

## **Topic 13. Financial Statement Analysis**

1. The essence of the Financial Statement Analysis.
2. Common-size analysis
3. Financial Ratio Analysis
4. Pro Forma Analysis

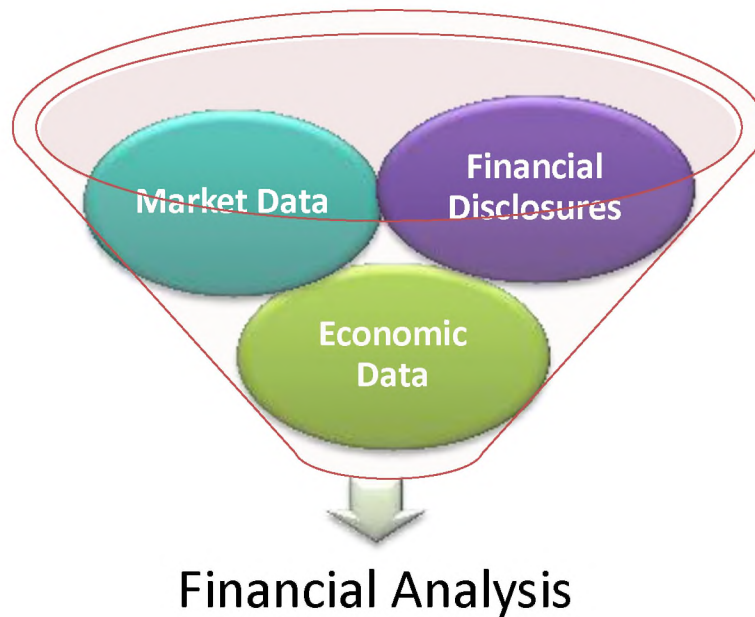
### **Didactic purposes:**

- *Definition of financial analysis.*
- *Classification of financial analysis.*
- *Understanding the main tasks of financial analysis.*
- *Knowledge of the structure of the financial statements of the company.*
- *Analysis of property of the enterprise.*
- *Evaluation of sources of funds of the enterprise.*
- *Assessment of the financial stability of the company.*
- *Analysis of the creditworthiness of the enterprise.*
- *Liquidity analysis.*
- *Calculation of profitability and business activity.*

*Keywords: financial analysis, horizontal analysis, vertical analysis, balance sheet, financial statements, enterprise property, sources of funds, growth rate, ratio, creditworthiness, liquidity, profitability, business activity.*

### **1. The essence of the Financial Statement Analysis.**

Financial analysis is a process of selecting, evaluating, and interpreting financial data, along with other pertinent information, in order to formulate an assessment of a company's present and future financial condition and performance.



Information needed:

- Financial disclosures (e.g., 10-K, annual report, 10-Q, 8-K)
- Market data (e.g., market price of stock, volume traded, value of bonds)
- Economic data (e.g., GDP, consumer spending)

### 1. Common-size analysis

Common-size analysis is the restatement of financial statement information in a standardized form.

- Horizontal common-size analysis uses the amounts in accounts in a specified year as the base, and subsequent years' amounts are stated as a percentage of the base value. Useful when comparing growth of different accounts over time.
- Vertical common-size analysis uses the aggregate value in a financial statement for a given year as the base, and each account's amount is restated as a percentage of the aggregate.

Balance sheet: Aggregate amount is total assets.

- Reveals proportion of asset investment among accounts.
- Reveals capital structure (proportions of capital).

Income statement: Aggregate amount is revenues or sales.

- Reveals profit margins.

Example: Common-size analysis

Consider the CS Company, which reports the following financial information:

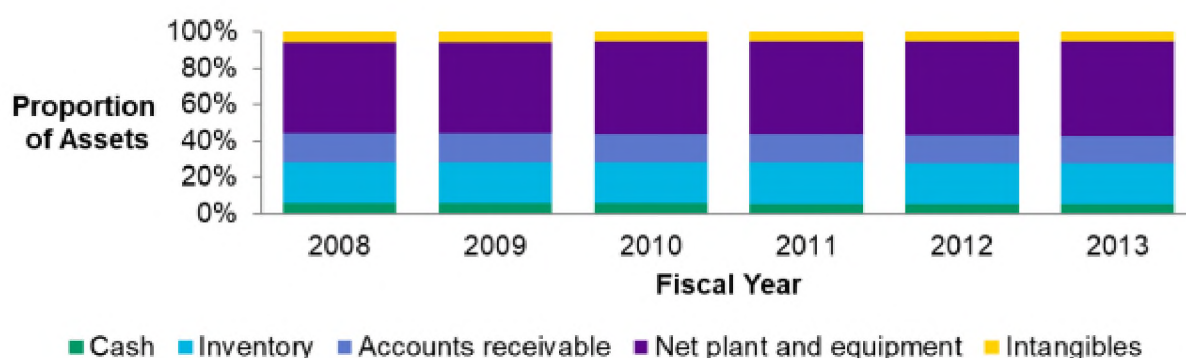
Year	2008	2009	2010	2011	2012	2013
Cash	\$400.00	\$404.00	\$408.04	\$412.12	\$416.24	\$420.40
Inventory	1,580.00	1,627.40	1,676.22	1,726.51	1,778.30	1,831.65
Accounts receivable	1,120.00	1,142.40	1,165.25	1,188.55	1,212.32	1,236.57
Net plant and equipment	3,500.00	3,640.00	3,785.60	3,937.02	4,094.50	4,258.29
Intangibles	400.00	402.00	404.01	406.03	408.06	410.10
Total assets	\$6,500.00	\$6,713.30	\$6,934.12	\$7,162.74	\$7,399.45	\$7,644.54

1. Create the vertical common-size analysis for the CS Company's assets.
2. Create the horizontal common-size analysis for CS Company's assets, using 2008 as the base year.

Vertical Common-Size Analysis:

Year	2008	2009	2010	2011	2012	2013
Cash	6%	6%	5%	5%	5%	5%
Inventory	23%	23%	23%	23%	22%	22%
Accounts receivable	16%	16%	16%	15%	15%	15%
Net plant and equipment	50%	50%	51%	51%	52%	52%
Intangibles	6%	6%	5%	5%	5%	5%
Total assets	100%	100%	100%	100%	100%	100%

Graphically:



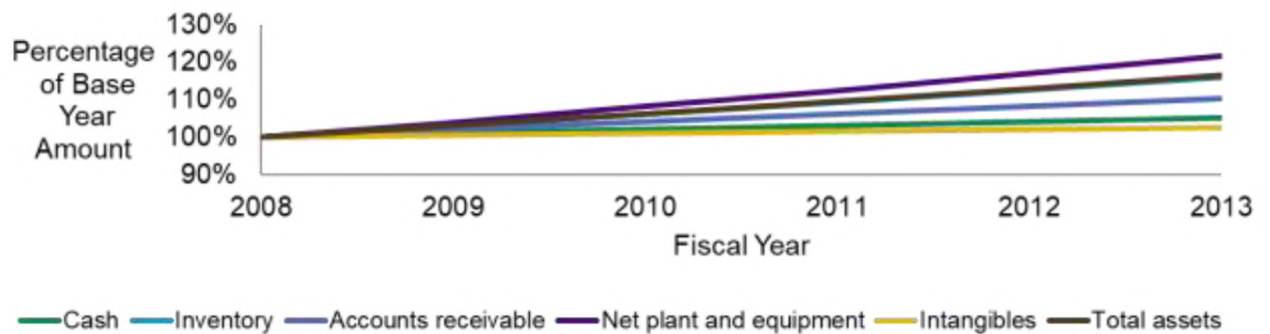
Interpretation:

- The relative investment in fixed assets (currently around 52% of assets), when compared with current assets, has increased since 2008.
- The proportion of assets that are current assets have decreased slightly over time.

Horizontal Common-Size Analysis (base year is 2008):

Year	2008	2009	2010	2011	2012	2013
Cash	100.00%	101.00%	102.01%	103.03%	104.06%	105.10%
Inventory	100.00%	103.00%	106.09%	109.27%	112.55%	115.93%
Accounts receivable	100.00%	102.00%	104.04%	106.12%	108.24%	110.41%
Net plant and equipment	100.00%	104.00%	108.16%	112.49%	116.99%	121.67%
Intangibles	100.00%	100.50%	101.00%	101.51%	102.02%	102.53%
Total assets	100.00%	103.08%	106.27%	109.57%	112.99%	116.53%

Graphically:

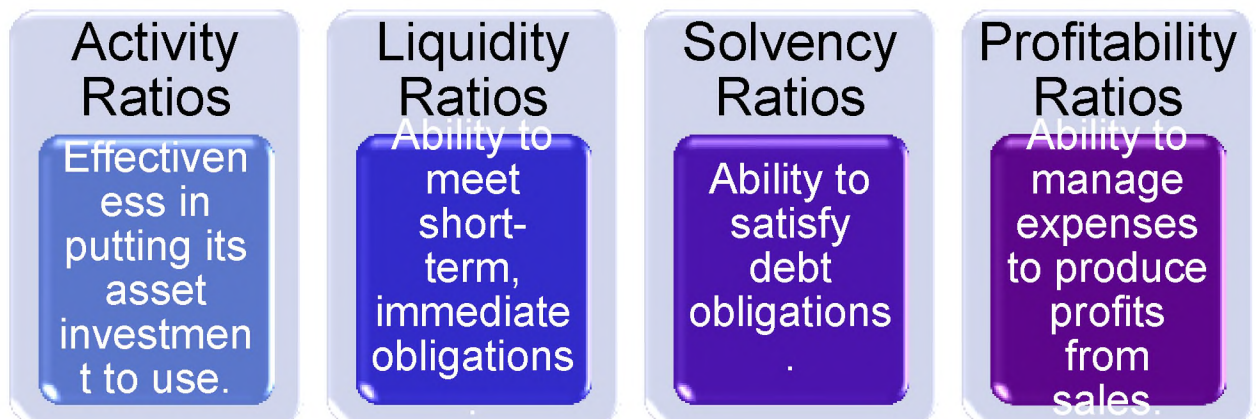


Interpretation:

- Net plant and equipment has increased more than other assets since 2008 (annual rate of 4%).
- Intangibles have increased the least over time.

### 3. Financial Ratio Analysis

- Financial ratio analysis is the use of relationships among financial statement accounts to gauge the financial condition and performance of a company.
- We can classify ratios based on the type of information the ratio provides:



## Activity Ratios

- Turnover ratios reflect the number of times assets flow into and out of the company during the period.
- A turnover is a gauge of the efficiency of putting assets to work.
- Ratios:

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

How many times inventory is created and sold during the period.

$$\text{Receivables turnover} = \frac{\text{Total revenue}}{\text{Average receivables}}$$

How many times accounts receivable are created and collected during the period.

$$\text{Total asset turnover} = \frac{\text{Total revenue}}{\text{Average total assets}}$$

The extent to which total assets create revenues during the period.

$$\text{Working capital turnover} = \frac{\text{Total revenue}}{\text{Average working capital}}$$

The efficiency of putting working capital to work

Turnover ratios reflect the number of times assets flow into and out of the company during the period.

A turnover is a gauge of the efficiency of putting assets to work.

- Inventory turnover: How many times inventory is created and sold during the period.
- Receivables turnover: How many times accounts receivable are created and collected during the period.
- Total asset turnover: The extent to which total assets create revenues during the period.
- Working capital turnover: The efficiency of putting working capital to work.

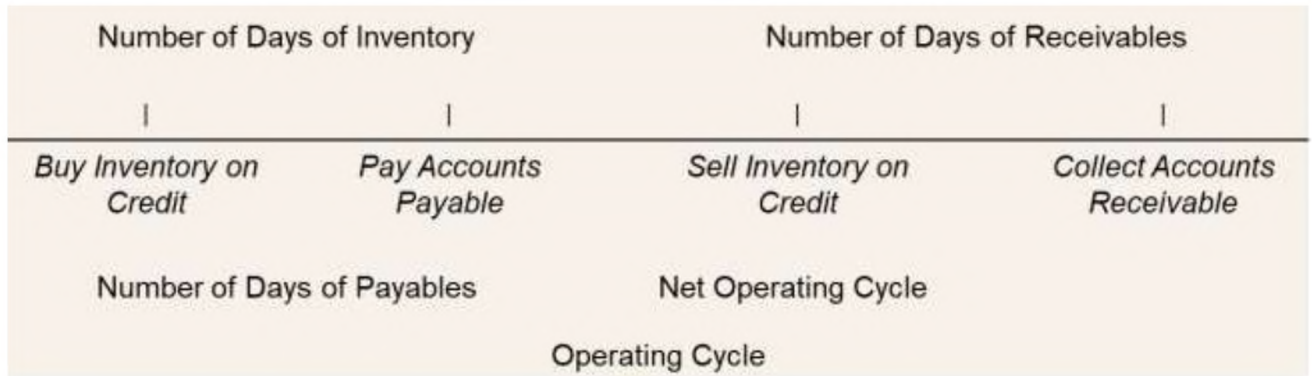
*Note:* A way of looking at turnover ratios is to consider that the denominator is the investment that is being put to work and the numerator is the result of that effort.

## Operating cycle components

- in goods and services to the time it collects cash from its accounts receivable.
- The net operating cycle is the length of time from when a company makes an investment in goods and services, considering the company makes some of its purchases on cThe

operating cycle is the length of time from when a company makes an investment credit, to the time it collects cash from its accounts receivable.

- The length of the operating cycle and net operating cycle provides information on the company's need for liquidity: The longer the operating cycle, the greater the need for liquidity.



### Operating Cycle Components

- The operating cycle is the length of time from when a company makes an investment in goods and services to the time it collects cash from its accounts receivable.
- The net operating cycle is the length of time from when a company makes an investment in goods and services, considering the company makes some of its purchases on credit, to the time it collects cash from its accounts receivable.
- The length of the operating cycle and net operating cycle provides information on the company's need for liquidity: The longer the operating cycle, the greater the need for liquidity.

*Note:* The operating cycle is also covered in Chapter 8, along with the formulas.

Discussion question: Why do we say that a company with a long operating cycle has a greater need for liquidity?

### Operating Cycle Formulas

$$\text{Number of days of inventory} = \frac{\text{Inventory}}{\text{Average day's cost of goods sold}} = \frac{365}{\text{Inventory turnover}}$$

Average time it takes to create and sell inventory.

$$\text{Number of days of receivables} = \frac{\text{Receivables}}{\text{Average day's revenues}} = \frac{365}{\text{Receivables turnover}}$$

Average time it takes to collect on accounts receivable.

$$\text{Number of days of payables} = \frac{\text{Accounts payable}}{\text{Average day's purchases}} = \frac{365}{\text{Accounts payable turnover}}$$

Average time it takes to pay suppliers.

### Operating Cycle Formulas

- Number of days of inventory: Average time it takes to create and sell inventory.
- Number of days of receivables: Average time it takes to collect on accounts receivable.
  - By using average day's revenues, we are assuming that all sales are on credit. If not, this would be modified to reflect only credit sales.
- Number of days of payables: Average time it takes to pay suppliers.

*Key:* The numerator is the “stock” of the denominator’s “flow.”

$$\text{Operating cycle} = \text{Number of days of inventory} + \text{Number of days of receivables}$$

Time from investment in inventory to collection of accounts.

$$\text{Net operating cycle} = \text{Number of days of inventory} + \text{Number of days of receivables} - \text{Number of days of payables}$$

Time from investment in inventory to collection of accounts, considering the use of trade credit in purchases.

### Liquidity

- Liquidity is the ability to satisfy the company’s short-term obligations using assets that can be most readily converted into cash.
- Liquidity ratios:

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

Ability to satisfy current liabilities using current assets.

$$\text{Quick ratio} = \frac{\text{Cash} + \text{Short-term investments} + \text{Receivables}}{\text{Current liabilities}}$$

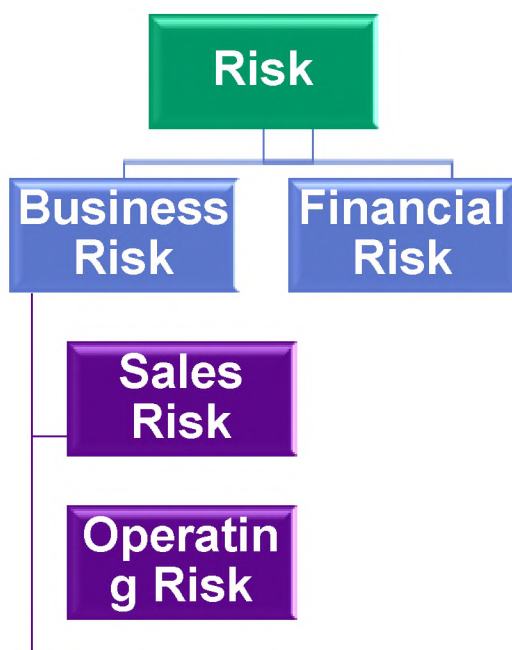
Ability to satisfy current liabilities using the most liquid of current assets.

$$\text{Cash ratio} = \frac{\text{Cash} + \text{Short-term investments}}{\text{Current liabilities}}$$

Ability to satisfy current liabilities using only cash and cash equivalents.

### Solvency Analysis

- A company's business risk is determined, in large part, from the company's line of business.
- Financial risk is the risk resulting from a company's choice of how to finance the business using debt or equity.
- We use solvency ratios to assess a company's financial risk.
- There are two types of solvency ratios: component percentages and coverage ratios.
  - Component percentages involve comparing the elements in the capital structure.
  - Coverage ratios measure the ability to meet interest and other fixed financing costs.





## Solvency ratios

Component-Percentage Solvency Ratios	Debt-to-assets ratio = $\frac{\text{Total debt}}{\text{Total assets}}$	Proportion of assets financed with debt.
	Long-term debt-to-assets ratio = $\frac{\text{Long-term debt}}{\text{Total assets}}$	Proportion of assets financed with long-term debt.
	Debt-to-equity ratio = $\frac{\text{Total debt}}{\text{Total shareholders' equity}}$	Debt financing relative to equity financing.
	Financial leverage = $\frac{\text{Total assets}}{\text{Total shareholders' equity}}$	Reliance on debt financing.
Coverage Ratios	Interest coverage ratio = $\frac{\text{EBIT}}{\text{Interest payments}}$	Ability to satisfy interest obligations.
	Fixed charge coverage ratio = $\frac{\text{EBIT} + \text{Lease payments}}{\text{Interest payments} + \text{Lease payments}}$	Ability to satisfy interest and lease obligations.
	Cash flow coverage ratio = $\frac{\text{CFO} + \text{Interest payments} + \text{Tax payments}}{\text{Interest payments}}$	Ability to satisfy interest obligations with cash flows.
	Cash-flow-to-debt ratio = $\frac{\text{CFO}}{\text{Total debt}}$	Length of time needed to pay off debt with cash flows.

## Profitability

- Margins and return ratios provide information on the profitability of a company and the efficiency of the company.
- A margin is a portion of revenues that is a profit.
- A return is a comparison of a profit with the investment necessary to generate the profit.

### Profitability ratios: Margins

Each margin ratio compares a measure of income with total revenues:

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

$$\text{Operating profit margin} = \frac{\text{Operating profit}}{\text{Total revenue}}$$

$$\text{Net profit margin} = \frac{\text{Net profit}}{\text{Total revenue}}$$

$$\text{Pretax profit margin} = \frac{\text{Earnings before taxes}}{\text{Total revenue}}$$

### Profitability Ratios: Returns

Return ratios compare a measure of profit with the investment that produces the profit:

$$\text{Operating return on assets} = \frac{\text{Operating income}}{\text{Average total assets}}$$

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Average total assets}}$$

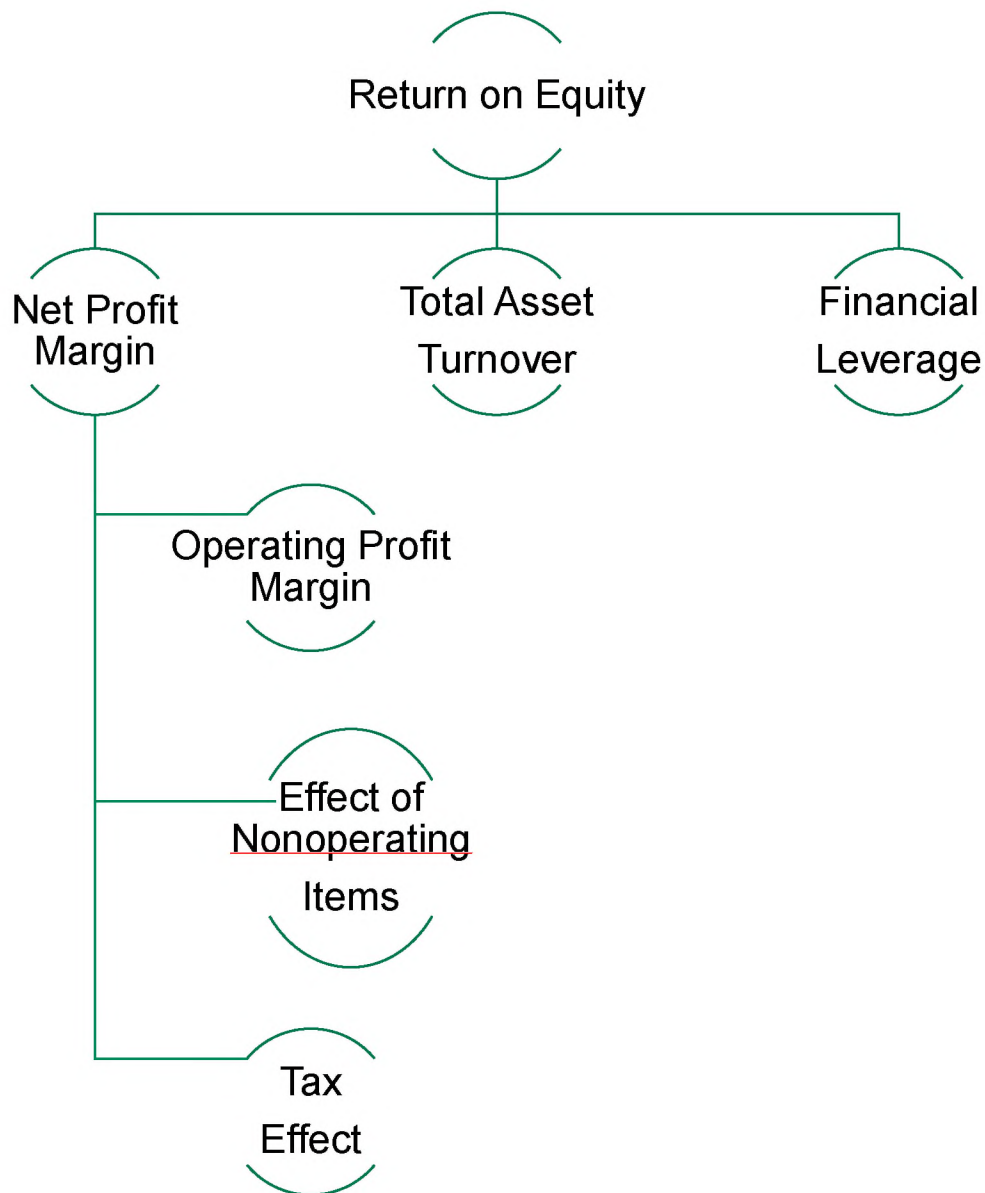
$$\text{Return on total capital} = \frac{\text{Net income}}{\text{Average interest-bearing debt} + \text{Average total equity}}$$

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Average shareholders' equity}}$$

$$\text{Operating return on assets} = \frac{\text{Operating income}}{\text{Average total assets}}$$

### **The DuPont Formulas**

- The DuPont formula uses the relationship among financial statement accounts to decompose a return into components.
- Three-factor DuPont for the return on equity:
  - Total asset turnover
  - Financial leverage
  - Net profit margin
- Five-factor DuPont for the return on equity:
  - Total asset turnover
  - Financial leverage
  - Operating profit margin
  - Effect of nonoperating items
  - Tax effect



Five-Component DuPont Model

$$\text{Return on equity} = \frac{\text{Total assets}}{\text{Shareholders' equity}} \times \text{Return on assets}$$

$$\text{Return on equity} = \frac{\text{Total assets}}{\text{Shareholders' equity}} \times \frac{\text{Net income}}{\text{Total assets}}$$

$$\text{Return on equity} = \frac{\text{Total assets}}{\text{Shareholders' equity}} \times \frac{\text{Revenues}}{\text{Total assets}} \times \frac{\text{Net income}}{\text{Revenues}}$$

$$\text{Return on equity} = \frac{\text{Total assets}}{\text{Shareholders' equity}} \times \frac{\text{Revenues}}{\text{Total assets}} \times \frac{\text{Operating income}}{\text{Revenues}} \times \frac{\text{Income before taxes}}{\text{Operating income}} \times \left( 1 - \frac{\text{Taxes}}{\text{Income before taxes}} \right)$$

### Example: The DuPont Formula

Suppose that an analyst has noticed that the return on equity of the D Company has declined from FY2012 to FY2013. Using the DuPont formula, explain the source of this decline.

(millions)	<u>2013</u>	<u>2012</u>
Revenues	\$1,000	\$900
Earnings before interest and taxes	\$400	\$380
Interest expense	\$30	\$30
Taxes	\$100	\$90
Total assets	\$2,000	\$2,000
Shareholders' equity	\$1,250	\$1,000
	<u>2013</u>	<u>2012</u>
Return on equity	0.20	0.22
Return on assets	0.13	0.11
Financial leverage	1.60	2.00
Total asset turnover	0.50	0.45
Net profit margin	0.25	0.24
Operating profit margin	0.40	0.42
Effect of nonoperating items	0.83	0.82
Tax effect	0.76	0.71
Notes for discussion:		

- Return on equity fell from 22% to 20%.

- This change is a result of the drop in the financial leverage (from 2 to 1.6); the return on assets increased.
- The return on assets increased from 11% to 13%.
  - The net profit margin improved (24% to 25%).
  - The asset turnover improved (0.45 times to 0.50 times).
- The change in the net profit margin improved because of taxes taking a smaller portion of income (although operating profit margin declined from 42% to 40%).

#### Other Ratios

- Earnings per share is net income, restated on a per share basis:

$$\text{Earnings per share} = \frac{\text{Net income available to common shareholders}}{\text{Number of common shares outstanding}}$$

- Basic earnings per share is net income after preferred dividends, divided by the average number of common shares outstanding.
- Diluted earnings per share is net income minus preferred dividends, divided by the number of shares outstanding considering all dilutive securities.
- Book value per share is book value of equity divided by number of shares.
- Price-to-earnings ratio (PE or P/E) is the ratio of the price per share of equity to the earnings per share.
  - If earnings are the last four quarters, it is the trailing P/E.

#### Measures of Dividend Payment:

$$\text{Dividends per share (DPS)} = \frac{\text{Dividends paid to shareholders}}{\text{Weighted average number of ordinary shares outstanding}}$$

$$\text{Dividend payout ratio} = \frac{\text{Dividends paid to common shareholders}}{\text{Net income attributable to common shares}}$$

$$\text{Plowback ratio} = 1 - \text{Dividend payout ratio}$$

- The proportion of earnings retained by the company.

Example: Shareholder ratios

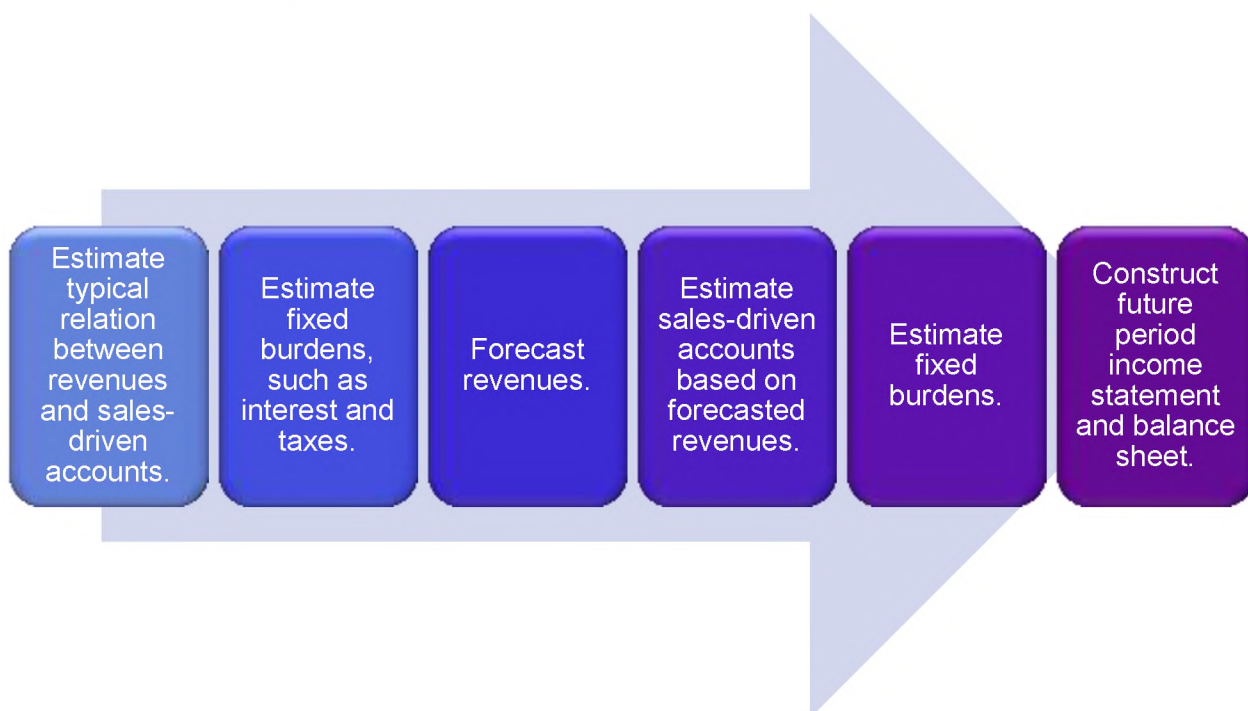
Calculate the book value per share, P/E, dividends per share, dividend payout, and plowback ratio based on the following financial information:

Book value of equity	\$100 million	
Market value of equity	\$500 million	
Net income	\$30 million	
Dividends	\$12 million	
Number of shares	100 million	
Book value per share	\$1.00	There is \$1 of equity, per the books, for every share of stock.
P/E	16.67	The market price of the stock is 16.67 times earnings per share.
Dividends per share	\$0.12	The dividends paid per share of stock.
Dividend payout ratio	40%	The proportion of earnings paid out in the form of dividends.
Plowback ratio	60%	The proportion of earnings retained by the company.

### Effective Use of Ratio Analysis

- In addition to ratios, an analyst should describe the company (e.g., line of business, major products, major suppliers), industry information, and major factors or influences.
- Effective use of ratios requires looking at ratios
  - Over time.
  - Compared with other companies in the same line of business.
  - In the context of major events in the company (for example, mergers or divestitures), accounting changes, and changes in the company's product mix.
  -

## 4. Pro Forma Analysis



### Pro Forma Income Statement

#### Imaginaire Company Income Statement (in millions)

	Year 0	One Year Ahead	
Sales revenues	€1,000.0	€1,050.0	⇨ Growth at 5%
Cost of goods sold	<u>600.0</u>	<u>630.0</u>	⇨ 60% of revenues
Gross profit	€400.0	€420.0	⇨ Revenues less COGS
SG&A	<u>100.0</u>	<u>105.0</u>	⇨ 10% of revenues
Operating income	€300.0	€315.0	⇨ Gross profit less operating exp.
Interest expense	<u>32.0</u>	<u>33.6</u>	⇨ 8% of long-term debt
Earnings before taxes	€268.0	€281.4	⇨ Operating income less interest exp.
Taxes	<u>93.8</u>	<u>98.5</u>	⇨ 35% of earnings before taxes
Net income	€174.2	€182.9	⇨ Earnings before taxes less taxes
Dividends	<b>€87.1</b>	<b>€91.5</b>	⇨ Dividend payout ratio of 50%

### Pro Forma Balance Sheet

#### Imaginaire Company Balance Sheet, End of Year (in millions)

	Year 0	One Year Ahead
	_____	_____

Current assets	<u>€600.0</u>	<u>€630.0</u>	↔ 60% of revenues
Net plant and equipment	<u>1,000.0</u>	<u>1,050.0</u>	↔ 100% of revenues
Total assets	€1,600.0	€1,680.0	
Current liabilities	€250.0	€262.5	↔ 25% of revenues
Long-term debt	400.0	420.0	↔ Debt increased by €20 structure
Common stock and paid-in capital	25.0	25.0	↔ Assume no change
Treasury stock		(44.0)	↔ Repurchased shares
Retained earnings	<u>925.0</u>	<u>1,016.5</u>	↔ Retained earnings in \
Total liabilities and equity	€1,600.0	€1,680.0	

### Summary

- Financial ratio analysis and common-size analysis help gauge the financial performance and condition of a company through an examination of relationships among these many financial items.
- A thorough financial analysis of a company requires examining its efficiency in putting its assets to work, its liquidity position, its solvency, and its profitability.
- We can use the tools of common-size analysis and financial ratio analysis, including the DuPont model, to help understand where a company has been.
- We then use relationships among financial statement accounts in pro forma analysis, forecasting the company's income statements and balance sheets for future periods, to see how the company's performance is likely to evolve.