

Chapter 7 Stock Valuation

- Characteristics of Common Stock
- Common Stock Valuation
- Constant Growth
- Nonconstant Growth
- Expected Rate of Return
- Market Multiple Analysis
- Stock Market Equilibrium
- Efficient Market Hypothesis
- Preferred Stock

Features of Common Stock

- New Issues - Primary Market
 - IPO's - Seasoned Issues
- Secondary Market
- Underwriting - Investment Banker
 - Underwritten Offering - Best Efforts Basis
- Prospectus - Red Herring Statement
- Tombstone Advertisement
- Shelf Registration
- Rights & Privileges
- Par Value - Book Value (SH equity / no of sh)



Feature 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
 - Dividends received by individuals are taxed as ordinary income
 - Dividends received by corporations have a minimum 70% exclusion from taxable income

Common Stock Valuation

Like bonds, the value of common stock is the present value of expected cash flows, which are dividends & future stock price. Dividends are paid _____ ?

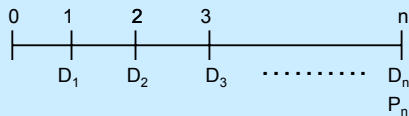
If we assume dividends will go on forever, we have



$$\text{Price} = P_0 = \sum_{t=1}^{\text{Inf.}} \frac{D_t}{(1 + R)^t}$$

Common Stock Valuation continued

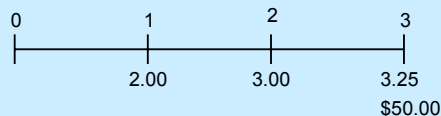
To eliminate the problem of infinite dividends, we can estimate the stock price in the future, and we have



$$\text{Price} = P_0 = \sum_{t=1}^n \frac{D_t}{(1+R)^t} + \frac{P_n}{(1+R)^n}$$

Example Common Stock Valuation

Assume we have 3 dividends, as shown below, and we will sell the stock in year 3 for \$50 and R = 9%.



Common Stock Valuation - Constant Dividends

We can avoid estimating a stock price by assuming constant (non-increasing) dividends forever.

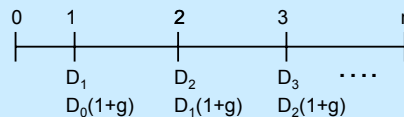


This becomes a perpetuity. If we receive a \$2.00 dividend and R = 9%, then our stock value is

Common Stock Valuation continued

We can refine our estimate by making another assumption, that dividends increase, but by a constant percentage. This gives us the Constant Growth Model or Gordon Model.

If we assume dividends grow at a constant rate, g, then the dividend stream looks as follows:



Constant Growth Model - Gordon Model

We can estimate the stock value as follows:

$$\text{Price} = P_0 = \frac{D_1}{(R - g)}$$

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

Constant Growth Model - Gordon Model Example

Assume D₁ = \$2.00, R = 9%, and g = 5%, what is the value of this stock?

$$\text{Price} = P_0 = \frac{D(1)}{(K - g)}$$

Important Points

$$\text{Price} = P_0 = \frac{D_0 (1 + g)}{(r - g)}$$

Note our 3 models gave us 3 different stock values:

\$45.48, \$22.22, and \$50.00

Which is correct?

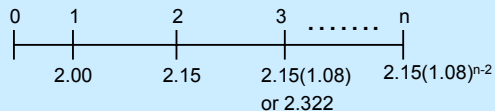
What happens when $g > R$?

For example, $r=8\%$ and $g=12\%$ and $D_0=2.00$

Nonconstant (Supernormal) Growth in Dividends

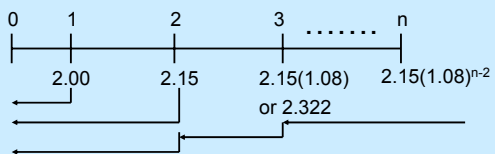
This is the most realistic, but more complicated.

For example, assume $D_1 = 2.00$, $D_2 = 2.15$, $R = 16\%$, and the dividends grow at 8% after period 2.



Find the stock value by finding the present value of these cash flows individually and using the constant growth model.

Nonconstant (Supernormal) Growth in Dividends



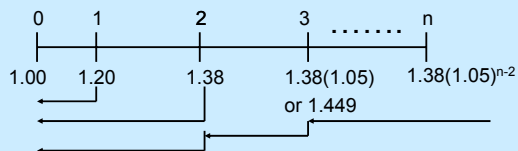
Supernormal Growth Problem Statement

- 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.

Supernormal Growth – Example Solution

- Compute the dividends until growth levels off

Nonconstant (Supernormal) Growth in Dividends



Using the DGM to Find R

- Start with the DGM:

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

rearrange and solve for R

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

Finding the Required Return - Example

- Suppose a firm's stock is selling for \$10.50. They just paid a \$1 dividend and dividends are expected to grow at 5% per year. What is the required return?

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

Estimates of Parameters in the Dividend-Discout Model

- The value of a firm depends upon its growth rate, g , and its discount rate, r .
 - Where does g come from?
 - Where does r come from?

Formula for Firm's Growth Rate

$$g = \text{Retention ratio} \times \text{Return on retained earnings}$$

$$g = (1 - \text{div. payout}) \times \text{ROE}$$

Calculating the Discount Rate - r

The discount rate can be broken into two parts.

- The dividend yield
- The growth rate (in dividends)
- In practice, there is a great deal of estimation error involved in estimating r .

Why are stock prices volatile?

$$P_0 = \frac{D_1}{r_s - g}$$

- $r_s = r_{RF} + (RP_M)b_i$ could change.
 - Inflation expectations
 - Risk aversion
 - Company risk
- g could change.

Stock value vs. changes in r_s and g

$$D_1 = \$2, r_s = 10\%, \text{ and } g = 5\%:$$

$$P_0 = D_1 / (r_s - g) = \$2 / (0.10 - 0.05) = \$40$$

What if r_s or g change?

	g	g	g
r_s	4%	5%	6%
9%	40.00	50.00	66.67
10%	33.33	40.00	50.00
11%	28.57	33.33	40.00

Are volatile stock prices consistent with rational pricing?

- Small changes in expected g and r_s cause large changes in stock prices.
- As new information arrives, investors continually update their estimates of g and r_s .
- If stock prices aren't volatile, then this means there isn't a good flow of information.

What is market equilibrium?

- In equilibrium, stock prices are stable.
- There is no general tendency for people to buy versus to sell.
- The expected price, \hat{P} , must equal the actual price, P . In other words, the fundamental value must be the same as the price.
- In equilibrium, expected returns must equal required returns:

$$r_s = D_1/P_0 + g \Rightarrow r_s = r_{RF} + (r_M - r_{RF})b.$$

How is equilibrium established?

If $r_s = \frac{D_1}{P_0} + g > r_s$, then \hat{P}_0 is "too low."

If the price is lower than the fundamental value, then the stock is a "bargain."

Buy orders will exceed sell orders, the price will be bid up, and D_1/\hat{P}_0 falls until

$$D_1/P_0 + g = r_s = r_s.$$

Price Earnings Ratio

- Many analysts frequently relate earnings per share to price.
- The price earnings ratio is the *multiple*

$$P/E \text{ ratio} = \frac{\text{Price per share}}{EPS}$$

- Firms whose shares are "in fashion" sell at high multiples. *Growth stocks* for example.
- Firms whose shares are out of favor sell at low multiples. *Value stocks* for example.
- Example:
 - Estimate the average P/E ratio of comparable firms. This is the P/E multiple.
 - Multiply this average P/E ratio by the *expected earnings* of the company to estimate its stock price.

Using Entity Multiples

- The entity value (V) is:
 - the market value of equity (# shares of stock multiplied by the price per share)
 - plus the value of debt.
- Pick a measure, such as EBITDA, Sales, Customers, etc.
- Calculate the average entity ratio for a sample of comparable firms. For example,
 - V/EBITDA
 - V/Customers
- To find the entity value of the firm in question:
 - Multiply the firm's sales by the V/Sales comparable multiple or
 - Multiply the firm's # of customers by the comparable V/Customers ratio
- The result is the total value of the firm.
- Subtract the firm's debt to get the total value of equity.
- Divide by the number of shares to get the price per share.

Price-Ratio Analysis for Stetson Inc.

- You have 5 years of data for Stetson Inc. Using ratio analysis compute the expected price for the stock.

	1999	2001	2002	2003	2004	Average
EPS	\$2.95	\$3.25	\$3.46	\$3.55	\$3.88	
P/E	13.40	15.60	16.10	14.20	13.30	14.52
CFPS	\$4.74	\$5.17	\$5.61	\$5.95	\$6.45	
P/CFPS	8.34	9.81	9.93	8.47	8.00	8.91
SPS	\$38.06	\$38.58	\$40.93	\$43.09	\$46.85	
P/SPS	1.04	1.31	1.36	1.17	1.10	1.20

Price Ratio Analysis for ABC (continued)

EP = P/E ratio x EPS x (1 + Earnings growth rate)

Earnings growth rate = $(\$3.88/\$2.95)^{1/4} - 1 = 7.09\%$

Expected price = $14.52 \times \$3.88 (1 + .0709) = \60.33

EP = P/CF ratio x CFPS x (1 + CF growth rate)

CF growth rate = $(\$6.45 / \$4.74)^{1/4} - 1 = 8.01\%$

Expected price = $8.91 \times \$6.45 (1 + .0801) = \62.07

EP = P/S ratio x SPS x (1 + Sales growth rate)

Sales growth rate = $(\$46.85/\$38.06)^{1/4} - 1 = 5.33\%$

Expected price = $1.20 \times \$46.85 (1 + .0533) = \59.22

EP = expected price

Problems with Market Multiple Methods

- It is often hard to find comparable firms.
- The average ratio for the sample of comparable firms often has a wide range.
 - For example, the average P/E ratio might be 20, but the range could be from 10 to 50. How do you know whether your firm should be compared to the low, average, or high performers?

What's the Efficient Market Hypothesis (EMH)?

Securities are normally in equilibrium and are "fairly priced." One cannot "beat the market" except through good luck or inside information.

- Weak form EMH
- Semi-Strong form EMH
- Strong form EMH

Definitions & Implications

- Weak-form EMH:
 - Can't profit by looking at past trends. Evidence supports weak-form EMH, but "technical analysis" is still used.
- Semistrong-form EMH:
 - All publicly available information is reflected in stock prices
- Strong-form EMH:
 - All information, even inside information, is embedded in stock prices. Insiders can gain by trading on the basis of insider information, but that's illegal.

Markets are generally efficient

- 100,000 or so trained analysts--MBAs, CFAs, and PhDs--work for firms like Fidelity, Merrill, Morgan, and Prudential.
- These analysts have similar access to data and billions to invest.
- Thus, news is reflected in P_0 almost instantaneously.

Preferred Stock

- Hybrid security.
- Preferred stockholders receive a fixed dividend which must be paid before dividends can be paid on common stock.
- Preferred stock dividends can be omitted without fear of pushing the firm into bankruptcy.

What's the expected return on preferred stock with $V_{ps} = \$50$ and annual dividend = \$5?

$$V_{ps} = \$50 = \frac{\$5}{\hat{r}_{ps}}$$

$$\hat{r}_{ps} = \frac{\$5}{\$50} = 0.10 = 10.0\%.$$