Learning Objectives
- Explain the objectives of financial statement analysis and its benefits for creditors, stockholders and managers
- Construct a common size income statement and a common size balance sheet
- Calculate liquidity, asset utilization, debt utilization and profitability ratios
- Identify limitations of ratio analysis

Objectives of Financial Statement Analysis
- Creditors
  - Firm’s ability to repay borrowed funds, i.e., creditworthiness and the probability of default
- Stockholders/owners
  - Firm’s future prospects (ability to generate value - cash flows)
- Managers
  - Identify strengths & weaknesses
  - Improve firm performance

Common Size Statements - Why?
- Allow for comparisons over time
  - e.g., did the company improve on last year’s performance?
- Allow for cross sectional comparisons (among firms in the same industry)
  - e.g., did the company do better or worse than firms in the same industry (industry average)?

Common Size Statements - How?
- Common Size Balance Sheet (BS)
  - Each account is expressed as a percentage of total assets:
    \[ \frac{100 \times \text{BS account}}{\text{Total assets}} \]
- Common Size Income Statement (IS)
  - Each item is expressed as a percentage of net sales:
    \[ \frac{100 \times \text{IS item}}{\text{Net sales}} \]

Example 1
- Inventory $135,600
- Total Assets $1,384,000

Inventory as % of Total Assets = \( \frac{100 \times 135,600}{1,384,000} = 9.8\% \)

How does 9.8% inventory compare to the industry average?
Does it vary over time?
Example 2

Net Sales $12,186,000
COGS $ 9,627,000
Gross profit $ 2,559,000

COGS as % of Net Sales
= 100 x $9,627,000 / $12,186,000 = 79%
I.e., the direct costs (COGS) associated with every $1 of net sales are 79 cents.

Gross profit margin ("markup")=
= 100 x $ 2,559,000 / $12,186,000 = 21%

Digression - Markup Example

Note that the textbook refers to "markup" as follows: "Barista was able to ‘mark up’ its clothing by about 21%", but the term markup is used in more than one way.
If a retailer sells a product for $10 which had a cost of $8, the gross profit is $2. The gross profit margin expresses the gross profit amount as a percentage of sales. In our example the gross profit margin is 20% ($2 are 20% of $10).
Some retailers use markup to mean the difference between a product’s cost and its selling price. In our example, the product had a cost of $8 and it had a markup of $2 resulting in a selling price of $10. The $2 markup is the same as the $2 gross profit. However, the markup percentage is often expressed as a percentage of cost. In our example the $2 markup is divided by the cost of $8 resulting in a markup of 25%.
Some retailers may use the term markup to mean the increase in the original selling price. For example, if the $10 selling price was increased to $11 because of high demand and limited supply, they would say the markup was $1.

Common Size Statements - Units

In the Common Size Income Statement we calculate the
Gross profit margin = Gross profit per $1 of sales
Operating profit margin = Operating profit per $1 of sales
Net income (profit) margin = Net income (profit) per $1 of sales

Financial Ratios

We use Balance Sheet accounts and Income Statement items to calculate ratios that measure
- Liquidity (solvency)
- Activity (asset utilization, turnover)
- Debt utilization (leverage)
- Profitability
- Other

Liquidity Ratios

Measure how well the company can meet its short-term obligations
Current ratio = \[
\frac{\text{Current assets}}{\text{Current liabilities}}
\]
Quick ratio = \[
\frac{\text{Current assets} - \text{Inventories}}{\text{Current liabilities}}
\]
Large values imply that the firm has cash to pay its bills on time \(\rightarrow\) low probability of insolvency

Activity Ratios

- Other names:
  - Asset utilization, or turnover ratios
  - Measures of business activity and efficiency within the firm
- Assets should be actively and efficiently used to generate returns
- If you can use the same assets more efficiently in your business then improve efficiency, if you can use them more efficiently elsewhere then free those assets for better uses
Activity Ratios – Definitions 1

**Average collection period**: how many days it takes the company to collect payments from credit sales

\[
\text{Average collection period} = \frac{\text{Account receivable}}{\text{Annual credit sales}} \times 360
\]

**Payables period**: how many days it takes the company to pay its trade accounts (suppliers)

\[
\text{Payables period} = \frac{\text{Account payable}}{\text{Cost of goods sold}} \times 360
\]

Digression - Industry Credit Terms

Trade credit is usually "interest free" but the terms include a discount for early payment → the effective cost of credit is not zero!

Typical credit terms: 2/10 net 30 (read: take 2% discount if paid within 10 days, otherwise the entire price must be paid within 30 days)

\[
\text{Effective annual cost} = \frac{\text{Discount percent}}{\text{Extra days if not take discount}} \times 360
\]

\[
= \frac{2\%}{(30-10)} \times 360 = 36\%
\]

Activity Ratios – Definitions 2

**Inventory conversion period**: how many days the company keeps inventory items in stock before they are sold

\[
\text{Inventory conversion period} = \frac{\text{Inventories}}{\text{Cost of goods sold}} \times 360
\]

Cash Conversion Cycle (CCC)

**CCC** is the number of days between cash expenditures and cash collections

- **Cash expenditures**: spending money to produce goods for sale or to buy goods for resale
- **Cash collections**: collecting money from customers

\[
\text{Cash conversion cycle} = \text{Cash expenditure} + \text{Cash collection} - \text{Cash expenditure}
\]

Activity Ratios – Definitions 3

**Inventory turnover ratio**: an industry specific inventory efficiency measure (higher values → higher efficiency)

\[
\text{Inventory turnover ratio} = \frac{\text{Cost of goods sold}}{\text{Inventories}}
\]

**Total asset turnover ratio**: an industry specific total assets efficiency measure (higher values → higher efficiency)

\[
\text{Total assets turnover ratio} = \frac{\text{Sales}}{\text{Total assets}}
\]
Debt Utilization Ratios

- Other names: leverage ratios
- Measure the extent to which the firm uses borrowed funds to finance its operations
- In general, we consider self (equity) financing as a good sign and an increase in debt financing as a bad sign

Debt Utilization Ratios - Definitions

\[ \text{Debt ratio} = \frac{\text{Total liabilities}}{\text{Total liabilities and equity}} = \frac{D}{D + E} \]

\[ \text{Debt to equity ratio} = \frac{\text{Total liabilities}}{\text{Equity}} = \frac{D}{E} \]

If debt levels are high
\[ \rightarrow \text{high risk of default} \]
\[ \rightarrow \text{difficulties raising new debt} \]

Profitability Ratios

Times Interest Earned (TIE): how many times the firm's annual operating earnings cover its debt-servicing charges (mainly interest)

\[ \text{Times Interest Earned} = \frac{\text{Operating income}}{\text{Interest expense}} \]

Large TIE \( \rightarrow \) high interest payments
\[ \rightarrow \] high probability of default

Income Statement profitability ratios:

- Gross profit margin = \( \frac{\text{Gross profit}}{\text{Net sales}} \)
- Operating profit margin = \( \frac{\text{Operating profit}}{\text{Net sales}} \)
- Net profit margin = \( \frac{\text{Net profit}}{\text{Net sales}} \)

Profitability Activity Equity multiplier

\[ \times \]

\[ \times \]

Extended DuPont Equation

Breaks down the Return on Equity (ROE) into three components:

\[ \text{ROE} = \frac{\text{Net income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Equity}} \]

The DuPont equation helps identify the reason / source for changes in ROE
Limitations of Ratio Analysis 1

Balance sheet values are stock measures - the values of assets and liabilities are captured on a specific date.

Ratios using balance sheet values may not reflect the company's state on other days of the year.

Example: A company that reports $1 million in cash on the last day of the fiscal year may have only $100k two days later, after paying salaries and suppliers.

Limitations of Ratio Analysis 2

The ratios are calculated using accounting data, not market values.

Accounting data is based on an asset's historical costs.

Market values are based on the asset's market value.

Example: if inventory value declines below historical cost but management did not adjust for this - every ratio involving total assets will be inaccurate.

Limitations of Ratio Analysis 3

There are no standard values for each ratio.

- E.g., what value is considered to be a "good" current ratio?

Should we use the industry average ratio as the standard?

- Not necessarily. Deviations from the industry average are not always a bad sign.

Summary

- Reasons for conducting financial statement analysis
- Common size financial statements
- 4 types of ratios: liquidity, activity, debt utilization, profitability
- Cash conversion cycle
- Extended DuPont Equation
- Limitations of ratio analysis