Financial Statement Analysis

Financial Analysis Techniques

Exam Focus

- Common size statements
- Pros and cons
- Activity ratios
- Liquidity ratios
- Solvency ratios
- Profitability ratios
- Integrated ratios: DuPont

Value of Ratio Analysis

- Analyze past performance and position; understand relationships useful for forecasting future position, performance, and cash flows
  - Economic relationships useful for forecasting earnings and free cash flow
  - Assessment of financial flexibility
  - Assessment of managerial ability
  - Analysis of industry changes
  - Comparability with competitors

Limitations of Financial Ratios

- **Not useful in isolation**—only valid when compared to other firms or the company's historical performance (compare to prior periods, expectations, industry peers)
- **Different accounting treatments**—particularly when analyzing non-U.S. firms
- **Finding comparable industry ratios** for companies that operate in multiple industries (conglomerates)
- All ratios must be viewed **relative** to one another
- Determining the target or comparison value requires some **range of acceptable values**

Vertical Common-Size Statements

Income Statement

$$\frac{\text{income statement account}}{\text{sales}} \quad \text{e.g.,} \quad \frac{\text{marketing expense}}{\text{sales}}$$

Balance Sheet

$$\frac{\text{balance sheet account}}{\text{total assets}} \quad \text{e.g.,} \quad \frac{\text{inventory}}{\text{total assets}}$$

Vertical Common-Size Statements

- Useful for:
  - Trend analysis (changes over time)
  - Cross-sectional analysis (comparison to competitors and industry averages)
- Differences across time or with competitors require investigation
- Low variability over time = useful for forecasting

Horizontal Common-Size Statements

- Each line shown as a relative to some base year
- Facilitates trend analysis

Assets	Year 0	Year 1	Year 2
Cash	1.0	1.2	1.1
AR	1.0	1.3	1.0
Inventory	1.0	0.8	1.2
PP&E	1.0	1.5	2.0
Total	1.0	1.3	1.5

Ratio Analysis

- Here are some general rules:
  - For ratios that use only **income statement items**, use the values from the current income statement.
  - For ratios using only **balance sheet items**, use the values from the current balance sheet.
  - For ratios using **both income statement and balance sheet items**, use the value from the current income statement and the **average value for the balance sheet item.**

Categories of Ratios

Category	
Activity	Efficiency of operations
Liquidity	Ability to meet short-term obligations
Solvency	Ability meet long-term debt obligations
Profitability	Ability to convert sales into profits Ability to use asset base to generate sales

Activity Ratios

$$\text{Inventory turnover} = \frac{\text{cost of goods sold}}{\text{average inventory}}$$

$$\text{Days of inventory on hand (DOH)} = \frac{365}{\text{inventory turnover}}$$

$$\text{Receivables turnover} = \frac{\text{revenue (net sales)}}{\text{average receivables}}$$

$$\text{Days of sales outstanding (DSO)} = \frac{365}{\text{receivables turnover}}$$

Activity Ratios

$$\text{Payables turnover} = \frac{\text{cost of goods sold}}{\text{average trade payables}}$$

$$\text{Number of days of payables} = \frac{365}{\text{payables turnover}}$$

$$\text{Working capital turnover} = \frac{\text{revenue (net sales)}}{\text{average working capital}}$$

$$\text{Working capital} = \text{current assets} - \text{current liabilities}$$

Activity Ratios

$$\text{Fixed asset turnover} = \frac{\text{revenue (net sales)}}{\text{average net fixed assets}}$$

$$\text{Working capital turnover} = \frac{\text{revenue (net sales)}}{\text{average working capital}}$$

$$\text{Total asset turnover} = \frac{\text{revenue (net sales)}}{\text{average total assets}}$$

Liquidity Ratios

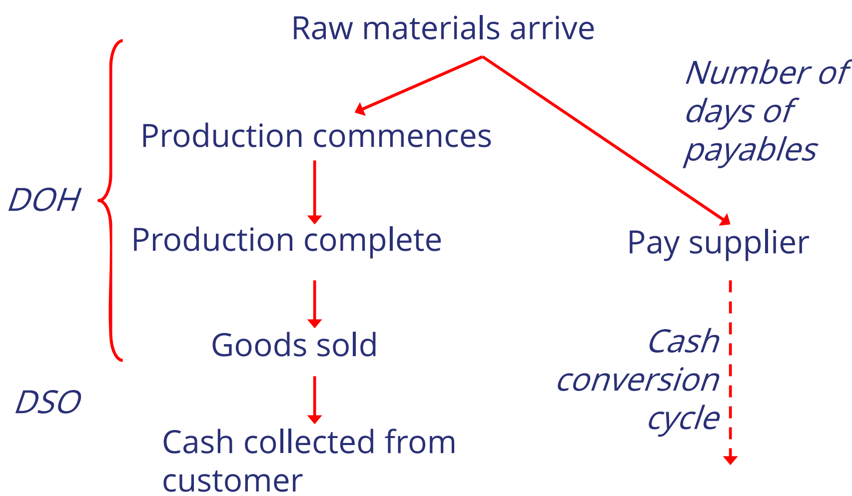
$$\text{Current ratio} = \frac{\text{current assets}}{\text{current liabilities}}$$

$$\text{Quick ratio (acid test)} = \frac{\text{cash + short-term marketable investments + receivables}}{\text{current liabilities}}$$

$$\text{Cash ratio} = \frac{\text{cash + short-term marketable investments}}{\text{current liabilities}}$$

$$\text{Defensive interval ratio} = \frac{\text{cash + short-term marketable investments + receivables}}{\text{daily cash expenditure}}$$

Cash Conversion Cycle



	Days
DOH	X
DSO	X
Nº days of payables	(X)
Cash conversion cycle	X

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Solvency Ratios

Total debt ratio: total debt = interest-bearing short-term and long-term liabilities

Debt-to-assets ratio $= \dfrac{\text{total debt}}{\text{total assets}}$

Debt-to-capital ratio $= \dfrac{\text{total debt}}{\text{total debt + total shareholders' equity}}$

Solvency Ratios

$$\text{Debt-to-equity ratio} = \frac{\text{total debt}}{\text{total shareholders' equity}}$$

$$\text{Financial leverage ratio} = \frac{\text{average total assets}}{\text{average total equity}}$$

Coverage ratios:

$$\text{Interest coverage} = \frac{\text{EBIT}}{\text{interest payments}}$$

$$\text{Fixed charge coverage} = \frac{\text{EBIT + lease payments}}{\text{interest payments + lease payments}}$$

Profitability Ratios

Return on sales ratios:

$$\text{Gross profit margin} = \frac{\text{gross profit}}{\text{revenue}}$$

$$\text{Operating profit margin} = \frac{\text{operating income}}{\text{revenue}}$$

$$\text{Pretax margin} = \frac{\text{EBT}}{\text{revenue}}$$

$$\text{Net profit margin} = \frac{\text{net income}}{\text{revenue}}$$

Profitability Ratios

Return on investment ratios:

Return on assets (ROA) $= \dfrac{\text{net income}}{\text{average total assets}}$

Operating ROA $= \dfrac{\text{operating income (EBIT)}}{\text{average total assets}}$

Return on invested capital $= \dfrac{\text{EBIT} \times (1 - \text{effective tax rate})}{\text{invested capital}}$

Profitability Ratios

Return on investment ratios:

Return on equity (ROE) $= \dfrac{\text{net income}}{\text{average total equity}}$

Return on common equity $= \dfrac{\text{net income} - \text{pref. div.}}{\text{average common equity}}$

Integrated Ratio Analysis: DuPont

$$\text{ROE} = \frac{\text{net income}}{\text{average stockholders' equity}}$$

$$\underbrace{\frac{\text{net income}}{\text{average total assets}}}_{\text{ROA}} \times \underbrace{\frac{\text{average total assets}}{\text{average stockholders' equity}}}_{\text{financial leverage ratio}}$$

Integrated Ratio Analysis: DuPont

$$\text{ROE} = \frac{\text{net income}}{\text{average stockholders' equity}}$$

$$\frac{\text{net income}}{\text{revenue}} \times \frac{\text{revenue}}{\text{equity}}$$

$$\underbrace{\frac{\text{net income}}{\text{revenue}}}_{\text{net profit margin}} \times \underbrace{\frac{\text{revenue}}{\text{total assets}}}_{\text{asset turnover}} \times \underbrace{\frac{\text{total assets}}{\text{equity}}}_{\text{leverage}}$$

Five-Stage DuPont

$$\frac{\text{net income}}{\text{revenue}} \times \frac{\text{revenue}}{\text{total assets}} \times \frac{\text{total assets}}{\text{equity}}$$

$$\underbrace{\frac{\text{EBIT}}{\text{revenue}}}_{\text{EBIT margin}} \times \underbrace{\frac{\text{EBT}}{\text{EBIT}}}_{\text{interest burden}} \times \underbrace{\frac{\text{net income}}{\text{EBT}}}_{\text{tax burden}}$$

Models and Forecasts

- Common-size statements and ratios can be used to model/forecast results using the following:
  - Expected relationships among financial statement data
  - Earnings model
  - Revenue-driven models
- Here are other methods for modeling/forecasting:
  - Sensitivity analysis
  - Scenario analysis
  - Simulation