Eco-30004
Options and futures
Tutorial 1

Question 1
An energy production firm is trying to decide whether to hedge. It feels that its greatest source of risk exposure lies in whether significant new crude oil discoveries will or will not be made next year. It believes that if none are made, energy prices will rise at a rate of 40%/year for the following two years, annual earnings before interest, depreciation, and taxes (EBIDT) will be $70 million. But if the discoveries are made, prices will be flat, and EBIDT will be $8 million. The probability that the new discoveries will be made is 30%. Interest expense will be $5 million, and depreciation expense will be $12 million. The tax rate is 40%. Compute the firm's expected net income and expected cash flow. Compute the variance of its net income.
Now suppose that if the firm hedges its exposure to changes in crude oil prices, it can reduce the uncertainty about its future EBIDT. Hedging would indicate the belief that if there is no oil discovered, EBIDT will be $55 million; but if there are new discoveries, EBIDT will be $43 million. Compute the firm's expected net income and expected cash flows. Compute the variance of its net income.

Question 2
Let's say that F(0,T)=$31 per barrel and S(T)=$32.20 per barrel. The forward contract covers 24000 barrels of oil. Which party, the one that bought the contract, or the one that sold the contract, made the profit? How much is the profit?

Question 3
On March 2, a firm sells a 3x8 FRA. The contracted forward rate is 5.93%. The principal amount is $80 million. On the settlement date the 5 months spot interest rate is 6.04%. What amount must firm pay or receive?

Question 4
A firm goes long a forward foreign exchange contract. The contract specifies that firm agrees to buy £5 million 6 months hence. The forward price is ¥168/£. Six months hence, the spot price is ¥180/£. At settlement, has the firm realized a profit or loss? What is the amount of that profit or loss?

Question 5
A US mutual fund has invested in a portfolio of British stocks. However it does not wish to be exposed to exchange rate risk.

a. Is the fund exposed to the risk that the $/£ rate will rise or fall?
b. To hedge, should buy or sell British pounds forward?
c. Suppose that the fund invests $16 million in British stocks. The spot exchange rate is $1.68£. The forward rate for delivery in 6 months hence is $1.673£. Six months later, the stocks are sold for £9 million, and the spot exchange rate is $1.70£. What final profit or loss would the fund have realized, in terms of dollars, had it originally hedged its initial investment in British stocks? What was its dollar based annualized rate of return? What would have been its dollar denominated profit and rate of return, had it not hedged?