DuPont model of Profit Analysis

LESE 306
Fall 2010

DuPont Formula

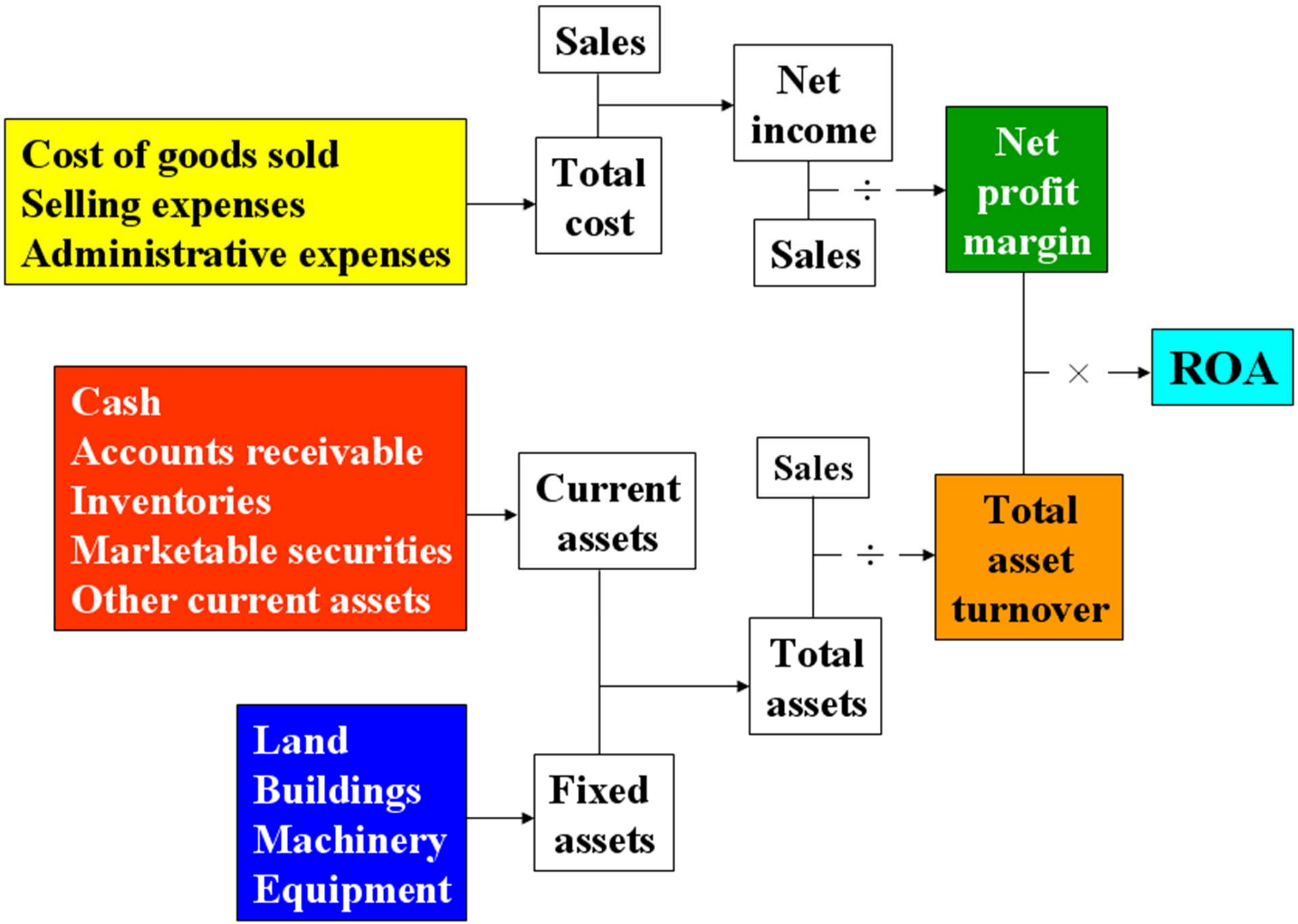
- ✓ROA can be broken down into profit margin and asset turnover.
- ✓Gain an insight into planning for profit improvement.
- ✓Need to improve the profit margin.
- ✓Need to improve asset turnover.
- ✓Need to improve both!!

Improving Profit Margin

- ✓Reducing expenses:
  - Using less costly materials.
  - Automation to improve productivity.
  - Review fixed costs (advertising, R&D, management development programs, etc.).
- ✓Raising prices:
  - Requires pricing power.
  - Also requires brand loyalty.
  - Easier for firms with unique high quality goods.

Improve Asset Turnover

- ✓ Increase sales while holding investment in assets relatively constant:
  - Dispose of obsolete and redundant assets.
  - Speed up collections of receivables.
  - Evaluate credit terms and policies.
  - Identify unused fixed assets.
- ✓ Use idle cash to repay outstanding debts or invest in profit producing activities.


Sales
Net income
Cost of goods sold
Selling expenses
Administrative expenses
Total cost
÷
Net profit margin
Sales
ROA
×
Cash
Accounts receivable
Inventories
Marketable securities
Other current assets
Current assets
Sales
÷
Total asset turnover
Total assets
Land
Buildings
Machinery
Equipment
Fixed assets

Problem #2: Fall 2009

Cash	$10,000
Cash receipts from sales	$73,000
Cash operating expenses	$51,200
Time and savings deposits	$11,000
Other current assets	$22,000
Machinery and equipment	$76,500
Buildings	$14,000
Land	$99,500
Hired labor expenses	$7,000
Allowance for income taxes	$7,213
Accounts payable	$1,200
Current payment on term loan	$7,500
Remaining balance on term loan	$29,500
Other long term liabilities	$1,200
Depreciation	$7,400
Interest payments on term loans	$2,500
Principal payments on term loans	$5,000

Year End Balance sheet

Cash	$10,000	Current payment on term loan	$7,500
Time and savings deposits	$11,000	Accounts payable	$1,200
Other current assets	$22,000	Allowance for income taxes	$7,213
Total current assets	$43,000	Total current liabilities	$15,913
Machinery and equipment	$76,500	Remaining balance on term loan	$29,500
Buildings	$14,000	Other long term liabilities	$1,200
Land	$99,500	Total noncurrent liabilities	$30,700
Total noncurrent assets	$190,000		
		Total liabilities	$46,613
		Equity or net worth	$186,387
Total assets	$233,000	Total claims on business	$233,000

Liquidity ratios:		**Solvency ratios:**	
Current ratio	2.70	Debt ratio	0.20
Working capital	$27,087	Net worth ratio	0.80
Acid test ratio	1.32	Asset ratio	5.00
Cash ratio	0.63	Leverage ratio	0.25

Debt repayment capacity ratios: 1/	
Term debt and capital lease coverage ratio	1.94
Times interest earned ratio	2.87
Debt burden ratio	9.95

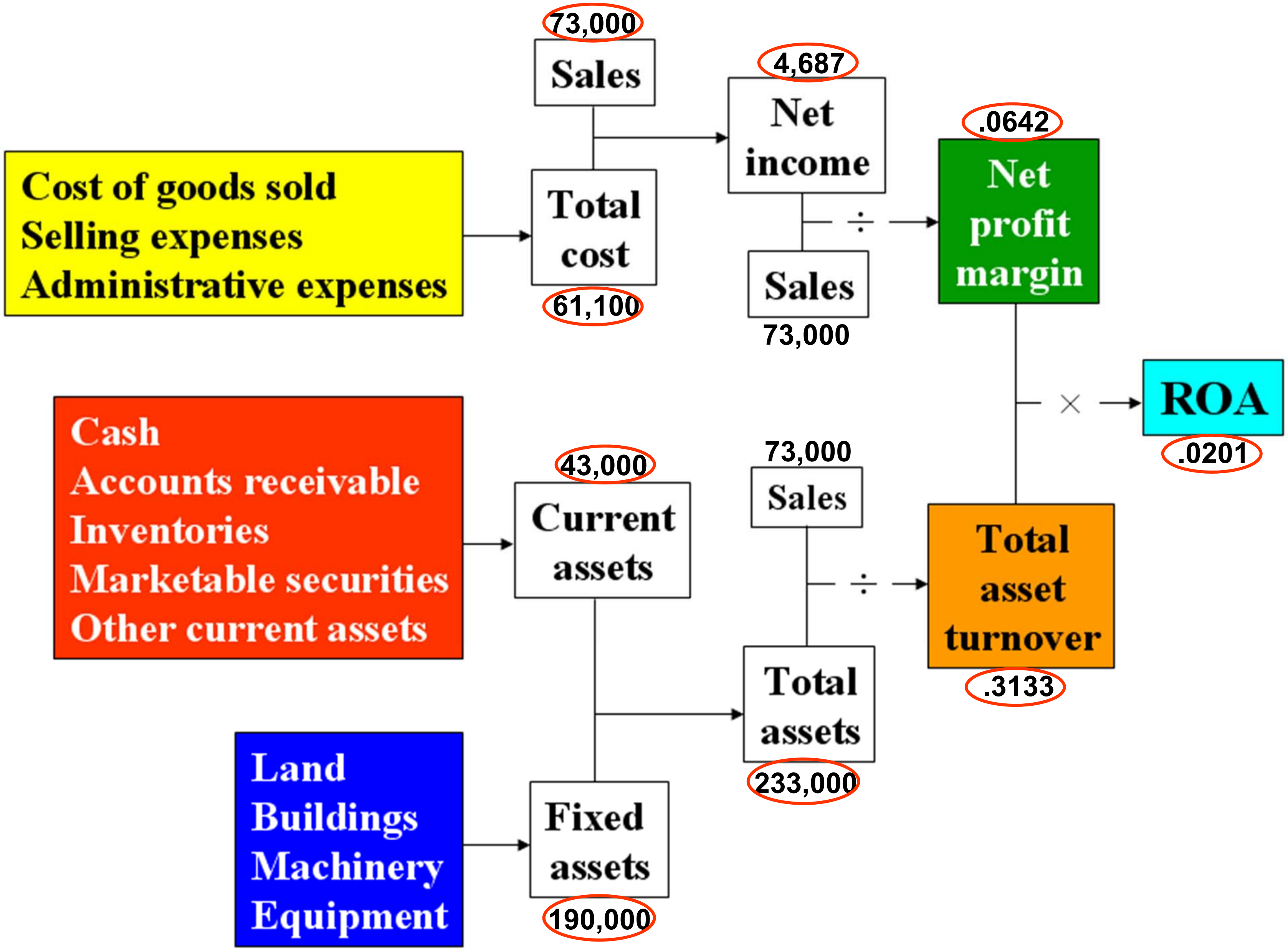
Earnings before interest and taxes	$14,400
Allowance for income taxes	$7,213
EBIT - taxes	$7,187
Definitions of coverage ratio:	
1. After-tax coverage ratio	0.96
2. After-tax cash coverage ratio	1.94

Annual Income Statement

Cash receipts from sales	$73,000
Total revenue	$73,000
Cash operating expenses	$51,200
Interest expenses	$2,500
Depreciation	$7,400
Total expenses	$61,100
Net income before taxes	$11,900
Allowance for income taxes	$7,213
Net income	$4,687

Profitability ratios:	
Rate of return on assets	2.01%
Rate of return on equity	2.51%
Net profit margin	6.42%
Efficiency ratios:	
Variable expense ratio	70.14%
Interest expense ratio	3.42%
Depreciation expense ratio	10.14%
Total asset turnover ratio	31.33%
Fixed asset turnover ratio	38.42%

1/ See the formulas on page 15 of the booklet for further discussion of these ratios.


73,000
Sales
4,687
Net income
.0642
Net profit margin
Cost of goods sold
Selling expenses
Administrative expenses
Total cost
61,100
÷
Sales
73,000
×
ROA
.0201
Cash
Accounts receivable
Inventories
Marketable securities
Other current assets
43,000
Current assets
73,000
Sales
÷
Total asset turnover
.3133
Total assets
233,000
Land
Buildings
Machinery
Equipment
Fixed assets
190,000

DuPont Formula

The use of borrowed funds can magnify returns to equity. To see this, consider the following definitions using problem 2 values:

ROE = Net income / Equity
= $4,687 / $186,387 = .0251

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or
ROE = ROA x Equity multiplier
= .0201 x 1.25 = .0251
where:
Equity multiplier = Total assets / Equity = $233,000 / $186,387 = 1.25
or
Equity multiplier = 1 / (1 – Debt ratio) = 1 / (1 - .20) = 1 / .80 = 1.25

DuPont Formula

Because it links several critical ratios, the DuPont formula allows you to examine how a firm generates its ROE.

NI = Net income = $4,687
NPM = Net profit margin = .0642
TA = Total assets = $233,000
EM = equity multiplier = 1 / (1 – Debt ratio) = 1.25
TAT = Total asset turnover ratio = Sales / Total assets = .3133
ROE = NPM x TAT x EM = .0642 x .3133 x 1.25 = .0251

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ROE = NPM x TAT x EM = .0642 x .3133 x 1.25 = .0251
or
ROE = (NI / TA) x EM = ($4,687 / $233,000) x 1.25 = .0251

Analyzing DuPont Formula

1. A high net profit margin or NPM signals *strong operating management*.
2. A high total asset turnover ratio or TAT signals *strong asset management*.
3. A high equity multiplier or EM signals *strong capital management* in the presence of low and stable cost of debt capital.