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: \( \Delta = -0.30, \) \( B = +11.7304 \)
- If Recount’s stock price falls to $32: \( \Delta = -1.0, \) \( B = +47.1698 \)

a. What transactions would be required today and one year from today to build the replicating portfolios?
b. 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 (\( \Delta = -0.30, \) \( B = +11.7304 \))?
c. Assume Recount’s stock price falls to $32 next year. Calculate the possible payoffs two years from today on the portfolio you build one year from today (\( \Delta = -1.0, \) \( B = +47.1698 \))?

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

a. Today: \((\text{short} \ 0.6328 \text{ shares}) + (\text{buy} \ 33.4155 \text{ of bonds})\)

In one year:

\( \Delta = -0.6328 \Rightarrow \text{buy} \ 0.3328 \text{ shares} = -3 \Rightarrow \) \( \text{sell} \ 17.3072 \text{ of bonds} \)

1) If do nothing, \( B = +35.4204 = 33.4155(1.06) \)
   \( \Rightarrow \text{change} = 18.1132 - 35.4204 = -17.3072 \)

2) Value of shares = \( 3.328 \times 52 = 17.3056 \)
   \( \Rightarrow \text{sell} \ 17.3056 \text{ of bonds to fund} \)

\( \Delta = -3 \Rightarrow \text{short} \ 0.3672 \text{ shares} = -1 \Rightarrow \) \( \text{buy} \ 11.7494 \text{ of bonds} \)

1) If do nothing, \( B = +35.4204 \)
   \( \Rightarrow \text{change} = 47.1698 - 35.4204 = 11.7494 \)

2) Value of shares = \( 3.672 \times 32 = 11.7504 \)
   \( \Rightarrow \text{buy} \ 11.7504 \text{ of bonds with proceeds} \)

b. If \( S = 64, \) Payoff = \( -3(64) \times 18.1132(1.06) = 0 \)
   \( \Rightarrow \text{net} \ 0 \)

If \( S = 44, \) Payoff = \( -3(44) \times 18.1132(1.06) = 6 \)

If \( S = 44, \) Payoff = \( -1(44) \times 47.1698(1.06) = 6 \)

C. If \( S = 44, \) Payoff = \( -1(44) + 47.1698(1.06) = 6 \)
   \( \Rightarrow \text{net} \ 0 \)

If \( S = 24, \) Payoff = \( -1(24) \times 47.1698(1.06) = 26 \)
   \( \Rightarrow \text{net} \ 26 \)