Chapter 8

Stock Valuation

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
• Understand how corporate directors are elected
• Understand how stock markets work
• Understand how stock prices are quoted

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

Table 8.1 - Stock Valuation Summary

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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
  - 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.
  - \( P_0 = \frac{D}{R} \)
- 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?
  - \( P_0 = \frac{0.50}{\left(1 + \frac{0.10}{4}\right)} = $20 \)
Dividend Growth Model

- Dividends are expected to grow at a constant percent per period.
  - \( P_0 = \frac{D_1}{1+R} + \frac{D_2}{(1+R)^2} + \frac{D_3}{(1+R)^3} + \ldots \)
  - \( P_0 = \frac{D_0(1+g)}{(1+R)} + \frac{D_0(1+g)^2}{(1+R)^2} + \frac{D_0(1+g)^3}{(1+R)^3} + \ldots \)
- 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?
  - \( P_0 = \frac{.50(1+.02)}{(.15 - .02)} = $3.92 \)

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?
  - \( P_0 = \frac{2}{(.2 - .05)} = $13.33 \)
  - Why isn’t the $2 in the numerator multiplied by (1.05) in this example?
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?
  - $P_0 = \frac{4}{(0.16 - 0.06)} = 40$
  - 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?
  - \( 50.50 = 40(1+\text{return})^4; \text{return} = 6\% \)
  - \( \text{PV} = -40; \text{FV} = 50.50; N = 4; \text{CPT I/Y} = 6\% \)

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

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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.
Valuing non-constant growth stocks

- Find the value of the non-constant dividends and one constant growth dividend
- Sell the stock as soon as growth becomes constant. \( P \text{ at year } n = \frac{\text{Dividend at year } (n+1)}{(\text{required return} - \text{growth})} \)
- Compute the NPV at the required return of the non-constant dividends and expected selling price

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

Quick Quiz – Part I

- 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? The required return stays at 15%.
Using the DGM to Find R

- Start with the DGM:

\[
\frac{P_0}{R - g} = \frac{D_0(1 + g)}{R - g}
\]

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

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?
  - \( R = \frac{1(1.05)}{10.50} + .05 = 15\% \)
- What is the dividend yield?
  - \( \frac{1(1.05)}{10.50} = 10\% \)
- 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
  - \( P_t = \text{Benchmark PE ratio} \times \text{EPS}_t \)
- 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

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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

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
Stock Market

- Dealers vs. Brokers
- New York Stock Exchange (NYSE)
  - Largest stock market in the world
  - License holders (1,366)
    - Commission brokers
    - Specialists
    - Floor brokers
    - Floor traders
- 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 & 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
- Click on the web surfer and visit Instinet
Reading Stock Quotes

- What information is provided in the stock quote?
- Click on the web surfer to go to Bloomberg for current stock quotes.

Quick Quiz – Part II

- 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?

Ethics Issues

- The status of pension funding (i.e., over-vs. under-funded) depends heavily on the choice of a discount rate. When actuaries are choosing the appropriate rate, should they give greater priority to future pension recipients, management, or shareholders?
- How has the increasing availability and use of the internet impacted the ability of stock traders to act unethically?
Comprehensive Problem

- XYZ stock currently sells for $50 per share. The next expected annual dividend is $2, and the growth rate is 6%. What is the expected rate of return on this stock?
- If the required rate of return on this stock were 12%, what would the stock price be, and what would the dividend yield be?

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