

## Chapter 13 Equity Valuation

1.  $P = \$19.09$

2. (a) and (b)

3.

a. 
$$P_0 = \frac{D_1}{k - g} = 12\%$$

b. \$18.18

The price falls in response to the more pessimistic forecast of dividend growth. The forecast for *current* earnings, however, is unchanged. Therefore, the P/E ratio decreases. The lower P/E ratio is evidence of the diminished optimism concerning the firm's growth prospects.

4.

- a. False.
- b. True.
- c. Uncertain.

5.

a.  $g = \text{ROE} \times b = 0.06 = 6.0\%$

$D_1 = \$1.40; P(0) = \$23.33; P/E = 11.67$

b.  $\text{PVGO} = P_0 - \frac{E_0}{k} = \$6.66$

c.  $g = \text{ROE} \times b = 0.04 = 4.0\%$

$D_1 = \$1.60; P(0) = \$20.00; P/E = 10.0$

$\text{PVGO} = \$3.33$

6.

a.  $g = \text{ROE} \times b = 0.08 = 8.0\%$

$$D_1 = \$1.00; P(0) = \$25.00$$

b.  $P_3 = P_0(1 + g)^3 = \$31.49$

7.

a. This director is confused. In the context of the constant growth model, 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 raises the dividend payout rate, then the growth rate ( $g$ ) will fall, and stock price will not necessarily rise. In fact, if  $\text{ROE} > k$ , price will fall.

b. i. An increase in dividend payout reduces the sustainable growth rate as less funds are reinvested in the firm.

ii. The sustainable growth rate is  $(\text{ROE} \times \text{plowback})$ , which falls as the plowback ratio falls. The increased dividend payout rate reduces the growth rate of book value for the same reason -- less funds are reinvested in the firm.

8.

$$\begin{aligned} \text{a. } k &= r_f + \beta (k_M - r_f) = 16\% \\ g &= 6\% \end{aligned}$$

$$D_1 = E_0 \times (1 + g) \times (1 - b) = \$1.06$$

$$P_0 = \frac{D_1}{k - g} = \$10.60$$

$$\text{b. Leading } P_0/E_1 = 3.33$$

$$\text{Trailing } P_0/E_0 = 3.53$$

$$\text{c. PVGO} = P_0 - \frac{E_0}{k} = \$-8.15$$

The low P/E ratios and negative PVGO are due to a poor ROE (9%) that is less than the market capitalization rate (16%).

d. Now, you revise the following:

$$b = 1/3$$

$$g = 0.03 = 3.0\%$$

$$D_1 = \$2.06$$

$$V_0 = \frac{D_1}{k - g} = \$15.85$$

$V_0$  increases because the firm pays out more earnings instead of reinvesting earnings at a poor ROE. This information is not yet known to the rest of the market.

9. FI Corporation

a.  $P_0 = \frac{D_1}{k-g} = \$160.00$

- b. The dividend payout ratio is  $8/12 = 2/3$ , so the plowback ratio is  $b = (1/3)$ . The implied value of ROE on future investments is found by solving as follows:

$$g = b \times \text{ROE}$$

$$0.05 = (1/3) \times \text{ROE} \Rightarrow \text{ROE} = 15\%$$

- c. Assuming  $\text{ROE} = k$ , the price is  $(E_1/k) \Rightarrow P_0 = \$120$

Therefore, the market is paying  $(\$160 - \$120) = \$40$  per share for growth opportunities.

11. High-Flyer stock

$$k = r_f + \beta (k_M - r_f) = 17.5\%$$

Therefore:

$$P_0 = \frac{D_1}{k-g} = \$20.00$$

12.

- a. It is true that NewSoft sells at higher multiples of earnings and book value than Capital. But this difference may be justified by NewSoft's higher expected growth rate of earnings and dividends. NewSoft is in a growing market with abundant profit and growth opportunities. Capital is in a mature industry with fewer growth prospects. Both the price-earnings and price-book ratios reflect the prospect of growth opportunities, indicating that the ratios for these firms do not necessarily imply mispricing.
- b. The most important weakness of the constant-growth dividend discount model in this application is that it assumes a perpetual constant growth rate of dividends. While dividends may be on a steady growth path for Capital, which is a more mature firm, that is far less likely to be a realistic assumption for NewSoft.
- c. NewSoft should be valued using a multi-stage DDM, which allows for rapid growth in the early years, but also recognizes that growth must ultimately slow to a more sustainable rate.

16.

a.  $k = r_f + \beta [E(r_M) - r_f] = 16\%$

b.

| <u>Year</u> | <u>Dividends</u>                            |
|-------------|---|
| 2007        | \$1.72                                      |
| 2008        | $\$1.72 \times 1.12 = \$1.93$               |
| 2009        | $\$1.72 \times 1.12^2 = \$2.16$             |
| 2010        | $\$1.72 \times 1.12^3 = \$2.42$             |
| 2011        | $\$1.72 \times 1.12^3 \times 1.09 = \$2.63$ |

Present value of dividends paid in years 2008 to 2010: \$4.82

$$P_{2010} = \frac{D_{2003}}{k - g} = \$37.57$$

PV (in 2007) of  $P_{2010} = \$24.07$

Intrinsic value of stock = \$28.89

c. The table presented in the problem indicates that Quick Brush is selling below intrinsic value, while we have just shown that Smile White is selling somewhat above the estimated intrinsic value. Based on this analysis, Quick Brush offers the potential for considerable abnormal returns, while Smile White offers slightly below-market risk-adjusted returns.

d. Strengths of two-stage DDM compared to constant growth DDM:

- The two-stage model allows for separate valuation of two distinct periods in a company's future. This approach can accommodate life cycle effects. It also can avoid the difficulties posed when the initial growth rate is higher than the discount rate.
- The two-stage model allows for an initial period of above-sustainable growth. It allows the analyst to make use of her expectations as to when growth may shift to a more sustainable level.
- A weakness of all DDMs is that they are all very sensitive to input values. Small changes in  $k$  or  $g$  can imply large changes in estimated intrinsic value. These inputs are difficult to measure.

18.

- a. The value of a share of Rio National equity using the Gordon growth model and the capital asset pricing model is \$22.40, as shown below.

Calculate the required rate of return using the capital asset pricing model:

$$k = r_f + \beta (k_M - r_f) = 13\%$$

Calculate the share value using the Gordon growth model:

$$P_0 = \frac{D_0 \times (1+g)}{k-g} = \$22.40$$

- b. The sustainable growth rate of Rio National is 9.97%, calculated as follows:

$$g = b \times \text{ROE} = \text{Earnings Retention Rate} \times \text{ROE} = (1 - \text{Payout Ratio}) \times \text{ROE} =$$

$$\left(1 - \frac{\text{Dividends}}{\text{Net Income}}\right) \times \frac{\text{Net Income}}{\text{Beginning Equity}} = 0.0997 = 9.97\%$$

21. Nogro Corporation

- a.  $D_1 = \$1$

$$g = b \times \text{ROE} = 0.10$$

Therefore:

$$k = 20.0\%$$

- b. Since  $k = \text{ROE}$ , the NPV of future investment opportunities is zero:

$$PVGO = P_0 - \frac{E_0}{k} = \$0$$

- c. Since  $k = \text{ROE}$ , the stock price would be unaffected if Nogro were to cut its dividend payout ratio to 25%. The additional earnings that would be reinvested would earn the ROE (20%).

Again, if Nogro eliminated the dividend, this would have no impact on Nogro's stock price since the NPV of the additional investments would be zero.

22. Xyrong Corporation

a.  $k = r_f + \beta[E(r_M) - r_f] = 16.4\%$

$$g = b \times \text{ROE} = 12\%$$

$$V_0 = \frac{D_0 \times (1+g)}{k-g} = \$101.82$$

b.  $P_1 = V_1 = V_0 \times (1 + g) = \$114.04$

$$E(r) = \frac{D_1 + P_1 - P_0}{P_0} = 18.52\%$$