoning in part (b), any change in F is magnified by a ratio of (l /margin requirement). This is the leverage effect. The return will be –10%.

2 a. 120 × 1.06 = $127.20

b. The stock price falls to: 120 × (1 – 0.03) = $116.40

The futures price falls to: 116.4 × 1.06 = $123.384

The investor loses: (127.20 – 123.384) × 1,000 = $3,816

c. The percentage loss is: $3,816/$12,000 = 0.318 = 31.8%

3.The parity value of F is: 2,000 × (1 + 0.04 – 0.01) = 2,060

The actual futures price is 2,050, low by 10

Arbitrage Portfolio	CF now	CF in 1 year
Short index	2,000	$-S_T - (0.01 \times 2{,}000)$
Buy futures	0	$S_T - 2{,}050$
Lend	−2,000	2,000 × 1.04
Total	0	10