

Problem 1.5.

An investor enters into a short forward contract to sell 100,000 British pounds for US dollars at an exchange rate of 1.5000 US dollars per pound. How much does the investor gain or lose if the exchange rate at the end of the contract is (a) 1.4900 and (b) 1.5200?

- (a) The investor is obligated to sell pounds for 1.5000 when they are worth 1.4900. The gain is $(1.5000 - 1.4900) \times 100,000 = \$1,000$.
- (b) The investor is obligated to sell pounds for 1.5000 when they are worth 1.5200. The loss is $(1.5200 - 1.5000) \times 100,000 = \$2,000$

Problem 1.6.

A trader enters into a short cotton futures contract when the futures price is 50 cents per pound. The contract is for the delivery of 50,000 pounds. How much does the trader gain or lose if the cotton price at the end of the contract is (a) 48.20 cents per pound; (b) 51.30 cents per pound?

- (a) The trader sells for 50 cents per pound something that is worth 48.20 cents per pound. Gain $= (\$0.5000 - \$0.4820) \times 50,000 = \900 .

The trader sells for 50 cents per pound something that is worth 51.30 cents per pound. Loss $= (\$0.5130 - \$0.5000) \times 50,000 = \650 .

Problem 1.19.

A trader enters into a short forward contract on 100 million yen. The forward exchange rate is \$0.0090 per yen. How much does the trader gain or lose if the exchange rate at the end of the contract is (a) \$0.0084 per yen; (b) \$0.0101 per yen?

- a) The trader sells 100 million yen for \$0.0090 per yen when the exchange rate is \$0.0084 per yen. The gain is 100×0.0006 millions of dollars or \$60,000.
- b) The trader sells 100 million yen for \$0.0090 per yen when the exchange rate is \$0.0101 per yen. The loss is 100×0.0011 millions of dollars or \$110,000.

c) Problem 1.35.

- d) The price of gold is currently \$1,400 per ounce. The forward price for delivery in one year is \$1,500. An arbitrageur can borrow money at 4% per annum. What should the arbitrageur do? Assume that the cost of storing gold is zero and that gold provides no income.

The arbitrageur should borrow money to buy a certain number of ounces of gold today and short forward contracts on the same number of ounces of gold for delivery in one year. This means that gold is purchased for \$1,400 per ounce and sold for \$1,500 per ounce. Interest on the borrowed funds will be $0.04 \times \$1400$ or \$56 per ounce. A profit of \$44 per ounce will therefore be made.

Problem 2.3.

Suppose that you enter into a short futures contract to sell July silver for \$17.20 per ounce. The size of the contract is 5,000 ounces. The initial margin is \$4,000, and the maintenance margin is \$3,000. What change in the futures price will lead to a margin call? What happens if you do not meet the margin call?

There will be a margin call when \$1,000 has been lost from the margin account. This will occur when the price of silver increases by $1,000/5,000 = \$0.20$. The price of silver must therefore rise to \$17.40 per ounce for there to be a margin call. If the margin call is not met, your broker closes out your position.

Problem 2.11.

A trader buys two July futures contracts on frozen orange juice. Each contract is for the delivery of 15,000 pounds. The current futures price is 160 cents per pound, the initial margin is \$6,000 per contract, and the maintenance margin is \$4,500 per contract. What price change would lead to a margin call? Under what circumstances could \$2,000 be withdrawn from the margin account?

There is a margin call if more than \$1,500 is lost on one contract. This happens if the futures price of frozen orange juice falls by more than 10 cents to below 150 cents per pound. \$2,000 can be withdrawn from the margin account if there is a gain on one contract of \$1,000. This will happen if the futures price rises by 6.67 cents to 166.67 cents per pound.

Problem 2.31.

Suppose that there are no storage costs for crude oil and the interest rate for borrowing or lending is 5% per annum. How could you make money if the June and December futures contracts for a particular year trade at \$80 and \$86?

You could go long one June oil contract and short one December contract. In June you take delivery of the oil borrowing \$80 per barrel at 5% to meet cash outflows. The interest accumulated in six months is about $80 \times 0.05 \times 1/2$ or \$2. In December the oil is sold for \$86 per barrel which is more than the \$82 that has to be repaid on the loan. The strategy therefore leads to a profit. Note that this profit is independent of the actual price of oil in June and December. It will be slightly affected by the daily settlement procedures.