

# *Stock Valuation*



# *The Bubble Bursts for Yahoo's Investors*

- \$10,000 investment in Yahoo's IPO in 1996 would have grown to \$1,000,000 by early 2000 when it was \$200/share.
- From 1995 to 2000 the DJIA increased by 7000 points.
- In that one 5-year period investors made almost twice as much in the stock market as in the previous 70 years.
- “irrational exuberance”—Greenspan
- Yahoo's stock price dropped as low as \$13 by July 2002.
- Does a rising tide in the stock market float all boats equally?  
No!

# Institutional Ownership of Common Stock

**TABLE 17-1**  
Institutional ownership  
of U.S. companies

Company Name	Institutional Ownership	Ownership in Shares (000's)
Minnesota Mining & Manufacturing .....	69.25%	277,907
General Motors Corp. ....	63.51	406,575
Philip Morris Cos. Inc. ....	63.35	1,506,590
Bristol-Myers Squibb Co. ....	61.18	1,208,857
Motorola, Inc. ....	59.44	424,799
PepsiCo, Inc. ....	59.14	860,972
Johnson & Johnson .....	56.49	785,509
Hewlett-Packard Co. ....	55.33	553,346
Du Pont Co. ....	53.66	560,480
Chevron .....	52.25	342,920
Ford Motor Co. ....	51.92	590,348
Procter & Gamble .....	51.85	682,180
General Electric .....	50.90	5,016,129
Coca-Cola Co. ....	50.08	1,236,876
International Business Machines .....	47.93	864,791
ExxonMobil .....	47.64	1,688,705
Compaq Computer .....	40.80	691,178
Microsoft .....	40.70	2,118,434
Wal-Mart Stores .....	35.56	1,582,749

Note: Data is year-end 1999 and taken from various issue of *Value Line Investment Survey*.

- **Table 17-1 (next) presents a list of major companies with high percentages of common stock owned by institutions at the beginning of September, 1998.**
- **You can see the level of institutional ownership of any company by looking on any internet site, such as Yahoo.**

# Common Stock

- Common stockholders own the corporation and have ultimate control over it
  -
- They have a residual (leftover) claim to all corporate income that is not paid out to others *sobranante*
- Common stockholders have the right to vote on all major issues, including election of the board of directors

# *Legal Rights and Privileges of Common Stockholders*

- Represents ownership of public corporations
- Ownership implies control
- Stockholders elect directors
- Directors elect management
- Management's goal: Maximize the stock price
- However, managerial welfare maximization is often evident (elect 1/3 of board each year, 75% approval for merger, “poison pills”)

**fusión**

# *Legal Rights and Privileges of Common Stockholders*

- **Proxy:** a document giving one person the authority to act for <sup>apoderado</sup> another, typically the power to vote shares of common stock.
- **Proxy Fight:** an attempt to gain control of stockholders votes in order to gain control of the <sup>intento</sup> board of directors.
- **Takeover:** an action whereby a person or group succeeds in <sup>adquisición</sup> ousting a firm's management and taking control of the company.
- **Preemptive Right:** the right of stockholders to purchase on a <sup>preferente</sup> pro rata basis new issues of common stock.

# *The Voting Right*

- Majority Voting:
  - all directors must be elected by at least 51% of the vote
  - doesn't allow minority stockholders representation on the board of directors
- Cumulative Voting:
  - a stockholder's votes can all be used to elect 1 person
  - allows minority stockholders representation on board

# *Types of Common Stock*

- ***Classified Stock:*** common stock given a special designation, such as Class A, Class B, etc., to meet special needs of the company.
- ***Founders Shares:*** stock owned by the firm's founders that has sole voting rights but restricted dividends for a specified number of years.



# *The Market for Common Stock*

- ***Closely Held Corporation:*** a corp. that is Posesión cerrada owned by a few individuals who are typically associated with the firm's management.
- ***Publicly Owned Corporation:*** a corp. that is owned by a relatively large number of individuals who are not actively involved in its management.

# *Types of stock market transactions*

- ***Primary market:*** the market in which firms issue new securities to raise corporate capital.
- ***Secondary market:*** the market in which “used” stocks are traded after they have been issued by corporations.
- ***Initial public offering market (IPO):*** the market for stocks of companies that are “going public” for the first time.

# *Example of Cumulative Voting*

- Suppose there are 10,000 shares outstanding and you own 1,001 of these shares. Nine directors are to be elected.

• Number of shares you own <sup>■</sup>	1,001
• Number of directors to be elected	<u>9</u>
• Number of votes you may cast	9,009
• Number of shares majority own	8,999
• Number of directors to be elected	<u>9</u>
• Number of votes (by majority)	80,991

# *Example of Cumulative Voting (continued)*

- Candidates do NOT run against each other—the nine candidates with the most votes will be elected.
- If you cast all 9,009 of your votes for one candidate, there is NO WAY the majority can prevent your candidate from being elected **impedir**

*The following two formulas are useful*

Shares required to elect N directors:

$$\frac{(N)(\text{Total Number of Shares Outstanding})}{\text{Number of directors to be elected} + 1} + 1$$



Number of directors you can elect:

$$\frac{(\text{Shares you own} - 1)(\text{Number of directors to be elected} + 1)}{\text{Total number of shares outstanding}}$$

22 states require cumulative voting (in USA)

# *Rights Offering:*

- gives current stockholders a first option to purchase new shares (called a preemptive right provision)
- **preferente** allows existing stockholders the same amount of control they have initially
- stockholder receives 1 right for each share of stock owned

# *“Rights-on” and “Ex-rights”*

- “Rights-on”
  - if you buy the stock, you will also acquire a right toward a future purchase of the stock
  - occurs when a rights offering is initially announced
- “Ex-rights”
  - when you buy the stock you no longer get a right toward future purchase of the stock
  - occurs after a certain period of time

# *An Example of Rights Financing*

- Watson Corporation has 9 million shares outstanding and needs to raise \$30 million **En circulación** for a new plant. ■
- Shares have a current market value of \$40 per share ( $\$40 \times 9 \text{ million} = \$360 \text{ million}$  market cap.)
- To raise the required \$30 million, Watson will sell 1 million of new shares at \$30 per share through a Rights Offering.



# *How many rights will be necessary?*

- If Watson issues 1 right per share, there will be 9 million rights outstanding. ■
- Since 1 million new shares are to be issued, the ratio of rights to new shares is 9 to 1.
- On this basis, Watson will offer one new share for each 9 rights plus \$30.

# What is a Watson Right

## worth?

vale

• Old market capitalization	\$360 Million	
• New funds raised	<u>30 Million</u>	
• Total value after new issue	\$390 Million	
• Total shares after new issue	<u>10 Million</u>	
• Value per share after new issue	\$39	
• Subscription price (cash)	<u>\$30</u>	
• Value differential		\$ 9
• Rights used to purchase differential		<u>9</u>
• Value per right		\$ 1

# *Formula to value right when the stock is trading rights-on*

$$R = \frac{M_0 - S}{N + 1}$$

where

R = Value of the Right

$M_0$  = Market value of stock with rights-on

S = Subscription price

N = Number of rights required to purchase a share of stock

# *Formula to value right when the stock is trading ex-rights*

$$R = \frac{M_e - S}{N}$$

where

R = Value of the Right

$M_e$  = Market value of stock trading ex-rights

S = Subscription price

N = Number of rights required to purchase a share of stock

# *Effect of Rights on Stockholder's Position*

- The following summarizes the effect
  - If you exercise, there will be NO effect on your new worth. ■  
Valor monetario
  - If you sell the right, there will be NO effect on your net worth.
  - If you ignore the right and let it expire, your net worth will decline.

# *Since rights generally have no effect on your net worth, why do companies use them?*

Valor monetario

Here are some reasons:

- Rights protect shareholders from ownership dilution (loss of control).
- Rights offer a proven, built-in market for company shares. **evidencia**
- Rights appear to be a bargain—you can buy shares for below-market prices. **regateo**
- Rights have a lower margin requirement for purchases (normal stock purchases require 50% down, rights purchases require only 25% down)

# *Poison Pill:*

- a rights offering made to existing shareholders of a company in order to make it more difficult for another company to acquire it
- used to avoid a takeover (anti-takeover weapon)
- makes hostile takeovers very expensive and unattractive  
**evitar adquisición**
- used as a defensive tactic in fending off an unwanted merger  
**defensa**
- allows existing shareholders the right to buy additional shares of the stock at a very low price  
**fusión**

# *American Depository Receipts (ADR)*

- ADRs are certificates that have a legal claim on an ownership interest in a foreign **derecho** company's common stock.
- The stock is put in trust in a foreign branch of a major U.S. bank.
- Allow foreign stocks to be traded in the U.S. like domestic stocks.



# *Advantages of ADRs:*

- Annual reports and financial statements are presented in English.
- Generally accepted accounting principles are used in reporting.

# *Disadvantages of ADRs:*

- Investors have foreign currency risk
- Foreign companies don't report results as often as U.S. companies.
- There is an information lag due to language translation. **retraso**

# *Preferred Stock:*

- a hybrid security combining characteristics of both debt and common stock
- has a fixed dividend that must be paid before dividends on common stock
- dividends are not tax deductible to a company (like interest payments on bonds are)
- provides the company with a balance in its capital structure
- primary purchasers are corporate investors, insurance companies, and pension funds

*Table shows average figures for AA bond yields and Moody's Preferred stock yields for 22 years. Notice that bonds always offer higher yields than do preferred stocks.*

Year	AA Bond Yields	Moody's High-Grade Preferred Stock Yields	Yield Spread <sup>margen</sup> Bonds – Preferred Stock
1977	8.24	7.12	1.12
1978	8.92	7.76	1.16
1979	9.94	8.54	1.40
1980	12.50	10.11	2.39
1981	14.75	11.64	3.11
1982	14.41	11.68	2.73
1983	12.42	10.05	2.37
1984	13.31	10.21	3.10
1985	11.82	9.41	2.41
1986	9.47	8.13	1.34
1987	9.68	7.94	1.74
1988	9.94	8.17	1.77
1989	9.46	7.82	1.64
1990	9.56	8.28	1.28
1991	9.05	7.87	1.18
1992	8.46	7.05	1.41
1993	7.40	6.32	1.08
1994	8.15	6.96	1.19
1995	8.34	7.18	1.16
1996	7.54	7.10	0.44
1997	7.47	6.68	0.79
1998	6.86	6.30	0.56
1999	7.05	6.60	0.45

**TABLE 17-2**

Before-tax yields on corporate bonds and high-grade preferred stock



*Provisions  
Associated with  
Preferred Stock*

# *Cumulative Dividends:*

- if not paid in one year, dividends accumulate and must be paid in total before common stockholders

# *Conversion Feature:*

- preferred stock may be converted into common stock at the option of the holder

# *Call Feature:*

- preferred stock may be “callable” before maturity (like debt) at a small premium over par



# *Participation Provision:*

- Once the common dividend equals the preferred dividend, the two classes may share equally in additional payouts

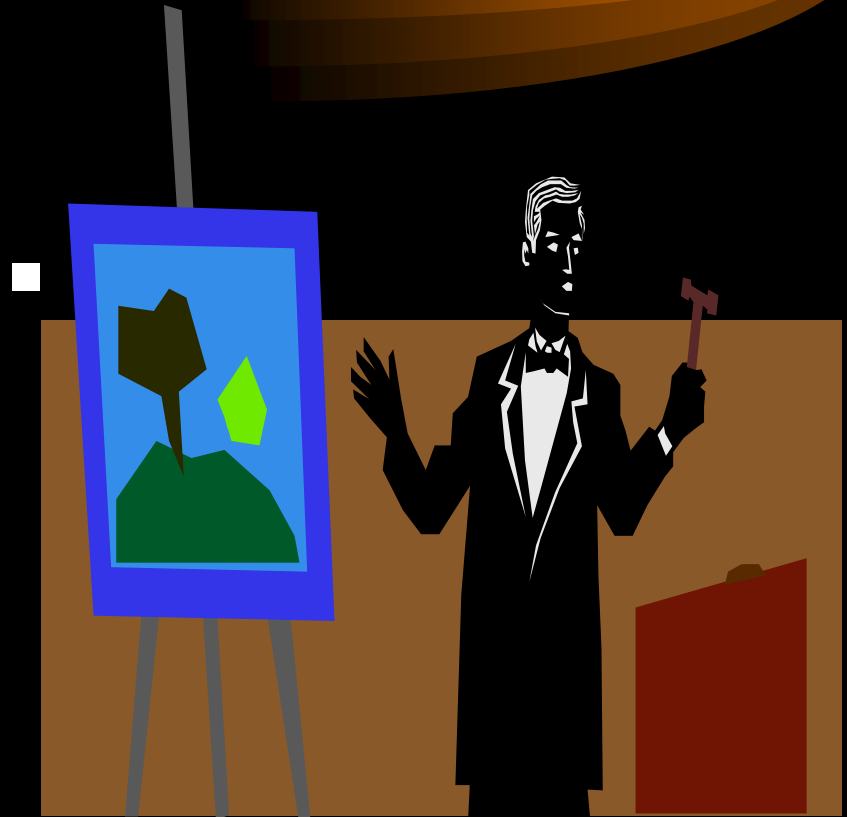
# *Floating Rate:*

- Dividends are adjusted to reflect inflation; the price is stable

# *Dutch Auction*

Subasta holandesa

- An auction to descending price.
- The auctioneer begins with a high price.
- The price goes descending until a bidder is willing to pay the quantity pointed out in that moment by the auctioneer.
- Strategically it is equal to an auction to the best price.



# *Dutch Auction Preferred*

**Subasta holandesa**

*Stock:*

- Short-term; mature every 7 weeks and is reauctioned at a subsequent billing.
- Bidder willing to accept the lowest yield gets first pick, then the second, etc.—allows investors to keep up with changing interest rates.

**resubastado**

**documento**

**Postor dispuesto**

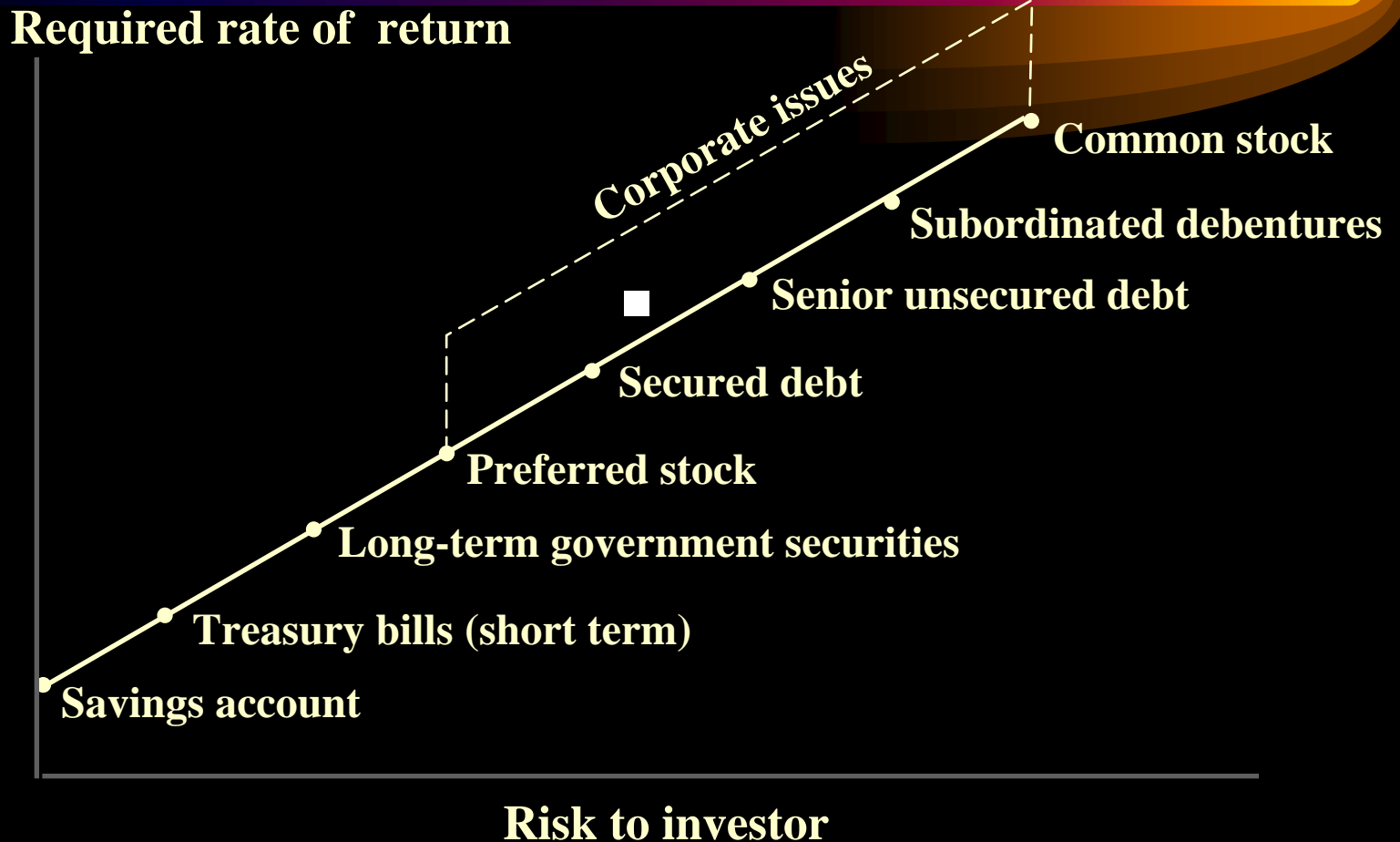
# *Par Value:*

- Determines annual dividend; sets amount to be received in liquidation.

## Features of alternative security issues

	<b>Common Stock</b>	<b>Preferred Stock</b>	<b>Bonds</b>
1. Ownership and control of the firm	Belongs to common stockholders through voting right and residual claim to income	Limited rights when dividends are missed	Limited rights under default in interest payment
2. Obligations to provide return	None	Must receive payment before common stockholders	Contractual obligation
3. Claim to assets in bankruptcy	Lowest claim of any security holder	Bondholders and creditors must be satisfied first	Highest claim
4. Cost of distribution	Highest	Moderate	Lowest
5. Risk–return trade-off	Highest risk, highest return (at least in theory)	Moderate risk, moderate return	Lowest risk, moderate return
6. Tax status of payment by corporation	Not deductible	Not deductible	Tax-deductible Cost = Interest payment $\times$ (1 – Tax rate)
7. Tax status of payment to recipient	70 percent of dividend to another corporation is tax-exempt	Same as common stock	Municipal bond interest is tax-exempt

# Risk and expected return for various security classes



# *Security Valuation*

- In general, the intrinsic value of an asset = the present value of the stream of expected cash flows discounted at an appropriate required rate of return.



# *Preferred Stock*

## A hybrid security:

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- it's like debt - preferred dividends are fixed.
  - missing a preferred dividend does not constitute default, but preferred dividends are cumulative.

# *Preferred Stock*

- **Usually sold for \$25, \$50, or \$100 per share.**
- **Dividends are fixed either as a dollar amount or as a percentage of par value.**
- *Example:* In 1988, Xerox issued \$75 million of 8.25% preferred stock at \$50 per share.
  - \$4.125 is the fixed, annual dividend per share.

# *Preferred Stock Features*

- Firms may have **multiple classes** of preferreds, each with different features.
- **Priority**: lower than debt, higher than common stock.
- **Cumulative feature**: all past unpaid preferred stock dividends must be paid before any common stock dividends are declared.

# *Preferred Stock Features*

- **Protective provisions** are common.
- **Convertibility**: many preferreds are convertible into common shares.
- **Adjustable rate** preferreds have dividends tied to interest rates.
- **Participation**: some (very few) preferreds have dividends tied to the firm's earnings.

# *Preferred Stock Features*

- **PIK Preferred:** Pay-in-kind preferred stocks pay additional preferred shares to investors rather than cash dividends.
- **Retirement:** Most preferreds are callable, and many include a **sinking fund** provision to set cash aside for the purpose of retiring preferred shares.



# *Preferred Stock Valuation*

- **A preferred stock can usually be valued like a perpetuity:**



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$$V_{ps} = \frac{D}{k_{ps}}$$

**D = dividend annual**

**K<sub>ps</sub> = required rate of return on preferred**

## *Example:*

- Xerox preferred pays an **8.25%** dividend on a **\$50** par value.
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# *Expected Rate of Return on Preferred*

- **Just adjust the valuation model:**



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$$\bar{k}_{ps} = \frac{D}{P_0}$$

**K<sub>ps</sub>** = expected return

**D** = preferred dividend

**P<sub>0</sub>** = preferred stock price

## *Example*

- If we know the preferred stock price is **\$40**, and the preferred dividend is **\$4.125**, the expected return is:



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## *Example*

- If we know the preferred stock price is **\$40**, and the preferred dividend is **\$4.125**, the expected return is:

$$\bar{k}_{ps} = \frac{D}{P_0} = \frac{4.125}{40} = .1031$$

*Example. If preferred stock with an annual dividend of \$5 sells for \$50, what is the preferred stock's expected return?*

$$V_p = D_p / k_p \quad (\text{perpetuity formula})$$

- to find expected return, solve for  $k_p$ ,  
where  $V_p = P_0$  (current market price)

$$\begin{aligned} \hat{k}_p &= D_p / V_p \\ \hat{k}_p &= \$5 / \$50 \\ \hat{k}_p &= 0.10 = 10\% \end{aligned}$$

# *Common Stock*

- is a **variable-income** security.
  - dividends may be increased or decreased, depending on earnings.
- represents **equity** or ownership.
- includes **voting rights**.
- **Limited liability**: liability is limited to amount of owners' investment.  
obligación
- **Priority**: lower than debt and preferred.

# *Common Stock Characteristics*

- **Claim on Income** - a stockholder has a <sup>derecho</sup> claim on the firm's residual income.
- **Claim on Assets** - a stockholder has a residual claim on the firm's assets in case of liquidation.
- **Preemptive Rights** - stockholders may <sup>Derechos preferentes</sup> share proportionally in any new stock issues.
- **Voting Rights** - right to vote for the firm's board of directors.

# *Common Stock Valuation*

- Common stock provides an expected future cash flow stream, and a stock's value is found in the same manner as the values of other financial assets—as the present value of the expected future cash flow stream.
- The expected cash flow consists of two elements:
  1. The dividends expected in each year and,
  2. The price investors expect to receive when they sell the stock.

# Definition of terms

- $P_0$  = market price today
- $\hat{P}_0$  = today's intrinsic (theoretical) value
- $\hat{P}_t$  = expected price (intrinsic value) at the end of year t.
- $g$  = expected growth rate in dividends
- $k_s$  = minimum acceptable or required rate of return
- $\hat{k}_s$  = expected total rate of return
- $\overline{k}_s$  = actual, or realized rate of return (after-the-fact)
- $D$  = dividend
- $D_1/P_0$  = expected dividend yield
- $(P_1 - P_0)/P_0$  = capital gains yield

# *Different approaches for valuing common stock*

- Corporate value model
- Using the multiples of comparable firms
- Dividend growth model



# *Total Company (Corporate Value) Model*

- An alternative to the dividend growth model to value firms that do not pay dividends (e.g., Compaq, Microsoft)
- Also called the free cash flow method. Suggests the value of the entire firm equals the present value of the firm's free cash flows.
- Remember, free cash flow is the firm's after-tax operating income less the net capital investment
  - $FCF = NOPAT - \text{Net capital investment}$

## *Applying the corporate value model*

- Find the market value (MV) of the firm.
  - $MV = PV$  of firm's future FCFs
- Subtract MV of firm's debt and preferred stock to get MV of common stock. ■
  - $MV \text{ of common stock} = MV \text{ of firm} - MV \text{ of debt and preferred}$
- Divide MV of common stock by the number of shares outstanding to get intrinsic stock price (value).
  - $P_0 = MV \text{ of common stock} / \# \text{ of shares}$

# *Issues regarding the corporate value model*

Problemas considerados en

- Often preferred to the dividend growth model, especially when considering number of firms that don't pay dividends or when dividends are hard to forecast.
- Similar to dividend growth model, assumes at some point free cash flow will grow at a constant rate.
- Terminal value ( $TV_n$ ) represents value of firm at the point that growth becomes constant.

# *Firm multiples method*

- Analysts often use the following multiples to value stocks.
  - P / E (price / earnings) ■
  - P / CF
  - P / Sales
- **EXAMPLE:** Based on comparable firms, estimate the appropriate P/E. Multiply this by expected earnings to back out an estimate of the stock price.

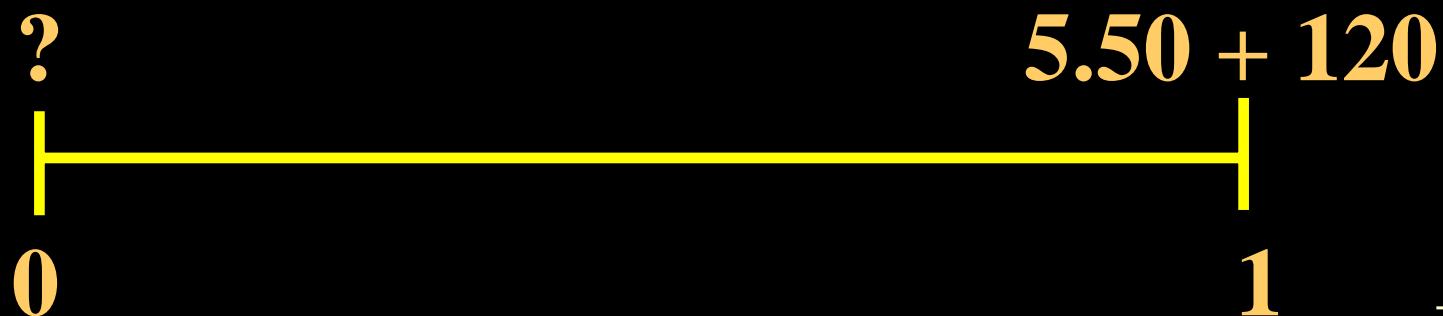
# *Common Stock Valuation* *(Single Holding Period)*

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- You expect XYZ stock to pay a **\$5.50** dividend at the end of the year. The stock price is expected to be **\$120** at that time.
- If you require a **15%** rate of return, what would you pay for the stock now?

# Common Stock Valuation (Single Holding Period)

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# Common Stock Valuation (Single Holding Period)

## Solution:

$$\begin{aligned} V_{cs} &= (5.50/1.15) + (120/1.15) \\ &= 4.783 + 104.348 \\ &= \$109.13 \end{aligned}$$

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- If you require a **15%** rate of return, what would you pay for the stock now?

# *Dividend growth model*

- The value of a stock is the present value of the future dividends expected to be generated by the stock (infinite holding period).

$$\hat{P}_0 = \frac{D_1}{(1+k_s)^1} + \frac{D_2}{(1+k_s)^2} + \frac{D_3}{(1+k_s)^3} + \dots + \frac{D_\infty}{(1+k_s)^\infty}$$

- The above equation holds true even if you plan to sell the stock after a finite holding period because the price at which you sell will be the present value of future dividends from that point in time.



# *Constant growth stock*

- For a constant growth stock the following conditions must hold
  - The dividend is expected to grow forever at a constant rate,  $g$ .
  - The stock price is expected to grow at the same rate.
  - The expected dividend yield is a constant.
  - The expected capital gains yield is also a constant,  $g$ .
  - The expected total rate of return is equal to the expected dividend yield plus the expected growth rate.
- A stock whose dividends are expected to grow forever at a constant rate,  $g$

$$D_1 = D_0 (1+g)^1$$

$$D_2 = D_0 (1+g)^2$$

$$D_t = D_0 (1+g)^t$$

# *Constant growth stock*

- If  $g$  is constant, the dividend growth formula given before,

$$\hat{P}_0 = \frac{D_1}{(1+k_s)^1} + \frac{D_2}{(1+k_s)^2} + \frac{D_3}{(1+k_s)^3} + \dots + \frac{D_\infty}{(1+k_s)^\infty}$$

converges to the computational formula given below:

$$\hat{P}_0 = \frac{D_0(1+g)}{k_s - g} = \frac{D_1}{k_s - g}$$

# *Common Stock Valuation*

## *(Multiple Holding Periods)*

- **Constant Growth Model**
- **Assumes common stock dividends will grow at a constant rate into the future.**

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- **$D_1$**  = the dividend at the end of period 1.
- **$k_{cs}$**  = the required return on the common stock.
- **$g$**  = the constant, annual dividend growth rate.

## *Example*

- XYZ stock **recently** paid a **\$5.00** dividend. The dividend is expected to grow at **10%** per year indefinitely. What would we be willing to pay if our required return on XYZ stock is **15%**?



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$$D_0 = \$5, \text{ so } D_1 = 5 (1.10) = \$5.50$$

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## Example

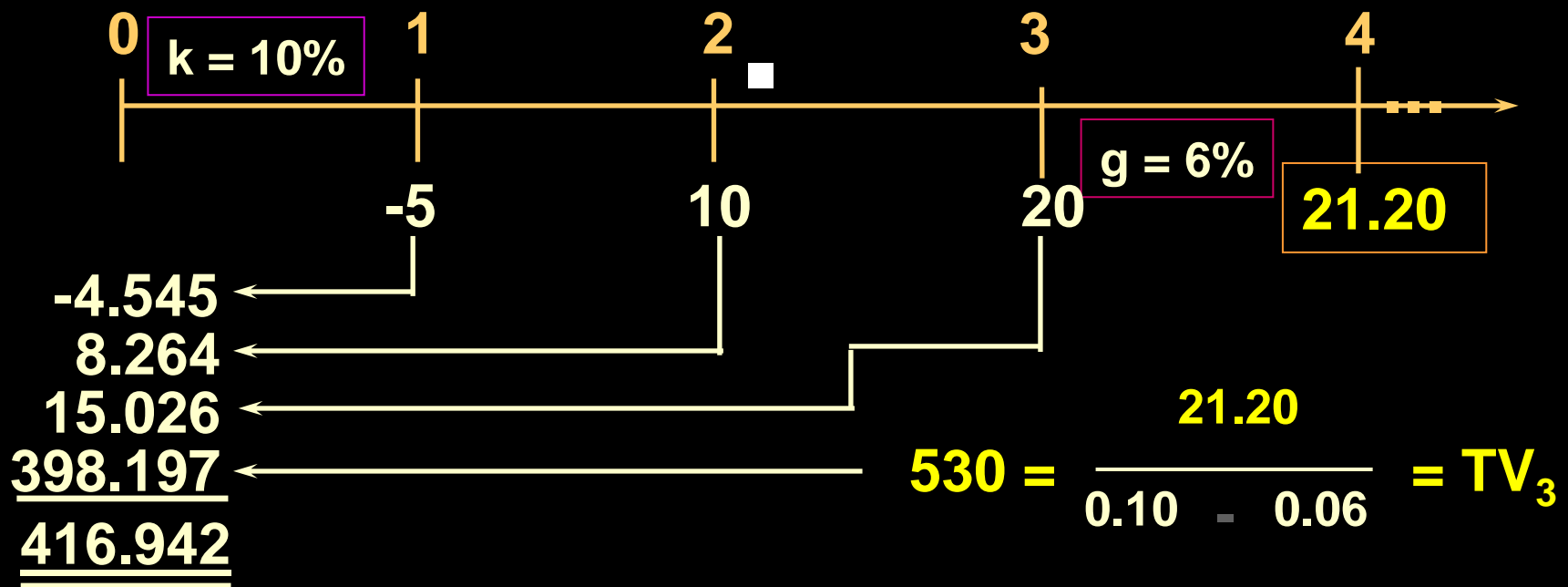
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$$V_{cs} = \frac{D_1}{k_{cs} - g} = \frac{5.50}{.15 - .10} = \$110$$

*Given the long-run  $g_{FCF} = 6\%$ , and WACC of  $10\%$ , use the corporate value model to find the firm's intrinsic value.*

Assumes constant growth,  $g = 6\%$ , after year three.

Terminal Value =  $D_{N+1}/k_{cs} - g_{fcf} = 21.20/(\cdot 10 - \cdot 06)$



*Example: If FCF of \$20 million next year is expected to grow at a constant rate of 6%.*

- $MV = TV = D_1 / (k_{cs} - g_{fcf})$
- $MV = TV = 20 / (.10 - .06) = \$500 \text{ million}$
- 
- MV of equity = MV of firm – MV of debt  
= \$500m - \$40m  
= \$460 million
- Value per share = MV of equity / # of shares  
= \$460m / 10m  
= \$46.00

market value (MV)

*If the firm has \$40 million in debt and has 10 million shares of stock, what is the firm's intrinsic value per share?*

- MV of firm = 416.94m
- MV of equity = MV of firm – MV of debt  
= \$416.94m - \$40m  
= \$376.94 million
- Value per share = MV of equity / # of shares  
= \$376.94m / 10m  
= \$37.69



## Example:

What is the expected current price,  $\hat{P}_0$ , given:

$$D_0 = \$1.15 \quad k_s = 13.4\% \quad g = 8\%$$

■

$$\hat{P}_0 = \frac{D_0(1+g)}{k_s - g} = \frac{D_1}{k_s - g} = \frac{\$1.15(1 + .08)}{0.134 - 0.08}$$

$$\hat{P}_0 = \frac{\$1.242}{0.054} = \$23.00$$

# *Expected Return on Common Stock*

- **Just adjust the valuation model**



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# *Expected Return on Common Stock*

- **Just adjust the valuation model**

$$V_{cs} = \frac{D}{k_{cs} - g}$$

$$\bar{k} = \left( \frac{D_1}{P_0} \right) + g$$

# *Example*

- We know a stock will pay a **\$3.00** dividend at time 1, has a price of **\$27** and an expected growth rate of **5%**.



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$$\bar{k}_{cs} = \left( \frac{D_1}{P_0} \right) + g$$

$$\bar{k}_{cs} = \left( \frac{3.00}{27} \right) + .05 =$$



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$$\bar{k}_{cs} = \left( \frac{D_1}{P_0} \right) + g$$

$$\bar{k}_{cs} = \left( \frac{3.00}{27} \right) + .05 = \mathbf{16.11\%}$$

## *What happens if $g > k_s$ ?*

- If  $g > k_s$ , the constant growth formula leads to a negative stock price, which does not make sense. ■
- The constant growth model can only be used if:
  - $k_s > g$
  - $g$  is expected to be constant forever

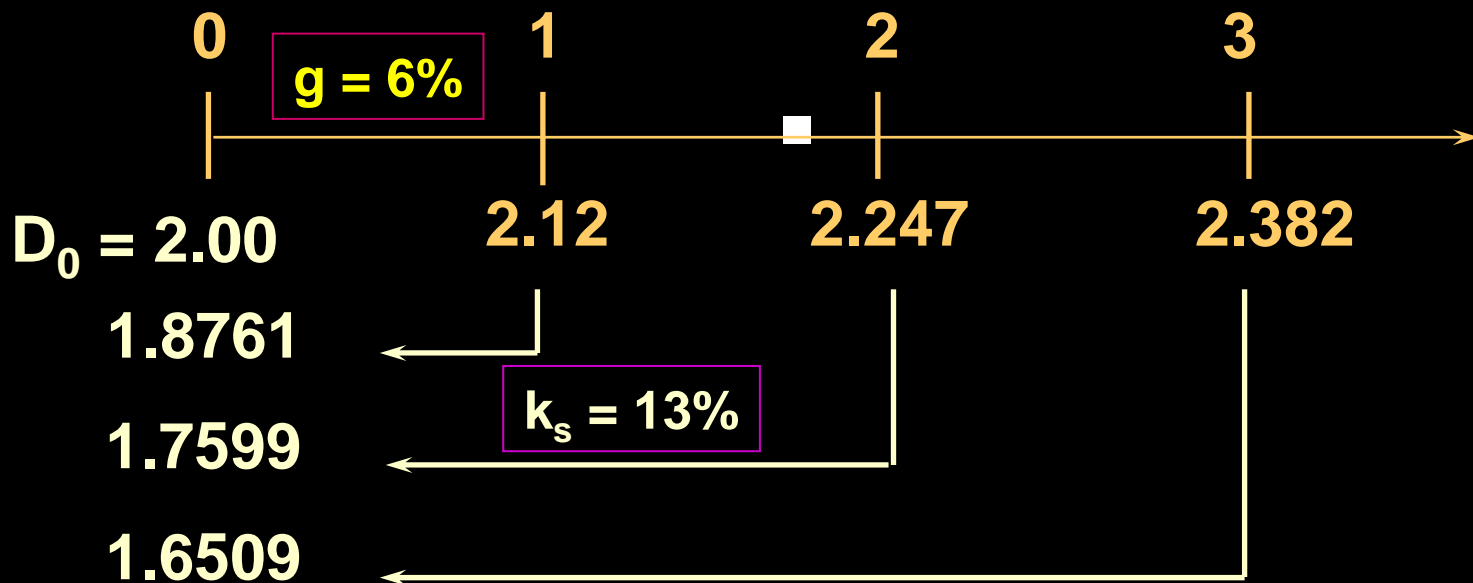
*If  $k_{RF} = 7\%$ ,  $k_M = 12\%$ , and  $\beta = 1.2$ , what is the required rate of return on the firm's stock?*

- Use the SML to calculate the required rate of return ( $k_s$  using CAPM):

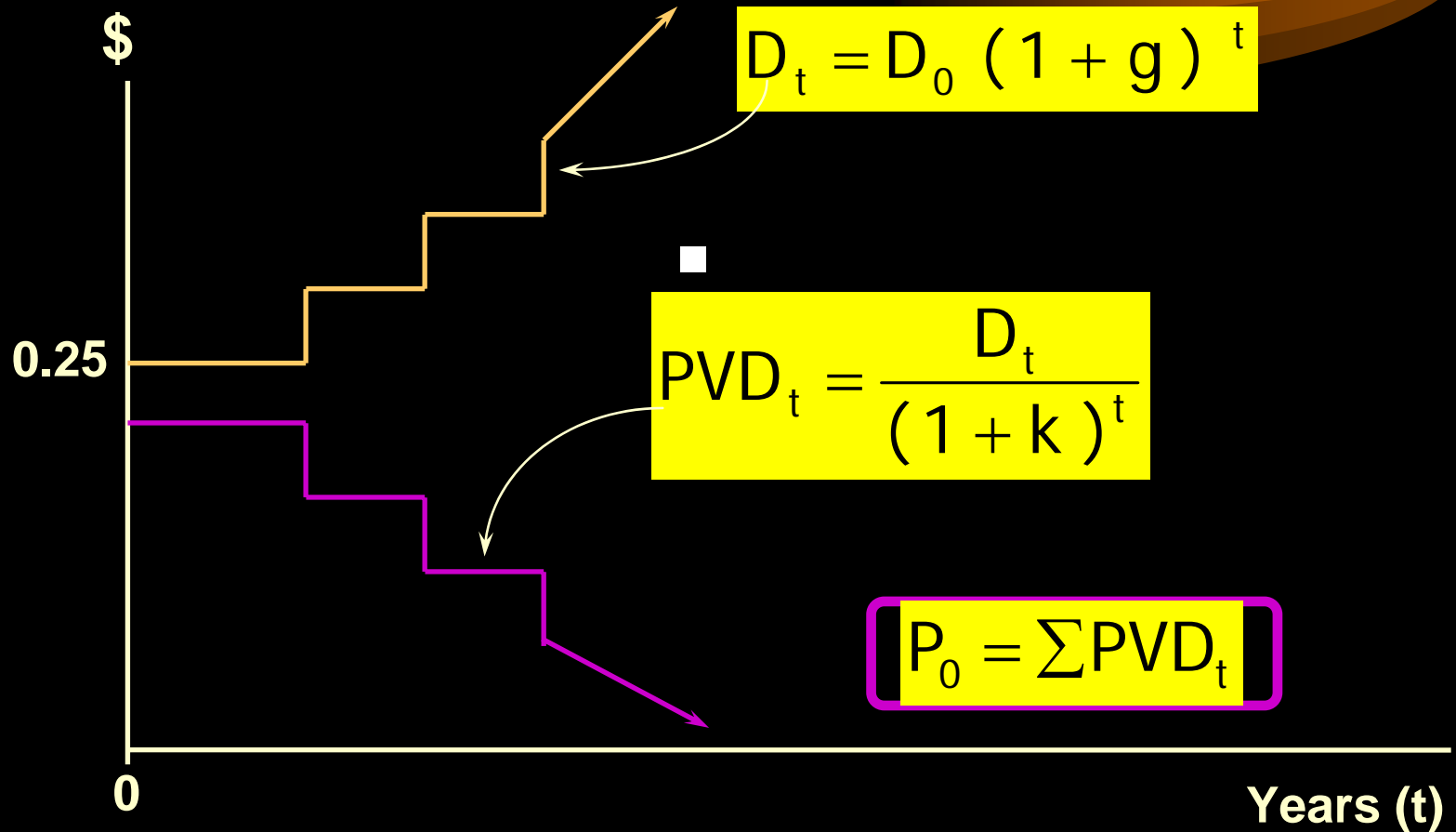


$$\begin{aligned}
 k_s &= k_{RF} + (k_M - k_{RF})\beta \\
 &= 7\% + (12\% - 7\%)1.2 \\
 &= 13\%
 \end{aligned}$$

*If  $D_0 = \$2$  and  $g$  is a constant 6%, find the expected dividend stream for the next 3 years, and their PVs.*



# *Future dividends and their present values (Figure 8-1)*



# *What is the stock's market value?*

- Using the constant growth model:

$$\begin{aligned}
 P_0 &= \frac{\hat{D}_1}{k_s - g} = \frac{\$2.12}{0.13 - 0.06} \\
 &= \frac{\$2.12}{0.07} \\
 &= \$30.29
 \end{aligned}$$

## *What is the expected market price of the stock, one year from now?*

- $D_1$  will have been paid out already. So,  $P_1$  is the present value (as of year 1) of  $D_2, D_3, D_4,$  etc.

$$\begin{aligned} \hat{P}_1 &= \frac{D_2}{k_s - g} = \frac{\$2.247}{0.13 - 0.06} \\ &= \$32.10 \end{aligned}$$

- Could also find expected  $P_1$  as:

$$\hat{P}_1 = P_0 (1.06) = \$32.10$$

# Expected $\hat{k}$ Rate of Return on a Constant Growth Stock, $k$

Constant Growth Valuation Model  $\longrightarrow$

$$\hat{P}_0 = \frac{D_0(1+g)}{k_s - g} = \frac{D_1}{k_s - g}$$

- Given a known market price  $P_0$ , solve for  $k_s$  to find the expected rate of return:

Expected rate of return = expected dividend yield + expected growth rate, or capital gains yield

$$\hat{k}_s = D_1/P_0 + g$$

$$\hat{k}_s = \$2.12/\$30.29 + .06$$

$$\hat{k}_s = .07 + .06$$

$$\hat{k}_s = .13 = 13\%$$



*What is the expected dividend yield, capital gains yield, and total return during the first year?*

- Dividend yield
  - =  $D_1 / P_0 = \$2.12 / \$30.29 = 7.0\%$
- Capital gains yield ■
  - =  $(P_1 - P_0) / P_0$
  - =  $(\$32.10 - \$30.29) / \$30.29 = 6.0\%$
- Total return ( $k_s$ )
  - = Dividend Yield + Capital Gains Yield
  - =  $7.0\% + 6.0\% = 13.0\%$

\* This is simply an alternative way of showing total return ( $k_s$ )

*What would the expected price today be, if  $g = 0$ ?*

- The dividend stream would be a *perpetuity*.

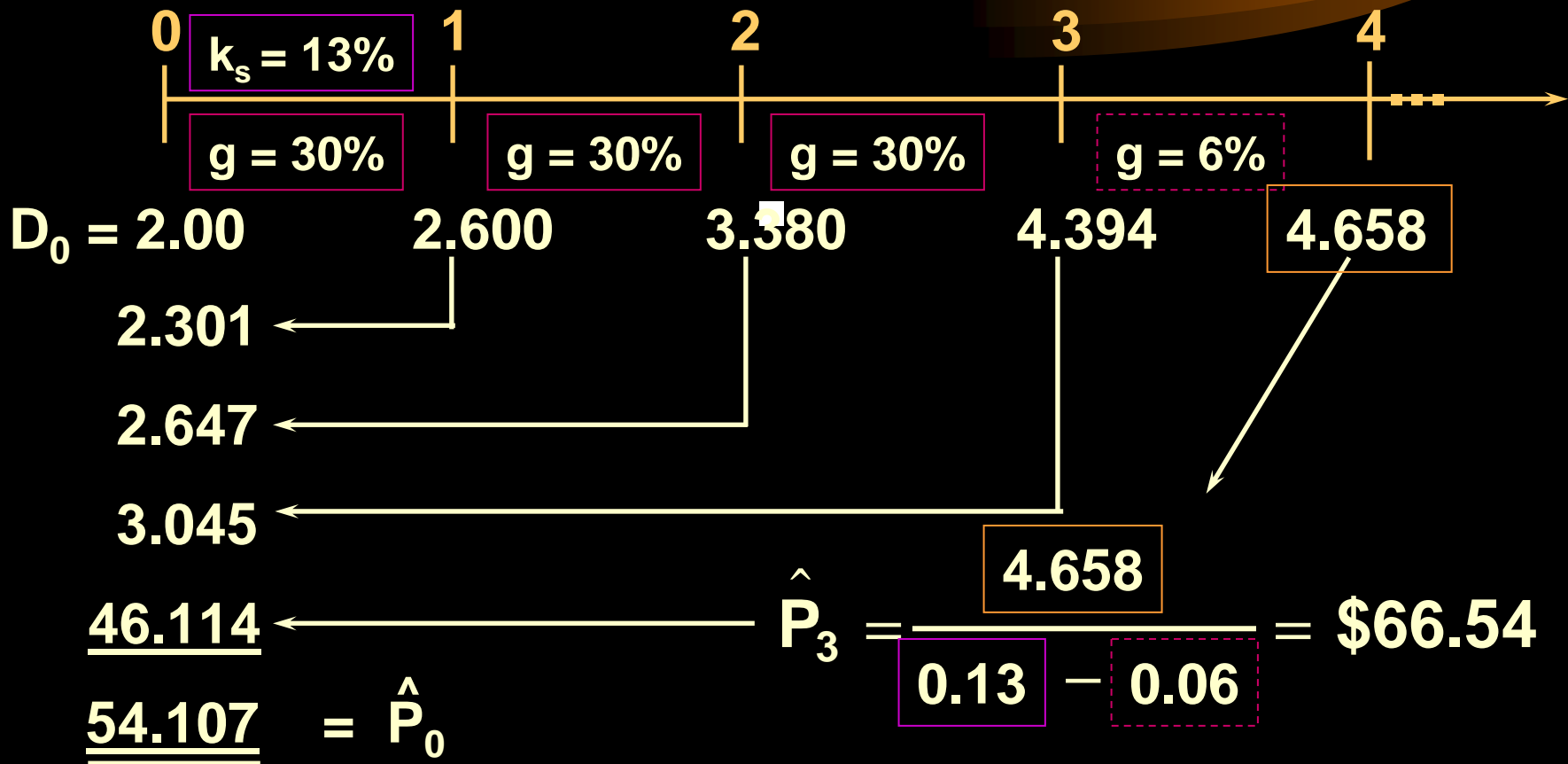


$$\hat{P}_0 = \frac{\text{PMT}}{k} = \frac{\$2.00}{0.13} = \$15.38$$

*Supernormal growth:  
What if  $g = 30\%$  for 3 years before  
achieving long-run growth of 6%?*

- Can no longer use just the constant growth model to find stock value.
- However, the growth does become constant after 3 years.

# Valuing common stock with nonconstant growth

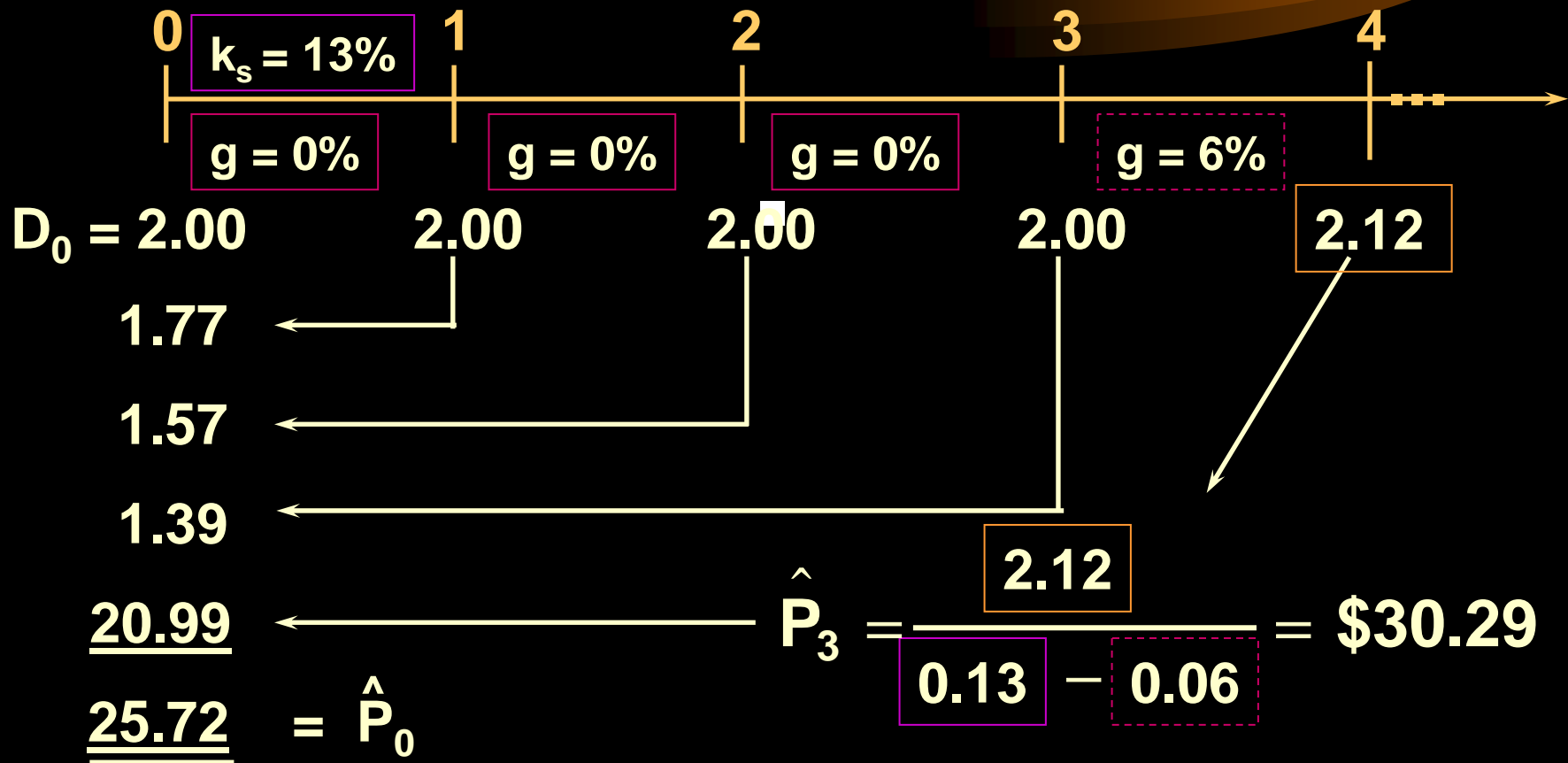


*Find expected dividend and capital gains yields during the first and fourth years.*

- Dividend yield (first year)  
=  $\$2.60 / \$54.11 = 4.81\%$
- Capital gains yield (first year)  
=  $13.00\% - 4.81\% = 8.19\%$
- During nonconstant growth, dividend yield and capital gains yield are not constant, and capital gains yield  $\neq g$ .
- After  $t = 3$ , the stock has constant growth and dividend yield =  $7\%$ , while capital gains yield =  $6\%$ .

# Nonconstant growth:

What if  $g = 0\%$  for 3 years before long-run growth of  $6\%$ ?



*Find expected dividend and capital gains yields during the first and fourth years.*

- Dividend yield (first year)  
=  $\$2.00 / \$25.72 = 7.78\%$
- Capital gains yield (first year)  
=  $13.00\% - 7.78\% = 5.22\%$
- After  $t = 3$ , the stock has constant growth and dividend yield = 7%, while capital gains yield = 6%.

*If the stock was expected to have negative growth ( $g = -6\%$ ), would anyone buy the stock, and what is its value?*

- The firm still has earnings and pays dividends, even though they may be declining, they still have value.



$$\begin{aligned}
 \hat{P}_0 &= \frac{D_1}{k_s - g} = \frac{D_0(1 + g)}{k_s - g} \\
 &= \frac{\$2.00(0.94)}{0.13 - (-0.06)} = \frac{\$1.88}{0.19} = \$9.89
 \end{aligned}$$



## *Find expected annual dividend and capital gains yields.*

- Capital gains yield  
=  $g = -6.00\%$
- Dividend yield  
=  $13.00\% - (-6.00\%) = 19.00\%$
- Since the stock is experiencing constant growth, dividend yield and capital gains yield are constant. Dividend yield is sufficiently large (19%) to offset a negative capital gains.

# *What is market equilibrium?*

- In equilibrium, stock prices are stable and there is no general tendency for people to buy versus to sell.
- In equilibrium, expected returns must equal required returns.

# *Market equilibrium*

- Expected returns are obtained by estimating dividends and expected capital gains.
- Required returns are obtained by estimating risk and applying the CAPM.

# *How is market equilibrium established (supply and demand)?*

- If expected return exceeds required return
  - ...
  - The current price  $(P_0)$  is “too low” and offers a bargain.
  - Buy orders will be greater than sell orders.
  - $P_0$  will be bid up until expected return equals required return

# *Factors that affect stock price*

- Required return ( $k_s$ ) could change
  - Changing inflation could cause  $k_{RF}$  to change
  - Market risk premium or exposure to market risk ( $\beta$ ) could change
- Growth rate ( $g$ ) could change
  - Due to economic (market) conditions
  - Due to firm conditions

# *What is the Efficient Market Hypothesis (EMH)?*

- Securities are normally in equilibrium and are “fairly priced” in the sense that the price reflects all publicly available information on each security (1000 analysts following each stock).
- Investors cannot consistently “beat the market” except through good luck or better information.
- Levels of market efficiency
  - Weak-form efficiency
  - Semistrong-form efficiency
  - Strong-form efficiency

# *Weak-form efficiency*

- All information contained in past price movements is fully reflected in current market prices.
- Can't profit by looking at past trends. A recent decline is no reason to think stocks will go up (or down) in the future.
- Evidence supports weak-form EMH, but “technical analysis” (charting past trends to identify future trends) is still used.

# *Semistrong-form efficiency*

- All *publicly available* information is reflected in stock prices, so it doesn't pay to over analyze annual reports looking for undervalued stocks.
- Implies that when new information is released (e.g., earnings reports) stock prices will respond only if the information is different from that which has been expected.
- Largely true, but superior analysts can still profit by finding and using new information, especially for under-publicized companies.



# *Strong-form efficiency*

- All information, even inside information, is embedded in stock prices.
- Not true--insiders can gain by trading on the basis of insider information, but that's illegal.

# *Is the stock market efficient?*

- Empirical studies have been conducted to test the three forms of efficiency. Most of which suggest the stock market was:
  - Highly efficient in the weak form.
  - Reasonably efficient in the semistrong form.
  - Not efficient in the strong form. Insiders can and do make abnormal (and sometimes illegal) profits.

# *Is the stock market efficient?*

- Yes, it is very difficult to “beat the market” except by luck or insider information.
- Even professional mutual fund managers do not, on average, outperform the overall stock market.
- This had led to the popularity of “index funds” that contain a basket of stocks that represent the overall market (e.g., S&P 500). The objective is simply match the market return.

# *Is the stock market efficient?*

- ***Behavioral finance*** – incorporates elements of cognitive psychology to better understand how individuals and markets respond to different situations.
- Response to speculative stock bubbles such as the Internet bubble which do not reflect rational analysis but show irrational and emotional reactions (“the bigger fool theory,” “irrational exuberance”).
- In the long run bubbles burst, however, and rationality (efficient markets) tend to reassert themselves with intrinsic values more closely reflected in stock prices.