Profitability Analysis

Chapter 3

Ratios and Financial Analysis

Ratios : Why

» Comparability among firms of different sizes

» Provides a profile of the firm

Caution:

» Economic assumption of Linearity – Proportionality

» Nonlinearity can cause problems

» Fixed costs, EOQ for inventories

Benchmarks: Is high Current ratio good? For whom?

Industry-wide norms.

Accounting Methods; Timing & Window Dressing

Current ratio: 300/200 to 200/100 is it getting better?

Negative numbers

Firm	Payout Ratios	Dividend	Income
A		$1,000	$5,000
	20.00%		
B		$1,000	$3,000
	33.33%		
C		$1,000	$(5,000)
	-20.00%		

Who has the highest payout ratio ? NOT B

Common Size Statements

All figures divided by the same figure

Balance Sheet: Divide by

Total Assets = Liabilities + Equity

Income Statement: Divide by

Revenue

Analysis across statements (activity analysis) not possible.

i.e. can not divide a Income Statement by Balance Sheet number

Industry Comparison [Robert Morris Associates]

Yahoo Finance

1 Activity Analysis

An Income Statement ÷ A Balance Sheet Figure

Inventory Turnover = Cost of Goods Sold ÷ Average Inventory

Receivables Turnover = Sales ÷ Average Receivables

Asset Turnover = Sales ÷ Average Total Assets

[365 / Turnover] is days outstanding.

More Turnover is it always good / bad

Payables Turnover = Purchases ÷ Average Payables

2 Liquidity Analysis

Cash Cycle= Days Inventory Outstanding
+ Days Receivables Outstanding
- Days Payable Outstanding

Curent Ratio = $\frac{\text{Current Assets}}{\text{Current Liabilities}}$

Quick Ratio = Cash + Marketable Securities
+ Accounts receivable
÷ Current Liabilities

Cash flow from operations ratio = Cash flow from operations
÷ Current Liabilities

Dell: 2004 10-K Look at pages 22 and 31

3 Long term Debt and Solvency Analysis

Important for Bond Covenants

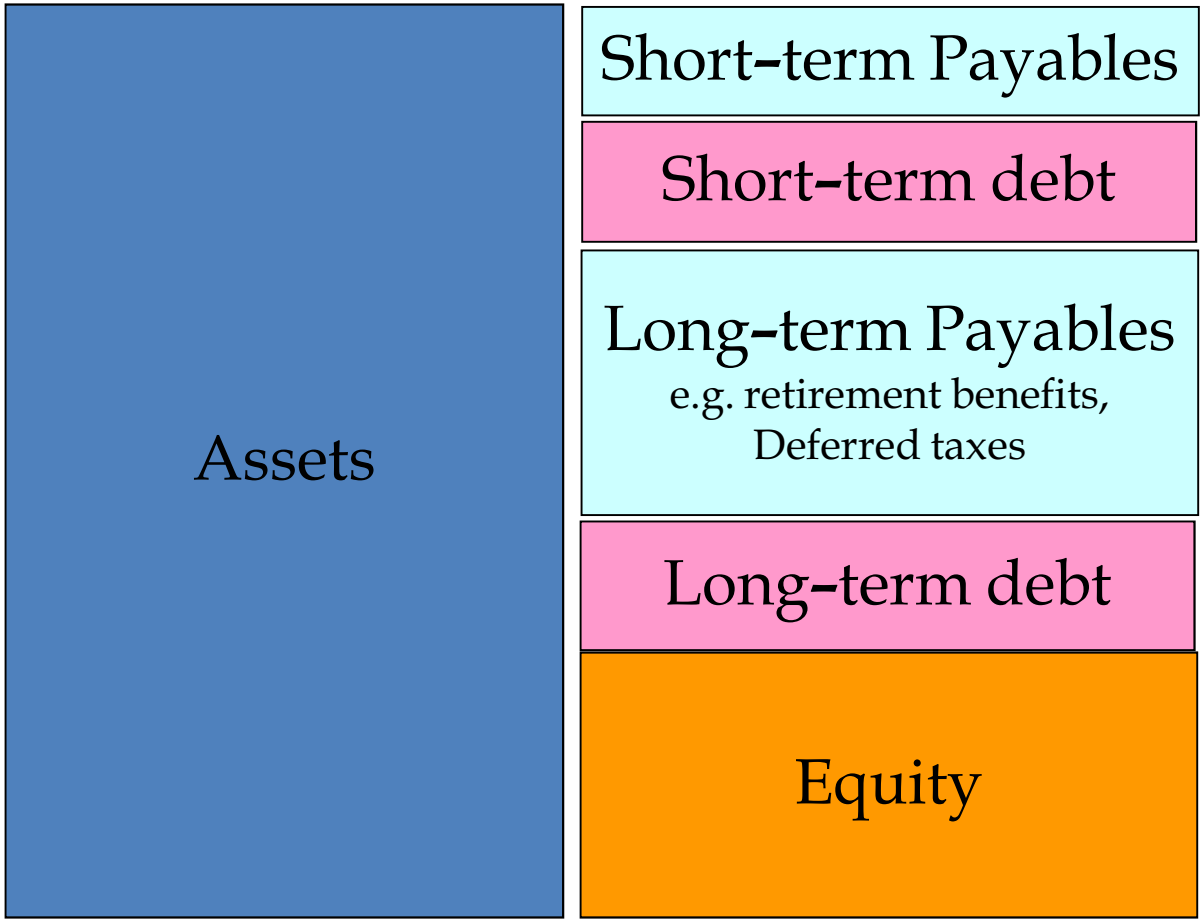
Debt = Short-term debt + Long-term debt

Total capital = Debt + Equity

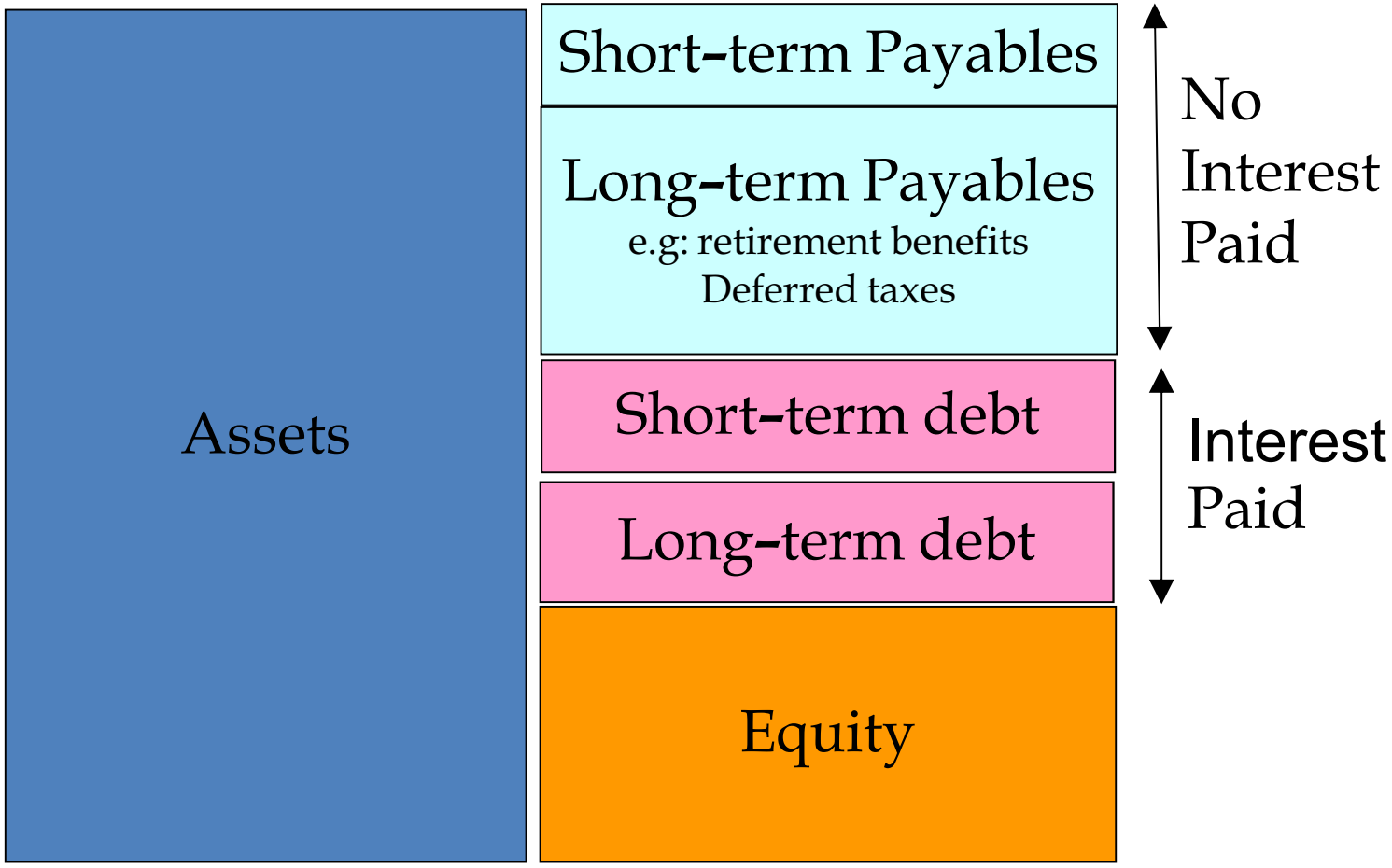
$$\text{Debt to Equity} = \frac{\text{Debt}}{\text{Equity}}$$

$$\text{Times Interest Earned} = \frac{\text{Earnings Before Interest \& Taxes}}{\text{Interest Expense}}$$

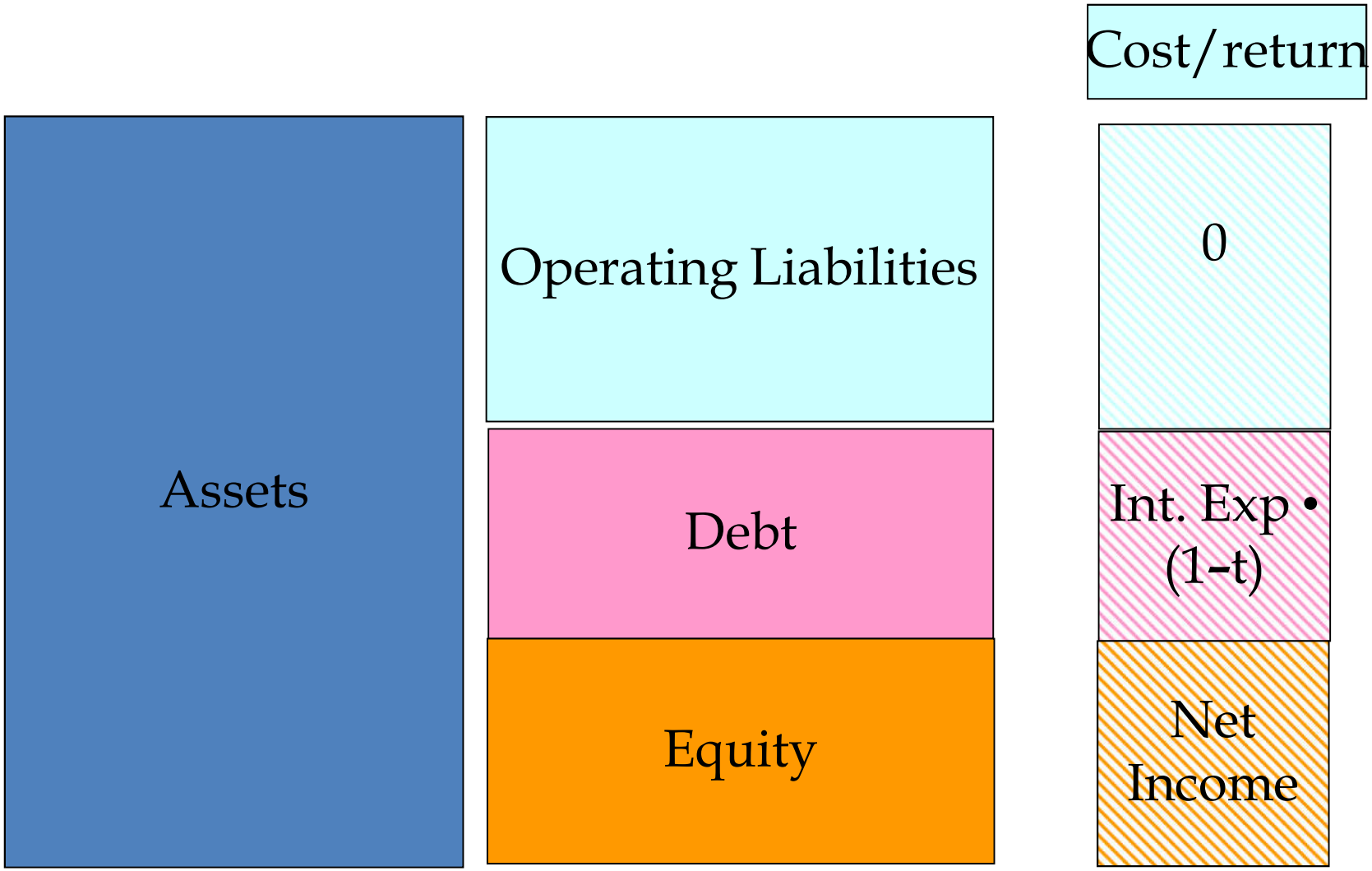
Balance Sheet - reported



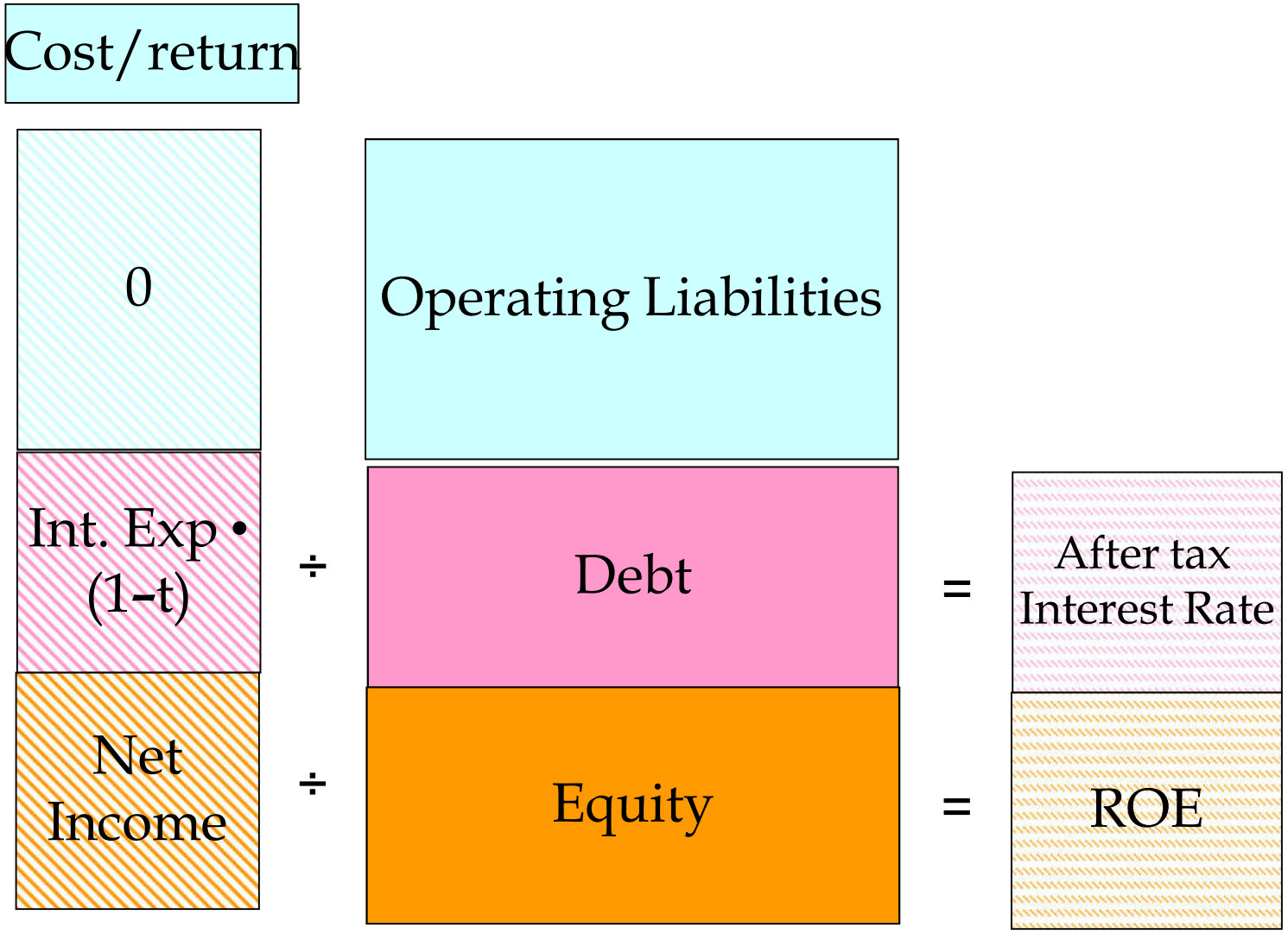
Balance Sheet - rearrange



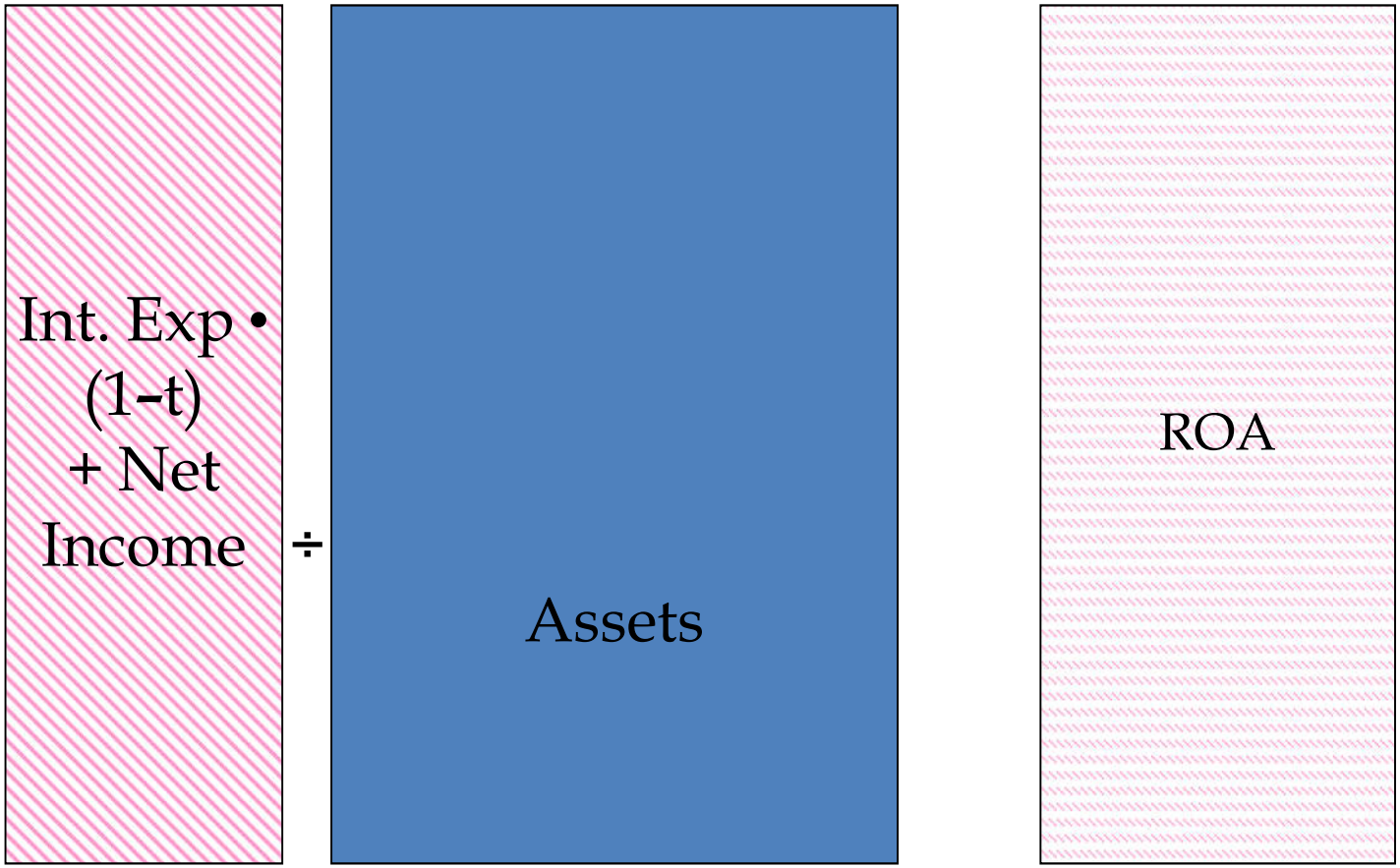
Returns


Cost/return
Assets
Operating Liabilities
Debt
Equity
0
Int. Exp • (1-t)
Net Income

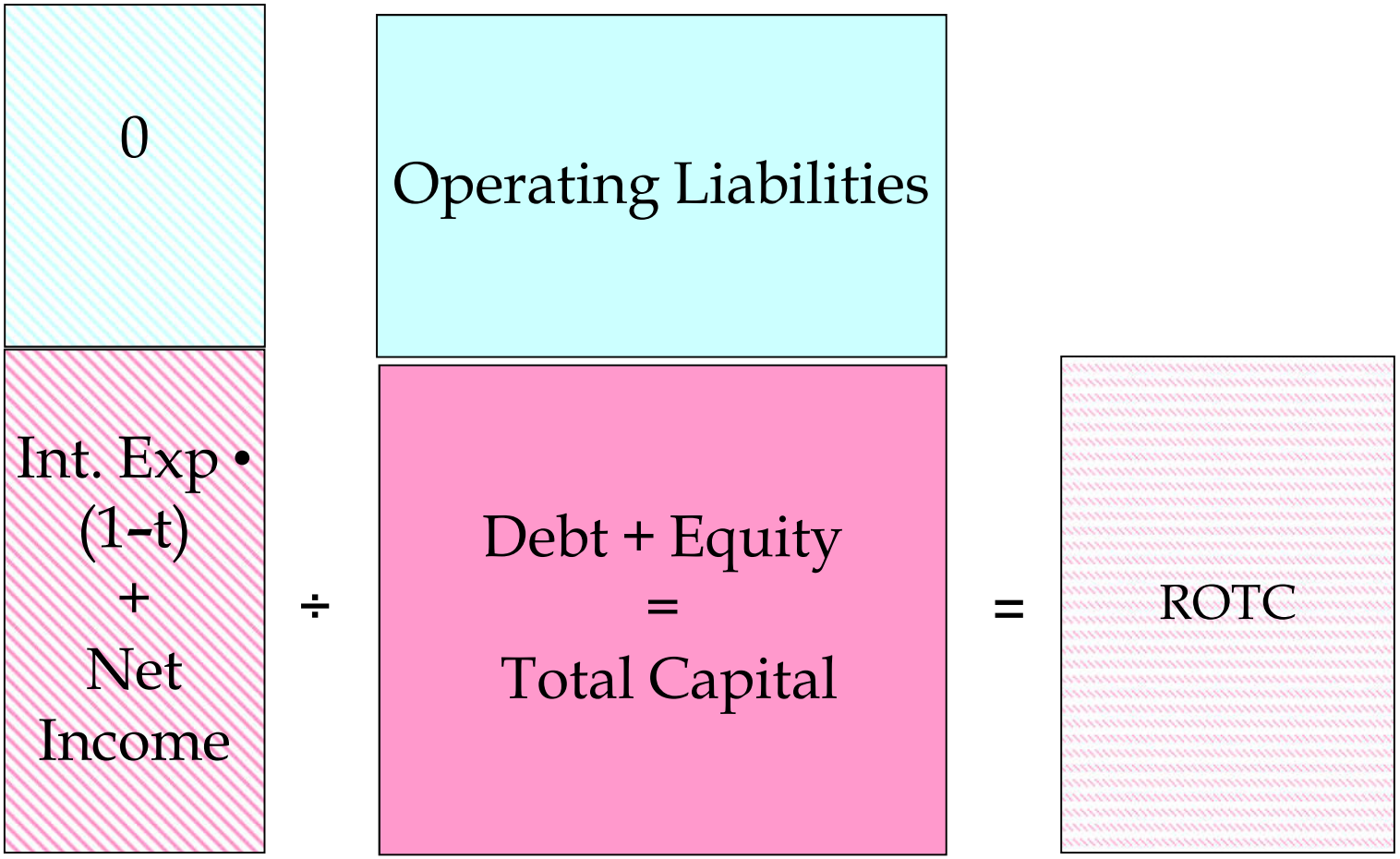
Returns ROE


Cost/return
0
Int. Exp • (1-t)
Net Income
÷
÷
Operating Liabilities
Debt
Equity
=
=
After tax Interest Rate
ROE

Returns ROA



Returns ROTC



Income Statement

	Revenue	
-	Cost of Goods Sold	
	Gross Profit	
-	Operating expenses	
	Core Income	
+	Non Operating Earnings (Including earnings from equity affiliates)	
	Operating Income	(OI)
+	Non-operating income (Interest and dividends)	
=	Earnings Before Interest & Taxes	(EBIT)
-	Interest Expense	
=	Earnings Before Taxes	(EBT)
-	Tax Expense	
=	Net Income	(NI)

Net Income = (EBIT – Interest Expense) (1 – tax)
Net Income + Interest Expense (1 – tax) = EBIT (1 – tax)

Profitability Analysis

$$\text{Gross Margin} = \frac{\text{Gross Profit}}{\text{Assets}}$$

$$\text{Margin Before Interest \& Taxes} = \frac{\text{EBIT}}{\text{Sales}}$$

$$\text{Asset Turnover} = \frac{\text{Sales}}{\text{Assets}}$$

$$\text{Return on Assets} = \frac{\text{NI} + (1\text{-tax})\ \text{Int Exp}}{\text{Assets}}$$

$$= \frac{\text{EBIT}(1\text{-tax})}{\text{Assets}}$$

Debt = average Debt;

Equity = Average Equity

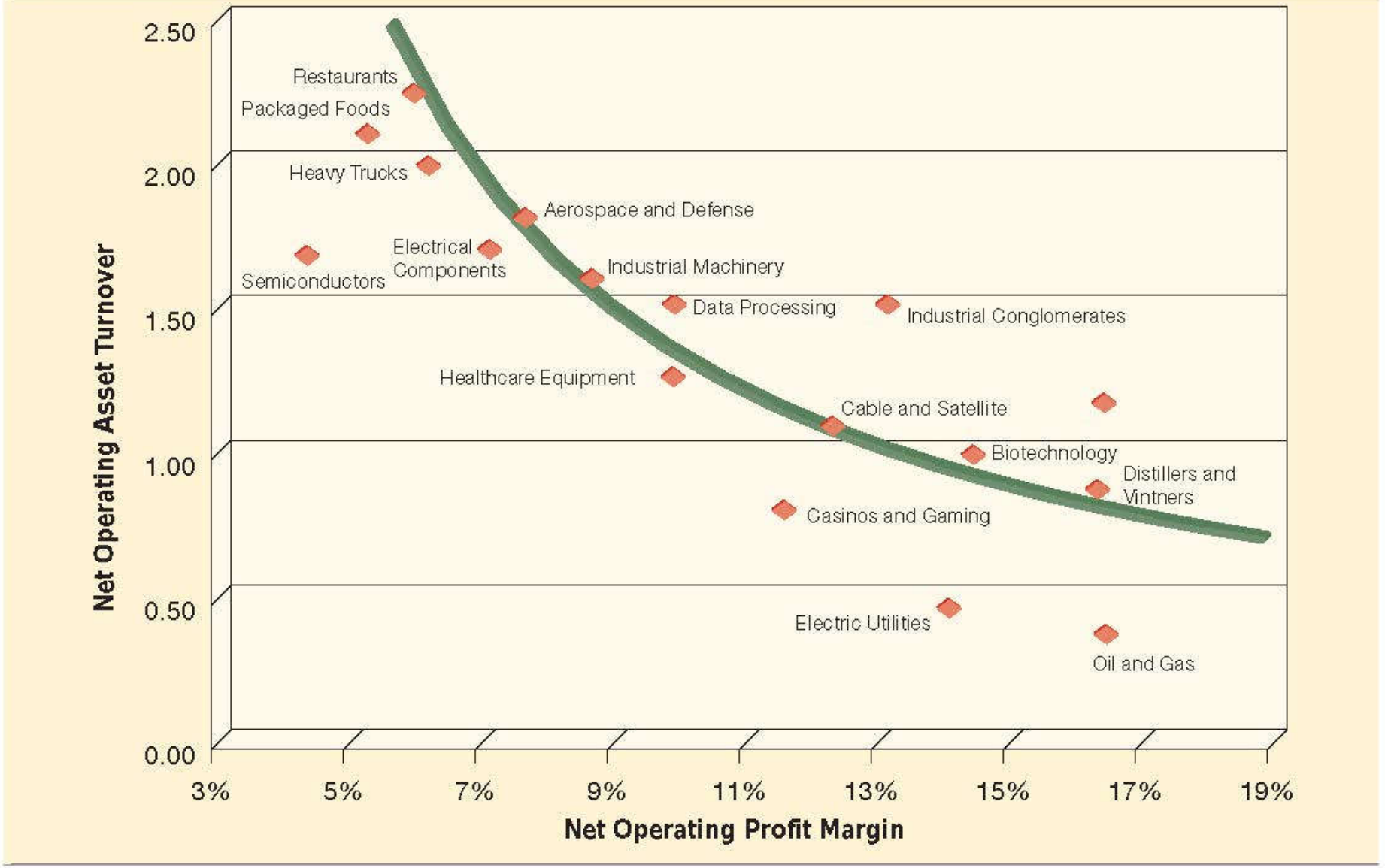
Ratios as composite DuPont Analysis

ROA = Margin Before Interest & Taxes •Asset Turnover • (1-tax)

$$\text{ROA} = \frac{\text{EBIT}}{\text{Assets}} \cdot \frac{\text{Sales}}{\text{Assets}} \cdot (1\text{-tax})$$

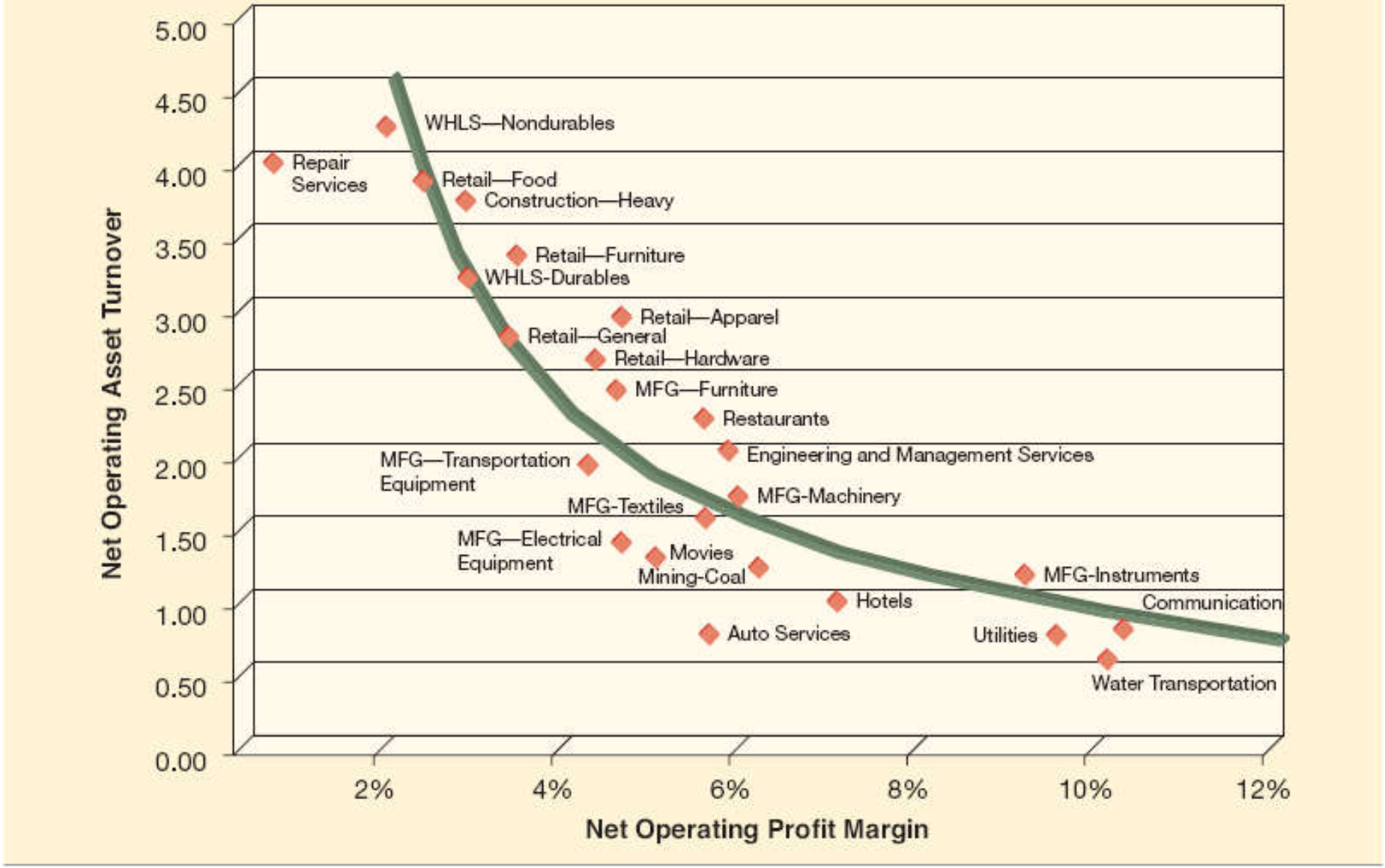
Margin vs. Turnover

EXHIBIT 3.4 Profitability and Productivity Across Industries



Margin vs. Turnover 3ed

EXHIBIT 3.4 Profitability and Productivity across Industries



ROTC Analysis

$$\text{Return on Total capital (ROTC)} = \frac{\text{NI} + (1\text{-tax})\ \text{Int Exp}}{\text{Equity} + \text{Debt}}$$

$$= \frac{\text{EBIT}\ (1\text{-tax})}{\text{Equity} + \text{Debt}}$$

$$\text{Net Interest Percent (NIntP)} = \frac{(1\text{-tax})\ \text{Int Exp}}{\text{Debt}}$$

$$\text{Return on Equity (ROE)} = \frac{\text{NI}}{\text{Equity}}$$

$$\text{ROE} = \text{ROTC} + \frac{\text{Debt}}{\text{Equity}}\ (\text{ROTC} - \text{NintP})$$

ROE from ROTC

$$ROE = \frac{\text{Net Income}}{\text{Equity}}$$

$$= \frac{\text{NI} + (1\text{-tax})\ \text{Int Exp}}{\text{Equity}} - \frac{(1\text{-tax})\ \text{Int Exp}}{\text{Equity}}$$

$$= \frac{\text{NI} + (1\text{-tax})\ \text{Int Exp}}{\text{Equity} + \text{Debt}} \cdot \frac{\text{Equity} + \text{Debt}}{\text{Equity}} - \frac{(1\text{-tax})\ \text{Int Exp}}{\text{Debt}} \cdot \frac{\text{Debt}}{\text{Equity}}$$

$$= \text{ROTC} \cdot \left[\ 1 + \frac{\text{Debt}}{\text{Equity}}\ \right] - (1\text{-tax})\ \text{Int Rate} \cdot \frac{\text{Debt}}{\text{Equity}}$$

$$= \boxed{\text{ROTC} + \frac{\text{Debt}}{\text{Equity}} \cdot \left[\ \text{ROTC} - (1\text{-tax})\ \text{Int Rate}\ \right]}$$

ROTC from ROA

$$\text{ROTC} = \frac{\text{NI} + (1\text{-tax}) \text{ Int Exp}}{\text{Equity} + \text{Debt}}$$

$$= \frac{\text{NI} + (1\text{-tax}) \text{ Int Exp}}{\text{Assets}} \cdot \frac{\text{Oper Liab} + \text{Debt} + \text{Equity}}{\text{Equity} + \text{Debt}}$$

$$= \text{ROA} \cdot \left[\frac{\text{Oper Liab}}{\text{Equity} + \text{Debt}} + 1 \right]$$

$$= \text{ROA} + \frac{\text{Oper Liab}}{\text{Capital}} \cdot \text{ROA}$$

NOPAT

	Operating Income	(NOBT)
+	Non-operating income (Interest and dividends)	
=	Earnings Before Interest & Taxes	(EBIT)
-	Interest Expense	
=	Earnings Before Taxes	(EBT)
-	Tax Expense	
=	Net Income	(NI)

Net Nonoperating Expense (NNE)

= (Interest expense – Interest income)(1-tax)

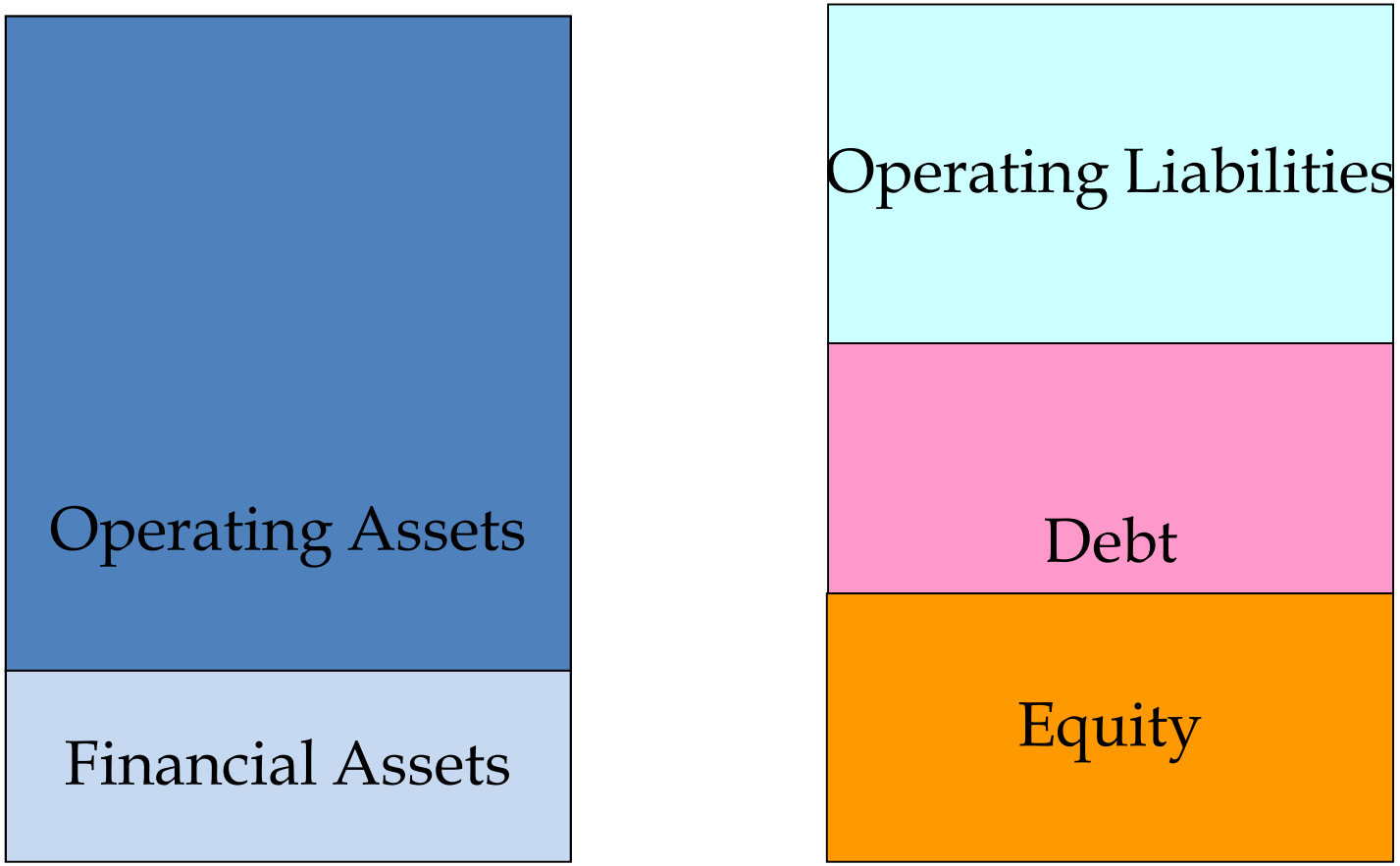
Tax on operating profit

= Tax Expense + (Interest expense – Interest income) • tax

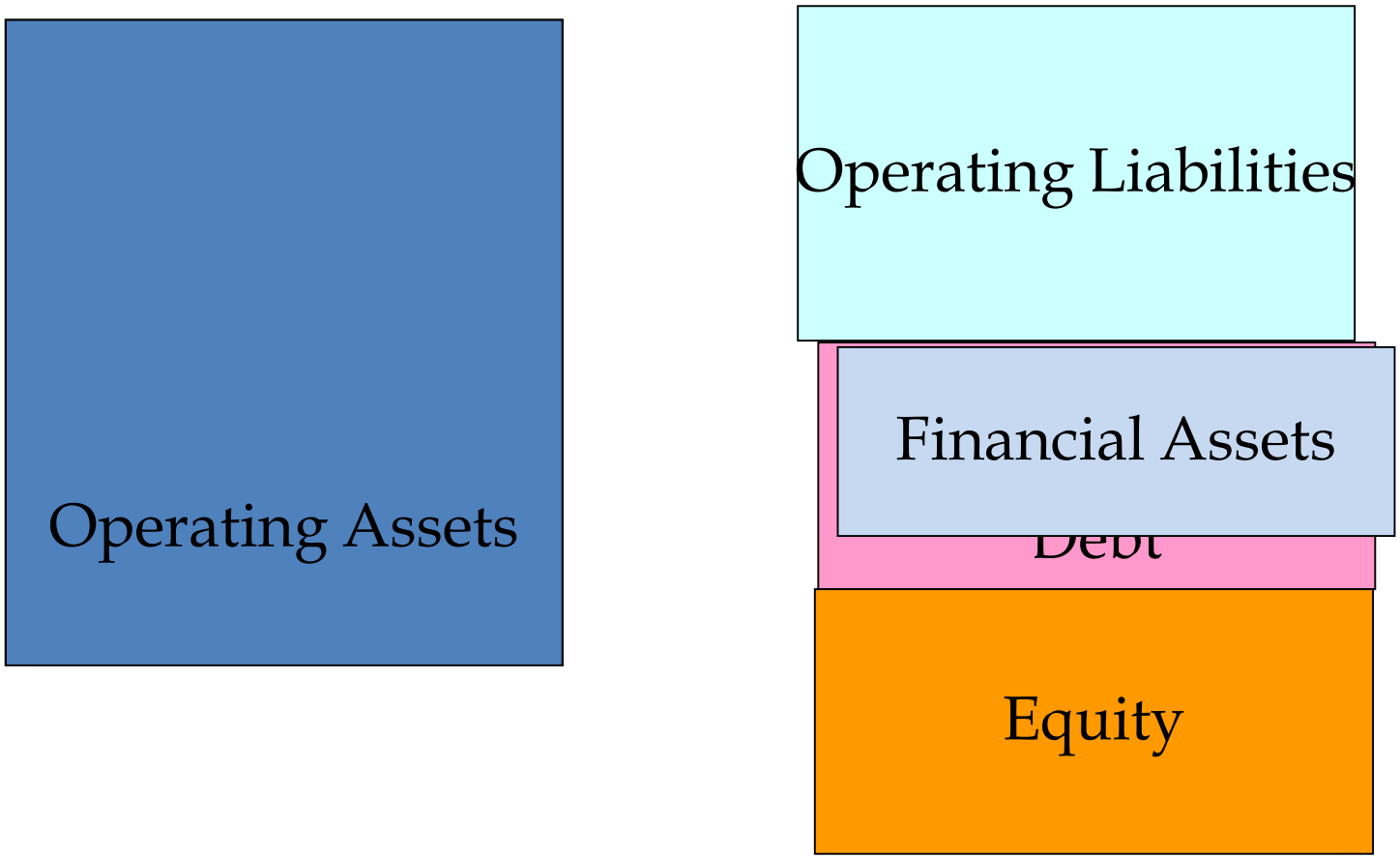
NOPAT = NOBT - Tax Expense - (Interest expense – Interest income) • tax

NOPAT = NI + NNE

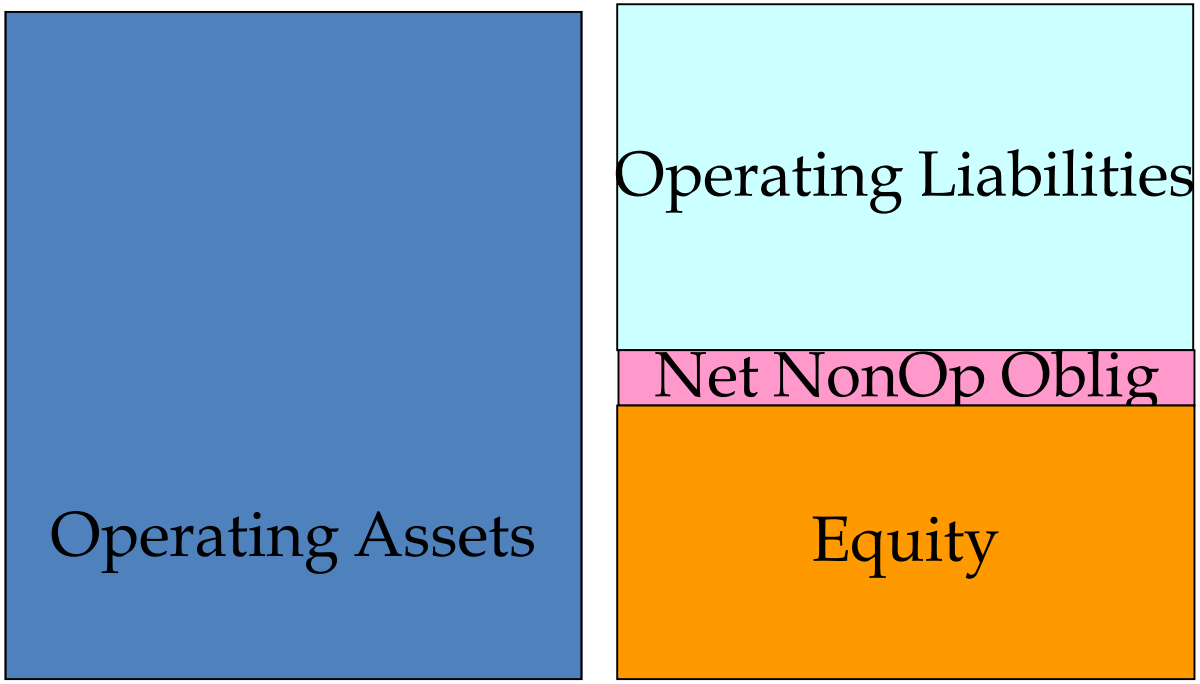
Financial Assets in Balance Sheet



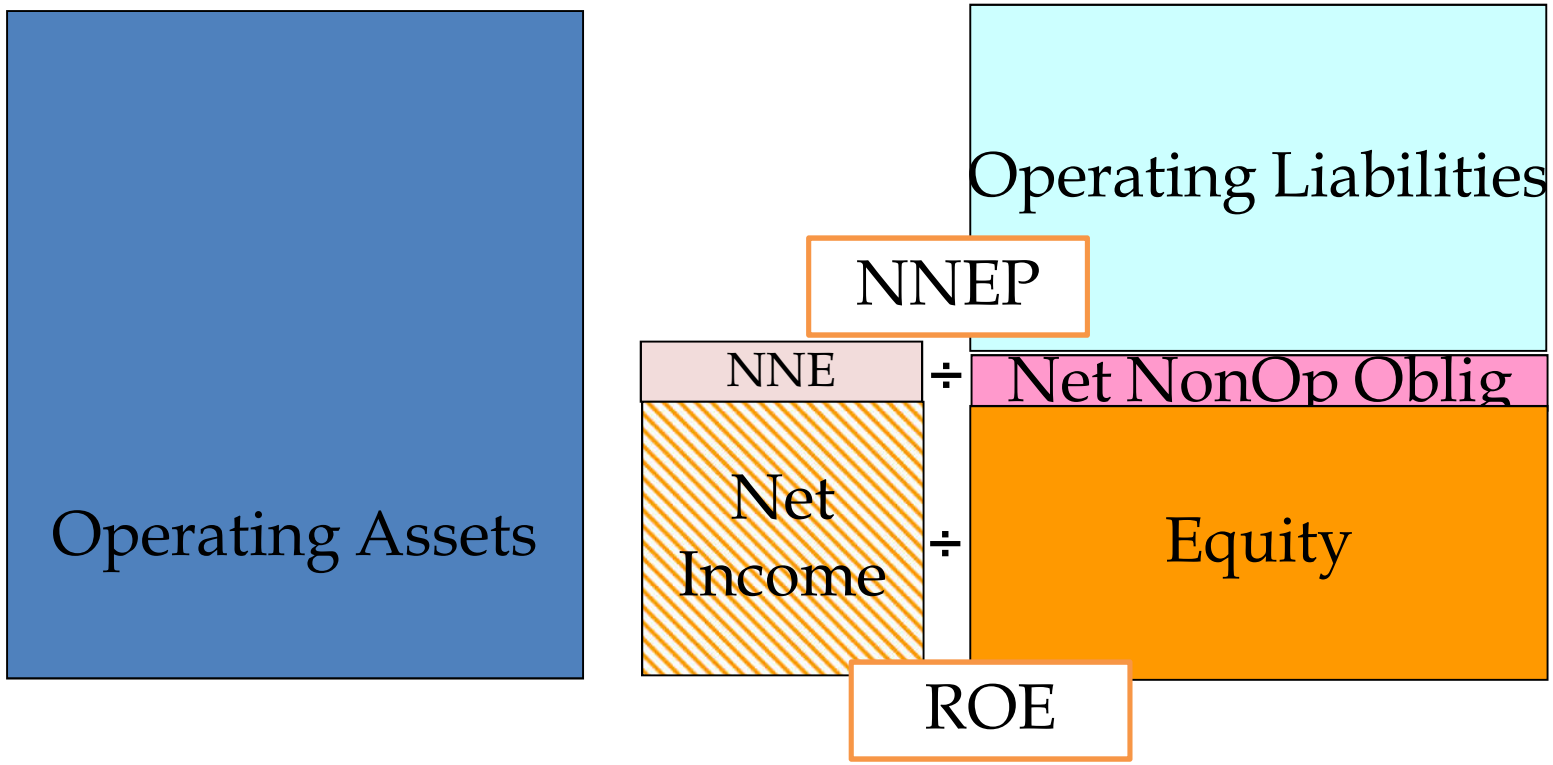
Balance Sheet



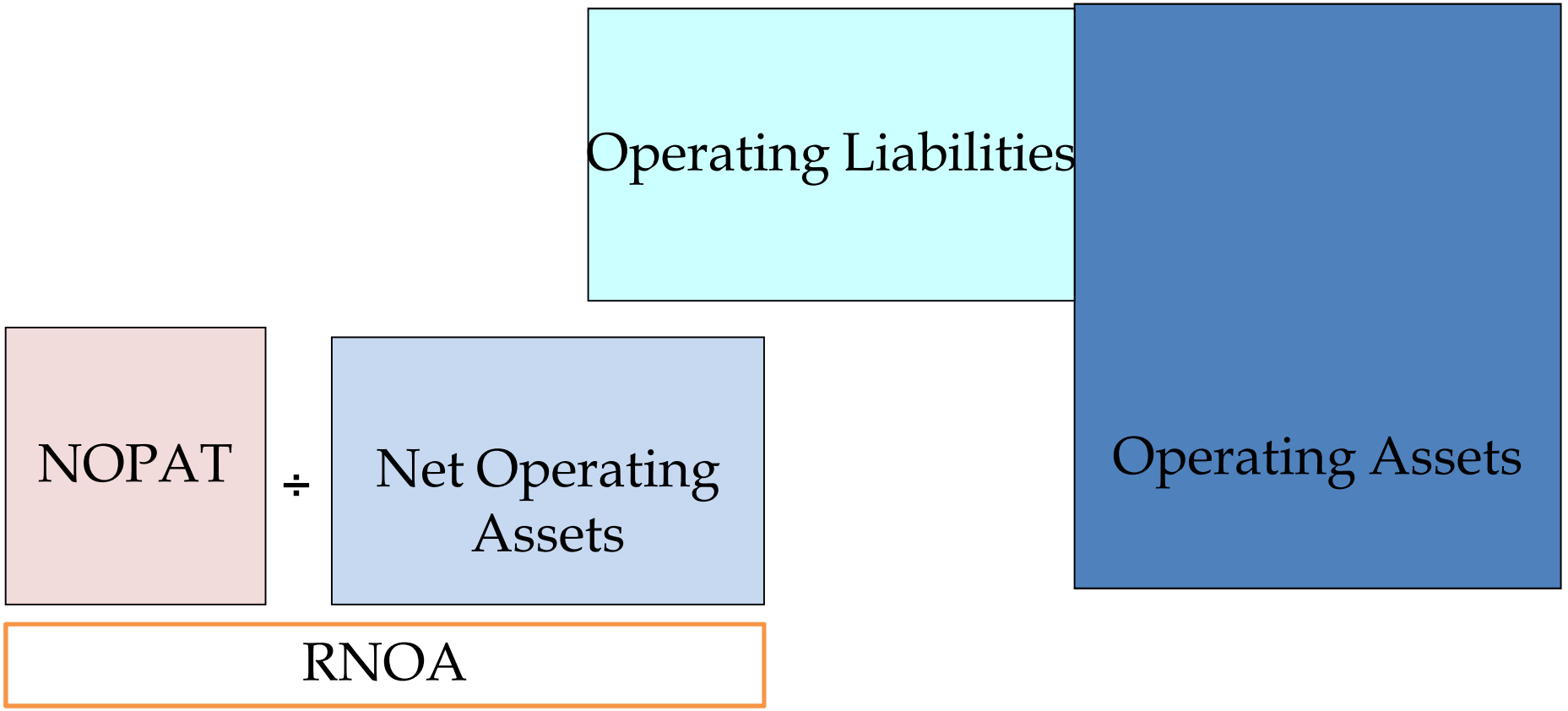
Balance Sheet



Balance Sheet



Balance Sheet



Return Analysis

$$\text{Return on Net Operating Assets} = \frac{\text{NOPAT}}{\text{Net Operating Assets}} = \frac{\text{NI} + \text{NNE}}{\text{Equity} + \text{NNO}}$$

$$\text{Net Nonoperating Expense P} = \frac{\text{NNE}}{\text{NNO}}$$

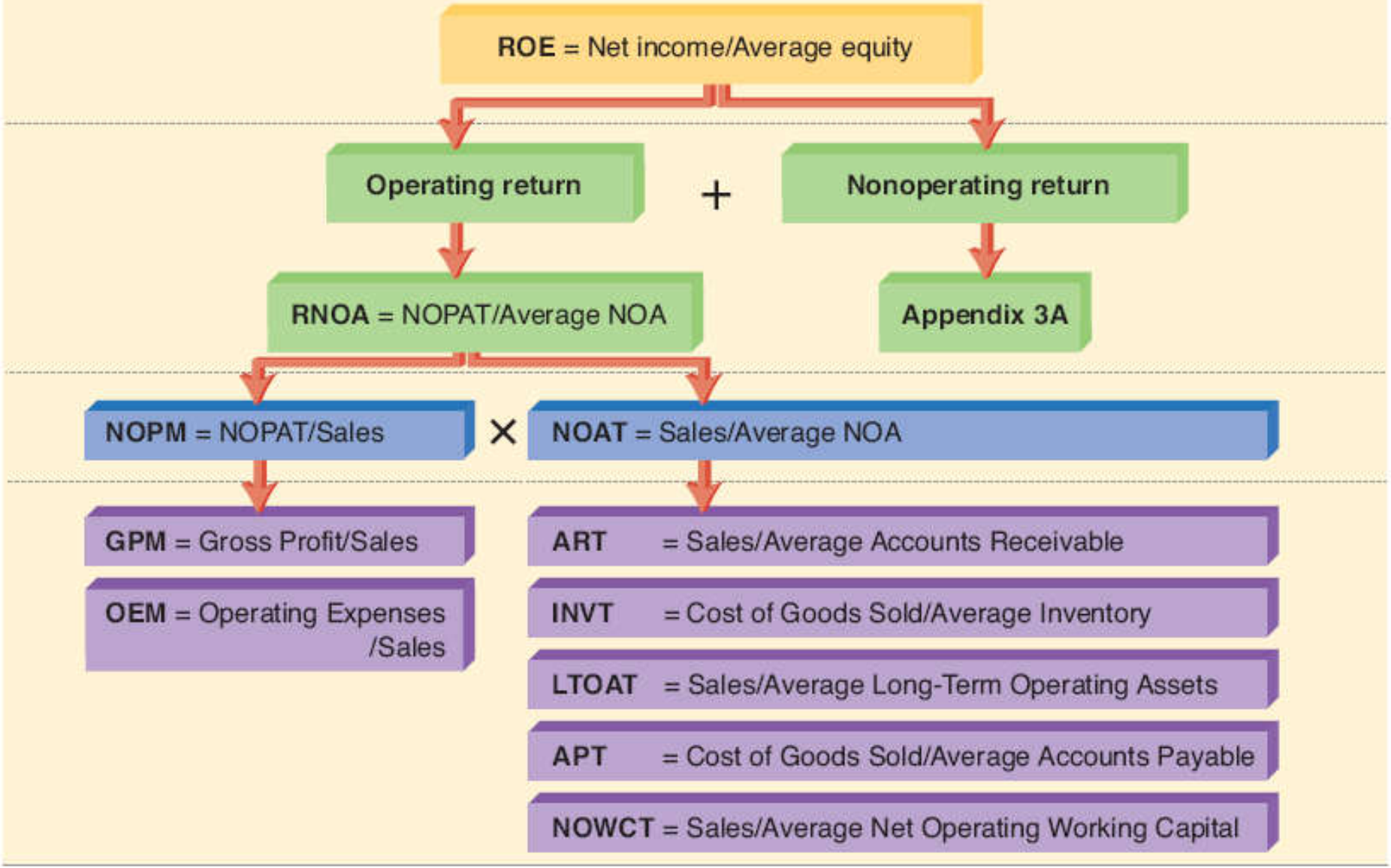
$$\text{Return on Equity (ROE)} = \frac{\text{NI}}{\text{Equity}}$$

$$\text{ROE} = \text{RNOA} + \frac{\text{NNO}}{\text{Equity}} (\text{RNOA} - \text{NNEP})$$

FLEV Spread

Balance Sheet - reported

EXHIBIT 3.5 ROE Disaggregation



Profitability Analysis

$$\text{Net Profit Margin (NOPM)} = \frac{\text{NOPAT}}{\text{Sales}}$$

$$\text{Operating Asset Turnover} = \frac{\text{Sales}}{\text{Operating Assets}}$$

$$\text{Return on operating assets} = \frac{\text{NOPAT}}{\text{Net Operating Assets}}$$

ROOA = NOPM •Operating Asset Turnover • (1–tax)

Appendix 3A: Nonoperating Return Framework

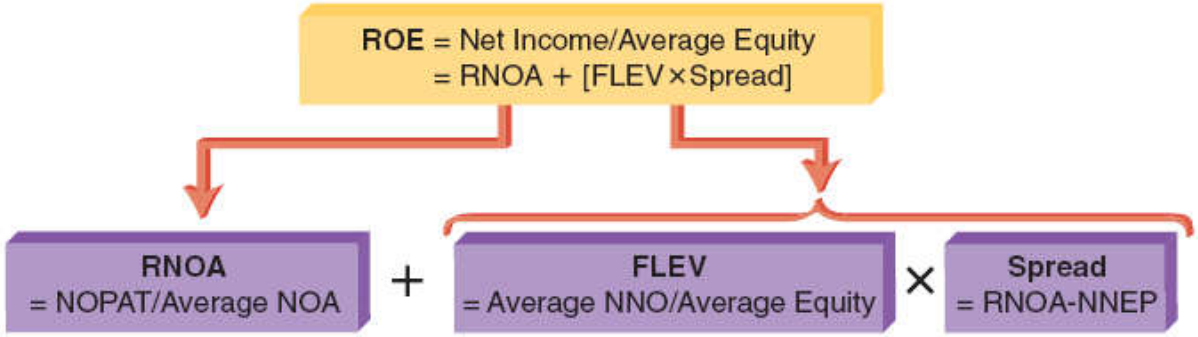


EXHIBIT 3A.1 Nonoperating Return Definitions

NNO: Net nonoperating obligations	Nonoperating liabilities (plus any noncontrolling interest reported on the balance sheet) less nonoperating assets
FLEV: Financial leverage	Average NNO/Average equity
NNE: Net nonoperating expense	NOPAT – Net income*; NNE consists of nonoperating expenses and revenues, net of tax, as well as any noncontrolling interest reported on the income statement. (Noncontrolling interest is *excluded* from the tax shield estimation.)
NNEP: Net nonoperating expense percent	NNE/Average NNO
Spread	RNOA – NNEP

GAAP Limitations of Ratio Analysis

1. Measurability – Financial statements reflect what can be reliably measured. This results in nonrecognition of certain assets, often internally developed assets, the very assets that are most likely to confer a competitive advantage and create value. Examples are brand name, a superior management team, employee skills, and a reliable supply chain.
2. Non-capitalized costs – Related to the concept of measurability is the expensing of costs relating to "assets" that cannot be identified with enough precision to warrant capitalization. Examples are brand equity costs from advertising and other promotional activities, and research and development costs relating to future products.
3. Historical costs – Assets and liabilities are usually recorded at original acquisition or issuance costs. Subsequent increases in value are not recorded until realized, and declines in value are only recognized if deemed permanent.