Financial Statement Analysis

Section 6.

Profitability and illiquidity Risk Analysis

Margin Analysis
Return Analysis: ROIC (or ROCE) and the Operating Profitability
Return Analysis: ROE and the Financial Profitability
Illiquidity risk: short and long-term ratios

Students version

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Learning objectives

- Understand the structure of the profitability analysis
- Prepare a common-size analysis as well as a trend analysis
- Define, calculate and interpret key financial ratios such as profit margin, return on invested capital, and Asset turnover
- Identify the limitations in using return on invested capital
- Understand the importance of trends and levels in key financial ratios
- Recognize that benchmarking is typically based on a comparison with the required rate of return or competitors
- Understand the impact of financial leverage on profitability

Profit Margin Analysis Versus Return Analysis

Margin Ratio ⇓ $\frac{\text{Profit}}{\text{Net Revenue}}$ ≠ **Return Ratio** ⇓ $\frac{\text{Profit}}{\text{Invested Capital}}$

Profitability analysis typically includes:

- **Common-size Analysis** (Revenue, Costs, Invested Capital)
- **Time series analysis** (identification of trends)
- **Comparison with the required rate of return** => Value Added.
- **Cross-sectional analysis** (Benchmark with competitors' performance)

Profit Margin Analysis

Profit margin ratios scales each item as a percentage of revenue:

$$\text{Profit Margin Ratios} = \frac{\text{Profit (i)}}{\text{Net Revenue}}$$

Measures a firm's **ability to generate profit** after consideration of expenses

Time series analysis & Cross-sectional analysis

- Provide a good idea of cost structure
- Very useful to compare operating performance across firms

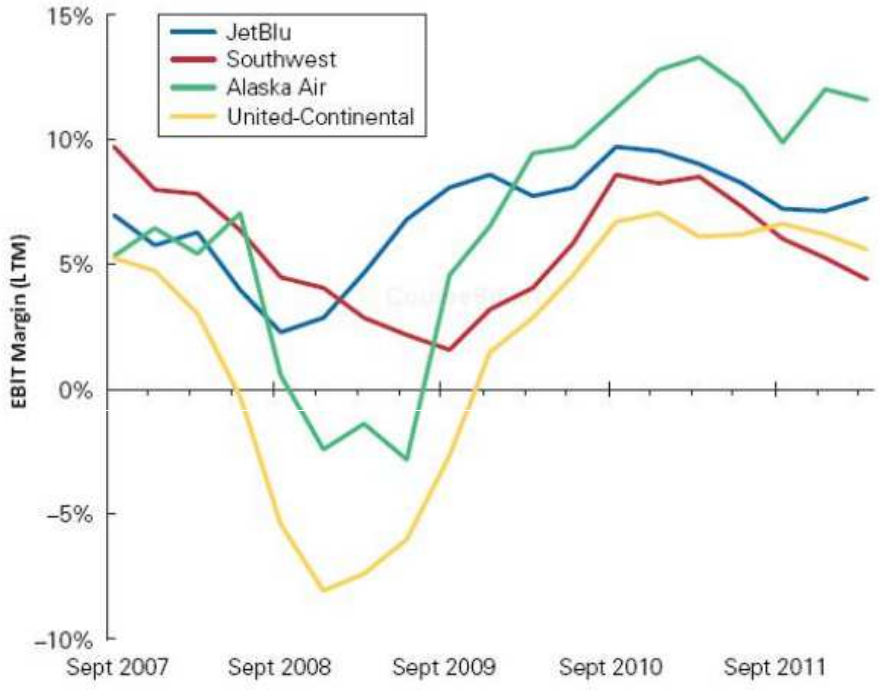
Profit Margin Analysis

Common-Size analysis of JIT's revenue and operating expenses

Profit & expenses % of Net Revenue	Year 2	Year 1
Net Revenue	**100%**	**100%**
Cost of sales	48,0%	46,0%
Gross Margin	**52,0%**	**54,0%**
Operating expenses	45,8%	49,2%
EBITDA Margin or Operating Margin	**6,2%**	**4,8%**
Depreciation & amortization	0,6%	0,6%
EBIT Margin	**5,6%**	**4,2%**
Net financial expenses	4,0%	2,6%
Pretax Income	**1,6%**	**1,6%**
- Corporate income tax	0,5%	0,5%
Net Profit Margin	**1,1%**	**1,1%**
NOPAT (Net Operating Profit After Tax)	**4%**	**3%**

Profit Margin Analysis Across Competitors

Example: EBIT Margin for four U.S. Airlines



Profit Margin Analysis and the OPERATING LEVERAGE

- **Operating leverage** is the relative proportion of fixed versus variable costs
- The **operating leverage <u>effect</u>** refers to the capacity of the company to boost its revenues thanks to an increase in fixed expenses;

  For ex. advertising campaign (Marketing), recruit highly specialized staff (R&D), hiring staff for receivables collection (administration), etc.

- **A higher proportion of fixed costs increases the sensitivity of the firm's cash flows to market risk**
  - The firm's beta will be higher
  - A higher cost of capital should be assigned

Profit Margin Analysis and Corporate Strategy

Quick Check Question: compare operating performance of Hermès and Carrefour.

In 2012	Hermès Int. SA	LVMH	Carrefour SA
Operating Margin	32%	21%	5%
Net Revenue	€ 3 Billion	€ 28 Billion	€76 Billion

➡ Differences in operating margins can result from corporate strategy

Profit Margin by Industry

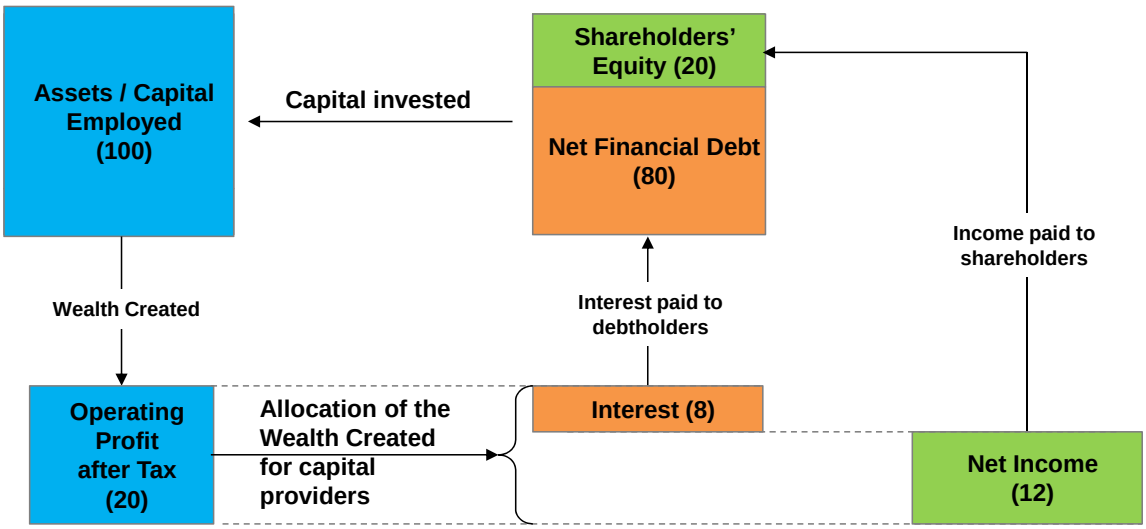
EBITDA margin in % of sales for leading listed European companies

Sector	1995	2000	2005	2006	2007	2008	2009	2010	2011e	2012e
Aerospace & Defence	9%	10%	11%	10%	11%	12%	11%	9%	10%	10%
Automotive	9%	8%	10%	10%	11%	9%	6%	11%	12%	12%
Building Materials	17%	17%	16%	17%	17%	15%	14%	14%	15%	16%
Capital Goods	10%	9%	11%	11%	14%	13%	12%	14%	15%	15%
Consumer Goods	18%	14%	15%	14%	15%	14%	13%	14%	14%	14%
Food Retail	6%	6%	6%	6%	7%	6%	6%	7%	7%	7%
IT Services	9%	12%	9%	9%	9%	10%	9%	9%	9%	10%
Luxury Goods	15%	16%	19%	19%	20%	20%	20%	23%	23%	24%
Media	8%	16%	21%	22%	22%	22%	21%	22%	23%	23%
Mining	17%	29%	41%	42%	41%	39%	34%	44%	47%	46%
Oil & Gas		19%	19%	20%	18%	18%	18%	17%	19%	20%
Pharmaceuticals	21%	26%	30%	32%	32%	33%	35%	36%	35%	34%
Steel		11%	16%	17%	16%	16%	8%	10%	11%	13%
Telecom Operators	40%	32%	35%	34%	33%	33%	34%	33%	33%	33%
Utilities	48%	16%	23%	22%	22%	20%	22%	21%	21%	21%

Source: Pierre Vernimmen (2013), P.163 - Data from Exane BNP Paribas

Return Analysis: The story of a business: from capital providers point of view

Wealth creation … requires investment … that must be funded … and be **sufficiently profitable**



Return on Investment

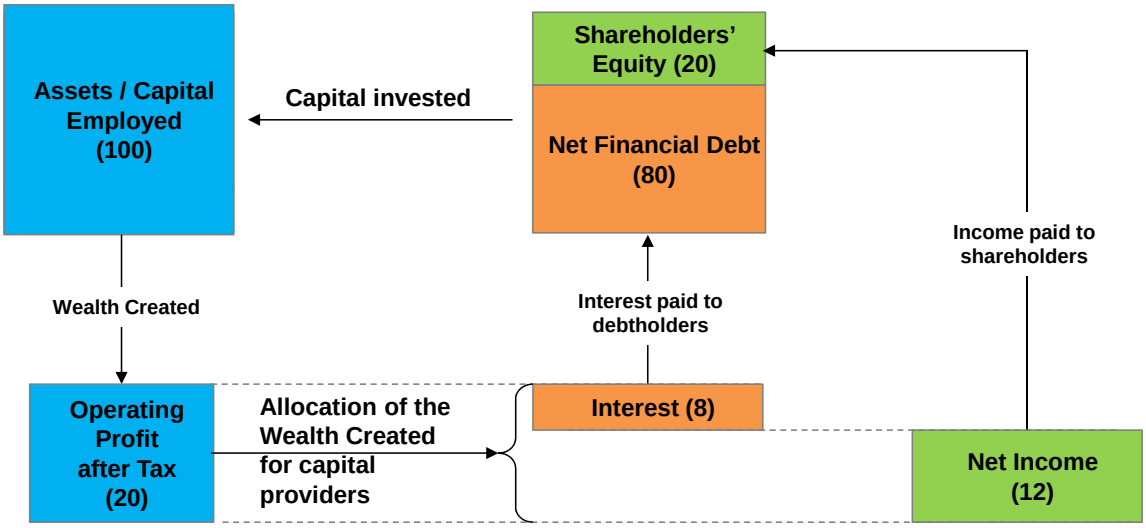
Return On Invested Capital $= \frac{20}{100} = 20\%$

Return on Debt $= \frac{8}{80} = 10\%$

Return On Equity $= \frac{12}{20} = 60\%$

Return Analysis: The story of a business: from the company point of view

Wealth creation … requires investment … that **must be funded** … and be sufficiently profitable



Cost of Capital

Cost of Capital (WACC) $= \frac{20}{100} = 20\%$

Cost of Debt $= \frac{8}{80} = 10\%$

Cost of Equity $= \frac{12}{20} = 60\%$

Operating Return: ROIC

Return On Invested Capital (ROIC) = Return On Capital Employed (ROCE)

$$ROIC = \frac{NOPAT}{Invested\ Capital}$$

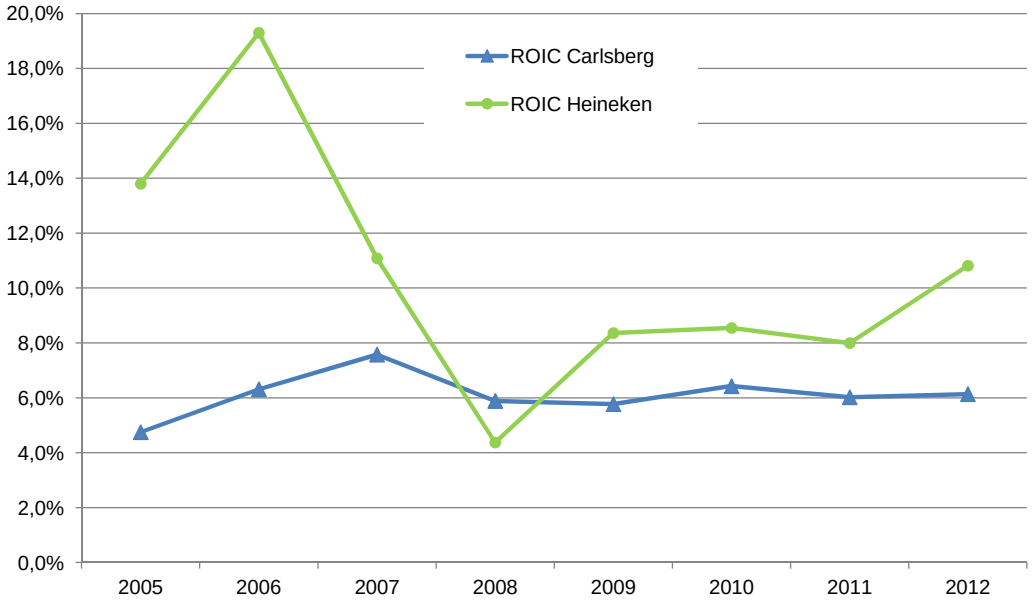
$$ROIC = \frac{NOPAT}{Equity + Net\ Fin.\ Debt} = \frac{NOPAT}{Fixed\ Assets + Working\ Capital}$$

Example: ROIC of JIT Computer Services

	Year 2	Year 1
Fixed Assets	121	81
Opearting Working Capital	3	3
Capital Employed	124	84
NOPAT (Net Operating Profit After Tax)	6,9	5,0
ROIC	**5,6%**	**6,0%**

Analyzing ROIC: Cross-Sectional Analysis

Return on invested capital for Carlsberg and Heineken



➡ Carlsberg is able to generate a ROIC that exceeds Heineken's only in 2008

Carlsberg's level of profitability is generally below Heineken's in the period examined

Analyzing ROIC : Where Does Profitability Come From?

ROIC does not explain whether profitability is driven by a better revenue and expense relation or an improved capital utilisation. It is necessary to decompose the ratio into:

$$ROIC = \frac{NOPAT}{Capital\ Employed} \quad \Rightarrow \quad ROIC = \frac{NOPAT}{Net\ Revenue} * \frac{Net\ Revenue}{Capital\ Employed}$$

$$\Rightarrow \quad ROIC = Profit\ Margin * Capital\ Employed\ Turnover$$

Capital Employed Turnover (also Asset Turnover)

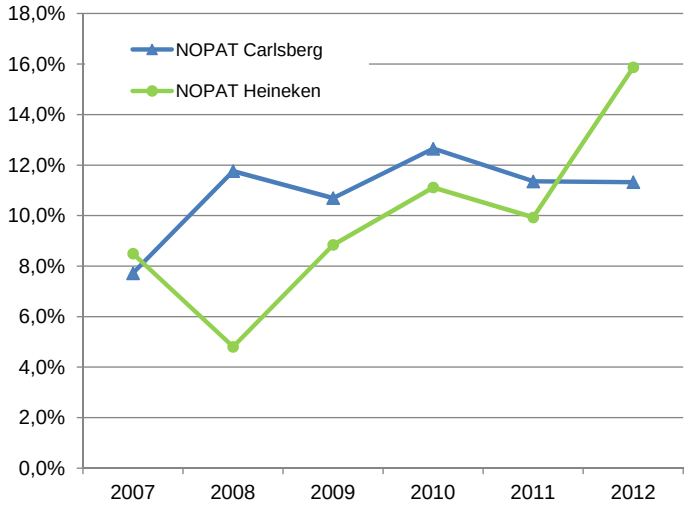
Measures a firm's effectiveness in using its assets invested in the operation

Example: ROIC of JIT Computer Services

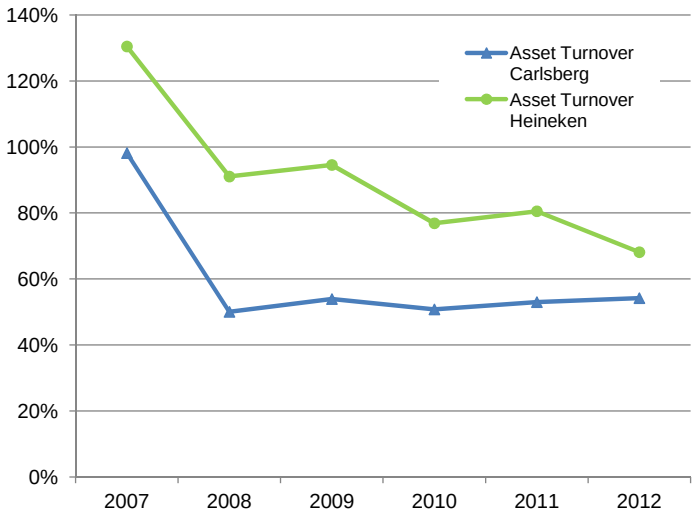
	Year 2	Year 1
NOPAT Margin	4%	3%
* Turnover rate of Capital employed	1.5	2.1
= ROIC	**5,6%**	**6,0%**

ROIC depends on Profit Margin and Asset turnover

Comparison of profit margin of Heineken and Carlsberg

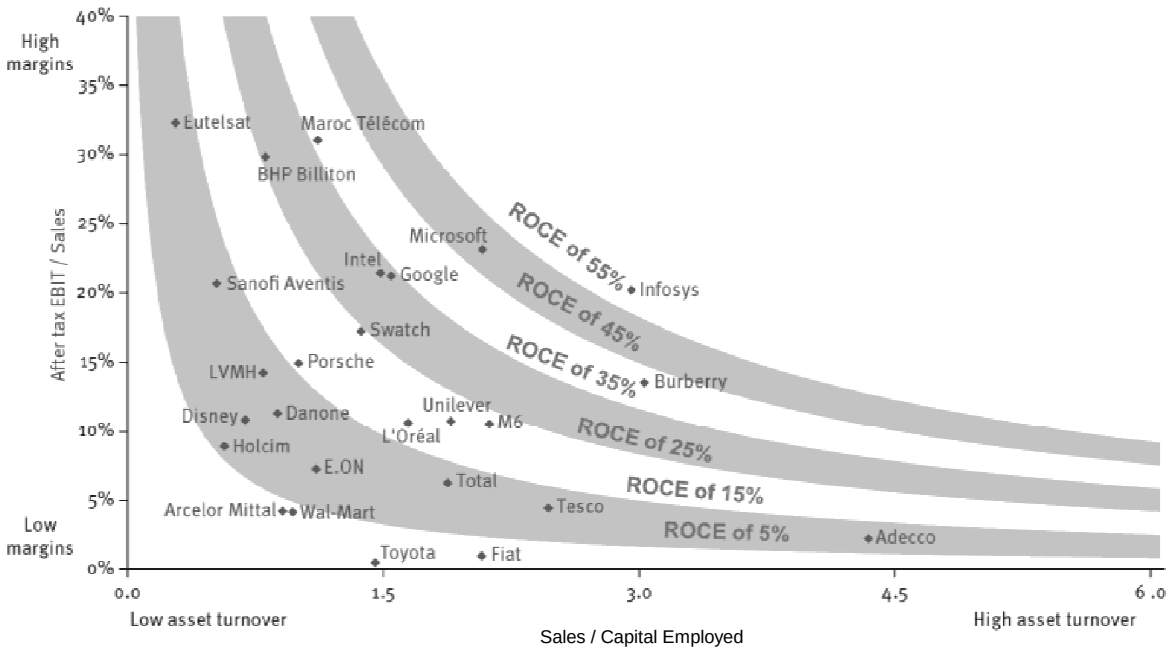


Comparison of turnover rate for Heineken and Carlsberg



ROIC depends on Profit Margin and Asset turnover

Profit margin, Asset turnover and **business sector**



Source: Pierre Vernimmen (2013), P.228 - Data from Exane BNP Paribas

Return On Equity: Financial Profitability

Return on equity measures owners' accounting return on their investments in a company

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

Example: ROE of JIT Computer Services

	Year 2	Year 1
Net Earnings	2,0	1,9

	Year 2	Year 1
Total Shareholders' Equity	32,2	31,2

	Year 2	Year 1
ROE (Return On Equity)	6,2%	6,1%

Return On Equity: Financial Profitability

Return on equity measures owners' accounting return on their investments in a company

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

Very frequently totally misleading + Prone to manipulation

Book value meaningless

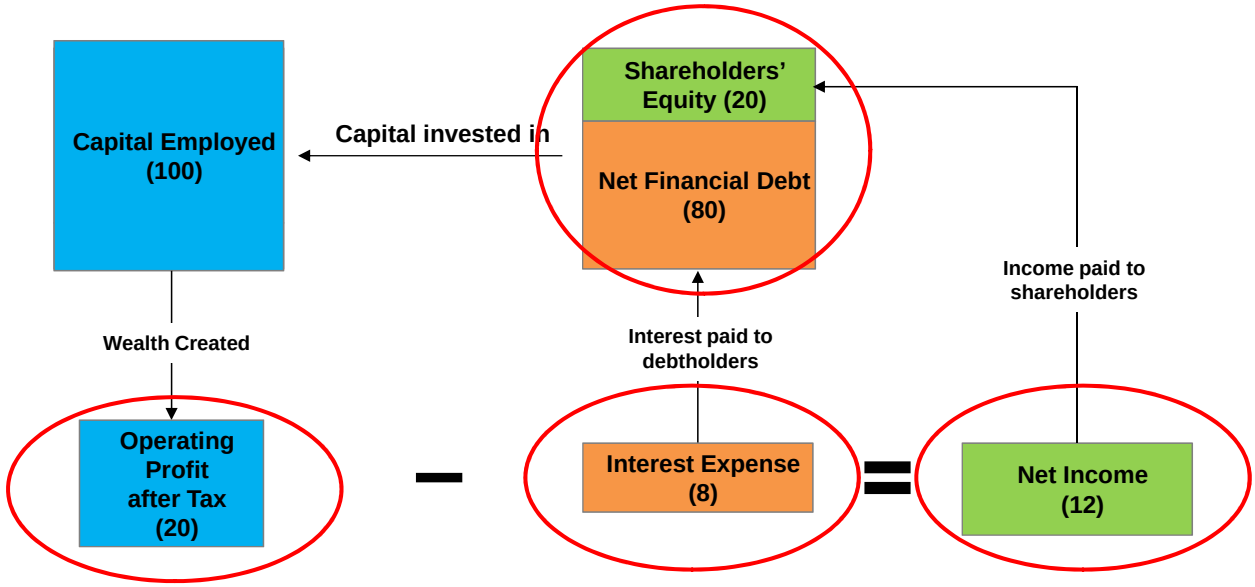
One period return meaningless

Financial Return cannot be judged independently of risk

➡ E.g. ROE heavily influenced by leverage

Factors impacting ROE

Allocation of the Wealth Created



$$\text{Return On Invested Capital} = \frac{20}{100} = 20\%$$

$$\text{Cost of Debt} = \frac{8}{80} = 10\%$$

$$\text{Return On Equity} = \frac{12}{20} = 60\%$$

Operating Return (ROIC) | **……** | **Owners' Return**

Return On Equity: The impact of financing on profitability

The following factors affect the level and trend in ROE:

- Operating profitability
- Net borrowing interest rate after tax
- Financial leverage.

This can be shown by a relationship, which will always apply:

$$ROE = ROIC + \text{Leverage Effect}$$

$$ROE = ROIC + (ROIC - \text{Net Cost of Debt}) * \frac{\text{Net Fin. Debt}}{\text{Equity}}$$

$$\text{Net Cost of Debt} = \frac{\text{Net Fin. expenses} * (1 - \text{Tax rate})}{\text{Net Fin. Debt}}$$

Return On Equity: The impact of financing on profitability

Example: 1st case: No Tax, Cost of Debt = 5%

	Cool Jazz Company	Hard Rock Company	Heavy Metal Company
Shareholders' Equity	100 000	50 000	40 000
Net Financial Debt	0	50 000	60 000
Invested Capital	100 000	100 000	100 000
EBIT (or NOPAT)	10 000	10 000	10 000
Net Fin. expenses	0	2 500	3 000
Net Income			
ROIC			
Net Cost of Debt	0 %	5 %	5 %
ROIC – Net Cost of Debt	+10%	+5%	+5%
* Financial Leverage	0	100%	150%
= Leverage Effect			
ROE			

➡ **If ROIC exceeds Net Cost of Debt, an increase in leverage is likely to improve ROE: positive leverage effect.**

Return On Equity: The impact of financing on profitability

If you can get cheap money, increase your leverage and boost your ROE

Cheap money (low cost of debt) is not a sufficient condition to increase leverage

➡ **The key question: what are you going to do with the borrowed money?**

➡ **The value of a business depends primarily on the capacity of its assets to generate cash flows, and less on capital structure choices**

Return On Equity: The impact of financing on profitability

Example: 1st case: No Tax, Cost of Debt = 15%

	Cool Jazz Company	Hard Rock Company	Heavy Metal Company
Shareholders' Equity	100 000	50 000	40 000
Net Financial Debt	0	50 000	60 000
Invested Capital	100 000	100 000	100 000
EBIT (or NOPAT)	10 000	10 000	10 000
Net Fin. expenses	0	7 500	9 000
Net Income			
ROIC			
Net Cost of Debt	0 %	15 %	15 %
ROIC – Net Cost of Debt	+10%	-5%	-5%
* Financial Leverage	0	100%	150%
= Leverage Effect			
ROE			

➡ **If ROIC is lower than Net Cost of Debt, an increase in leverage is likely to destroy ROE: negative leverage effect.**

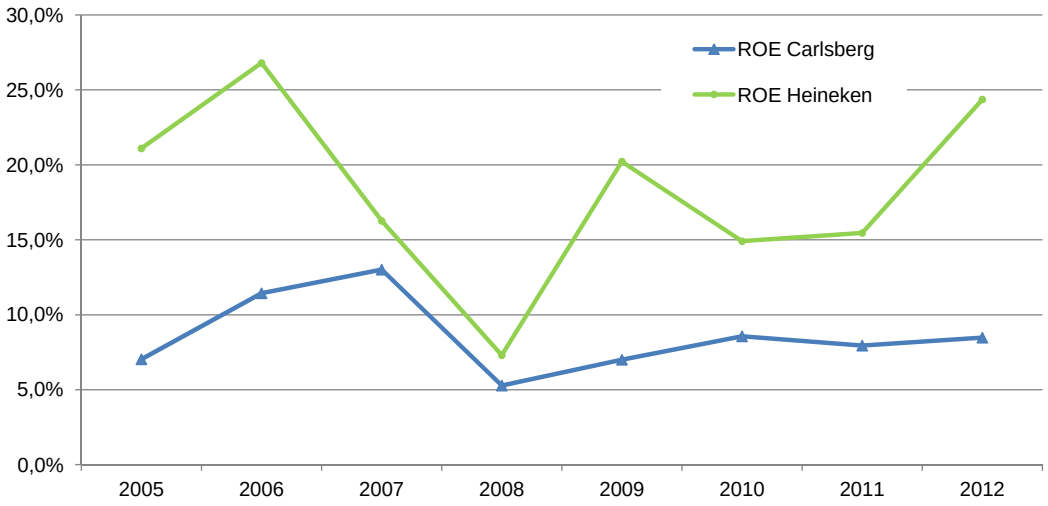
Return On Equity: The impact of financing on profitability

A lever can become a club

➡ **The impact of financial leverage cannot be analyzed independently of Risk**

Analyzing ROE: Cross-Sectional Analysis

Return On Equity for Carlsberg and Heineken



➡ Carlsberg's level of ROE was generally below Heineken's in the period examined

A decomposition of ROE shows that the higher return in Heineken can be attributed to a **higher ROIC**.

Illiquidity Risk is a crucial subject

An analysis of liquidity risk is needed as lack of funds may:

Restrict management's room for manoeuvre
Restrict management's opportunities to exploit profitable investments
Force management to dispose of business units with a considerable discount
Increase financial costs
Lead to suspension of payments

➡ Suspension of payments and bankruptcy influence a range of stakeholders:

Employees : Risk of losing job / lack of job security.
Creditors: Potential loss on loans and missing future business opportunities
Suppliers: Potential loss on customer and missing future business opportunities
Customers: Risk of shortage of supply
Investors: Potential loss on investment and missing future business opportunities

Measuring Short-term illiquidity risk

Short-term liquidity is defined as a firm's ability to pay all short term obligations

- What is the likelihood that current assets cover current liabilities in the event of liquidation?

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

$$\text{Quick Ratio} = \frac{\text{Current Assets - Inventories}}{\text{Current Liabilities}}$$

$$\text{Cash Ratio} = \frac{\text{Cash \& Cash equivalents} + \text{ST investments}}{\text{Current Liabilities}}$$

$$\text{CFO to ST Debt Ratio} = \frac{\text{Cash Flow from Operations}}{\text{Current Liabilities}}$$

- The larger the ratio, the greater the likelihood that the sale of current assets are able to cover current liabilities

Measuring Short-term illiquidity risk

The cash burn rate is one of the most conservative financial ratios used to measure short-term liquidity risk and is typically only used on companies with negative earnings.

The ratio measures how long a company is able to fund projected costs without any further cash contribution from shareholders or creditors.

$$\text{Cash Burn Ratio} = \frac{\text{Cash \& Cash equivalents} + \text{ST investments}}{\text{EBIT}}$$

- The cash burn rate is typically used in businesses which do not yet have a proper level of earnings.

  Start-up companies, biotech companies and similar types of businesses are characterized by significant investments (cash outlays) and little or no earnings.

Measuring Long-term Illiquidity Risk (or Solvency Risk)

Long-term liquidity risk is defined as a firm's ability to pay all long term obligations

$$\text{Financial Leverage} = \frac{\text{Net Fin. Debt}}{\text{Equity}}$$

$$\text{Solvency Ratio} = \frac{\text{Equity}}{\text{Equity} + \text{Total Liabilities}}$$

Generally, a high financial leverage and a low solvency ratio indicate high long-term liquidity risk

$$\text{Interest Coverage Ratio} = \frac{\text{EBIT}}{\text{Net Financial Expenses}}$$

$$\text{Interest Coverage Ratio (Cash)} = \frac{\text{Cash Flow from Operations}}{\text{Net Financial Expenses}}$$

How many times operating profit covers net financial expenses?

$$\text{Debt to EBITDA} = \frac{\text{Net Fin. Debt}}{\text{EBITDA}}$$

$$\text{Debt to CFO} = \frac{\text{Net Fin. Debt}}{\text{Cash Flow from Operations}}$$

Time that would be needed to pay off all debt, ignoring the factors of interest, taxes, depreciation and amortization.

Measuring Long-term Illiquidity Risk (or Solvency Risk)

Net Debt to EBITDA ratio for leading listed European companies

Sector	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Oil & Gas	79%	125%	104%	100%	110%	89%	70%	47%	56%	76%
Chemical	91%	114%	101%	152%	138%	128%	108%	108%	126%	106%
Basic Resources	140%	134%	134%	188%	162%	158%	129%	110%	98%	112%
Construction and Materials	71%	66%	104%	112%	83%	65%	91%	101%	118%	116%
Industrials Goods and Services	59%	80%	108%	110%	124%	104%	100%	96%	89%	87%
Automobiles & Parts	125%	159%	162%	210%	168%	156%	135%	133%	103%	154%
Food & Beverage	131%	139%	206%	185%	170%	164%	162%	181%	189%	181%
Personal & Household Goods	80%	85%	116%	116%	97%	98%	76%	86%	98%	100%
Health Care	77%	93%	109%	127%	108%	96%	77%	114%	94%	108%
Retail	41%	73%	89%	89%	89%	69%	56%	105%	73%	117%
Media	6%	19%	19%	67%	78%	55%	20%	48%	44%	125%
Travel & Leisure	173%	143%	210%	224%	151%	160%	148%	112%	146%	122%
Telecommunications	120%	137%	102%	139%	93%	88%	85%	104%	102%	64%
Utilities	158%	155%	175%	148%	171%	226%	218%	216%	175%	185%
Technology	−28%	−28%	−4%	8%	−17%	−57%	−72%	−71%	−63%	−27%

Weaknesses of financial ratios measuring liquidity risk

Knowledge of a company's liquidity is important, as lack of liquidity may lead to loss of business opportunities and, in a worst case, suspension of payments

Weaknesses of liquidity ratios

Based on historical accounting information and, thus, backward-looking

Book value of assets is almost meaningless

Capital structure ratios at market value should make more sense than at book values but are very volatile

Liquidity ratios can be easily manipulated if the company knows that it is being analyzed:

E.g. Interest or other financing costs can be shifted to the future

Bad liquidity ratios can be the result of good cash management

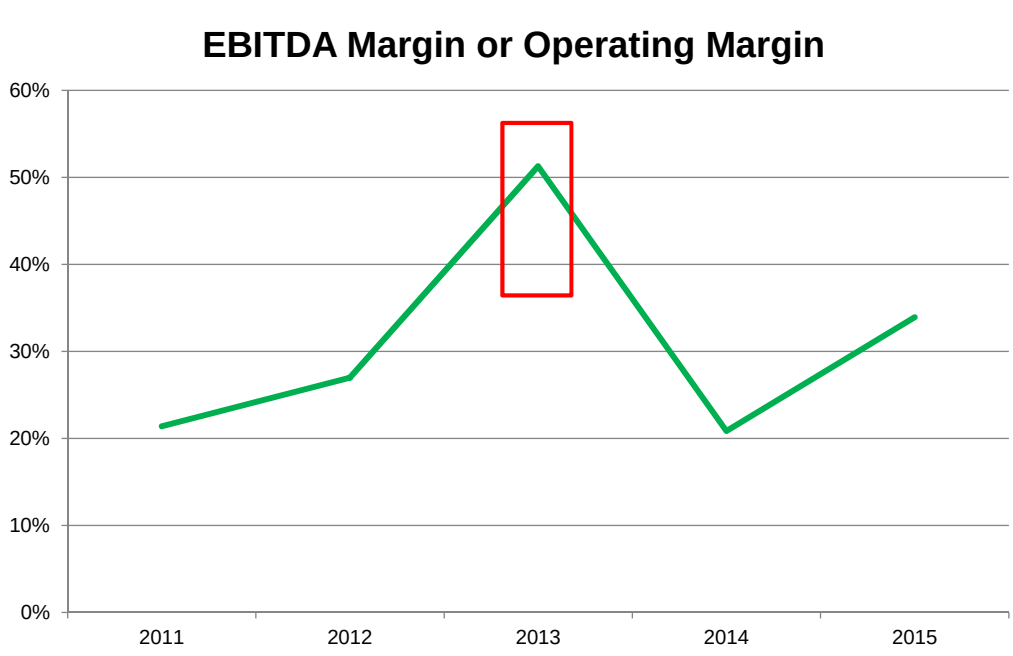
Concept Check and Critical Thinking

1. When is it useful to define ROIC before and after tax, respectively?
2. A company experiences a drop in ROIC from 12% in year 1 to 5% in year 4. Provide potential explanations for the drop in ROIC of 7 percentage points.
3. What is the appropriate benchmark for ROIC?
4. What actions can a management take to improve the profit margin?
5. What actions can the management take to improve the turnover rate of invested capital?
6. How does financial leverage affect the return to shareholders?
7. What is the appropriate benchmark for ROE?
8. What are the potential shortcomings of financial ratios measuring liquidity risk?
9. How can these shortcomings be addressed?

Appendix

Some stories on margin trends

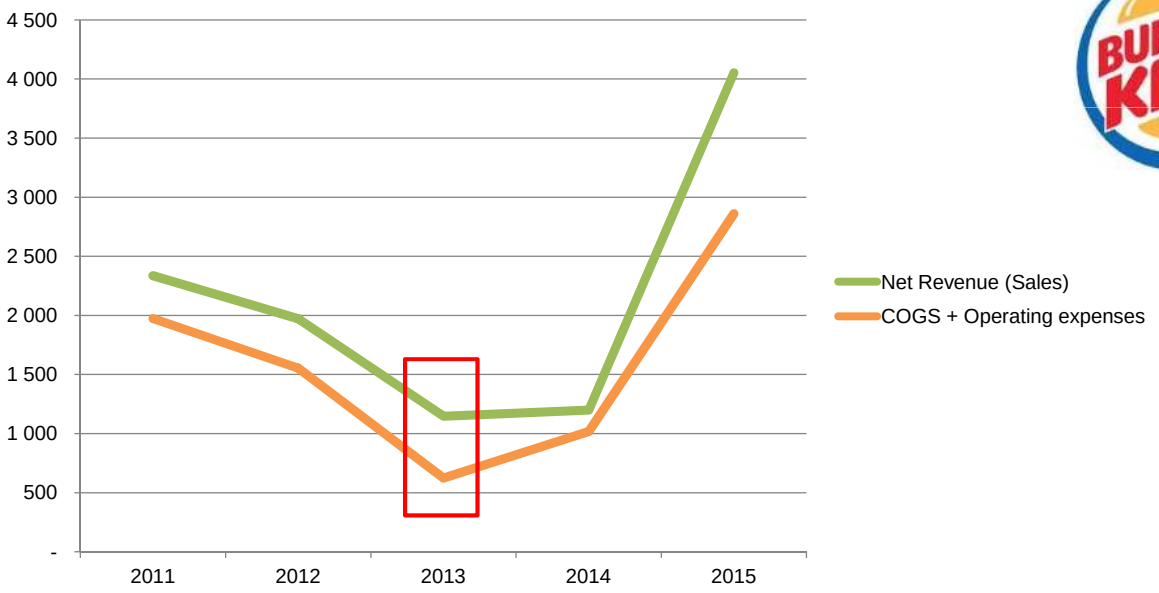
Margin Analysis : the example of Burger King



We notice a very high volatility in Burger King's EBITDA Margin, **ranging from 20 to 51%.**

This 51% peak in 2013 is probably the result of an exceptional increase in revenues ! ?

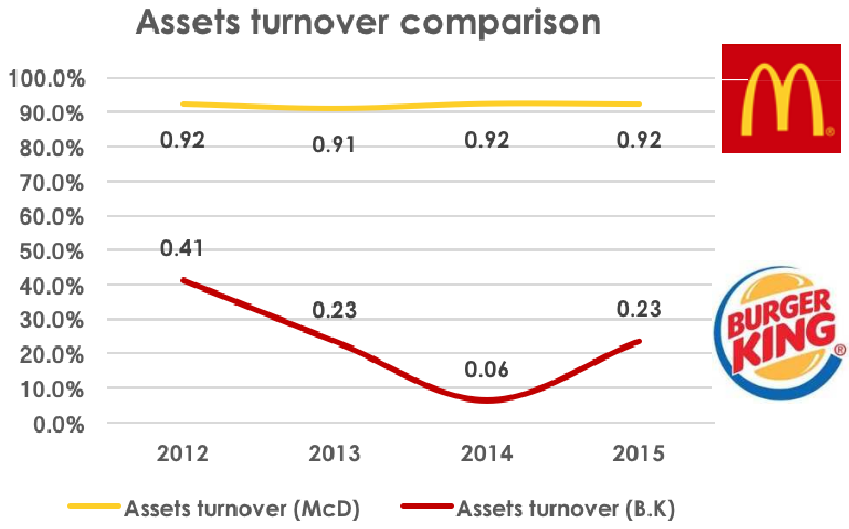
Margin Analysis : the example of Burger King



This 51% peak in 2013 corresponds to a **big drop in sales (-42%)** and an **even higher cost reduction of about 60%.**

Asset turnover: comparison McDonald's vs Burger King

On December 12, 2014, Burger King **acquired Tim Hortons**, an iconic Canadian coffee and doughnuts brand, for $**12 bn** to form Restaurant Brands International, the third largest fast food company in the world.



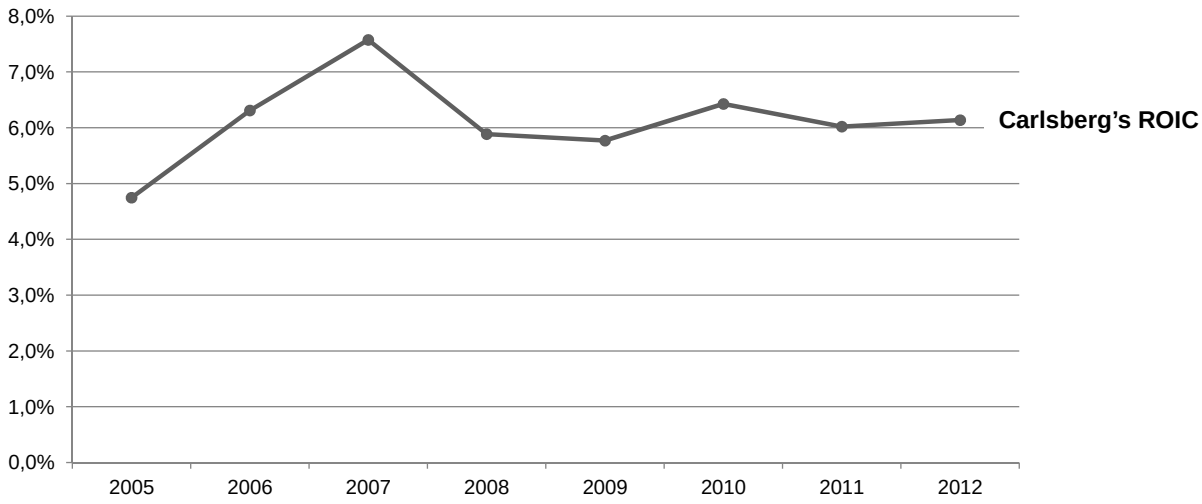
=> The lower asset turnover in 2014 is not due to lower efficiency but to an increase in assets

Appendix

Value added and Residual income

Analyzing ROIC

Return on invested capital for Carlsberg



Is Carlsberg's ROIC satisfactory?

- Estimation of the Economic Value Added
- Comparison with competitors and industry peers (benchmarking).

Analyzing ROIC: Economic Value Added

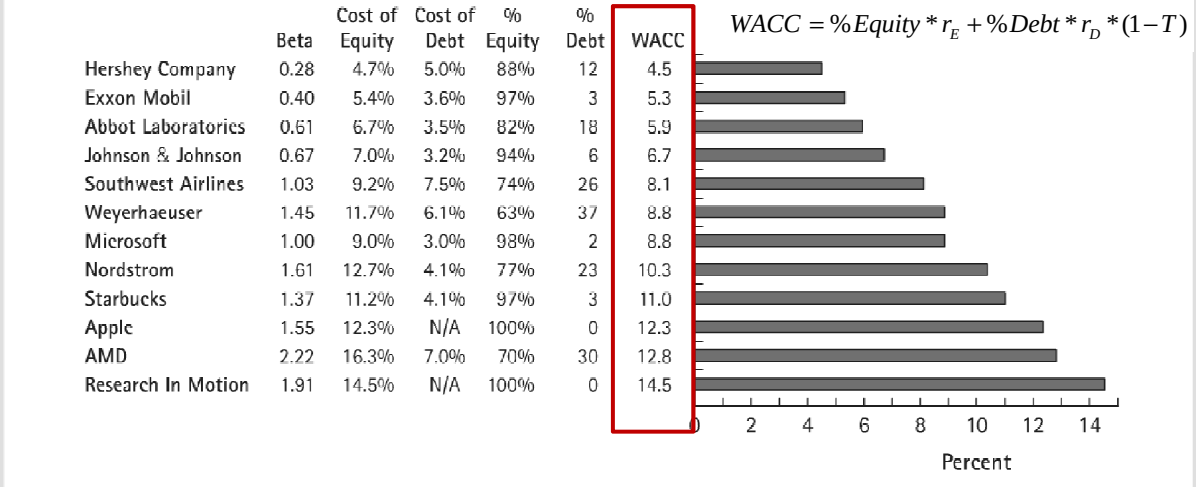
Comparing ROIC and WACC provides an idea on EVA: value creation for capital providers

$$EVA = (ROIC - WACC) * Capital\ Employed$$

The cost of equity is computed using the company's equity beta, a risk-free rate of 3%, and a market risk premium of 6%. The cost of debt is based on market yield to maturities of the debt. The percent equity and percent debt are determined from the company's market capitalization and balance sheet. The WACC is computed using Eq. 13.7 with a 35% tax rate and is shown in the accompanying bar graph. "N/A" means that the cost of debt is not applicable and refers to companies that have no debt.

	Beta	Cost of Equity	Cost of Debt	% Equity	% Debt	WACC
Hershey Company	0.28	4.7%	5.0%	88%	12	4.5
Exxon Mobil	0.40	5.4%	3.6%	97%	3	5.3
Abbot Laboratories	0.61	6.7%	3.5%	82%	18	5.9
Johnson & Johnson	0.67	7.0%	3.2%	94%	6	6.7
Southwest Airlines	1.03	9.2%	7.5%	74%	26	8.1
Weyerhaeuser	1.45	11.7%	6.1%	63%	37	8.8
Microsoft	1.00	9.0%	3.0%	98%	2	8.8
Nordstrom	1.61	12.7%	4.1%	77%	23	10.3
Starbucks	1.37	11.2%	4.1%	97%	3	11.0
Apple	1.55	12.3%	N/A	100%	0	12.3
AMD	2.22	16.3%	7.0%	70%	30	12.8
Research In Motion	1.91	14.5%	N/A	100%	0	14.5

$$WACC = \%Equity * r_E + \%Debt * r_D * (1-T)$$

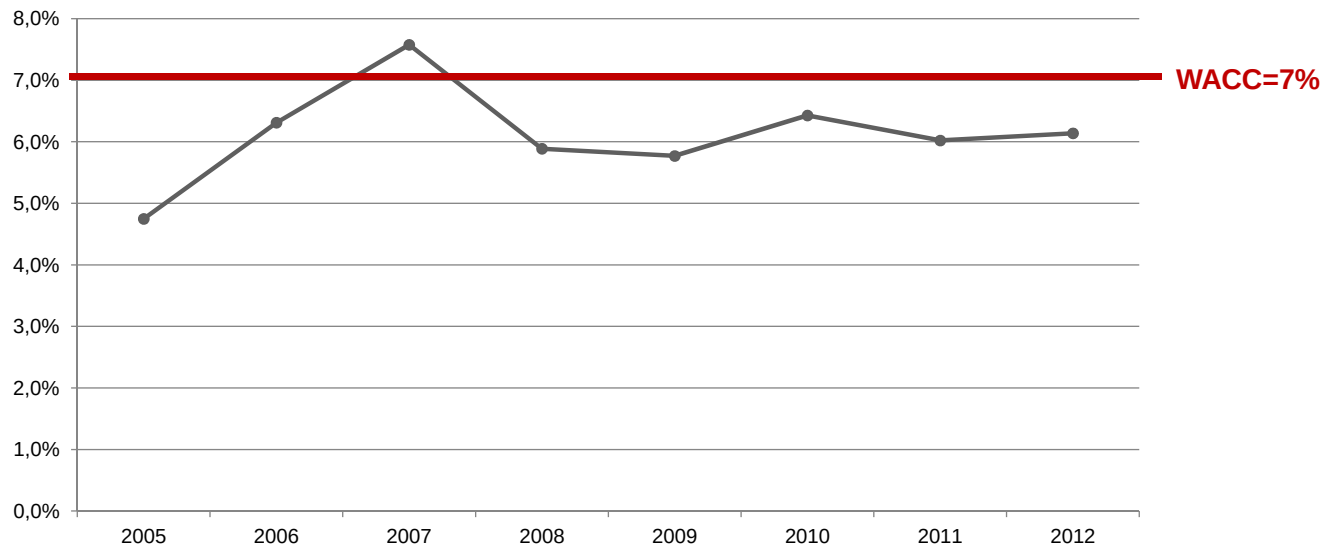


Source: Authors' calculations based on publicly available information in 2010.

Fig. 13.3 (B&DM – FCF – p.392)

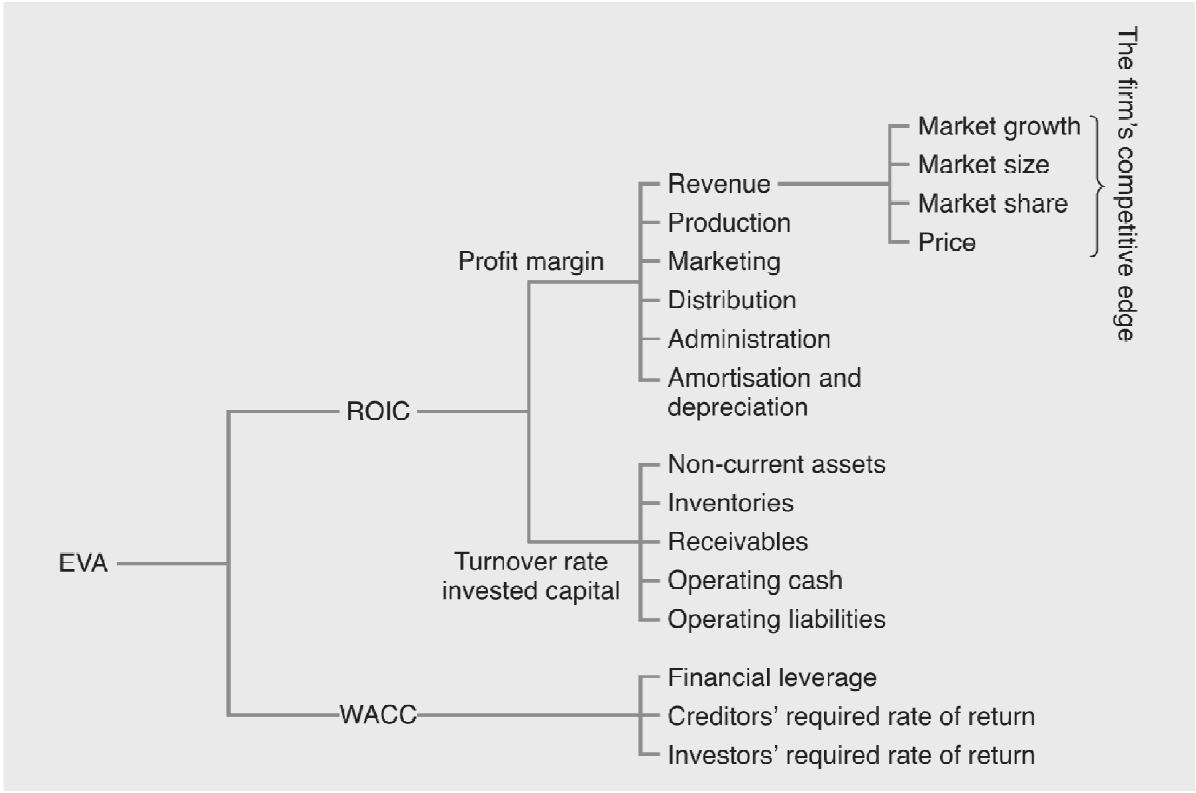
Analyzing ROIC: Economic Value Added

Return on invested capital for Carlsberg Versus WACC



➡ Carlsberg is only creating value for its shareholders in 2007

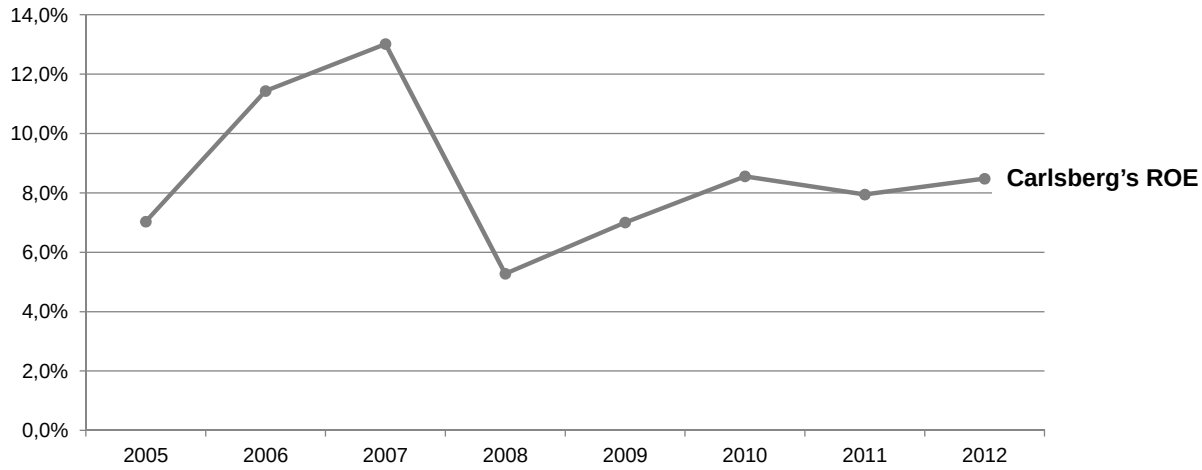
The Structure For Operating Profitability Analysis



Source: Thomas Plenborg and Christian Petersen (2012), p.94

Analyzing ROE

Return On Equity for Carlsberg



Is Carlsberg's ROE satisfactory?

- Estimation of the Residual Income
- Comparison with competitors and industry peers (benchmarking).

Analyzing ROE: Residual Income = Value added for owners = Owners' Economic Profit

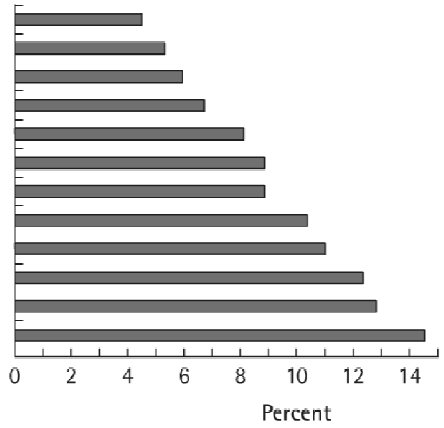
Comparing ROE and r_e provides an idea on Residual Income : value creation for <u>shareholders</u>

$$\text{Residual Income} = (\text{ROE} - r_e) * \text{Equity}$$

The cost of equity is computed using the company's equity beta, a risk-free rate of 3%, and a market risk premium of 6%. The cost of debt is based on market yield to maturities of the debt. The percent equity and percent debt are determined from the company's market capitalization and balance sheet. The WACC is computed using Eq. 13.7 with a 35% tax rate and is shown in the accompanying bar graph. "N/A" means that the cost of debt is not applicable and refers to companies that have no debt.

	Beta	Cost of Equity	Cost of Debt	% Equity	% Debt	WACC
Hershey Company	0.28	4.7%	5.0%	88%	12	4.5
Exxon Mobil	0.40	5.4%	3.6%	97%	3	5.3
Abbot Laboratories	0.61	6.7%	3.5%	82%	18	5.9
Johnson & Johnson	0.67	7.0%	3.2%	94%	6	6.7
Southwest Airlines	1.03	9.2%	7.5%	74%	26	8.1
Weyerhaeuser	1.45	11.7%	6.1%	63%	37	8.8
Microsoft	1.00	9.0%	3.0%	98%	2	8.8
Nordstrom	1.61	12.7%	4.1%	77%	23	10.3
Starbucks	1.37	11.2%	4.1%	97%	3	11.0
Apple	1.55	12.3%	N/A	100%	0	12.3
AMD	2.22	16.3%	7.0%	70%	30	12.8
Research In Motion	1.91	14.5%	N/A	100%	0	14.5

$r_E = r_f + \beta * \text{Market risk premium}$

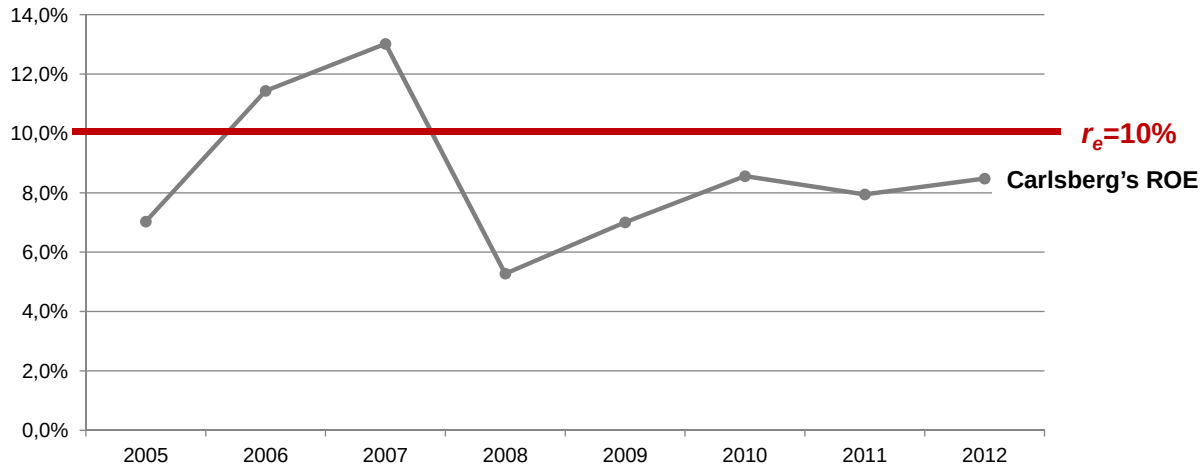


Source: Authors' calculations based on publicly available information in 2010.

Fig. 13.3 (B&DM – FCF – p.392)

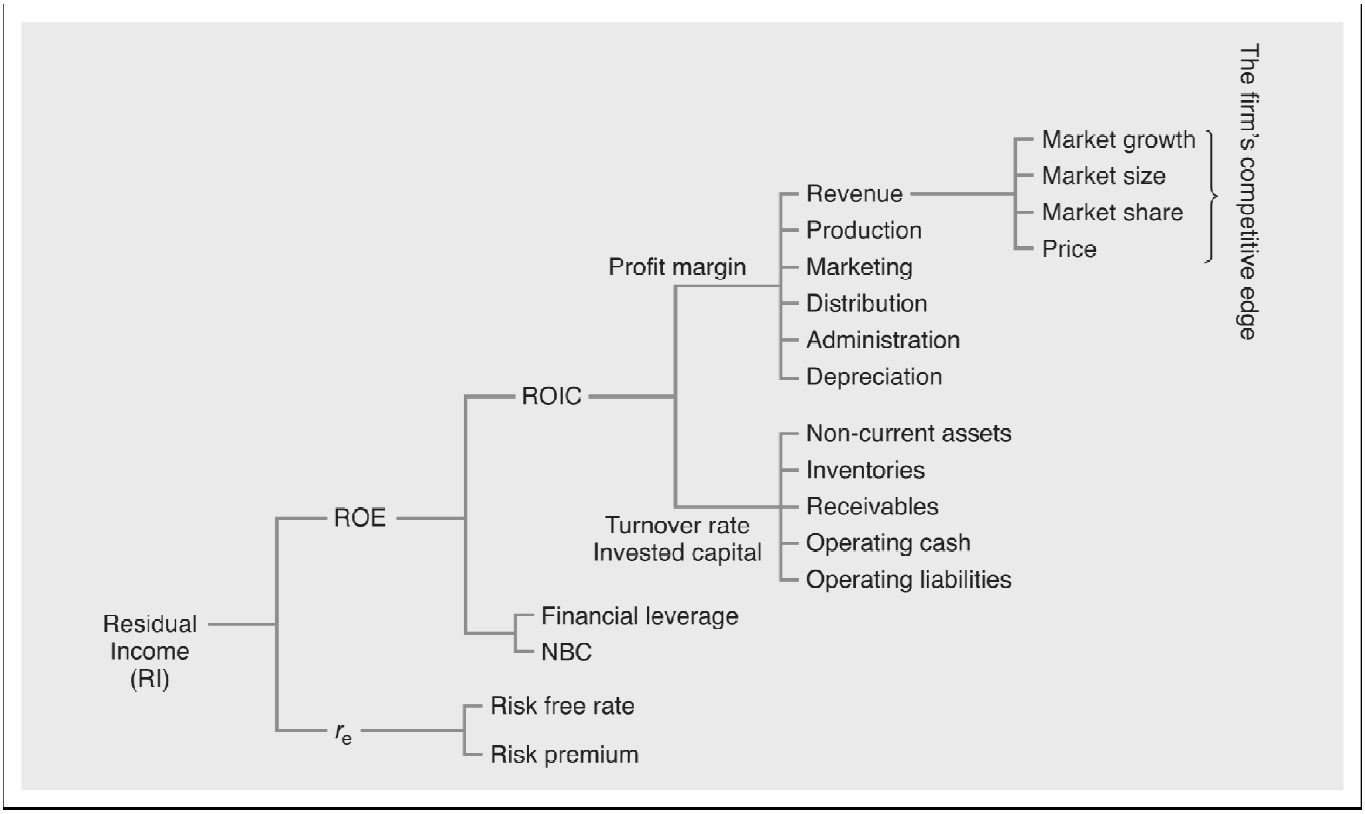
Analyzing ROE: Residual Income = Value added for owners = Owners' Economic Profit

Return On Equity for Carlsberg Versus Required Return on Equity (Equity Cost of Capital)



➡ Carlsberg is only creating value for its shareholders in 2006 and 2007

Return On Equity: Structure of a profitability analysis



Source: Thomas Plenborg and Christian Petersen (2012), p.94

The particular case of negative Net Debt

Example:

Cash = 100, Gross debt = 50, Equity = 200

⇒ net debt = - 50 => meaningless

⇒ Financial leverage = -50 / 200 = -25% => meaningless

Financial expenses = 2, Financial revenue = 3

=> Net cost of debt = 2 / -50 = - 4% => meaningless

Suggested solution:

Consider “gross debt” rather than “net debt”

⇒ Net cost of debt = Financial expenses / Gross debt = 2 / 50 = + 4%

⇒ Financial leverage = Gross debt / Equity = 50 / 200 = + 25%

ROIC ➡ $$ROIC = \frac{\text{EBIT} + \text{financial revenues}}{\text{Fixet Assets} + \text{WC} + \text{Cash}}$$