Class 7
Derivatives: options

Reading: GT: Chapter 8.

Question 1

A one-period European call option on ABC stock has an exercise price of 120. The current price of ABC stock is 100, and if things go well, the price in the following period will be 150. If things go badly over the coming period, the price will be 90. The risk-free rate is 10 percent. What is the no-arbitrage price of this option?

Question 2

Using the stock price data from the previous question, price a European put option on ABC stock with a strike price of 100.

Question 3

Consider a European call option in a two-period binomial model.
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.

Suppose that in month 3 the CH_4 stock price is £88. How at that point could you replicate an investment in the stock by a combination of call options and risk-free lending? Show that our strategy does indeed produce the same returns as from an investment in the stock.

Question 4

Refer to the previous question.
Suppose that you own an American put option on CH_4 stock with an exercise price of £110.

a. Would you ever want to exercise the put early?
b. Calculate the value of the put.
c. Now compare the value with that of an equivalent European put option.