Class 8
Derivatives: options

Reading: GT: Chapter 8.

Question 1

Consider a European call option in a two-period binomial model. Use the risk-neutral method. CH_4 Trading's stock price is £110 and in the next 3 months will either increase by 25 percent or fall by 20 percent. A 6-month call on CH_4 stock has an exercise price of £90. The interest rate is 1 percent per month, or about 3 percent for 3 months.

a. What is the value of the CH_4 call?

b. Now assume that this is an American call option. What is its value?

c. Find the value of a European put option on CH_4 with the same exercise price and expiration date using put-call parity. Prove your answer using risk-neutral method.

Question 2

a. Suppose that put options on a stock with strike prices $30 and $35 cost $4 and $7, respectively. How can the options be used to create a bull spread and a bear spread?

b. Three put options on a stock have the same expiration date and strike prices of $55, $60 and $65. The market prices are $3, $5 and $8, respectively. Explain how a butterfly spread can be created. For what range of stock prices would the butterfly spread lead to a loss?

c. A call with a strike price of $50 costs $6. A put with the same strike price and expiration date costs $4. Construct a straddle strategy. For what range of stock prices would the straddle lead to a loss?

d. An investor believes that there will be a big jump in the stock price but is uncertain as to the direction. Identify different strategies the investor can follow to extract profit.

e. What is the result if the strike price of the put is higher than the strike price of the call in a strangle?