经济管理学院
The college of Economics and Management

Lecture 8

Stock Valuation

Corporate Finance – Fall 2019

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Learning Objectives

LO1: How stock prices depend on future dividends and dividend growth

LO2: How to value stocks using multiples

LO3: The different ways corporate directors are elected to office

LO4: How the stock markets work

Chapter Outline

8.1 Common Stock Valuation

8.2 Some Features of Common and Preferred Stocks

8.3 The Stock Markets

Prelude

- Besides bond, common and preferred stock is also a major source of financing for corporations
- This chapter mainly focuses on developing dividend growth model based on cash flows associated with a stock
- Moreover, we examine features of common and preferred stocks, focusing on shareholder rights, and discuss how stocks are traded and how stock prices and other important information are reported

8.1 Common stock valuation

- Difficulties in valuing stocks
  - First, not even the promised cash flows are known in advance
  - Second, common stock has no maturity
  - Third, no way to easily observe the rate of return that the market requires
  - Nonetheless, there are cases we can determine the value by DCF model

8.1.1 Cash flows

- If you buy a share of stock, you can receive cash in two ways
  - The company pays dividends
    - Note: A stock that currently pays no dividends may or may not have value
      - a stock that will NEVER pay a dividend cannot have any value as long as investors are rational
      - For a stock that currently pays no dividend, market value derives from (a) the hope of future dividends and/or (b) the expectation of a liquidating dividend. (see textbook example 8.1)
  - You sell your shares, either to another investor in the market or back to the company (repurchase)
- 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

- 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
  - The PV of stock price is essentially zero if we push far away enough
  - You would find that the price of the stock is really just the *present value of <u>all</u> expected future dividends*
  - $$P_0 = \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \frac{D_3}{(1+R)^3} + \frac{D_4}{(1+R)^4} + \frac{D_5}{(1+R)^5} + \cdots$$
  - How can we estimate infinite future dividend payments?
  - We make simplifying assumptions by considering special cases

8.1.2 Some 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
  - $D_1 = D_2 = D_3 = ... = D \rightarrow P_0 = D / R$
  - 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?
  - $P_0 = .50 / (.1 / 4) = \$20$

- Constant growth
  - 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 dividend growth model (DGM)

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

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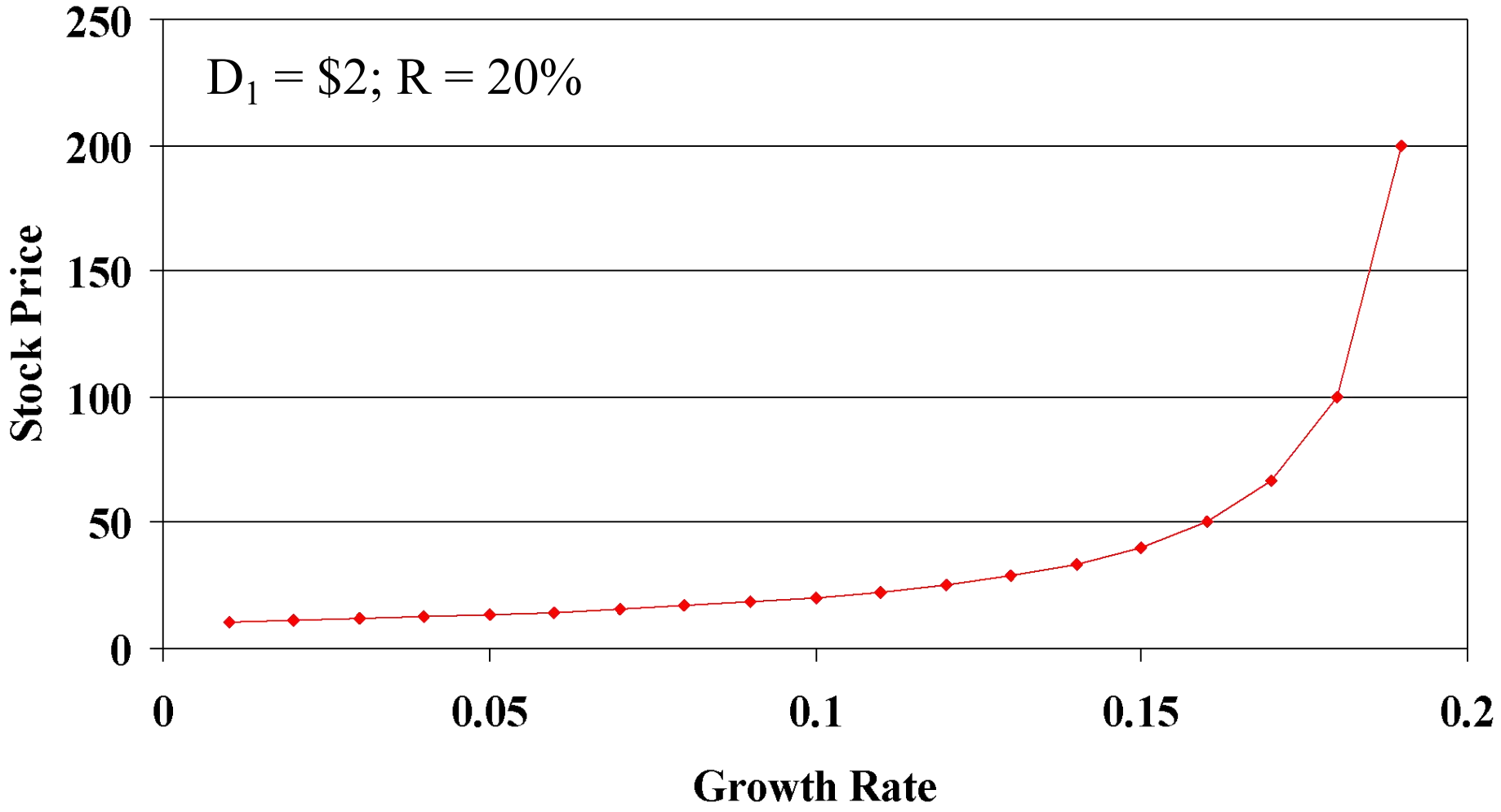
- Dividend growth model (DGM)
  - A model that determines the **current price** of a stock as its **dividend next period** divided by the discount rate less the dividend growth rate
  - Notice that the price of a stock grows at a same rate as the dividends on the stock (see textbook example 8.3)
    - If the cash flows on an investment grow at a constant rate through time, so does the value of that investment
  - For many companies, steady growth in dividends is an explicit goal

- The biggest mistake that students usually make with the DGM is using the wrong dividend. We are finding a present value, so the dividend needed is the one that will be paid NEXT period, not the one that has already been paid.
- 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?
  - $P_0 = 2 / (.2 - .05) = \$13.33$
  - Does this result look familiar? The examples used in 8.1.1 were based on a 5% growth rate in dividends.
  - Why isn't the $2 in the numerator multiplied by (1.05) in this example?

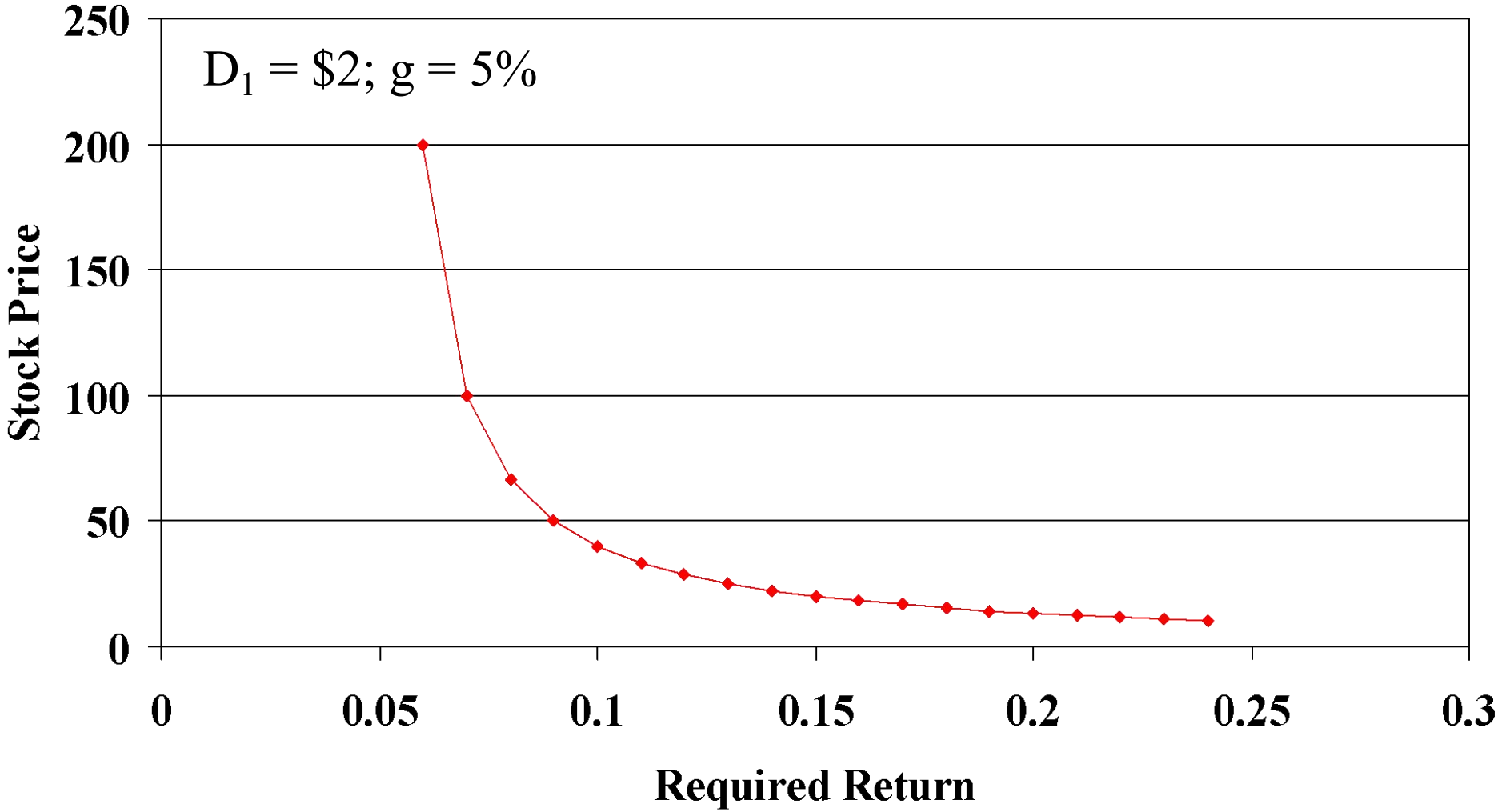
➢ Stock Price Sensitivity to Dividend Growth, g

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



➢ Stock Price Sensitivity to Required Return, R

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



- Nonconstant growth
  - The dividends start growing at a constant rate sometime in the future
    - Only allows for supernormal growth rate over some finite length of time
    - Question: what will happen if the growth rate exceeds the required return indefinitely?
  - Principle: when constant growth starts -> apply DGM
    - See textbook example 8.4

- *Example*: 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
  - 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
    - $P_0 = 1.20 / (1.2) + (1.38 + 9.66) / (1.2)^2 = 8.67$

- Two stage growth
  - Dividends grow at g_1 for t years, then grow at g_2 forever
  - See textbook example 8.5

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

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

  - There is also a formula for calculating P_{t-1} instead of P_t. You can derive it on your own. (optional)

- 8.1.3 Components of the required return
  - Using the DGM to examine the implications of R

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

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

  - Total return has two components: dividend yield and growth rate
  - Dividend yield: a stock's expected cash dividend divided by its current price (similar to current yield in Chapter 7)
  - Under previous assumptions, the growth rate can be interpreted as the capital gains yield
    - Capital gains yield: the yield at which the value of an investment grows

- 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%

8.1.4 Stock valuation using multiples

- Many companies don't pay dividends
- 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
- Securities analysts spend a lot of time forecasting future earnings
  - forward PE ratio = current price / estimated EPS
  - target price = benchmark PE * estimated EPS
- Price-sales ratio
  - Often used to value newer companies that do not pay dividends and are not yet profitable (meaning that earnings are negative).

- Example 1 (on textbook): Multiples and target price
  - 1. comprehensive analysis of the economy, the industry, and the firm -> a benchmark PE ratio of 20 is reasonable
  - 2. query of financial data -> total earnings over the four most recent quarters combined are $2 per share
  - 1+2 -> 3. The stock should sell for 20*$2 = $40
    - For stock investors, current price less (more) than 40 means an attractive (expensive) purchase
  - 4. forecast future earnings -> earnings for the coming year is going to be $2.50
  - 3+4 -> 5. forward PE ratio = $40/$2.50 = 16
  - 1+4 -> 6. target price = 20*$2.5 = $50
    - If both the benchmark PE and earnings forecast are appropriate, the price will go towards $50

- Example 2: Industry average 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 x $3 = $36 per share
- Summary of stock valuation in Table 8.1
  - How can we use these method in valuing stocks in the Chinese market?
    - Can we apply the DGM to stocks listed in ChiNext?
    - Can we apply the DGM to bank stocks?
    - Can we apply the multiples to ChiNext?
    - Can we apply the two components to returns of ChiNext stocks?
    - …

8.2 Some features of common and preferred stocks

- Stock features: shareholder rights, dividend payments
- Preferred stock: what "preferred" means, whether preferred stock is really debt or equity

8.2.1 Common stock features

- COMMON STOCK: equity without priority either for dividends or in bankruptcy
- Shareholders' right of voting for directors
  - Shareholders elect directors who hire managers to carry out their directives
    - Shareholders control the corporation through the right to elect the directors
    - Generally, only shareholders have this right

- Directors are elected at an annual shareholders' meeting by a vote of the holders of a majority of shares who are present and entitled to vote
  - Electing mechanism varies across companies
  - The most difference is whether shares must be voted cumulatively or voted straight
- CUMULATIVE VOTING: a procedure in which a shareholder may cast all votes for one member of the board of directors
  - See textbook example 8.6
  - *1/(N+1) percent of shares plus one share* will guarantee you one seat in N directors up for election
  - Cumulative voting increases the likelihood of minority shareholders getting a seat on the board

- STRAIGHT VOTING: a procedure in which a shareholder may cast all votes for each member of the board of directors
- STAGGERED ELECTIONS: only a fraction of the directorships are up for election at a particular time
  - Often called classified boards (directors are placed into different classes with terms that expire at different times)
  - More difficult for a minority to elect a director (N is smaller)
  - Makes takeover attempts less likely to be successful (more difficult to vote in a majority of new directors)
- In recent years, corporations have come under pressure to declassify their boards
  - All directors would stand for election every year

- Proxy voting
  - PROXY: a grant of authority by a shareholder allowing another individual to vote his/her shares
  - Applied in much of the voting in large public corporations
- Proxy fight
  - Unsatisfied shareholders can try to obtain votes via proxy
  - They vote by proxy in an attempt to replace management by electing enough directors, or to affect other important issues that are coming up for a vote

- Other rights
  - The right to share proportionally in dividends paid
  - The right to share proportionally in assets remaining after liabilities have been paid in a liquidation
  - The right to vote on shareholder matters of great importance
    - e.g., a merger
  - Preemptive right: first shot at new stock issue to maintain proportional ownership if desired

- Classes of stock
  - Some firms have more than one class of common stock
  - Often the classes are created with unequal voting rights
  - A primary reason for creating dual or multiple classes of stock has to do with control of the firm
  - Management can raise equity capital by issuing nonvoting or limited-voting stock while maintaining control
  - The subject of unequal voting rights is controversial in US
    - But that kind of shares is common in UK and elsewhere around the world

- Dividends
  - DIVIDENDS: payments by a corporation to shareholders, made in either cash or stock
  - Dividends are not a liability of the firm until a dividend has been declared by the board
    - A firm cannot go bankrupt for not declaring dividends
    - The amount and even whether it is paid are the decisions made by the board

- Dividends paid and taxes
  - Dividend payments are not considered a business expense
  - they are not tax deductible and are paid out of the aftertax profits
- Dividends received and taxes
  - The taxation of dividends received by individuals depends on the holding period
  - Dividends received by corporations have a minimum 70% exclusion from taxable income

8.2.3 Preferred stock features

- PREFERRED STOCK: stock with dividend priority over common stock, normally with a fixed dividend rate, sometimes without voting rights
- preferred shares have a stated liquidating value
- voting rights
  - Preferred stock generally does not carry voting rights

- dividends
  - “preference” means that stated dividends must be paid before dividends can be paid to common stockholders
  - most preferred dividends are cumulative
    - any missed preferred dividends have to be paid before common dividends can be paid
  - dividends are not a liability of the firm, and preferred dividends can be deferred indefinitely
    - holders of preferred shares are often granted voting and other rights if no preferred dividends are paid for some time

- is preferred stock really debt?
  - preferred stock is really debt in disguise (a kind of equity bond)
    - receive a stated dividend
    - get a stated value in liquidation
    - carry credit ratings much like those of bonds.
    - sometimes convertible into common stock, often callable
    - many have obligatory sinking funds
      - many new issues have sinking funds that effectively convert what was a perpetual security into an equity security with a definite maturity

8.3 The stock markets

- Primary market and secondary market
  - In the primary (new issue) market, share of stock are first brought to the market and sold to investors
    - Companies sell securities to raise money
  - In the secondary market, existing shares are traded among investors

- Dealers and brokers
  - Dealers maintain an inventory and stands ready to trade at quoted bid (price at which they will buy) and ask (price at which they will sell) prices
  - Dealers make their profit from the difference between the bid and ask prices, called the bid-ask spread
    - The smaller the spread, the more competition and the more liquid the stock
  - Brokers match buyers and sellers
  - Brokers perform the search function for a fee (commission)
    - They do not hold an inventory of securities.

- Organization of the NYSE
  - Largest stock market in the world
  - License holders
    - Commission brokers
    - Specialists
    - Floor brokers
    - Floor traders
  - Operations
  - Floor activity

- NASDAQ operations
  - Not a physical exchange – computer-based quotation system
    - NASDAQ market site in Times Square is NOT an exchange
    - It is just offices and basically a place for reporters to report on what is happening with Nasdaq stocks
  - 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

Epilogue

- Now we have a good grasp of present value
- We know how to calculate PV, loan payments,...
- Next move to capital budgeting decisions
- The techniques from CH5-8 form the basis for evaluating business investment decisions

CH8 Assignments (Due at 11 a.m. 2019/10/23)

Compulsory: QUESTIONS AND PROBLEMS: 4, 6, 34