

Introduction to Financing

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Lecture 2





مجموعة جامعة
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Equity Market and Stock Valuation

Lecture 2

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Topic
02

OUTLINE

- 1 Common Stock Valuation
- 2 Some Features of Common and Preferred Stocks
- 3 The Stock Markets

Topic
02

Key Concepts and Skills

- Understand how stock prices depend on future dividends and dividend growth
- Be able to compute stock prices using the dividend growth model

One Period Example

- Suppose you are thinking of purchasing the stock of Moore Oil, Inc.
 - You expect it to pay a \$2 dividend in one year
 - You believe you can sell the stock for \$14 at that time.
 - You require a return of 20% on investments of this risk
 - What is the maximum you would be willing to pay?

One Period Example

- $D_1 = \$2$ dividend expected in one year
- $R = 20\%$
- $P_1 = \$14$
- $CF_1 = \$2 + \$14 = \$16$
- Compute the PV of the expected cash flows

$$P_0 = \frac{(2 + 14)}{1.20} = \$13.33$$

Two Period Example

- What if you decide to hold the stock for two years?
 - $D_1 = \$2.00$ $CF_1 = \$2.00$
 - $D_2 = \$2.10$
 - $P_2 = \$14.70$ $\left. \begin{array}{l} D_2 \\ P_2 \end{array} \right\} CF_2 = \$2.10 + \$14.70 = \16.80
 - Now how much would you be willing to pay?

$$P_0 = \frac{2}{1.20} + \frac{(2.10 + 14.70)}{(1.20)^2} = \$13.33$$

Three Period Example

- What if you decide to hold the stock for three years?
 - $D_1 = \$2.00$ $CF_1 = \$2.00$
 - $D_2 = \$2.10$ $CF_2 = \$2.10$
 - $D_3 = \$2.205$ }
• $P_3 = \$15.435$ } $CF_3 = \$2.205 + \$15.435 = \$17.640$
 - Now how much would you be willing to pay?

$$P_0 = \frac{2}{1.20} + \frac{2.10}{(1.20)^2} + \frac{(2.205 + 15.435)}{(1.20)^3} = \$13.33$$

Developing The Model

- You could continue to push back when you would sell the stock
- You would find that the price of the stock is really just the *present value of all expected future dividends*

Stock Value = PV of Dividends

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

$$\hat{P}_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+R)^t}$$

How can we estimate all future dividend payments?

Estimating Dividends Special Cases

- Constant dividend/Zero Growth
 - Firm will pay a constant dividend forever
 - Like preferred stock
 - Price is computed using the perpetuity formula
- Constant dividend growth
 - Firm will increase the dividend by a constant *percent* every period
- Supernormal growth
 - Dividend growth is not consistent initially, but settles down to constant growth eventually

Zero Growth

- Dividends expected at regular intervals forever = perpetuity

$$P_0 = D / R$$

- Suppose stock is expected to pay a \$0.50 dividend every quarter and the required return is 10% with quarterly compounding. What is the price?

$$P_0 = \frac{0.50}{.10/4} = \$20$$

Constant Growth Stock

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

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

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

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

D_0 = Dividend JUST PAID

$D_1 - D_t$ = Expected dividends

Projected Dividends

- $D_0 = \$2.00$ 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

Dividend Growth Model

$$\hat{P}_0 = D_0 \sum_{t=1}^{\infty} \frac{(1+g)^t}{(1+R)^t}$$

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

“Gordon Growth Model”

DGM – Example 1

- Suppose Big D, Inc. just paid a dividend of \$.50. It is expected to increase its dividend by 2% per year. If the market requires a return of 15% on assets of this risk, how much should the stock be selling for?
- $D_0 = \$0.50$
- $g = 2\%$
- $R = 15\%$

$$P_0 = \frac{D_0(1+g)}{R-g}$$
$$P_0 = \frac{0.50(1+.02)}{.15-.02} = \$3.92$$

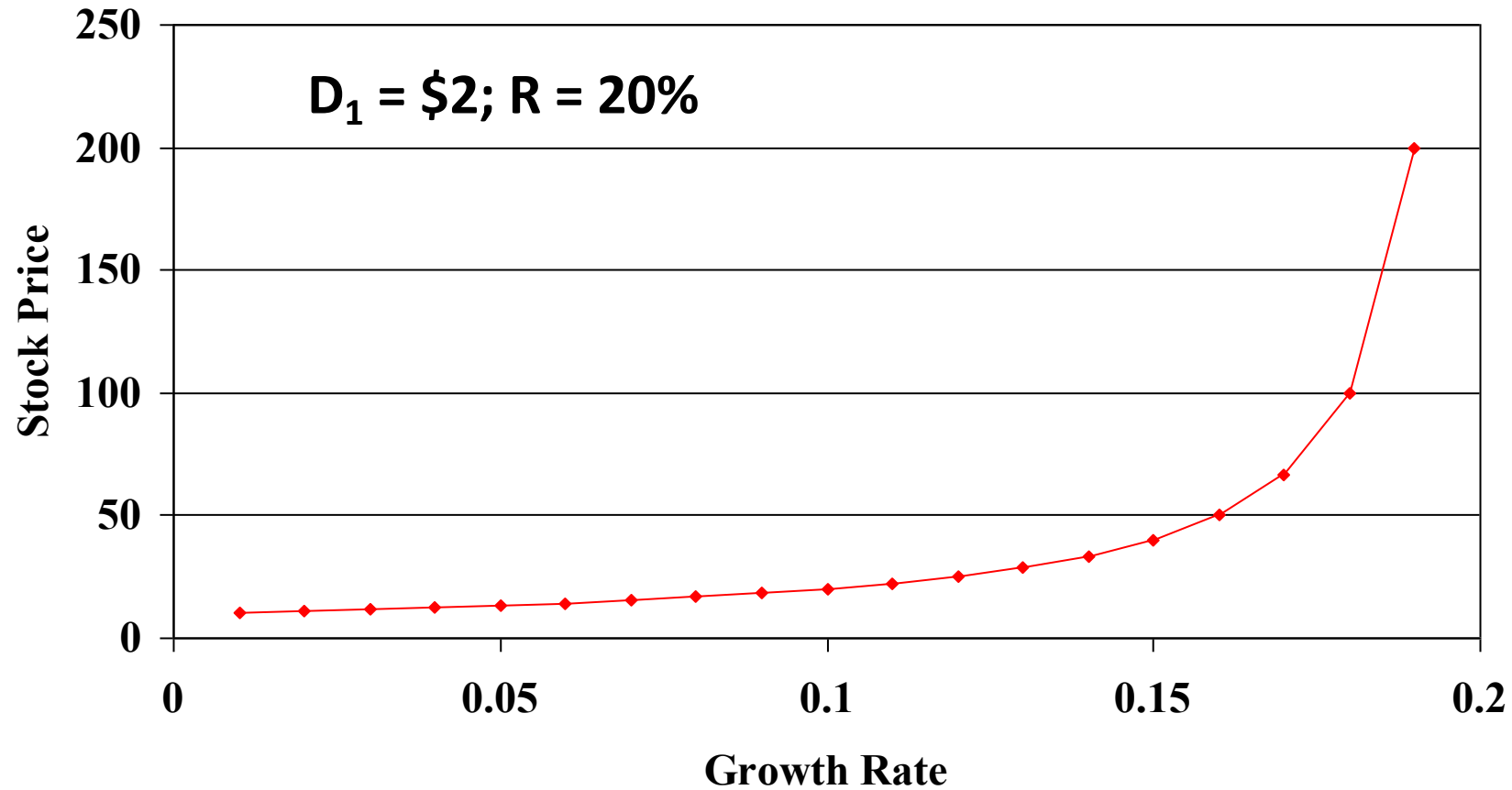
DGM – Example 2

- Suppose TB Pirates, Inc. is expected to pay a \$2 dividend in one year. If the dividend is expected to grow at 5% per year and the required return is 20%, what is the price?

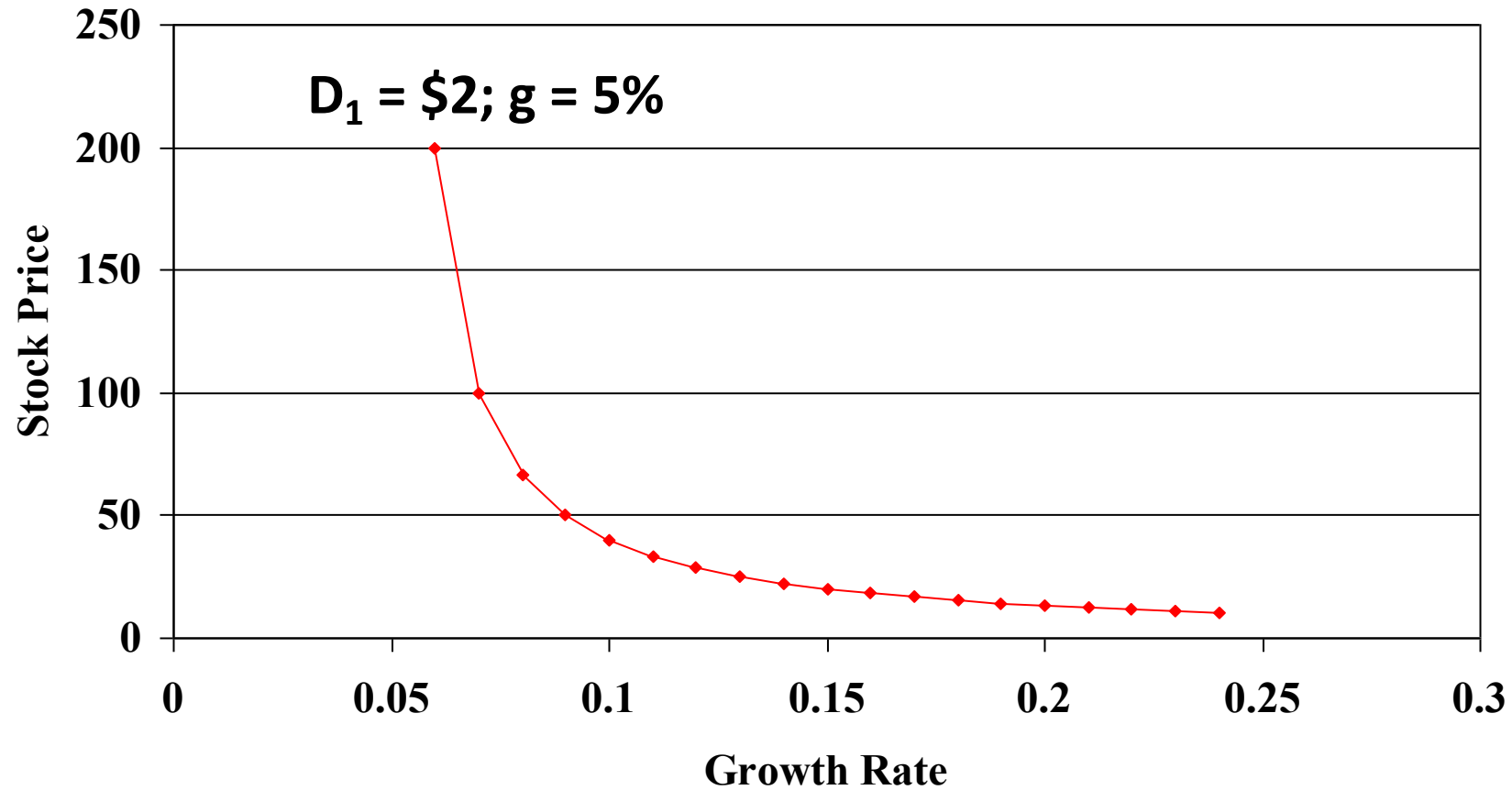
- $D_1 = \$2.00$
- $g = 5\%$
- $r = 20\%$

$$P_0 = \frac{D_1}{R - g}$$
$$P_0 = \frac{2.00}{.20 - .05} = \$13.33$$

Stock Price Sensitivity to Dividend Growth, g



Stock Price Sensitivity to Required Return, R



Example 3

Gordon Growth Company - I

- Gordon Growth Company is expected to pay a dividend of \$4 next period and dividends are expected to grow at 6% per year. The required return is 16%.
- What is the current price?

$$P_0 = \frac{D_1}{R - g}$$
$$P_0 = \frac{4.00}{.16 - .06} = \$40$$

Example 3

Gordon Growth Company - II

- What is the price expected to be in year 4?

$$P_4 = \frac{D_4(1+g)}{R-g} + \frac{D_5}{R-g}$$
$$D_5 = D_1(1+g)^4$$
$$P_4 = \frac{4.00(1+.06)^4}{.16-.06} = \$50.50$$

Example 3

Gordon Growth Company - II

- What is the implied return given the change in price during the four year period?

$$50.50 = 40(1 + \text{return})^4; \text{return} = 6\%$$

$$4, ; 40 \text{ S.}; 50.50 \text{ 0}; 0 /; \% = 6\%$$

❖ The price grows at the same rate as dividends

Constant Growth Model Conditions

1. Dividend expected to grow at g forever
2. Stock price expected to grow at g forever
3. Expected dividend yield is constant
4. Expected capital gains yield is constant and equal to g
5. Expected total return, R , must be $> g$
6. Expected total return (R):
 - = expected dividend yield (DY)
 - + expected growth rate (g)
 - = dividend yield + g

Nonconstant Growth

- Suppose a firm is expected to increase dividends by 20% in one year and by 15% in two years. After that dividends will increase at a rate of 5% per year indefinitely. If the last dividend was \$1 and the required return is 20%, what is the price of the stock?
- Remember that we have to find the PV of all expected future dividends.

Nonconstant Growth – Solution

- Compute the dividends until growth levels off
 - $D_1 = 1(1.2) = \$1.20$
 - $D_2 = 1.20(1.15) = \$1.38$
 - $D_3 = 1.38(1.05) = \$1.449$
- Find the expected future price at the beginning of the constant growth period:
 - $P_2 = D_3 / (R - g) = 1.449 / (.2 - .05) = 9.66$
- Find the present value of the expected future cash flows
 - $P_0 = 1.20 / (1.2) + (1.38 + 9.66) / (1.2)^2 = 8.67$

Nonconstant + Constant growth

Basic PV of all Future Dividends Formula

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

Dividend Growth Model

$$\hat{P}_t = \frac{D_{t+1}}{R - g}$$

Nonconstant + Constant growth

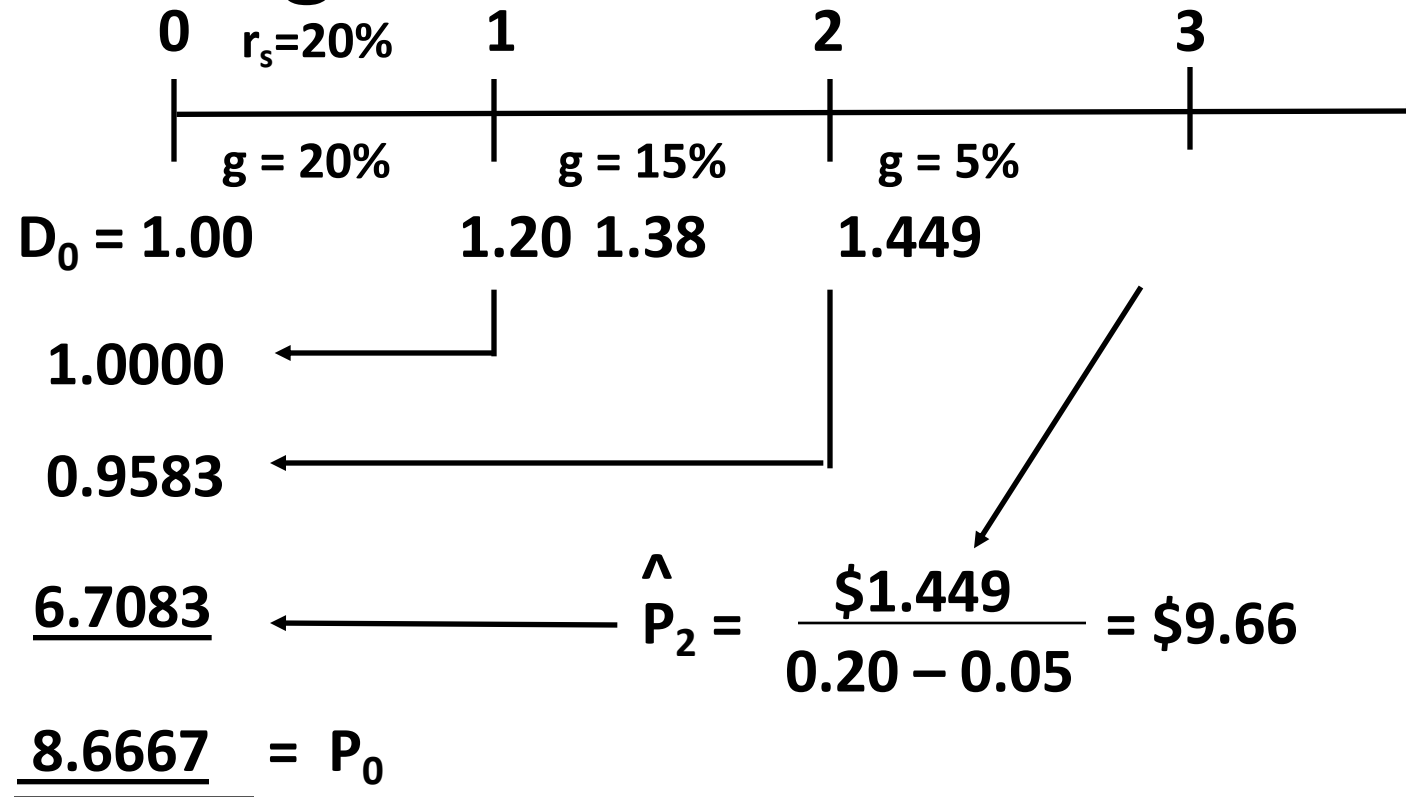
$$\hat{P}_0 = \frac{D_1}{1-R} + \frac{D_2}{(1-R)^2} + \frac{P_2}{(1-R)^2}$$

Because $P_2 = \sum_{t=3}^{\infty} \frac{D_t}{(1-R)^t}$

If g constant after $t = 2$, then

$$P_2 = \frac{D_3}{R-g}$$

Nonconstant growth followed by constant growth:



Quick Quiz: Part 1

- What is the value of a stock that is expected to pay a constant dividend of \$2 per year if the required return is 15%?

$$P_0 = \frac{2.00}{.15} = \$13.33$$

- What if the company starts increasing dividends by 3% per year beginning with the next dividend? The required return remains at 15%.

$$P_0 = \frac{2.00(1.03)}{.15 - .03} = \$17.17$$

Using the DGM to Find R

Start with the DGM:

$$P_0 = \frac{D_0(1 - g)}{R - g} + \frac{D_1}{R - g}$$

Rearrange and solve for R:

$$R = \frac{D_0(1 - g)}{P_0} + g + \frac{D_1}{P_0} + g$$

Finding the Required Return Example

- A firm's stock is selling for \$10.50. They just paid a \$1 dividend and dividends are expected to grow at 5% per year.
- What is the required return?

Finding the Required Return Example

- $P_0 = \$10.50$.
- $D_0 = \$1$
- $g = 5\%$ per year.
- What is the required return?

$$R = \frac{D_0(1+g)}{P_0} + g = \frac{D_1}{P_0} + g$$

$$R = \frac{1.00(1.05)}{10.50} + .05 = 15\%$$

Finding the Required Return Example

- $P_0 = \$10.50$
- $D_0 = \$1$
- $g = 5\%$ per year
- What is the dividend yield?
 $1(1.05) / 10.50 = 10\%$
- What is the capital gains yield?
 $g = 5\%$

R	$\frac{D_0(1+g)}{P_0}$	+	g	
R	$\frac{D_1}{P_0}$	+	g	
R	$\frac{1.00(1.05)}{10.50}$	+	.05	= 15%
	Dividend		Capital Gains	
	Yield		Yield	

Table 1

I. The general case

In general, the price today of a share of stock, P_0 , is the present value of all of its future dividends, $D_1, D_2, D_3, \dots$:

$$P_0 = \frac{D_1}{(1 + R)^1} + \frac{D_2}{(1 + R)^2} + \frac{D_3}{(1 + R)^3} + \dots$$

where R is the required return.

II. Constant growth case

If the dividend is constant and equal to D , then the price can be written as:

$$P_0 = \frac{D}{R}$$

If the dividend grows at a steady rate, g , then the price can be written as:

$$P_0 = \frac{D_1}{R - g}$$

This result is called the *dividend growth model*.

III. The required return, R , can be written as the sum of two things:

$$R = D_1/P_0 + g$$

where D_1/P_0 is the *dividend yield* and g is the *capital gains yield* (which is the same thing as the growth rate in dividends for the steady growth case).

Features of Common Stock

- Voting Rights
 - Stockholders elect directors

Features of Common Stock

- Other Rights
 - Share proportionally in declared dividends
 - Share proportionally in remaining assets during liquidation
 - Preemptive right
 - Right of first refusal to buy new stock issue to maintain proportional ownership if desired

Dividend Characteristics

- Dividends are not a liability of the firm until declared by the Board of Directors
 - A firm cannot go bankrupt for not declaring dividends
- Dividends and Taxes
 - Dividends are not tax deductible for firm
 - Taxed as ordinary income for individuals
 - Dividends received by corporations have a minimum 70% exclusion from taxable income

Features of Preferred Stock

- Dividends
 - Must be paid before dividends can be paid to common stockholders
 - Not a liability of the firm
 - Can be deferred indefinitely
 - Most preferred dividends are cumulative
 - Missed preferred dividends have to be paid before common dividends can be paid
- Preferred stock generally does not carry voting rights

The Stock Markets

- Primary vs. Secondary Markets
 - Primary = new-issue market
 - Secondary = existing shares traded among investors
- Dealers vs. Brokers
 - Dealer: Maintains an inventory
 - Ready to buy or sell at any time
 - Think “Used car dealer”
 - Broker: Brings buyers and sellers together
 - Think “Real estate broker”

Work the Web

- Not only are stock price quotes readily available online. Some online trading sites display their “order book” or “limit order book” live online.
- Batstrading is one of these.
- Follow the link and see current buy and sell orders for Microsoft (MSFT).

Quick Quiz: Part 2

- You observe a stock price of \$18.75. You expect a dividend growth rate of 5% and the most recent dividend was \$1.50. What is the required return?

$$R = \frac{D_0(1+g)}{P_0} + g = \frac{D_1}{P_0} + g$$

$$R = \frac{1.50(1.05)}{18.75} + .05 = 13.4\%$$

Quick Quiz: Part 2

- What are some of the major characteristics of common stock?
- What are some of the major characteristics of preferred stock?



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