Stock Valuation

Gestão Financeira I
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Corporate Finance I
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LISBON
SCHOOL OF
ECONOMICS &
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Outline

- Stock Basics
- The Mechanics of Stock Trades
- The Dividend-Discount Model
- Estimating Dividends in the Dividend-Discount Model
- Limitations of the Dividend-Discount Model
- Share Repurchases and the Total Payout Model
- Putting It All Together

Stock Basics

- Stock Market Reporting: Stock Quotes
  - Common Stock
  - Ticker Symbol

- Ver exemplo Lisboa:

http://www.bolsadelisboa.com.pt/cotacoes/accoes-lisboa

Source: www.google.com/finance?q=nke.

Stock Basics

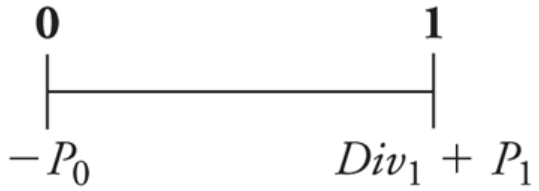
- Common Stock
  - Shareholder Voting
    - Straight Voting
    - Cumulative Voting
    - Classes of Stock
  - Shareholder Rights
    - Annual Meeting
    - Proxy
      - Proxy Contest
- Preferred Stock
  - Cumulative versus Non-Cumulative Preferred Stock
  - Preferred Stock: Equity or Debt?

The Mechanics of Stock Trades

- Market Order
- Limit Order
- Round Lot
- Super Display Book system
- Floor Broker
- Dealer

The Dividend Discount Model

- Start with a one-year investor (buy now, sell in after 1 year).
  - The timeline with associated cash flows would be:



  - Since the cash flows are risky, we must discount them at the **equity cost of capital (r_E).** Price would be:

$$P_0 = \left(\frac{Div_1 + P_1}{1 + r_E} \right)$$

  - Total Equity Return is due to:

$$r_E = \frac{Div_1 + P_1}{P_0} - 1 = \underbrace{\frac{Div_1}{P_0}}_{\text{Dividend Yield}} + \underbrace{\frac{P_1 - P_0}{P_0}}_{\text{Capital Gain Rate}}$$

The Dividend Discount Model (cont.)

- **Example:**
  - 3M (MMM) is expected to pay dividends of $1.92 per share in the coming year.
  - You expect the stock price to be $85 per share at the end of the year.
  - Investments with equivalent risk have an expected return of 11%.
    - **What is the most you would pay today for 3M stock?**
    - **What dividend yield and capital gain rate would you expect at this price?**

$$P_0 = \frac{Div_1 + P_1}{(1 + r_E)} = \frac{\$1.92 + \$85}{(1 .11)} = \$78.31$$

$$\text{Dividend Yield} = \frac{Div_1}{P_0} = \frac{\$1.92}{\$78.31} = 2.45\%$$

$$\text{Capital Gains Yield} = \frac{P_1 - P_0}{P_0} = \frac{\$85.00 - \$78.31}{\$78.31} = 8.54\%$$

  - Total Return = 2.45% + 8.54% = 10.99% ≈ 11%

The Dividend Discount Model: with Constant Growth Rate

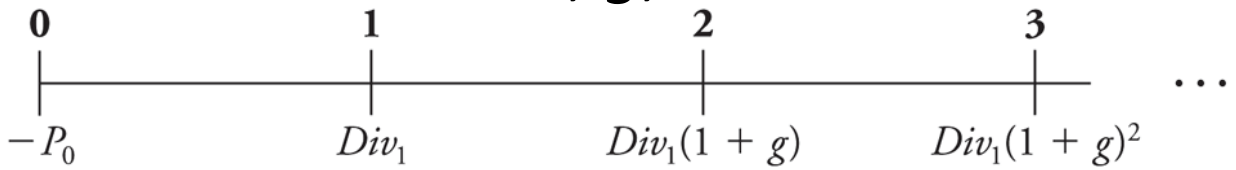
- What is the price if we plan on holding the stock for N years?

$$P_0 = \frac{Div_1}{1 + r_E} + \frac{Div_2}{(1 + r_E)^2} + \cdots + \frac{Div_N}{(1 + r_E)^N} + \frac{P_N}{(1 + r_E)^N}$$

  - This is known as the Dividend Discount Model. Therefore:

$$P_0 = \frac{Div_1}{1 + r_E} + \frac{Div_2}{(1 + r_E)^2} + \frac{Div_3}{(1 + r_E)^3} + \cdots = \sum_{n=1}^{\infty} \frac{Div_n}{(1 + r_E)^n}$$

- How to Apply the Dividend Discount Model?
  - One possibility is assuming Constant Dividend Growth, at a constant rate, *g*, forever.



The Dividend Discount Model: with Constant Growth Rate (cont.)

- With the Constant Dividend Growth Model we have:

$$P_0 = \frac{Div_1}{r_E - g} \qquad r_E = \frac{Div_1}{P_0} + g$$

  - **Example**:
    - AT&T plans to pay $1.44 per share in dividends in the coming year.
    - Its equity cost of capital is 8%.
    - Dividends are expected to grow by 4% per year in the future.
    - **Estimate the value of AT&T's stock.**

$$P_0 = \frac{Div_1}{r_E - g} = \frac{\$1.44}{.08 - .04} = \$36.00$$

The Dividend Discount Model: with Constant Growth Rate (cont.)

Where does the growth rate *g* come from? A simple model assumes:

$$r_E = \frac{Div_1}{P_0} + g$$

$$Div_t = \underbrace{\frac{\text{Earnings}_t}{\text{Shares Outstanding}_t}}_{EPS_t} \times \text{Dividend Payout Rate}_t$$

Dividend Payout Rate: the percentage of earnings distributed as dividends.

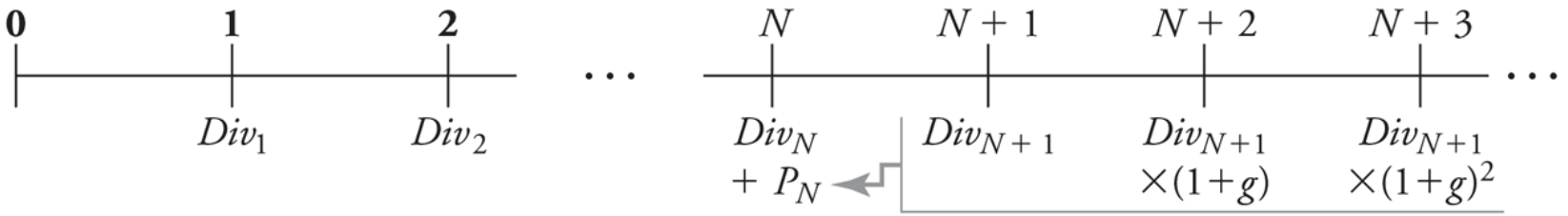
$$g = \text{Retention Rate} \times \text{Return on New Investment}$$

Retention Rate: the fraction of earnings that the firm reinvests

- **Note: if a firm keeps its Retention Rate constant, the growth rate in dividends will equal the growth rate in earnings.**

The Dividend Discount Model: With Changing Growth rates

- We cannot use the constant dividend growth model to value a stock if the growth rate is not constant.
- But we can use the general form of the model to value a firm by applying the constant growth model to calculate the future share price of the stock once the expected growth rate stabilizes. Timeline would be:



- With constant growth from year N+1 onwards:

$$P_N = \frac{Div_{N+1}}{r_E - g}$$

The Dividend Discount Model: With Changing Growth rates (cont.)

- Finally, the Dividend-Discount Model with Constant Long-Term Growth gives us:

$$P_0 = \frac{Div_1}{1 + r_E} + \frac{Div_2}{(1 + r_E)^2} + \cdots + \frac{Div_N}{(1 + r_E)^N} + \frac{1}{(1 + r_E)^N}\left(\frac{Div_{N+1}}{r_E - g}\right)$$

- Example: Small Fry, Inc. invented an extremely innovative potato chip.
  - It considers reinvesting all of its earnings to expand operations. Earnings were $2 per share in the past year and are expected to grow at 20% per year until the end of year 4.
  - After that point, investment will be cut, 60% of earnings will be paid out as dividends, and growth will slow to a long-run rate of 4%.
  - Given Small Fry's equity cost of capital of 8%.
  - **What's the value of a share today?**

The Dividend Discount Model: With Changing Growth rates (cont.)

- Example (cont.):
  - Forecast EPS and Dividends:

Year	0	1	2	3	4	5	6
EPS growth rate (versus previous year)		20%	20%	20%	20%	4%	4%
EPS	$ 2,00	$ 2,40	$ 2,88	$ 3,46	$ 4,15	$ 4,31	$ 4,49
Dividend Payout Rate		0%	0%	0%	60%	60%	60%
Div		$ -	$ -	$ -	$ 2,49	$ 2,59	$ 2,69

  - Compute Price in perpetuity: $P_4 = \frac{Div_5}{R_E - g} = \frac{\$2.59}{0.08 - 0.04} = \$64.75$

  - Compute Price today:

$$P_0 = \frac{Div_1}{(1+R_E)} + \frac{Div_2}{(1+R_E)^2} + \frac{Div_3}{(1+R_E)^3} + \frac{Div_4 + P_4}{(1+R_E)^4}$$

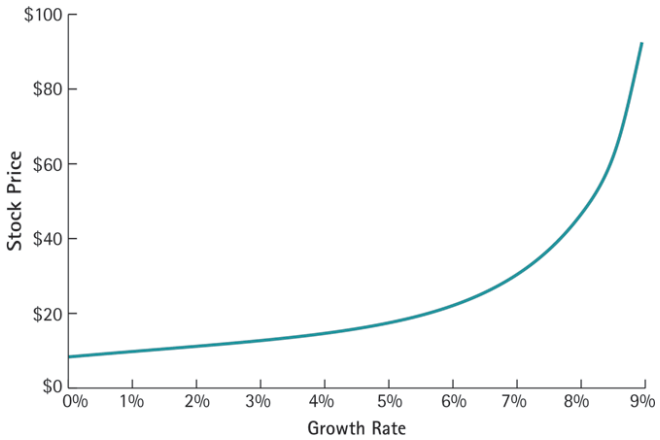
$$P_0 = 0 + 0 + 0 + \frac{\$2.49 + \$64.75}{(1+0.08)^4} = \$49.42$$

The Dividend Discount Model:
Estimating Dividends in the Dividend-Discount Model

- Value Drivers and the Dividend-Discount Model
  - The dividend-discount model includes an implicit forecast of the firm's profitability which is discounted back at the firm's equity cost of capital

The Dividend Discount Model: Limitations of the Dividend-Discount Model

- Uncertain Dividend Forecasts
  - The dividend-discount model values a stock based on a forecast of the future dividends, but a firm's future dividends carry a tremendous amount of uncertainty



NKE Stock Prices for Different Expected Growth Rates

- Non-Dividend-Paying Stocks
  - Many companies do not pay dividends, thus the dividend-discount model must be modified
- Share Repurchases
  - The firm uses excess cash to buy back its own stock
    - Consequences:
      - The more cash the firm uses to repurchase shares, the less cash it has available to pay dividends
      - By repurchasing shares, the firm decreases its share count, which increases its earnings and dividends on a per-share basis

The Total Payout Model

- With Share Repurchases we may use the Total Payout Model.

$$PV_0 = \frac{PV(\text{Future Total Dividends and Repurchases})}{\text{Shares Outstanding}_0}$$

- The Total Payout Model starts by valuing total equity of the firm.
  - You discount total dividends and share repurchases and use the growth rate of earnings (rather than earnings per share) when forecasting the growth of the firm's total payouts.
  - Lastly you divide total equity by the number of shares outstanding.

The Total Payout Model (cont.)

- **Example**:
  - Titan Industries has 217 million shares outstanding, and expects earnings of $860 million at the end of this year. The equity cost of capital is 10%.
  - Titan plans to pay out 50% of its earnings, paying 30% as a dividend and using 20% to repurchase shares. The payout rates are expected to remain constant.
  - Titan's earnings are expected to grow by 7.5% per year.
- What's the expected share price of Titan Industries?
  - Total Payout Year 1= 50%x$860 million = $430 million
  - PV(Future Total Dividends and Repurchases)= $\frac{430}{0.1-0.075} = \$17.2 \text{ billion}$
  - Price per share = Po = 17.2 billion/217 million shares = $79.26