Lecture 4:
Stock Valuation

MBA 614

Cash Flows for Shareholders

- If you buy a share of stock, you can receive cash in two ways
  - The company pays dividends
  - You sell your shares, either to another investor in the market or back to the company
- As with bonds, the price of the stock is the present value of these expected cash flows

One Period Example

- Suppose you are thinking of purchasing the stock of Moore Oil, Inc. and you expect it to pay a $2 dividend in one year and you believe that you can sell the stock for $14 at that time. If you require a return of 20% on investments of this risk, what is the maximum you would be willing to pay?
  - Compute the PV of the expected cash flows
  - Price = (14 + 2) / (1.2) = $13.33
  - Or FV = 16; I/Y = 20; N = 1; CPT PV = -13.33

Two Period Example

- Now what if you decide to hold the stock for two years? In addition to the $2 dividend in one year, you expect a dividend of $2.10 in two years and a stock price of $14.70 at the end of year 2. Now how much would you be willing to pay now?
  - PV = $2 / (1.2) + (2.10 + 14.70) / (1.2)^2 = 13.33$
  - Or $CF_0 = 0$; C01 = 2; F01 = 1; C02 = 16.80; F02 = 1; NPV; I = 20; CPT NPV = 13.33

Three Period Example

- Finally, what if you decide to hold the stock for three periods? In addition to the dividends at the end of years 1 and 2, you expect to receive a dividend of $2.205 at the end of year 3 and a stock price of $15.435. Now how much would you be willing to pay?
  - PV = 2 / 1.2 + 2.10 / $(1.2)^2$ + (2.205 + 15.435) / $(1.2)^3$ = 13.33
  - Or CF_0 = 0; C01 = 2; F01 = 1; C02 = 2.10; F02 = 1; C03 = 17.64; F03 = 1; NPV; I = 20; CPT NPV = 13.33

Developing The Model

- You could continue to push back the date 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*
- So, how can we estimate all future dividend payments?

Estimating Dividends: Special Cases

- Constant dividend
  - The firm will pay a constant dividend forever
  - This is like preferred stock
  - The price is computed using the perpetuity formula
- Constant dividend growth
  - The 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

- If dividends are expected at regular intervals forever, then this is like preferred stock and is valued as a 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?
  - $P_0 = .50 / (.1 / 4) = \$20$

Dividend Growth Model

- Dividends are expected to grow at a constant percent per period.
  - $P_0 = D_1 /(1+R) + D_2 /(1+R)^2 + D_3 /(1+R)^3 + \ldots$
  - $P_0 = D_0(1+g)/(1+R) + D_0(1+g)^2/(1+R)^2 + D_0(1+g)^3/(1+R)^3 + \ldots$
- With a little algebra, this reduces to:

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

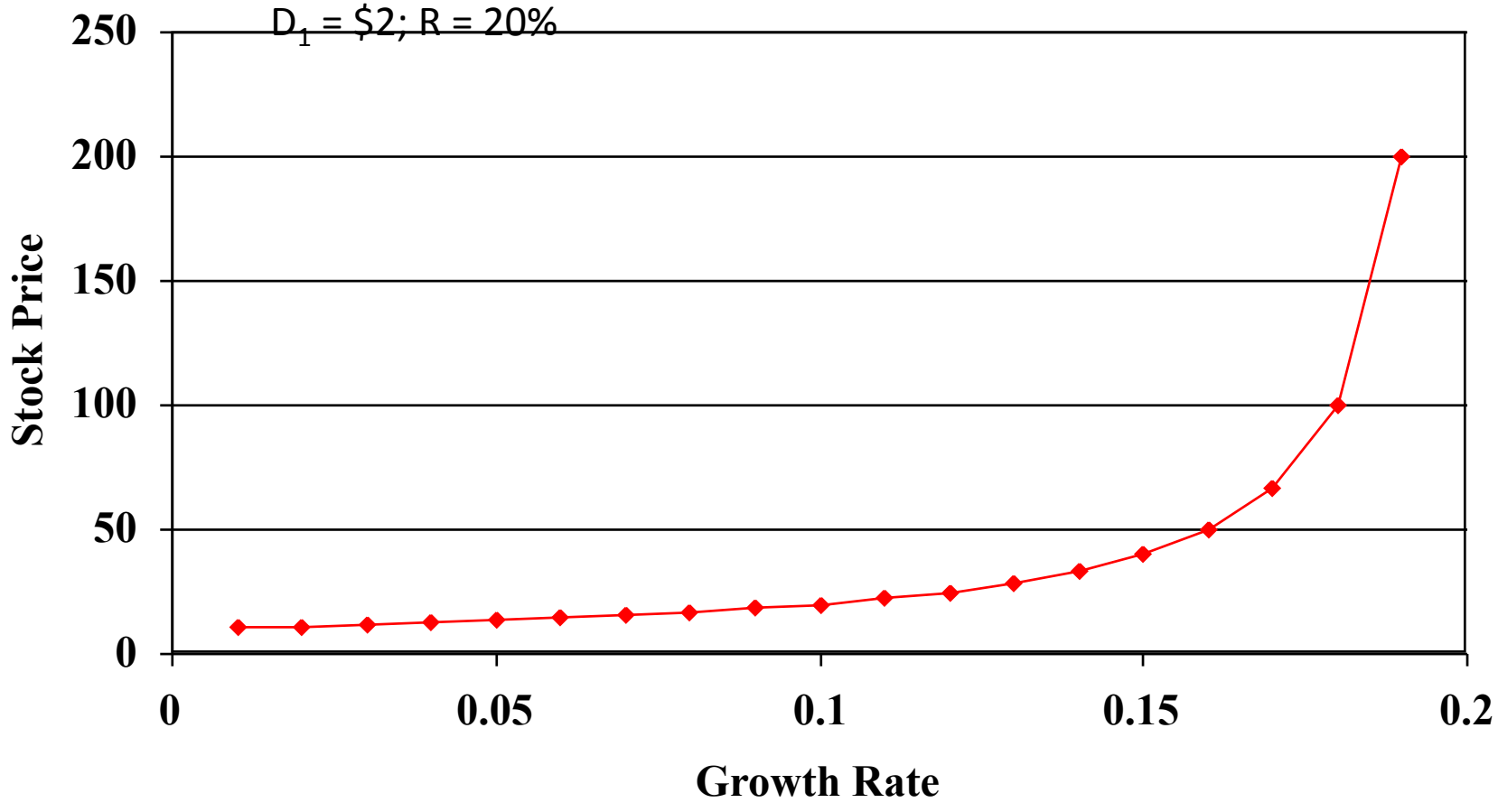
DGM – Example 1

- Suppose Big D, Inc. just paid a dividend of $0.50. 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?
- $P_0 = .50(1+.02) / (.15 - .02) = \$3.92$

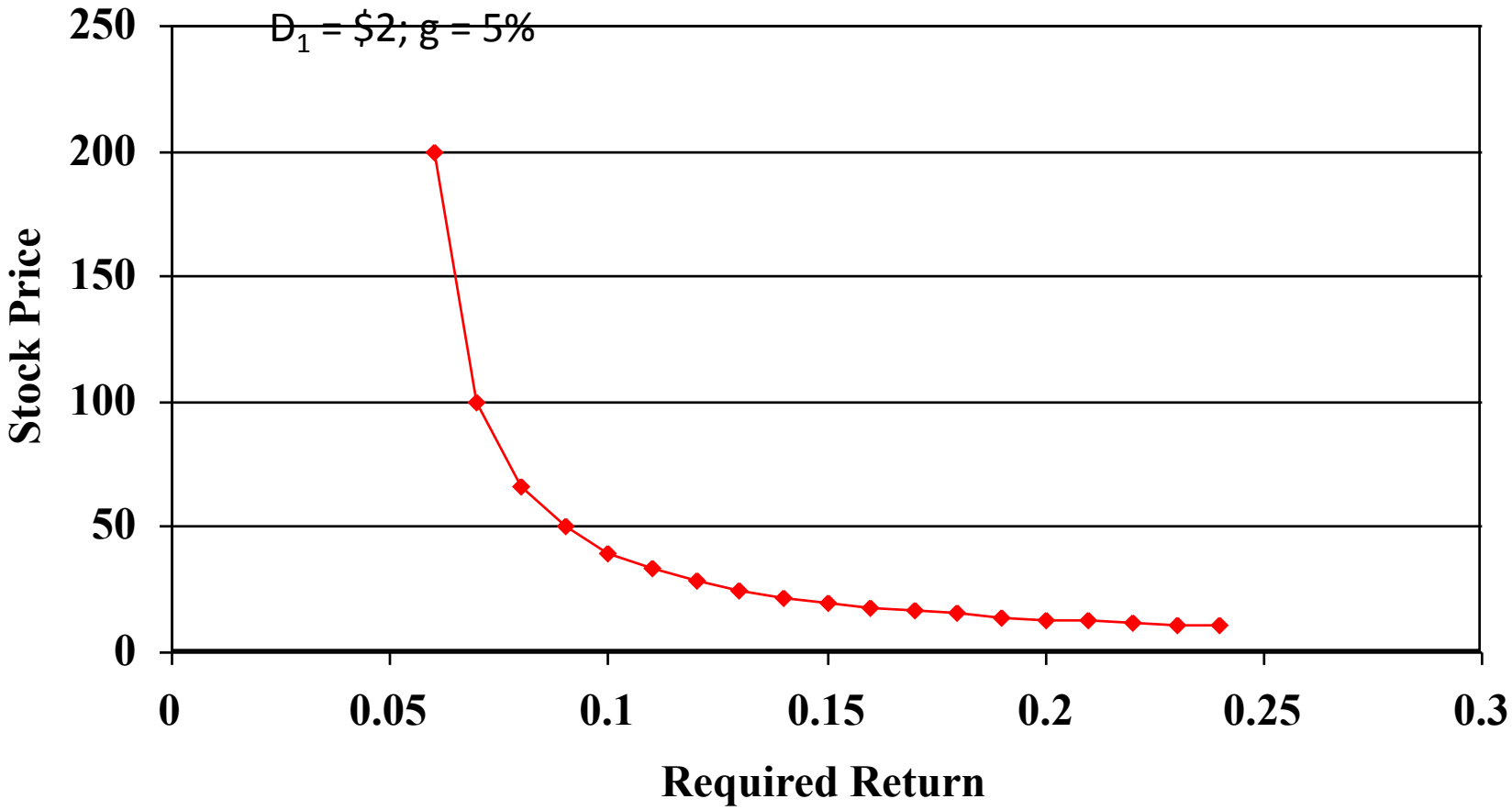
DGM – Example 2

- 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?
  - $P_0 = 2 / (.2 - .05) = \$13.33$
  - Why isn't the $2 in the numerator multiplied by (1.05) in this example?

Stock Price Sensitivity to Dividend Growth, g



Stock Price Sensitivity to Required Return, R



Gordon Growth Company – Example 1

- 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?
  - $P_0 = 4 / (.16 - .06) = \$40$
  - Remember that we already have the dividend expected next year, so we don't multiply the dividend by 1+g

Gordon Growth Company – Example 2

- What is the price expected to be in year 4?
  - $P_4 = D_4(1 + g) / (R – g) = D_5 / (R – g)$
  - $P_4 = 4(1+.06)^4 / (.16 - .06) = 50.50$
- What is the implied return given the change in price during the four year period?
  - $50.50 = 40(1+return)^4$; return = 6%
  - PV = -40; FV = 50.50; N = 4; CPT I/Y = 6%
- The price grows at the same rate as the dividends

Example – Non-constant Dividend 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.

Example – Non-constant Dividend Growth Continued

- 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
  - $P_2 = D_3 / (R - g) = 1.449 / (.2 - .05) = 9.66$
- Find the present value of the expected future cash flows
  - $P_0 = 1.20 / (1.2) + (1.38 + 9.66) / (1.2)^2 = 8.67$

Example

- 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%?
- What if the company starts increasing dividends by 3% per year, beginning with the next dividend? Assume that the required return stays at 15%.

Using the Constant DGM to Find R

- Start with the constant DGM:

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

rearrange and solve for R

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

- This shows the components of the required return

Example – Finding the Required Return

- Suppose 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?
  - R = [1(1.05)/10.50] + .05 = 15%
- What is the dividend yield?
  - 1(1.05) / 10.50 = 10%
- What is the capital gains yield?
  - g =5%

Summary of Stock Valuation

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 . . .

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

where r is the required return.

Zero Growth Case

If there is no growth in dividends, the price can be written as

$$P_0 = \frac{D_1}{r}$$

Constant Growth Case

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

$$P_0 = \frac{D_1}{(r - g)}$$

This result is called the *dividend growth model.*

Supernormal Growth Case

If the dividend grows steadily after t periods, the price can be written as:

$$P_0 = \frac{D_1}{(1 + r)^1} + \frac{D_2}{(1 + r)^2} + \cdots + \frac{D_t}{(1 + r)^t} + \frac{P_t}{(1 + r)^t}$$

where

$$P_t = \frac{D_t \times (1 + g)}{(r - g)}$$

The Required Return

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 the dividends for the steady growth case).

Common Stock Features

- Shareholders' Rights
- Other Rights
  - Share proportionally in declared dividends
  - Share proportionally in remaining assets during liquidation
  - Preemptive right – first shot at new stock issue to maintain proportional ownership if desired
- Classes of stock
  - Unequal voting rights
  - Control of firm
  - Coattail provision

Dividend Characteristics

- Dividends are not a liability of the firm until a dividend has been declared by the Board
- Consequently, a firm cannot go bankrupt for not declaring dividends
- Dividends and Taxes
  - Dividend payments are not considered a business expense and are not tax deductible
  - Dividends received by individual shareholders are partially sheltered by the dividend tax credit
  - Dividends received by corporate shareholders are not taxed
  - This prevents double taxation of dividends

Preferred Stock Features

- Dividends
  - Most preferreds have a stated dividend that must be paid before common dividends can be paid
  - Dividends are not a liability of the firm and preferred dividends can be deferred indefinitely
  - Most preferred dividends are cumulative – any missed preferred dividends have to be paid before common dividends can be paid
- Preferred stock generally does not carry voting rights

Example

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