Finance 5360 Quiz A: 8/4/15 Name Key

Note: Answer the following on a per-share basis.

Assume you want to value a put with a strike price of $50 that expires two years from today. The price of the stock on which the put will be written is $42, but the price will either rise $6 or fall $4 each of the next two years. Assume that the risk-free interest rate equals 3.5% per year.

a. What is the value today of the put?
b. If you create a portfolio today that is equivalent to the put, what will be the makeup of the portfolio?
c. Assume the stock price falls next year. What trades would you have to make a year from today to rebalance your portfolio?
d. What trades will be required two years from today to close out you portfolio? What cash flows will occur?

if the stock falls both years

a. $S_u = 42+6 = 48$; $S_d = 42-4 = 38$; $S_{uu} = 48+6 = 54$; $S_{ud} = S_{du} = 48-4 = 44$; $S_{dd} = 38-4 = 34$

$P_{uu} = 0$; $P_{ud} = P_{du} = 6$; $P_{dd} = 16$

$\Delta_u = \frac{0-6}{54-44} = -0.6$; $B_u = \frac{6-(-.6)44}{1.035} = 31.3043$; $P_u = 48(-.6)+31.3043 = 2.5043$

$\Delta_d = \frac{6-16}{44-34} = -1$; $B_d = \frac{16-(-1)(34)}{1.035} = 48.3092$; $P_d = 38(-1)+48.3092 = 10.3092$

$\Delta = \frac{2.5043-10.3092}{48-38} = -0.7805$; $B = \frac{10.3092-(-.7805)(38)}{1.035} = 38.6160$

$P = 42(-.7805)+38.6160 = 5.8357$

b. short sell .7805 shares; buy 38.6160 bonds

c. short sell .2195 shares ($-1-(-.7805)$); Buy 8.3416 bonds ($48.3092-38.6160(1.035)$)

d. Sell bonds for $48.3092(1.035) = 50$; Buy back one share @ 34