

Exercise Set 5 - Forward Contracts*

Corporate Finance and Incentives - Fall 2010

Problem 1

A one-year forward contract for 100 units of a non-dividend paying stock is entered when the stock price is \$40 and the risk-free rate of interest is 10% per annum.

- a) What is the forward price and the initial value of the forward?
- b) Six months later, the price of the stock is \$45 and the risk-free rate is still 10%. What is the forward price and the value of the forward contract?

Problem 2

A stock is expected to pay a dividend of \$1 per share in two and five months. The stock price is \$50, and the risk-free rate of interest is 8% per annum with for all maturities.

An investor has just taken a short position in a six-month forward contract on 100 units of the stock.

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

Problem 3

The current price of silver is \$9 per ounce. The storage costs are \$0.24 per ounce per year payable quarterly in advance. Assuming interest rates are 6% per annum for all maturities, calculate the futures price of 5000 ounces of silver for delivery in nine months.

Problem 4

The owner of a company knows that he will need 35000 barrels of oil in exactly six months. The oil price today is \$37 and the six month zero coupon bond rate is 3.5%. The storage costs are \$1 dollar per barrel per year payable in advance. The owner of the company is offered to buy 35.000 barrels of oil to be delivered in six months for \$1.300.000.

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- a) Find the arbitrage forward price of a barrel of oil, and show how the offer leads to an arbitrage.
- b) What possible explanations could you find to the limits of arbitrage in the case of consumption commodities like oil?

Problem 5

A European investor holds a portfolio of American stocks with a market value of \$100 mio. He is however concerned that the dollar will fall over the next six months. The exchange rate is 1.15 *EUR/USD*. The six months interest on dollar loans is 4% and the six months interest rate on euro loans is 2%.

- a) How can the investor hedge this risk?
- b) Find the six month forward price of USD.
- c) What is the difference between a forward and a futures contract?