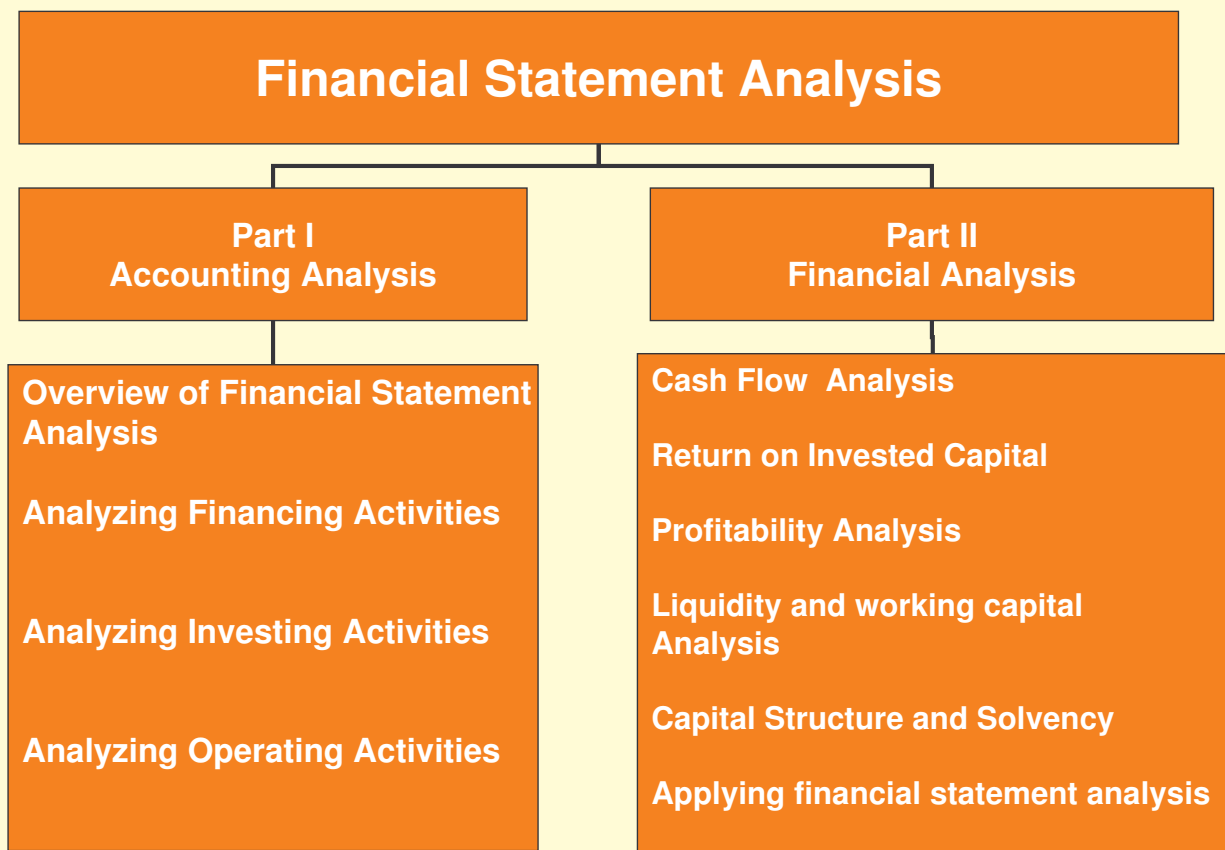


# Return on Invested Capital

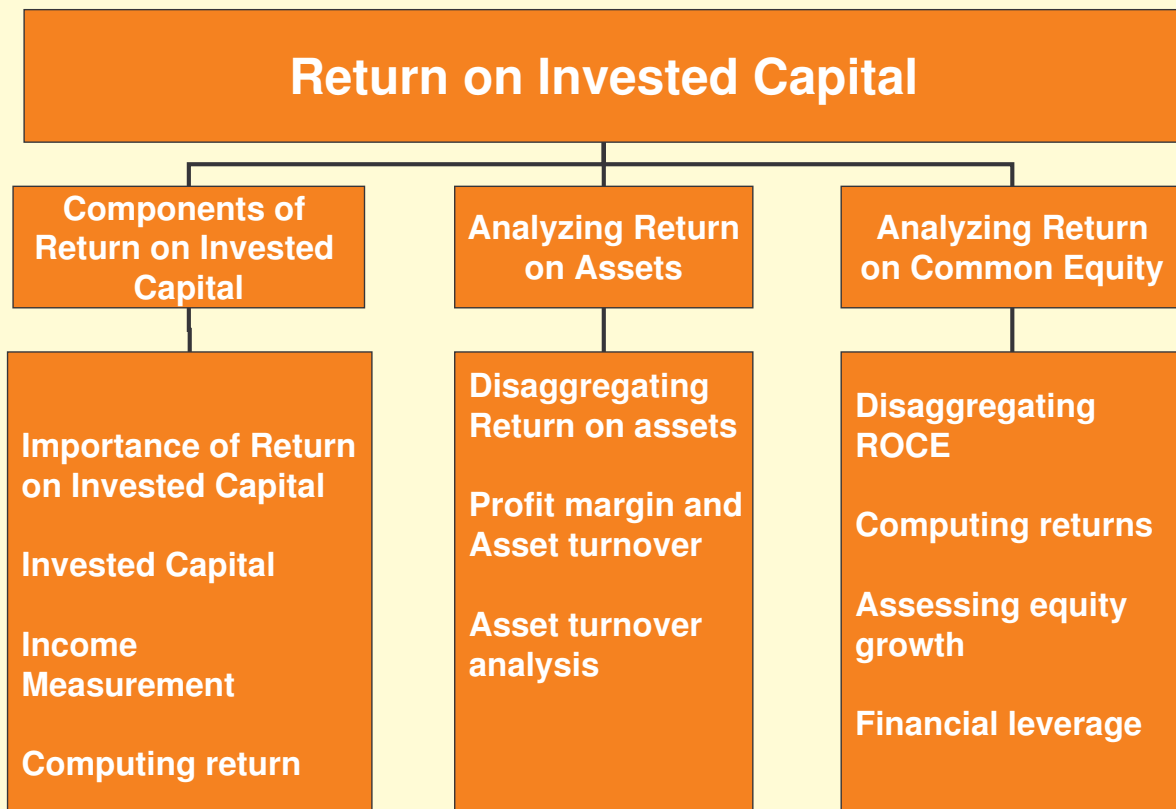
6

Lecture

## Course Structure



# Lecture 6: Agenda



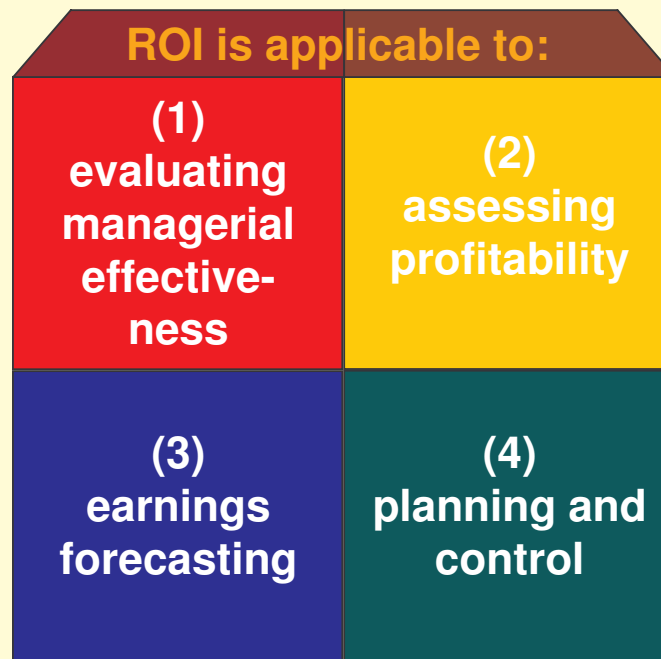
## Return on Invested Capital

### ROI Relation

- ROI relates income, or other performance measure, to a company's level and source of financing
- ROI allows comparisons with alternative investment opportunities
- Riskier investments are expected to yield a higher ROI
- ROI impacts a company's ability to succeed, attract financing, repay creditors, and reward owners

# Return on Invested Capital

## Application of ROI



## Components of ROI

### Definition

Return on invested capital is defined as:

$$\frac{\text{Income}}{\text{Invested capital}}$$

# Components of ROI

## Invested Capital Defined

- No universal measure of invested capital exists
- Different measures of invested capital reflect different financiers' perspectives

# Components of ROI

## Alternative Measures of Invested Capital

### Common Measures:

1. Total Assets
2. Long-Term Debt Plus Equity
3. Equity
4. Market Value of Invested Capital

# Components of ROI

## (1) Total Assets

- Perspective is that of its total financing/investing base
- Called **return on assets (ROA)**

### ROA:

- ◆ measures operating efficiency/performance
- ◆ reflects return from all financing/investing
- ◆ does not distinguish return by financing sources

# Components of ROI

## (2) Long-Term Debt Plus Equity Capital

- Perspective is that of the two main suppliers of long-term financing — long-term creditors and equity shareholders
- Referred to as long-term capitalization
- Excludes current liability financing

# Components of ROI

## (3) Equity Capital

- Perspective is that of **equity holders**
- Called **return on common equity (ROCE)**
- Captures the **effect of leverage** (debt) capital on equity holder return
- Excludes all debt financing and preferred equity

# Components of ROI

## (4) Market Value of Invested Capital

- Assumes **certain assets not recognized** in financial statements
- Uses the market value of invested capital (debt and equity)

# Components of ROI

## Computing Invested Capital

- Usually computed using average capital available for the period
- Typically add beginning and ending invested capital amounts and divide by 2
- More accurate computation is to average interim amounts - quarterly or monthly

# Components of ROI

## Definition

Return on invested capital is defined as:

$$\frac{\text{Income}}{\text{Invested capital}}$$

# Components of ROI

## Income Defined

- Definition of **income (return)** depends on definition of **invested capital**
- Measures of income in computing return on invested capital must reflect all applicable expenses from the perspective of the capital contributors
- Income taxes are valid deductions in computing income for return on invested capital

### Examples:

- Return on total assets capital uses income **before** interest expense and dividends
- Return on long-term debt plus equity capital uses income **before** interest expense and dividends
- Return on common equity capital uses net income **after** deductions for interest and preferred dividends

# Components of ROI

## Return on Assets -- ROA

$$\frac{\text{Net income} + \text{Interest expense} (1 - \text{Tax rate}) + \text{Minority interest in income}^*}{(\text{Beginning total assets} + \text{Ending total assets}) \div 2}$$

*\* This appears on consolidated financial statements where the parent company's figures are combined with those of its subsidiaries. Even if the parent company owns less than 100% of a subsidiary's stock, all of the subsidiary's assets and liabilities are combined in the consolidated financial statements. To compensate, the part not owned by the parent company is minority interest and is shown as a liability on the balance sheet and deducted in the earnings statement.*



# Components of ROI

## Return on Common Equity -- ROCE

$$\frac{\text{Net income} - \text{Preferred dividends}}{\text{Total common shareholders' equity}}$$

[When ROCE is higher than ROA, it often reflects favorable impacts of leverage]

ROCE is approximated by

$$\frac{\text{Basic earnings per share}}{\text{Book value per share}}$$

# Analyzing Return on Assets--ROA

## Disaggregating ROA

Return on assets \* = Profit margin x Asset turnover

$$\frac{\text{Income}}{\text{Assets}} = \frac{\text{Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}}$$

\* in its most simplified form

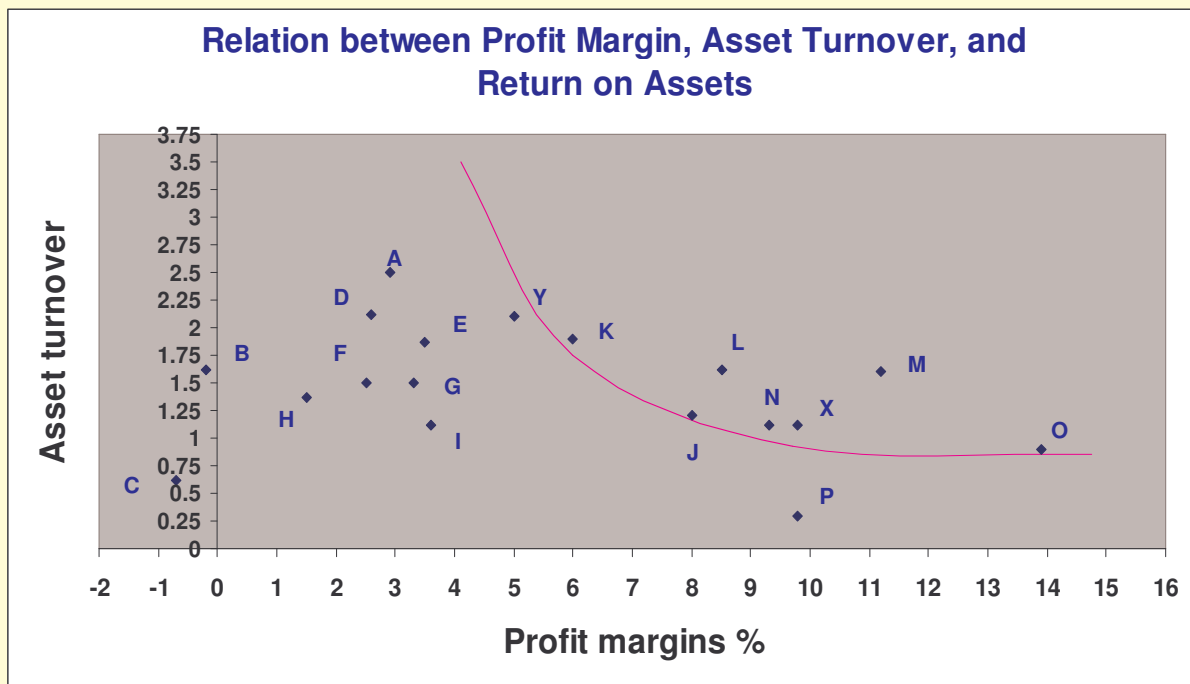
**Profit margin:** measures profitability relative to sale

**Asset turnover (utilization):** measures effectiveness in generating sales from assets

# Analyzing Return on Assets--ROA

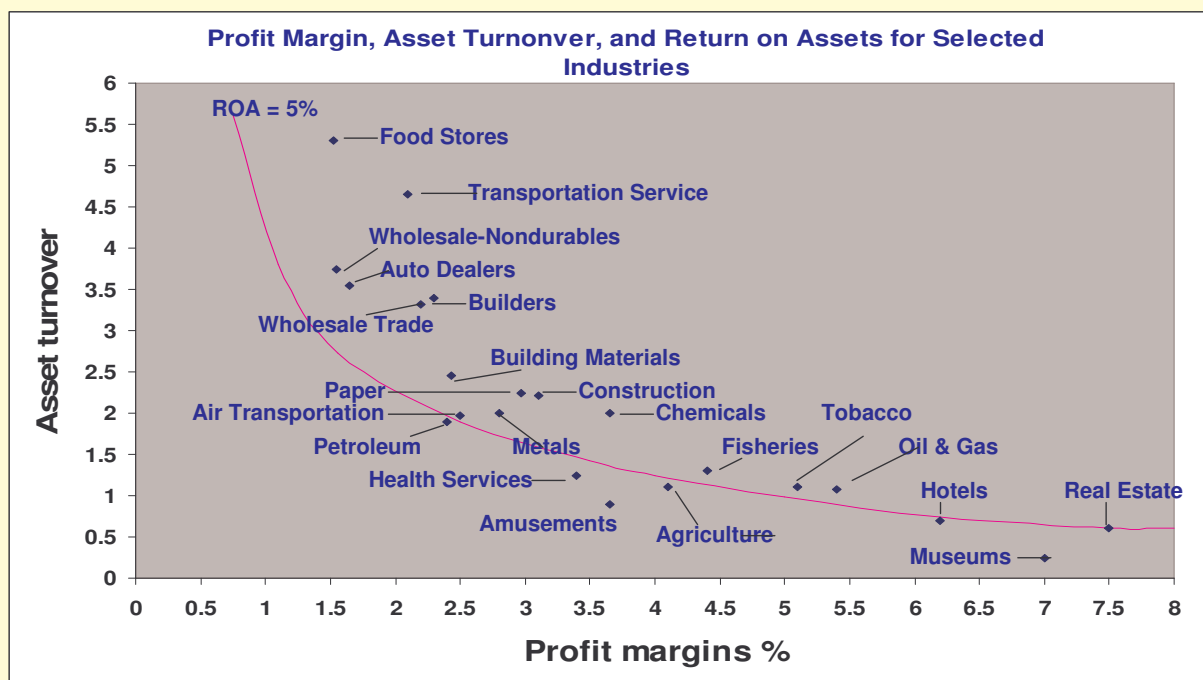
## Relation Between Profit Margin and Asset Turnover

Profit margin and asset turnover are **interdependent**



# Analyzing Return on Assets--ROA

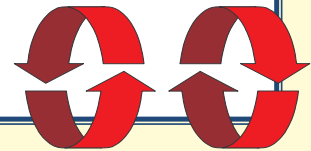
## Relation Between Profit Margin and Asset Turnover



# Analyzing Return on Assets--ROA

## Asset Turnover Analysis

- Asset turnover measures the intensity with which companies utilize assets
- Relevant measure is the amount of sales generated



# Analyzing Return on Assets--ROA

## Disaggregating Asset turnover

**Sales to Cash:** Reflects trade-off between liquidity and accumulation of low-return funds

**Sales to Receivables:** Reflects trade-off between increased sales and accumulation of funds in receivables

**Sales to Inventories:** Reflects trade-off between funds accumulated in inventory and the potential loss of current and future sales

**Sales to Fixed Assets:** Reflects trade-off between fixed asset investments having high break-even points and investments in more efficient, productive assets with high sales potential

**Sales to Current Liabilities:** Reflects a relation between sales and current trade liabilities

# Analyzing Return on Common Equity--ROCE

## Disaggregating ROCE

$$ROCE = \text{Adjusted profit margin} \times \text{Asset turnover} \times \text{Leverage}$$

$$\frac{\text{Net income} - \text{Preferred dividends}}{\text{Average common equity}} = \frac{\text{Net income} - \text{Preferred dividends}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average assets}} \times \frac{\text{Average assets}}{\text{Average common equity}}$$

- **Adjusted profit margin:** portion of each sales dollar remaining for common shareholders after providing for all costs and claims (including preferred dividends)
- **Asset turnover (utilization):** measures effectiveness in generating sales from assets
- **Leverage\*:** measures the proportion of assets financed by common shareholders

\*Also called *financial leverage* and *common leverage*.

# Analyzing Return on Common Equity--ROCE

## Further Disaggregation of ROCE

$$ROCE = [(\text{EBIT profit margin} \times \text{Asset turnover}) - \text{Interest burden}] \times \text{Leverage} \times \text{retention rate}$$

- EBIT is earnings (income) before interest and taxes (and before any preferred dividends)
- EBIT profit margin is EBIT divided by sales
- Interest burden is interest expense divided by average assets (also seen as Pretax Income / EBIT)
- Retention rate = 1 – effective tax rate (also seen as Net Income / Pretax Income)

This disaggregation highlights effects of both interest and taxes on ROCE

## Analyzing Return on Common Equity--ROCE

### Leverage and ROCE

- **Leverage** refers to the extent of invested capital from other than common shareholders
- If suppliers of capital (other than common shareholders) receive less than ROA, then common shareholders benefit; the reverse occurs when suppliers of capital receive more than ROA
- The larger the difference in returns between common equity and other capital suppliers, the more successful (or unsuccessful) is the trading on the equity

## Analyzing Return on Common Equity--ROCE

### Assessing Equity Growth

$$\text{Equity growth rate} = \frac{\text{Net income} - \text{Preferred dividends} - \text{Dividend payout}}{\text{Average common stockholders' equity}}$$

- Assumes earnings retention *and* a constant dividend payout
- Assesses common equity growth rate through earnings retention



# Analyzing Return on Common Equity--ROCE

## Assessing Equity Growth

Sustainable equity growth rate = ROCE  $\times$  (1-Payout rate)

Assumes internal growth depends on *both* earnings retention and return earned on the earnings retained

