Statement Analysis
Financial Statements Analysis

• Common size statements
  – Allows to compare firms with each other (cross-sectionally) and over time (inter-temporally)

• Ratio analysis
  – Gain insight into liquidity, solvency, leveraged, efficiency and other aspects of the firm

• DuPont Analysis
  – Provides an insight into components of profitability
Common Size Statements

- **Common-Size Balance Sheets**
  - Compute all accounts as a percent of total assets

- **Common-Size Income Statements**
  - Compute all line items as a percent of sales

- Standardized statements make it easier to compare financial information, particularly as the company grows.

- They are also useful for comparing companies of different sizes, particularly within the same industry.
## Sample Balance Sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>2006 ($)</th>
<th>2007 ($)</th>
<th>Liab &amp; Eq</th>
<th>2006 ($)</th>
<th>2007 ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Curr Assets</strong></td>
<td></td>
<td></td>
<td><strong>Curr Liab.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>84</td>
<td>98</td>
<td>A/P</td>
<td>312</td>
<td>344</td>
</tr>
<tr>
<td>A/R</td>
<td>165</td>
<td>188</td>
<td>N/P</td>
<td>231</td>
<td>196</td>
</tr>
<tr>
<td>Inv.</td>
<td>393</td>
<td>422</td>
<td>Total CL</td>
<td>543</td>
<td>540</td>
</tr>
<tr>
<td><strong>Total CA</strong></td>
<td>642</td>
<td>708</td>
<td>LT Debt</td>
<td>531</td>
<td>457</td>
</tr>
<tr>
<td><strong>Fixed Asst</strong></td>
<td></td>
<td></td>
<td>Equity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPE</td>
<td>2731</td>
<td>2880</td>
<td>Comm Eq.</td>
<td>500</td>
<td>550</td>
</tr>
<tr>
<td><strong>Total Asst</strong></td>
<td>3373</td>
<td>3588</td>
<td>RE</td>
<td>1799</td>
<td>2041</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total Eq.</td>
<td>2299</td>
<td>2591</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total L+E</td>
<td>3373</td>
<td>3588</td>
</tr>
</tbody>
</table>
## Common-size Balance Sheet

<table>
<thead>
<tr>
<th>Assets</th>
<th>2006 (%)</th>
<th>2007 (%)</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Assets</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>2.5</td>
<td>2.7</td>
<td>0.2</td>
</tr>
<tr>
<td>A/R</td>
<td>4.9</td>
<td>5.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Inv.</td>
<td>11.7</td>
<td>11.8</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>Total CA</strong></td>
<td>19.1</td>
<td>19.7</td>
<td></td>
</tr>
<tr>
<td><strong>Fixed Asst</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPE</td>
<td>80.9</td>
<td>80.3</td>
<td>-0.6</td>
</tr>
<tr>
<td><strong>Total Asst</strong></td>
<td>100</td>
<td>100</td>
<td>-</td>
</tr>
</tbody>
</table>
## Common-size Balance Sheet

<table>
<thead>
<tr>
<th>Liab &amp; Eq</th>
<th>2006 (%)</th>
<th>2007 (%)</th>
<th>Change (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Liab.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A/P</td>
<td>9.2</td>
<td>9.6</td>
<td>0.4</td>
</tr>
<tr>
<td>N/P</td>
<td>6.8</td>
<td>5.5</td>
<td>-1.3</td>
</tr>
<tr>
<td>Total CL</td>
<td>16</td>
<td>15.1</td>
<td>-0.9</td>
</tr>
<tr>
<td>LT Debt</td>
<td>15.7</td>
<td>12.7</td>
<td>-3</td>
</tr>
<tr>
<td>Equity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comm Eq</td>
<td>14.8</td>
<td>15.3</td>
<td>0.5</td>
</tr>
<tr>
<td>RE</td>
<td>53.3</td>
<td>56.9</td>
<td>3.6</td>
</tr>
<tr>
<td>Total Eq</td>
<td>68.1</td>
<td>72.2</td>
<td>4.1</td>
</tr>
<tr>
<td>Total L+E</td>
<td>100</td>
<td>100</td>
<td>-</td>
</tr>
</tbody>
</table>
## Statement Analysis

### Income Statement

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$2311</td>
<td>100%</td>
</tr>
<tr>
<td>Cost of Good Sold (COGS)</td>
<td>1344</td>
<td>58.2%</td>
</tr>
<tr>
<td>Earning before Interest, tax, depreciation &amp; amortization (EBITDA)</td>
<td>967</td>
<td>41.8%</td>
</tr>
<tr>
<td>Depreciation</td>
<td>276</td>
<td>11.9%</td>
</tr>
<tr>
<td>Earning before Interest &amp; Tax (EBIT)</td>
<td>691</td>
<td>29.9%</td>
</tr>
<tr>
<td>Interest</td>
<td>141</td>
<td>6.2%</td>
</tr>
<tr>
<td>Taxable Income (EBT)</td>
<td>550</td>
<td>23.8%</td>
</tr>
<tr>
<td>Taxes</td>
<td>187</td>
<td>8.1%</td>
</tr>
<tr>
<td>Net Income (NI)</td>
<td>363</td>
<td>15.7%</td>
</tr>
<tr>
<td>Dividends</td>
<td>121</td>
<td>5.2%</td>
</tr>
</tbody>
</table>
Ratio Analysis

- Ratios also allow for better comparison through time or between companies.
- As we look at each ratio, ask yourself:
  - How is the ratio computed?
  - What is the ratio trying to measure and why?
  - What is the unit of measurement?
  - What does the value indicate?
  - How can we improve the company’s ratio?
Categories of Financial Ratios

- Short-term solvency or liquidity ratios
- Long-term solvency, or financial leverage, ratios
- Asset management or turnover ratios
- Profitability ratios
- Market value ratios
Computing Liquidity Ratios

- Current Ratio = CA / CL
  - \( \frac{708}{540} = 1.31 \) times

- Quick Ratio = (CA – Inventory) / CL
  - \( \frac{708 - 422}{540} = .53 \) times

- Cash Ratio = Cash / CL
  - \( \frac{98}{540} = .18 \) times
Computing Leverage Ratios

- **Total Debt Ratio** = \( \frac{(TA - TE)}{TA} \)
  - \( \frac{(3588 - 2591)}{3588} = 28\% \)

- **Debt/Equity** = \( \frac{TD}{TE} \)
  - \( \frac{(3588 - 2591)}{2591} = 38.5\% \)

- **Equity Multiplier** = \( \frac{TA}{TE} = 1 + \frac{D}{E} \)
  - \( 1 + 0.385 = 1.385 \)
Computing Coverage Ratios

- **Times Interest Earned = EBIT / Interest**
  - \( \frac{691}{141} = 4.9 \) times

- **Cash Coverage = (EBIT + Depreciation) / Interest**
  - \( \frac{691 + 276}{141} = 6.9 \) times
Computing Inventory Ratios

• Inventory Turnover = Cost of Goods Sold / Inventory
  – 1344 / 422 = 3.2 times

• Days’ Sales in Inventory = 365 / Inventory Turnover
  – 365 / 3.2 = 114 days
Computing Receivables Ratios

• Receivables Turnover = Sales / Accounts Receivable
  \[ \frac{2311}{188} = 12.3 \text{ times} \]

• Days’ Sales in Receivables = 365 / Receivables Turnover
  \[ \frac{365}{12.3} = 30 \text{ days} \]
Computing Total Asset Turnover

• Total Asset Turnover = Sales / Total Assets
  – \( \frac{2311}{3588} = .64 \) times
  – It is not unusual for TAT < 1, especially if a firm has a large amount of fixed assets.
Computing Profitability Measures

- **Profit Margin** = Net Income / Sales
  - \( \frac{363}{2311} = 15.7\% \)

- **Return on Assets (ROA)** = Net Income / Total Assets
  - \( \frac{363}{3588} = 10.1\% \)

- **Return on Equity (ROE)** = Net Income / Total Equity
  - \( \frac{363}{2591} = 14.0\% \)
Computing Market Value Measures

- Market Price = $88 per share
- Shares outstanding = 33 million
- PE Ratio = Price per share / Earnings per share
  - $88 / $11 = 8 times
- Market-to-book ratio = market value per share / book value per share
  - $88 / ($2591 / 33) = 1.12 times
Personal Finance Corner

Over the past year alone, house prices in the greater Hypesville has dropped by 15%. The interest on an interest only loan has also reset from 3% to 6%. A borrower whose annual income is $60,000 was qualified for a $600,000 loan with 10% down a year ago. What is and was 1) interest coverage ratio, 2) debt-to-equity ratio, and 3) leverage ratio, assuming he had purchased a house with the above loan?
The Du Pont Identity

- ROE = NI / TE

- Multiply by 1 and then rearrange:
  - ROE = (NI / TE) (TA / TA)
  - ROE = (NI / TA) (TA / TE) = ROA * EM

- Multiply by 1 again and then rearrange:
  - ROE = (NI / TA) (TA / TE) (Sales / Sales)
  - ROE = (NI / Sales) (Sales / TA) (TA / TE)
  - ROE = PM * TAT * EM
Using the Du Pont Identity

\[ \text{ROE} = \text{PM} \times \text{TAT} \times \text{EM} \]

- Profit margin is a measure of the firm’s operating efficiency – how well it controls costs.
- Total asset turnover is a measure of the firm’s asset use efficiency – how well it manages its assets.
- Equity multiplier is a measure of the firm’s financial leverage.
Calculating the Du Pont Identity

• ROA = 10.1% and EM = 1.39
  – ROE = 10.1% * 1.385 = 14.0%

• PM = 15.7% and TAT = 0.64
  – ROE = 15.7% * 0.64 * 1.385 = 14.0%
Using Financial Statements

- Ratios are not very helpful by themselves: they need to be compared to something.
- Time-Trend Analysis
  - Used to see how the firm’s performance is changing through time.
- Peer Group Analysis
  - Compare to similar companies or within industries.
  - SIC and NAICS codes.
Potential Problems

- There is no underlying theory, so there is no way to know which ratios are most relevant.
- Benchmarking is difficult for diversified firms.
- Globalization and international competition makes comparison more difficult because of differences in accounting regulations.
- Firms use varying accounting procedures.
- Firms have different fiscal years.
- Extraordinary, or one-time, events
Long-Term Financial Planning

- Investment in new assets – determined by capital budgeting decisions
- Degree of financial leverage – determined by capital structure decisions
- Cash paid to shareholders – determined by dividend policy decisions
- Liquidity requirements – determined by net working capital decisions
### Financial Planning Ingredients

- **Sales Forecast** – many cash flows depend directly on the level of sales (often estimate sales growth rate)
- **Pro Forma Statements** – setting up the plan as projected (pro forma) financial statements allows for consistency and ease of interpretation
- **Asset Requirements** – the additional assets that will be required to meet sales projections
- **Financial Requirements** – the amount of financing needed to pay for the required assets
- **Plug Variable** – determined by management decisions about what type of financing will be used (makes the balance sheet balance)
- **Economic Assumptions** – explicit assumptions about the coming economic environment
Percent of Sales Approach

- Some items vary directly with sales, others do not.
- Income Statement
  - Costs may vary directly with sales - if this is the case, then the profit margin is constant
  - Depreciation and interest expense may not vary directly with sales – if this is the case, then the profit margin is not constant
  - Dividends are a management decision and generally do not vary directly with sales – this affects additions to retained earnings
Percent of Sales Approach

• Balance Sheet
  – Initially assume all assets, including fixed, vary directly with sales.
  – Accounts payable also normally vary directly with sales.
  – Notes payable, long-term debt, and equity generally do not vary with sales because they depend on management decisions about capital structure.
  – The change in the retained earnings portion of equity will come from the dividend decision.

• External Financing Needed (EFN)
  – The difference between the forecasted increase in assets and the forecasted increase in liabilities and equity.
Statement Analysis

Percent of Sales and EFN

- External Financing Needed (EFN) can also be calculated as:

\[
EFN = \left( \frac{\text{Assets}}{\text{Sales}} \right) \times \Delta \text{Sales} \\
- \frac{\text{Spon Liab}}{\text{Sales}} \times \Delta \text{Sales} \\
- (PM \times \text{Projected Sales}) \times (1 - d) \\
= (3 \times 250) - (0.3 \times 250) - (0.13 \times 1250 \times 0.667) \\
= $565
\]
External Financing and Growth

- At low growth levels, internal financing (retained earnings) may exceed the required investment in assets.
- As the growth rate increases, the internal financing will not be enough, and the firm will have to go to the capital markets for financing.
- Examining the relationship between growth and external financing required is a useful tool in long-range planning.
The Internal Growth Rate

- The internal growth rate tells us how much the firm can grow assets using retained earnings as the only source of financing.

- Using the information from the Hoffman Co.
  - \( \text{ROA} = \frac{66}{500} = .132 \)
  - \( b = \frac{44}{66} = .667 \)

\[
\text{Internal Growth Rate} = \frac{\text{ROA} \times b}{1 - \text{ROA} \times b} = \frac{.132 \times .667}{1 - .132 \times .667} = 9.65\%
\]
The Sustainable Growth Rate

- The sustainable growth rate tells us how much the firm can grow by using internally generated funds and issuing debt to maintain a constant debt ratio.

- Using the Hoffman Co.
  - ROE = 66 / 250 = .264
  - b = .667

  Sustainable Growth Rate = \( \frac{\text{ROE} \times b}{1 - \text{ROE} \times b} \)

  \[ \frac{.264 \times .667}{1 - .264 \times .667} = .214 \]

  = 21.4%
Determinants of Growth

- Profit margin – operating efficiency
- Total asset turnover – asset use efficiency
- Financial leverage – choice of optimal debt ratio
- Dividend policy – choice of how much to pay to shareholders versus reinvesting in the firm
Some Caveats

- Financial planning models do not indicate which financial policies are the best.
- Models are simplifications of reality, and the world can change in unexpected ways.
- Without some sort of plan, the firm may find itself adrift in a sea of change without a rudder for guidance.