
DIVIDEND DISCOUNT MODELS
Problem 1

- A. False. The dividend discount model can still be used to value the dividends that the company will pay after the high growth eases.
- B. False. It depends upon the assumptions made about expected future growth and risk.
- C. False. This will be true only if the stock market falls more than merited by changes in the fundamentals (such as growth and cash flows).
- D. True. Portfolios of stocks that are undervalued using the dividend discount model seem to earn excess returns over long time periods.
- E. True. The model is biased towards these stocks because of its emphasis on dividends.

Problem 2

A. Cost of Equity = $6.25\% + 0.90 * 5.5\% = 11.20\%$
 Value Per Share = $\$3.56 * 1.055 / (.1120 - .055) = \65.89

B. $\$3.56 (1 + g) / (.1120 - g) = \80

Solving for g,

$$g = (80 * .112 - 3.56) / (80 + 3.56) = 6.46\%$$

Problem 3

A. Retention Ratio = $1 - \text{Payout Ratio} = 1 - 0.42/1.50 = 72\%$

Return on Capital

$$= (\text{Net Income} + \text{Int Exp} (1-t)) / (\text{BV of Debt} + \text{BV of Equity})$$

$$= (30 + 0.8 * (1 - 0.385)) / (7.6 + 160) = 18.19\%$$

$$\text{Debt/Equity Ratio} = 7.6/160 = .0475$$

$$\text{Interest Rate on Debt} = 0.8/7.6 = 10.53\%$$

Expected Growth Rate

$$= 0.72 [.1819 + .0475 (.1819 - .1053 * (1 - 0.385))] = 13.5\%$$

Alternatively, and much more simply,

$$\text{Return on Equity} = 30/160 = .1875$$

$$\text{Expected Growth Rate} = 0.72 * .1875 = 13.5\%$$

B. Expected payout ratio after 1998:

$$= 1 - g / [\text{ROC} + \text{D/E} (\text{ROC} - i (1-t))]$$

$$= 1 - .06 / (.125 + .25(.125 - .07(1-.385)))$$

$$= 0.5876$$

C. Beta in 1993 = 0.85

$$\text{Unlevered Beta} = 0.85 / (1 + (1 - 0.385) * 0.05) = 0.8246$$

$$\text{Beta After 1998} = 0.8246 * (1 + (1 - 0.385) * 0.25) = 0.95$$

D. Cost of Equity in 1999 = 7% + 0.95 * 5.5% = 12.23%

Expected Dividend in 1999

$$= (\$1.50 * 1.135^5 * 1.06) * 0.5876 = \$1.76$$

$$\text{Expected Price at End of 1998} = \$1.76 / (.1223 - .06) = \$28.25$$

E.

<i>Year</i>	<i>EPS</i>	<i>DPS</i>	
1994	\$1.70	\$0.48	
1995	\$1.93	\$0.54	
1996	\$2.19	\$0.61	
1997	\$2.49	\$0.70	
1998	\$2.83	\$0.79	\$28.25
Cost of Equity = 7% + 0.85 * 5.5% =			11.68%
PV of Dividends and Terminal Price (@ 11.68%) =			\$18.47

F. Total Value per Share = \$18.47

Value Per Share Using Gordon Growth Model

$$= \$1.50 * 1.06 * 0.5876 / (.1223 - .06) = \$15.00$$

$$\text{Value Per Share With No Growth} = \$1.50 * 0.5876 / .1223 = \$7.21$$

$$\text{Value of Extraordinary Growth} = \$18.47 - \$15.00 = \$3.47$$

$$\text{Value of Stable Growth} = \$15.00 - \$7.21 = \$7.79$$

Problem 4

A. Cost of Equity = 6.25% + 0.85 * 5.5% = 10.93%

$$\text{Value of Stable Growth} = \$0.48 * 1.07 / (.1093 - .07) = \$13.07$$

B. Value of Extraordinary Growth

$$= \$0.48 * (6/2) * (.25 - .07) / (.1093 - .07) = \$6.60$$

C. The payout ratio is assumed to remain unchanged as the growth rate changes. The payout ratio in this case is assumed to remain at 60% (0.48/0.80).

Problem 5

A.

<i>Period</i>	<i>EPS</i>	<i>DPS</i>
1	\$4.58	\$0.79
2	\$5.32	\$0.92
3	\$6.17	\$1.07
4	\$7.15	\$1.21
5	\$8.30	\$1.43
6	\$9.46	\$2.35
7	\$10.59	\$3.56
8	\$11.65	\$4.94
9	\$12.58	\$6.44
10	\$13.34	\$8.00

B. Expected Price at End of 2003

$$= (\$13.34 * 1.06 * 0.60) / (.1175 - .06) = \$147.54$$

(Cost of Equity = 6.25% = 5.5% = 11.75%)

C.

PV of Dividends - High Growth =	\$3.67
PV of Dividends - Transition =	\$9.10
PV of Terminal Price =	\$44.59
Value Per Share =	\$57.36

Problem 6

a. Dividends = \$ 20 million

$$\text{Value of equity} = 20 (1.05) / (.12 - .05) = \$ 300 \text{ million}$$

b. Average annual stock buyback = 180/4 = \$ 45 million

Modified dividends = \$ 65 million

$$\text{Value of equity} = 65 (1.05) / (.12 - .05) = \$ 975 \text{ million}$$