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# **CHAPTER 8**

## **STOCK VALUATION**

### **Answers to Concepts Review and Critical Thinking Questions**

1. The value of any investment depends on its cash flows; i.e., what investors will actually receive. The cash flows from a share of stock are the dividends.
2. Investors believe the company will eventually start paying dividends (or be sold to another company).
3. In general, companies that need the cash will often forgo dividends since dividends are a cash expense. Young, growing companies with profitable investment opportunities are one example; another example is a company in financial distress. This question is examined in depth in a later chapter.
4. The general method for valuing a share of stock is to find the present value of all expected future dividends. The dividend growth model presented in the text is only valid (i) if dividends are expected to occur forever, that is, the stock provides dividends in perpetuity, and (ii) if a constant growth rate of dividends occurs forever. A violation of the first assumption might be a company that is expected to cease operations and dissolve itself some finite number of years from now. The stock of such a company would be valued by the methods of this chapter by applying the general method of valuation. A violation of the second assumption might be a start-up firm that isn't currently paying any dividends, but is expected to eventually start making dividend payments some number of years from now. This stock would also be valued by the general dividend valuation method of this chapter.
5. The common stock probably has a higher price because the dividend can grow, whereas it is fixed on the preferred. However, the preferred is less risky because of the dividend and liquidation preference, so it is possible the preferred could be worth more, depending on the circumstances.
6. The two components are the dividend yield and the capital gains yield. For most companies, the capital gains yield is larger. This is easy to see for companies that pay no dividends. For companies that do pay dividends, the dividend yields are rarely over five percent and are often much less.
7. Yes. If the dividend grows at a steady rate, so does the stock price. In other words, the dividend growth rate and the capital gains yield are the same.
8. In a corporate election, you can buy votes (by buying shares), so money can be used to influence or even determine the outcome. Many would argue the same is true in political elections, but, in principle at least, no one has more than one vote.
9. It wouldn't seem to be. Investors who don't like the voting features of a particular class of stock are under no obligation to buy it.
10. Investors buy such stock because they want it, recognizing that the shares have no voting power. Presumably, investors pay a little less for such shares than they would otherwise.

11. Presumably, the current stock value reflects the risk, timing and magnitude of all future cash flows, both short-term and long-term. If this is correct, then the statement is false.

### Solutions to Questions and Problems

#### Basic

- $$P_0 = D_0(1 + g) / (R - g) = \$1.75 (1.06) / (.12 - .06) = \$30.92$$

$$P_3 = D_3(1 + g) / (R - g) = D_0(1 + g)^4 / (R - g) = \$1.75 (1.06)^4 / (.12 - .06) = \$36.82$$

$$P_{15} = D_{15}(1 + g) / (R - g) = D_0(1 + g)^{16} / (R - g) = \$1.75 (1.06)^{16} / (.12 - .06) = \$74.09$$
- $$R = D_1 / P_0 + g = (\$2.50 / \$48.00) + .05 = 10.21\%$$
- Dividend yield =  $D_1 / P_0 = 5.21\%$ ; capital gains yield = 5%
- $$P_0 = D_1 / (R - g) = \$4.00 / (.13 - .04) = \$44.44$$
- $$R = \text{dividend yield} + \text{capital gains yield} = .042 + .07 = 11.2\%$$
- Dividend yield =  $1/2(.14) = .07 = \text{capital gains yield}$   

$$D_1 = .07(\$60) = \$4.20; D_0(1 + g) = D_1, D_0 = \$4.20 / (1.07) = \$3.93$$
- $$P_0 = \$9.00(\text{PVIFA}_{11\%,8}) = \$46.32$$
- $$R = D/P_0 = \$8.50/\$124 = 6.85\%$$

#### Intermediate

- $$P_6 = D_6(1 + g) / (R - g) = D_0(1 + g)^7 / (R - g) = \$3.00 (1.075)^7 / (.13 - .075) = \$90.49$$

$$P_3 = [\$3.00 (1.075)^4 / (1.12)] + [\$3.00 (1.075)^5 / (1.12)^2] + [\$3.00 (1.075)^6 / (1.12)^3] + [\$90.49 / (1.12)^3]$$

$$= \$74.72$$

$$P_0 = \$3.00(1.075)/(1.18) + \$3.00(1.075)^2/(1.18)^2 + \$3.00(1.075)^3/(1.18)^3 + \$74.72/(1.18)^3$$

$$= \$52.97$$
- $$P_9 = D_{10} / (R - g) = \$7.00 / (.14 - .06) = \$87.50; P_0 = \$87.50 / 1.14^9 = \$26.91$$
- $$P_0 = \$8 / (1.11) + \$10 / (1.11)^2 + \$12 / (1.11)^3 + \$14 / (1.11)^4 = \$33.32$$
- $$P_4 = D_4(1 + g) / (R - g) = \$2.00 (1.05) / (.16 - .05) = \$19.09$$

$$P_0 = \$6.50 / (1.16) + \$5.00 / (1.16)^2 + \$3.00 / (1.16)^3 + \$21.09 / (1.16)^4 = \$22.89$$
- $$P_3 = D_3(1 + g) / (R - g) = D_0(1 + g_1)^3(1 + g_2) / (R - g) = \$2.25 (1.32)^3(1.07) / (.15 - .07) = \$69.21$$

$$P_0 = [\$2.25(1.32) / (1.15)] + [\$2.25(1.32)^2 / (1.15)^2] + [\$2.25(1.32)^3 / (1.15)^3] + [\$69.21 / (1.15)^3]$$

$$= \$54.46$$

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14.  $D_3 = D_0(1.25)^3$ ;  $D_4 = D_0(1.25)^3(1.18)$   
 $P_4 = D_4(1 + g) / (R - g) = D_0(1 + g_1)^3(1 + g_2)(1 + g_3) / (R - g)$   
 $= D_0(1.25)^3(1.18)(1.08) / (.15 - .08) = 35.56D_0$   
 $P_0 = \$60.00 = D_0\{(1.25/1.15) + (1.25/1.15)^2 + (1.25/1.15)^3 + [(1.25)^3(1.18) + 35.56] / 1.15^4\}$   
 $D_0 = \$60.00 / \$25.20 = \$2.38$ ;  $D_1 = \$2.38(1.25) = \$2.98$
15.  $P_0 = D_0(1 + g) / (R - g) = \$9.00(0.92) / (.14 + .08) = \$37.64$
16.  $P_0 = \$45 = D_0(1 + g) / (R - g)$ ;  $D_0 = \$45(.12 - .08) / (1.08) = \$1.67$
17.  $P_5 = \$8.00 / .06 = \$133.33$ ;  $P_0 = \$133.33 / (1.06)^5 = \$99.63$
18. Dividend yield = .013 =  $\$0.48 / P_0$ ;  $P_0 = \$0.48/.013 = \$36.92$   
 Stock up  $\$0.95$ , so yesterday's closing price =  $\$36.92 - 0.95 = \$35.97$   
 P/E = 51; EPS =  $\$36.92 / 51 = \$0.72 = \text{NI} / \text{shares}$ ; NI =  $\$0.72(2,000,000) = \$1.44\text{M}$

Challenge

19. W:  $P_0 = D_0(1 + g) / (R - g) = \$4.50(1.10)/(.20 - .10) = \$49.50$   
 Dividend yield =  $D_1/P_0 = 4.50(1.10)/49.50 = 10\%$ ; capital gains yield =  $.20 - .10 = 10\%$   
 X:  $P_0 = D_0(1 + g) / (R - g) = \$4.50/ (.20 - 0) = \$22.50$   
 Dividend yield =  $D_1/P_0 = 4.50/22.50 = 20\%$ ; capital gains yield =  $.20 - .20 = 0\%$   
 Y:  $P_0 = D_0(1 + g) / (R - g) = \$4.50(0.95)/(.20 + .05) = \$17.10$   
 Dividend yield =  $D_1/P_0 = 4.50(0.95)/17.10 = 25\%$ ; capital gains yield =  $.20 - .25 = -5\%$   
 Z:  $P_2 = D_2(1 + g) / (R - g) = D_0(1 + g_1)^2(1 + g_2) / (R - g) = \$4.50(1.2)^2(1.12)/(.20 - .12) = \$90.72$   
 $P_0 = \$4.50(1.2) / (1.2) + \$4.50(1.2)^2 / (1.2)^2 + \$90.72 / (1.2)^2 = \$72.00$   
 Dividend yield =  $D_1/P_0 = 4.50(1.2)/72.00 = 7.5\%$ ; capital gains yield =  $.20 - .075 = 12.5\%$

In all cases, the required return is 20%, but the return is distributed differently between current income and capital gains. High growth stocks have an appreciable capital gains component but a relatively small current income yield; conversely, mature, negative-growth stocks provide a high current income but also price depreciation over time.

20. a.  $P_0 = D_0(1 + g) / (R - g) = \$2.50(1.08)/(.14 - .08) = \$45.00$   
 b. Next four dividends:  $\$2.50(1.08)/4 = \$0.675$   
 Effective quarterly rate:  $1.14^{.25} - 1 = .0333$   
 Effective  $D_1 = \$0.675(\text{FVIFA}_{3.33\%,4}) = \$2.84$   
 $P_0 = \$2.84/.06 = \$47.30$
21.  $P_0 = \$4.00(1.20)/(1.13) + \$4.00(1.20)(1.15)/(1.13)^2 + \$4.00(1.20)(1.15)(1.10)/(1.13)^3$   
 $+ [\$4.00(1.20)(1.15)(1.10)(1.05)/(.13 - .05)]/(1.13)^3 = \$68.01$
22.  $P = \$4.00(1.20)/(1 + R) + \$4.00(1.20)(1.15)/(1 + R)^2 + \$4.00(1.20)(1.15)(1.10)/(1 + R)^3$   
 $+ [\$4.00(1.20)(1.15)(1.10)(1.05)/(R - .05)]/(1 + R)^3 = \$100$ ;  
 Using trial and error, or a calculator with a root solving function, gives  $R = 10.25\%$