Profitability Ratio Analysis

Profitability Ratios

- Purpose:
  - Provide insight about ability to generate income
- Return on assets
  \[
  = \frac{\text{Net income} + \text{interest} \times (1 - \text{tax rate})}{\text{Assets}}
  \]
- Return on equity
  \[
  = \frac{\text{Net income}}{\text{equity}}
  \]
- Favorable vs. unfavorable financial leverage
  - After-tax cost of debt vs. ROA and ROE.
Return on Equity

- Simply stated:
  \[ \text{ROE} = \frac{\text{Net income}}{\text{equity}} \]
- Fails to reveal underlying factors
  - What is the contribution of operating activity to profitability?
  - Can asset management improve profitability?
  - Has debt financing provided favorable leverage?
  - How have income taxes impacted profitability?
  - What is the influence of non-operating activities on profitability?
  - Can the firm sustain its current level of growth?
- Decompose to obtain an understanding.

DuPont ROE

- Decompose: \[ \text{ROE} = \frac{\text{Net income}}{\text{equity}} \]
- Into:
  \[ \text{ROE} = \text{Return on sales} \]
    * Asset turnover
    * Financial leverage
- Analyze trends in the components
- Critically examine both “good” and “bad” performance.
Extended DuPont Analysis

- Operations via a common-size analysis
- Asset turnover
- Financial leverage
  - Interest expense
  - Debt vs. equity proportions in the balance sheet
- Tax effect
- Unusual items effect
- Discuss using handout example.

Common-Size Income Statement

- Usefulness:
  - Are the company’s margins consistent with its stated competitive strategy?
  - Are the company’s margins changing? Why? What are the underlying causes?
  - Is the company managing its overhead and administrative costs well? What are the activities driving these costs? Are the activities necessary?
Efficiency in Managing Assets

- Detailed analysis reveals effectiveness of investment management
  - Use turnover ratios
- Two primary areas:
  - Net working capital management
    » Receivables, inventory, payables
    » Support normal operations
  - Long-term asset management
    » Assets generate long-term earnings.

Turnover Ratios

- Purpose:
  - Measure efficiency in managing assets
- Definition:
  - Sales / asset
- A slight digression:
  » Assume total assets
    = Cash + receivables + inventory + fixed assets
    $1,000 = $100 + $300 + $200 + $400 & sales = $5,000
- Calculate turnover ratio for each component
- Questions:
  » Are the ratios additive for the components?
  » Interpretations?
Net Working Capital Management

- Net current assets / sales
  = (Cash + marketable securities) / sales
  + Accounts receivable / sales
  + Inventories / sales
  + Prepaids / sales
  - Accounts payable & accruals
- 1 / (Net current assets / sales)
  = Sales / net current assets
  = Turnover of net current assets.

Turnover: Receivables Issues

- How well does the company manage its credit policies?
- Are these policies consistent with its marketing strategy?
- Is the company artificially increasing sales by loading distribution channels?
## Turnover: Inventory Issues

- How well does the company manage its inventory?
- Does the company use modern manufacturing techniques?
- What is the underlying business reason for change in inventory ratios?
- Are new products being planned?
- Is there a mismatch between demand forecasts and actual sales?

## Long-Term Asset Management

\[
\frac{\text{Long-term assets}}{\text{sales}} = \frac{\text{Gross fixed assets}}{\text{sales}} - \frac{\text{Accumulated depreciation}}{\text{sales}} + \frac{\text{Other long-term assets}}{\text{sales}}
\]

\[
1 \div (\frac{\text{Long-term assets}}{\text{sales}}) = \frac{\text{Sales}}{\text{long-term assets}} = \text{Turnover of long-term assets.}
\]
Long-Term Investment Issues

- Is investment in plant and equipment consistent with the competitive strategy?
- Does the company have a sound policy of acquisitions and divestitures?
- How is product quality affected?
- What is the estimated age of the assets?
  - Gross fixed assets / depreciation expense
  - Accumulated depreciation / depreciation expense
  - Net fixed assets / depreciation expense.

Operating Return on Assets

- Operating return on assets before taxes is:
  - EBIT / assets
- It is also the product of:
  - Operating return on sales = EBIT / sales
  - Asset turnover ratio = Sales / assets
- Note:
  - All financing costs are excluded from EBIT
  - Taxes have been excluded from EBIT
    - Show a separate tax effect later.
Financial Leverage Effect

- Financial leverage increases ROE if rate of return earned on the invested funds > cost of debt financing
- However, financial leverage increases risk of financial distress
- Debt obligations have priority over equity payments
- Financial leverage consists of two components
  » Interest expense multiplier
  » Balance sheet financing multiplier

Interest Expense Multiplier

- Defined as:
  1 - (interest expense) / (operating earnings)
  \[ or \quad 1 - \frac{\text{interest expense}}{\text{EBIT}} \]
  \[ or \quad \frac{\text{EBIT} - \text{interest expense}}{\text{EBIT}} \]
  \[ or \quad \frac{\text{EBT}}{\text{EBIT}} \]
- Interpretation:
  - The proportion of $1 of operating earnings (before interest expense) that is left after paying interest.
Balance Sheet Financing Multiplier

- Financial leverage = Assets / equity
- But, Assets = Debt + Equity
  Thus, Assets / equity = (Debt / equity) + 1
- Assets / equity
  = Current liabilities / equity
    + Long-term debt / equity
    + Other LT liabilities / equity
    + Preferred stock / equity
    + 1.

Joint Financial Leverage Effect

- Defined as the product of:
  - Interest expense multiplier
  - Balance sheet financing multiplier
- Interpretation of joint effect:
  - Positive financial leverage if product > 1
  - Negative financial leverage if product < 1.
**W.T. Grant’s Management of Financial Leverage**

<table>
<thead>
<tr>
<th>Year</th>
<th>Assets/Equity</th>
<th>CL/Equity</th>
<th>LTL/Equity</th>
<th>Other/Equity</th>
<th>Preferred/Equity</th>
<th>Equity/Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974</td>
<td>3.962</td>
<td>1.761</td>
<td>0.697</td>
<td>0.480</td>
<td>0.024</td>
<td>1.000</td>
</tr>
<tr>
<td>1973</td>
<td>3.410</td>
<td>1.544</td>
<td>0.389</td>
<td>0.451</td>
<td>0.026</td>
<td>1.000</td>
</tr>
<tr>
<td>1972</td>
<td>2.983</td>
<td>1.145</td>
<td>0.406</td>
<td>0.403</td>
<td>0.029</td>
<td>1.000</td>
</tr>
<tr>
<td>1971</td>
<td>2.762</td>
<td>1.246</td>
<td>0.110</td>
<td>0.373</td>
<td>0.033</td>
<td>1.000</td>
</tr>
<tr>
<td>1970</td>
<td>2.531</td>
<td>1.025</td>
<td>0.127</td>
<td>0.338</td>
<td>0.041</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Accounting identity: Assets = Liabilities + equity

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**W.T. Grant’s Interest Rate Environment**

![Graph showing interest rate environment from Jan. '69 to Jan. '74]
Income Tax Multiplier

- Income tax multiplier
  - Defined as:
    1 - (income tax) / (pretax income)
    or as (EBT - income taxes) / EBT
    or as NI / EBT

- Interpretation
  - The proportion of $1 of pretax income left after paying income tax.

ROE: Excluding Unusual Items

- ROE is the product of:
  - Operating return on sales
  - Asset turnover ratio
  - Joint interest & financial leverage multiplier
  - After income tax multiplier

- By excluding unusual items
  - Better fix on profitability of normal operations.
Effect of Unusual Items

- Restructuring charges, extraordinary gains/losses, etc... can seriously change ROE
- Adjusting ROE for these items lets you see the impact of nonrecurring items
- Although not unusual, an adjustment for preferred dividends is necessary
  - Why?
    » Preferred shareholders are not residual owners of the business.

Background for Sustainable Growth

- Sustainable growth relies on:
  Return on equity
  Dividend policy.
Sustainable Growth

- **Definition:**
  - Growth the firm can sustain
    - Without issuing new equity
    - Maintaining current financial policies
- **Based on “sources” = “uses” concept**
- **Formula:**
  \[ \text{Growth} = \frac{\text{Retention ratio} \times \text{ROE}}{1 - (\text{Retention ratio} \times \text{ROE})} \]
- **Compare:** Sustainable growth vs. actual growth.

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An Example

<table>
<thead>
<tr>
<th></th>
<th>LY</th>
<th>TY</th>
<th></th>
<th>LY</th>
<th>TY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assets</td>
<td>200</td>
<td>330</td>
<td>Sales</td>
<td>400</td>
<td>700</td>
</tr>
<tr>
<td>Debts</td>
<td>40</td>
<td>80</td>
<td>Costs</td>
<td>300</td>
<td>550</td>
</tr>
<tr>
<td>Equity</td>
<td>160</td>
<td>250</td>
<td>Profit</td>
<td>100</td>
<td>150</td>
</tr>
<tr>
<td><strong>Sales growth = 75%</strong></td>
<td></td>
<td></td>
<td><strong>Dividends</strong></td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td><strong>Asset growth = 65%</strong></td>
<td></td>
<td></td>
<td><strong>Retained</strong></td>
<td>60</td>
<td>90</td>
</tr>
</tbody>
</table>

\[ \text{Growth} = \frac{\text{Retention ratio} \times \text{ROE}}{1 - (\text{Retention ratio} \times \text{ROE})} \]

\[ = \frac{.60 \times .625}{1 - (.60 \times .625)} \]

\[ = .60 \times .60 / [1 - .60 \times .60] \]

60.0% 56.3%
## W.T. Grant’s Sustainable Growth

<table>
<thead>
<tr>
<th>Year</th>
<th>Return on sales</th>
<th>Inverted asset turnover</th>
<th>Financial leverage</th>
<th>Retention rate</th>
<th>Sustainable growth</th>
<th>Actual growth (sales)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974</td>
<td>.004</td>
<td>.677</td>
<td>2.962</td>
<td>-1.542</td>
<td>-.038</td>
<td>.125</td>
</tr>
<tr>
<td>1973</td>
<td>.023</td>
<td>.675</td>
<td>2.410</td>
<td>.444</td>
<td>.054</td>
<td>.196</td>
</tr>
<tr>
<td>1972</td>
<td>.025</td>
<td>.687</td>
<td>1.983</td>
<td>.402</td>
<td>.046</td>
<td>.096</td>
</tr>
<tr>
<td>1971</td>
<td>.031</td>
<td>.644</td>
<td>1.762</td>
<td>.477</td>
<td>.068</td>
<td>.036</td>
</tr>
<tr>
<td>1970</td>
<td>.034</td>
<td>.584</td>
<td>1.531</td>
<td>.532</td>
<td>.085</td>
<td>.096</td>
</tr>
</tbody>
</table>

Formula: Sustainable growth = \(\text{ROS} \times \text{Retention Rate} \times \frac{\text{Assets}}{\text{Equity}}\)

\[
\text{Assets/Sales} - \text{ROS} \times \text{Retention Rate} \times \frac{\text{Assets}}{\text{Equity}}
\]

## Inflation-Adjusted Statements

**Important considerations:**

- Inflation sensitivity of assets and liabilities
- Old assets vs. relatively new assets
- Price vs. volume gains
- Productivity gains?
### W.T. Grant’s Inflation Management Performance

<table>
<thead>
<tr>
<th></th>
<th>As Reported</th>
<th>Adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>1,849,802</td>
<td>1,849,802</td>
</tr>
<tr>
<td>Cost of sales</td>
<td>1,163,998</td>
<td>1,300,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>13,579</td>
<td>17,282</td>
</tr>
<tr>
<td>Other expenses</td>
<td>623,646</td>
<td>623,646</td>
</tr>
<tr>
<td>Operating earnings</td>
<td>48,579</td>
<td>-91,126</td>
</tr>
<tr>
<td>Interest expense</td>
<td>7,033</td>
<td>7,033</td>
</tr>
<tr>
<td>Taxes</td>
<td>787</td>
<td>787</td>
</tr>
<tr>
<td>Net income</td>
<td>3,778</td>
<td>-135,927</td>
</tr>
<tr>
<td>Dividends</td>
<td>21,122</td>
<td>21,122</td>
</tr>
<tr>
<td>Retained earnings</td>
<td>-12,693</td>
<td>-152,398</td>
</tr>
</tbody>
</table>

The End