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## SOLUTIONS TO PRACTICE EXERCISES LECTURE 4

### Solution Q1:

Use Eq. (9.1) to solve for the price of the stock in one year given the current price of \$45.00, the \$2.05 dividend, and the 16% cost of capital.

$$\begin{aligned}
 P_0 &= \frac{Div_1 + P_1}{1 + r_E} \\
 \$45 &= \frac{\$2.05 + P_1}{1 + 0.16} \\
 \$45 &= \frac{\$2.05 + P_1}{1.16} \\
 \$45(1.16) &= \$2.05 + P_1 \\
 \$52.2 - \$2.05 &= P_1 \\
 P_1 &= \$52.2 - \$2.05 = \$50.15
 \end{aligned}$$

At a current price of \$45.00, we can expect Evco stock to sell for \$50.15 immediately after the firm pays the dividend in one year.

### Solution Q2:

- Dividend yield =  $Div_1/P_0 = 2/27 = 7.41\%$
- Capital gain rate =  $(P_1 - P_0)/P_0 = (28 - 27)/27 = 3.70\%$
- Equity cost of capital =  $7.41\% + 3.70\% = 11.11\%$

### Solution Q3:

- $P(0) = 2.72 / 1.111 + (2.99 + 53.72) / 1.111^2 = \$48.39$
- If you keep the stock for one year, you basically discount the future cash flows in year 2 (i.e. dividend year 2 and price of Acap's stock in year 2) to year one. Hence,  $P(1) = (2.99 + 53.72) / 1.111 = \$51.04$
- $P(0) = (2.72 + 51.04) / 1.111 = \$48.39$ . The price is the same—otherwise, there would be an arbitrage opportunity

### Solution Q4:

The price in one year is  $P(t+1) = Div(t+2)/(r - g) = 0.25/(\.10 - \.02) = \$3.125$

The price today is  $P(t) = P(t+1)/(1+r) = \$3.125/1.1 = \$2.84$

### Solution Q5:

- $g = \text{retention rate} \times \text{return on new investment} = (1.92/4.01) \times 15.1\% = 7.23\%$
- $P = 2.09 / (12.8\% - 7.23\%) = \$37.52$

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**Solution Q6:**

a. PV of the first 5 dividends:

$$PV_{\text{first 5}} = \frac{1.62}{1.085} + \frac{1.74}{1.085^2} + \frac{1.86}{1.085^3} + \frac{1.98}{1.085^4} + \frac{2.10}{1.085^5} = \$7.25.$$

b. PV of the remaining dividends in year 5:

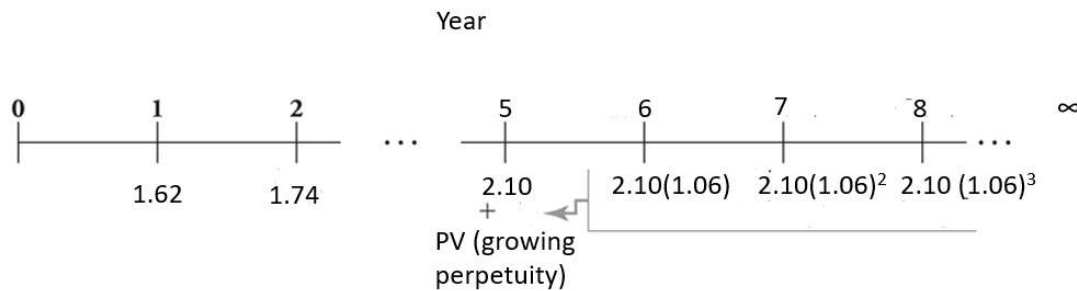
$$PV_{\text{remaining in year 5}} = \frac{2.10(1.06)}{0.085 - 0.06} = 89.04.$$

Discounting back to the present

$$PV_{\text{remaining}} = \frac{89.04}{(1.085)^5} = \$59.22.$$

Thus the price of Colgate is

$$P = PV_{\text{first 5}} + PV_{\text{remaining}} = \$66.47.$$



**Solution Q7:**

a.  $R = \frac{1 + (55 - 50)}{50} = 0.12 = 12\%$

b.  $R_{\text{div}} = \frac{1}{50} = 2\%$

$$R_{\text{capital gain}} = \frac{55 - 50}{50} = 10\%$$

The realized return on the equity investment is 12%. The dividend yield is 10%.

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**Solution Q8:**

- a. Let  $n_i$  be the number of share in stock I, then

$$n_G = \frac{300,000 \times 0.6}{23} = 7,826$$

$$n_M = \frac{300,000 \times 0.3}{71} = 1,268$$

$$n_V = \frac{300,000 \times 0.1}{4} = 7,500$$

The new value of the portfolio is  $= n_G \times 40 + n_M \times 60 + n_V \times 14 = \$494,120$

- b. Return  $= \frac{494,120}{300,000} - 1 = 0.6471 = 64.71\%$

- c. The portfolio weights are the fraction of value invested in each stock.

$$\text{GoldFinger: } \frac{n_G \times 40}{494,120} = 63.35\%$$

$$\text{Moosehead: } \frac{n_M \times 60}{494,120} = 15.40\%$$

$$\text{Venture Associates: } \frac{n_V \times 14}{494,120} = 21.25\%$$

**Solution Q9:**

This is similar to Example 11.16 on p. 420

- a. The expected return of:

$$\text{HEC Corp} = 3\% + 0.455(8\% - 3\%) = 5.28\%$$

$$\text{Green Midget} = 3\% + 1.456(8\% - 3\%) = 10.28\%$$

$$\text{Alive and Well} = 3\% + 0.594(8\% - 3\%) = 5.97\%$$

- b. The expected return of the portfolio  $= (0.26 \times 5.28\%) + (0.29 \times 10.28\%) + (0.45 \times 5.97\%) = 7.04\%$

- c. Beta of the portfolio  $= (0.26 \times 0.455) + (0.29 \times 1.456) + (0.45 \times 0.594) = 0.8078$

- d. The expected return of the portfolio based on the answer from part (c):  $3\% + 0.8078(8\% - 3\%) = 7.04\%$

**Solution Q10:**

For large portfolios there is a relationship between returns and volatility—portfolios with higher returns have higher volatilities. For stocks, no clear relation exists.

**Solution Q11:**

Beta  $= (0.70)(2.10) + (0.30)(0.75) = 1.695$ . Hence,  $E[R] = 5.5\% + 1.695(14\% - 5.5\%) = 19.91\%$ .