

## Valuation of Common Stocks

### Basic exercises (1-4):

The DDM model assumes that the value of a share of stock equals the present value of its expected future cash receipts.

The elements of the computation are:

Dividend one year hence:	$D_{(1)}$	=	€
Stock price one year hence:	$P_{(1)}$	=	€24
Annual risk adjusted discount rate: <sup>1</sup>	$k$	=	12.5%
Current stock price:	$P_{(0)}$	=	???

$$\boxed{P_{(0)} = D_{(1)} / k}$$

1. Solve  $P_{(0)}$  from the data above.

**Answer:**

$$(\text{€}24 + \text{€}) / 1.125 = \underline{\text{€}24.}$$

2. Solve the case above with a growth rate of dividends ( $g$ ) of 4.5%

**Answer:**

$$\text{€ dividend} / (0.125 \text{ req. rate of return} - 0.045 \text{ growth rate}) = \underline{\text{€}37.50.}$$

3. Compute the expected share price in the example above after 7 years.

**Answer:**

$$\text{€}37.50 \text{ shareprice} \times 1.045^7 \text{ growth} = \underline{\text{€}51.03.}$$

4. Solve from this equation the dividend yield and the capital gains rate after year 7.

**Answer:**

$$1) \text{ Dividend } (t_7) = \text{€} * 1.045^6 = \underline{\text{€}3.91.}$$

$$2) \text{ Stock price } (t_6) = \text{€}37.50 * 1.045^6 = \underline{\text{€}48.83.}$$

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<sup>1</sup> or market capitalization rate or required rate of return.

**Required rate of return =  $\frac{€3.91}{€48.83} + (\frac{€1.03 - €48.83}{48.83}) = 8\% + 4.5\% = \underline{12.5\%}$ .**

5. Stable Ltd., all equity financed, expects this year's earnings to be € per share paid out at the end of the year. Future net investments are zero. The required rate of return for Stable is 10% annually.
- a. Compute the current value of Stable, assume the date is January 1 in the current year.

**Answer:**

**€ net earnings / 0.1 required rate of return = €30 stock price at the start of year 0.**

Gro Ltd., also all equity financed, expects earnings per share of € at the end of the current year as well. But its (fixed) plowback ratio of earnings for new investments is 60%. Required return on equity is 10% per year. The expected return on equity is 15% per year.

- b. What is the expected growth rate of earnings?

**Answer:**

- 1) Expected earnings of €.
- 2) Return on equity of 15%.
- 3) Plow back ratio of 60%.

**What is the expected growth rate?**

**Growth rate =  $15\% \times 60\% = \underline{9\%}$ .**

- c. When applying the DDM, what is the current share value of Gro assuming a capitalization rate of 10% per year? Assume the date is January 1 in the current year.

**Answer:**

**When using the dividend discount model, you'll get:**

**$(40\% \times €) / (0.10 - 0.09) = \underline{€120}$ .**

- d. Could you split up the value of Gro into the value of current earnings and the NPV of future investments?

**Answer:**

$$\text{€120} - \text{€30} = \text{€90}.$$

- e. Now assume that the return on equity of Gro is 10% instead of 15%. Reconsider your answers b, c and d.

**Answer:**

1. **Growth rate = 60% x 10% = 6%.**
2. **Stock price = (40% x €3) / (10% - 6%) = €30.**
3. **If the return on investment equals the required rate of return (equivalent to cost of capital) then NPV of growth opportunities is 0. This is also the answer to question f.**

- f. Draw a general conclusion from your findings in question e.

6. Briefly discuss the following statement: "it is healthy for a firm to grow, so do it."

**Answer:**

**Only if these retained earnings can be *reinvested* at a rate which is higher than *the required rate*, the firm value will increase.**