

Recount Inc. has a current price of \$40 per share. For each of the next two years, Recount's stock price will either rise \$12 per share or fall \$8 per share. Thus, Recount's stock price will equal either \$52 or \$32 per share one year from today, and Recount's stock price will equal either \$64 or \$44 or \$24 per share two years from today. Assume that the risk-free interest rate equals 6% and that replicating portfolios for a particular put on Recount would need to consist of the following:

Today:  $\Delta = -0.6328$ ,  $B = +33.4155$

One year from today:

If Recount's stock price climbs to \$52:  $\Delta = -0.30$ ,  $B = +18.1132$

If Recount's stock price falls to \$32:  $\Delta = -1.0$ ,  $B = +47.1698$

- What transactions would be required today and one year from today to build the replicating portfolios?
- Assume Recount's stock price climbs to \$52 next year. Calculate the possible payoffs two years from today on the portfolio you built one year from today ( $\Delta = -0.30$ ,  $B = +18.1132$ )?
- Assume Recount's stock price falls to \$32 next year. Calculate the possible payoffs two years from today on the portfolio you built one year from today ( $\Delta = -1.0$ ,  $B = +47.1698$ )?

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

a. Today  $\Rightarrow$  (short <sup>+6</sup> 0.6328 shares) + (buy 33.4155 of bonds)

In one year

If  $S = 52 \Rightarrow$  buy <sup>+3</sup> 0.3328 shares  $\downarrow$  =  $-0.3 - (-0.6328)$  <sup>+3</sup>   
 $\Rightarrow$  sell <sup>+6</sup> <sup>+7</sup> 17.3072 of bonds <sup>+return to lender</sup>

1) If do nothing,  $B = 35.4204 = 33.4155(1.06)$    
 $\Rightarrow$  change =  $18.1132 - 35.4204 = -17.3072$

2) \$ value of shares =  $0.3328 \times 52 = 17.3056$    
 $\Rightarrow$  sell \$17.3056 of bonds to fund

If  $S = 32 \Rightarrow$  short <sup>+3</sup> 0.3672 shares =  $-1 - (-0.6328)$  <sup>+3</sup>   
 $\Rightarrow$  buy <sup>+6</sup> <sup>+7</sup> \$11.70494 of bonds

1) If do nothing,  $B = 35.4204$    
 $\Rightarrow$  change =  $47.1698 - 35.4204 = 11.7494$

2) \$ value of shares =  $0.3672 \times 32 = 11.7504$    
 $\Rightarrow$  buy \$11.7504 of bonds w/ proceeds

b. If  $S = 64$ , payoff =  $-0.3(64) + 18.1132(1.06) = 0$

If  $S = 44$ , payoff =  $-0.3(44) + 18.1132(1.06) = 6$

c. If  $S = 44$ , payoff =  $-1(44) + 47.1698(1.06) = 6$

If  $S = 24$ , payoff =  $-1(24) + 47.1698(1.06) = 26$