

# 6

## Common Stock Valuation

- **Security Analysis**
- **The Dividend Discount Model**
- **The Two-Stage Dividend Growth Model**
- **Price Ratio Analysis**
- **An Analysis**
- **Summary & Conclusions**

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## Common Stock Valuation

- Our goal in this chapter is to examine the methods commonly used by financial analysts to assess the economic value of common stocks.
- These methods are grouped into two categories:
  - **Dividend discount models**
  - **Price ratio models**

6-2

## Security Analysis: Be Careful Out There

- **Fundamental analysis**
  - Study a firm's accounting statements and other financial and economic information to estimate the economic value of a company's stock.
- Try to identify "undervalued" stocks and "overvalued" stocks
- In practice such stocks may be correctly priced for reasons not immediately apparent to the analyst.

6-3

## The Dividend Discount Model

- **Dividend Discount Model (DDM)**
  - Estimate the value of a stock by discounting all expected future dividend payments:

$$V(0) = \frac{D(1)}{(1+k)} + \frac{D(2)}{(1+k)^2} + \frac{D(3)}{(1+k)^3} + \dots + \frac{D(T)}{(1+k)^T}$$

6-4

## Example: The Dividend Discount Model

- Suppose that a stock will pay three annual dividends of \$200 per year, and the appropriate risk-adjusted discount rate,  $k$ , is 8%. What is the value of the stock today?

$$V(0) = \frac{D(1)}{(1+k)} + \frac{D(2)}{(1+k)^2} + \frac{D(3)}{(1+k)^3}$$

$$V(0) = \frac{\$200}{(1+0.08)} + \frac{\$200}{(1+0.08)^2} + \frac{\$200}{(1+0.08)^3} = \$515.42$$

6-5

## Example: The Dividend Discount Model

- Suppose that a stock will pay three annual dividends  $D(1)$  \$5,  $D(2)$  \$15, and  $D(3)$  \$25, and the appropriate risk-adjusted discount rate,  $k$ , is 10%. What is the value of the stock today?

$$V(0) = \frac{D(1)}{(1+k)} + \frac{D(2)}{(1+k)^2} + \frac{D(3)}{(1+k)^3}$$

$$V(0) = \frac{\$5}{(1+0.10)} + \frac{\$15}{(1+0.10)^2} + \frac{\$25}{(1+0.10)^3} = \$35.73$$

6-6

### The Dividend Discount Model: the *Constant Growth Rate Model*

- Assume that the dividends will grow at a constant growth rate  $g$ .

- Then, the dividend next period ( $t + 1$ ) is:

$$D(t + 1) = D(t) \times (1 + g)$$

- The DDM formula becomes:

$$V(0) = \frac{D(0)(1+g)}{k-g} \left[ 1 - \left( \frac{1+g}{1+k} \right)^T \right] \quad \text{if } k \neq g$$

$$V(0) = T \times D(0) \quad \text{if } k = g$$

6-7

### Example: The Constant Growth Rate Model

- Suppose the current dividend is \$2, the dividend growth rate is 6%, there will be 30 yearly dividends, and the appropriate discount rate is 12%. What is the value of the stock, based on the constant growth rate model?

$$V(0) = \frac{D(0)(1+g)}{k-g} \left[ 1 - \left( \frac{1+g}{1+k} \right)^T \right] \quad \text{if } k \neq g$$

$$V(0) = \frac{\$2 \times (1.06)}{.12 - .06} \left[ 1 - \left( \frac{1.06}{1.12} \right)^{30} \right] = \$28.56$$

6-8

### The Dividend Discount Model: the *Constant Perpetual Growth Model*.

- Assume that dividends will grow *forever* at a constant growth rate  $g$ .

- The DDM formula becomes:

$$V(0) = \frac{D(0) \times (1+g)}{k-g} = \frac{D(1)}{k-g} \quad g < k$$

Sometimes called the "Gordon growth model"

6-9

### Example: *Constant Perpetual Growth Model*

- In mid-2004, the dividend paid by the utility company, American Electric Power (AEP), was \$1.40.
- Using  $D(0) = \$1.40$ ,  $k = 6.5\%$ , and  $g = 1.5\%$ , calculate an estimated value for AEP.

$$V(0) = \frac{D(1)}{k-g} \quad g < k$$

$$V(0) = \frac{\$1.40 \times (1.015)}{.065 - .015} = \$28.42$$

Note: the actual mid-2004 stock price of AEP was \$33.12

6-10

### The Dividend Discount Model: Estimating the Growth Rate

- The growth rate in dividends ( $g$ ) can be estimated in a number of ways.
  - Use the company's historical average growth rate.
  - Use an industry median or average growth rate.
  - Use the *sustainable growth rate*.

6-11

### The Historical Average Growth Rate

- Suppose the Stetson Company paid the following dividends:
  - 1998: \$1.55      2001: \$1.90
  - 1999: \$1.65      2002: \$2.00
  - 2000: \$1.85      2003: \$2.10
- The spreadsheet below estimates historical average growth rates, using arithmetic and geometric averages.

Year:	Dividend:	Pct. Chg:	1 + Pct	
2003	\$2.10	5.00%	105.00%	
2002	\$2.00	5.26%	105.26%	
2001	\$1.90	2.70%	102.70%	Grown at
2000	\$1.85	12.12%	112.12%	Year: 6.26%
1999	\$1.65	6.45%	106.45%	1998
1998	\$1.55			1999
				2000
				2001
				2002
				2003
	Arithmetic Average:	6.31%		
	Geometric Average:	6.26%	6.26%	

6-12

## The Sustainable Growth Rate

$$\begin{aligned} \text{Sustainable Growth Rate} &= \text{ROE} \times \text{Retention Ratio} \\ &= \text{ROE} \times (1 - \text{Payout Ratio}) \end{aligned}$$

- Return on Equity (ROE) = Net Income / Equity
- Payout Ratio = Proportion of earnings paid out as dividends  
DPS / EPS
- Retention Ratio = Proportion of earnings retained for investment  
1 - Payout Ratio

6-13

## Example: Calculating and Using the Sustainable Growth Rate

- In 2004, AEP had an ROE of 8%, projected earnings per share of \$2.32, and a per-share dividend of \$1.40. What was AEP's Sustainable growth rate?
- Payout ratio =  
 $\$1.40 / \$2.32 = .603$
- Retention ratio =  
 $1 - .603 = .397$  or 39.7%
- Sustainable growth rate = SGR =  
 $8\% \times .397 = 3.18\%$

6-14

## Example: Calculating and Using the Sustainable Growth Rate, Cont.

- What is the value of AEP stock, using the perpetual growth model, and a discount rate of 6.5%?
- Recall the actual mid-2003 stock price of AEP was \$33.12.

$$V(0) = \frac{\$1.40 \times (1.0318)}{.065 - .0318} = \$43.51 \gg \$33.12$$

- There was news of declining operations at this time, so there was considerable uncertainty regarding AEP. Dividend growth models do not do well under severe uncertainty.

6-15

## The Two-Stage Dividend Growth Model

- The two-stage dividend growth model assumes that a firm will initially grow at a rate  $g_1$  for  $T$  years, and thereafter grow at a rate  $g_2 < k$  during a perpetual second stage of growth.
- The Two-Stage Dividend Growth Model formula is:

$$V(0) = \frac{D(0)(1+g_1)}{k-g_1} \left[ 1 - \left( \frac{1+g_1}{1+k} \right)^T \right] + \left( \frac{1+g_1}{1+k} \right)^T \frac{D(0)(1+g_2)}{k-g_2}$$

6-16

## Using the Two-Stage Dividend Growth Model, I.

- Suppose Stetson Inc. has a current dividend of  $D(0) = \$2$ , which is expected to grow at the rate  $g_1 = 11\%$  for 4 years, but grow at the rate  $g_2 = 6\%$  forever. The discount rate,  $k = 12\%$ . What is the value of the stock?

$$V(0) = \frac{D(0)(1+g_1)}{k-g_1} \left[ 1 - \left( \frac{1+g_1}{1+k} \right)^T \right] + \left( \frac{1+g_1}{1+k} \right)^T \frac{D(0)(1+g_2)}{k-g_2}$$

6-17

## Using the Two-Stage Dividend Growth Model, II.

$$V(0) = \frac{D(0)(1+g_1)}{k-g_1} \left[ 1 - \left( \frac{1+g_1}{1+k} \right)^T \right] + \left( \frac{1+g_1}{1+k} \right)^T \frac{D(0)(1+g_2)}{k-g_2}$$

$$V(0) = \frac{\$2.00(1+.11)}{0.12-0.11} \left[ 1 - \left( \frac{1.11}{1+0.12} \right)^4 \right] + \left( \frac{1.11}{1+0.12} \right)^4 \frac{\$2.00(1+0.06)}{0.12-0.06}$$

$$= \$7.82 + \$34.09 = \$41.91$$

6-18

### Example: Using the DDM to Value a Firm Experiencing "Supernormal" Growth, I.

- Stetson Inc has been growing at a rate of 20% per year.
- You believe that this rate will last for only 3 more years.
- Then, you think the rate will drop to 5% per year.
- Total dividends just paid were \$10 million.
- The required rate of return is 15%.
- What is the total value of Stetson Inc.?

6-19

### Example: Using the DDM to Value a Firm Experiencing "Supernormal" Growth, II.

- First, calculate the total dividends over the "supernormal" growth period:

Year	Total Dividend: (in \$millions)
1	\$10.00 x 1.20 = \$12.00
2	\$12.00 x 1.20 = \$14.40
3	\$14.40 x 1.20 = \$17.28

- Using the long run growth rate,  $g$ , the value of all the shares at Time 3 can be calculated as:

$$V(3) = [D(3) \times (1 + g)] / (k - g)$$

$$V(3) = [\$17.28 \times 1.05] / (0.15 - 0.05) = \$181.44$$

6-20

### Example: Using the DDM to Value a Firm Experiencing "Supernormal" Growth, III.

- To find the present value of the firm today, we find the present value of \$181.44 and the present value of the dividends paid in the first 3 years:

$$V(0) = \frac{D(1)}{(1+k)} + \frac{D(2)}{(1+k)^2} + \frac{D(3)}{(1+k)^3} + \frac{V(3)}{(1+k)^3}$$

$$V(0) = \frac{\$12.00}{(1+0.15)} + \frac{\$14.40}{(1+0.15)^2} + \frac{\$17.28}{(1+0.15)^3} + \frac{\$181.44}{(1+0.15)^3}$$

$$= \$10.43 + \$10.89 + \$11.36 + \$119.30$$

$$= \$151.99 \text{ million.}$$

- If there were 10 million shares, the stock would be worth \$15.20 per share.

6-21

### Discount Rates for Dividend Discount Models

Start with the CAPM (covered in a later chapter):

$$\text{Discount rate} = \text{Risk-free rate} + (\text{Stock beta} \times \text{Market risk premium})$$

where:

Risk-free rate = U.S. T-bill rate, which is the wait component or time value of money.

Stock beta measures the individual stock's risk relative to the market.

Market risk premium measures the difference in return between investing in the market and investing in T-bills.

6-22

### Discount Rate Example

Assume T-bills yield 4.5%; KO's beta is 1.15; and the market risk premium = 8%

$$\text{Discount rate} = 4.5\% + (1.15 \times 8\%) = 13.70\%$$

Using the CPGM with  $D(0) = \$2$  and  $g = 6\%$ :

$$V(0) = \$2(1.06)/(.1370 - .06) = \$27.53$$

What if the MRP were 9%?

$$DR = 4.5\% + (1.15 \times 9\%) = 14.85\%$$

$$V(0) = \$2(1.06)/(.1485 - .06) = \$23.95$$

What if  $g = 7\%$ ?

$$V(0) = \$2(1.07)/(.1370 - .07) = \$31.94$$

6-23

### Observations on Dividend Discount Models, I.

#### Constant Perpetual Growth Model:

- Simple to compute
- Not usable for firms that do not pay dividends
- Not usable when  $g > k$
- Is sensitive to the choice of  $g$  and  $k$
- $k$  and  $g$  may be difficult to estimate accurately.
- Constant perpetual growth is often an unrealistic assumption.

6-24

## Observations on Dividend Discount Models, II.

### **Two-Stage Dividend Growth Model:**

- More realistic in that it accounts for two stages of growth
- Usable when  $g > k$  in the first stage
- Not usable for firms that do not pay dividends
- Is sensitive to the choice of  $g$  and  $k$
- $k$  and  $g$  may be difficult to estimate accurately.

6-25

## Residual Income Model

- For firms that don't pay dividends, can use the RIM
- Considers residual earnings over "required earnings" or economic value added
- Similar to constant growth dividend model

$$P_0 = \frac{EPS_1 - B_0 \times g}{k - g}$$

- Where  $EPS$  are next years earning
- $B(0)$  is book value of equity at the beginning of the period
- And  $k$  is the required return,  $g$  is the growth rate

6-26

## Residual Income Model

- Stetson Corporation has
- $EPS(0) = \$0.55$
- $DIV = \$0$
- Book value,  $B(0) = \$3.56$
- $g = 6\%$  and  $K = 12\%$
- Compute the stock price using RIM

$$P_0 = \frac{EPS_1 - B_0 \times g}{k - g} =$$

$$P_0 = \frac{(0.55) \times (1 + .06) - 3.56 \times 0.06}{0.12 - 0.06}$$

$$P_0 = \$6.157$$

6-27

## Price Ratio Analysis, I.

- *Price-earnings ratio (P/E ratio)*
  - Current stock price divided by annual earnings per share (EPS)
- *Earnings yield*
  - Inverse of the P/E ratio: earnings divided by price (E/P)
- Growth – high P/E
- Value – low P/E

6-28

## Price Ratio Analysis, II.

- *Price-cash flow ratio (P/CF ratio)*
  - Current stock price divided by current cash flow per share
  - cash flow = net income + depreciation = cash flow from operations or operating cash flow
- Cash flow is more informative than net income.
- Earnings and cash flows that are far apart may be a signal of poor quality earnings.

6-29

## Price Ratio Analysis, III.

- *Price-sales ratio (P/S ratio)*
  - Current stock price divided by annual sales per share
  - A high P/S ratio suggests high sales growth, while a low P/S ratio suggests sluggish sales growth.
- *Price-book ratio (P/B ratio)*
  - Market value of a company's common stock divided by its book (accounting) value of equity (assets – liabilities)
  - A ratio bigger than 1.0 indicates that the firm is creating value for its stockholders.

6-30

## 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

6-31

## 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

6-32

## An Analysis of the McGraw-Hill Company

The next few slides contain a financial analysis of the McGraw-Hill Company, using data from the Value Line Investment Survey.

6-33

## The McGraw-Hill Company Analysis, I.



6-34

## The McGraw-Hill Company Analysis, II.

CURRENT POSITION	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
EPS	2.95	3.25	3.46	3.55	3.88	4.25	4.65	5.10	5.60	6.15	6.75	7.40	8.10	8.85	9.65	10.50	11.40	12.35	13.35	14.40	15.50	16.65	17.85	19.10	20.40	21.75	23.15	24.60	26.10	27.65	29.25	30.90	32.60	34.35	36.15	38.00	39.90	41.85	43.85	45.90	48.00	50.15	52.35	54.60	56.90	59.25	61.65	64.10	66.60	69.15	71.75	74.40	77.10	79.85	82.65	85.50	88.40	91.35	94.35	97.40	100.50	103.65	106.85	110.10	113.40	116.75	120.15	123.60	127.10	130.65	134.25	137.90	141.60	145.35	149.15	153.00	156.90	160.85	164.85	168.90	173.00	177.15	181.35	185.60	189.90	194.25	198.65	203.10	207.60	212.15	216.75	221.40	226.10	230.85	235.65	240.50	245.40	250.35	255.35	260.40	265.50	270.65	275.85	281.10	286.40	291.75	297.15	302.60	308.10	313.65	319.25	324.90	330.60	336.35	342.15	348.00	353.90	359.85	365.85	371.90	378.00	384.15	390.35	396.60	402.90	409.25	415.65	422.10	428.60	435.15	441.75	448.40	455.10	461.85	468.65	475.50	482.40	489.35	496.35	503.40	510.50	517.65	524.85	532.10	539.40	546.75	554.15	561.60	569.10	576.65	584.25	591.90	599.60	607.35	615.15	623.00	630.90	638.85	646.85	654.90	663.00	671.15	679.35	687.60	695.90	704.25	712.65	721.10	729.60	738.15	746.75	755.40	764.10	772.85	781.65	790.50	799.40	808.35	817.35	826.40	835.50	844.65	853.85	863.10	872.40	881.75	891.15	900.60	910.10	919.65	929.25	938.90	948.60	958.35	968.15	978.00	987.90	997.85	1007.85	1017.90	1028.00	1038.15	1048.35	1058.60	1068.90	1079.25	1089.65	1100.10	1110.60	1121.15	1131.75	1142.40	1153.10	1163.85	1174.65	1185.50	1196.40	1207.35	1218.35	1229.40	1240.50	1251.65	1262.85	1274.10	1285.40	1296.75	1308.15	1319.60	1331.10	1342.65	1354.25	1365.90	1377.60	1389.35	1401.15	1413.00	1424.90	1436.85	1448.85	1460.90	1473.00	1485.15	1497.35	1509.60	1521.90	1534.25	1546.65	1559.10	1571.60	1584.15	1596.75	1609.40	1622.10	1634.85	1647.65	1660.50	1673.40	1686.35	1699.35	1712.40	1725.50	1738.65	1751.85	1765.10	1778.40	1791.75	1805.15	1818.60	1832.10	1845.65	1859.25	1872.90	1886.60	1900.35	1914.15	1928.00	1941.90	1955.85	1969.85	1983.90	1998.00	2012.15	2026.35	2040.60	2054.90	2069.25	2083.65	2098.10	2112.60	2127.15	2141.75	2156.40	2171.10	2185.85	2200.65	2215.50	2230.40	2245.35	2260.35	2275.40	2290.50	2305.65	2320.85	2336.10	2351.40	2366.75	2382.15	2397.60	2413.10	2428.65	2444.25	2459.90	2475.60	2491.35	2507.15	2523.00	2538.90	2554.85	2570.85	2586.90	2603.00	2619.15	2635.35	2651.60	2667.90	2684.25	2700.65	2717.10	2733.60	2750.15	2766.75	2783.40	2800.10	2816.85	2833.65	2850.50	2867.40	2884.35	2901.35	2918.40	2935.50	2952.65	2969.85	2987.10	3004.40	3021.75	3039.15	3056.60	3074.10	3091.65	3109.25	3126.90	3144.60	3162.35	3180.15	3198.00	3215.90	3233.85	3251.85	3269.90	3288.00	3306.15	3324.35	3342.60	3360.90	3379.25	3397.65	3416.10	3434.60	3453.15	3471.75	3490.40	3509.10	3527.85	3546.65	3565.50	3584.40	3603.35	3622.35	3641.40	3660.50	3679.65	3698.85	3718.10	3737.40	3756.75	3776.15	3795.60	3815.10	3834.65	3854.25	3873.90	3893.60	3913.35	3933.15	3953.00	3972.90	3992.85	4012.85	4032.90	4053.00	4073.15	4093.35	4113.60	4133.90	4154.25	4174.65	4195.10	4215.60	4236.15	4256.75	4277.40	4298.10	4318.85	4339.65	4360.50	4381.40	4402.35	4423.35	4444.40	4465.50	4486.65	4507.85	4529.10	4550.40	4571.75	4593.15	4614.60	4636.10	4657.65	4679.25	4700.90	4722.60	4744.35	4766.15	4788.00	4809.90	4831.85	4853.85	4875.90	4898.00	4920.15	4942.35	4964.60	4986.90	5009.25	5031.65	5054.10	5076.60	5099.15	5121.75	5144.40	5167.10	5189.85	5212.65	5235.50	5258.40	5281.35	5304.35	5327.40	5350.50	5373.65	5396.85	5420.10	5443.40	5466.75	5490.15	5513.60	5537.10	5560.65	5584.25	5607.90	5631.60	5655.35	5679.15	5703.00	5726.90	5750.85	5774.85	5798.90	5823.00	5847.15	5871.35	5895.60	5919.90	5944.25	5968.65	5993.10	6017.60	6042.15	6066.75	6091.40	6116.10	6140.85	6165.65	6190.50	6215.40	6240.35	6265.35	6290.40	6315.50	6340.65	6365.85	6391.10	6416.40	6441.75	6467.15	6492.60	6518.10	6543.65	6569.25	6594.90	6620.60	6646.35	6672.15	6698.00	6723.90	6749.85	6775.85	6801.90	6828.00	6854.15	6880.35	6906.60	6932.90	6959.25	6985.65	7012.10	7038.60	7065.15	7091.75	7118.40	7145.10	7171.85	7198.65	7225.50	7252.40	7279.35	7306.35	7333.40	7360.50	7387.65	7414.85	7442.10	7469.40	7496.75	7524.15	7551.60	7579.10	7606.65	7634.25	7661.90	7689.60	7717.35	7745.15	7773.00	7800.90	7828.85	7856.85	7884.90	7913.00	7941.15	7969.35	7997.60	8025.90	8054.25	8082.65	8111.10	8139.60	8168.15	8196.75	8225.40	8254.10	8282.85	8311.65	8340.50	8369.40	8398.35	8427.35	8456.40	8485.50	8514.65	8543.85	8573.10	8602.40	8631.75	8661.15	8690.60	8720.10	8749.65	8779.25	8808.90	8838.60	8868.35	8898.15	8928.00	8957.90	8987.85	9017.85	9047.90	9078.00	9108.15	9138.35	9168.60	9198.90	9229.25	9259.65	9290.10	9320.60	9351.15	9381.75	9412.40	9443.10	9473.85	9504.65	9535.50	9566.40	9597.35	9628.35	9659.40	9690.50	9721.65	9752.85	9784.10	9815.40	9846.75	9878.15	9909.60	9941.10	9972.65	10004.25	10035.90	10067.60	10099.35	10131.15	10163.00	10194.90	10226.85	10258.85	10290.90	10323.00	10355.15	10387.35	10419.60	10451.90	10484.25	10516.65	10549.10	10581.60	10614.15	10646.75	10679.40	10712.10	10744.85	10777.65	10810.50	10843.40	10876.35	10909.35	10942.40	10975.50	11008.65	11041.85	11075.10	11108.40	11141.75	11175.15	11208.60	11242.10	11275.65	11309.25	11342.90	11376.60	11410.35	11444.15	11478.00	11511.90	11545.85	11579.85	11613.90	11648.00	11682.15	11716.35	11750.60	11784.90	11819.25	11853.65	11888.10	11922.60	11957.15	11991.75	12026.40	12061.10	12095.85	12130.65	12165.50	12200.40	12235.35	12270.35	12305.40	12340.50	12375.65	12410.85	12446.10	12481.40	12516.75	12552.15	12587.60	12623.10	12658.65	12694.25	12729.90	12765.60	12801.35	12837.15	12873.00	12908.90	12944.85	12980.85	13016.90	13053.00	13089.15	13125.35	13161.60	13197.90	13234.25	13270.65	13307.10	13343.60	13380.15	13416.75	13453.40	13490.10	13526.85	13563.65	13600.50	13637.40	13674.35	13711.35	13748.40	13785.50	13822.65	13859.85	13897.10	13934.40	13971.75	14009.15	14046.60	14084.10	14121.65	14159.25	14196.90	14234.60	14272.35	14310.15	14348.00	14385.90	14423.85	14461.85	14500.00	14538.20	14576.45	14614.75	14653.10	14691.50	14730.00	14768.55	14807.15	14845.80	14884.50	14923.25	14962.05	15000.90	15039.80	15078.75	15117.75	15156.80	15195.90	15235.05	15274.25	15313.50	15352.80	15392.15	15431.55	15471.00	15510.50	15550.05	15589.65	15629.30	15669.00	15708.75	15748.55	15788.40	15828.30	15868.25	15908.25	15948.30	15988.40	16028.55	16068.75	16109.00	16149.30	16189.65	16230.05	16270.



### Problem 2

Atlantis Seafood Company stock currently sells for \$70 per share. The company is expected to pay a dividend of \$4 per share next year, and analysts project that dividends should increase at 4% per year for the indefinite future. What must the relevant discount rate be for Atlantis stock?

Solution:

$$V(0) = \$70 = \$4 / (k - .04)$$
$$k = .04 + \$4 / \$70 = 9.71\%$$

6-43

### Problem 3

Johnson Products earned \$12.50 per share last year and paid a \$5 per share dividend. If ROE was 20%, what is the sustainable growth rate?

Solution:

$$\text{Retention ratio} = 1 - (\$5 / \$12.50) = 0.60$$
$$\text{Sustainable growth rate} = .20 \times .60 = 12\%$$

6-44

### Problem 4

Gaggle Communications does not currently pay a dividend. You expect the company to begin paying a \$3 per share dividend in 5 years, and you expect dividends to grow perpetually at 12% per year thereafter. If the discount rate is 15%, how much is the stock currently worth?

Solution:

$$V(5) = \$3(1.12) / (.15 - .12) = \$112$$
$$V(0) = \$112 / (1.15)^5 = \$55.68$$

6-45