NBA 5420 – Investments and Portfolio Management
Problem Set 3 – Arbitrage Pricing

Problem 1:

Answer the following questions:

a. If the futures price on the S&P500 is above the current value of the index, investors expect the index to rise. True or false?

b. Explain why a higher dividend rate makes a futures contract less valuable relative to the spot price of the underlying asset, other things equal.

Problem 2:

Using put-call parity:

a. Show how one can replicate a one-year pure discount Treasury bill with a face value of $100 using a share of stock, a put and a call.
b. Suppose that S = $100, P = $15, and C = $35 (exercise prices = $100). What must be the one-year interest rate?
c. Show that if the one-year risk-free interest rate is lower than in your answer to part (b), there would be an arbitrage opportunity. (Hint: The price of the zero coupon bond would be too high.)

Problem 3:

There are two states of the world, up and down, to be realized in one year. A bond issued by firm XYZ pays out $1,000 in the up state; in the down state, it defaults and only pays out $200. A credit default swap (CDS) on XYZ is a derivative that makes you whole in the event of default: it pays out $0 in the up state, and $800 in the down state. The risk free rate is $r_f = 5\%$. Suppose that the probability of up is 0.95, and the probability of down is 0.05. The CDS costs $20 to buy today. Using no arbitrage, what is the value of the XYZ bond today?