CHAPTER 12: EQUITY VALUATION

3. a. \( P_0 = \frac{D_1}{k-g} \)
   
   \[
   \frac{50}{0.16-g} \Rightarrow \quad g = 0.16 - \frac{2}{50} = 0.12 = 12\%
   \]
   
   b. \( P_0 = \frac{D_1}{k-g} = \frac{2}{0.16-0.05} = 18.18 \)

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.

5. a. \( g = ROE \times b = 0.20 \times 0.30 = 0.06 = 6.0\% \)
   
   \( D_1 = 2(1-b) = 2(1-0.30) = 1.40 \)
   
   \( P_0 = \frac{D_1}{k-g} = \frac{1.40}{0.12-0.06} = 23.33 \)
   
   \( P/E = \frac{23.33}{2} = 11.67 \)
   
   b. \( PVGO = P_0 - \frac{E_0}{k} = 23.33 - \frac{2.00}{0.12} = 6.66 \)
   
   c. \( g = ROE \times b = 0.20 \times 0.20 = 0.04 = 4.0\% \)
   
   \( D_1 = 2(1-b) = 2(1-0.20) = 1.60 \)
   
   \( P_0 = \frac{D_1}{k-g} = \frac{1.60}{0.12-0.04} = 20.00 \)
   
   \( P/E = \frac{20}{2} = 10.0 \)
   
   \( PVGO = P_0 - \frac{E_0}{k} = 20.00 - \frac{2.00}{0.12} = 3.33 \)

6. a. \( g = ROE \times b = 0.16 \times 0.5 = 0.08 = 8.0\% \)
   
   \( D_1 = 2(1-b) = 2(1-0.50) = 1.00 \)
   
   \( P_0 = \frac{D_1}{k-g} = \frac{1.00}{0.12-0.08} = 25.00 \)
b. \( P_3 = P_0(1 + g)^3 = \$25(1.08)^3 = \$31.49 \)

9. **FI Corporation**

a. \( P_0 = \frac{D_1}{k - g} = \frac{\$8.00}{0.10 - 0.05} = \$160.00 \)

b. The dividend payout ratio is \( \frac{8}{12} = \frac{2}{3} \), so the plowback ratio is \( b = (1/3) \). The implied value of ROE on future investments is found by solving as follows:
\[
g = b \times ROE
\]
\[
0.05 = (1/3) \times ROE \Rightarrow ROE = 15%
\]
c. Assuming ROE = \( k \), the price is \( (E/k) \Rightarrow P_0 = \$12/0.10 = \$120 \)
Therefore, the market is paying \( (\$160 - \$120) = \$40 \) per share for growth opportunities.

13.

<table>
<thead>
<tr>
<th></th>
<th><strong>Stock A</strong></th>
<th><strong>Stock B</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Dividend payout ratio = 1 – b</td>
<td>$1/$2 = 0.50</td>
<td>$1/$1.65 = 0.606</td>
</tr>
<tr>
<td>b. Growth rate = ( g = ROE \times b )</td>
<td>( 0.14 \times 0.5 = 7.0% )</td>
<td>( 0.12 \times 0.394 = 4.728% )</td>
</tr>
<tr>
<td>c. Intrinsic value = ( V_0 )</td>
<td>( $1/(0.10 – 0.07) )</td>
<td>( $1/(0.10 – 0.04728) )</td>
</tr>
<tr>
<td></td>
<td>= $33.33</td>
<td>= $18.97</td>
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</tbody>
</table>

d. You would choose to invest in Stock A since its intrinsic value exceeds its price. You might choose to sell short stock B.

21. **Nogro Corporation**

a. \( D_1 = 0.5 \times \$2 = \$1 \)
\( g = b \times ROE = 0.5 \times 0.20 = 0.10 \)

Therefore:
\[
k = \frac{D_1}{P_0} + g = \frac{\$1}{\$10} + 0.10 = 0.20 = 20.0\%
\]

b. Since \( k = ROE \), the NPV of future investment opportunities is zero:
\[
PVGO = P_0 - \frac{E_0}{k} = \$10 - \$10 = \$0
\]

c. Since \( k = ROE \), 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.