# 15.535

# Class #5
# “Comparative Analysis”

# Announcements

- Assignment #1:
  - Hand in at start of class on Tuesday, Feb, 25th.
  - 2 page memo (any format)
  - Complete individually or in group of up to 3 people
- Valuation Projects (Post tomorrow at NOON):
  - Teams, company choices & due diligence matches can be found on Sloanspace.

# Recap From Prior Classes

- DCF Analysis
  - Equity Valuation
    - All valuation models based on DCF framework.
    - Key is to estimate future cashflows.
    - Earnings are generally the starting point and then we can back out cashflows.
    - Abnormal Earnings (or EBO or Residual Income) Valuation is a DCF-based model that relies on accounting earnings.
      - Strengths and weaknesses of abnormal earnings
- Recap of "Back of Envelope Valuation" of Dell
  - Draw time-line!
  - Summary of Assumptions

# Today- Comparative Analysis

- Valuation Comparisons (Multiples analysis):
  - Compare market price (stock price) to a benchmark of fundamental value (i.e. cashflows)
- Financial Ratio Comparisons

# Valuation Comparison: DCF Limitations

- **What if firm has:**
  - Unknown history, Unknown implementation timing
  - Unfathomable market, Unknown competition, Untested product, Unknown cost structure, Unknown market acceptance
  - Projecting an unknown growth trajectory …. DCF is tough!
- **Other DCF Limitations:**
  - DCF may miss growth options, options to expand, options to redirect
  - You may need to adjust projections for GAAP expense treatment of R&D, customer acquisition costs, selected L/T marketing, etc. All difficult!

# Equity Valuation Analysis: What Do Analysts Use? (Asquith et al, 2001)

| | |
|---|---|
| Earnings Multiple | 99% |
| P-E | 97% |
| Relative P-E | 35% |
| Revenue Multiple | 15% |
| Price-to-Book | 25% |
| CF Multiple | 13% |
| | |
| DCF | 13% |
| EVA | 2% |
| "Model" | 4% |

# CASE FOR MULTIPLES:

- You wish to value Target (retailer):
  - Find benchmark firms: ie Walmart, JCPenny, Sears
  - Assume market correctly sets competitors' stock prices.
  - Assume all firms have the same risk (systematic & industry).
  - Assume cashflow growth is similar for all the firms.
  - Assume accounting techniques to calculate earnings (or book equity or sales or EBITDA) are similar for all the firms.
  - Implication: the P/E model (perpetuity or growing perpetuity) is the same for competitors and Target Corp.
  - A Multiples Valuation Approach:
    - Take average P/E of competitors
    - Multiply by Target's EPS of obtain the predicted price of Target.

# Overview of Comparative Analysis

- Use of Multiples:
  - Is stock price too high/low relative to a measure of future cash flows? (Implicit is a DCF model)
- Method is simple to implement:
  - No detailed multi-year forecasts necessary.
- Steps:
  1) Select financial performance measure (ie sales, cash flow, earnings, book value of equity, etc).
  2) Estimate price multiples for comparable firms using the measure of performance. Take average/median/other.
  3) Apply comparable firm(s) multiple to the performance measure of the firm being analyzed.

# Approach to Multiples

- Implicit assumptions of multiples analysis:
  - Assume stock market prices are mean reverting with (not same as perfect market efficiency!)
  - Rely on the stock market to evaluate the prospects of profitability and growth of comparable/competitor firms.
  - Assume that the same prospects apply to firm of interest.

- How to identify comparables?

# P/E Multiples

- In Class #2, we showed that the perpetuity and growing perpetuity formulae gave us direct insights into P/E multiples:

$$P/E = 1/r \qquad \text{or} \qquad P/E = 1/(r-g)$$

- For multiples comparisons, we <u>assume</u>:
  - Risk ("r" ) is the same for firms
    - Therefore, industry, leverage are important
    - Higher risk implies lower P/E
  - Growth is the same for firms
    - Starting point is important (stage in life cycle)
    - Higher growth implies higher P/E

# P/E Multiples

- What if today's earnings are not a good measure of future earnings (cashflows)?
- Solution 1: Use the forward P/E ratio (maybe firm has write-down today)
- Example: Apple Computer
  - Current price is $14.80 (Yesterday's price)
  - Earnings for last 12 months is $0.05
  - Trailing (or current) P/E = 296
  - Industry P/E is 28
  - Is company overvalued?
  - But predicted earnings for 2004 year is $0.27/share
  - Therefore, forward P/E = 55 (less overvalued?)

# P/E Multiples

- Solution 2: Use "pro forma" earnings … that is remove non-recurring items.
  - Components of Earnings:
    - Operating Income
    - Special or Unusual Items (usually negative)
      - » Either infrequent or not part of normal business
    - Extraordinary Items (usually negative)
      - » Both infrequent and not part of normal business
    - Use Price to operating cash flow (does not contain "one-time accounting items")

# P/E Applications

- Solution 3: Directly model and understand implications of future earnings growth!
  - The growing perpetuity is a better interpretation of P/E multiple in this case.
    - P/E=1/(r-g)
    - Higher expected future growth (g) means higher current P/E ratio.
    - Again, higher risk ("r") still implies lower P/E

# Accounting for future growth directly in ratios – The" PEG" ratio

- PEG ratio:
  - New metric used on the Street DCF Analysis
  - PEG = (P/E) / (5 yr future earnings growth rate)
  - See handout on "PEG" Ratio
  - Pitfalls Little theoretical underpinnings
- Example: Apple computer (see http://biz.yahoo.com/z/a/a/aapl.html

| Apple | Industry | Sector | S&P500 |
|---|---|---|---|
| 6.11 | 1.80 | 1.88 | 1.36 |

# Other types of P/E ratios

- Two generic categories
  - Using levered (after interest) flows in denominator:
  - Standard P/E = price (per share) of common / EPS
  - P/CF= price of common stock / CFO (usually before changes in WC)
  - Using unlevered flows in denominator:
    - [Debt + Equity] / EBIT
    - [Debt + Equity] / EBITDA
    - [Debt + Equity] / Sales
    - Newer jargon: Enterprise Value (EV)/EBITDA

# Balance Sheet multiples

- What if today's (and near-term) earnings are not relevant?
  - Firm is generating losses now and near future.
    - Difficult to predict future cash flows.
  - What other financial information can we use?
    - The Balance Sheet!
  - What is break-up value of company if it liquidated?
- Compare market value of equity (M=P) to the book value of equity: M/B ratio
  - What do you expect the M/B to be?

# Screening Stocks on Financial Ratios

- *Stock screens based on financial ratios:*
  - *www.stockscreener.com (Provided by Hoover's)*
  - *www.quicken.com/investments/stocks/search (Quicken.com)(Click on Full Search)*
  - *http://screen.yahoo.com/stocks.html (Yahoo)*

# “Guideline approach”

- During “Internet Bubble”:
  - Internet valuation shifted to “Guideline Method”
  - Ignored traditional value relationships (P/E, M/B, Enterprise value/EBITDA).
  - Focused on “new” valuation metrics like:
    - Enterprise/Revenue, P/Sales
    - Price to “clicks,” Price to “subscribers,” Price to “page views”, etc
  - Problems: 1) Are these measures of future cashflows? 2) What if all prices are wrong?

# Preview of Non-Price Financial Ratios: Valuation

- Non-price ratios can also be relevant for valuation, performance measurement, and prediction
- Ratios allow for comparisons across firms and over time:
  - Profitability ratios
  - Short-term liquidity ratios
  - Long-term solvency ratios

# Profitability Ratios: Example - Return on Assets

- The objective is to assess how successful a firm's operating performance as been (i.e., how successful has the firm been at generating profits?).
- Measures a firm's success in using assets to generate earnings, independent of the financing of those assets (i.e., debt versus equity).

$$\text{ROA} = \frac{\textbf{Net Income + (1 - Tax Rate)(Interest Exp)}}{\textbf{Average Total Assets}}$$

The numerator is operating income after income taxes, excluding any financing costs.

# Return on Assets

Decomposition of ROA: Insights into a firm's profitability can be gained by decomposing ROA into its components, profit margin and asset turnover.

**ROA = Profit Margin X Assets Turnover**

$$\frac{\text{Net Income + Interest Expense (net of taxes)}}{\text{Avg Total Assets}} = \frac{\text{Net Income + Interest Expense (net of taxes)}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Avg Total Assets}}$$

# Fixed Asset Turnover

Measures the relation between sales and the investment in property, plant, and equipment.

How efficiently is the firm using its fixed assets to generate sales?

$$\textbf{Fixed asset turnover} = \frac{\textbf{Sales}}{\textbf{Average fixed assets}}$$

# Return on Common Equity (ROE)

ROE measures the return to common shareholders after accounting for the cost of debt and (preferred) equity financing.

$$\textbf{ROE} = \frac{\textbf{Net Income - Preferred Dividends}}{\textbf{Average Common Equity}}$$

Or

$$\textbf{ROE} = \frac{\textbf{Net Income Available to Common}}{\textbf{Average Common Equity}}$$

# Decomposition of ROE

| | | | | | | |
|---|---|---|---|---|---|---|
| **ROE** | **=** | **ROA** | **x** | **Common Earnings Leverage (CEL)** | **x** | **Capital Structure Leverage (LEV)** |

NI Avail to Common / Avg CEquity =

(NI*/Avg TA)x(NI Avail to Common/NI*)x(Avg TA/Avg CEquity)

# Du Pont Analysis

- Dis-aggregating ROE (*Du Pont analysis)*
  ROE = Net Income / Shareholders' equity

  **ROE = Profit margin X Turnover X Leverage**

  Profit margin = Net Income / Sales
  Turnover = Sales / Assets
  Leverage = Assets / Shareholders equity

# Preview of Short-Term Liquidity

- Commonly used measure of short-term debt paying ability:

$$\textbf{Current Ratio} = \frac{\textbf{Current Assets}}{\textbf{Current Liabilities}}$$

  - Matches the amount of cash & other current assets that will become cash within 1 year against obligations that come due in the next year. Basic rule of thumb: Minimum ratio of 1.0.
  - A variation of the current ratio is the **Quick Ratio** (or "Acid Test Ratio"):

$$\textbf{Quick Ratio} = \frac{\textbf{Current Assets- Inventory}}{\textbf{Current Liabilities}}$$

Why would we use this ratio?

# Operating Cash Flow to Current Liabilities Ratio

- Another measure a firm's short-term liquidity.
  - The advantage is that it is based on cash flow AFTER the funding needs for working capital (i.e., accounts receivables and inventory) been made.

$$\frac{\text{Operating Cash Flow}}{\text{Average Current Liabilities}}$$

# Long-Term Solvency Ratios

- Measure firm's ability to meet interest & principal payments on long-term debt when they come due.
- The best indicator for assessing long-term solvency is the firm's ability to generate earnings in long term.

$$\text{Long-Term Debt Ratio} = \frac{\text{Long-Term Debt}}{\text{Long-Term Debt + Shareholders' Equity}}$$

$$\text{Debt/Equity Ratio} = \frac{\text{Long-Term Debt}}{\text{Shareholders' Equity}}$$

$$\text{Liabilities/Assets Ratio} = \frac{\text{Total Liabilities}}{\text{Total Assets}}$$

# Summary of Financial Ratio Analysis

- Analysis of a particular firm's financial ratios over a period of years allows one to track historical trends and variability in the ratios over time.
- An important part of the analyst's job is to use financial ratios to identify aspects of the firm that warrant deeper investigation.
- We will return to other ratios (ie receivables, inventories, payables) in a future class.

# Where Next?

- Assignment #1 is a practical implementation of the valuation techniques we have covered so far:
  - Due at the beginning of next class
- Next Class – Turbo Accounting
  - A review of how to read a financial statement
  - Some recent "hot" accounting issues
  - Readings:
    - Course Reader: Read pages 21-32 of Section A ("Overview of Financial Statement Analysis")