

Using Ratios

- **Ratios are useful in assessing profitability, liquidity, and risk**
 - Highlight sources of competitive advantage and “red flag” potential trouble
- **Ratios must be compared to a benchmark**
 - Compare same firm across time (time-series analysis)
 - Compare firm to other firms or to industry (cross-sectional analysis)
- **Ratios are contextual**
 - Try to determine the underlying activity that the ratio represents to determine whether it is good or bad news
- **Key: Ratio analysis does not provide answers, but instead helps you ask better questions**

Misusing ratios

- **Standard ratios have multiple definitions**
 - There is no GAAP for ratio definitions
 - Use the same definition to make valid comparisons
- **Choosing the appropriate benchmark for comparison is important**
 - Major changes in the firm distort time-series analysis
 - Differences in business strategy, capital structure, or business segments distort cross-sectional analysis
 - Differences in accounting methods make all comparisons difficult
- **Ratios may be manipulated by managerial action**

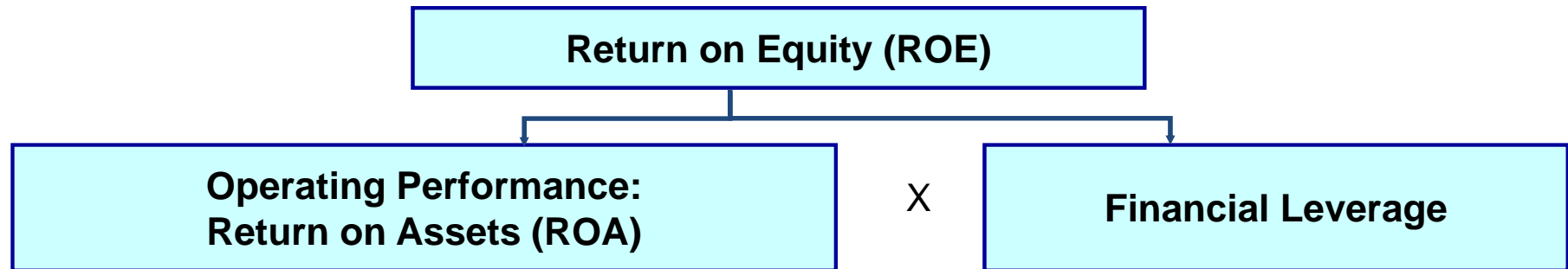
Return on Equity

- Is a Net Income of \$10,000,000 good or bad?
 - Depends on level of investment required
- Return on Equity (ROE)
 - $ROE = \text{Net Income} / \text{Average Shareholders' Equity}$
 - The numerator represents how much return the company generated for shareholders during the year based on accrual accounting
 - The denominator represents the shareholders' investment in the company
 - Must take average of beginning and ending balances
 - Measures Return on Investment (ROI)
 - Should increase with the risk of the company

Drivers of ROE

- **Two drivers of Return on Equity**
- **Operating performance**
 - How effectively do managers use company resources (assets) to generate profits?
 - Return on Assets (ROA)
 - $ROA = \text{Net Income} / \text{Average Assets}$
- **Financial leverage**
 - How much do the managers use debt to increase available assets for a given level of shareholder investment?
 - $\text{Financial leverage} = \text{Avg. Assets} / \text{Avg. Shareholders' Equity}$
 - Note that this is different from many “leverage” ratios you hear about (e.g., debt-to-equity)

ROE Framework



$\text{ROE} = \text{Net Income/Assets}$

$\times \text{Assets/Equity}$

Example: Company raises \$100 from shareholders and borrows \$100 from bank to buy \$200 of assets, which are used to generate \$10 of net income

**$\text{ROE} = 10\% (10/100)$, $\text{ROA} = 5\% (10/200)$, $\text{Leverage} = 2 (200/100)$
 $\Rightarrow 10\% = 5\% \times 2$**

Return on Assets

- **Two drivers of Return on Assets**
- **Profitability**
 - How much profit does the company earn on each dollar of sales?
 - Return on Sales (ROS)
 - $ROS = \text{Net Income} / \text{Sales}$
- **Efficiency**
 - How much sales does the company generate based on its available resources?
 - Asset Turnover
 - $ATO = \text{Sales} / \text{Avg. Assets}$

ROA and Leverage

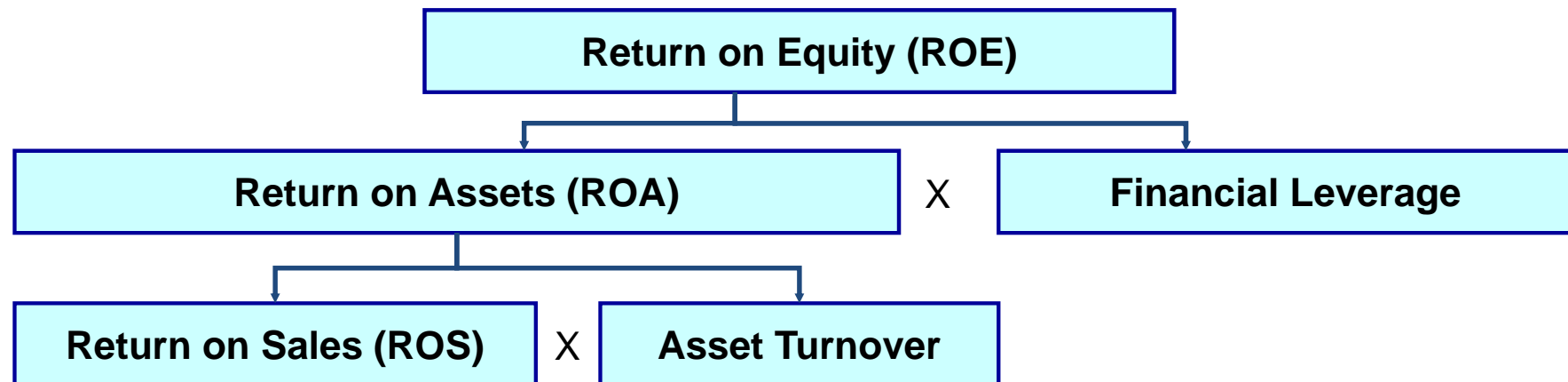
- Ideally, ROA would measure operating performance independent of the company's financing decisions
- But, the numerator of ROA, Net Income, includes Interest Expense
 - More leverage => higher Interest Expense => lower Net Income
- To truly remove all financing effects from ROA, we must de-lever Net Income
- $ROA = \text{De-Levered Net Income} / \text{Avg. Assets}$
- $\text{De-levered Net Income} = \text{Net Income} + (1-t) \times \text{Interest Expense}$

ROA Example

De-levering NI removes effects of capital structure:

	<u>No debt</u>	<u>Some debt</u>
Pretax, pre-interest income	300	300
Interest expense	<u>0</u>	<u>(50)</u>
Pretax income	300	250
Taxes (35%)	<u>(105)</u>	<u>(87.5)</u>
Net income	195	162.5
De-levered Net Income	195	195 $[162.5 + 50(1 - .35)]$

DuPont Ratio Analysis Framework



$$\begin{aligned} \text{ROE} &= \text{Net Income/Sales} \times \text{Sales/Assets} \times \text{Assets/Equity} \\ &= \text{Profitability} \times \text{Efficiency} \times \text{Leverage} \end{aligned}$$