Chapter 13
RETURN ON CAPITAL EMPLOYED AND RETURN ON EQUITY

The leverage effect is much ado about nothing

So far we have analysed:

- how a company can create wealth (margins' analysis);
- what kind of investment is required to create wealth: capital expenditure and increase in working capital;
- how those investments are financed through debt or equity.

We now have everything we need to carry out an assessment of the company's efficiency, i.e. its profitability.

A company that delivers returns that are at least equal to those required by its shareholders and lenders will not experience financing problems in the long term, since it will be able to repay its debts and create value for its shareholders.

Hence the importance of this chapter, in which we attempt to measure the **book** profitability of companies.

Section 13.1
ANALYSIS OF CORPORATE PROFITABILITY

We can measure profitability only by studying returns in relation to the invested capital. If no capital is invested, there is no profitability to speak of.

Book profitability is the ratio of the wealth created (i.e. earnings) to the capital invested. **Profitability should not be confused with margins**. Margins represent the ratio of earnings to business volumes (i.e. sales or production), while profitability is the ratio of profits to the capital that had to be invested to generate the profits.

Above all, analysts should focus on the profitability of capital employed by studying the ratio of operating profit to capital employed, which is called return on capital employed (ROCE).

$$\text{Return on capital employed (ROCE)} = \frac{\text{Operating profit after tax}}{\text{Capital employed}}$$

Return on capital employed can also be considered as the **return on equity if net debt is zero**.

The operating pro t gure that should be used is the one we presented in Chapter 9, i.e. after employee pro t-sharing, incentive payments and all the other revenues and charges that are assigned to the operating cycle.
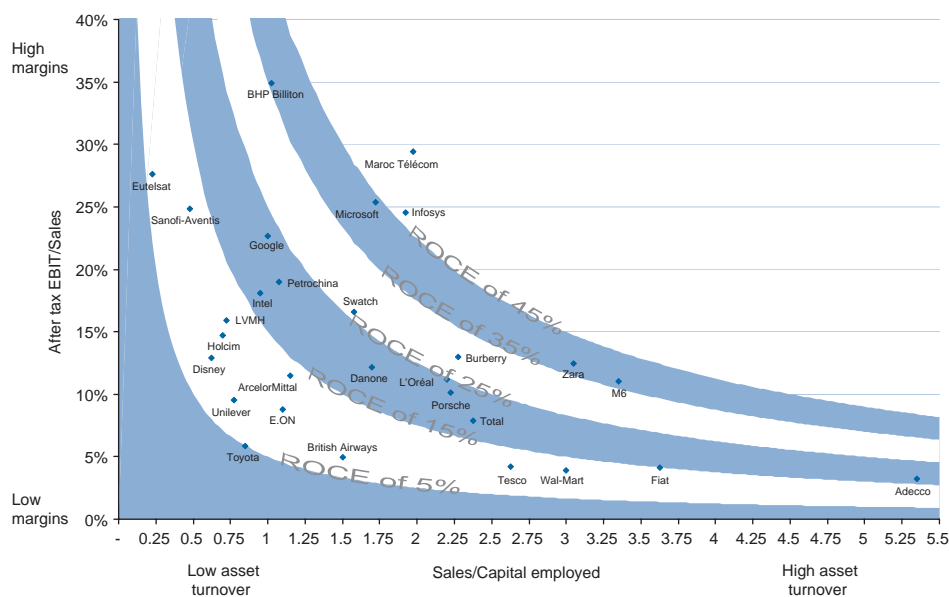
Much ink has been spilled over the issue of whether opening or closing capital employed[1] or an average of the two gures should be used. We will leave it up to readers to decide for themselves. This said, you should take care not to change the method you decide to use as you go along so that comparisons over longer periods are not skewed.

Return on capital employed can be calculated by combining a margin and turnover rate as follows:

$$\frac{\text{Operating pro t after tax}}{\text{Capital employed}} = \frac{\text{Operating pro t after tax}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Capital employed}}$$

The rst ratio – operating pro t after tax/sales – corresponds to the operating margin generated by the company, while the second – sales/capital employed – re ects asset turnover or capital turn (the inverse of capital intensity), which indicates the amount of capital (capital employed) required to generate a given level of sales. Consequently, a "normal" return on capital employed may result from weak margins, but high asset turnover (and thus low capital intensity), e.g. in mass retailing. It may also stem from high margins, but low asset turnover (i.e. high capital intensity), e.g. whisky producers.

The following gure shows the ROCE and its components achieved by some leading European groups during 2004:

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1 <i>Depending on whether capital expenditure during the period is regarded as having contributed to wealth creation or not.</i>
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Although Zara and BHP Billiton generate a similar return on capital employed, their operating margins and asset turnover are entirely different. BHP Billiton has a strong operating margin (35%), but a weak asset turnover: 1.2 (because it is very capital intensive) while Zara has smaller operating margin (15%) but a higher asset turnover: 3.1.

These gures are calculated after tax, which means that we calculate return on capital employed after tax at the normal rate.

> Analysts will have to decide for themselves whether, as we suggest here, they work on an after-tax basis. If so, they will have to calculate operating profit after theoretical tax (calculated based on the company's normalised tax rate), which is called NOPAT (net operating profit after tax).

Secondly, we can calculate the **return on equity (ROE)**, which is the ratio of net income to shareholders' equity.

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Shareholders' equity}}$$

In practice, most nancial analysts take goodwill impairment losses and nonrecurring items out of net income before calculating return on equity.

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Section 13.2
LEVERAGE EFFECT

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1/ THE PRINCIPLE

The leverage effect explains a company's return on equity in terms of its return on capital employed and cost of debt.

In our approach, we considered the total amount of capital employed, including both equity and debt. This capital is invested in assets that form the company's capital employed and that are intended to generate earnings, as follows:

HOW THE WEALTH CREATED IS APPORTIONED

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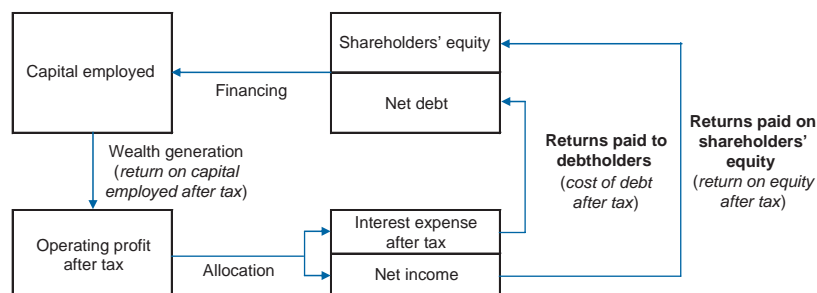
All the capital provided by lenders and shareholders is used to nance **all the uses of funds, i.e. the company's capital employed**. These uses of funds generate operating pro t, which itself is apportioned between net nancial expense (returns paid to debtholders) and net income attributable to shareholders.

If we compare a company's return on equity with its return on capital employed (after tax to remain consistent), we note that the difference is due only to its financial structure, apart from nonrecurring items and items specific to consolidated accounts which we will deal with later on.

By definition, the leverage effect is the difference between return on equity and return on capital employed.

The leverage effect explains how it is possible for a company to deliver a return on equity exceeding the rate of return on all the capital invested in the business, i.e. its return on capital employed.

Readers should pause for a second to contemplate this corporate nirvana, which apparently consists in making more money than is actually generated by a company's industrial and commercial activities.

But before getting too carried away, readers should note that the leverage effect works both ways. Although it can lift a company's return on equity above return on capital employed, it can also depress it, turning the dream into a nightmare.

The leverage effect works as follows. When a company raises debt and invests the funds it has borrowed in its industrial and commercial activities, it generates operating profit that normally exceeds the interest expense due on its borrowings. If this is not the case, it is not worth investing, as we shall see at the beginning of Section II of this book. So, the company generates a surplus consisting of the difference between the return on capital employed and the cost of debt related to the borrowing. This surplus is attributable to shareholders and is added to shareholders' equity. The leverage effect of debt thus increases the return on equity. Hence its name.

Let's consider a company with capital employed of 100, generating a return of 10% after tax, which is financed entirely by equity. Its return on capital employed and return on equity both stand at 10%.

If the same company finances 30 of its capital employed with debt at an interest rate of 4% after tax and the remainder with equity, its return on equity is:

	Operating profit after tax:	$10\% \times 100 = 10$
−	Interest expense after tax:	$4\% \times 30 = 1.2$
=	Net income after tax:	$= 8.8$

When divided by shareholders' equity of 70 (100 − 30), this yields a return on equity after tax of 12.6% (8.8/70), while the after-tax return on capital employed stands at 10%.

The borrowing of 30 that is invested in capital employed generates operating profit after tax of 3 which, after post-tax interest expense (1.2), is fully attributable for an amount of 1.8 to shareholders. This surplus amount (1.8) is added to operating profit generated by the equity-financed investments (70 $\times$ 10% $= 7$) to give net income of $7 + 1.8 = 8.8$. The company's return on equity now stands at $8.8/70 = 12.6\%$.

The leverage effect of debt thus increases the company's return on equity by 2.6%, or the surplus generated (1.8) divided by shareholders' equity (1.8/70 = 2.6%).

Debt can thus be used to boost a company's return on equity without any change in return on capital employed.

But readers will surely have noticed the prerequisite for the return on equity to increase when the company raises additional debt, i.e. **its ROCE must be higher than its cost of debt**. Otherwise, the company borrows at a higher rate than the returns it generates by investing the borrowed funds in its capital employed. This gives rise to a de cit, which reduces the rate of return generated by the company's equity. Its earnings decline, and the return on equity **dips below** its return on capital employed.

Let's go back to our company and assume that its return on capital employed falls to 3% after tax. In this scenario, its return on equity is as follows:

	Operating profit after tax:	$100 \times 3\% = 3$
−	Interest expense after tax:	$30 \times 4\% = 1.2$
=	Net income after tax:	$= 1.8$

When divided by shareholders' equity of 70, this yields a return on equity after tax of 2.6% (1.8/70).

Once invested in tangible assets or working capital, the borrowing of 30 generates an operating pro t after tax of 0.9 which, after deducting the 1.2 in interest charges, produces a de cit of 0.3 on the borrowed funds. This shortfall is thus deducted from net income, which will drop to $70 \times 3\% - 0.3 = 1.8$.

The original return on capital employed of 3% is thus reduced by 0.3/70 = 0.4% to give a return on equity of 2.6% after tax.

When the return on capital employed falls below the cost of debt, the leverage effect of debt shifts into reverse and reduces the return on equity, which in turn falls below return on capital employed.

2/ FORMULATING AN EQUATION

Before we go any further, we need to clarify the impact of tax on this line of reasoning.

Tax reduces earnings. All revenues give rise to taxation and all charges serve to reduce the tax bite (provided that the company is pro table). Consequently, each line of the income statement can thus be regarded as giving rise to either tax expense or a theoretical tax credit, with the actual tax charge payable being the net amount of the tax expense and credits. We can thus calculate an operating pro t gure net of tax, by simply multiplying the operating pro t before tax by a factor of (1 − rate of corporate income tax).

As a result, we can ensure the consistency of our calculations. Throughout this chapter, we have **worked on an after-tax basis** for all the key pro t indicators, i.e. operating pro t, net nancial expense and net income (note that our reasoning would have been identical had we worked on a pre-tax basis).

Let's now formulate an equation encapsulating our conclusions. Net income is equal to the return on capital employed multiplied by shareholders' equity plus a surplus (or deﬁcit) arising on net debt, which is equal to the net debt multiplied by the difference between the after-tax return on capital employed and the after-tax cost of debt.

Translating this formula into a proﬁtability- rather than an earnings-based equation, we come up with the following:

$$\text{Return on equity} = \text{Return on capital employed (after tax)} + \left(\text{Return on capital employed (after tax)} - \text{After tax cost of debt} \right) \times \frac{\text{Net debt}}{\text{Shareholders' equity}}$$

or:

$$\text{ROE} = \text{ROCE} + (\text{ROCE} - i) \times \frac{D}{E}$$

Readers should not let themselves get bogged down by this equation, which is based on an accounting tautology. The leverage effect is merely a straightforward factor that is used to account for return on equity, and nothing more.

The ratio of net debt to shareholders' equity is called ﬁnancial leverage or gearing.

The leverage effect can thus be expressed as follows:

$$\frac{\text{Net debt}}{\text{Shareholders' equity}} \times (\text{Return on capital employed} - \text{After-tax cost of debt})$$

Return on equity is thus equal to the return on capital employed plus the leverage effect.

Note that:

- the higher the company's return on capital employed relative to the cost of debt (e.g. if ROCE increases to 16% in our example, return on equity rises to 16% + 5.1% = 21.1%); or
- the higher the company's debt burden; the higher the leverage effect.

Naturally, the leverage effect goes into reverse once:

- return on capital employed falls below the cost of debt;
- the cost of debt was poorly forecast or suddenly soars because the company's debt carries a variable rate and interest rates are on the rise.

The leverage effect applies even when a company has negative net debt, i.e. when its short-term ﬁnancial investments exceed the value of its debt. In such cases, return on equity equates to the average of return on equity and return on short-term investments weighted by shareholders' equity and short-term investments. The leverage effect can thus be calculated in exactly the same way, with i corresponding instead to the after-tax rate of return on short-term ﬁnancial investments and D showing a negative value because net debt is negative.

For instance, let's consider the case of Puma in 2007. Its shareholders' equity stood at €1155m and its net debt was a negative €356m, while its short-term nancial investments yielded 2.0% after tax. Its return on capital employed after applying an average tax rate of 30% stood at 33% based on its operating pro t of €372m.[2] Return on equity thus stands at:

$$33\% + (33\% - 2.0\%) \times \frac{-356}{1155}, \text{i.e. } 23\%$$

$$2 \quad \frac{372 \times (1 - 30\%)}{(1155 - 356)} = 33\%$$

The reason for Puma's ROE being lower than its ROCE is clearly not that the group's cost of debt is higher than its return on capital employed! To put things simply, Puma is unable to secure returns on the nancial markets for its surplus cash on a par with those generated by its manufacturing facilities. Consequently, it has to invest the funds at a rate below its return on capital employed, thus depressing its return on equity.

The following tables show trends in ROE and ROCE posted by various different sectors in Europe over the 1998–2007 period.

ROE FOR LEADING LISTED EUROPEAN COMPANIES (%)

Sector	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Oil and Gas	5	9	12	11	8	9	12	14	12	13
Chemical	13	12	12	9	9	6	9	12	13	16
Basic Resources	9	8	12	6	6	6	10	7	13	14
Construction and Materials	12	14	14	12	12	12	14	17	20	18
Industrials Goods and Services	17	15	15	9	6	8	12	15	16	17
Automobiles and Parts	14	9	12	8	11	10	12	13	12	14
Food & Beverage	16	14	11	11	11	12	11	13	12	14
Personal & Household Goods	14	14	14	9	12	12	14	15	15	17
Health Care	9	8	7	5	3	6	5	4	3	2
Retail	17	17	15	13	13	13	14	15	15	15
Media	15	14	13	1	3	8	10	15	13	13
Travel & Leisure	12	11	9	5	8	8	9	10	12	13
Telecommunications	11	11	9	1	3	7	14	13	15	17
Utilities	10	10	9	9	10	10	9	12	14	14
Technology	19	15	5	− 4	− 6	1	7	11	11	11

Source: Infinancials

ROCE FOR LEADING LISTED EUROPEAN COMPANIES (%)

| Sector	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Oil & Gas	6	9	15	13	9	9	12	13	12	14
Chemical	14	13	13	10	9	8	11	12	11	13
Basic Resources	10	8	13	7	7	6	9	7	11	12
Construction and Materials	15	15	14	13	14	13	15	17	18	16
Industrials Goods and Services	16	15	15	11	9	10	12	13	15	15
Automobiles & Parts	13	13	12	9	12	13	13	14	12	14
Food & Beverage	15	14	13	12	12	12	12	12	12	12
Personal & Household Goods	17	16	16	13	15	14	16	16	16	16
Health Care	12	12	9	10	8	11	9	7	8	5
Retail	18	19	16	15	15	15	16	16	16	14
Media	21	20	16	8	10	10	15	13	12	12
Travel & Leisure	12	12	9	6	8	8	8	9	9	10
Telecommunications	16	11	8	6	7	11	10	12	12	15
Utilities	9	9	9	8	8	8	9	10	11	9
Technology	24	22	12	0	−1	3	11	14	13	12

Source: Infinancials

The reader may notice among other things the global improvement in ROCE since 2001 (this may not last!). Automotive and Utilities have similar ROE at around 14% but very dissimilar ROCE (14% and 9% respectively). The explanation lies in the level of debt, which is generally very high in the utilities industry as it is a capital intensive sector and lower in the Automotive industry. The quality of Utilities' ROE is much better than in the Automotive sector.

3/ CALCULATING THE LEVERAGE EFFECT

(a) Presentation

To calculate the leverage effect and the return on equity, we recommend using the table shown below. The items needed for these calculations are listed below. We strongly recommend that readers should use the data shown in the tables on p. 239.

ROE
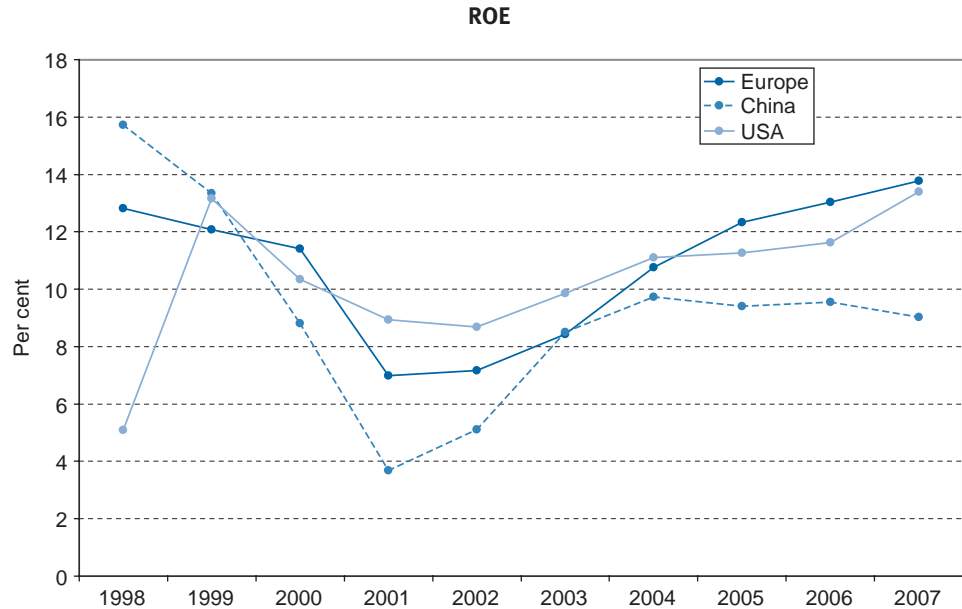
- On the income statement:

  - sales (S);
  - pro t before tax and nonrecurring items (PBT);
  - nancial expense net of nancial income (FE);
  - operating pro t (EBIT).

- On the balance sheet:

  - xed assets (FA);
  - working capital (WC) comprising both operating and nonoperating working capital;
  - capital employed, i.e. the sum of the two previous lines, as well as the sum of the two following lines, since capital employed is nanced by shareholders' equity and debt (CE);
  - shareholders' equity (E);
  - net debt encompassing all short-, medium- and long-term bank borrowings and debt less marketable securities, cash and equivalents (D).

Corporate income tax is abbreviated to Tc.

LEVERAGE EFFECT (e.g. Indesit)

Basic data

€m	2004	2005	2006	2007
Sales (S)	3100	3064	3249	3438
Profit before tax and nonrecurring items (PBT)	159	93	132	167
+ Financial expense net of financial income (FE)	34	29	26	30
= Operating profit (EBIT)	193	122	158	197
Fixed assets (FA)	1233	1275	1254	1208
+ Working capital (WC)	− 15	12	− 28	− 48
= CAPITAL EMPLOYED (CE)	1218	1288	1226	1160
Shareholders' equity (E)	444	519	552	580
+ (restated) Net debt (D)	774	769	674	580
= CAPITAL INVESTED = CAPITAL EMPLOYED (CE)	1218	1288	1226	1160
Corporate income tax (Tc)	37%	46%	42%	37%

Calculations

		2004	2005	2006	2007
i	After tax cost of debt $= \dfrac{FE \times (1 - Tc)}{D}$	3%	2%	2%	3%
ROCE	Return on capital employed (after tax) $= \dfrac{EBIT \times (1 - Tc) \text{ or NOPAT}}{CE}$	10%	5%	8%	11%
ROCE − i	Return on capital employed (after tax) − after-tax cost of debt	7%	3%	5%	7%
D/E	Gearing	1.7	1.5	1.2	1.0
	Leverage effect $= (ROCE - i) \times \dfrac{D}{E}$	13%	5%	6%	7%
ROE	Return on equity $= \dfrac{PBT \times (1 - Tc)}{E}$ or $ROCE + (ROCE - i) \times \dfrac{D}{E}$	23%	10%	14%	18%

Results

		2004	2005	2006	2007
	Return on capital employed (A)	10%	5%	8%	11%
	Return on capital employed − after-tax cost of debt (ROCE − i)	7%	3%	5%	7%
×	Gearing (D/E)	1.7	1.5	1.2	1.0
=	**Leverage effect (B)**	13%	5%	6%	7%
=	**Return On Equity (A + B)**	23%	10%	14%	18%

(b) Practical problems

We recommend that readers use the balance sheets and income statements prepared during Chapters 4 and 9 as a starting point when filling in the previous table.

We cannot overemphasise the importance of the two following accounting equations:

Capital employed = shareholders' equity + net debt

Operating profit after tax = net income + net financial expense after tax.

Consequently, readers will arrive at the same return on equity figure whichever way they calculate it. It is worth remembering that using profit before tax and nonrecurring items rather than net income eliminates the impact of nonrecurring items.

Besides breaking down quasi-equity between debt or shareholders' equity, provisions between working capital or debt, etc. which we dealt with in Chapter 7, only two concrete problems arise when we calculate the leverage effect in consolidated financial statements: how to treat goodwill and associate companies.

The way goodwill is treated (see Chapter 6) has a significant impact on the results obtained. Setting off the entire amount of goodwill against shareholders' equity using the pooling of interests method causes a large chunk of capital employed and shareholders' equity to disappear from the balance sheet. As a result, the nominal returns on equity and on capital employed may look deceptively high when this type of merger accounting is used. Just because whole chunks of capital appear to have vanished into thin air from a balance sheet perspective does not mean that shareholders will give up their normal rate of return requirements on the capital that has done a perfectly legitimate disappearing act under certain accounting standards. The abolition of the pooling of interests method in IAS and US accounting standards is gradually eliminating this problem.

Likewise, goodwill amortisation when it is compulsory or impairment losses artificially reduce the capital that appears to be invested in the business. Consequently, we recommend that readers should, wherever possible, work with **gross** goodwill figures and add back to shareholders' equity the difference between gross and net goodwill to keep the balance sheet in equilibrium.[3] Likewise, we would advise working on the basis of operating profit and net profit before goodwill amortisation or impairment losses.

By doing so, readers will be able to conduct a rigorous assessment of a company's profitability. This area is explored further in Exercise 4 at the end of this chapter.

Consolidated accounts present another problem, which is how **income from associates**[4] **should be treated**. Should income from associates be considered as financial income or as a component of operating profit, bearing in mind that the latter approach implies adding an income after financial expense and tax to an operating profit (which is before tax)?

- The rationale for considering income from associates as financial income is that it equals to the dividend that the group would receive if the associate company paid out 100% of its earnings. This first approach seems to fit a financial group that may sell one or other investment to reduce its debt.
- The rationale for considering income from associates as part of the operating profit is that income from associates derives from investments included in capital employed. This latter approach is geared more to an industrial group, for which such situations should be exceptional and temporary because the majority of industrial groups intend to control more than 50% of their subsidiaries.

3 *In the previous example involving Indesit, this adjustment was made as there was no goodwill written down.*

4 *For more on income from associates see page 78, In the Indesit case study, the problem was disregarded as associates' book value is close to 0 with marginal contribution to results.*

This said, in a bid to improve the presentation of their accounts, certain groups park their least pro table assets and substantial debts in associate companies in which they own less than 40% and which are thus accounted for under the equity method. For instance, Coca-Cola boasted a headline return on capital employed of 23% in 2004. Note, however, that vital (bottling) assets worth $45bn are housed in less than 40%-owned associate companies, together with $26bn in bank and other borrowings. The return on capital employed generated by these assets stands at just 6% since internal transfer pricing keeps most of the pro ts within the parent company. In such situations, where the letter of accounting standards is abided by but in our opinion not the spirit, analysts would be advised to examine the pro tability of the parent and associate companies separately before forming an overall assessment. Adjusted for this accounting "trick", the group's return on capital employed comes to 11.5%.

Lastly, the tax rate may be affected by various deferred tax assets and liabilities arising from the restatement of individual nancial statements for consolidation purposes. In practice, we recommend that readers choose an effective tax rate based on the company's average tax rate.

4/ COMPANIES WITH NEGATIVE CAPITAL EMPLOYED

Companies with negative capital employed usually have high negative working capital exceeding the size of their net xed assets. This phenomenon is prevalent in certain speci c sectors (contract catering, retailing, etc.) and this type of company typically posts a very high return on equity.

Of the two roles played by shareholders' equity, i.e. financing capital expenditure and acting as a guarantee for lenders, the former is not required by such companies. Only the latter role remains.

Consequently, return on capital employed needs to be calculated taking into account income from short-term nancial investments (included in earnings) and the size of these investments (included in capital employed):

$$\text{ROCE} = \frac{(\text{EBIT} + \text{Financial income}) \times (1 - \text{Tc})}{\text{Capital employed} + \text{Short-term nancial investments}}$$

As a matter of fact, companies in this situation factor their nancial income into the selling price of their products and services. Consequently, it would not make sense to calculate capital employed without taking short-term nancial investments into account.

Section 13.3
USES AND LIMITATIONS OF THE LEVERAGE EFFECT

1/ LIMITATIONS OF BOOK PROFITABILITY INDICATORS

Book-based return on capital employed gures are naturally of great interest to nancial analysts and managers alike. This said, they have much more limited appeal from a nancial standpoint. The leverage effect equation always stands up to analysis, although

sometimes some anomalous results are produced. For instance, the cost of debt calculated as the ratio of financial expense net of financial income to balance sheet debt may be plainly too high or too low. This simply means that the net debt shown on the balance sheet does not reflect average debt over the year, that the company is in reality much more (or less) indebted or that its debt is subject to seasonal fluctuations.

Attempts may be made to overcome this type of problem by using average or restated figures, particularly for fixed assets and shareholders' equity. But this approach is really feasible only for internal analysts with sufficient data at their disposal.

> It is thus important not to set too much store by implicit interest rates or the corresponding leverage effect when they are clearly anomalous.

For managers of a business or a profit centre, return on capital employed is one of the key performance and profitability indicators, particularly with the emergence of economic profit indicators, which compare the return on capital employed with the weighted average cost of capital (see Chapter 19).

From a financial standpoint, however, book-based returns on capital employed and returns on equity hold very limited appeal. Since book returns are prepared from the accounts, they do not reflect risks. As such, book returns should not be used in isolation as an objective for the company because this will prompt managers to take extremely unwise decisions.

As we have seen, it is easy to boost book returns on equity by gearing up the balance sheet and harnessing the leverage effect. The risk of the company is also increased without being reflected in the accounting-based formula.

> Return on capital employed and return on equity are accounting indicators used for historical analysis. In no circumstances whatsoever should they be used to project the future rates of return required by shareholders or all providers of funds.

If a company's book profitability is very high, shareholders require a lot less and will already have adjusted their valuation of shareholders' equity, whose market value is thus much higher than its book value. If a company's book profitability is very low, shareholders want much more and will already have marked down the market value of shareholders' equity to well below its book value.[5]

It is therefore essential to note that the book return on equity, return on capital employed and cost of debt do not reflect the rates of return required by shareholders, providers of funds or creditors respectively. These returns cannot be considered as financial performance indicators because they do not take into account the two key concepts of risk and valuation. Instead, they belong to the domains of financial analysis and control. We refer readers to Chapter 19 for a more detailed analysis.

Some analysts attempt to calculate return on capital employed by using the ratio of operating profit to market capitalisation plus the market value of debt. In our view, the theoretical basis for this type of approach is very shaky because an accounting profit indicator from the past is used in conjunction with an asset valuation based on expectations of future profits.

2/ USES OF THE LEVERAGE EFFECT

The leverage effect sheds light on the origins of return on equity, i.e. whether it ows from operating performance (i.e. a good return on capital employed) or from a favourable nancing structure harnessing the leverage effect. Our experience tells us that **in the long term, only an increasing return on capital employed guarantees a steady rise in a company's return on equity.**

The main point of the leverage effect is to show how return on equity breaks down between the profitability of a company's industrial and commercial operations and its capital structure (i.e. the leverage effect).

Consider the pro tability of the following groups:

RETURN ON EQUITY (%)

	2002	2003	2004	2005
Group A	15	16	18	20
Group B	15	15	15	15
Group C	40	40	40	40

RETURN ON CAPITAL EMPLOYED (AFTER TAX) (%)

	2002	2003	2004	2005
Group A	10	8	7	7
Group B	15	15	15	15
Group C	10	10	10	10

A super cial analysis may suggest that group C is a star performer owing to its stunningly high return on equity (40%), that group A is improving and that group B is rather disappointing by comparison.

But this analysis does not even scratch the surface of the reality! C generates its very high returns through the unbridled use of the leverage effect that weakens the whole company, while its return on capital employed is average. B has no debt and carries the least risk, while its return on capital employed is the highest. A's improvement is merely a mirage because it is attributable entirely to a stronger and stronger leverage effect while its return on capital employed is steadily declining, so A is actually exposed to the greatest risks.

As we shall see in Section III, the leverage effect is not very useful in nance because it does not create any value except in two very special cases:

- in times of rising in ation, real interest rates (i.e. after in ation) are negative, thereby eroding the wealth of a company's creditors who are repaid in a lender's depreciating currency to the great bene t of the shareholders;
- when companies have a very heavy debt burden (e.g. following an LBO, see Chapter 44), which obliges management to ensure that they perform well so that the cash ows generated are suf cient to cover the heavy debt servicing costs. In this type of situation, the leverage effect gives management a very strong incentive to do well, because the price of failure would be very high.

In 2007, Indesit generates an attractive ROCE (11%) and thanks to a positive leverage effect a high ROE (18%).

In fact the situation was less appealing in 2005: the ROCE of 5% was poor and ROE reached 10% only thanks to an important leverage effect. The decrease in ROCE from 2004 to 2005 from 10% to 5% demonstrated a high volatility of the results and therefore a signi cant operating risk. Obviously, due to the high level of debt during that period, the impact on ROE was ampli ed.

The very good result in 2007 is due to the restructuring process implemented since 2005. The increase in ROCE from 5% to 11% was a combination of:

- increase in operating margins from 4% to 6%;
- higher asset turnover (the group generating more sales with fewer assets);
- and a decrease in effective tax rate.

Although the ROE in 2007 is slightly lower than in 2004, the situation of the group appears to be saner as the leverage effect component of the ROE is largely reduced and the ROCE is higher.

SUMMARY

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Return on capital employed (ROCE) is the book return generated by a company's operations. It is calculated as operating profit after normalised tax divided by capital employed or as the NOPAT margin (net operating profit after tax/sales) multiplied by asset turnover (sales/capital employed). Return on equity (ROE) is the ratio of net profit to shareholders' equity.

The leverage effect of debt is the difference between return on equity and return on capital employed. It derives from the difference between return on capital employed and the after-tax cost of debt and is influenced by the relative size of debt and equity on the balance sheet. From a mathematical standpoint, the leverage effect leads to the following accounting tautology:

$$ROE = ROCE + (ROCE - i) \times \frac{D}{E}$$

The leverage effect works both ways. Although it may boost return on equity to above the level of return on capital employed, it may also dilute it to a weaker level when the return on capital employed falls below the cost of debt.

Book return on capital employed, return on equity and cost of debt do not reflect the returns required by shareholders, providers of funds and creditors. These figures cannot be regarded as financial indicators because they do not take into account risk or valuation, two key parameters in finance. Instead, they reflect the historical book returns achieved and belong to the realms of financial analysis and control.

The leverage effect helps to identify the source of a good return on equity, which may come from either a healthy return on capital employed or merely from a company's capital structure, i.e. the leverage effect. This is its only real point.

In the long run, only a healthy return on capital employed will ensure a decent return on equity. As we shall see, the leverage effect does not create any value. Although it may boost return on equity, it leads to an increase in risk that is proportional to the additional profit.

1/Why is capital employed equal to invested capital?

2/What is the leverage effect?

3/How is the leverage effect calculated?

4/Why is the leverage effect equation an accounting tautology?

5/According to the leverage effect equation, for the same after-tax ROCE of 10%, an increase in debt (costing 4% after tax) could improve the return on equity. State your views.

6/Why is goodwill a problem when calculating ROCE?

7/What is the basic purpose of the leverage effect?

8/Your financial director suggests that you increase debt to increase ROE. State your views.

9/What is the main problem with accounting profitability indicators such as ROE or ROCE?

10/Over a given period, interest rates are low, corporation tax rates are high and the economy is doing well. What consequences will this have on the financial structure of companies?

EXERCISES

1/ Prove the leverage effect equation.

2/ A businessman is hoping to get a 20% return on equity after tax. The business generates a 3% sales margin (after tax). Provide two possible combinations of financial structure, profitability and capital employed that could lead to the generation of a 20% return on equity (the cost of borrowing is 5% before tax, the tax rate is 40% and the company's capital employed is 1000).

3/ Calculate the leverage effect for each year. What are your conclusions?

Millions of €	1	2	3	4	5
Shareholders' equity	100	115	320	300	240
Long- and medium-term debt	123	180	540	640	680
Financial expense before tax	11	18.5	29	63	83
Net income	14	16	(20)	(60)	(40)
Tax rate	35%	35%	35%	35%	35%

4/ Calculate the ROCE and the ROE of Carlsberg. You will include retirement benefits in the net debt and other long term liabilities in working capital. There has been no amortisation or impairment of goodwill. Income tax rate in the Netherlands is 25.5%.

€ m	2006	%
NET SALES	**41.08**	
− Cost of sales	20.15	
= GROSS MARGIN	20.93	51.0
− Selling and marketing costs	14.17	
− General and administrative costs	3.07	
± Other operating income and expense	0.27	
+ Income from associates	0.09	
= **RECURRING OPERATING PROFIT**	**4.05**	**9.8**
± Nonrecurring items	−0.16	
= **OPERATING PROFIT**	**3.89**	**9.5**
− Financial expense	1.58	
+ Financial income	0.73	
= PROFIT BEFORE TAX	3.03	7.4
− Income tax	0.86	
− Minority interests	0.29	
NET PROFIT ATTRIBUTABLE TO SHAREHOLDERS	**1.88**	**4.6**

	2006
Goodwill	16.9
Other intangible fixed assets	4.3
Tangible fixed assets	20.4
Equity in associated companies	0.6
Other noncurrent assets	2.3
NONCURRENT ASSETS (FIXED ASSETS)	**44.5**
Inventories	3.2
Trade receivables	6.1
Other operating receivables	2.1
Trade payables	5.1
Other operating payables	5.9
OPERATING WORKING CAPITAL (1)	0.4
NONOPERATING WORKING CAPITAL (2)	-0.1
WORKING CAPITAL (1 + 2)	**0.3**
SHAREHOLDERS' EQUITY GROUP SHARE	17.6
Minority interests in consolidated subsidiaries	1.4
SHAREHOLDERS' EQUITY	**19.0**
Retirement benefits	2.0
Deferred tax	2.4
Other long-term liabilities	0.4
LONG-TERM LIABILITIES (ex FIN. DEBT)	4.8
Medium- and long-term borrowings and liabilities	16.2
Bank overdrafts and short-term borrowings	7.3
Cash and equivalents	2.5
NET DEBT	**21.0**

Questions

1/ *Because accounts are balanced!*
2/ *The difference between return on equity and ROCE after tax.*
3/ *Leverage effect* $= (ROCE - i) \times \dfrac{D}{E}$.
4/ *As it is based on total assets being exactly equal to total liabilities and equity.*
5/ *That is true but it also increases the risk to the shareholder.*
6/ *Because if it had been impaired, reducing capital employed (see Chapter 6), it would have artificially increased book returns. Our advice is to look at the gross rather than the net figures (before impairment losses on this goodwill).*
7/ *It helps to identify the source of a good return on equity.*
8/ *Is ROCE higher than the cost of debt? What is the risk for shareholders?*
9/ *They do not factor in risk.*
10/ *An increase in the leverage effect. However, see Section III of this book.*

ANSWERS

EXERCISES

1/ Where:

$$NI = Net\ income$$

$$EBIT = Operating\ profit$$

$$Tc = Tax\ rate$$

$$i = After\ tax\ cost\ of\ debt$$

$$ROE = \frac{NI}{E} = \frac{EBIT \times (1 - Tc) - i \times D}{E} = \frac{EBIT \times (1 - Tc)}{E} - \frac{i \times D}{E}$$

$$= \frac{EBIT \times (1 - Tc) \times (E + D)}{E \times (E + D)} - \frac{i \times D}{E}$$

$$= \frac{EBIT \times (1 - Tc)}{E + D} + \frac{EBIT \times (1 - Tc)}{E + D} \times \frac{D}{E} - i \times \frac{D}{E}$$

whereas $ROCE = \dfrac{EBIT \times (1 - Tc)}{E + D}$ and so $ROE = ROCE + (ROCE - i) \times \dfrac{D}{E}$

2/ Using the leverage effect equation the following can be determined:

	Solution 1	Solution 2
Capital employed	1000	1000
Net borrowings	750	0
Shareholders' equity	250	1000
Sales	1666.7	6666.7
Operating profit	120.8	333
Financial expense	37.5	0
Corporate income tax	33.3	133
Net income	50	200

3/

	1	2	3	4	5
ROCE after tax	9.5%	9.5%	0.7%	0.2%	3.0%
Leverage	1.23	1.57	1.69	2.13	2.83
Net cost of debt*	5.8%	6.7%	4.8%	9.7%	10.0%
Leverage effect	4.5%	4.4%	−6.9%	−20.2%	−19.7%
ROE	14%	13.9%	−6.2%	−20%	−16.7%

* Tax savings have only had a partial impact in the last three years.

When ROCE is above the after-tax cost of debt, debt boosts ROE and depresses it when ROCE is lower than the after-tax cost of debt. This company is on the verge of bankruptcy.

4/ *There is no one right answer. However, it is important to be consistent when calculating. Special attention should be paid:*

When calculating ROCE:

○ *Our advice is to take operating income before nonrecurring items.*
○ *If capital employed includes long-term investments and investments in associates, operating income should be restated to include income on these assets. Here, operating profit includes income from associates, therefore to be consistent capital employed should include equity in associated companies. In any case, in our example, and given the small amounts, the difference between the ways of calculating would not be material.*
○ *Whether to use recurring operating profit or total operating profit is another question. But if we use recurring operating profit, then net result should also be restated for the calculation of ROE.*
○ *What tax rate to use? Marginal tax rate or actual tax rate? We tend to use actual tax rate, in particular for international groups which pay tax in different jurisdictions. But there again the key is to be consistent.*

When calculating ROE:

○ *ROE (group share) can be calculated by dividing net profits (group share) by shareholders' equity (group share). However, if the numerator includes minorities' shares, it will have to be divided by total shareholders' equity (including minority interests).*

Capital employed	$44.5 + 0.3 - 2.4 - 0.4 = 42.0$
Operating income	*3.9*
Tax at 28% (actual tax rate for Carlsberg)	*1.1*
Return on capital employed after tax	*6.7%*
Shareholders' equity, group share	*17.6*
Net earnings, group share	*1.9*
Return on equity, group share	*10.8%*

Carlsberg has a modest ROCE (6.7% is probably close to cost of capital) and a stronger ROE (10.8%) because the company relies on debt (leverage of 1.2) taking advantage of a low after-tax cost of debt (2.7%).

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