



Stocks and Their Valuation

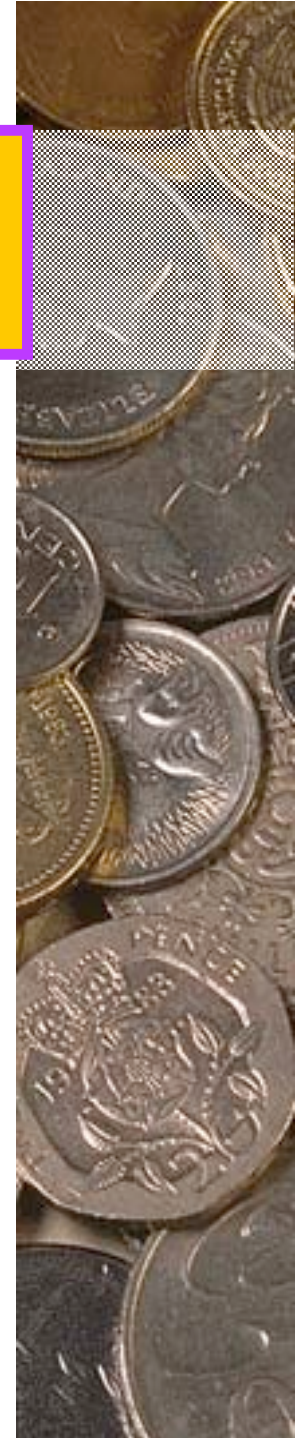
Features of common stock
Determining common stock values

Efficient markets

Preferred stock

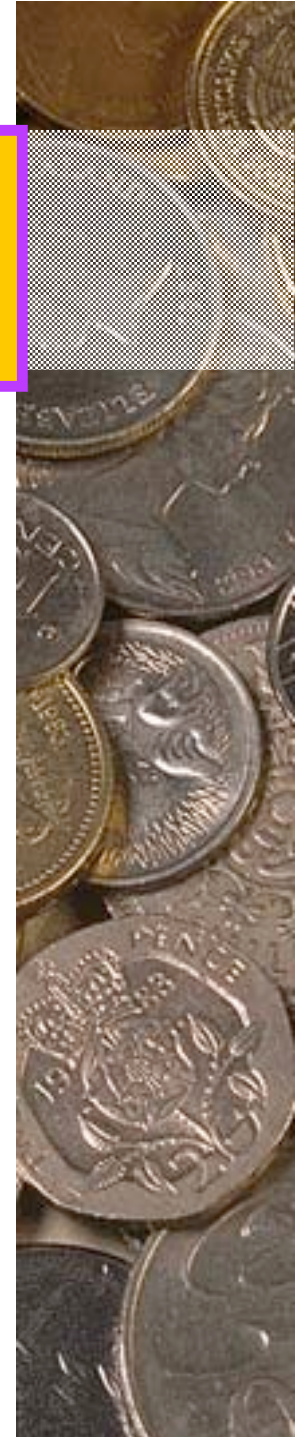
Common Stock: Owners, Directors, and Managers

- Represents **ownership**.
- Ownership implies **control**.
- Stockholders elect **directors**.
- Directors hire **management**.
- Since managers are “agents” of shareholders, their goal should be: **Maximize stock price**.



Different Approaches for Valuing Common Stock

- Dividend growth model
- Using the multiples of comparable firms
- Free cash flow method (covered in Chapter 15)



Stock Value = PV of Dividends

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

What is a constant growth stock?

One whose dividends are expected to grow forever at a constant rate, g .



For a constant growth stock,

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

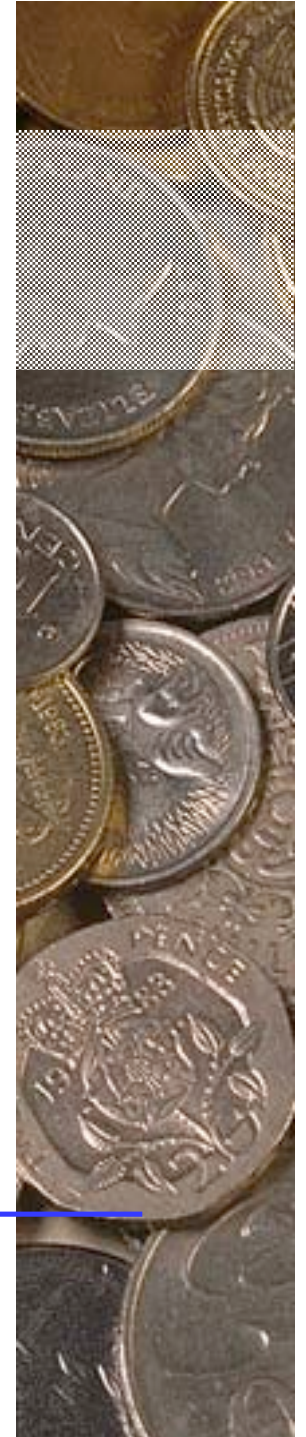
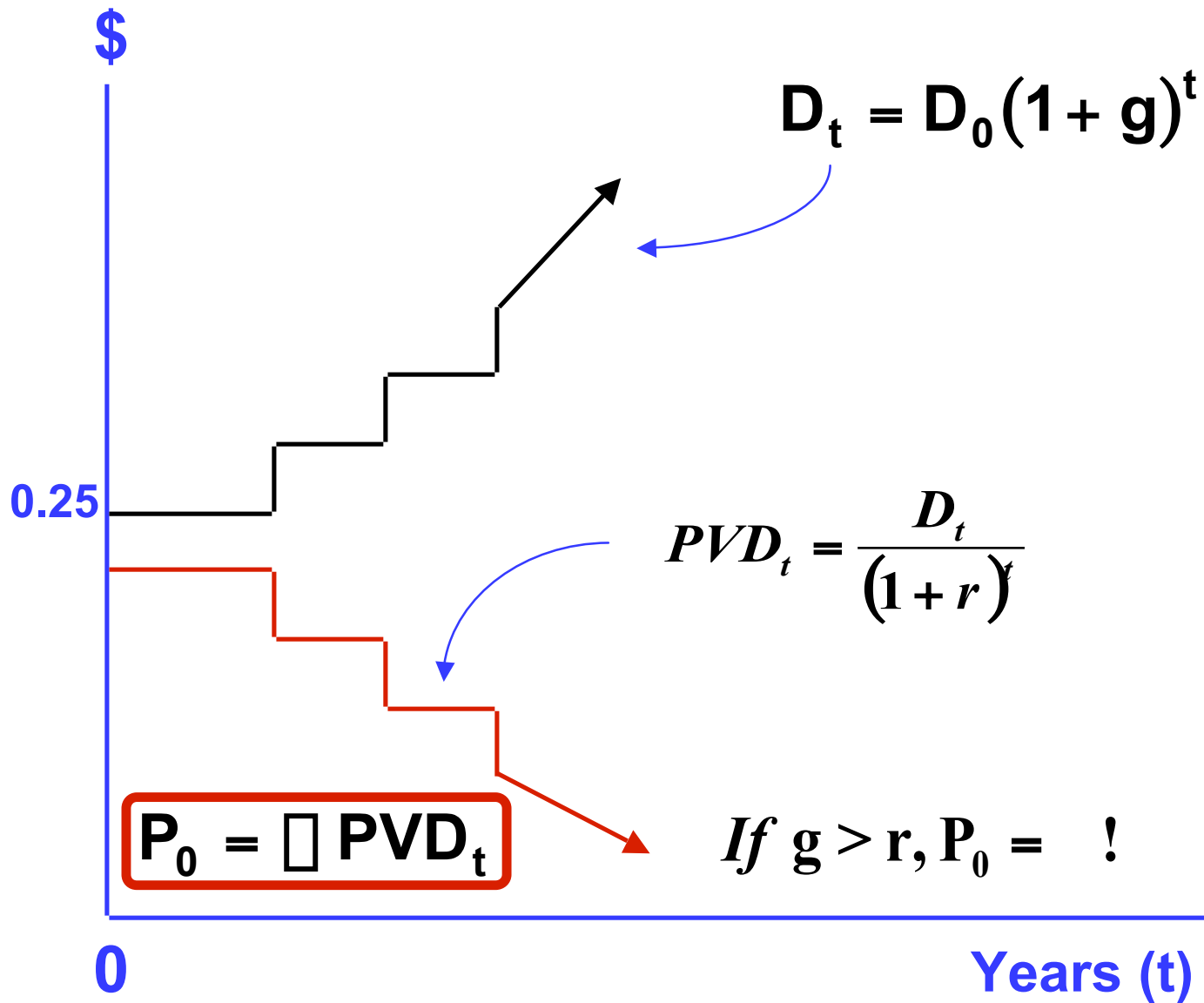
$$D_2 = D_0(1 + g)^2$$

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

If g is constant, then:

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





What happens if $g > r_s$?

$$\hat{P}_0 = \frac{D_1}{r_s - g} \text{ requires } r_s > g.$$

- If $r_s < g$, get negative stock price, which is nonsense.
- We can't use model unless (1) $g < r_s$ and (2) g is expected to be constant forever. Because g must be a long-term growth rate, it cannot be $> r_s$.



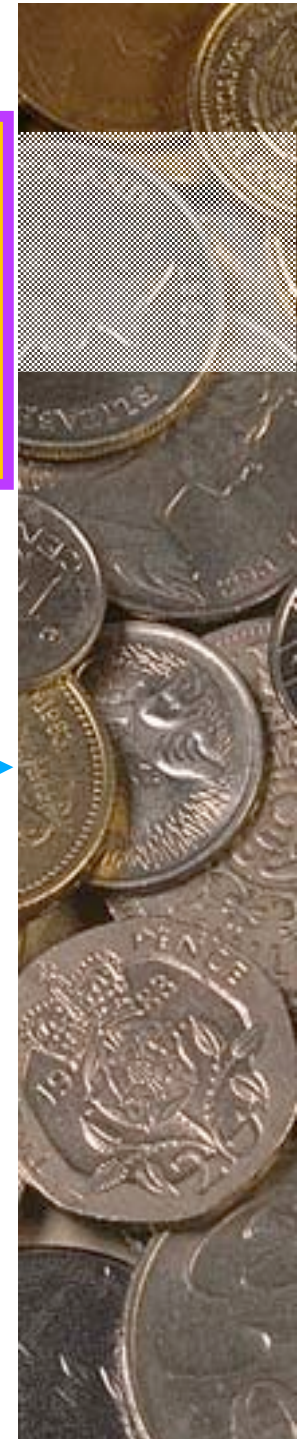
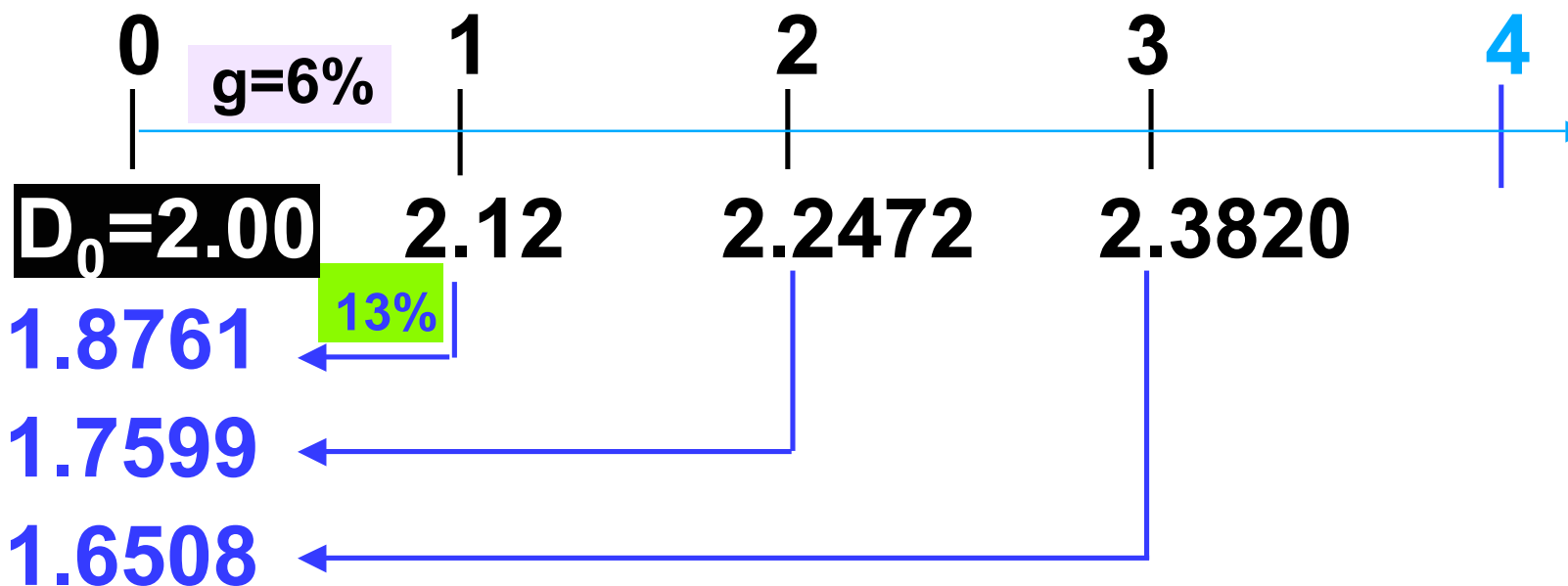
Assume beta = **1.2**, $r_{RF} = 7\%$, and $RP_M = 5\%$. What is the required rate of return on the firm's stock?

Use the SML to calculate r_s :

$$\begin{aligned} r_s &= r_{RF} + (RP_M)b_{\text{Firm}} \\ &= 7\% + (5\%) (1.2) \\ &= \mathbf{13\%}. \end{aligned}$$



D_0 was \$2.00 and g is a constant 6%. Find the expected dividends for the next 3 years, and their PVs. $r_s = 13\%$.



What's the stock's market value?

$$D_0 = 2.00, r_s = 13\%, g = 6\%.$$

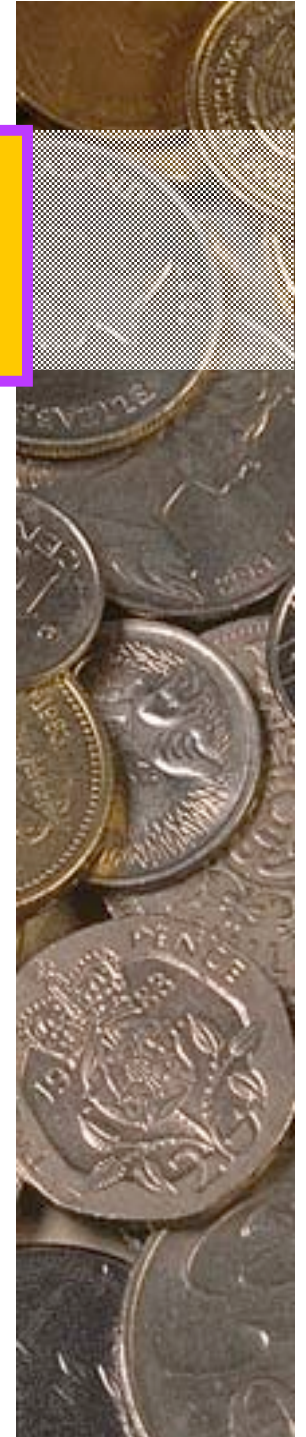
Constant growth model:

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

$$= \frac{\$2.12}{0.13 - 0.06}$$

$$= \frac{\$2.12}{0.07}$$

\$30.29.



What is the stock's market value one year from now, P_1 ?

- D_1 will have been paid, so expected dividends are D_2, D_3, D_4 and so on.

Thus,

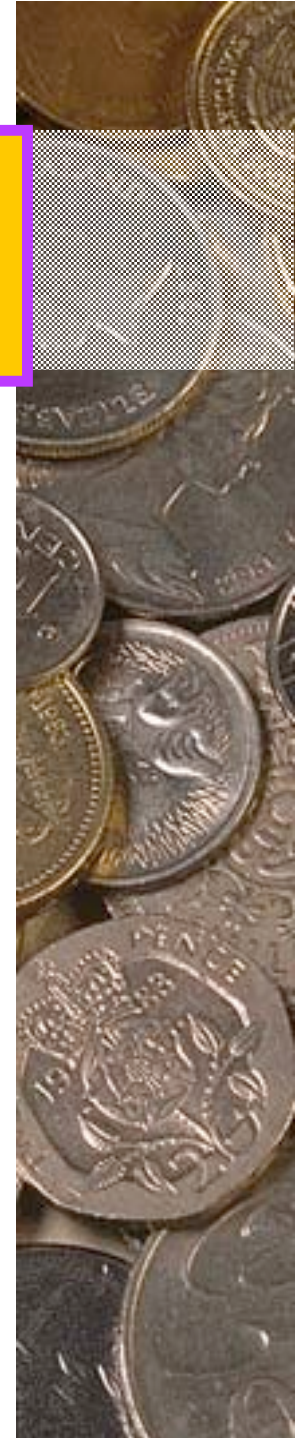
$$P_1 = \frac{D_2}{r_s - g}$$
$$= \frac{\$2.2427}{0.07} = \$32.10$$



Find the expected dividend yield and capital gains yield during the first year.

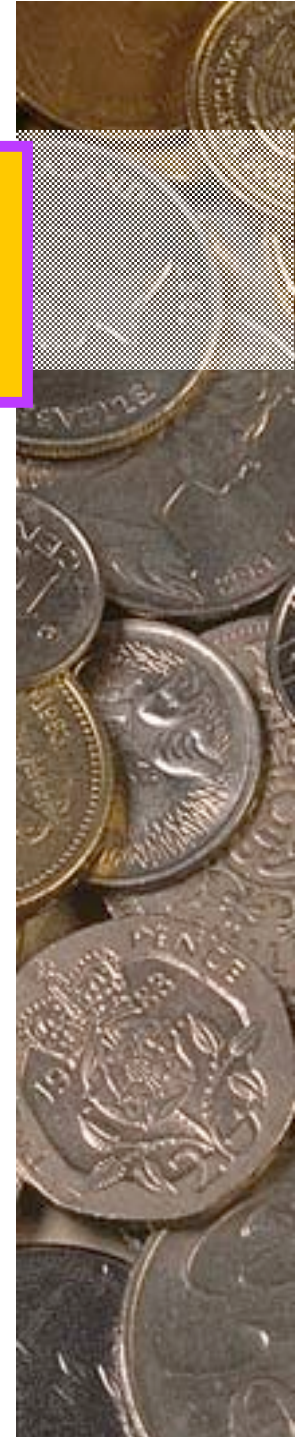
$$\text{Dividend yield} = \frac{D_1}{P_0} = \frac{\$2.12}{\$30.29} = 7.0\%.$$

$$\begin{aligned} \text{CG Yield} &= \frac{\hat{P}_1 - P_0}{P_0} = \frac{\$32.10 - \$30.29}{\$30.29} \\ &= 6.0\%. \end{aligned}$$



Find the total return during the first year.

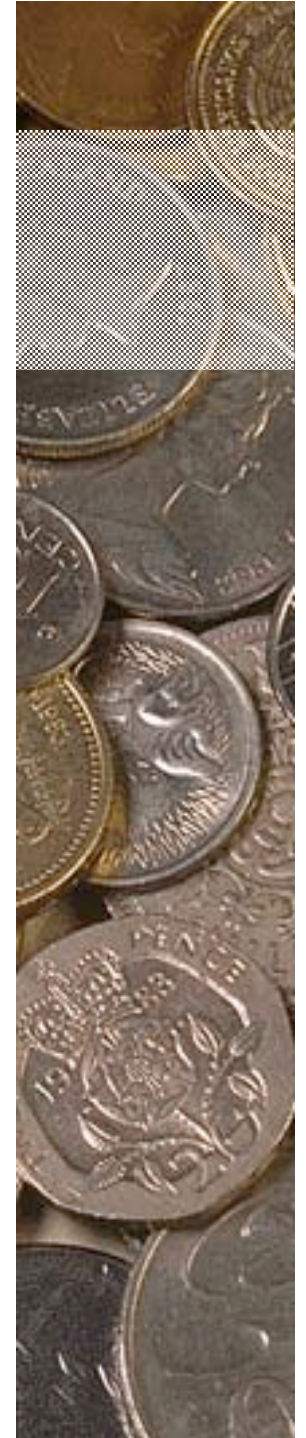
- Total return = Dividend yield + Capital gains yield.
- Total return = $7\% + 6\% = 13\%$.
- Total return = $13\% = r_s$.
- For constant growth stock:
Capital gains yield = $6\% = g$.



Rearrange model to rate of return form:

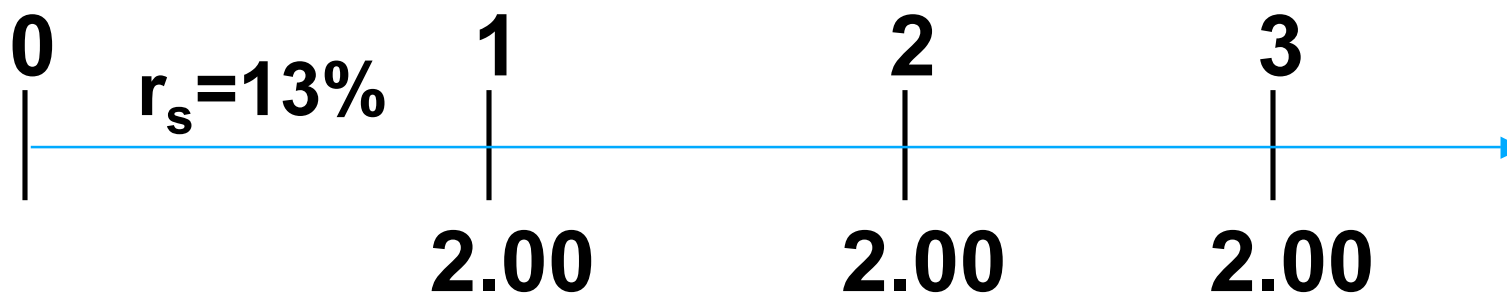
$$\hat{P}_0 = \frac{D_1}{r_s - g} \text{ to } r_s = \frac{D_1}{P_0} + g.$$

Then, $\hat{r}_s = \$2.12/\$30.29 + 0.06$
 $= 0.07 + 0.06 = 13\%.$

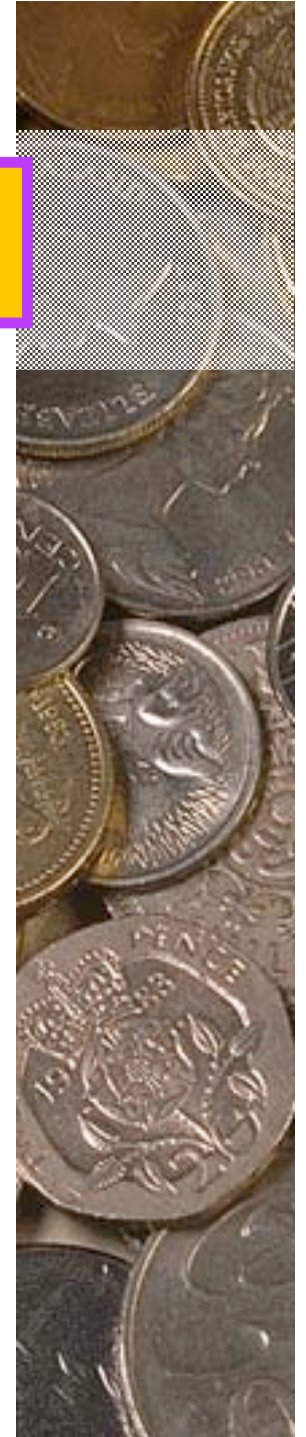


What would P_0 be if $g = 0$?

The dividend stream would be a perpetuity.

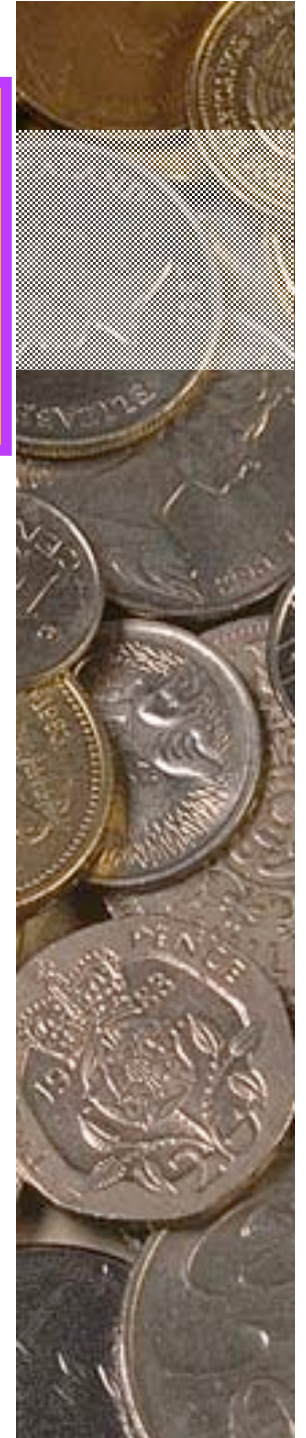


$$P_0 = \frac{\text{PMT}}{r} = \frac{\$2.00}{0.13} = \$15.38.$$

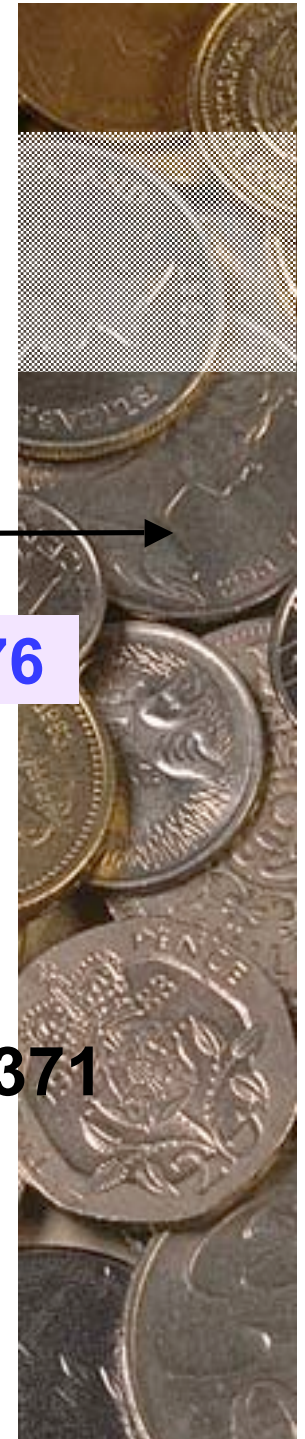
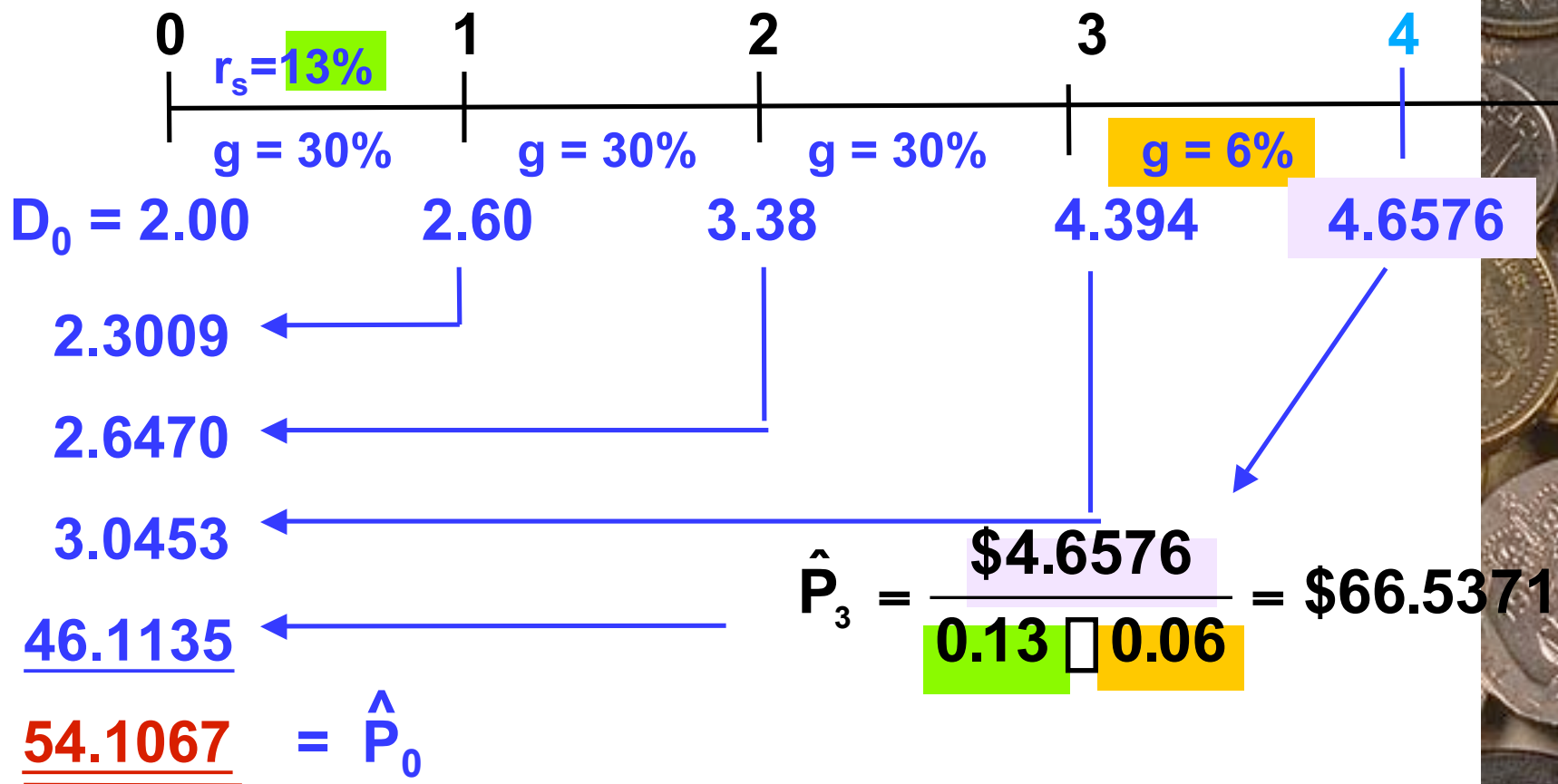


If we have supernormal growth of 30% for 3 years, then a long-run constant $g = 6\%$, what is P_0 ? r is still 13%.

- **Can no longer use constant growth model.**
- **However, growth becomes constant after 3 years.**



Nonconstant growth followed by constant growth:



What is the expected dividend yield and capital gains yield @ t = 0? @ t = 4?

@ t = 0:

$$\text{Dividend yield} = \frac{D_1}{P_0} = \frac{\$2.60}{\$54.11} = 4.8\%.$$

$$\text{CG Yield} = 13.0\% - 4.8\% = 8.2\%.$$

(More...)



- During nonconstant growth, dividend yield and capital gains yield are **not constant**.
- If current growth is **greater than g** , current capital gains yield is **greater than g** .
- After $t = 3$, $g = \text{constant} = 6\%$, so the $t = 4$ capital gains yield = **6%** .
- Because $r_s = 13\%$, the $t = 4$ dividend yield = $13\% - 6\% = \mathbf{7\%}$.



Is the stock price based on short-term growth?

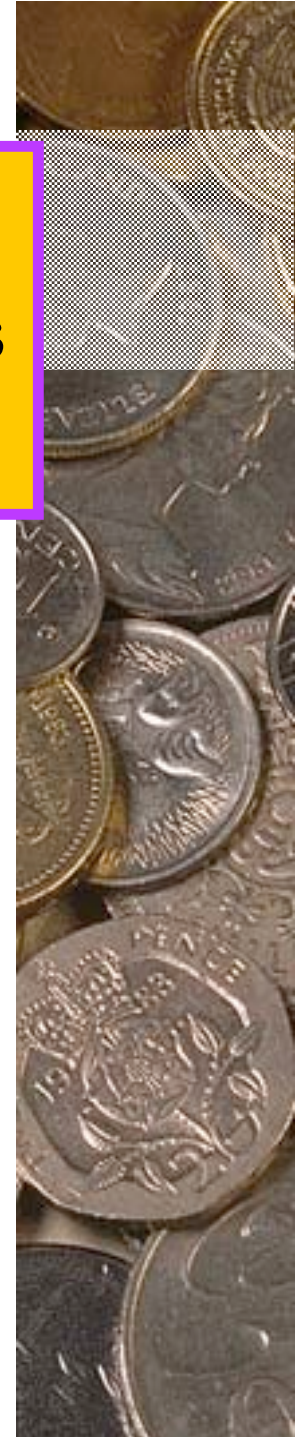
- The current stock price is **\$54.11**.
- The PV of dividends beyond year 3 is **\$46.11** (P_3 discounted back to $t = 0$).
- The percentage of stock price due to “long-term” dividends is:

$$\frac{\$46.11}{\$54.11} = 85.2\%.$$

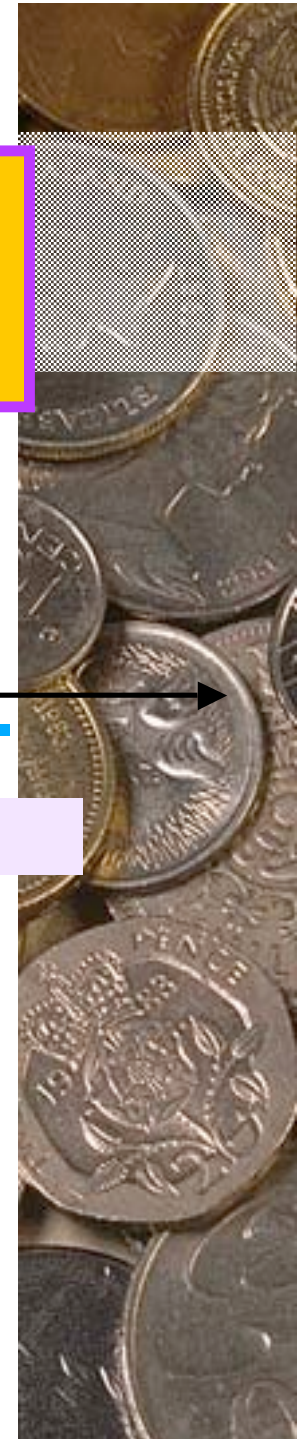
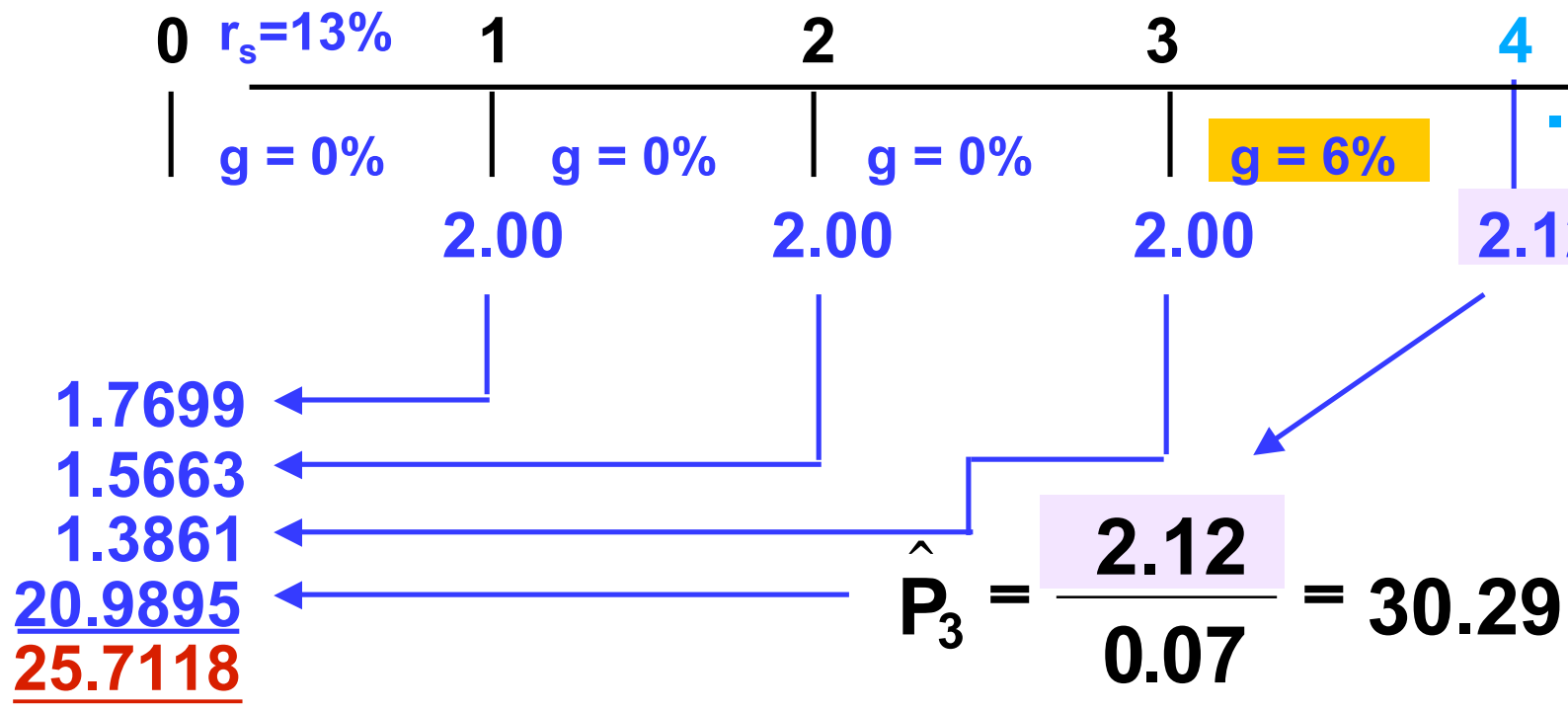


If most of a stock's value is due to long-term cash flows, why do so many managers focus on quarterly earnings?

- **Sometimes changes in quarterly earnings are a signal of future changes in cash flows. This would affect the current stock price.**
- **Sometimes managers have bonuses tied to quarterly earnings.**



Suppose $g = 0$ for $t = 1$ to 3, and then \hat{g} is a constant 6%. What is P_0 ?

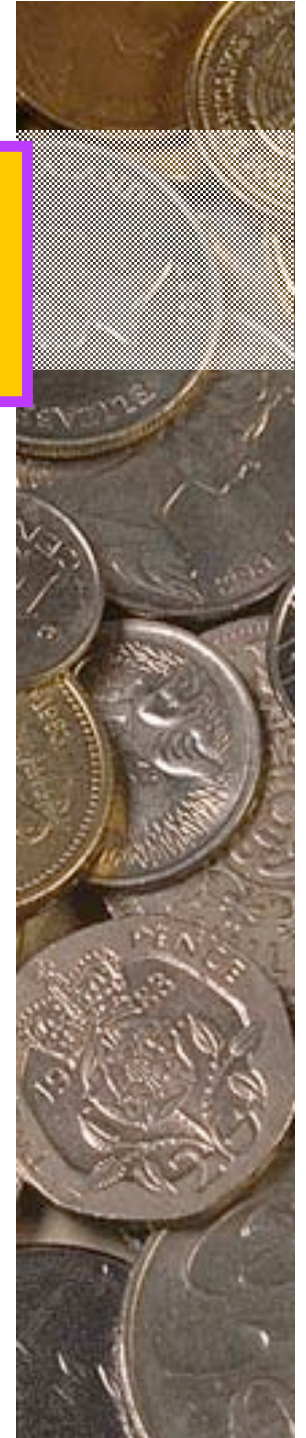


What is dividend yield and capital gains yield at $t = 0$ and at $t = 3$?

$$t = 0 \quad \frac{D_1}{P_0} = \frac{2.00}{\$25.72} = 7.8\%.$$

$$\text{CGY} = 13.0\% - 7.8\% = 5.2\%.$$

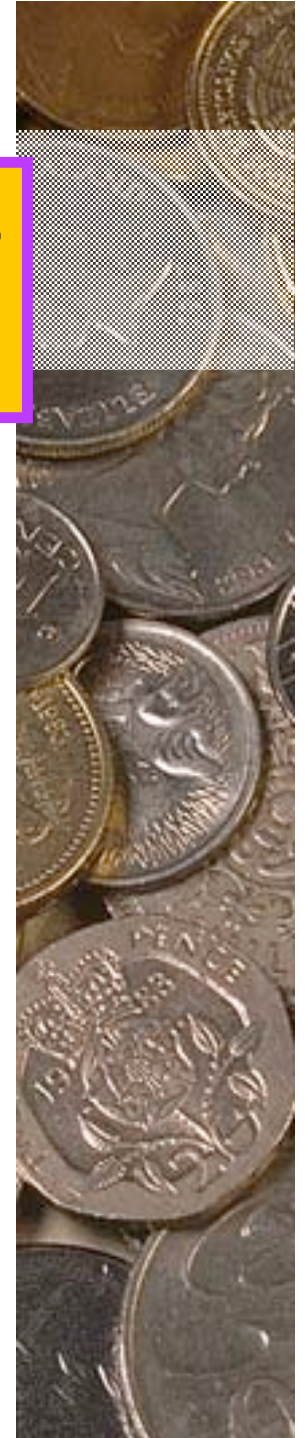
t = 3: Now have constant growth with $g =$ capital gains yield = 6% and dividend yield = 7%.



If $g = -6\%$, would anyone buy the stock? If so, at what price?

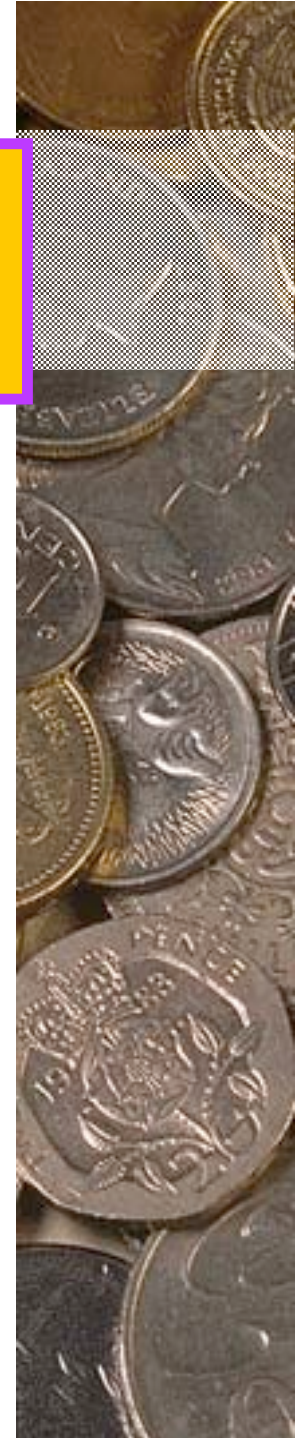
Firm still has earnings and still pays dividends, so $\hat{P}_0 > 0$:

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



What are the annual dividend and capital gains yield?

- Capital gains yield = $g = -6.0\%$.
- Dividend yield = $13.0\% - (-6.0\%) = 19.0\%$.
- Both yields are constant over time, with the high dividend yield (19%) offsetting the negative capital gains yield.



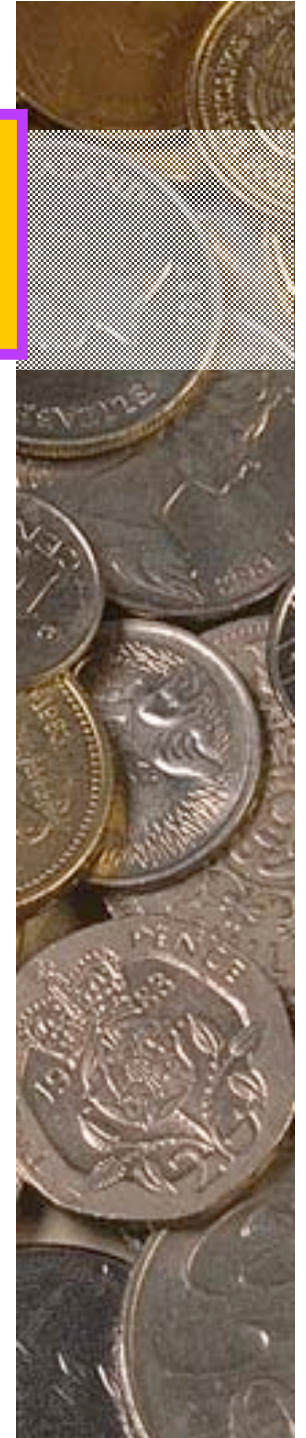
Using the Stock Price Multiples to Estimate Stock Price

- Analysts often use the **P/E multiple** (the price per share divided by the earnings per share) or the **P/CF multiple** (price per share divided by cash flow per share, which is the earnings per share plus the dividends per share) to value stocks.
- Example:
 - Estimate the average P/E ratio of comparable firms. This is the **P/E multiple**.
 - Multiply this average P/E ratio by the expected earnings of the company to estimate its stock price.



Using Entity Multiples

- The entity value (V) is:
 - the market value of equity (# shares of stock multiplied by the price per share)
 - plus the value of debt.
- Pick a measure, such as EBITDA, Sales, Customers, Eyeballs, etc.
- Calculate the average entity ratio for a sample of comparable firms. For example,
 - V/EBITDA
 - $V/\text{Customers}$



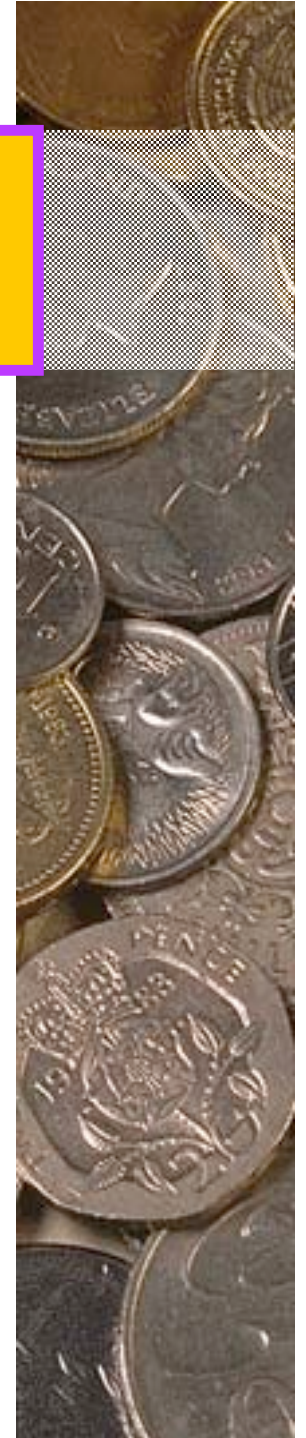
Using Entity Multiples (Continued)

- Find the entity value of the firm in question. For example,
 - Multiply the firm's sales by the V/Sales multiple.
 - Multiply the firm's # of customers by the $V/\text{Customers}$ ratio
- The result is the total value of the firm.
- Subtract the firm's debt to get the total value of equity.
- Divide by the number of shares to get the price per share.



Problems with Market Multiple Methods

- It is often hard to find comparable firms.
- The average ratio for the sample of comparable firms often has a wide range.
 - For example, the average P/E ratio might be 20, but the range could be from 10 to 50. How do you know whether your firm should be compared to the low, average, or high performers?



Why are stock prices volatile?

$$\hat{P}_0 = \frac{D_1}{r_s - g}$$

- $r_s = r_{RF} + (RP_M)b_i$ could change.
 - Inflation expectations
 - Risk aversion
 - Company risk
- g could change.



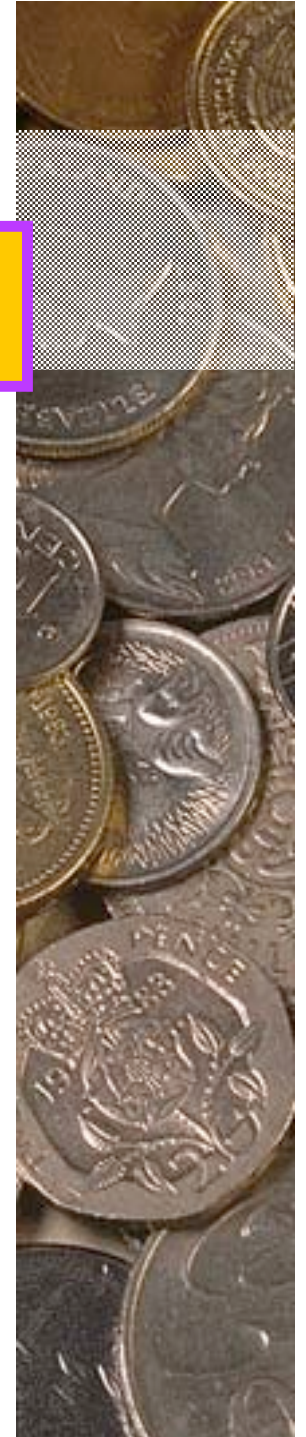
Stock value vs. changes in r_s and g

$D_1 = \$2$, $r_s = 10\%$, and $g = 5\%$:

$$P_0 = D_1 / (r_s - g) = \$2 / (0.10 - 0.05) = \$40.$$

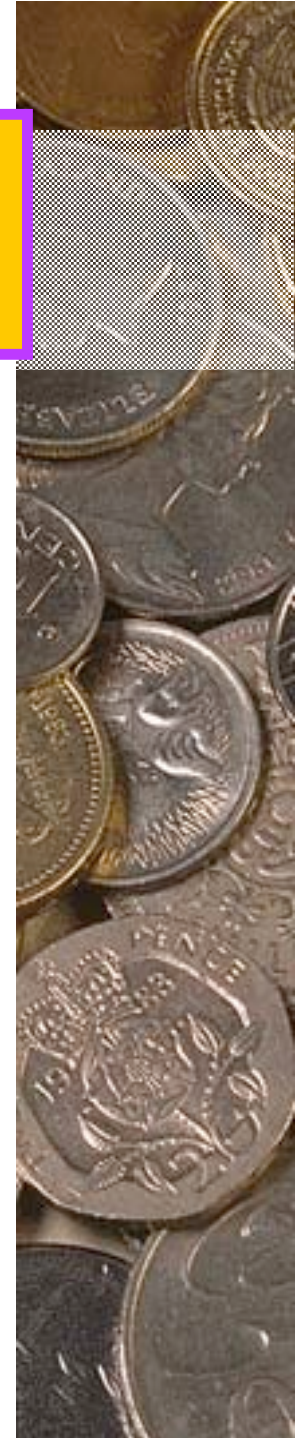
What if r_s or g change?

	g	g	g
r_s	<u>4%</u>	<u>5%</u>	<u>6%</u>
9%	40.00	50.00	66.67
10%	33.33	40.00	50.00
11%	28.57	33.33	40.00



Are volatile stock prices consistent with rational pricing?

- Small changes in expected g and r_s cause large changes in stock prices.
- As new information arrives, investors continually update their estimates of g and r_s .
- If stock prices aren't volatile, then this means there isn't a good flow of information.

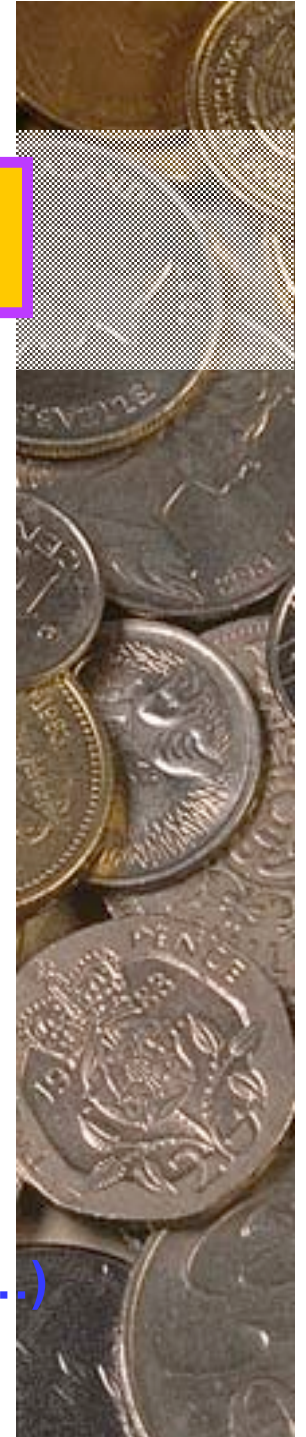


What is market equilibrium?

In equilibrium, stock prices are stable. There is no general tendency for people to buy versus to sell.

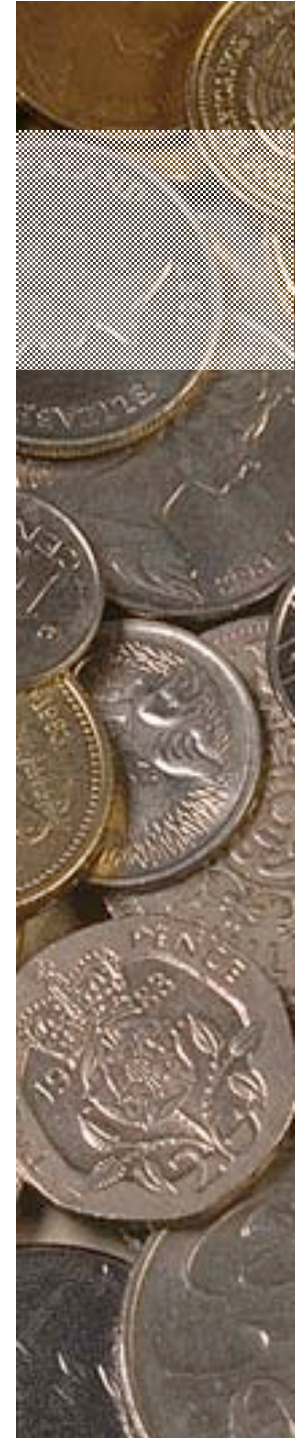
The expected price, \hat{P} , must equal the actual price, P . In other words, the fundamental value must be the same as the price.

(More...)



In equilibrium, **expected returns** must equal **required returns**:

$$\hat{r}_s = D_1/P_0 + g = r_s = r_{RF} + (r_M - r_{RF})b.$$



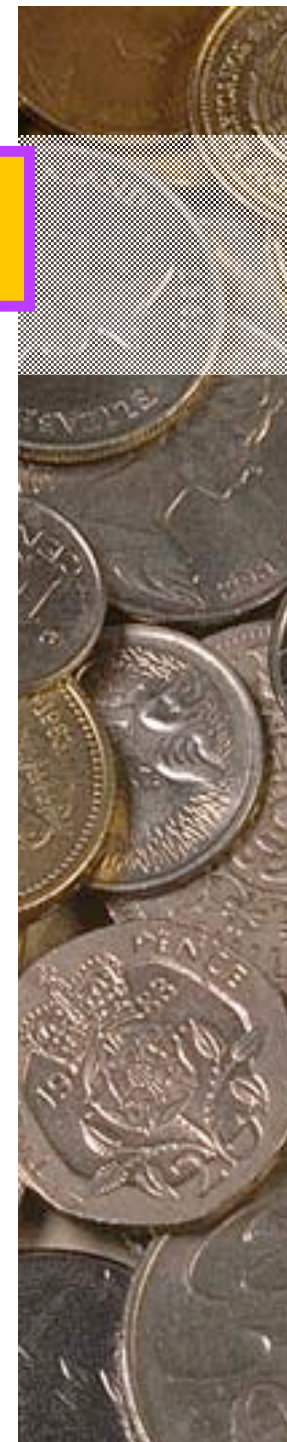
How is equilibrium established?

If $\hat{r}_s = \frac{\hat{D}_1}{P_0} + g > r_s$, then P_0 is “too low.”

If the price is lower than the fundamental value, then the stock is a “bargain.”

Buy orders will exceed sell orders, the price will be bid up, and D_1/P_0 falls until

$$D_1/P_0 + g = r_s = r_s.$$



Why do stock prices change?

$$\hat{P}_0 = \frac{D_1}{r_i - g}$$

- $r_i = r_{RF} + (r_M - r_{RF})b_i$ could change.
 - Inflation expectations
 - Risk aversion
 - Company risk
- g could change.



What's the Efficient Market Hypothesis (EMH)?

Securities are normally in equilibrium and are “fairly priced.” One cannot “beat the market” except through good luck or inside information.

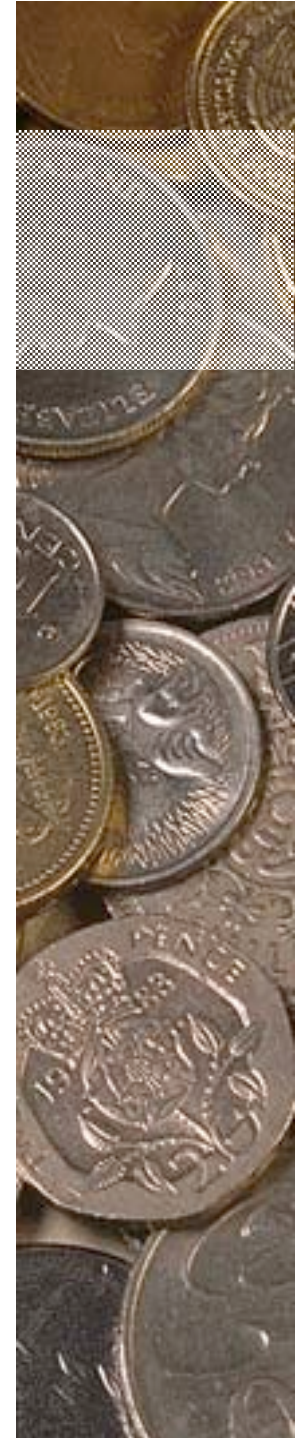
(More...)



1. **Weak-form EMH:**

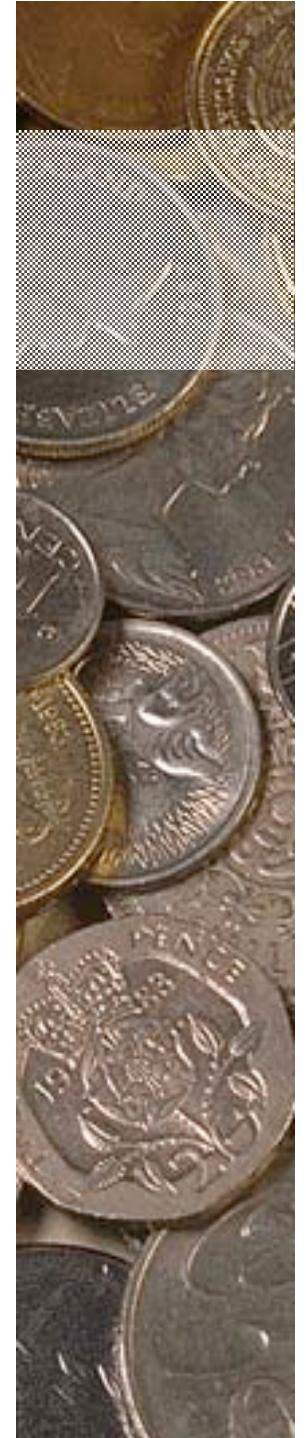
Can't profit by looking at past trends. A recent decline is no reason to think stocks will go up (or down) in the future.

Evidence supports weak-form EMH, but “technical analysis” is still used.



2. Semistrong-form EMH:

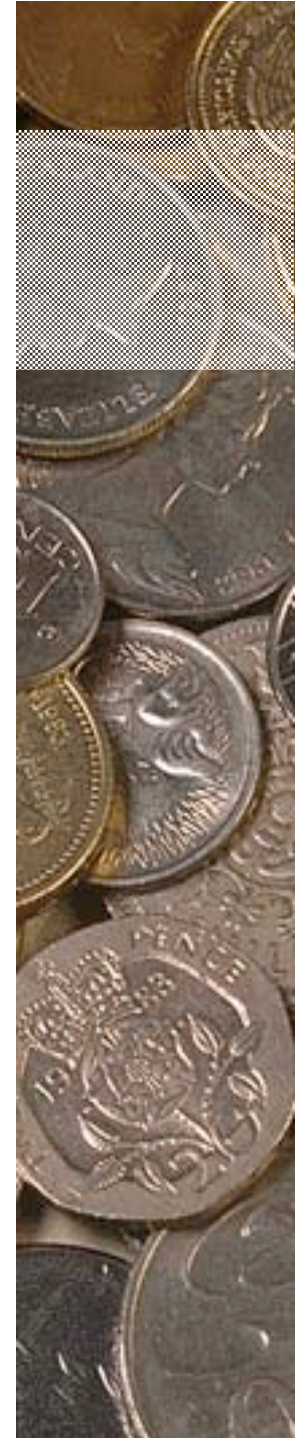
All publicly available information is reflected in stock prices, so it doesn't pay to pore over annual reports looking for undervalued stocks. Largely true.



3. Strong-form EMH:

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.



Markets are generally efficient because:

- 1. 100,000 or so trained analysts-- MBAs, CFAs, and PhDs--work for firms like Fidelity, Merrill, Morgan, and Prudential.**
- 2. These analysts have similar access to data and megabucks to invest.**
- 3. Thus, news is reflected in P_0 almost instantaneously.**

