CHAPTER 13

Equity Valuation

13.1 VALUATION BY COMPARABLES

Fundamental Stock Analysis: Models of Equity Valuation

- Basic Types of Models
  - Balance Sheet Models
  - Dividend Discount Models
  - Price/Earnings Ratios
- Estimating Growth Rates and Opportunities

Models of Equity Valuation

- Valuation models use comparables
  - Look at the relationship between price and various determinants of value for similar firms
- The internet provides a convenient way to access firm data. Some examples are:
  - EDGAR
  - Finance.yahoo.com

Table 13.1 Microsoft Corporation Financial Highlights

TABLE 13.1

Microsoft Corporation, financial highlights, year-end, 2006.

Current Quarter Ended:	December 2006	Current Year Ended:	June 2006
Miscellaneous			
Current Price	29.460000	Comn Sharehldrs (actual)	148993
Comn Shares Outstdg (mil)	9777.000	Employees (actual)	71000
Market Capitalization (mil)	288030.420	S&P Issuer Credit Rating	AA
Latest 12 Months	**Company**		**1 Yr Chng (%)**
Sales (mil)	46057.000		11.4
EBITDA (mil)	17515.000		−2.3
Net Income (mil)	11909.000		−8.8
EPS from Ops	1.25		0.0
Dividends/Share	0.370000		15.6
Valuation	**Company**		**Industry Avg**
Price/EPS from Ops	23.6		23.2
Price/Book	7.9		5.6
Price/Sales	6.3		5.6
Price/Cash Flow	22.2		21.0
Profitability (%)			
Return on Equity	32.5		22.7
Return on Assets	17.9		12.4
Oper Profit Margin	35.7		31.9
Net Profit Margin	25.9		22.9
Financial Risk			

Source: Standard & Poor's Market Insight (**www.mhhe.com/edumarketinsight**), February 2007. Access available through this Onlinee Learning Center.

Valuation Methods

- Book value
- Market value
- Liquidation value
- Replacement cost

13.2 INTRINSIC VALUE VERSUS MARKET PRICE

Expected Holding Period Return

- The return on a stock investment comprises cash dividends and capital gains or losses
  - Assuming a one-year holding period

$$\text{Expected HPR} = E(r) = \frac{E(D_1) + [E(P_1) - P_0]}{P_0}$$

Required Return

- CAPM gave us required return:

$$k = r_f + \beta\left[E(r_M) - r_f\right]$$

- If the stock is priced correctly
  - Required return should equal expected return

Intrinsic Value and Market Price

- Market Price
  - Consensus value of all potential traders
  - Current market price will reflect intrinsic value estimates
  - This consensus value of the required rate of return, *k*, is the market capitalization rate
- Trading Signal
  - IV > MP Buy
  - IV < MP Sell or Short Sell
  - IV = MP Hold or Fairly Priced

13.3 DIVIDEND DISCOUNT MODELS

General Model

$$V_o = \sum_{t=1}^{\infty} \frac{D_t}{(1+k)^t}$$

- V_0 = Value of Stock
- D_t = Dividend
- k = required return

No Growth Model

$$V_o = \frac{D}{k}$$

- Stocks that have earnings and dividends that are expected to remain constant
  – Preferred Stock

No Growth Model: Example

$$V_o = \frac{D}{k}$$

$E_1 = D_1 = \$5.00$

$k = .15$

$V_0 = \$5.00 / .15 = \$33.33$

Constant Growth Model

$$Vo = \frac{D_o(1+g)}{k-g}$$

- g = constant perpetual growth rate

Constant Growth Model: Example

$$Vo = \frac{D_o(1+g)}{k-g}$$

$E_1 = \$5.00$ b = 40% k = 15%

(1-b) = 60% $D_1 = \$3.00$ g = 8%

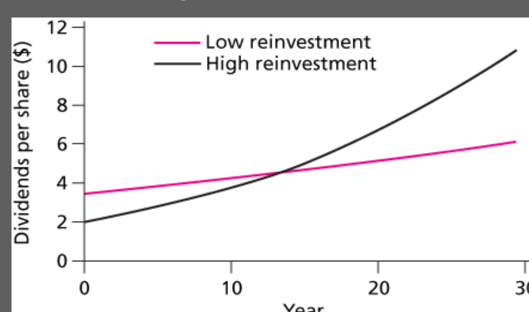
$V_0 = 3.00 / (.15 - .08) = \$42.86$

Stock Prices and Investment Opportunities

$$g = ROE \times b$$

- g = growth rate in dividends
- ROE = Return on Equity for the firm
- b = plowback or retention percentage rate
  – (1- dividend payout percentage rate)

Figure 13.1 Dividend Growth for Two Earnings Reinvestment Policies



Present Value of Growth Opportunities

- If the stock price equals its IV, growth rate is sustained, the stock should sell at:

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

- If all earnings paid out as dividends, price should be lower (assuming growth opportunities exist)

Present Value of Growth Opportunities (cont.)

- Price = No-growth value per share + PVGO (present value of growth opportunities)

$$P_0 = \frac{E_1}{k} + PVGO$$

- Where:

  E_1 = Earnings Per Share for period 1 and

$$PVGO = \frac{D_0(1+g)}{(k-g)} - \frac{E_1}{k}$$

Partitioning Value: Example

- ROE = 20% d = 60% b = 40%
- E_1 = \$5.00 D_1 = \$3.00 k = 15%
- g = .20 x .40 = .08 or 8%

Partitioning Value: Example (cont.)

$$P_o = \frac{3}{(.15-.08)} = \$42.86$$

$$NGV_o = \frac{5}{.15} = \$33.33$$

$$PVGO = \$42.86 - \$33.33 = \$9.52$$

P_o = price with growth
NGV_o = no growth component value
PVGO = Present Value of Growth Opportunities

Life Cycles and Multistage Growth Models

$$P_o = D_0 \sum_{t=1}^{T} \frac{(1+g_1)^t}{(1+k)^t} + \frac{D_T(1+g_2)}{(k-g_2)(1+k)^T}$$

- g_1 = first growth rate
- g_2 = second growth rate
- T = number of periods of growth at g_1

Multistage Growth Rate Model: Example

D_0 = \$2.00 g_1 = 20% g_2 = 5%
k = 15% T = 3 D_1 = 2.40
D_2 = 2.88 D_3 = 3.46 D_4 = 3.63

$V_0 = D_1/(1.15) + D_2/(1.15)^2 + D_3/(1.15)^3 + D_4 / (.15 - .05) ((1.15)^3$

V_0 = 2.09 + 2.18 + 2.27 + 23.86 = \$30.40

13.4 PRICE-EARNINGS RATIOS

P/E Ratio and Growth Opportunities

- P/E Ratios are a function of two factors
  - Required Rates of Return (k)
  - Expected growth in Dividends
- Uses
  - Relative valuation
  - Extensive use in industry

P/E Ratio: No expected growth

$$P_0 = \frac{E_1}{k}$$

$$\frac{P_0}{E_1} = \frac{1}{k}$$

- E_1 - expected earnings for next year
  - E_1 is equal to D_1 under no growth
- k - required rate of return

P/E Ratio: Constant Growth

$$P_0 = \frac{D_1}{k-g} = \frac{E_1(1-b)}{k-(b \times ROE)}$$

$$\frac{P_0}{E_1} = \frac{1-b}{k-(b \times ROE)}$$

- b = retention ration
- ROE = Return on Equity

Numerical Example: No Growth

E_0 = \$2.50 g = 0 k = 12.5%

P_0 = D/k = \$2.50/.125 = \$20.00

P/E = 1/k = 1/.125 = 8

Numerical Example with Growth

b = 60% ROE = 15% (1-b) = 40%

E_1 = \$2.50 (1 + (.6)(.15)) = \$2.73

D_1 = \$2.73 (1-.6) = \$1.09

k = 12.5% g = 9%

P_0 = 1.09/(.125-.09) = \$31.14

P/E = 31.14/2.73 = 11.4

P/E = (1 - .60) / (.125 - .09) = 11.4

P/E Ratios and Stock Risk

- Riskier stocks will have lower P/E multiples
- Riskier firms will have higher required rates of return (higher values of *k*)

$$\frac{P}{E} = \frac{1-b}{k-g}$$

Pitfalls in Using P/E Ratios

- Flexibility in reporting makes choice of earnings difficult
- Pro forma earnings may give a better measure of operating earnings
- Problem of too much flexibility

Figure 13.3 P/E Ratios and Inflation

FIGURE 13.3
P/E ratio of the S&P 500 Index and inflation

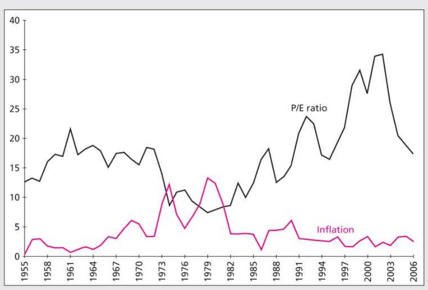


Figure 13.4 Earnings Growth for Two Companies

FIGURE 13.4
Earnings growth for two companies

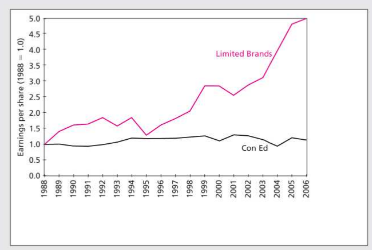


Figure 13.5 Price-Earnings Ratios

FIGURE 13.5
Price–earnings ratios

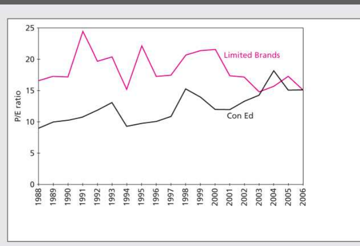


Figure 13.6 P/E Ratios

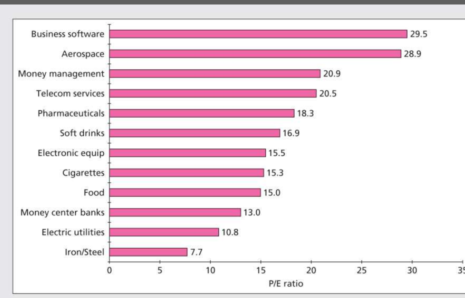
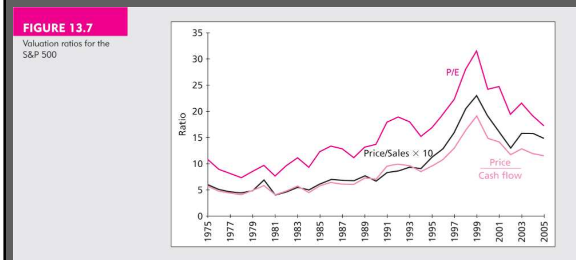


FIGURE 13.6
P/E ratios
Source: Yahoo! Finance, February 6, 2007. Reproduced with permission of Yahoo! Inc. © 2007 by Yahoo! Inc. Yahoo! and the Yahoo! logo are trademarks of Yahoo! Inc.

Other Comparative Valuation Ratios

- Price-to-book
- Price-to-cash flow
- Price-to-sales
- Be creative

Figure 13.7 Valuation Ratios for the S&P 500



13.5 FREE CASH FLOW VALUATION APPROACHES

Free Cash Flow

- One approach is to discount the free cash flow for the firm (FCFF) at the weighted-average cost of capital
  - Subtract existing value of debt
  - FCFF = EBIT (1- t_c) + Depreciation – Capital expenditures – Increase in NWC

    where:

    EBIT = earnings before interest and taxes

    t_c = the corporate tax rate

    NWC = net working capital

Free Cash Flow (cont.)

- Another approach focuses on the free cash flow to the equity holders (FCFE) and discounts the cash flows directly at the cost of equity
- FCFE = FCFF – Interest expense (1- t_c) + Increases in net debt

Comparing the Valuation Models

- Free cash flow approach should provide same estimate of IV as the dividend growth model
- In practice the two approaches may differ substantially
  - Simplifying assumptions are used

13.6 THE AGGREGATE STOCK MARKET

Earnings Multiplier Approach

- Forecast corporate profits for the coming period
- Derive an estimate for the aggregate P/E ratio using long-term interest rates
- Product of the two forecasts is the estimate of the end-of-period level of the market

Figure 13.8 Earnings Yield of the S&P 500 Versus 10-year Treasury Bond Yield

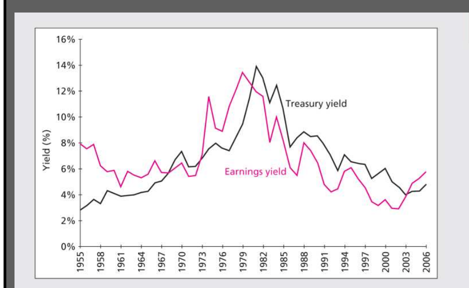


FIGURE 13.8
Earnings yield of S&P 500 versus 10-year Treasury bond yield

Table 13.4 S&P 500 Index Forecasts

TABLE 13.4
S&P 500 index forecasts under various scenarios

	Most Likely Scenario	Pessimistic Scenario	Optimistic Scenario
Treasury bond yield	4.8%	5.3%	4.3%
Earnings yield	5.8%	6.3%	5.3%
Resulting P/E ratio	17.2	15.9	18.9
EPS forecast	86	86	86
Forecast for S&P 500	1,483	1,365	1,623

Note: The forecast for the earnings yield on the S&P 500 equals the Treasury bond yield plus 1%. The P/E ratio is the reciprocal of the forecasted earnings yield.