Chapter 7
Stock Valuation

Learning Goals

1. Differentiate between debt and equity.
2. Discuss the rights, characteristics, and features of both common and preferred stock.
3. Describe the process of issuing common stock, including venture capital, going public and the investment banker’s, and interpreting stock quotations.

Learning Goals (cont.)

4. Understand the concept of market efficiency and basic common stock valuation using zero growth, constant growth, and variable growth models.
5. Discuss the free cash flow valuation model and the book value, liquidation value, and price/earnings (P/E) multiple approaches.
6. Explain the relationship among financial decisions, return, risk, and the firm’s value.
### Differences Between Debt & Equity

**Table 7.1 Key Differences between Debt and Equity Capital**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Debt</th>
<th>Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice in management</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Claim on income &amp; assets</td>
<td>Secured equity</td>
<td>Subordinated to debt</td>
</tr>
<tr>
<td>Maturity</td>
<td>Bonded</td>
<td>None</td>
</tr>
<tr>
<td>Tax treatment</td>
<td>Interest deduction</td>
<td>No deduction</td>
</tr>
</tbody>
</table>

Note: The issuer vertices in stated equities/sell agreements to both debt holders and preferred stockholders may receive a voice in managerial affairs, only common stockholders have voting rights.

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### The Nature of Equity Capital:

#### Voice in Management

- Unlike bondholders and other credit holders, holders of equity capital are owners of the firm.
- Common equity holders have voting rights that permit them to elect the firm’s board of directors and to vote on special issues.
- Bondholders and preferred stockholders receive no such privileges.

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### The Nature of Equity Capital:

#### Claims on Income & Assets

- Equity holders are have a residual claim on the firm’s income and assets.
- Their claims can not be paid until the claims of all creditors, including both interest and principle payments on debt have been satisfied.
- Because equity holders are the last to receive distributions, they expect greater returns to compensate them for the additional risk they bear.
The Nature of Equity Capital: Maturity

• Unlike debt, equity capital is a **permanent** form of financing.
• Equity has no maturity date and never has to be repaid by the firm.

The Nature of Equity Capital: Tax Treatment

• While interest paid to bondholders is tax-deductible to the issuing firm, dividends paid to preferred and common stockholders of the corporation is not.
• In effect, this further lowers the cost of debt relative to the cost of equity as a source of financing to the firm.

Common Stock

• Common stockholders, who are sometimes referred to as residual owners or **residual claimants**, are the true owners of the firm.
• As residual owners, common stockholders receive what is left—the residual—after all other claims on the firm’s income and assets have been satisfied.
• Because of this uncertain position, common stockholders expect to be compensated with adequate dividends and ultimately, capital gains.
Common Stock: Ownership

- The common stock of a firm can be **privately owned** by an individual, **closely owned** by a small group of investors, or **publicly owned** by a broad group of investors.
- Typically, small corporations are privately or closely owned and if their shares are traded, this occurs infrequently and in small amounts.
- Large corporations are typically publicly owned and have shares that are actively traded on major securities exchanges.

Common Stock: Par Value

- Unlike bonds, common stock may be sold **without par value**.
- The par value of a common stock is generally low ($1) and is a relatively useless value established in the firm’s **corporate charter**.
- A low par value may be advantageous in states where certain corporate taxes are based on the par value of the stock.

Common Stock: Preemptive Rights

- A **preemptive right** allows common stockholders to maintain their proportionate ownership in a corporation when new shares are issued.
- This allows existing shareholders to maintain **voting control** and protect against the **dilution** of their ownership.
- In a **rights offering**, the firm grants rights to its existing shareholders, which permits them to purchase additional shares at a price below the current price.
Common Stock: Authorized, Outstanding, and Issued Shares

- **Authorized shares** are the number of shares of common stock that a firm’s corporate charter allows.
- **Outstanding shares** are the number of shares of common stock held by the public.
- **Treasury stock** is the number of outstanding shares that have been purchased by the firm.
- **Issued shares** are the number of shares that have been put into circulation and includes both outstanding shares and treasury stock.

Golden Enterprises, a producer of medical pumps, has the following stockholder’s equity account on December 31st.

<table>
<thead>
<tr>
<th>Stockholders’ Equity</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common stock—$0.80 par value:</td>
<td></td>
</tr>
<tr>
<td>Authorized 35,000,000 shares</td>
<td>$12,000,000</td>
</tr>
<tr>
<td>Issued 15,000,000 shares</td>
<td>61,000,000</td>
</tr>
<tr>
<td>Paid-in capital in excess of par</td>
<td>31,000,000</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>106,000,000</td>
</tr>
<tr>
<td>Less: Cost of treasury stock (1,000,000 shares)</td>
<td>4,000,000</td>
</tr>
<tr>
<td>Total stockholders’ equity</td>
<td>100,000,000</td>
</tr>
</tbody>
</table>

Common Stock: Voting Rights

- Each share of common stock entitles its holder to **one vote** in the election of **directors** and on special issues.
- Votes are generally **assignable** and may be cast at the annual stockholders meeting.
- Many firms have issued two or more **classes** of stock differing mainly in having unequal voting rights.
- Usually, **class A** common stock is designated as nonvoting while **class B** is designated as voting.
Common Stock: Voting Rights (cont.)

- Because most shareholders do not attend the annual meeting to vote, they may sign a proxy statement giving their votes to another party.
- Occasionally, when the firm is widely owned, outsiders may wage a proxy battle to unseat existing management and gain control.

Common Stock: Dividends

- Payment of dividends is at the discretion of the board of directors.
- Dividends may be made in cash, additional shares of stock, and even merchandise.
- Because stockholders are residual claimants—they receive dividend payments only after all claims have been settled with the government, creditors, and preferred stockholders.

Common Stock: International Stock Issues

- The international market for common stock is not as large as that for international debt.
- However, cross-border trading and issuance of stock has increased dramatically during the past 20 years.
- Much of this increase has been driven by the desire of investors to diversify their portfolios internationally.
Common Stock: International Stock Issues (cont.)

• Stock Issued in Foreign Markets
  – A growing number of firms are beginning to list their stocks on foreign markets.
  – Issuing stock internationally both broadens the company’s ownership base and helps it to integrate itself in the local business scene.

Common Stock: International Stock Issues (cont.)

• Foreign Stocks in U.S. Markets
  – Only the largest foreign firms choose to list their stocks in the U.S. because of the rigid reporting requirements of the U.S. markets.
  – Most foreign firms instead choose to tap the U.S. markets using ADRs—claims issued by U.S. banks representing ownership shares of foreign stock trading in U.S. markets.

Preferred Stock

• Preferred stock is an equity instrument that usually pays a fixed dividend and has a prior claim on the firm’s earnings and assets in case of liquidation.
• The dividend is expressed as either a dollar amount or as a percentage of its par value.
• Therefore, unlike common stock a preferred stock’s par value may have real significance.
• If a firm fails to pay a preferred stock dividend, the dividend is said to be in arrears.
Preferred Stock (cont.)

• In general, and arrearage must be paid before common stockholders receive a dividend.
• Preferred stocks which possess this characteristic are called cumulative preferred stocks.
• Preferred stocks are also often referred to as hybrid securities because they possess the characteristics of both common stocks and bonds.
• Preferred stocks are like common stock because they are perpetual securities with no maturity date.

Preferred Stock (cont.)

• Preferred stocks are like bonds because they are fixed income securities. Dividends never change.
• Because preferred stocks are perpetual, many have call features which give the issuing firm the option to retire them should the need or advantage arise.
• In addition, some preferred stocks have mandatory sinking funds which allow the firm to retire the issue over time.
• Finally, participating preferred stock allows preferred stockholders to participate with common stockholders in the receipt of dividends beyond a specified amount.

Issuing Common Stock

• Initial financing for most firms typically comes from a firm’s original founders in the form of a common stock investment.
• Early stage debt or equity investors are unlikely to make an investment in a firm unless the founders also have a personal stake in the business.
• Initial non-founder financing usually comes first from private equity investors.
• After establishing itself, a firm will often “go public” by issuing shares of stock to a much broader group.
Venture Capital

• Initial equity financing privately raised by startup or early stage businesses comes from venture capital.

• Venture capitalists are usually formal businesses that maintain strong oversight over firms they invest in and have clearly defined exit strategies.

• Angel investors are one type of venture capitalist who tend to be wealthy individuals who do not take part in management of a business – instead, they invest in the equity of promising early stage companies.

Table 7.2 Organization of Institutional Venture Capital Investors

<table>
<thead>
<tr>
<th>Organization</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small business investment companies</td>
<td>Corporations chartered by the federal government that can borrow at attractive rates from the U.S. Treasury and use the funds to make venture capital investments in private companies.</td>
</tr>
<tr>
<td>Financial VC funds</td>
<td>Subsidiaries of financial institutions, particularly banks, set up to help young firms grow and, if a hoped, become major customers of the institution.</td>
</tr>
<tr>
<td>Corporate VC funds</td>
<td>Firms, sometimes subsidiaries, established by nonfinancial firms, typically to gain access to new technologies that the corporation can acquire further on its own account.</td>
</tr>
<tr>
<td>VC limited partnerships</td>
<td>Limited partnerships organized by professional VC firms, which serve as the general partners and operate, invest, and manage the partnership using the limited partners' funds; the professionals in the partnership and distribute the proceeds to all partners.</td>
</tr>
</tbody>
</table>

Venture Capital: Deal Structure and Pricing

• Venture capital investments are made under legal contracts that clearly allocate responsibilities and interests between all parties.

• Terms depend on factors related to the (a) original founders, (b) business structure, (c) stage of development, and (d) other market and timing issues.

• Specific financial terms depend upon (a) the value of the enterprise, (b) the amount of funding required, and (c) the perceived risk of the investment.
Venture Capital: Deal Structure and Pricing (cont.)

- To control the VC’s risk, various covenants are included in agreements and the actual funding provided may be staggered based on the achievement of measurable milestones.
- The contract will also have a defined exit strategy.
- The amount of equity to which the VC is entitled depends on (a) the value of the firm, (b) the terms of the contract, (c) the exit terms, and (d) minimum return required by the VC.

Going Public

- When a firm wishes to sell its stock in the primary market, it has three alternatives.
- A public offering or IPO, in which it offers its shares for sale to the general public (our focus).
- A rights offering, in which new shares are sold to existing shareholders.
- A private placement, in which the firm sells new securities directly to an investor or a group of investors.

Going Public (cont.)

- IPOs are typically made by small, fast-growing companies that either:
  – require additional capital to continue expanding, or
  – have met a milestone for going public that was established in a contract to obtain VC funding.
- The firm must obtain approval of current shareholders, and hire an investment bank to underwrite the offering.
- The investment banker is responsible for promoting the stock and selling its shares.
Going Public (cont.)

• The company must file a registration statement with the SEC.
• Part of the registration statement is a prospectus, which describes the key aspects of the issue, the issuer, and its management and financial position.
• While waiting for approval, prospective investors can review the firm’s red herring, which is a preliminary prospectus.
• After the IPO is complete, the company must observe a quiet period, which restricts company statements.

Figure 7.1
Cover of a Preliminary Prospectus for a Stock Issue

Going Public (cont.)

• Investment bankers and company officials promote the company through a road show, a series of presentations to potential investors throughout the country and sometimes overseas.
• This helps investment bankers gauge the demand for the offering which helps them to set the initial offer price.
• After the underwriter sets the terms, the SEC must approve the offering.
The Investment Banker’s Role

• Most public offerings are made with the assistance of investment bankers which are financial intermediaries that specialize in selling new securities and advising firms with regard to major financial transactions.

• The main activity of the investment banker is underwriting, which involves the purchase of the security issue from the issuing company at an agreed-on price and bearing the risk of selling it to the public at a profit.

The Investment Banker’s Role (cont.)

• Underwriting syndicates are typically formed when companies bring large issues to the market.

• Each investment banker in the syndicate normally underwrites a portion of the issue in order to reduce the risk of loss for any single firm and insure wider distribution of shares.

• The syndicate does so by creating a selling group which distributes the shares to the investing public.

Figure 7.2 The Selling Process for a Large Security Issue
The Investment Banker’s Role: Cost of Investment Banking Services

• Investment bankers typically earn their return by profiting on the spread.
• The spread is difference between the price paid for the securities by the investment banker and the eventual selling price in the marketplace.
• In general, costs for underwriting equity is highest, followed by preferred stock, and then bonds.
• In percentage terms, costs can be as high as 17% for small stock offerings to as low as 1.6% for large bond issues.

Figure 7.3 Stock Quotations

Common Stock Valuation

• Stockholders expect to be compensated for their investment in a firm’s shares through periodic dividends and capital gains.
• Investors purchase shares when they feel they are undervalued and sell them when they believe they are overvalued.
• This section describes specific stock valuation techniques after first discussing the concept of market efficiency.
Common Stock Valuation: Market Efficiency

- Investors base their investment decisions on their perceptions of an asset’s risk.
- In competitive markets, the interaction of many buyers and sellers results in an equilibrium price—the market value—for each security.
- This price is reflective of all information available to market participants in making buy or sell investment decisions.

Common Stock Valuation: Market Adjustment to New Information

- The process of market adjustment to new information can be viewed in terms of rates of return.
- Whenever investors find that the expected return is not equal to the required return, price adjustment will occur.
- If expected return is greater than required return, investors will buy and bid up price until new equilibrium price is reached.
- The opposite would occur if required return is greater than expected return.

Common Stock Valuation: Market Adjustment to New Information (cont.)

- The expected return can be estimated by using the following equation:
  \[ \hat{r} = \frac{\text{Expected benefit during each period}}{\text{Current price of asset}} \]
- Whenever investors find that the expected return is not equal to the required return, a market price adjustment occurs.
- If the expected return is less than the required return, investors sell the asset because they do not expect it to earn a return commensurate with its risk.
Common Stock Valuation: The Efficient Market Hypothesis

- The **efficient market hypothesis**, which is the basic theory describing the behavior of a “perfect” market specifically states:
  - Securities are typically in equilibrium, meaning they are fairly priced and their expected returns equal their required returns.
  - At any point in time, security prices fully reflect all public information available about a firm and its securities and these prices react quickly to new information.
  - Because stocks are fairly priced, investors need not waste time trying to find and capitalize on improperly priced securities.

Common Stock Valuation: The Behavioral Finance Challenge

- Although considerable evidence supports the concept of market efficiency, research collectively known as behavioral finance has begun to cast doubt on this notion.
- Behavioral finance is a growing body of research that focuses on investor behavior and its impact on investment decisions and stock prices.
- Throughout this book, we ignore both disbelievers and behavioralists and continue to assume market efficiency.

Common Stock Valuation

**Stock Returns** are derived from both dividends and capital gains, where the capital gain results from the appreciation of the stock’s market price due to the growth in the firm’s earnings. Mathematically, the expected return may be expressed as follows:

\[ E(r) = \frac{D}{P} + g \]

For example, if the firm’s $1 dividend on a $25 stock is expected to grow at 7%, the expected return is:

\[ E(r) = \frac{1}{25} + 0.07 = 11\% \]
Stock Valuation Models:  
The Basic Stock Valuation Equation

\[ P_0 = \frac{D_1}{(1 + r_0)^1} + \frac{D_2}{(1 + r_0)^2} + \cdots + \frac{D_n}{(1 + r_0)^n} \]

- \( P_0 \) = value of common stock.
- \( D_t \) = per-share dividend expected at the end of year \( t \)
- \( r_0 \) = required return on common stock

Stock Valuation Models:  
The Zero Growth Model

- The zero dividend growth model assumes that the stock will pay the same dividend each year, year after year.

\[ r_0 = \frac{D_1}{\sum_{t=0}^{\infty} \frac{1}{(1 + r_0)^t}} = \frac{D_1}{(PVIFA, t)} = D_1 \times \frac{1}{r - D_1} \]

Stock Valuation Models:  
The Zero Growth Model (cont.)

The dividend of Denham Company, an established textile manufacturer, is expected to remain constant at $3 per share indefinitely. What is the value of Denham's stock if the required return demanded by investors is 15%?

\[ P_0 = \frac{3}{0.15} = 20 \]

- Note that the zero growth model is also the appropriate valuation technique for valuing preferred stock.
Stock Valuation Models: Constant Growth Model

• The constant dividend growth model assumes that the stock will pay dividends that grow at a constant rate each year—year after year forever.

\[
P_0 = \frac{D_0 \times (1 + g)}{r_s - g} + \frac{D_0 \times (1 + g)^2}{(1 + r_s)^2} + \frac{D_0 \times (1 + g)^3}{(1 + r_s)^3} + \ldots
\]

\[
P_0 = \frac{D_1}{r_s - g}
\]

Stock Valuation Models: Constant Growth Model (cont.)

Lamar Company, a small cosmetics company, paid the following per share dividends:

<table>
<thead>
<tr>
<th>Year</th>
<th>Dividend per share</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>$1.40</td>
</tr>
<tr>
<td>2008</td>
<td>1.29</td>
</tr>
<tr>
<td>2007</td>
<td>1.20</td>
</tr>
<tr>
<td>2006</td>
<td>1.12</td>
</tr>
<tr>
<td>2005</td>
<td>1.05</td>
</tr>
<tr>
<td>2004</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Stock Valuation Models: Constant Growth Model (cont.)

Using Appendix Table A-2 and time value techniques, we can determine that the growth in dividends is 7%.

\[
P_0 = \frac{1.50/(0.15 - 0.07)} = $18.75
\]

• Assuming the values of \(D_1\), \(r_s\), and \(g\) are accurately estimated, Lamar Company’s stock value is $18.75 per share.
Stock Valuation Models: Variable-Growth Model

- The non-constant dividend growth or variable-growth model assumes that the stock will pay dividends that grow at one rate during one period, and at another rate in another year or thereafter.
- We will use a four-step procedure to estimate the value of a share of stock assuming that a single shift in growth rates occurs at the end of year N.
- We will use $g_1$ to represent the initial growth rate and $g_2$ to represent the growth rate after the shift.

Stock Valuation Models: Variable-Growth Model (cont.)

**Step 1.** Find the value of the cash dividends at the end of each year, $D_t$, during the initial growth period, years 1 through $N$.

$$D_t = D_0 \times (1 + g_1)^t = D_0 \times FVIF_{g_1,t}$$

Stock Valuation Models: Variable-Growth Model (cont.)

**Step 2.** Find the present value of the dividends expected during the initial growth period.

$$\sum_{t=0}^{N} \frac{D_t \times (1 + g_1)^t}{(1 + r)^t} = \sum_{t=0}^{N} \frac{D_t}{(1 + r)^t} = \sum_{t=0}^{N} (D_t \times FVIF_{r,t})$$
Step 3. Find the value of the stock at the end of the initial growth period, \( P_N = \frac{D_{N+1}}{(k_s - g_2)} \), which is the present value of all dividends expected from year \( N+1 \) to infinity, assuming a constant dividend growth rate, \( g_2 \).

\[
\frac{1}{(1 + r)^N} \times \frac{D_{N+1}}{r_2 - g_2} = PVF_{N^2} \times P_N
\]

Step 4. Add the present value components found in Steps 2 and 3 to find the value of the stock, \( P_0 \), given in Equation 7.6.

\[
P_0 = \sum_{i=0}^{N} \frac{D_i \times (1 + g_1)^I}{(1 + r_1)^I} + \left[ \frac{1}{(1 + r_1)^N} \times \frac{D_{N+1}}{r_2 - g_2} \right]
\]

The most recent annual (2006) dividend payment of Warren Industries, a rapidly growing boat manufacturer, was $1.50 per share. The firm’s financial manager expects that these dividends will increase at a 10% annual rate, \( g_1 \), over the next three years. At the end of three years (the end of 2009), the firm’s mature is expected to result in a slowing of the dividend growth rate to 5% per year, \( g_2 \), for the foreseeable future. The firm’s required return, \( k_s \), is 15%.
Steps 1 and 2. See Table 7.3 below.

Table 7.3 Calculation of Present Value of Warren Industries Dividends (2010–2012)

<table>
<thead>
<tr>
<th>t</th>
<th>End of year</th>
<th>$D_0 = D_{2009}</th>
<th>PV_{\text{IF}_{15%}}</th>
<th>\frac{D_0}{r} + \frac{1}{1+g} \times \frac{D_1}{r} + \frac{1}{1+g}^2 \times \frac{D_2}{r} + \frac{1}{1+g}^3 \times \frac{D_3}{r}</th>
<th>\text{Present value of dividends}</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2010</td>
<td>$1.10</td>
<td>1.05</td>
<td>$1.10 \times \frac{1}{1.05} + 1.20 \times \frac{1}{1.05}^2 + 1.30 \times \frac{1}{1.05}^3</td>
<td>$5.44</td>
</tr>
<tr>
<td>2</td>
<td>2011</td>
<td>1.30</td>
<td>1.05</td>
<td>1.30 \times \frac{1}{1.05} + 1.35 \times \frac{1}{1.05}^2 + 1.40 \times \frac{1}{1.05}^3</td>
<td>$7.38</td>
</tr>
<tr>
<td>3</td>
<td>2012</td>
<td>1.50</td>
<td>1.05</td>
<td>1.50 \times \frac{1}{1.05} + 1.55 \times \frac{1}{1.05}^2 + 1.60 \times \frac{1}{1.05}^3</td>
<td>$9.00</td>
</tr>
</tbody>
</table>

Sum of present value of dividends = \sum_{t=1}^{3} \frac{D_t}{r} \times \frac{1}{1+g}^t = $5.44

Step 3. The value of the stock at the end of the initial growth period (N = 2009) can be found by first calculating $D_{2010} = D_{2009} \times (1 + 0.05) = $2.00 \times (1.05) = $2.10$

By using $D_{2010} = $2.10, a 15% required return, and a 5% dividend growth rate, we can calculate the value of the stock, $P_{2009}$, at the end of 2009 as follows:

$P_{2009} = \frac{D_{2010}}{r - g} = \frac{2.10}{0.15 - 0.05} = $21.00$

Step 3 (continued). Finally, in Step 3, the share value of $21 at the end of 2009 must be converted into a present (end of 2006) value:

$PVIF_{15\%,3} \times P_{2009} = 0.658 \times 21.00 = $13.82$

Step 4. Adding the PV of the initial dividend stream (found in Step 2) to the PV of the stock at the end of the initial growth period (found in Step 3), we get:

$P_{2006} = 4.14 + 13.82 = $17.96 per share$
This example can be summarized using the time line below:

Stock Valuation Models: Free Cash Flow Model

- The **free cash flow model** is based on the same premise as the dividend valuation models except that we value the firm’s free cash flows rather than dividends.

\[
V_C = \frac{FCF_1}{(1 + r_p)^1} + \frac{FCF_2}{(1 + r_p)^2} + \cdots + \frac{FCF_n}{(1 + r_p)^n}
\]

- \( V_C \) = value of the entire company
- \( FCF_t \) = free cash flow expected at the end of year \( t \)
- \( r_p \) = the firm’s weighted average cost of capital

Stock Valuation Models: Free Cash Flow Model (cont.)

- The free cash flow valuation model estimates the value of the **entire company** and uses the cost of capital as the discount rate.
- As a result, the value of the firm’s debt and preferred stock must be subtracted from the value of the company to estimate the value of equity.

\[
V_E = V_C - V_D - V_P
\]
Dewhurst Inc. wishes to value its stock using the free cash flow model. To apply the model, the firm’s CFO developed the data given in Table 7.4.

### Table 7.4 Dewhurst, Inc.’s Data for the Free Cash Flow Valuation Model

<table>
<thead>
<tr>
<th>Year</th>
<th>FCF</th>
<th>Other data</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>$400,000</td>
<td>Growth rate of FCF, beyond 2010 to infinity, ( g_c = 3% )</td>
</tr>
<tr>
<td>2011</td>
<td>$410,000</td>
<td>Weighted average cost of capital, ( r_c = 9% )</td>
</tr>
<tr>
<td>2012</td>
<td>$420,000</td>
<td>Market value of all debt, ( V_D = $1,000,000 )</td>
</tr>
<tr>
<td>2013</td>
<td>$430,000</td>
<td>Market value of preferred stock, ( V_P = $100,000 )</td>
</tr>
<tr>
<td>2014</td>
<td>$440,000</td>
<td>Number of shares of common stock outstanding = 300,000</td>
</tr>
</tbody>
</table>

*Developed using Equations 7.4 and 7.5 (on pages 714 and 715).*

### Step 1. Calculate the present value of the free cash flow occurring from the end of 2012 to infinity, measured at the beginning of 2012.

\[
\text{Value of FCF}_{2011-\infty} = \frac{FCF_{2011}}{r_c - g_c} = \frac{\$600,000 \times (1 + 0.03)}{0.09 - 0.03} = \frac{\$618,000}{0.06} = \$10,300,000
\]

### Step 2. Add the PV (in 2011) of the FCF for 2012 found in Step 1 to the FCF for 2011 to get total FCF for 2011.

\[
\text{Total FCF}_{2011} = \$600,000 + \$10,300,000 = \$10,900,000
\]

### Step 3. Find the sum of the present values of the FCFs for 2007 through 2011 to determine, \( V_C \), and the market values of debt, \( V_D \), and preferred stock, \( V_P \), given in Table 7.5 on the following slide.
Stock Valuation Models: Free Cash Flow Model (cont.)

Table 7.5 Calculation of the Value of the Entire Company for Dewhurst, Inc.

<table>
<thead>
<tr>
<th>Year</th>
<th>FCFS</th>
<th>PVF at i</th>
<th>Present value of FCFS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>$400,000</td>
<td>0.797</td>
<td>$319,800</td>
</tr>
<tr>
<td>2002</td>
<td>$500,000</td>
<td>0.694</td>
<td>$347,000</td>
</tr>
<tr>
<td>2003</td>
<td>$520,000</td>
<td>0.604</td>
<td>$313,440</td>
</tr>
<tr>
<td>2004</td>
<td>$10,950,000</td>
<td>0.530</td>
<td>$5,781,000</td>
</tr>
</tbody>
</table>

Value of entire company, $V = $5,862,620


$V_E = $8,628,620 - $3,100,000 = $4,728,620

$P_E = $4,728,628 / 300,000 shares = $15.16 per share

Other Approaches to Stock Valuation: Book Value

- **Book value per share** is the amount per share that would be received if all the firm’s assets were sold for their exact book value and if the proceeds remaining after paying all liabilities were divided among common stockholders.

- This method lacks sophistication and its reliance on historical balance sheet data ignores the firm’s earnings potential and lacks any true relationship to the firm’s value in the marketplace.
Other Approaches to Stock Valuation: Liquidation Value

- **Liquidation value** per share is the actual amount per share of common stock to be received if all of the firm’s assets were sold for their market values, liabilities were paid, and any remaining funds were divided among common stockholders.
- This measure is more realistic than book value because it is based on current market values of the firm’s assets.
- However, it still fails to consider the earning power of those assets.

Other Approaches to Stock Valuation: Price/Earnings (P/E) Multiples

- Some stocks pay no dividends—using P/E ratios are one way to evaluate a stock under these circumstances.
- The model may be written as:

\[
P_0 = (\text{EPS}_{t+1}) \times \text{Industry Average P/E}\]

For example, Lamar’s expected EPS is $2.60/share and the industry average P/E multiple is 7, then \( P_0 = 2.60 \times 7 = 18.20 \) share.

Decision Making and Common Stock Value

- Valuation equations measure the stock value at a point in time based on expected return and risk.
- Any decisions of the financial manager that affect these variables can cause the value of the firm to change as shown in the Figure below.

**Figure 7.4** Decision Making and Stock Value
### Decision Making and Common Stock Value: Changes in Dividends or Dividend Growth

- Changes in expected dividends or dividend growth can have a profound impact on the value of a stock.

<table>
<thead>
<tr>
<th>( D_0 )</th>
<th>2.00 $</th>
<th>2.00 $</th>
<th>2.00 $</th>
<th>2.00 $</th>
<th>2.00 $</th>
<th>2.00 $</th>
</tr>
</thead>
<tbody>
<tr>
<td>( g )</td>
<td>3.0%</td>
<td>3.0%</td>
<td>3.0%</td>
<td>3.0%</td>
<td>6.0%</td>
<td>9.0%</td>
</tr>
<tr>
<td>( D_1 )</td>
<td>2.06 $</td>
<td>2.58 $</td>
<td>3.09 $</td>
<td>2.06 $</td>
<td>2.12 $</td>
<td>2.18 $</td>
</tr>
<tr>
<td>( k_s )</td>
<td>10.0%</td>
<td>10.0%</td>
<td>10.0%</td>
<td>10.0%</td>
<td>10.0%</td>
<td>10.0%</td>
</tr>
<tr>
<td>( P_0 )</td>
<td>29.43 $</td>
<td>36.79 $</td>
<td>44.14 $</td>
<td>29.43 $</td>
<td>53.00 $</td>
<td>218.00 $</td>
</tr>
</tbody>
</table>

### Decision Making and Common Stock Value: Changes in Risk and Required Return

- Changes in expected dividends or dividend growth can have a profound impact on the value of a stock.

<table>
<thead>
<tr>
<th>( D_0 )</th>
<th>2.00 $</th>
<th>2.00 $</th>
<th>2.00 $</th>
<th>2.00 $</th>
<th>2.00 $</th>
<th>2.00 $</th>
</tr>
</thead>
<tbody>
<tr>
<td>( g )</td>
<td>3.0%</td>
<td>3.0%</td>
<td>3.0%</td>
<td>3.0%</td>
<td>3.0%</td>
<td>3.0%</td>
</tr>
<tr>
<td>( D_1 )</td>
<td>2.06 $</td>
<td>2.06 $</td>
<td>2.06 $</td>
<td>2.06 $</td>
<td>2.06 $</td>
<td>2.06 $</td>
</tr>
<tr>
<td>( k_s )</td>
<td>5.0%</td>
<td>7.5%</td>
<td>10.0%</td>
<td>12.5%</td>
<td>15.0%</td>
<td>17.5%</td>
</tr>
<tr>
<td>( P_0 )</td>
<td>103.00 $</td>
<td>45.78 $</td>
<td>29.43 $</td>
<td>21.68 $</td>
<td>17.17 $</td>
<td>14.21 $</td>
</tr>
</tbody>
</table>

### Table 7.6 Summary of Key Valuation Definitions and Formulas for Common Stock (cont.)

<table>
<thead>
<tr>
<th>Definitions of variables:</th>
</tr>
</thead>
</table>
| \( D_0 \) = 
pre-stata dividend expected at the end of year  |
| \( P_0 \) = 
value of the entire company |
| \( V_C \) = 
market value of all the common stock |
| \( V_P \) = 
market value of preferred stock |
| \( V_C \) = 
value of common stock |

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### Table 7.6 Summary of Key Valuation Definitions and Formulas for Common Stock

<table>
<thead>
<tr>
<th>Valuation Formula</th>
<th>Description</th>
<th>Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic stock value</td>
<td>$P_0 = \frac{P_1}{1 + g}$</td>
<td>Equation 7.8</td>
</tr>
<tr>
<td>Common stock value</td>
<td>$P_0 = \frac{D_1}{r - g}$</td>
<td>Equation 7.8</td>
</tr>
<tr>
<td>Common growth</td>
<td>$g = \frac{D_1}{P_0}$</td>
<td>Equation 7.8</td>
</tr>
<tr>
<td>Rational growth</td>
<td>$g = \left( \frac{D_0 + g_0}{P_0} \right)^{1/n} - 1$</td>
<td>Equation 7.8</td>
</tr>
<tr>
<td>ICO value of firm</td>
<td>$V = \frac{D_1}{r - g}$</td>
<td>Equation 7.7</td>
</tr>
<tr>
<td>NOP common stock value</td>
<td>$V_0 = \frac{D_1}{r - g}$</td>
<td>Equation 7.4</td>
</tr>
</tbody>
</table>