

Valuation of Stocks with Non-Constant Growth

Goodwin Technologies, a relatively young company, has been very successful but has not paid any dividends yet. The first dividend ($D_3 = \$4.25$) is expected to be paid three years from now. The dividends are expected to grow at 22.10% for the following two years (D_4 and D_5), and after the fifth year, the dividends will grow at a constant rate of 4.08% per year. Goodwin's required return is 13.60%.

Step-by-Step Solution:

Step 1: Calculate Dividends for Years 4 and 5

Formula Used:

$$D_4 = D_3 \times (1 + g_1)$$
$$D_5 = D_4 \times (1 + g_1)$$

Where:
- D_3 = \$4.25 (Given)
- g_1 = 22.10%

Calculations:

$$D_4 = 4.25 \times (1 + 0.2210) = 4.25 \times 1.2210 = \$5.19$$
$$D_5 = 5.19 \times (1 + 0.2210) = 5.19 \times 1.2210 = \$6.34$$

Explanation: The dividends (D_4 and D_5) are calculated by growing the previous year's dividend by 22.10%.

Supporting Statement: Calculating the future dividends forms the basis for determining the horizon value.

Step 2: Calculate the Horizon Value (Terminal Value) at Year 5

Formula Used:

$$HV_5 = \frac{D_6}{r - g_2}$$
$$D_6 = D_5 \times (1 + g_2)$$

Where:
- D_6 = Dividend in year 6
- r = Required return = 13.60%
- g_2 = Constant growth rate = 4.08%

Calculations:

$$D_6 = 6.34 \times (1 + 0.0408) = 6.34 \times 1.0408 = \$6.60$$
$$HV_5 = \frac{6.60}{0.1360 - 0.0408} = \frac{6.60}{0.0952} = \$69.33$$

Explanation: The horizon value is the present value of all dividends expected after year 5, calculated using the Gordon Growth Model.

Supporting Statement: The horizon value represents the value of the stock at the end of the non-constant growth period.

Step 3: Calculate the Current Intrinsic Value

Formula Used:

$$P_0 = \frac{D_3}{(1 + r)^3} + \frac{D_4}{(1 + r)^4} + \frac{D_5}{(1 + r)^5} + \frac{HV_5}{(1 + r)^5}$$

Where:
- P_0 = Current intrinsic value
- D_3 = \$4.25
- D_4 = \$5.19
- D_5 = \$6.34

$$- \text{\textbackslash}(HV_5 = \$69.33 \text{\textbackslash})$$

$$- \text{\textbackslash}(r = 0.136 \text{\textbackslash})$$

Calculations:

$$\text{\textbackslash}(P_0 = \frac{4.25}{(1 + 0.136)^3} + \frac{5.19}{(1 + 0.136)^4} + \frac{6.34}{(1 + 0.136)^5} + \frac{69.33}{(1 + 0.136)^5} \text{\textbackslash})$$

$$\text{\textbackslash}(P_0 = \frac{4.25}{1.4641} + \frac{5.19}{1.6617} + \frac{6.34}{1.8874} + \frac{69.33}{1.8874} \text{\textbackslash})$$

$$\text{\textbackslash}(P_0 = 2.90 + 3.12 + 3.36 + 36.73 \text{\textbackslash})$$

$$\text{\textbackslash}(P_0 = \$46.11 \text{\textbackslash})$$

Explanation: The current intrinsic value is the present value of all expected dividends and the horizon value, calculated using the discount rate of 13.60%.

Supporting Statement: The intrinsic value helps to determine whether the stock is overvalued, undervalued, or fairly priced.

Step 4: Determine Expected Dividend Yield and Capital Gains Yield

Formula Used:

$$\text{\textbackslash}(\text{Dividend yield} = \frac{D_1}{P_0} \text{\textbackslash})$$

$$\text{\textbackslash}(\text{Capital gains yield} = r - \text{Dividend yield} \text{\textbackslash})$$

Since $P_0 = 46.11$ and $D_1 = 4.25$

Calculations:

$$\text{\textbackslash}(\text{Dividend yield} = \frac{4.25}{46.11} = 0.0922 \text{\textbackslash})$$

$$\text{\textbackslash}(\text{Capital gains yield} = 0.136 - 0.0922 = 0.0438 \text{\textbackslash})$$

Explanation: The expected dividend yield is the ratio of the next year's dividend to the current stock price, and the capital gains yield is the annual return attributed to the expected price appreciation.

Supporting Statement: The dividend yield and capital gains yield together make up the total expected return.

Summary:

Horizon Value at Year 5: \$69.33

Current Intrinsic Value: \$46.11

Expected Dividend Yield: 9.22%

Capital Gains Yield: 4.38%

Conclusion: Yes, the statement "Investors prefer the deferred tax liability that capital gains offer over dividends" is a possible explanation for why the firm hasn't paid a dividend yet.