

## Seminar 4 Solutions

### A. Multiple Choice Questions

**A1. Choice “c” is correct.**

$$P = \frac{\text{Div}_1}{r_p} = \frac{\$5.00}{5\%} = \$100.00$$

Choice “a” is incorrect. This is the perpetual dividend, not the value of the preferred shares.

Choice “b” is incorrect. This is the result if the Company’s 10% debt rate is used in the denominator, but the denominator should be the yield on similar quality preferred stocks.

Choice “d” is incorrect. This is the result if the risk-free rate of interest is used in the denominator, but the denominator should be the yield on similar quality preferred stocks.

**A2. Choice “b” is correct.**

$$\text{Current yield} = \frac{\text{Dividend}}{\text{Stock Price}}$$

$$\text{Stock price at year 3} = \frac{\text{Dividend}}{\text{Current yield}} = \frac{25\% \times \$2.40}{3\%} = \$20$$

$$P_{cs} = \frac{0.25 \times \$2.00}{1.15} + \frac{0.25 \times \$2.20}{(1.15)^2} + \frac{0.25 \times \$2.40}{(1.15)^3} + \frac{\$20.00}{(1.15)^3} = \$14.40$$

Choice “a” is incorrect. This is the price if the stock value at year three is incorrectly discounted for four periods, not three.

Choice “c” is incorrect. This is the next year’s projected dividend ( $25\% \times \$2.00 = \$0.50$ ) divided by the year three 3% current yield.

Choice “d” is incorrect. This is the price that results if earnings, not dividends, are used in calculating the price.

**A3. Choice “a” is correct.**

$$P_{cs} = \frac{\text{Div}_1 + P_1}{1 + r} = \frac{\$1.50 + \$26.00}{1.15} = \$23.91$$

Choice “b” is incorrect. This is the value excluding the dividends, but the dividends should be included.

Choice “c” is incorrect. This is the result if the dividends are incorrectly double counted.

Choice “d” is incorrect. This is the cash flows, but they should be discounted by the 15% required return.

**A4. Choice “a” is correct.**

First, calculate the next two year’s dividends:

$$Div_1 = Div_0(1 + g_{Div}) = \$1.00(1.05) = \$1.05$$

$$Div_2 = Div_1(1 + g_{Div}) = \$1.05(1.05) = \$1.10$$

Next, calculate the terminal value:

$$P_{CS_2} = \frac{Div_2}{CY_2} = \frac{\$1.10}{2\%} = \$55.00$$

Finally, calculate the price today:

$$P_{CS_2} = \frac{Div_1}{(1 + r_{CE})} + \frac{Div_2 + P_{CS_2}}{(1 + r_{CE})^2} = \frac{\$1.05}{1.10} + \frac{\$1.10 + \$55.00}{(1.10)^2} = \$47.32$$

Choice “b” is incorrect. This is the value of all calculations are based on \$1.00 being used as dividend<sub>1</sub> instead of the correct \$1.05.

Choice “c” is incorrect. This is the value of the stock in two years.

Choice “d” is incorrect. This is the expected year one dividend divided by the year two yield of 2%.

**5. Choice “c” is correct.** The current dividend of \$2.00 will grow to \$2.08 next year, using the 4% growth rate. Thus the numerator is \$2.08. The denominator is the investor’s required return minus the growth rate.

$$P_{CS_2} = \frac{Div_1}{r_{Ce} - g} = \frac{\$2.00(1.04)}{.09 - .04} = \$41.60$$

Choice “a” is incorrect. This is the result if the current dividend is divided by the 10-year Treasury rate.

Choice “b” is incorrect. This is the result if the current dividend is divided by the required rate of return less the growth rate.

Choice “d” is incorrect. This is the result if  $r_{CE}$  is calculated by adding the risk-free rate to the 10-year Treasury rate. The correct dividend and growth rate are used.

**B. Short Answer Questions**

**B1.** To answer this question; think about the relationship between the variables in the P/E ratio formula:

$$\frac{P_0}{E_1} = \frac{D_1}{E_1(K_e - g)} = \frac{D_0(1 + g)}{E_1(K_e - g)}$$

- The rise in  $g$  implies that the P/E ratio would rise.
- The rise in the retention rate implies the P/E ratio will fall.
- The rise in the earnings per share would result in the P/E ratio falling.

**B2.**

- a. This director is confused. In the context of the constant growth model [i.e.,  $P_0 = D_1/(k - g)$ ], it is true that price is higher when dividends are higher *holding everything else including dividend growth constant*. But everything else will not be constant. If the firm increases the dividend payout rate, the growth rate  $g$  will fall **(given that the company will have to forego retained earnings for increased dividends)**, and stock price will not necessarily rise. In fact, if  $ROE > k$ , price will fall.
- b. (i) An increase in dividend payout will reduce the sustainable growth rate as less funds are reinvested in the firm. The sustainable growth rate (i.e.,  $ROE \times \text{plowback}$ ) will fall as plowback ratio falls.  
(ii) The increased dividend payout rate will reduce the growth rate of book value for the same reason -- **less funds are reinvested in the firm.**

**C. Problems**

See excel spreadsheet