

CHAPTER 7

Stocks, Stock Valuation, and Stock Market Equilibrium

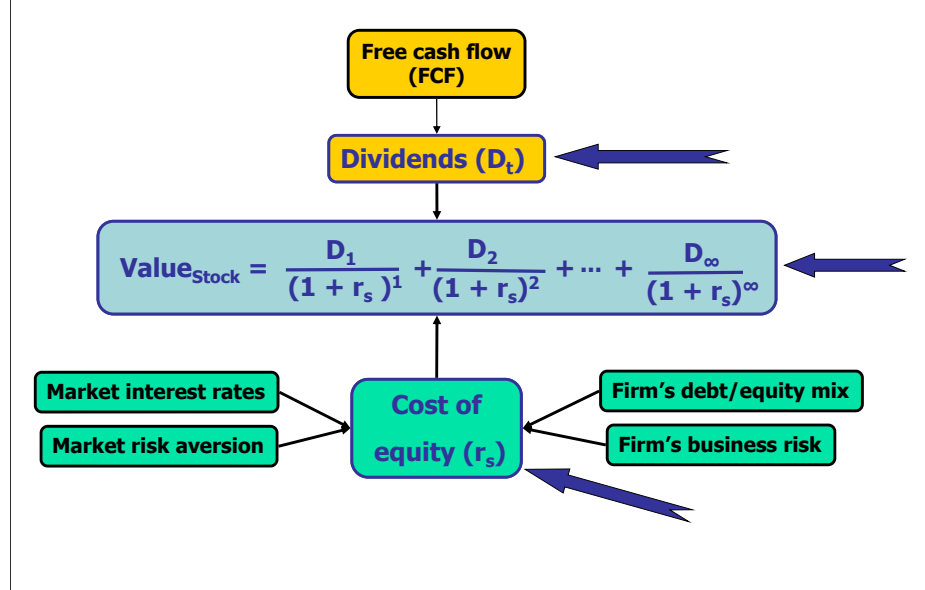
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Topics in Chapter

- Features of common stock
- Valuing common stock
- Preferred stock
- Stock market equilibrium
- Efficient markets hypothesis
- Implications of market efficiency for financial decisions

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The Big Picture: The Intrinsic Value of Common 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.

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Different Approaches for Valuing Common Stock

- Dividend growth model
 - Constant growth stocks
 - Nonconstant growth stocks
- Free cash flow method (covered in Chapter 11)
- Using the multiples of comparable firms

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Stock Value = PV of Dividends

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

What is a constant growth stock?

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

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For a constant growth stock:

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

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

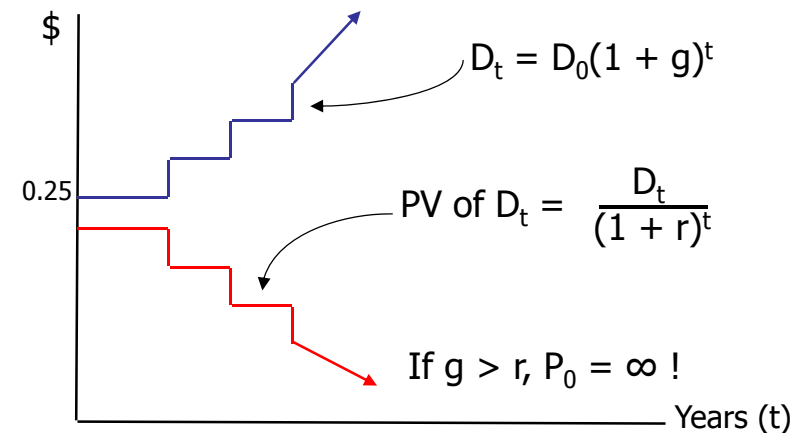
$$D_t = D_0(1 + g)^t$$

If g is constant and less than r_s , then:

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

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Dividend Growth and PV of Dividends: $P_0 = \sum(\text{PV of } D_t)$



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What happens if $g > r_s$?

$$\hat{P}_0 = \frac{D_0(1+g)^1}{(1+r_s)^1} + \frac{D_0(1+g)^2}{(1+r_s)^2} + \dots + \frac{D_0(1+r_s)^\infty}{(1+r_s)^\infty}$$

If $g > r_s$, then $\frac{(1+g)^t}{(1+r_s)^t} > 1$, and $\hat{P}_0 = \infty$

So g must be less than r_s for the constant growth model to be applicable!!

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Required rate of return: $\beta = 1.2$,
 $r_{RF} = 7\%$, and $RP_M = 5\%$.

Use the SML to calculate r_s :

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

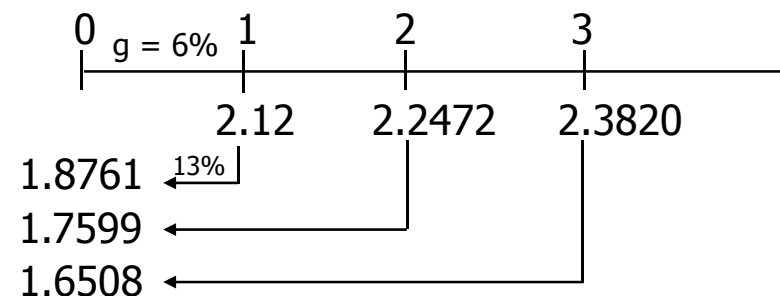
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Projected Dividends

- $D_0 = \$2$ and constant $g = 6\%$
- $D_1 = D_0(1+g) = \$2(1.06) = \2.12
- $D_2 = D_1(1+g) = \$2.12(1.06) = \2.2472
- $D_3 = D_2(1+g) = \$2.2472(1.06) = \2.3820

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Expected Dividends and PVs ($r_s = 13\%$, $D_0 = \$2$, $g = 6\%$)



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Intrinsic Stock Value:

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

Constant growth model:

$$\begin{aligned}\hat{P}_0 &= \frac{D_0(1+g)}{r_s - g} = \frac{D_1}{r_s - g} \\ &= \frac{\$2.12}{0.13 - 0.06} = \frac{\$2.12}{0.07} = \$30.29.\end{aligned}$$

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Expected value one year from now:

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

$$\hat{P}_1 = \frac{D_2}{r_s - g} = \frac{\$2.2472}{0.07} = \$32.10$$

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Expected Dividend Yield and Capital Gains Yield (Year 1)

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

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

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Total Year 1 Return

- 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 .

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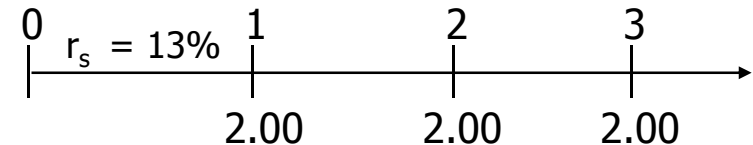
Rearrange model to rate of return form:

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

$$\begin{aligned} \text{Then, } \hat{r}_s &= \$2.12/\$30.29 + 0.06 \\ &= 0.07 + 0.06 = 13\%. \end{aligned}$$

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If $g = 0$, the dividend stream is a perpetuity.



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

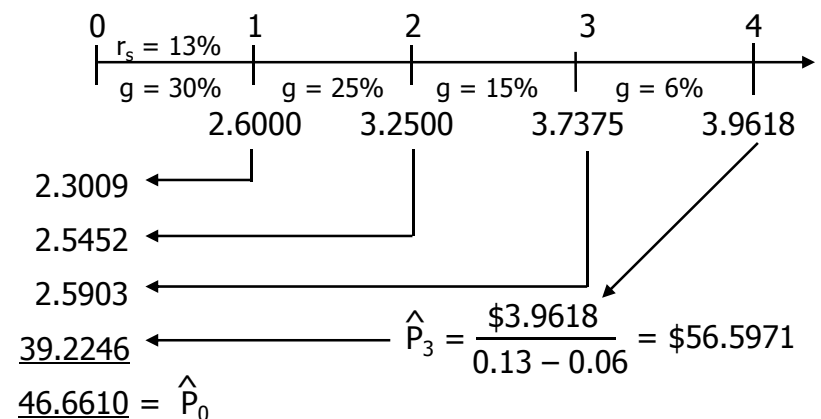
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Supernormal Growth Stock

- Supernormal growth of 30% for Year 0 to Year 1, 25% for Year 1 to Year 2, 15% for Year 2 to Year 3, and then long-run constant $g = 6\%$.
- Can no longer use constant growth model.
- However, growth becomes constant after 3 years.

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Nonconstant growth followed by constant growth ($D_0 = \$2$):



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Expected Dividend Yield and Capital Gains Yield (t = 0)

At t = 0:

$$\text{Dividend yield} = \frac{D_1}{P_0} = \frac{\$2.60}{\$46.66} = 5.6\%$$

$$\text{CG Yield} = 13.0\% - 5.6\% = 7.4\%.$$

(More...)

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Expected Dividend Yield and Capital Gains Yield (after t = 3)

- 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 = constant = 6%, so the capital gains yield = 6%.
- Because $r_s = 13\%$, after t = 3 dividend yield = $13\% - 6\% = 7\%$.

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Is the stock price based on short-term growth?

The current stock price is \$46.66.

The PV of dividends beyond Year 3 is:

$$\hat{P}_3 / (1+r_s)^3 = \$39.22 \text{ (see slide 22)}$$

The percentage of stock price due to "long-term" dividends is:

$$\frac{\$39.22}{\$46.66} = 84.1\%.$$

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Intrinsic Stock Value vs. Quarterly Earnings

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

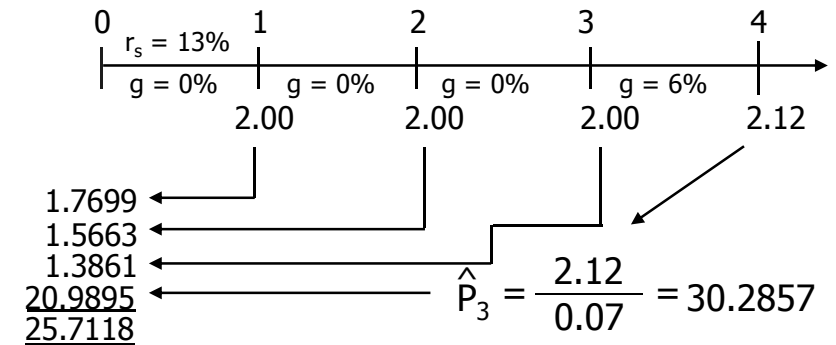
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Intrinsic Stock Value vs. Quarterly Earnings

- 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.

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Suppose $g = 0$ for $t = 1$ to 3, and then g is a constant 6%.



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Dividend Yield and Capital Gains Yield ($t = 0$)

- Dividend Yield = D_1/P_0
- Dividend Yield = $\$2.00/\25.72
- Dividend Yield = 7.8%
- CGY = $13.0\% - 7.8\% = 5.2\%$.

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Dividend Yield and Capital Gains Yield (after $t = 3$)

- Now have constant growth, so:
- Capital gains yield = $g = 6\%$
- Dividend yield = $r_s - g$
- Dividend yield = $13\% - 6\% = 7\%$

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

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

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

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Annual Dividend and Capital Gains Yields

Capital gains yield = $g = -6.0\%$.

$$\begin{aligned}\text{Dividend yield} &= 13.0\% - (-6.0\%) \\ &= 19.0\%.\end{aligned}$$

Both yields are constant over time, with the high dividend yield (19%) offsetting the negative capital gains yield.

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Preferred Stock

- Hybrid security.
- Similar to bonds in that preferred stockholders receive a fixed dividend which must be paid before dividends can be paid on common stock.
- However, unlike bonds, preferred stock dividends can be omitted without fear of pushing the firm into bankruptcy.

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Expected return, given $V_{ps} = \$50$ and annual dividend = \$5

$$V_{ps} = \$50 = \frac{\$5}{\hat{r}_{ps}}$$

$$\hat{r}_{ps} = \frac{\$5}{\$50} = 0.10 = 10.0\%$$

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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.

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Consider the following situation.

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

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

What happens if r_s or g changes?

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Stock Prices vs. Changes in r_s and g

r_s	g		
	4%	5%	6%
9%	\$40.00	\$50.00	\$66.67
10%	\$33.33	\$40.00	\$50.00
11%	\$28.57	\$33.33	\$40.00

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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.

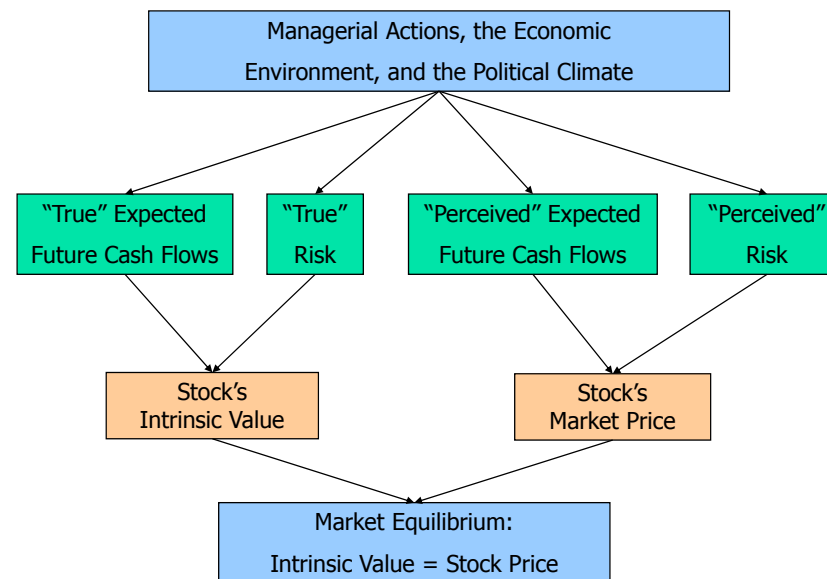
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What is market equilibrium?

- In equilibrium, the intrinsic price must equal the actual price.
- If the actual price is lower than the fundamental value, then the stock is a "bargain." Buy orders will exceed sell orders, the actual price will be bid up. The opposite occurs if the actual price is higher than the fundamental value.

(More...) 37

Intrinsic Values and Market Stock Prices



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 until:

$$D_1/P_0 + g = \hat{r}_s = r_s.$$



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.
- EMH does not assume all investors are rational.
- EMH assumes that stock market prices track intrinsic values fairly closely.

(More...)

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EMH (continued)

- If stock prices deviate from intrinsic values, investors will quickly take advantage of mispricing.
- Prices will be driven to new equilibrium level based on new information.
- It is possible to have irrational investors in a rational market.

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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.

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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.

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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.

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Market Efficiency

- For most stocks, for most of the time, it is generally safe to assume that the market is reasonably efficient.
- However, periodically major shifts can and do occur, causing most stocks to move strongly up or down.

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Conclusions

- Markets are rational to a large extent, but at time they are also subject to irrational behavior.
- One must do careful, rational analyses using the tools and techniques covered in the book.
- Recognize that actual prices can differ from intrinsic values, sometimes by large amounts and for long periods.
- Good news! Differences between actual prices and intrinsic values provide wonderful opportunities for those able to capitalize on them.

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