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!

<table>
<thead>
<tr>
<th>Metric</th>
<th>Usage</th>
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<tbody>
<tr>
<td>Earnings Multiple</td>
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<tr>
<td>P-E</td>
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<tr>
<td>Relative P-E</td>
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<tr>
<td>Revenue Multiple</td>
<td>15%</td>
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<tr>
<td>Price-to-Book</td>
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<tr>
<td>CF Multiple</td>
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<tr>
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<tr>
<td>EVA</td>
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<tr>
<td>“Model”</td>
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</table>
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:
  
  \[ P/E = \frac{1}{r} \quad \text{or} \quad P/E = \frac{1}{(r-g)} \]

• For multiples comparisons, we assume:
  – 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.
    
    • $P/E = \frac{1}{(r-g)}$
    
    • 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)

<table>
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<tr>
<th></th>
<th>Apple</th>
<th>Industry</th>
<th>Sector</th>
<th>S&amp;P500</th>
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<tbody>
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<td>6.11</td>
<td>1.80</td>
<td>1.88</td>
<td>1.36</td>
</tr>
</tbody>
</table>
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.stock screener.com](http://www.stock screener.com) * (Provided by Hoover’s)
  – [www.quicken.com/investments/stocks/search](http://www.quicken.com/investments/stocks/search) * (Quicken.com) *(Click on Full Search)*
“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 has 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).

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

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.

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

\[
\text{Fixed asset turnover} = \frac{\underline{\text{Sales}}}{\underline{\text{Average fixed assets}}}
\]
ROE measures the return to common shareholders after accounting for the cost of debt and (preferred) equity financing.

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

Or

ROE = \frac{\text{Net Income Available to Common}}{\text{Average Common Equity}}
Decomposition of ROE

\[ \text{ROE} = \text{ROA} \times \text{Earnings Leverage (CEL)} \times \text{Structure Leverage (LEV)} \]

\[ \frac{\text{NI Avail to Common}}{\text{Avg CEquity}} = \left( \frac{\text{NI}^*}{\text{Avg TA}} \right) \times \left( \frac{\text{NI Avail to Common}}{\text{NI}^*} \right) \times \left( \frac{\text{Avg TA}}{\text{Avg CEquity}} \right) \]
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:

\[ \text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \]

- 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”):

\[ \text{Quick Ratio} = \frac{\text{Current Assets- Inventory}}{\text{Current Liabilities}} \]

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.

Operating Cash Flow
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.

\[ \text{Long-Term} = \frac{\text{Long-Term Debt}}{\text{Debt Ratio}} \]

\[ \text{Debt/Equity} = \frac{\text{Long-Term Debt}}{\text{Shareholders’ Equity}} \]

\[ \text{Liabilities/Assets} = \frac{\text{Total Liabilities}}{\text{Total Assets}} \]
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”)