



# Stock Valuation

Gestão Financeira I  
Gestão Financeira  
Corporate Finance I  
Corporate Finance

Licenciatura  
2015-2016

# 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>

NIKE, Inc. (NYSE:NKE)

Add to portfolio

60.39

+0.44 (0.73%)

After Hours: 60.42 +0.03 (0.05%)  
Jun 25, 6:13PM EDT

NYSE real-time data - Disclaimer  
Currency in USD

Range 59.95 - 60.99 Div/yield 0.21/1.39  
52 week 42.55 - 66.07 EPS 2.52  
Open 60.42 Shares 893.61M  
Vol / Avg. 5.45M/3.54M Beta 0.88  
Mkt cap 53.97B Inst. own 67%  
P/E 24.00

+1 137

Compare:    Dow Jones  S&P 500 [more >](#)



Source: [www.google.com/finance?q=nke](http://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<sub>E</sub>)**. 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?

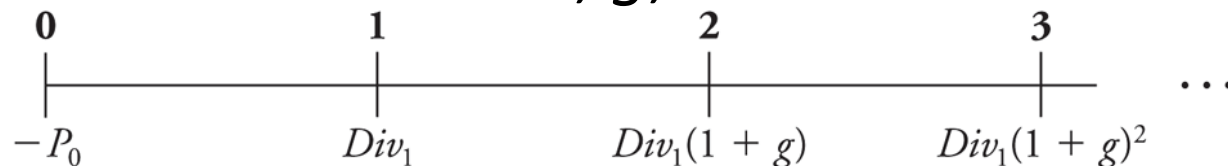
$$P_0 = \frac{Div_1}{1 + r_E} + \frac{Div_2}{(1 + r_E)^2} + \dots + \frac{Div_N}{(1 + r_E)^N} + \frac{P_N}{(1 + r_E)^N}$$

- This is known as the Dividend Discount Model.

Therefore:

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

- **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:

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

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

– **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.

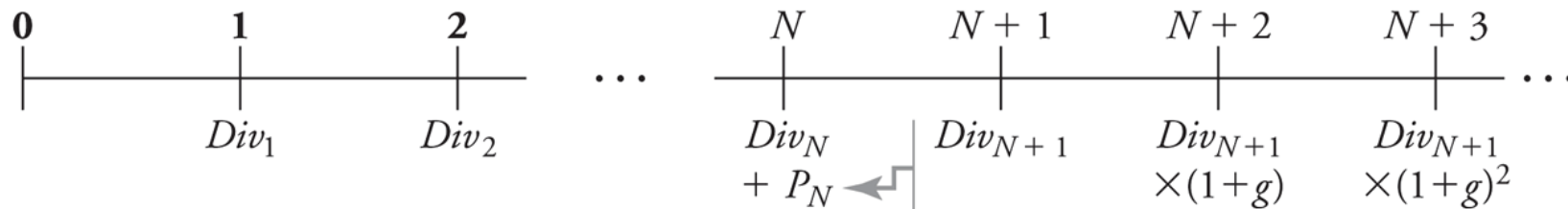
$$g = \text{Retention Rate} \times \text{Return on New Investment}$$

**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:

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

- **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:

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

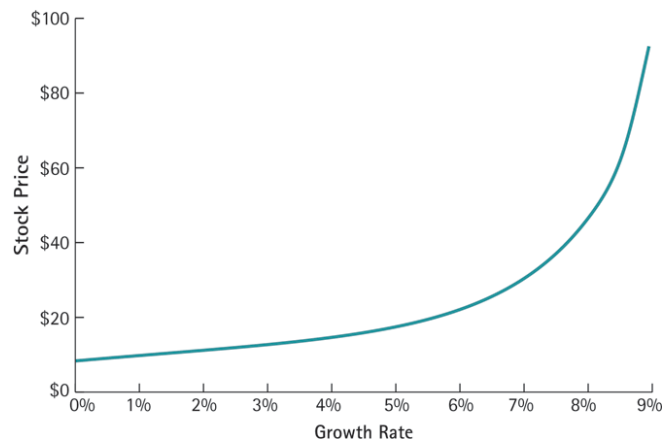
$$P_0 = 0 + 0 + 0 + \frac{\$2.49 + \$64.75}{(1 + 0.08)^4} = \$49.42$$

# 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 =  $50\% \times \$860 \text{ million} = \$430 \text{ million}$
- $PV(\text{Future Total Dividends and Repurchases}) = \frac{430}{0.1 - 0.075} = \$17.2 \text{ billion}$
- Price per share =  $P_0 = 17.2 \text{ billion} / 217 \text{ million shares} = \$79.26$