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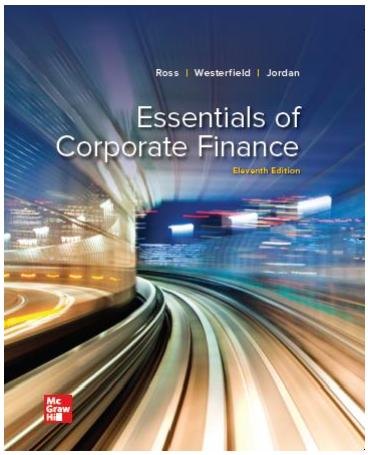
Chapter 07

Equity Markets and 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

7.1 Common Stock Valuation.

7.2 Some Features of Common and Preferred Stock.

7.3 The Stock Markets.

Cash Flows for Stockholders

If you own 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.

- Dividends → cash income.
- Selling → capital gains.

One-Period Example 1

Suppose you are thinking of purchasing the stock of Moore Oil, Inc.

- You expect it to pay a $2 dividend in one year.
- You believe you can sell the stock for $14 at that time.
- You require a return of 20 percent on investments of this risk.
- What is the maximum you would be willing to pay?

One-Period Example 2

D_1 = $2 dividend expected in one year.

R = 20 percent.

P_1 = $14.

CF_1 = $2 + 14 = $16.

Compute the PV of the expected cash flows.

$$P_0 = \frac{(\$2 + 14)}{1.20} = \$13.33$$

Two-Period Example

What if you decide to hold the stock for two years?

- D_1 = \$2.00 CF_1 = \$2.00.
- D_2 = \$2.10.
- P_2 = \$14.70.

} CF_2 = \$2.10 + 14.70 = \$16.80

- Now how much would you be willing to pay?

$$P_0 = \frac{2}{1.20} + \frac{(\$2.10 + 14.70)}{1.20^2} = \$13.33$$

Three-Period Example

What if you decide to hold the stock for three years?

- D_1 = \$2.00 CF_1 = \$2.00.
- D_2 = \$2.10 CF_2 = \$2.10.
- D_3 = \$2.205.
- P_3 = \$15.435.

} CF_3 = \$2.205 + 15.435 = \$17.640

- Now how much would you be willing to pay?

$$P_0 = \frac{2}{1.20} + \frac{\$2.10}{1.20^2} + \frac{2.205 + 15.435}{1.20^3} = \$13.33$$

Three-Period Example Using TI BAII + Cash Flow Worksheet

Cash Flows:

CF0 = 0
CF1 = 2.00
CF2 = 2.10
CF3 = 17.64

Display	*You Enter*	
	CF	
C00	*0*	*Enter, Down*
C01	*2*	*Enter, Down*
F01	*1*	*Enter, Down*
C02	*2.10*	*Enter, Down*
F02	*1*	*Enter, Down*
C03	*17.64*	*Enter, Down*
F03	*1*	*Enter, Down NPV*
I	*20*	*Enter, Down CPT*
NPV $13.33		

Developing the Model

You could continue to push back when you would sell the stock.

You would find that the price of the stock is really just the *present value of all expected future dividends.*

Stock Value = PV of Dividends

$$\hat{P}_0 = \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \frac{D_3}{(1+R)^3} + \ldots + \frac{D_\infty}{(1+R)^\infty}$$

$$\hat{P}_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+R)^t}$$

How can we estimate all future dividend payments?

Estimating Dividends Special Cases

Constant dividend/Zero Growth.

- Firm will pay a constant dividend forever.
- Like preferred stock.
- Price is computed using the perpetuity formula.

Constant dividend growth.

- Firm will increase the dividend by a constant percent every period.

Supernormal growth.

- Dividend growth is not consistent initially, but settles down to constant growth eventually.

Zero Growth

Dividends expected at regular intervals forever = perpetuity.

$$P_0 = D / R$$

Suppose stock is expected to pay a $.50 dividend every quarter and the required return is 10 percent with quarterly compounding. What is the price?

$$P_0 = \frac{\$.50}{.10/4} = \$20$$

Constant Growth Stock

One whose dividends are expected togrow forever at a constant rate, g.

$$D_1 = D_0(1+g)^1$$

$$D_2 = D_0(1+g)^2$$

$$D_t = D_0(1+g)^t$$

D_0 = Dividend JUST PAID.

D_1 to D_t = Expected dividends.

Projected Dividends

D_0 = \$2.00 and constant g = 6 percent.

$D_1 = D_0(1 + g) = 2(1.06) = \$2.12.$

$D_2 = D_1(1 + g) = 2.12(1.06) = \$2.2472.$

$D_3 = D_2(1 + g) = 2.2472(1.06) = \$2.3820.$

Dividend Growth Model

$$\hat{P}_0 = D_0 \sum_{t=1}^{\infty} \frac{(1+g)^t}{(1+R)^t}$$

$$\hat{P}_0 = \frac{D_0(1+g)}{R-g} = \frac{D_1}{R-g}$$

"Gordon growth model"

DGM: Example 1

Suppose Big D, Inc., just paid a dividend of $.50. It is expected to increase its dividend by 2 percent per year. If the market requires a return of 15 percent on assets of this risk, how much should the stock be selling for?

- D_0= $.50.
- g = 2%.
- R = 15%.

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

$$P_0 = \frac{\$.50(1+.02)}{.15-.02} = \$3.92$$

DGM: Example 2

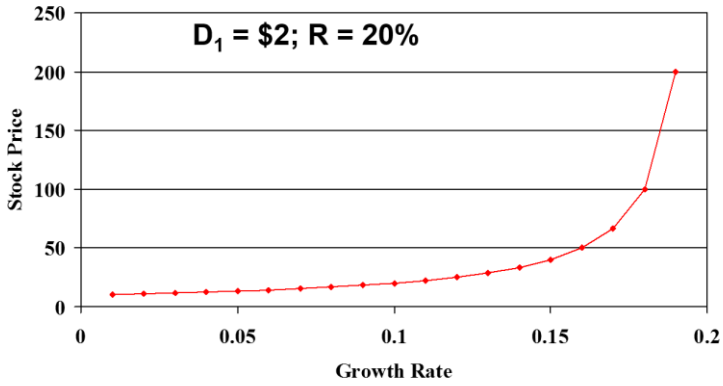
Suppose TB Pirates, Inc., is expected to pay a $2 dividend in one year. If the dividend is expected to grow at 5 percent per year and the required return is 20 percent, what is the price?

- D_1 = $2.00
- g = 5%
- r = 20%

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

$$P_0 = \frac{\$2.00}{.20-.05} = \$13.33$$

Stock Price Sensitivity to Dividend Growth, *g*



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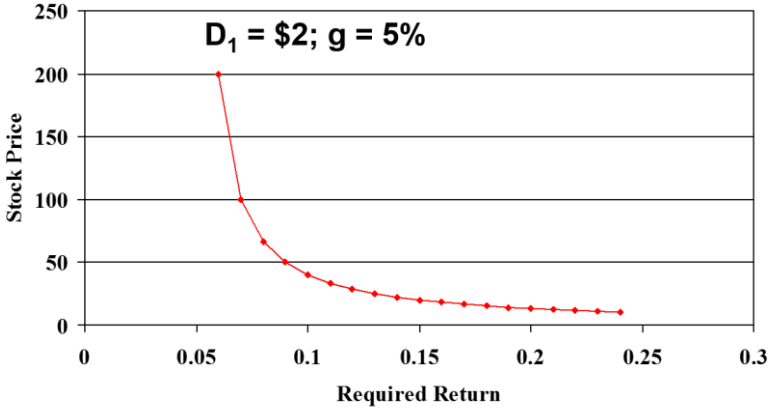
Stock Price Sensitivity to Required Return, *R*



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Example 7.3 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 percent per year. The required return is 16 percent.

What is the current price?

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

$$P_0 = \frac{\$4.00}{.16 - .06} = \$40$$

Example 7.3 Gordon Growth Company II [1]

What is the price expected to be in Year 4?

$$P_4 = \frac{D_4(1+g)}{R-g} = \frac{D_5}{R-g}$$

$$D_5 = D_1(1+g)^4$$

$$P_4 = \frac{\$4.00(1+.06)^4}{.16-.06} = \$50.50$$

Example 7.3 Gordon Growth Company II [2]

What is the implied return given the change in price during the four-year period?

$$\$50.50 = \$40(1 + \text{return})^4 ; \text{return} = 6 \text{ percent}$$

$$4 \text{ N}; \ -40 \text{ PV}; 50.50 \text{ FV}; 0 \text{ PMT}; \text{CPT I/Y} = 6\%$$

The price grows at the same rate as dividends.

Constant Growth Model Conditions

1. Dividend expected to grow at *g* forever.
2. Stock price expected to grow at *g* forever.
3. Expected dividend yield is constant.
4. Expected capital gains yield is constant and equal to *g.*
5. Expected total return, *R*, must be > *g.*
6. Expected total return (*R*):

   = Expected dividend yield (DY).

   + Expected growth rate (g).

   = Dividend yield + *g.*

Nonconstant Growth

Suppose a firm is expected to increase dividends by 20 percent in one year and by 15 percent in two years. After that dividends will increase at a rate of 5 percent per year indefinitely. If the last dividend was $1 and the required return is 20 percent, what is the price of the stock?

Remember that we have to find the PV of ***all*** expected future dividends.

Nonconstant Growth – Solution

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 at the beginning of the constant growth period:

- $P_2 = D_3 / (R - g) = \$1.449 / (.2 - .05) = \$9.66.$

Find the present value of the expected future cash flows.

- $P_0 = \$1.20 / 1.2 + (\$1.38 + 9.66) / 1.2^2 = \$8.67.$

Nonconstant + Constant Growth 1

Basic PV of all Future Dividends Formula

$$\hat{P}_0 = \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \frac{D_3}{(1+R)^3} + \ldots + \frac{D_\infty}{(1+R)^\infty}$$

Dividend Growth Model

$$\hat{P}_t = \frac{D_{t+1}}{R-g}$$

Nonconstant + Constant Growth 2

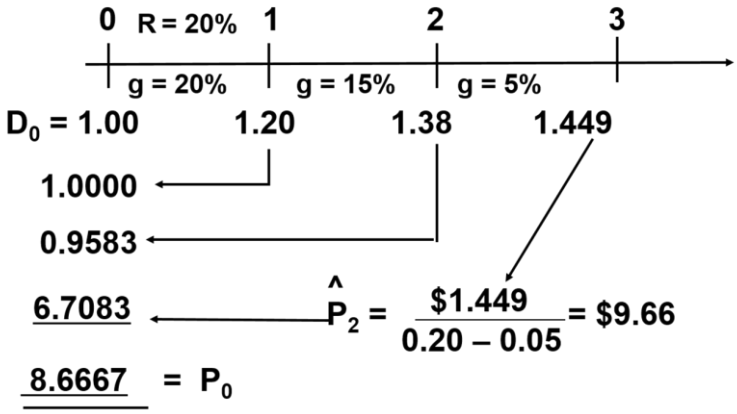
$$\hat{P}_0 = \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \frac{P_2}{(1+R)^2}$$

Because $P_1 = \sum_{t=3}^{\infty} \frac{D_t}{(1+R)^t}$

If g constant after t = 2, then

$$P_2 = \frac{D_3}{R-g}$$

Nonconstant Growth Followed by Constant Growth



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Quick Quiz: Part 1

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 percent?

$$P_0 = \frac{\$2.00}{.15} = \$13.33$$

What if the company starts increasing dividends by 3 percent per year beginning with the next dividend? The required return remains at 15 percent.

$$P_0 = \frac{\$2.00(1.03)}{.15 - .03} = \$17.17$$

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 1

A firm's stock is selling for $10.50. They just paid a $1 dividend and dividends are expected to grow at 5 percent per year.

What is the required return?

Finding the Required Return Example 2

P_0 = \$10.50.

D_0 = \$1.

g = 5 percent per year.

What is the required return?

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

$$R = \frac{1.00(1.05)}{10.50} + .05 = 15\%$$

Finding the Required Return Example 3

P_0 = \$10.50.

D_0 = \$1.

g = 5 percent per year.

What is the dividend yield?

$\$1(1.05) / \$10.50 = .10,$ or 10%.

What is the capital gains yield?

g = 5%.

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

$$R = \frac{D_1}{P_0} + g$$

$$R = \frac{\$1.00(1.05)}{\$10.50} + .05 = 15\%$$

Dividend Yield | Capital Gains Yield

Valuation Using Multiples

For stocks that don't pay dividends (or have erratic dividend growth rates), we can value them using the price-earnings (PE) ratio and/or the price-sales ratio:

$$\text{Price at time } t = P_t$$
$$= \text{Benchmark PE ratio} \times \text{Earnings per share}_t$$

$$\text{Price at time } t = P_t$$
$$= \text{Benchmark price-sales ratio} \times \text{Sales per share}_t$$

- *The price-sales ratio can be especially useful when earnings are negative.*

Valuation Using Multiples Example

Suppose we are trying to value the company Inactivision, a video game developer that does not pay dividends. If the appropriate industry PE for this type of company is 20 and you predict earnings to be $2.50 per share for the coming year, then the forecasted stock price for a year from now, or *target* price, is the following:

Target price = 20 × $2.50 = $50

Table 7.2 1

Table 7.2 Summary of Stock Valuation

I. The general case

In general, the price today of a share of stock, P_0, is the present value of all of its future dividends, D_1, D_2, D_3, … :

$$P_0 = \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \frac{D_3}{(1+R)^3} + \dots$$

where R is the required return.

II. Constant growth case

If the dividend is constant and equal to D, then the price can be written as:

$$P_0 = \frac{D}{R}$$

Table 7.2 2

If the dividend grows at a steady rate g, then the price can be written as:

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

This result is called the *dividend growth model*.

III. Nonconstant Growth

If the dividend grows steadily after t periods, then the price can be written as:

$$P_0 = \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \cdots + \frac{D_t}{(1+R)^t} + \frac{P_t}{(1+R)^t}$$

where:

$$P_t = \frac{D_t \times (1+g)}{(R-g)}$$

Table 7.2 3

IV. The required return, *R*, can be written as the sum of two things:

$$R = D_1 / P_0 + g$$

where D_1 / P_0 is the *dividend yield* and *g* is the *capital gains yield*

(which is the same thing as the growth rate in dividends for the steady growth case).

V.Valuation Using Comparables

For stocks that don't pay dividends (or have erratic dividend growth rates), we can value them using the PE ratio and/or the price-sales ratio:

$$P_t = \text{Benchmark PE ratio} \times \text{EPS}_t$$

$$P_t = \text{Benchmark price} - \text{sales ratio} \times \text{Sales per share}_t$$

Features of Common Stock 1

Voting Rights.

- Stockholders elect directors.
- Cumulative voting versus Straight voting.
- Boards are often staggered, or "classified."
- Proxy voting.

Classes of stock.

- Founders' shares.
- Class A and Class B shares.

Return to Quiz

Features of Common Stock 2

Other Rights.

Share proportionally in declared dividends.

Share proportionally in remaining assets during liquidation.

Preemptive right.

- Right of first refusal to buy new stock issue to maintain proportional ownership if desired.

Return to Quiz

Dividend Characteristics

Dividends are not a liability of the firm until declared by the Board of Directors.

- A firm cannot go bankrupt for not declaring dividends.

Dividends and Taxes.

- Dividends are not tax deductible for firm.
- Taxed as ordinary income for individuals.
- Dividends received by corporations have a minimum 70 percent exclusion from taxable income.

Features of Preferred Stock

Dividends.

Must be paid before dividends can be paid to common stockholders.

Not a liability of the firm.

Can be deferred indefinitely.

Most preferred dividends are cumulative.

- Missed preferred dividends have to be paid before common dividends can be paid.

Preferred stock generally does not carry voting rights.

Return to Quiz

The Stock Markets

Primary versus Secondary Markets.

- Primary = new-issue market.
- Secondary = existing shares traded among investors.

Dealers versus Brokers.

- Dealer: Maintains an inventor.

  Ready to buy or sell at any time.

  Think “Used car dealer.”

- Broker: Brings buyers and sellers together.

  Think “Real estate broker.”

New York Stock Exchange (NYSE)

NYSE.

- Merged with Euronext in 2007.
- NYSE Euronext merged with the American Stock Exchange in 2008.

Members (Historically).

- Buy a trading license (own a seat).
- Designated market makers, DMMs (formerly known as “specialists”).
- Floor brokers.
- Supplemental liquidity providers (SLPs).

NYSE Operations

Operational goal = attract order flow.

NYSE DMMs:

Assigned broker/dealer.

- Each stock has one assigned DMM.
- All trading in that stock occurs at the “DMM’s post.”

Trading takes place between customer orders placed with the DMMs and “the crowd.”

“Crowd”= Floor brokers and SLPs.

Nasdaq

Nasdaq (merged with OMX in 2007).

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.

ECNs

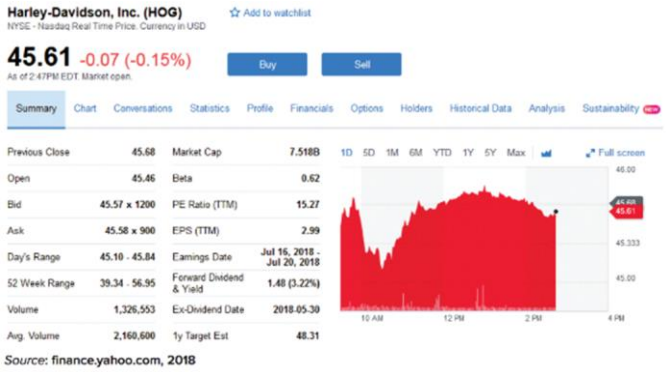
Electronic Communications Networks provide direct trading among investors.

Developed in late 1990s.

ECN orders transmitted to Nasdaq.

Observe live trading online: markets.cboe.com/us/equities.

Reading Stock Quotes



Harley-Davidson, Inc. (HOG) ☆ Add to watchlist
NYSE - Nasdaq Real Time Price. Currency in USD

45.61 -0.07 (-0.15%) Buy Sell
As of 2:47PM EDT. Market open.

Summary | Chart | Conversations | Statistics | Profile | Financials | Options | Holders | Historical Data | Analysis | Sustainability

Previous Close	45.68	Market Cap	7.518B
Open	45.46	Beta	0.62
Bid	45.57 x 1200	PE Ratio (TTM)	15.27
Ask	45.58 x 900	EPS (TTM)	2.99
Day's Range	45.10 - 45.84	Earnings Date	Jul 16, 2018 - Jul 20, 2018
52 Week Range	39.34 - 56.95	Forward Dividend & Yield	1.48 (3.22%)
Volume	1,326,553	Ex-Dividend Date	2018-05-30
Avg. Volume	2,160,600	1y Target Est	48.31

1D 5D 1M 6M YTD 1Y 5Y Max | Full screen

46.00 | 45.667 | 45.61 | 45.333 | 45.00 | 10 AM | 12 PM | 2 PM | 4 PM

Source: finance.yahoo.com, 2018

What information is provided in the stock quote?

Click on this link to go to Bloomberg for current stock quotes.

Access the text alternative for slide images.

Work the Web

Not only are stock price quotes readily available online. Some online trading sites display their “order book” or “limit order book” live online.

The BATS Exchange was one of these websites until it was purchased by the CBOE in 2016.

Follow this link to see current buy and sell orders for Microsoft (MSFT).

Quick Quiz: Part 2 1

You observe a stock price of $18.75. You expect a dividend growth rate of 5 percent and the most recent dividend was $1.50. What is the required return?

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

$$R = \frac{1.50(1.05)}{18.75} + 0.5 = 13.4\%$$

Quick Quiz: Part 2 2

What are some of the major characteristics of common stock? (Slide 40 and Slide 41).

What are some of the major characteristics of preferred stock? (Slide 43).

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