



Aalto University
School of Business

Financial Statement Analysis (22E00100)

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School of Business

Financial Ratio Analysis

Learning objectives

- How cause-of-change analysis and common-size and trend statements illuminate complex financial statement patterns and shed light on business activities.
- How competitive forces and business strategies affect a company's profitability and financial position.
- How return on assets (ROA) can be used to analyze a company's profitability, and what insights are gained from disaggregating ROA into its profit margin and asset turnover components.
- How short-term liquidity risk and long-term solvency risk are assessed.

Financial statement analysis

Tools:

Common size statements

Trend statements

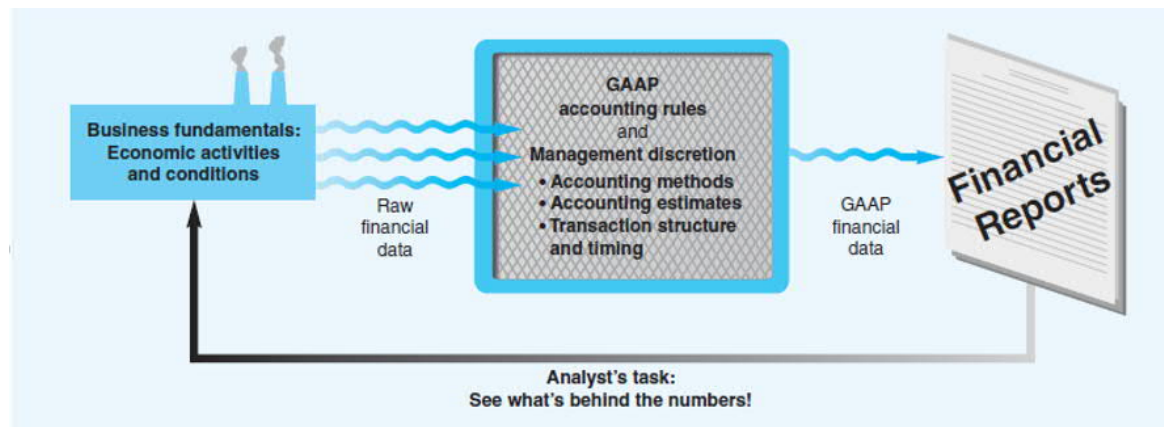
Financial ratios

Approaches used with each tool:

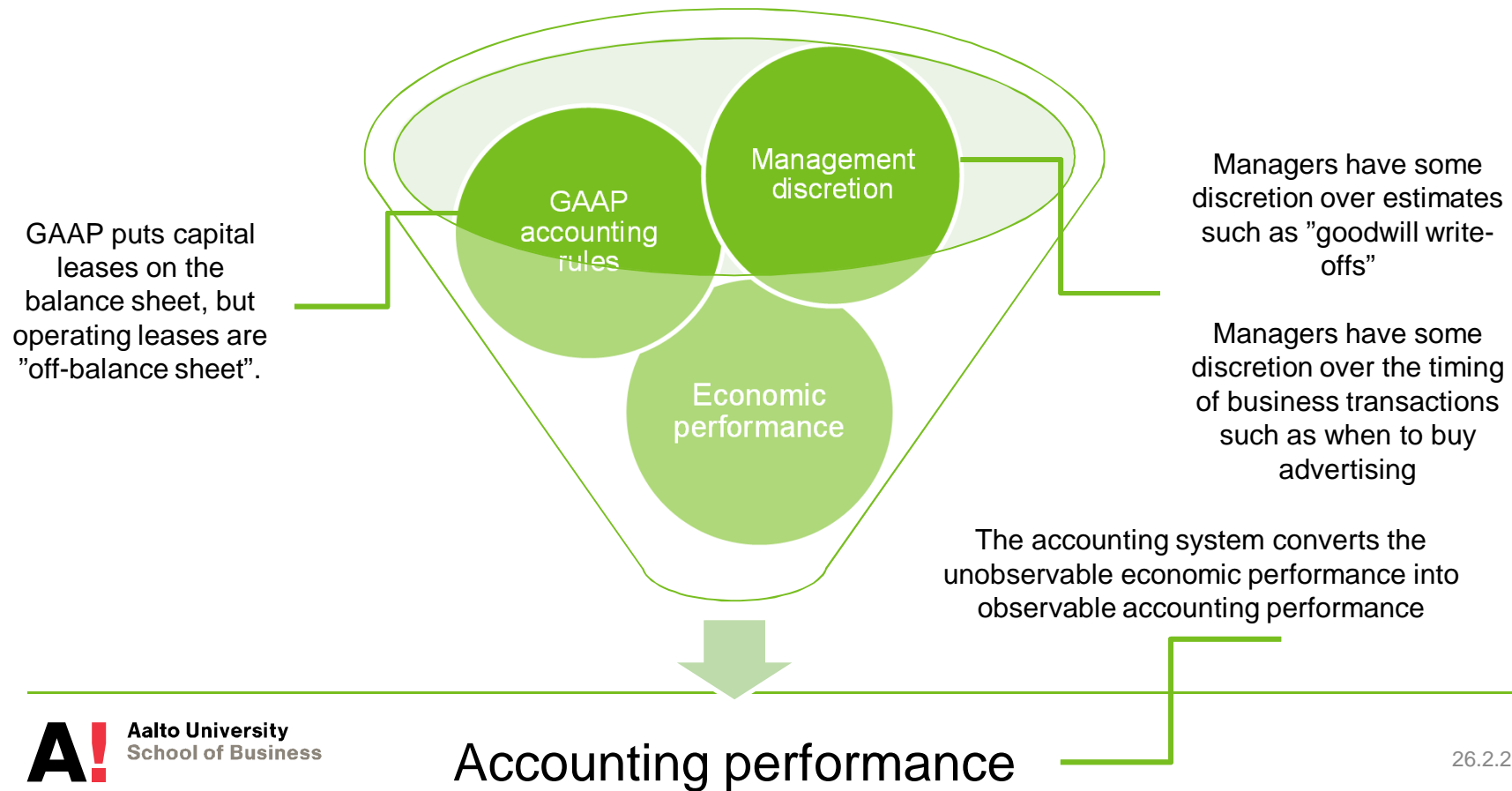
1. Time-series analysis: the same firm over time (e.g. Kone Oyj 2014–2016)
2. Cross-sectional analysis: different firms at a single point in time (e.g. Kone and Otis Elevator Company in 2015)
3. Benchmark comparison: using industry norms or predetermined standards.

Evaluating accounting “quality”

- Analysts use financial statement information to “get behind the numbers”.
- However, financial statements do not always provide a complete and faithful picture of a company’s activities and condition.



How the financial accounting “filter” sometimes works



Common-size and trend statements

- Common-size and trend statements provide a convenient way to organize financial statement information so that major financial components and changes can be easily recognized.
- Common-size income statements recast each statement item as a percentage of sales.
 - They show how much of each sales dollar/euro the company spent on operating expenses and other business costs and how much of each sales dollar hit the bottom line as profit.
 - For example, Kone's costs and expenses for 2016 are shown as 84.1% of 2016 sales.

Common-size and trend statements

- The trend statements also recast each statement item in percentage terms, but they do so using a base year number rather than sales.
 - Trend statements help you spot increases and decreases over time in each income statement item.
 - For example, the trend statement of Kone indicate that sales growth exceeded net income growth, which was negative in 2016.

KONE - Comparative Income Statement and common size statements

Consolidated statement of income				
MEUR	1-12/2016	%	1-12/2015	%
Sales	8 784.3	100.0 %	8 647.3	100.0 %
Costs and expenses	-7 384.5	-84.1 %	-7 305.9	-84.5 %
Depreciation and amortization	-106.5	-1.2 %	-100.0	-1.2 %
Operating income	1 293.3	14.7 %	1 241.5	14.4 %
Share of associated companies' net income	1.2	0.0 %	0.6	0.0 %
Financing income	66.8	0.8 %	198.9	2.3 %
Financing expenses	-31.0	-0.4 %	-76.5	-0.9 %
Income before taxes	1 330.3	15.1 %	1 364.4	15.8 %
Taxes	-307.7	-3.5 %	-311.4	-3.6 %
Net income	1 022.6	11.6 %	1 053.1	12.2 %

KONE – Trend analysis

Consolidated statement of income				
MEUR	1-12/2016	%	1-12/2015	%
Sales	8 784.3	101.6 %	8 647.3	100.0 %
Costs and expenses	-7 384.5	101.1 %	-7 305.9	100.0 %
Depreciation and amortization	-106.5	106.5 %	-100.0	100.0 %
Operating income	1 293.3	104.2 %	1 241.5	100.0 %
Share of associated companies' net income	1.2	200.0 %	0.6	100.0 %
Financing income	66.8	33.6 %	198.9	100.0 %
Financing expenses	-31.0	40.5 %	-76.5	100.0 %
Income before taxes	1 330.3	97.5 %	1 364.4	100.0 %
Taxes	-307.7	98.8 %	-311.4	100.0 %
Net income	1 022.6	97.1 %	1 053.1	100.0 %

KONE – Comparative Balance Sheet

Assets MEUR	Dec 31, 2016	% Dec 31, 2015		%
Non-current assets				
Goodwill	1 371.8	17.3 %	1 306.7	17.4 %
Other intangible assets	292.9	3.7 %	271.5	3.6 %
Tangible assets	368.3	4.6 %	345.4	4.6 %
Loan receivables and other interest-bearing assets	7.4	0.1 %	7.0	0.1 %
Investments	129.9	1.6 %	122.7	1.6 %
Employee benefits	-		8.4	0.1 %
Deferred tax assets	318.4	4.0 %	299.7	4.0 %
Total non-current assets	2 488.5	31.3 %	2 361.4	31.5 %
Current assets				
Inventories	1 373.5	17.3 %	1 326.7	17.7 %
Accounts receivable	1 573.7	19.8 %	1 480.2	19.7 %
Deferred assets and income tax receivables	429.8	5.4 %	434.0	5.8 %
Current deposits and loan receivables	1 496.6	18.8 %	1 350.6	18.0 %
Cash and cash equivalents	589.2	7.4 %	552.7	7.4 %
Total current assets	5 462.8	68.7 %	5 144.2	68.5 %
Total assets	7 951.3	100.0 %	7 505.6	100.0 %

KONE – Comparative Balance Sheet

Equity and liabilities MEUR	Dec 31, 2016	% Dec 31, 2016	Dec 31, 2015	% Dec 31, 2015
Equity	2 795.6	35.2 %	2 575.5	34.3 %
Non-current liabilities				
Loans	203.1	2.6 %	32.5	0.4 %
Employee benefits	176.7	2.2 %	169.2	2.3 %
Deferred tax liabilities	154.2	1.9 %	140.9	1.9 %
Total non-current liabilities	534.0	6.7 %	342.6	4.6 %
Provisions	183.2	2.3 %	173.6	2.3 %
Current liabilities				
Loans	25.8	0.3 %	204.4	2.7 %
Advance payments received	1 976.9	24.9 %	1 829.4	24.4 %
Accounts payable	743.3	9.3 %	728.9	9.7 %
Accruals and income tax payables	1 692.5	21.3 %	1 651.3	22.0 %
Total current liabilities	4 438.5	55.8 %	4 414.0	58.8 %
Total equity and liabilities	7 951.3	100.0 %	7 505.6	100.0 %

KONE – Comparative Cash Flow Statements

- The common-size statements are constructed by dividing each cash flow item by sales for the year.

MEUR	1-12/2016	%	1-12/2015	%
Operating income	1 293.3	14.7 %	1 241.5	14.4 %
Change in working capital before financing items and taxes	109.7	1.2 %	132.3	1.5 %
Depreciation and amortization	106.5	1.2 %	100.0	1.2 %
Cash flow from operations before financing items and taxes	1 509.5	17.2 %	1 473.7	17.0 %
Cash flow from financing items and taxes	-331.0	-3.8 %	-27.0	-0.3 %
Cash flow from operating activities	1 178.4	13.4 %	1 446.7	16.7 %
Cash flow from investing activities	-197.6	-2.2 %	-155.0	-1.8 %
Cash flow after investing activities	980.8	11.2 %	1 291.8	14.9 %
Purchase of own shares	-39.3	-0.4 %	-71.2	-0.8 %
Increase in equity (option rights)	18.4	0.2 %	13.5	0.2 %
Profit distribution	-718.2	-8.2 %	-616.3	-7.1 %
Change in deposits and loans receivable, net	-154.2	-1.8 %	-373.3	-4.3 %
Change in loans payable and other interest-bearing debt	-20.9	-0.2 %	-15.9	-0.2 %
Changes in non-controlling interests	-26.7	-0.3 %	-18.4	-0.2 %
Cash flow from financing activities	-941.0	-10.7 %	-1 081.4	-12.5 %
Change in cash and cash equivalents	39.8	0.5 %	210.3	2.4 %
Cash and cash equivalents at beginning of period	552.7	6.3 %	336.1	3.9 %
Translation difference	-3.3	0.0 %	6.2	0.1 %
Cash and cash equivalents at end of period	589.2	6.7 %	552.7	6.4 %

KONE – Trends in Cash Flows

MEUR	1-12/2016		1-12/2015	
Operating income	1 293.3	104.2 %	1 241.5	100.0 %
Change in working capital before financing items and taxes	109.7	82.9 %	132.3	100.0 %
Depreciation and amortization	106.5	106.5 %	100.0	100.0 %
Cash flow from operations before financing items and taxes	1 509.5	102.4 %	1 473.7	100.0 %
Cash flow from financing items and taxes	-331.0	1225.9 %	-27.0	100.0 %
Cash flow from operating activities	1 178.4	81.5 %	1 446.7	100.0 %
Cash flow from investing activities	-197.6	127.5 %	-155.0	100.0 %
Cash flow after investing activities	980.8	75.9 %	1 291.8	100.0 %
Purchase of own shares	-39.3	55.2 %	-71.2	100.0 %
Increase in equity (option rights)	18.4	136.3 %	13.5	100.0 %
Profit distribution	-718.2	116.5 %	-616.3	100.0 %
Change in deposits and loans receivable, net	-154.2	41.3 %	-373.3	100.0 %
Change in loans payable and other interest-bearing debt	-20.9	131.4 %	-15.9	100.0 %
Changes in non-controlling interests	-26.7	145.1 %	-18.4	100.0 %
Cash flow from financing activities	-941.0	87.0 %	-1 081.4	100.0 %
Change in cash and cash equivalents	39.8	18.9 %	210.3	100.0 %
Cash and cash equivalents at beginning of period	552.7	164.4 %	336.1	100.0 %
Translation difference	-3.3	-53.2 %	6.2	100.0 %
Cash and cash equivalents at end of period	589.2	106.6 %	552.7	100.0 %

KONE - Business Segment information

Sales by business

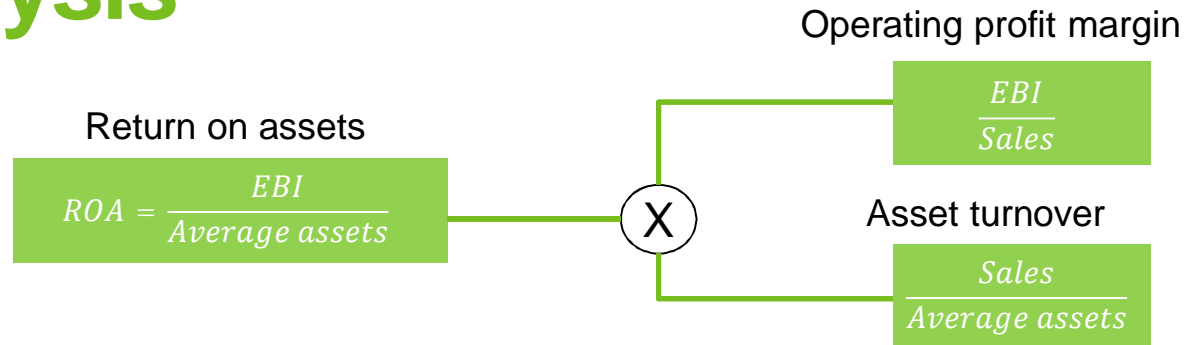
MEUR	Jan 1–Dec 31, 2016	%	Jan 1–Dec 31, 2015	%
New equipment	4,793.0	55	4,934.8	57
Services	3,991.2	45	3,712.5	43
Maintenance	2,772.5	31	2,641.5	31
Modernization	1,218.7	14	1,071.0	12
Total	8,784.3		8,647.3	

Sales by geographical area

MEUR	Jan 1–Dec 31, 2016	%	Jan 1–Dec 31, 2015	%
EMEA ¹⁾	3,476.8	40	3,369.6	39
Americas	1,658.5	19	1,466.0	17
Asia-Pacific	3,648.9	41	3,811.8	44
Total	8,784.3		8,647.3	

¹⁾ EMEA = Europe, Middle East, Africa

Financial ratios and profitability analysis



Analysts do not always use the reported earnings, sales and asset figures. Instead, they often consider three types of adjustments to the reported numbers:

1. Remove non-operating and nonrecurring items to isolate sustainable operating profits.
2. Eliminate after-tax interest expense to avoid financial structure distortions.
3. Eliminate any accounting quality distortions (e.g., off-balance operating leases).

How can ROA be increased?

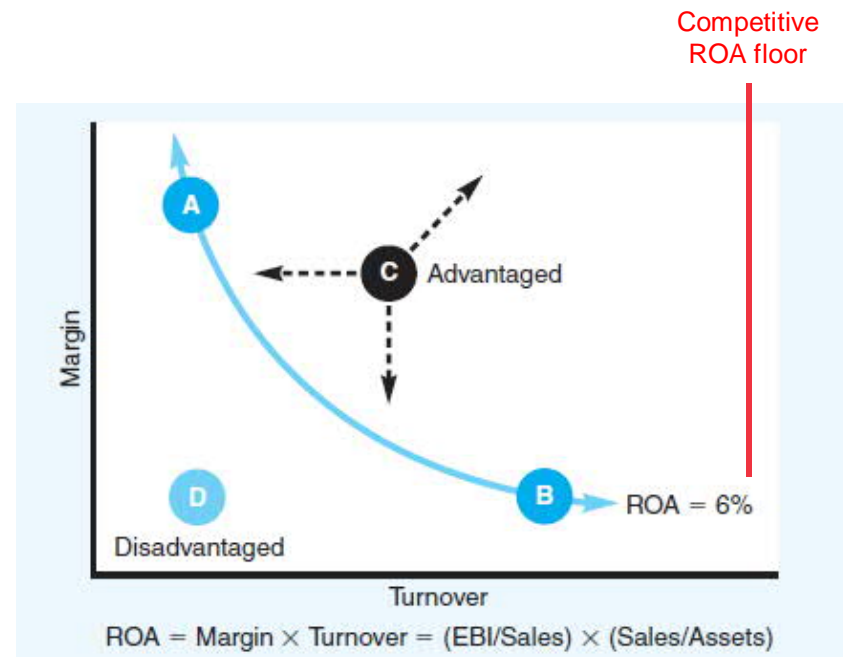
There are just two ways:

1. Increase the operating profit margin, or
2. Increase the intensity of asset utilization (turnover rate).

$$ROA = \frac{EBI}{Average\ assets} = \frac{EBI}{Sales} \times \frac{Sales}{Average\ assets}$$

ROA and competitive advantage: Four hypothetical restaurant firms

- Competition works to drive down ROA toward the competitive floor.
- Companies that consistently earn an ROA above the floor are said to have a competitive advantage.
- However, a high ROA attracts more competition which can lead to an erosion of profitability and advantage.
- Firm A and B earn the same ROA, but Firm A follows a differentiation strategy while Firm B is a low cost leader.
- Differences in business strategies give rise to economic differences that are reflected in differences in operating margin, asset utilization, and profitability (ROA).



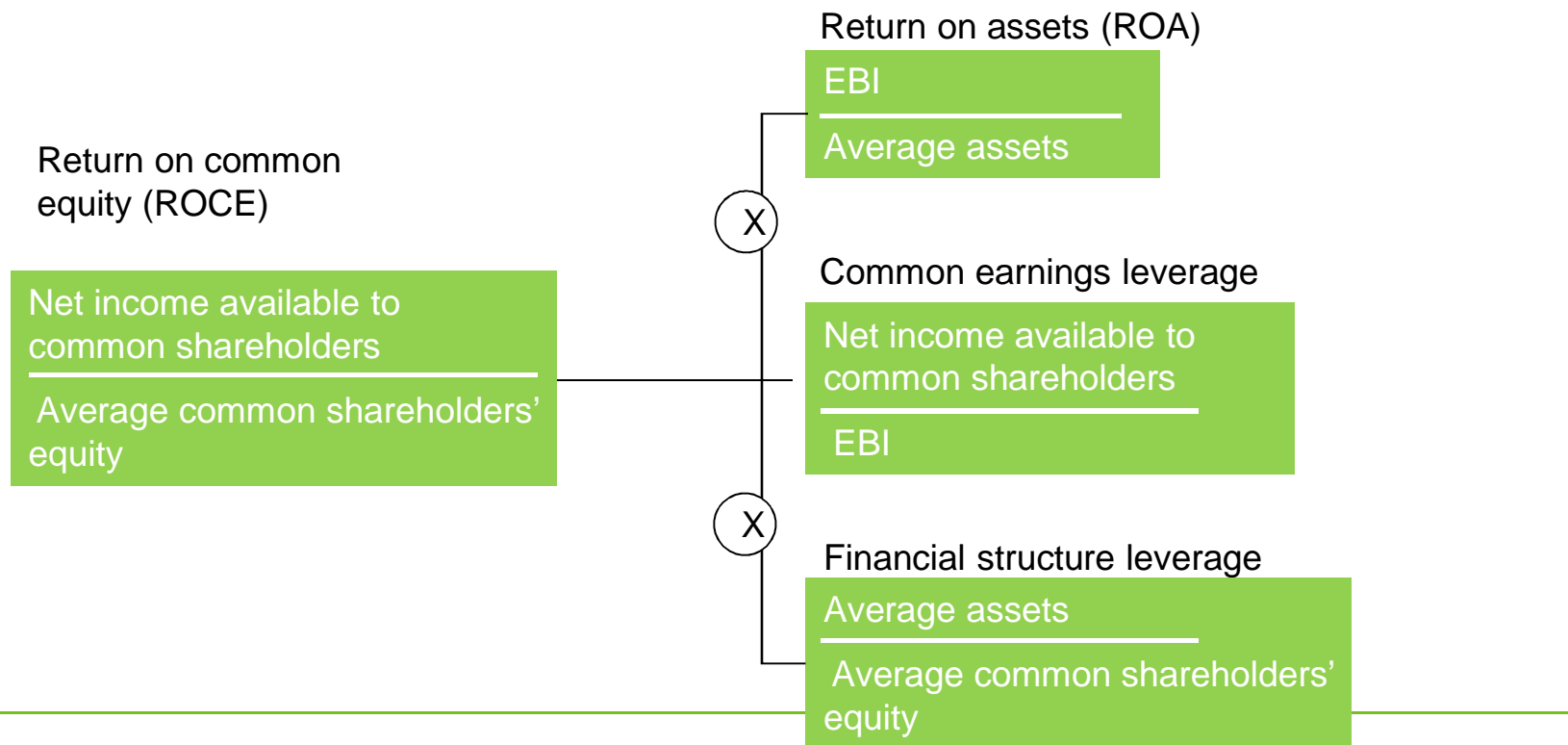
Return on equity and financial leverage

- 2011: No debt, so all the earnings belong to shareholders.
- 2012: \$1 million borrowed at 10% interest, but ROCE climbs to 20%.
- 2013: Another \$1 million borrowed at 20% interest, and ROCE falls to only 15%.

	Earnings before Interest*	Assets	Common Shareholders' Equity	Return on Assets (ROA)	Interest Charges	Net Income Available to Common Stockholders	Return on Common Equity (ROCE)
2011	\$150,000	\$1 million	\$1 million	15%	—	\$150,000	15%
2012	300,000	2 million	1 million	15	\$100,000	200,000	20
2013	450,000	3 million	1 million	15	300,000	150,000	15

* Earnings are before interest but after taxes, and they are distributed to lenders (as interest) and shareholders (as dividends) each year.

Components of ROCE



Profitability and financial leverage: Nodebt and Hidebt example

Profitability and Financial Leverage

	Total Assets	Shareholders' Equity	Earnings before Interest (EBI)*	After-Tax Interest	Available to Common Shareholders	ROA	ROCE
Good earnings year							
HiDebt	\$2 million	\$1 million	\$240,000	\$60,000	\$180,000	12.0%	18.0%
NoDebt	2 million	2 million	240,000	—	240,000	12.0	12.0
Neutral earnings year							
HiDebt	2 million	1 million	120,000	60,000	60,000	6.0	6.0
NoDebt	2 million	2 million	120,000	—	120,000	6.0	6.0
Bad earnings year							
HiDebt	2 million	1 million	60,000	60,000	—	3.0	0.0
NoDebt	2 million	2 million	60,000	—	60,000	3.0	3.0

* Earnings are before interest but after taxes. HiDebt has after-tax interest charges of \$60,000—that is, $\$1 \text{ million} \times 10\% \times (1 - 40\%)$ —each year.

Financial statement analysis and accounting quality

- Financial ratios, common-size statements, and trend statements are extremely powerful tools.
- But they can be no better than the data from which they are constructed.
- Be on the lookout for accounting distortions when using these tools. Examples include:

Nonrecurring gains and losses

Differences in accounting methods

Differences in accounting estimates

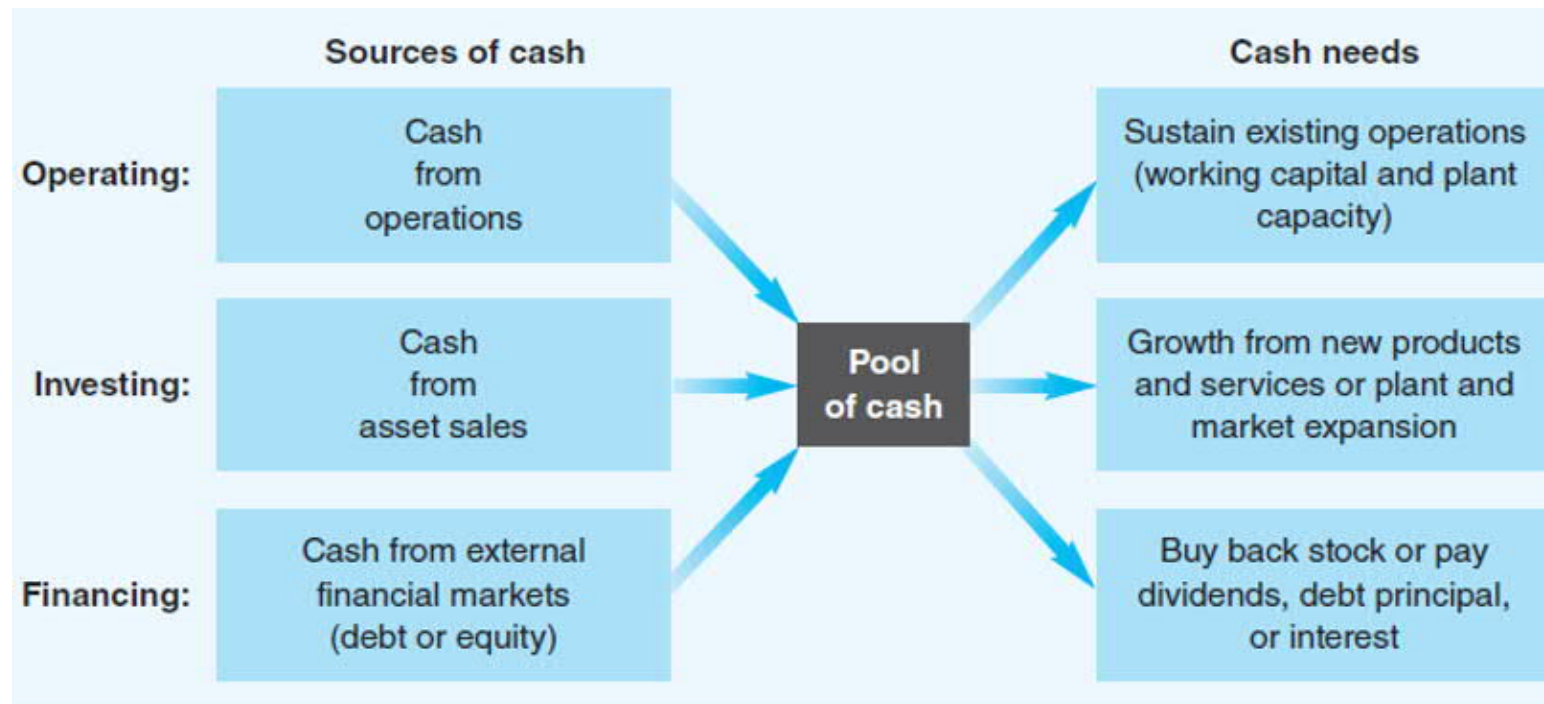
GAAP implementation differences

Historical cost convention

Liquidity, Solvency, and Credit Analysis: Overview

- Credit risk refers to the risk of default by the borrower.
- The lender risks losing interest payments and loan principal.
- A company's ability to repay debt is determined by its capacity to generate cash from operations, asset sales, or external financial markets in excess of its cash needs.
- A company's willingness to repay debt depends on which of the competing cash needs management believes is most pressing at the moment.

Liquidity, Solvency, and Credit Analysis: Balancing cash sources and needs



Role of Working Capital

- Working capital is current assets (chiefly accounts receivable, inventories, and cash) less current liabilities (primarily accounts payable and short-term debt)
- Efficient firms may use working capital capital as a source of fund.

NET WORKING CAPITAL
-1,055 MEUR

OPERATIVE CASH FLOW
1,509 MEUR

3 NET WORKING CAPITAL

IN THIS SECTION

This section comprises the following notes, which describe KONE's net working capital for 2016:

- 3.1 Inventories and advance payments received
- 3.2 Accounts receivable
- 3.3 Deferred assets
- 3.4 Accruals
- 3.5 Provisions
- 3.6 Deferred tax assets and liabilities

KONE'S NET WORKING CAPITAL

- Our business model enables us to operate with negative net working capital.
- KONE operates with advance payments across businesses and geographies. Advance payments consist of customer payments for new equipment and modernization orders included in work-in-progress as well maintenance contracts.



NET WORKING CAPITAL

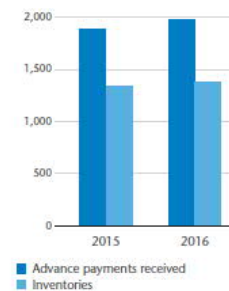
MEUR	Dec 31, 2016	Dec 31, 2015
Net working capital		
Inventories	1,373.5	1,326.7
Advance payments received	-1,976.9	-1,829.4
Accounts receivable	1,573.7	1,480.2
Deferred assets and income tax receivables	429.8	434.0
Accruals and income tax payables	-1,692.5	-1,651.3
Provisions	-183.2	-173.6
Accounts payable	-743.3	-728.9
Net deferred tax assets/liabilities	164.1	158.8
Total net working capital	-1,054.8	-983.4

3.1 INVENTORIES AND ADVANCE PAYMENTS RECEIVED

Inventories, MEUR	Dec 31, 2016	Dec 31, 2015
Raw materials, supplies and finished goods	240.4	230.6
Work in progress	1,117.2	1,081.4
Advance payments made	15.9	14.7
Total	1,373.5	1,326.7

Advance payments received, MEUR	Dec 31, 2016	Dec 31, 2015
Advance payments received	1,976.9	1,829.4

Advance payments received vs. inventories, (MEUR)



Accounting principles

Inventories

Inventories are valued at the lower of cost and net realizable value. Cost is determined on a first-in-first-out (FIFO) basis. Raw materials and supplies, however, are valued based on weighted average cost method or at standard cost. Semi-manufactures are valued at production costs.

Work in progress includes direct labor and material costs as of the consolidated statement of financial position date with a proportion of indirect costs related to manufacturing and installation costs of sales orders included in work in progress.

An allowance is recorded for obsolete items based on management's estimate of expected net realizable value.

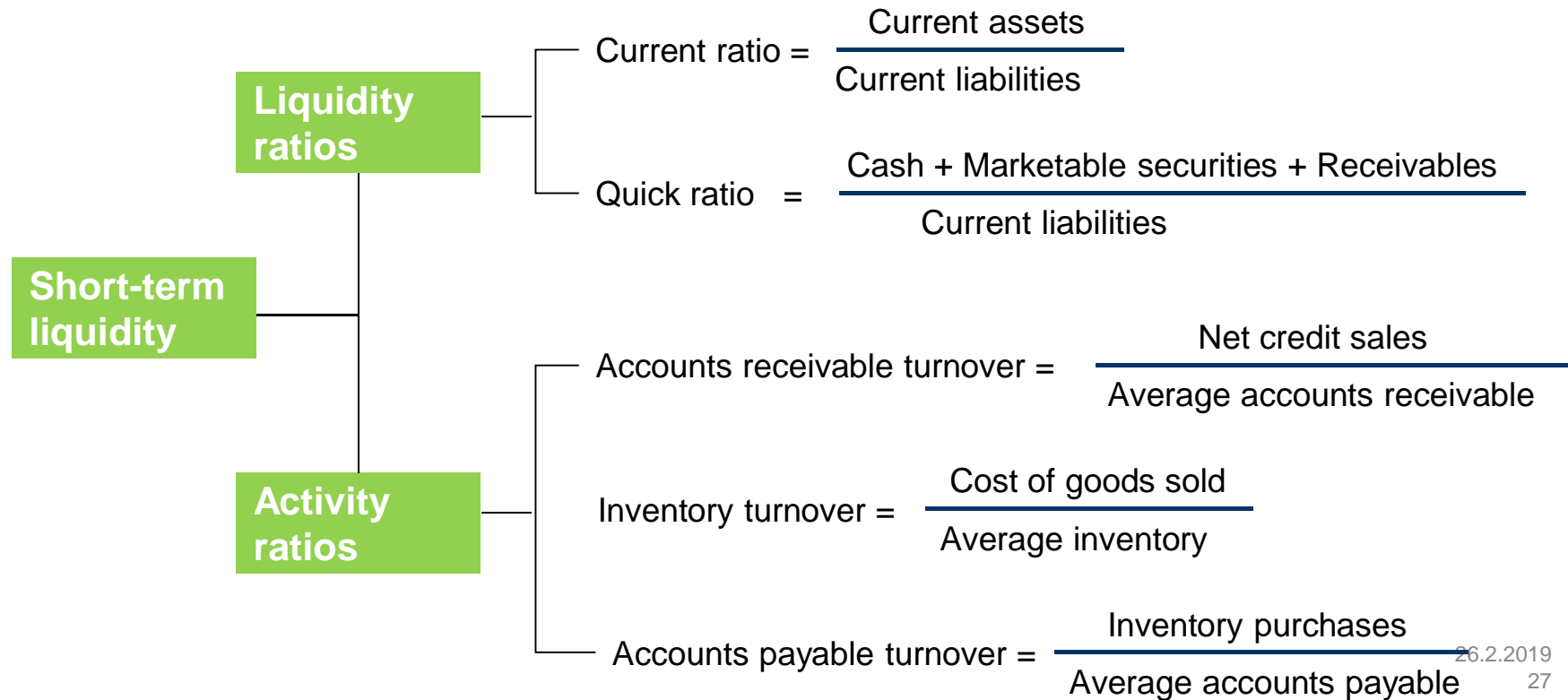
Accounting principles

Advance payments received

Advance payments received include customer payments for the orders included in work in progress.

Liquidity Analysis:

Short-term liquidity ratios



Liquidity Analysis:

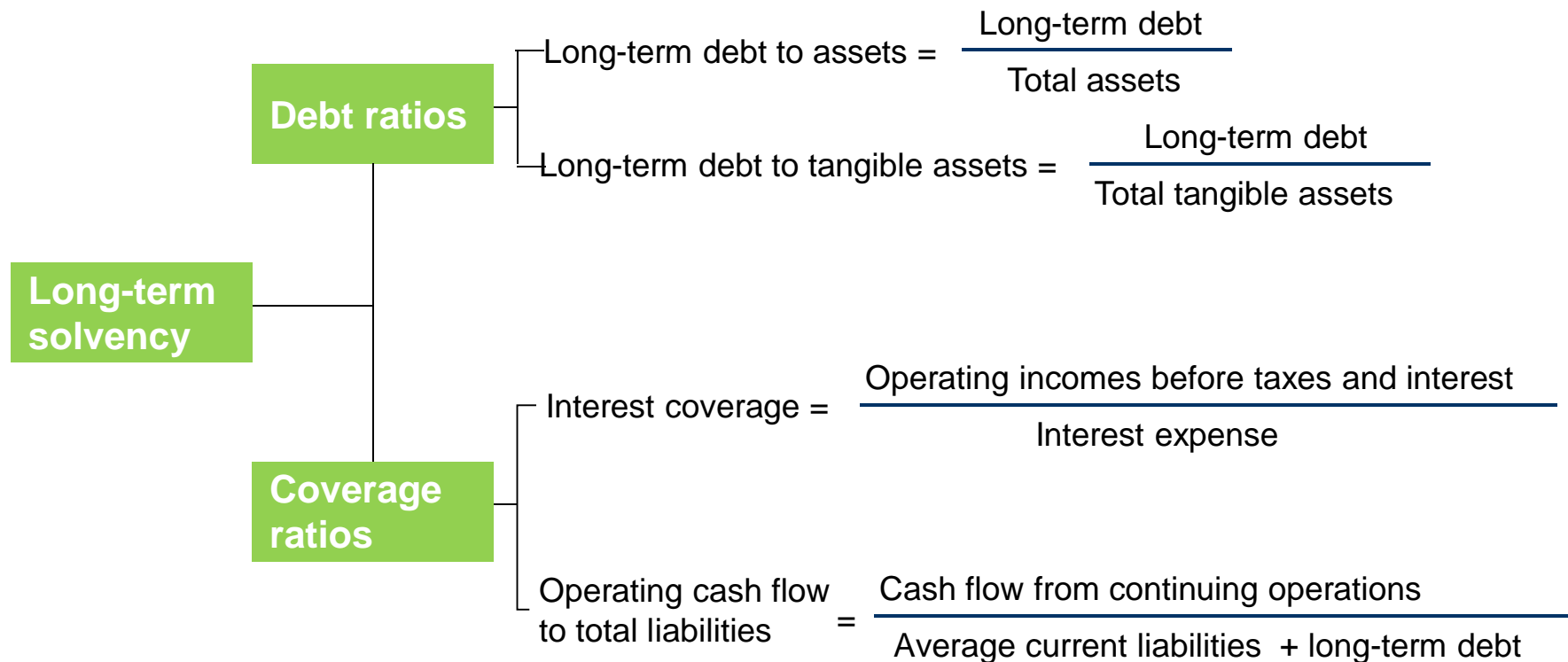
Operating and cash conversion cycle example

Comparison of Operating and Cash Conversion Cycles

	Amazon.com	Wal-Mart	Nordstrom
Working capital activity ratios:			
1. Days inventory held	25.0	50.0	88.8
2. Days accounts receivable outstanding	0.0	3.0	46.0
3. Days accounts payable outstanding	74.0	33.9	47.1
Operating cycle (1 + 2)	25.0	53.0	134.8
Cash conversion cycle (1 + 2 - 3)	(49.0)	19.1	87.7

Liquidity Analysis:

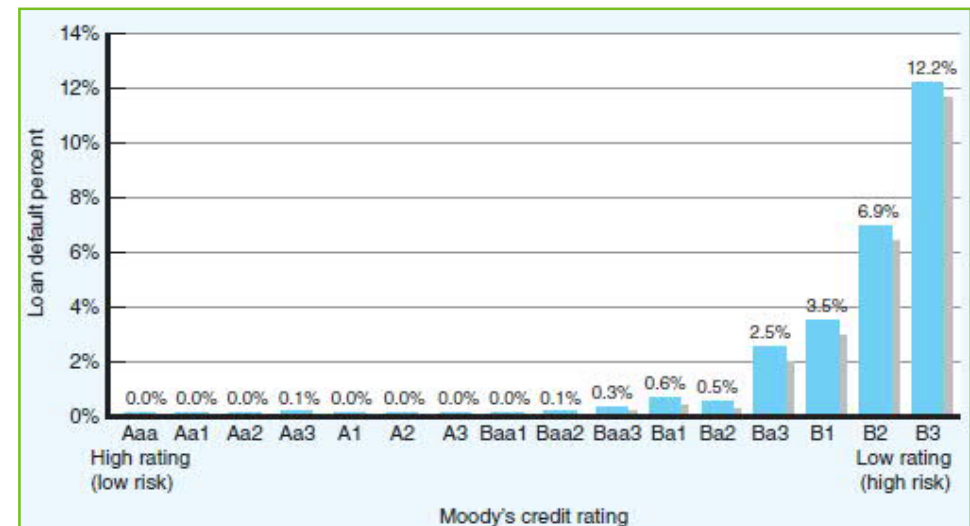
Long-term solvency



Credit risk:

Financial ratios and default risk

- A firm defaults when it fails to make principal or interest payments.
- Lenders can then:
 - Adjust the loan payment schedule.
 - Increase the interest rate and require loan collateral.
 - Seek to have the firm declared insolvent.
- Financial ratios play two roles in credit analysis:
 - They help quantify the borrower's credit risk before the loan is granted.
 - Once granted, they serve as an early warning device for increased credit risk.

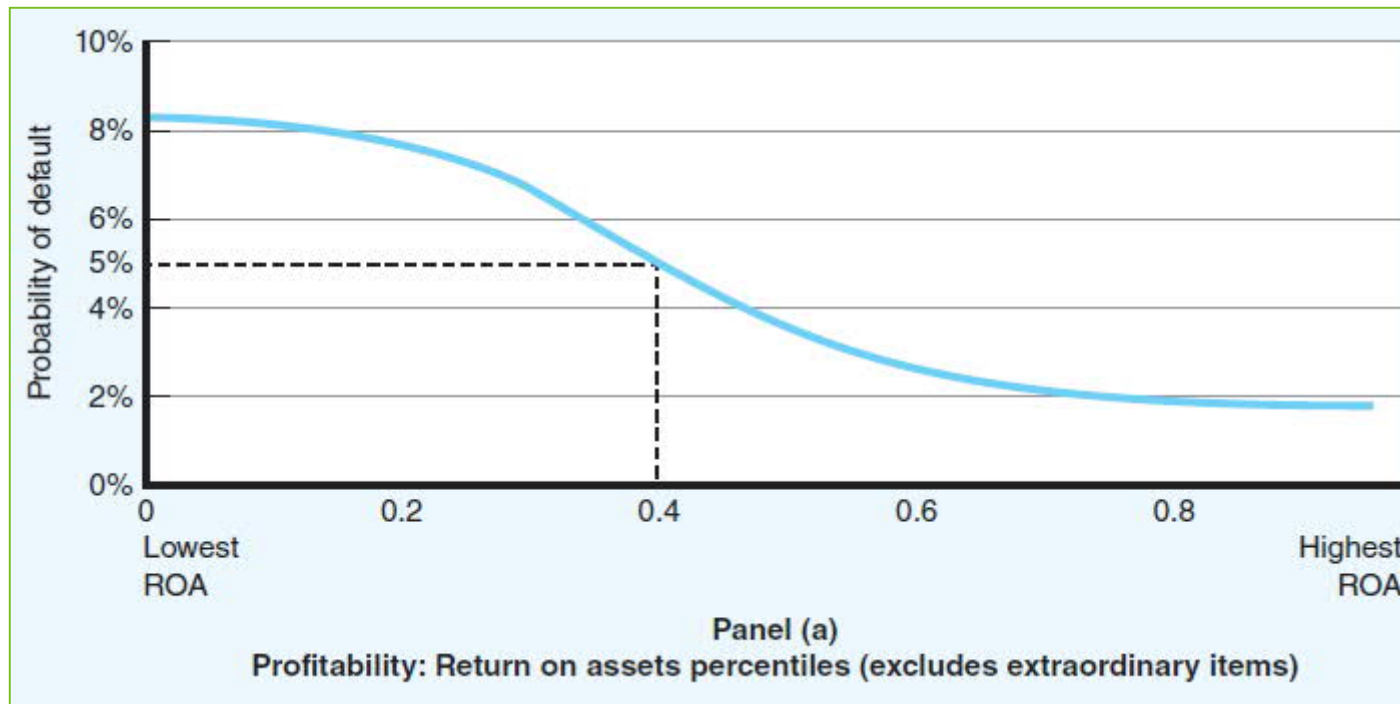


Default rates by Moody's credit rating, 1983-1999

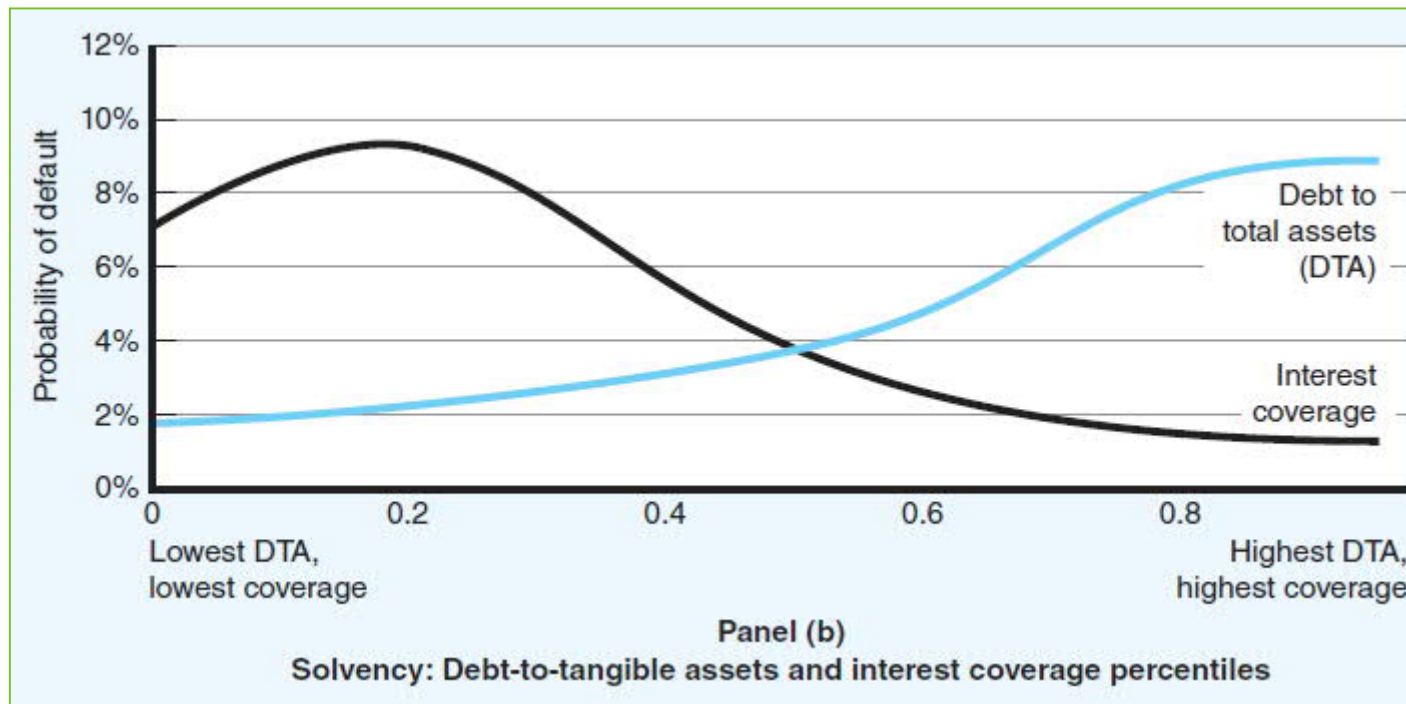
Source: Moody's Investors Service (May 2000)

Default frequency:

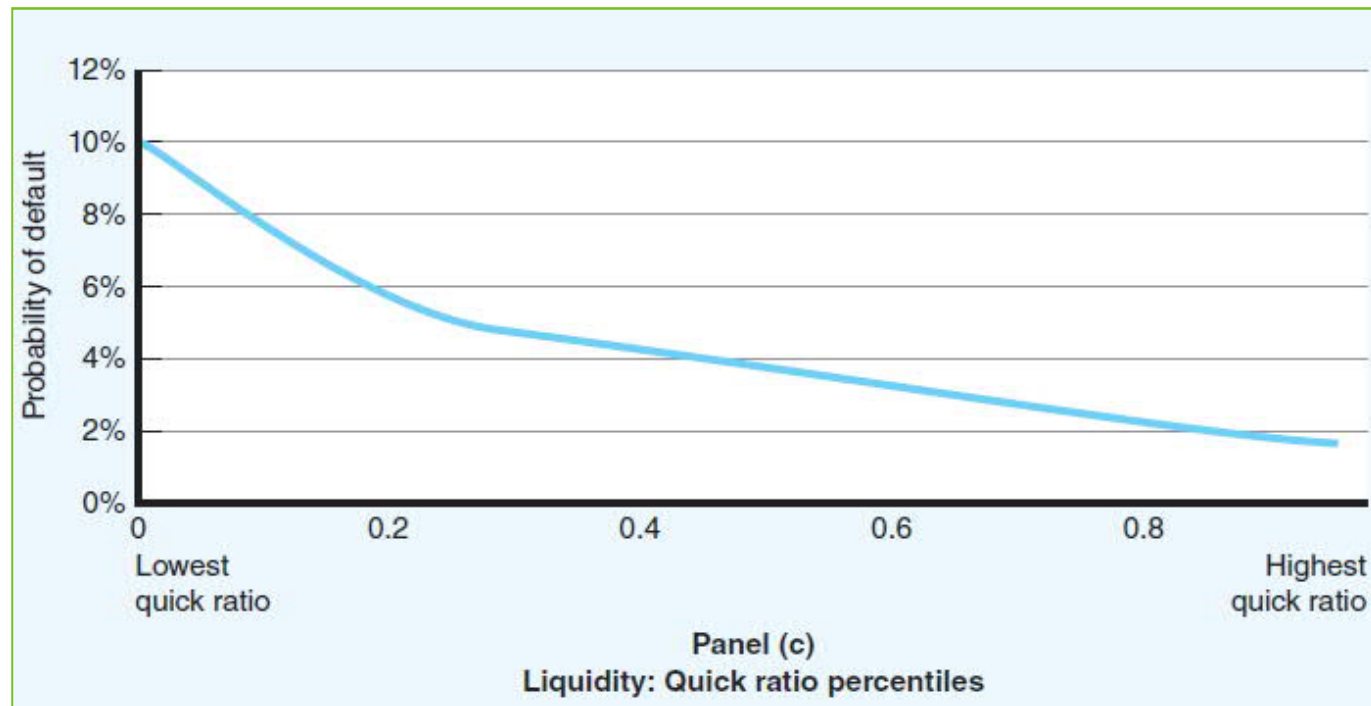
Return on assets (ROA)



Default frequency: Debt-to-tangible assets and interest coverage



Default frequency: Quick ratio



Summary

Financial ratios, common-size statements and trend statements are powerful tools.

However:

- There is no single “correct” way to compute financial ratios.
- Financial ratios don’t provide the answers, but they can help you ask the right questions.
- Watch out for accounting distortions that can complicate your interpretation of financial ratios and other comparisons.