# Stock Prices and Investment Opportunities

- **Example**: Takeover Target is run by entrenched management that insists on reinvesting 60% of its earnings in projects that provide an RoE of 10%, despite the fact that the firm' capitalization rate is k=15%. The firm' year-end dividend will be €2 per share, paid out of earnings of €5 per share. At what price will the stock sell? What is the present value of growth opportunities? Why should such a firm be a takeover target for another firm?

# STOCK PRICES AND INVESTMENT OPPORTUNITIES

(1) → THE DIVIDEND GROWTH RATE IS:

$$g = ROE \cdot b = 10\% \cdot 0.6 = 6\%$$

(2) → THE STOCK PRICE IS:

$$P_0 = \frac{2}{0.15 - 0.06} = 22.22 \text{ €}$$

(3) → THE PRESENT VALUE OF GROWTH OPPORTUNITIES (PVGO) IS:

$$PVGO = (\text{PRICE PER SHARE}) - (\text{NO-GROWTH VALUE PER SHARE})$$

$$= 22.22 - \frac{5}{0.15} = -11.11 \text{ €}$$

PVGO IS NEGATIVE, BECAUSE THE NET PRESENT VALUE OF THE FIRM'S PROJECTS IS NEGATIVE. THE RATE OF RETURN ON THOSE ASSETS IS LESS THAN THE OPPORTUNITY COST OF CAPITAL.

(4) → THE FIRM WOULD BE SUBJECT TO TAKEOVER, BECAUSE ANOTHER FIRM COULD BUY THE FIRM FOR THE MARKET PRICE ($P_0$) OF 22.22 € AND INCREASE THE VALUE OF THE FIRM BY CHANGING ITS INVESTMENT POLICY.

# Life Cycles and Multistage Growth Models

- **Example**: Let us consider the following dividend forecasts: 2012: €0.72; 2013: €0.81; 2014: €0.90; 2015: € 1.00. Let us assume the dividend growth rate will be steady beyond 2015. The dividend payout ratio is 25% and the RoE is 10%. The beta is 0.90, the risk-free rate on long-term T-bonds is 2.9%, and that the market risk premium is 8%. What is a reasonable guess for that steady-state growth rate? What is the intrinsic/fundamental value in 2011?

# LIFE CYCLES AND MULTISTAGE GROWTH MODELS

① → THE REASONABLE GUESS FOR THAT STEADY-STATE GROWTH RATE IS

$$g = ROE \cdot b = 10\% \cdot (1 - 0.25) = 7.5\%$$

② → COMPUTING THE INTRINSIC/FUNDAMENTAL VALUE IN 2011.

$$P_{2011} = \frac{D_{2012}}{(1+k)} + \frac{D_{2013}}{(1+k)^2} + \frac{D_{2014}}{(1+k)^3} + \frac{D_{2015} + P_{2015}}{(1+k)^4} =$$

$$= \frac{0.72}{(1+k)} + \frac{0.81}{(1+k)^2} + \frac{0.9}{(1+k)^3} + \frac{1 + P_{2015}}{(1+k)^4} =$$

$$\text{where } P_{2015} = \frac{D_{2016}}{k-g} = \frac{D_{2015}(1+g)}{k-g} = \frac{1\,(1.075)}{k - 0.075}$$

$$\text{where } k \Rightarrow CAPM \Rightarrow \quad k_i = r_f + \beta_i (r_{mkt} - r_f)$$

$$r_{mkt} = r_f + \text{market risk premium}$$

$$r_{mkt} = 2.9\% + 8\% = 10.9\%$$

$$k_i = 2.9\% + 0.9(10.9 - 2.9) = 10.1\%$$

$$P_{2015} = \frac{1 \cdot (1.075)}{0.101 - 0.075} = 41.35\ €$$

$$P_{2011} = \frac{0.72}{1.101} + \frac{0.81}{(1.101)^2} + \frac{0.9}{(1.101)^3} + \frac{1 + 41.35}{(1.101)^4} = 30.81 \text{ €}$$

**Question**

Determine the intrinsic value of Milos in each of the following scenarios.

| Inputs | |
|---|---|
| beta | 0.95 |
| mkt_prem | 0.08 |
| rf | 0.02 |
| k_equity | 0.096 |
| plowback | 0.75 |
| roe | 0.1 |
| term_gwth | 0.075 |

| Year | Dividend | Div growth | Term value | Investor CF |
|---|---|---|---|---|
| 2012 | 0.78 | | | 0.78 |
| 2013 | 0.85 | | | 0.85 |
| 2014 | 0.92 | | | 0.92 |
| 2015 | 1.00 | | | 1.00 |
| 2016 | 1.09 | 0.086 | | 1.09 |
| 2017 | 1.18 | 0.0852 | | 1.18 |
| 2018 | 1.28 | 0.0841 | | 1.28 |
| 2019 | 1.38 | 0.0829 | | 1.38 |
| 2020 | 1.5 | 0.0818 | | 1.5 |
| 2021 | 1.62 | 0.0807 | | 1.62 |
| 2022 | 1.75 | 0.0795 | | 1.75 |
| 2023 | 1.88 | 0.0784 | | 1.88 |
| 2024 | 2.03 | 0.0773 | | 2.03 |
| 2025 | 2.18 | 0.076 | | 2.18 |
| 2026 | 2.35 | 0.075 | | 2.35 |
| 2027 | 2.52 | 0.075 | 129.18 | 131.71 |

Value line forecasts of annual dividends

Transitional period with slowing dividend growth

Beginning of constant growth period

$0.086 - \left(\frac{0.096 - 0.0}{10}\right)$

$0.0773 - \left(\frac{0.086 - 0.0}{10}\right)$

= PV of CF

$129.18 + 2.52 = 131.7$

① $\Rightarrow r_i = k_i = r_f + \beta_i (r_{mkt} - r_f)$

$= 0.02 + 0.95(0.08) = 9.6\%$

② $\Rightarrow g = \text{plowback ratio} \cdot ROE = 0.75 \cdot 0.1 = 0.075 = 7.5\%$

③ $\Rightarrow 0.78(1+x)^3 = 1 \quad x = \sqrt[3]{\frac{1}{0.78}} - 1 = 8.6\%$

④ $\Rightarrow DIV_{2016} = DIV_{2015}(1+g) = 1(1.086) = 1.09$

⑤ $\Rightarrow DIV_{2017} = DIV_{2016}(1+g) = 1.09(1.0852) = 1.18$

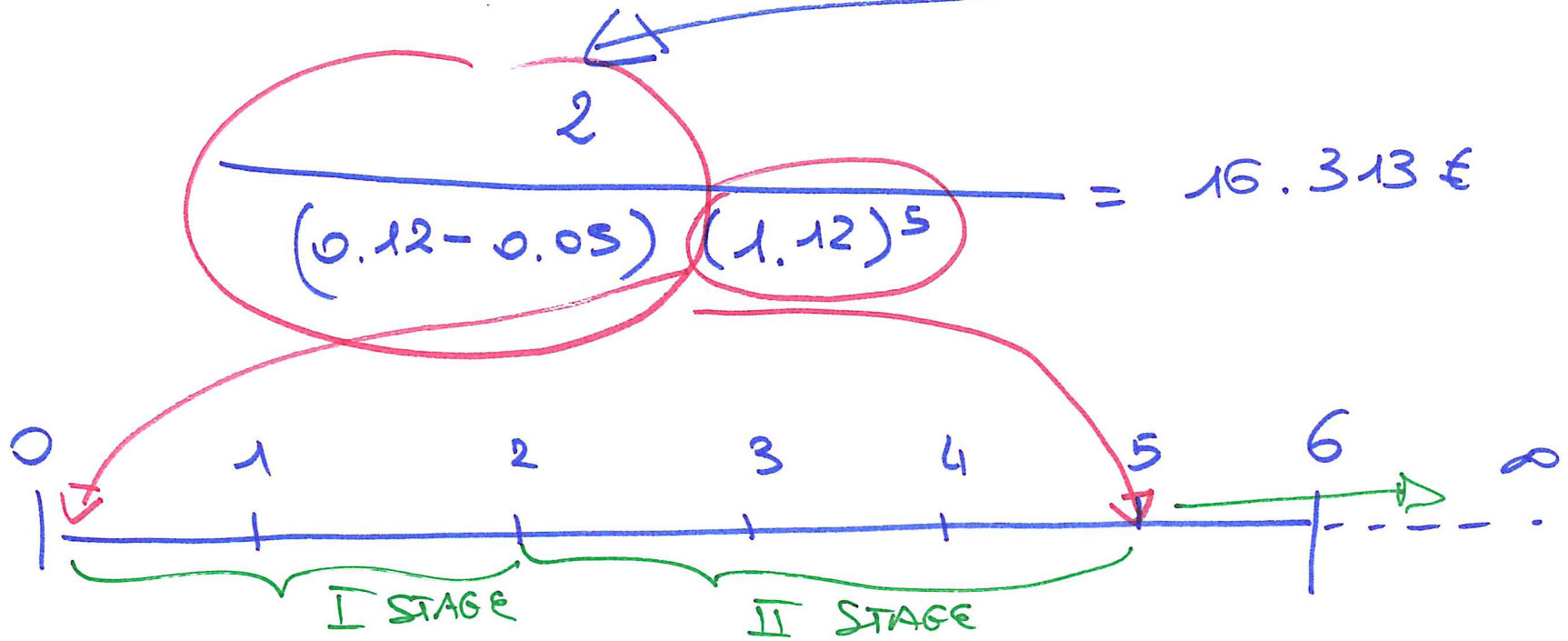
⑥ $\Rightarrow$ TERM VALUE $= \frac{2.52(1.075)}{0.096 - 0.075} = 129.18$

$$PV_{2011} = \frac{0.78}{1.096} + \frac{0.85}{(1.096)^2} + \frac{0.92}{(1.096)^3} + \dots + \frac{2.35}{(1.096)^{15}} + \frac{131.71}{(1.096)^{16}} = 40.28 €$$

DOKOS IS EXPECTED TO GROW AT VARIOUS RATES OVER THE NEXT FIVE YEARS.
THE COMPANY JUST PAID A 1.00 € DIVIDEND ($t=0$).
THE COMPANY EXPECTS TO GROW AT 20% FOR THE NEXT TWO YEARS (AFFECTING D1 and D2), THEN THE COMPANY EXPECTS TO GROW AT 10% FOR THREE ADDITIONAL YEARS (D3, D4, D5) AFTER WHICH THE COMPANY EXPECTS TO GROW AT A CONSTANT RATE OF 5% PER YEAR INDEFINITELY. IF THE REQUIRED RATE OF RETURN ON DOKOS'S STOCK IS 12%, WHAT IS THE $P_{t=0}$? OF DOKOS?

| TIME PERIOD | DIVIDEND | PRESENT VALUE |
|---|---|---|
| 1 | $1(1.2) = 1.2$ | $1(1.2)/1.12 = 1.071$ |
| 2 | $1(1.2)^2 = 1.4$ ; $1.2(1.2)$ | $1.4/(1.12)^2 = 1.148$ |
| 3 | $1(1.2)^2(1.1) = 1.58$ | $1.58/(1.12)^3 = 1.127$ |
| 4 | $1(1.2)^2(1.1)^2 = 1.74$ | $1.74/(1.12)^4 = 1.107$ |

| | | |
|---|---|---|
| 5 | $1(1.2)^2(1.1)^3 = 1.91$ | $1.91/(1.12)^5 = 1.088$ |
| 6 | $1(1.2)^2(1.1)^3(1.05) = 2$ | |




$PV_{t=0} = 1.071 + 1.148 + 1.127 + 1.107 + 1.088 + 16.313 =$

$= 21.85$ €