CHAPTER 8

STOCK VALUATION

KEY CONCEPTS AND SKILLS

- Explain how stock prices depend on future dividends and dividend growth

- Show how to value stocks using multiples

- Lay out the different ways corporate directors are elected to office

- Define how the stock markets work

CHAPTER OUTLINE

- Common Stock Valuation

- Some Features of Common and Preferred Stocks

- The Stock Markets

CASH FLOWS FOR STOCKHOLDERS

- 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.
  - 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 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?

  - $PV = 2 / (1.2) + (2.10 + 14.70) / (1.2)^2 = 13.33$

THREE-PERIOD EXAMPLE

- Finally, what if you decide to hold the stock for three years?
  - 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 the stock price is expected to be $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

DEVELOPING THE MODEL

- You could continue to push back the year in which you will 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 (i.e., zero growth)
  - 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.
  - The price is computed using the growing perpetuity model.

- Supernormal growth
  - Dividend growth is not consistent initially, but settles down to constant growth eventually.
  - The price is computed using a multistage model.

ZERO GROWTH

- If dividends are expected at regular intervals forever, then this is a perpetuity, and the present value of expected future dividends can be found using the perpetuity formula.
  - $P_0 = D / R$

- Suppose a 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 and some series work, 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 per share.
- 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?
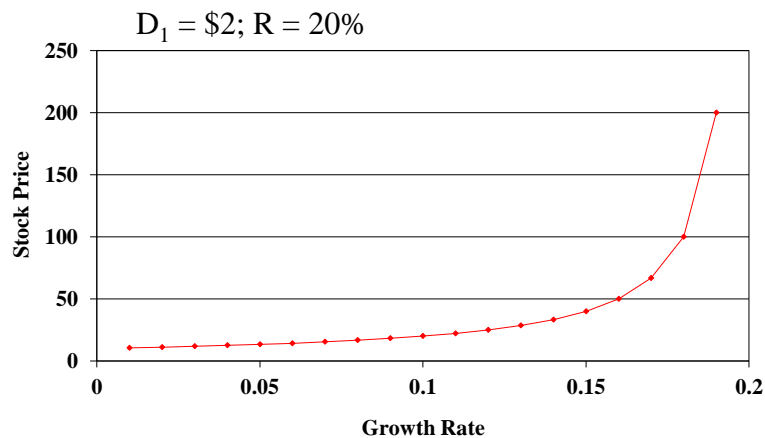
- $P_0 = .50(1+.02) / (.15 - .02) = \$3.92$

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?

  - $P_0 = 2 / (.2 - .05) = \$13.33$

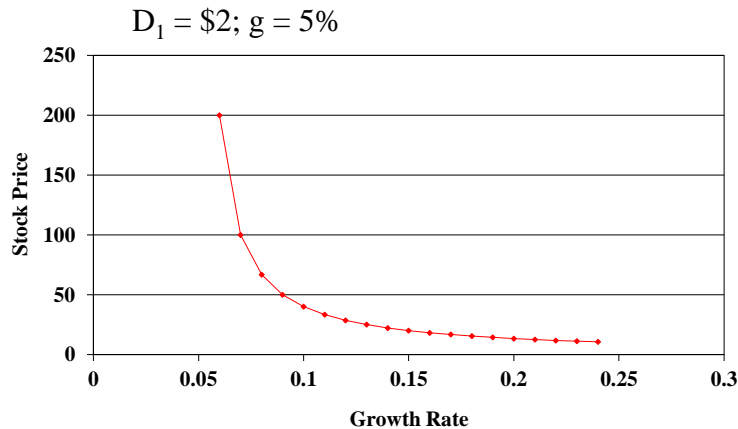 - Why isn't the $2 in the numerator multiplied by (1.05) in this example?

STOCK PRICE SENSITIVITY TO DIVIDEND GROWTH, G

$D_1 = \$2; R = 20\%$

STOCK PRICE SENSITIVITY TO REQUIRED RETURN, R

$D_1 = \$2; \; g = 5\%$

EXAMPLE 8.3: 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?

  - $P_0 = 4 / (.16 - .06) = \$40$

  - Remember that we already have the dividend expected next year, so we don't multiply the dividend by 1+g.

EXAMPLE 8.3: GORDON GROWTH COMPANY - II

- 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?
  - $50.50 = 40(1+\text{return})^4$; return = 6%
  - PV = -40; FV = 50.50; N = 4; CPT I/Y = 6%

- The price is assumed to grow at the same rate as the dividends.

NONCONSTANT GROWTH EXAMPLE - I

- 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 EXAMPLE - II

- 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.
  - $P_0 = 1.20 / (1.2) + (1.38 + 9.66) / (1.2)^2 = 8.67$

USING THE DGM TO FIND R

- Start with the DGM:

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

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

EXAMPLE: FINDING THE REQUIRED RETURN

- Suppose a firm's stock is selling for $10.50. It 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%

STOCK VALUATION USING MULTIPLES

- Another common valuation approach is to multiply a benchmark PE ratio by earnings per share (EPS) to come up with a stock price.

- P_t = Benchmark PE ratio × EPS_t

- The benchmark PE ratio is often an industry average or based on a company's own historical values.
- The price-sales ratio can also be used.

EXAMPLE: STOCK VALUATION USING MULTIPLES

- Suppose a company had earnings per share of $3 over the past year. The industry average PE ratio is 12.
- Use this information to value this company's stock price.

- $P_t = 12 \times \$3 = \$36$ per share

TABLE 8.1 – STOCK VALUATION SUMMARY (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, $D_1, D_2, D_3, \ldots$:

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

where R is the required return.

II. Constant Growth Case

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. Nonconstant Growth

If the dividend grows steadily after t periods, then 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

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

TABLE 8.1 – STOCK VALUATION SUMMARY (2)

IV. Two-Stage Growth

If the dividend grows at rate g_1 for t periods and then grows at rate g_2 thereafter, then the price can be written as:

$$P_0 = \frac{D_1}{R - g_1} \times \left[1 - \left(\frac{1 + g_1}{1 + R} \right)^t \right] + \frac{P_t}{(1 + R)^t}$$

where

$$P_t = \frac{D_{t+1}}{R - g_2} = \frac{D_0 \times (1 + g_1)^t \times (1 + g_2)}{R - g_2}$$

V. Valuation Using Multiples

For stocks that don't pay dividends (or have erratic dividend growth rates), we can value them using the PE ratio and/or the price-sales ratio:

P_t = Benchmark PE ratio × EPS_t

P_t = Benchmark price-sales ratio × Sales per share$_t$

VI. 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 dividends for the steady growth case).

FEATURES OF COMMON STOCK

- Voting Rights

- Proxy voting

- Classes of stock

- 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

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; therefore, they are not tax deductible.
  - The taxation of dividends received by individuals depends on the holding period.
  - Dividends received by corporations have a minimum 70% exclusion from taxable income.

8-27

FEATURES OF PREFERRED STOCK

- Dividends
  - Stated dividend that must be paid before dividends can be paid to common stockholders

  - 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.

8-28

14

STOCK MARKET

- Dealers vs. Brokers

- New York Stock Exchange (<u>NYSE</u>)
  - Largest stock market in the world
  - License holders (1,366)
    - Designated market makers (DMMs)
    - Floor brokers
    - Supplemental liquidity providers (SLPs)

  - Operations

  - Floor activity

NASDAQ

- Not a physical exchange – computer-based quotation system

- Multiple market makers

- Electronic Communications Networks

- Three levels of information
  - Level 1 – median quotes, registered representatives
  - Level 2 – view quotes, brokers, and dealers
  - Level 3 – view and update quotes, dealers only

- Large portion of technology stocks

WORK THE WEB EXAMPLE

- Electronic Communications Networks provide trading in NASDAQ securities.

- To see more detail, visit Instinet.

READING STOCK QUOTES

- What information is provided in the stock quote?
- You can go to Bloomberg for current stock quotes.