Key to Quiz D: 4/4/12

Quiz: Assume a firm's stock price currently equals $50 and that its stock price will either rise by 20% or fall by 10% one year from today. Assume also that the risk free rate of return is 5% and that you are evaluating a put with a strike price of $55.

a. What are the potential payoffs on the long put?
b. What portfolio of stocks and risk-free bonds will duplicate the payoffs on the put?
c. What payoff would each part of the portfolio generate if the stock price rises by 20% next year?
d. What payoff would each part of the portfolio generate if the stock price falls by 10% next year?
e. What is the value of the long put today?

S_u = 50(1.2) = 60; S_d = 59(.9) = 45

a. P_u = 0, P_d = 10

b. $\Delta = \frac{0-10}{60-45} = -0.6667$; $B = \frac{10-(-0.6667)(45)}{1.05} = 38.0952$ => short-sell 0.6667 shares and buy $38.0952 of risk-free bonds.

c. Stock = – 0.6667(60) = – 40; Bond = 38.0952*1.05 = 40

d. Stock = – 0.6667(45) = – 30; Bond = 40

e. P = – 0.6667(50) + 38.0952 = 4.7619