

Assume that Accidental Petroleum's stock price currently equals \$50 per share and that its stock price will rise 12% or fall 8% each of the next two years. If the risk-free interest rate is 2% per year, what is the value today of a call on Accidental with a strike price of \$45 that expires in two years?

Wall Street Journal Questions are on the back of this page.

$$\begin{array}{c}
 \underline{0} \qquad \qquad \qquad \underline{1} \qquad \qquad \qquad \underline{2} \\
 K=45 \\
 S=50
 \end{array}
 \begin{array}{l}
 \swarrow \quad \searrow \\
 S_u = 56 = 50(1.12) \\
 S_d = 46 = 50(.92)
 \end{array}
 \begin{array}{l}
 \swarrow \quad \searrow \\
 S_{uu} = 62.72 = 56(1.12) \\
 C_{uu} = 17.72 = 62.72 - 45 \\
 S_{ud} = S_{du} = 51.52 = 56(.92) = 46(1.12) \\
 C_{ud} = C_{du} = 6.52 = 51.52 - 45 \\
 S_{dd} = 42.32 = 46(.92) \\
 C_{dd} = 0
 \end{array}$$

$$\Delta_u = \frac{17.72 - 6.52}{62.72 - 51.52} = 1 \quad \text{(5)}$$

$$B_u = \frac{6.52 - 1(51.52)}{1.02} = -44.1176 \quad \text{(5)}$$

$$C_u = 56(1) - 44.1176 = 11.8824 \quad \text{(5)}$$

$$\Delta_d = \frac{6.52 - 0}{51.52 - 42.32} = 0.7087 \quad \text{(5)}$$

$$B_d = \frac{0 - (0.7087)(42.32)}{1.02} = -29.4039 \quad \text{(5)}$$

$$C_d = 46(0.7087) - 29.4039 = 3.1961 \quad \text{(5)}$$

$$\Delta = \frac{11.8824 - 3.1961}{56 - 46} = 0.8686 \quad \text{(9)}$$

$$B = \frac{3.1961 - (0.8686)(46)}{1.02} = -36.04 \quad \text{(6)}$$

$$C = 50(0.8686) - 36.04 = 7.3914 \quad \text{(5)}$$