Chapter 10

Stock Valuation

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Overview

1. Common Stock
   Identify the basic characteristics and features of common stock and use the discounted cash flow model to value common shares.

2. The Comparables Approach to Valuing Common Stock
   Use the price to earnings (P/E) ratio to value common stock.

3. Preferred Stock
   Identify the basic characteristics and features of preferred stock and value preferred shares.

4. The Stock Market
   Use the secondary market for common stock.
10.1 Common Stock

- Common stockholders are the owners of the firm.
- They elect the firm’s board of directors, who in turn appoint the firm’s top management team.

- Claim on Assets
  - In case of liquidation, common stockholders have residual claim on assets.
  - However, bankrupt firms rarely have enough assets to satisfy the claims of bondholders.
Claim on Income

- Common stockholders have the right to the firm’s income that remains after bondholders and preferred stockholders have been paid.

- The common stockholders either receive cash payments in the form of dividends or the firm’s management reinvests the earnings in the firm.

- The right to residual income means that the potential return is unlimited;

- However, it could also mean that there could be little or nothing left after claims of bondholders and preferred shareholders are met.
Voting Rights

- In general, common shareholders are the only security holders given the right to vote.

- Common shareholders have the right to elect the board of directors and approve any changes in the corporate charter.

- Some firms have multiple classes of stock with different voting rights.

- For Example: Google’s class A stock has one vote per share and class B stock has 10 votes per share.

- Class B stocks are owned by Chief Executive Eric Schmidt and founders Larry Page and Sergey Brin.
Voting Rights

- Most shareholders vote by proxy. A proxy gives a designated party the temporary power of attorney to vote for the signee at the corporation’s annual meeting.

- There are two commonly used procedures for voting: majority voting and cumulative voting.
Voting Rights

- **Majority Voting**: Each share of stock allows the shareholder one vote, and each position on the board is voted on separately. Because each member of the board is elected by a simple majority, a majority of shares has the power to elect the entire board of directors.

- **Cumulative Voting**: Each share of stock allows the shareholders a number of votes equal to the number of directors being elected. The shareholders can use all his or her votes for a single candidate or split them among the various candidates. The advantage of cumulative voting is that it gives minority shareholders the power to elect a director.
In theory, common stockholders elect the board and effectively control the firm through their representatives on the board.

In reality, stockholders are given a slate of nominees for the board selected by the management. As a result, management effectively elects the board and thus the board may have more allegiance to the managers than to the shareholders. This may lead to agency problems.

Managers are employees of the firm, but may put their interests ahead of the firm’s stockholders (its owners).

The costs associated with manager-stockholder agency problems are difficult to quantify, but it could be significant.
Valuing Common Stock Using the Discounted Dividend Model

- Like bonds, common stock’s value is equal to the present value of all future cash flows that the stockholder expects to receive from owning the shares of stock.

- However, unlike bonds, the future cash flows in the form of dividends are not fixed. Thus, the value of common stock is derived from discounting “expected dividend.”
Three Step Procedure for Valuing Common Stock

1. Estimate the amount and timing of future cash flows the common stock is expected to provide.

2. Evaluate the riskiness of the future dividends, and determine the rate of return an investor might expect to receive from a comparable risky investment, which becomes the investor’s required rate of return.

3. Calculate the present value of the expected dividends by discounting them back to the present at the investor’s required rate of return.
Basic Concept of the Stock Valuation

Example 10.1 Consider a situation in which we are valuing a share of common stock that we plan to hold for only one year. What will be the value of the stock today if it pays a dividend of $2.00, is expected to have a price of $75 and the investor’s required rate of return is 12%?
Basic Concept of the Stock Valuation

Value of Common stock

= Present Value of future cash flows

= Present Value of (dividend + expected selling price)

= ($2 + $75) ÷ (1.12)^1

= $68.75
Basic Concept of the Stock Valuation

**Example 10.2** Continue example 10.1. What will be the value of common stock if you hold the stock for two years and sell it for $82? Assume the dividend payment is fixed at $2 per year.

**Value of Common stock**

\[
\text{Value of Common stock} = \text{Present Value of future cash flows} = \text{Present Value of (dividends + expected selling price)}
\]

\[
= \left\{ \frac{($2)}{(1.12)^1} \right\} + \left\{ \frac{($2+$82)}{(1.12)^2} \right\}
\]

\[
= \$71.14
\]
Basic Concept of the Stock Valuation

- Since stocks do not have a maturity period, we can consider the value of stock to be equal to the present value of future expected dividends over a certain period and an expected selling price.

- Valuing common stocks using general discounted cash flow model is made difficult as analyst has to forecast each of the future dividends. This problem is greatly simplified if we assume that dividends grow at a fixed or constant rate.
The Constant Dividend Growth Rate Model

If the firm’s cash dividend grow by a constant rate each year, then the common stock can be valued as follows:

\[
\text{Value of Common Stock in Year 0} = \frac{\text{Dividend Paid in Year 0}}{\left(1 + \frac{\text{Dividend Growth Rate}}{\text{Stockholder’s Required Rate of Return}}\right)^1} + \frac{\text{Dividend Paid in Year 0}}{\left(1 + \frac{\text{Dividend Growth Rate}}{\text{Stockholder’s Required Rate of Return}}\right)^2} + \ldots + \frac{\text{Dividend Paid in Year 0}}{\left(1 + \frac{\text{Dividend Growth Rate}}{\text{Stockholder’s Required Rate of Return}}\right)^n} + \ldots (\text{forever})
\]
The Constant Dividend Growth Rate Model

\[ V_{cs} = \frac{D_0(1 + g)}{r_{cs} - g} = \frac{\text{Dividend in year 1}}{\text{Stockholders’ Required Rate of Return} - \text{Growth Rate}} \]

- \( V_{cs} \) = Value of a share of common stock
- \( D_0 \) = Annual cash dividend in the year of valuation (paid already)
- \( g \) = annual growth rate in the dividend
- \( r_{cs} \) = the common stockholder’s required rate of return
Valuing Common Stock

Consider the valuation of a share of common stock that paid a $2 dividend at the end of last year and is expected to pay a cash dividend every year from now to infinity. Each year, the dividends are expected to grow at a rate of 10%. Based on an assessment of the riskiness of the common stock, the investor’s required rate of return is 15%. What is the value of this common stock?
Checkpoint 10.1: Solution

\[ V_{cs} = \frac{D_0(1 + g)}{r_{cs} - g} = \frac{2(1 + 0.10)}{0.15 - 0.10} = 44 \]
Checkpoint 10.1: Check Yourself

• What is the value of a share of common stock that paid $6 dividend at the end of last year and is expected to pay a cash dividend every year from now to infinity, with that dividend growing at a rate of 5 percent per year, if the investor’s required rate of return is 12% on that stock?
  • What will be the stock value if the growth rate is 10%?
  • How about a dividend growth rate of 13%?

Answers: 90;330;inf.
What Causes Stock Prices to Go Up and Down?

Equation 10-2 indicates that there are three variables that drive share value:

- The most recent dividend ($D_0$): The more, the higher.
- Expected rate of growth in future dividends ($g$): The higher, the higher.
- Investor’s required rate of return ($r_{cs}$): The higher, the lower.

Since most recent dividend ($D_0$) has already been paid, it cannot be changed. Thus, variations in the other two variables, $r_{cs}$ and $g$, can lead to changes in stock prices.
Determinants of the Investor’s Required Rate of Return

- The investor’s required rate of return is determined by two key factors:
  1. The level of interest rates in the economy; and
  2. The risk of the firm’s stock.

- In Chapter 8, we used the CAPM to describe the determinants of investor required rate of return.

\[
\text{Expected Rate of Return} = \text{Risk Free Rate of Interest} + \text{Common Stock} \left( \frac{\text{Expected Rate of Return on the Market Portfolio}}{\text{Beta Coefficient}} - \frac{\text{Risk Free Rate of Interest}}{\text{Beta Coefficient}} \right)
\]

- If risk-free rate and/or systematic risk (beta) rises, the investor’s required rate of return will rise and the stock value will fall.
Determinants of Growth Rate of Future Dividends

- Firm’s growth opportunities relate to:
  - The rate of return the firm expects to earn when they reinvest earnings (the return on equity, ROE), and
  - The proportion of firm’s earnings that they reinvest. This is known as the retention ratio, $b_r = 1 - \text{dividend payout ratio}$.

- The growth rate can be formally expressed as follows:
  \[
  \text{Rate of Growth in Dividends (}g\text{)} = \left(1 - \frac{\text{Dividend Payout Ratio}}{\text{ROE}}\right) \times \text{Rate of Return on Equity (}ROE\text{)}
  \]
  - $g$ = the expected rate of growth of dividends
  - $D_1/E_1$ = the dividend payout ratio
  - ROE = the return on equity earned when the firm reinvests a portion of its earning back into the firm.
10.2 The Comparable Approach to Valuing Common Stock

- This method estimates the value of the firm’s stock as a multiple of some measure of firm’s performance, such as the firm’s earnings per share, book value per share, sales per share, cash flow per share, where the multiple is determined by the multiples observed from comparable companies.

- The most common metric is earnings per share.
The P/E Ratio Valuation Model

- Price/Earnings ratio (P/E ratio) is a popular measure of stock valuation.

- P/E ratio is a relative value model because it tells the investor how many dollars investors are willing to pay for each dollar of the company’s earnings.

\[ V_{cs} = \left( \frac{\text{Appropriate Price Earnings Ratio}}{\text{Per Share for Year 1}} \right) \times \left( \frac{\text{Estimated Earnings Per Share for Year 1}}{E_1} \right) = \frac{P}{E_1} \times E_1 \]

- \( V_{cs} \) = the value of common stock of the firm.
- \( P/E_1 \) = the price earnings ratio for the firm based on the current price per share divided by earnings for end of year 1.
- \( E_1 \) = estimated earnings per share of common stock for the end of year 1.
The Heels Shoe Company sells a line of athletic shoes for children and young adults including cleats and other specialty footwear used for various types of sports. The company is privately owned and is considering the sale of a portion of its shares to the public. The company owners are currently in discussions with an investment banker who has offered to manage the sale of shares to the public. The critical point of their discussion is the price that Heels might expect to receive upon the sale of its shares. The investment banker has suggested that this price can be estimated by looking at the P/E multiples of other publicly traded firms that are in the same general business as the Heels Shoe Company and multiplying their average P/E ratio by Heels’ expected EPS for the coming year. Last year the Heels Shoe Company had earnings of $1.65 per share for the 12-month period ended in March, 2009. Heels’ CFO estimates that company earnings for 2010 will be $1.83 a share.
The investment banker suggested that estimation of an appropriate P/E ratio involves looking at the P/E multiples for similar companies. As a preliminary step they suggested that Heels’ management team consider the P/E multiples of three companies: Deckers Outdoor Corp. (DECK), Nike (NKE), and Timberland Co. (TBL). The current P/E ratios for these firms are as follows:

<table>
<thead>
<tr>
<th>Company</th>
<th>P/E Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deckers</td>
<td>26.85</td>
</tr>
<tr>
<td>Nike</td>
<td>18.79</td>
</tr>
<tr>
<td>Timberland</td>
<td>22.18</td>
</tr>
<tr>
<td>Average</td>
<td>22.61</td>
</tr>
</tbody>
</table>

What is your estimate of the price of Heels’ shares based on the above Comparable P/E ratios?
**STEP 3: Solve**

Substituting into Equation (10-4) we estimate that Heels’ share price to be $41.38:

\[ V_{cs} = \frac{P}{E_1} \times E_1 = 22.61 \times 1.83 = 41.38 \]

**STEP 4: Analyze**

Based on the P/E ratios of these three comparable firms we estimate the offering price of Heels’ shares to be $41.38. However, this estimate is contingent on the appropriateness of the comparable set of companies to the Heels Shoe Company. Also, since the sale of a privately held company’s shares to the public can take several months, this estimate is contingent on no significant changes in the market. For example, if inflation worsens and the country slips into a recession, the P/E multiples of all public companies may fall. For this reason the final offering price for a firm’s shares that are being sold to the public is typically set the night before the offering and reflects the most recent P/E ratios of comparable firms.
Checkpoint 10.2: Check Yourself

- After some careful analysis and reflection on the valuation of the Heals’ shares the company CFO suggested that the earnings projection are too conservative and earnings for the coming year could easily jump to $2.00. What does this do for your estimate of the value of Heals’ shares?

  \[ V_{cs} = 22.61 \times \$2 = \$45.22 \]
What Determines the P/E Ratio for a Stock?

- We can investigate the determinants of P/E ratio by observing equations (10-5) and (10-5a)

\[ V_{cs} = \frac{D_0(1 + g)}{r_{cs} - g} = \frac{\text{Dividend in year 1}}{\text{Stockholders’ Required Rate of Return} - \text{Growth Rate}} \]

\[ \frac{P}{E_1} = \frac{D_1/E_1}{r_{cs} - g} \]

\[ \frac{P}{E_1} = \frac{D_1/E_1}{r_{cs} - g} = \frac{D_1/E_1}{r_{cs} - [(1 - D_1/E_1) \times \text{ROE}]} \]
What Determines the P/E Ratio for a Stock?

- We observe that there are two fundamental determinants of a firm’s P/E ratio:
  1. Growth rate in dividends, and
  2. Investor’s required rate of return.

- What causes the growth rate in dividends (and earnings) and the investor’s required rate of return to go up and down? These are the real determinants of the P/E ratio.
  - Firm factors impacting the investor’s required rate of return,
  - Economic or macro factors impacting the investor’s required rate of return,
  - Firm factors impacting the growth rate – dividend policy and firm investment opportunities.
10.3 Preferred Stock

- **Dividend:**
  - In general, size of preferred stock dividend is *fixed*, and it is either stated as a dollar amount or as a percentage of the preferred stock’s par value.
  - Unlike common stockholders, preferred stockholders receive the same fixed dividend regardless of how well the firm does.

- **Multiple Classes:**
  - If a company chooses, it can issue more than one class of preferred stock, and each class can have different characteristics.
  - For example, Public Storage (PSA) has 16 different issues of preferred stock outstanding that vary in terms of dividend, convertibility, seniority.
<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Par Value</th>
<th>Price</th>
<th>Dividend</th>
<th>Dividend Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacific Gas &amp; Electric 6% PF</td>
<td>PCGprA</td>
<td>$25.00</td>
<td>$25.08</td>
<td>$1.50</td>
<td>6.00%</td>
</tr>
<tr>
<td>Pacific Gas &amp; Electric 5% RED 1ST PF D</td>
<td>PCGprD</td>
<td>$25.00</td>
<td>$21.00</td>
<td>$1.25</td>
<td>6.00%</td>
</tr>
<tr>
<td>Pacific Gas &amp; Electric 4.80% PFD G</td>
<td>PCGprG</td>
<td>$25.00</td>
<td>$20.10</td>
<td>$1.20</td>
<td>6.00%</td>
</tr>
<tr>
<td>Pacific Gas &amp; Electric 4.36% PF I</td>
<td>PCGprI</td>
<td>$25.00</td>
<td>$18.25</td>
<td>$1.09</td>
<td>6.00%</td>
</tr>
</tbody>
</table>
Preferred Stock

- **Claims on Assets and Income:**
  - In the event of bankruptcy, preferred stockholders have priority over common stock. However, they have lower priority than the firm’s debt holders.
  - Firm must pay dividends on preferred stock prior to paying dividend on common stock.
  - Most preferred stock carry a **cumulative feature**. Cumulative feature requires that all past unpaid dividends to be paid before any common stock dividends can be declared.
  - Thus, preferred stocks are less risky than common stocks but more risky than bonds.
Preferred Stock

- **Preferred Stock as a Hybrid Security**
  - Like common stocks, preferred stocks do not have a fixed maturity date. Also, like common stocks, nonpayment of dividends does not lead to bankruptcy of the firm.
  - Like debt, preferred stocks have a fixed dividend. Also, most preferred stocks are periodically retired even though there is no stated maturity date.
Valuing Preferred Stock

- Since preferred stockholders generally receive a fixed dividend and the stocks are perpetuities (non-maturing), it can be valued using the present value of perpetuity equation introduced in chapter 6.

\[
\text{Value of Preferred Stock} = \frac{\text{Annual Preferred Stock Dividend}}{\text{Market’s Required Yield on Preferred Stock}}
\]

\[
V_{ps} = \frac{D_{ps}}{r_{ps}}
\]
Valuing Preferred Stock

- Estimating the Market Yield:
  - The market yield on a share of preferred stock is typically estimated using the market prices of similar shares of preferred stock which can be observed in the financial market. We can use equation 10-6 to solve for market yield.

\[
r_{ps} = \frac{D_{ps}}{V_{ps}}
\]
Example 10.3 What will be the yield on XYZ’s preferred stock if the company has promised annual dividend of $1.20 per share and each share is currently selling for $32.50?

\[ r_{ps} = \frac{D_{ps}}{V_{ps}} = \frac{1.2}{32.5} = 0.0369 = 3.69\% \]
Checkpoint 10.3

Valuing Preferred Stock

Consider Con Edison’s (ED) preferred stock issue, which pays an annual dividend of $5.00 per share, does not have a maturity date, and on which the market’s required yield or promised rate of return (rps) for similar shares of preferred stock is 6.02%. What is the value of the Con Edison preferred stock?

\[ V_{ps} = \frac{D_{ps}}{r_{ps}} = \frac{5.00}{0.0602} = \$83.06. \]
Checkpoint 10.3: Check Yourself

What is the present value of a share of preferred stock that pays a dividend of $12 per share if the market’s yield on similar issues of preferred stock is 8%?

\[
V_{ps} = \frac{D_{ps}}{r_{ps}} = \frac{12.00}{0.08} = $150.
\]
Table 10.2  Summary of Discounted Cash Flow Valuation of Bonds, Preferred Stock, and Common Stock

Bonds and preferred stock state a promised cash payment to the security holder. In the case of a bond, interest and principal must be paid in accordance with the terms of the bond contract (indenture). Preferred shares have stated dividend yields, which when multiplied by the face or par value of the preferred stock, equal the promised preferred dividend. Both bonds and preferred stock are valued by discounting these promised cash flows back to the present. However, since these are promised (and not expected) cash flows, we discount the cash flows using promised rate of return as reflected in current market prices of similar securities. Common stock, on the other hand, does not have a contractual promised dividend payment, so we apply the discounted cash flow model in this instance by estimating expected future dividends and then discounting them back to the present using the expected rate of return that an investor would require if investing in a stock with the risk attributes of the shares being valued.

<table>
<thead>
<tr>
<th>Type of Security</th>
<th>Cash Flow</th>
<th>Discount Rate</th>
<th>Valuation Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bond</td>
<td>Promised interest and principal payments. These payments are set forth in the contract between the bond issuing company and the owner of the bond.</td>
<td>Market’s required yield to maturity (YTM market). Typically the YTM on a similar bond is used to value a bond. This YTM is the realized rate of return to the bondholder only if all promised payments are made on time. Consequently, the yield to maturity calculated for a bond is a promised yield and not the expected yield.</td>
<td>Bond Value = Interest $\left(\frac{1}{1 + \text{YTM market}}\right)^n + \text{Principal} \left(\frac{1}{1 + \text{YTM}}\right)$</td>
</tr>
<tr>
<td>Preferred stock</td>
<td>Promised dividends. Dividends are defined using a contractually set dividend yield that is multiplied by the par or face value of the preferred stock to get the preferred stock dividend.</td>
<td>Market or promised yield on preferred stock. We typically calculate this yield using market prices and promised dividends for similar shares of preferred stock. This yield is a promised yield that will only be earned if the preferred stock dividends are fully paid every period as promised.</td>
<td>Value of Preferred Stock ( (V_{ps}) ) = $\frac{\text{Annual Preferred Stock Dividend}}{\text{Market’s Required Yield on Preferred Stock}} = \frac{D_{ps}}{r_{ps}}$</td>
</tr>
<tr>
<td>Common stock</td>
<td>Expected future dividends. No dividend is prescribed for common stock. Instead dividends must be estimated, so we value common stock using expected rather than promised future cash flows. In the constant dividend growth rate model dividends are estimated using a constant rate of growth from year to year.</td>
<td>Investor’s expected rate of return which is the investor’s required rate of return. Since common stock dividends are risky we use expected future dividends and discount them using a risk-adjusted or expected rate of return for investing in shares of stock of firms with similar risk to the common stock being valued. We can estimate this expected rate of return using the CAPM.</td>
<td>Value of Common Stock ( (V_{cs}) ) = $\frac{D_{cs}(1 + g)}{r_{cs} - g}$</td>
</tr>
</tbody>
</table>
10.4 The Stock Market

- New securities trade in the **primary market** while currently outstanding securities trade in the **secondary market**. The corporation receives money from sale of its securities only in the primary market.

- There are two types of secondary markets:
  - **Organized exchanges** where trading occurs at a physical location; and
  - **Over-the-counter market** where trading occurs over the telephone or through computer networks.
Organized Exchanges

- **The New York Stock Exchange (NYSE),** also called the “Big Board,” is the oldest of all organized exchanges and the largest organized exchange in the world. While the NYSE is considered an organized exchange because of its physical location, the majority of its trades are done electronically without a face-to-face meeting of traders.

- To be listed on the NYSE, a firm must meet strict requirements dealing with profitability and market value, and be widely owned.

- Much of the trading on the NYSE is made up of **block trades** i.e. transactions involving 10,000 shares or more by a single individual or institution.
Organized Exchanges

- The **American Stock Exchange** (AMEX) is the nation’s second largest, floor-based exchange. However, in terms of volume, the AMEX is a distant number two with less than 5% of that on the NYSE.

- AMEX merged with NASDAQ in 1998 but continues to operate as a separate entity.
Over-the-Counter (OTC) Market

- The **over-the-counter market** is a network of dealers that has no listing or membership requirements. Today, the OTC market is electronic with Nasdaq leading the way.

- OTC listings generally include companies too new or too small to be eligible for listing on a major exchange.

- **Nasdaq** debuted in 1971 and is the world’s first electronic stock market.

- While Nasdaq lists more companies than the NYSE, they are relatively smaller companies (with a few exceptions).
Over-the-Counter (OTC) Market

- There are about 1,000 market participants, trading firms that are linked electronically, with price and trading information broadcast to over 350,000 terminals worldwide.

- The Nasdaq stock market has two tiers of listed companies:
  - Nasdaq National Markets, made up of around 4,000 companies like Dell (D), Intel (INTC); and
  - Nasdaq Smallcap Market, which includes over 1,000 smaller emerging growth companies.