

Key to Quiz B: 4/4/12

Quiz: Assume a firm's stock price currently equals \$24 and that its stock price will either rise by \$5 or fall by \$4 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 \$25.

- What are the potential payoffs on the long put?
- What portfolio of stocks and risk-free bonds will duplicate the payoffs on the put?
- What payoff would each part of the portfolio generate if the stock price rises by \$5 next year?
- What payoff would each part of the portfolio generate if the stock price falls by \$4 next year?
- What is the value of the long put today?

$$S_u = 24 + 5 = 29; S_d = 24 - 4 = 20$$

a. $P_u = 0, P_d = 5$

b. $\Delta = \frac{0-5}{29-20} = -0.5556; B = \frac{5 - (-0.5556)(20)}{1.05} = 15.3439 \Rightarrow$ short-sell 0.5556 shares and buy \$15.3439 of risk-free bonds.

c. Stock = $-0.5556(29) = -16.1111$; Bond = $15.3439 * 1.05 = 16.1111$

d. Stock = $-0.5556(20) = -11.1111$; Bond = 16.1111

e. $P = -0.5556(24) + 15.3439 = 2.0106$