Quiz B: 4/11/12

Quiz: Suspend Campaign Company has a current stock price of $50. For the next two years, Suspend's stock price will either rise by 8% per share or fall by 4% per share.

a. Set up the calculations needed to determine the value of a call today with a strike price of $50 if the risk-free interest rate is 3% per year and is not expected to change.

b. Set up the calculations needed to determine how many bonds would you need to buy or sell a year from today if Suspend's stock price rises by 8% next year?

Note: Bonus WSJ Questions on back of page

\[
S_0 = 50 \times 1.08 = 54; \quad S_d = 50 \times 0.96 = 48
\]

\[
S_{0u} = 50 \times 1.08^2 = 58.32; \quad S_{0d} = 50 \times 0.96^2 = 51.84; \quad S_{ud} = 60 \times 1.08^2 = 66.08
\]

\[K = 50\]

\[
C_{0u} = 58.32 - 50 = 8.32; \quad C_{0d} = 51.84 - 50 = 1.84; \quad C_{ud} = 0
\]

\[t = 1\]

\[
\Delta u = \frac{58.32 - 1.84}{58.32 - 51.84} = 1; \quad \beta_u = \frac{1.84 - 0}{1.03} = -4.8543
\]

\[
\beta_u = \frac{54 - 0}{51.84 - 48.08} = 0.3194; \quad \beta_d = \frac{1.84 - 0}{1.03} = -14.2913
\]

\[
C_u = 54 - 51.84 = 14.2913 = 1.84
\]

\[t = 0\]

\[
\Delta = \frac{54 - 51.84}{54 - 48} = 0.7308; \quad \beta = \frac{1.0418 - 0}{1.03} = -33.276
\]

\[
C = 50 \times 1.7357 - 33.2736 = 3.511
\]

b) 1) Change in stock: \[1 - 1.7357 = 0.2643; \quad c^2 = 14.272\]

\[\Rightarrow \text{buy 264 shares for 2643} \times \text{stock} = 533.928\]

\[\Rightarrow \text{short sell 10 shares of bond}\]

2) Bonds if do nothing: \[-33.2736 \times 1.03 = -34.2718\]

\[\Rightarrow \text{change in bonds} = -14.2719 - (-34.2718) = 14.2719\]

\[\Rightarrow \text{short sell 14.2719 of bond}\]