NICOLAS SCHMIDLIN

The Art of Company Valuation and Financial Statement Analysis

A Value Investor's Guide with Real-life Case Studies

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Everything should be made as simple as possible, but not simpler.

Albert Einstein

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Preface

We all know that Art is not truth. Art is a lie that makes us realize the truth, at least the truth that is given to us to understand.

Pablo Picasso

This book looks at the valuation and financial statement analysis of listed companies. Another suitable title could have been 'Not another book on company valuation!' Amazon.com displays more than 5,000 hits for this topic and a further 4,000 hits for financial statement analysis. Why do we need another book on this subject? Maybe you have noticed that the introductory quotation stems not from a famous economist, entrepreneur or investor, but from an artist. Company valuation is more art than science.

The figures and ratios that we obtain from any fundamental analysis do give us an overview, but figures are not everything. If pure calculation and comparison of key figures and ratios were sufficient for identifying undervalued or promising enterprises, this book would be superfluous and a computer could carry out all the necessary work in seconds. This is not the case. The findings that we derive from fundamental analysis only let us draw conclusions about how a company has developed *thus far*. Factors from a variety of areas, especially qualitative ones, will contribute to its future development. Financial market theory struggles with this fact. Most of today's textbooks consist of abstract formulae, are full of Greek letters, and tend to be difficult to understand. This book, however, attempts to convey company valuation and fundamental analysis in a pragmatic, lively and case study-oriented style. It aims to give comprehensive and practical insight into company analysis and valuation in particular by considering alternative approaches in addition to established methods.

The analysis described in this book is carried out with an entrepreneur in mind. It is analysis intended for shareholders who understand that they own shares in a real company, with real employees, real products and (hopefully) real cash flows. The aim of this book is to be a tool that aids the analysis and decision making of such an enterprising investor, rather than a short-term-oriented speculator. Pure figures are one thing, evaluating them reasonably altogether another. Together they form pieces of the puzzle that will reveal a picture of the intrinsic value of a company.

In contrast to other textbooks on company valuation, this book largely dispenses with complicated mathematical formulae and abstract explanations. It aims to be a guide to practical and pragmatic company valuation instead of conveying dry, overly complex and often impractical theory.

Looking at the contents, it is noticeable that only one chapter deals explicitly with company valuation. In fact, each chapter builds upon the previous ones to allow the reader to gain a full picture of the inherent value of a company. Hence the valuation case study described in Chapter 8 builds upon the preceding chapters and can therefore not be understood, or at least correctly applied, without them.

Valuation itself is a technical process; the investor's actual value-adding activity lies within the process of understanding the business and its prospective value drivers.

This book contains over 110 examples interspersed throughout the various chapters. Each example strives to illustrate the practical application of a certain aspect of valuation practice and its link to the topic being covered. Since the majority of investors are still focusing on North American and European equity markets and both regions use comparable accounting systems, this book mainly employs case studies from these markets. There are, however, also examples of companies in emerging markets to take into account this growing market segment. For authenticity and to familiarize the investor with different types of notation, the country-specific use of digits and presentation has been maintained within the cases. The reader can therefore trace the examples directly to the original underlying financial statements should he wish to do so. In the running commentary and formulae the numbers employ the standard English notation in order to ensure that the narrative itself is coherent.

This book focuses on the valuation of listed companies, but it could also be applied to privately-owned companies.

The re-evaluation and revision of one's own valuation is part of daily business for anyone following shares listed on a stock exchange. Major political decisions and other factors that will range from macro-economic developments down to strategic management decisions impact the fair value of a company and make the art of company valuation not only one of the most intellectually challenging but also one of the most exciting activities one can undertake on the financial markets. The following chapters will attempt to convey this dynamic and rewarding side of the subject matter in addition to illustrating the technical aspects of financial statement analysis and company valuation.

The valuation of companies is an art, the inherent value of a company always unknown because constantly in flux, and yet still possible to define. Let us illuminate the darkness.

Nicolas Schmidlin, February 2014
London/Frankfurt

1
Introduction

By means of this he can at any time survey the general whole, without needing to perplex himself in the details. What advantages does he derive from the system of book-keeping by double entry! It is among the finest inventions of the human mind.

Johann Wolfgang von Goethe

Accounting is the language of businesses. Those who wish to value companies and invest successfully in the long term have to be able to understand and interpret financial statements. The primary purpose of accounting is to quantify operational processes and to present them to stakeholders including shareholders and creditors but also suppliers, employees and the financial community. The financial statement forms a condensed representation of these processes. It delineates the assets and liabilities as well as performance indicators such as turnover, profit and cash flow. Evaluating and interpreting this data against the background of business activity is an important component of the valuation process. Developing an understanding of this 'language of businesses' and, at the same time, including qualitative factors in the analysis provides a solid foundation for anyone interested in valuing enterprises. Accountancy illustrates, in one snapshot, the corporate world in the past and the present. Company valuation joins in at this point and attempts to predict the future development and the risks of an enterprise with the help of data obtained from the financial statement. This chapter addresses the weaknesses and limits of modern accounting. A particular disadvantage of accountancy is that it is by nature a purely quantitative model. A sound financial statement analysis, meanwhile, while being quantitative by design, requires the combination of both quantitative facts and qualitative characteristics in order to be a reliable forecast of the future.

This chapter deals primarily with different types of accounting systems, the components of financial statements and the calculation of a first set of key financial ratios. Chapter 2 lays the foundation for further ratio-based analysis, and also for the following qualitative analyses, which are at least oriented towards the financial statement.

1.1 IMPORTANCE AND DEVELOPMENT OF BUSINESS ACCOUNTANCY

The precursors of today's accounting rules came into being after the stock market crash of 1929, when the American Institute of Accountants' special committee first proposed a list of generally applicable accounting principles. By 1939, the first Committee on Accounting Procedure was created in the US in order to establish a coherent and reliable system of accounting standards. This set of rules was meant to tackle the rather dubious and unreliable accounting procedures and helped to restore the trust in financial statements published by listed companies. Now the Financial Accounting Standards Board (FASB) prescribes the main accounting standards in the United States. This set of rules, the US Generally Accepted

Accounting Principles, or US GAAP for short, governs the accounting principles for all companies subject to Securities and Exchange Commission (SEC) regulation.

On the other side of the Atlantic, beginning in 1973, the European Union began harmonizing the diverse accounting rules of its member countries. This process eventually culminated in the creation of the International Financial Reporting Standards. The IFRS have so far been adopted by more than 100 countries, including all the members of the European Union, Hong Kong, Australia, Russia, Brazil and Canada. Whilst there are several differences between the US GAAP and IFRS, both accounting systems are based on a similar set of principles and are, by and large, comparable. Following the previously mentioned international harmonization of accounting standards around the globe, a key future milestone is the planned full adoption of the International Financial Reporting Standards by the SEC. This adoption, when it occurs, will also require US companies to employ the IFRS, which will effectively unify the accounting standards in most developed countries. This process, which was initially aimed to be completed by 2014 but might require more time, will allow investors to directly compare financial figures and ratios between European and American companies without having to adjust them for diverging accounting treatments.

Given the fact that large-scale regulatory projects such as the US GAAP/IFRS convergence are rarely implemented on schedule, this book covers both accounting standards, presenting case studies of companies using the US GAAP as well as IFRS. The book focuses primarily on US-based and British corporations but also considers emerging market companies. This approach is simply a recognition that the vast majority of investors will have access to equity markets around the world.

Whilst the accounting systems in the US and Europe are by and large comparable, the outward appearance of the annual reports is not. Whereas there are virtually no restrictions as to the presentation and quantity of information contained in European annual reports and financial statements, US companies have to complete a predefined form (commonly called form 10-K) which must be filed with the SEC. The latter leaves little room for supplementary charts and data, which may often provide further information about the market and business model of the company. The standardized presentation and submission requirements can be mainly attributed to the US accounting scandals and frauds in the late 1990s which resulted in the passage of the Sarbanes-Oxley Act. As a result of this legislation, financial statements of listed corporations are more or less standardized, and have to be signed by management and filed with the SEC. From an investor's point of view, this offers both benefits and drawbacks. On the one hand, US-style annual reports (10-K) are well structured and clearly laid out once the reader gets used to the numerous legal phrases peppering the reports. Information about the market or additional industry data, however, is only rarely contained within these reports. In contrast, European annual reports not only supply their recipients with the essential annual accounts, but also include additional data intended to deepen an understanding of the company. It can, however, be argued that forming a true opinion of a company's performance and prospects is more likely in the case of a US-style annual report, as the additional information and graphs that can be included in European-style reports have at least the potential of being suggestive. Given the laxer rules, European annual reports also exhibit a considerably lower degree of comparability than their US counterparts. US annual (10-K) and quarterly reports (10-Q) can also be easily accessed via the SEC web page, whereas the reports of European companies can only be obtained directly from their respective investor relations websites.

Having said this, it must be mentioned that the SEC's EDGAR system to access 10-K and 10-Q filing isn't the most user-friendly. Retrieving company reports may sometimes be faster by simply searching for the term '*company name* + Investor Relations' in a search engine.

Listed companies usually publish interim reports on a quarterly basis as well as a more detailed and extensive annual report at the end of each fiscal year. Smaller companies, whose stock is traded in less regulated markets, often face less rigorous reporting obligations. In this case issuers are commonly able to report less frequently and are able to disclose less information to the general public. Irrespective of the extent of the reporting obligations, these publications are usually released a few months after the end of the quarter or the fiscal year and form the basis of financial statement analysis.

Quoted companies are generally organized as an affiliated group, or, in other words, as a consolidated group of individual companies under the roof of a parent company. Therefore it is the *consolidated* financial statements or group accounts that are usually the starting point in any balance sheet analysis. The distinction between consolidated group accounts and the individual accounts of the parent company is important since the vast majority of European companies publish both accounts in their annual reports. In essence, the consolidated group accounts or financial statements present information about the group as that of a single economic entity. So, although big enterprises consist of numerous subsidiaries worldwide, the consolidated financial statement acts as if there was only one company that encompassed the whole group. In the process of consolidating the accounts of all affiliates and subsidiaries into one group account, all interdependencies between the individual group companies are effectively cancelled out. For example, both a receivable and a liability are being created if one company grants a loan to another group affiliate. On a group level, however, this can be considered a non-event and thus has to be eliminated. Therefore the consolidated group accounts always result in a more accurate representation of the state of the group than an analysis of the individual group member accounts could ever yield.

The following example demonstrates the need for compiling consolidated financial statements and the reason why analysing individual financial statements within a group of companies may lead to incorrect analysis results.

Example 1.1 – Consolidated financial statement: holding structure
Parent Inc. has the individual financial statement below. There are currently no other companies in the group beside Parent Inc. The individual financial statement and the consolidated financial statement are therefore one and the same (Table 1.1).

Table 1.1   Parent Inc.'s consolidated balance sheet

Parent Inc.			
Assets	$		Liabilities
Fixed assets	100	Shareholders' equity	150
Receivables	50	Loans	50
Financial assets	0		
Cash	50		
Balance sheet total	200	Balance sheet total	200

Now Parent Inc. decides to split off its operating division into a separate business unit, which is designated Subsidiary Ltd. Newly founded Subsidiary Ltd. is equipped with fixed assets of $100 and a loan from Parent Inc. of $50. The balance sheets of Parent Inc. and Subsidiary Ltd. now look as shown in Tables 1.2 and 1.3.

Table 1.2   Parent Inc.'s unconsolidated balance sheet

	Parent Inc.		
Assets	$	Liabilities	
Fixed assets	0	Shareholders' equity	150
Receivables	100	Loans	50
Financial assets	100		
Cash	0		
Balance sheet total	200	Balance sheet total	200

Table 1.3   Subsidiary Ltd.'s unconsolidated balance sheet

	Subsidiary Ltd.		
Assets	$	Liabilities	
Fixed assets	100	Shareholders' equity	100
Receivables	0	Loans	50
Financial assets	0		
Cash	50		
Balance sheet total	150	Balance sheet total	150

After splitting off the operating division, Parent Inc.'s individual financial statement contains a noticeably reduced amount of information. Fixed assets were entirely transferred to Subsidiary Ltd., cash was reduced due to the loan to Subsidiary Ltd. and in return receivables increased by $50. Notice also the item 'financial assets', which includes the share in the newly set-up Subsidiary Ltd. In this case Parent Inc. is the so-called holding company, which only takes on administrative and strategic tasks, while the operating business is carried out by Subsidiary Ltd. The group now has to compile a consolidated financial statement summarizing the various individual financial statements into one document in order to give interested external parties an insight into its assets, liabilities, financial position and profit or loss situation.

To do this, all individual balance sheet items are simply added up, with the internal interrelationships consequently eliminated. The resulting consolidated financial statement will give an adequate insight into the financial conditions of the entire group.

The consolidated financial statements predominantly play an informative role and can be considered the pivotal element in the fundamental analysis of any company. Typically, they consist of the following numerical components (British expressions in parentheses):

- balance sheet (statement of financial position)
- income statement (profit and loss account)

- statement of cash flows (cash flow statement)
- statement of investment and distribution to owners
- notes.

In addition to these, most annual reports include wide-ranging management discussions and an analysis of the past year, a description of the business, risk factors and legal proceedings, as well as an outlook and selected financial data intended to permit a quick overview of the company's past performance.

It is crucial, however, to be aware that any accounting system is always simply a model that *attempts* to capture and represent the business reality and does not always mirror an exact and true picture of the company.

Example 1.2 – Differences in accounting systems
Examine the balance sheet and income statement positions of the two companies given for year-end 2006 shown in Table 1.4.

Table 1.4   Differences in accounting standards

Company 1		€m	Company 2	
Net income	7,021		Net income	6,517
Shareholders' equity	49,650		Shareholders' equity	52,599
Earnings per share	17.09		Earnings per share	15.59

The numbers cited for both companies are of about the same magnitude; however, Company 1 has posted a 7.7% higher net income and consequently higher earnings per share, whereas Company 2's equity base is 5% higher. Despite these differences, both figures were in fact released by the same company – the world's largest insurance company, Allianz SE. These differences arise because of different accounting standards used: while the first figures were reported under the IFRS, the second employed the US GAAP. This comparison is possible because Allianz maintained a double-listing in Frankfurt and New York until 2007, and therefore had to comply with SEC rules as well. This example emphasizes that while accounting figures may give a good general overview of a company's performance and are still the best numerical measure of a company's success, they cannot be mistaken for reality and are always only as good as the accounting framework applied. Whilst IFRS and US GAAP are fairly similar accounting principles, the impact of changes in accounting standards can sometimes be puzzling: when Volkswagen AG switched its reporting from national German GAAP to IFRS in 2000, its shareholders' equity nearly doubled – overnight. As we will see later, other alternative accounting treatments, such as leasing contracts for example, can have a substantial effect on the reliability of the reported figures.

1.1.1   Limited significance of financial statements

Despite numerous rules and regulations issued by the regulatory authorities and governments, criminal activity is ubiquitous in the business world. The most impressive case of accounting fraud, which led to the Sarbanes-Oxley Act in 2002, was committed by former

US energy giant Enron. It would have been difficult to uncover this large-scale fraud by applying traditional balance sheet analysis. Even rating agencies such as Standard & Poor's, which have a deeper insight into a company's books than do investors, gave the company a good credit rating shortly before it was declared insolvent in 2001. In fact, there were clearer signs of trouble in 'soft' factors such as corporate identity and communication suggesting that Enron had something to hide. For instance, in its annual report the company referred to itself as 'The World's Greatest Company'. Critical analysts were insulted during annual press conferences when they dared challenge the reported results.

How did Enron manage to cook its books? Some of the practices were simple. Long-term transactions, for example, were entirely recognized as income at inception instead of allocating profits over the total lifetime of the deal. Another method involved carrying out business with its own offshore enterprises, which had been set up by Enron's management, and reporting such transactions as profit. To compound such practices, Enron failed to declare several billion dollars in liabilities in its books and gave assets inflated values by employing questionable valuation models.

Most instances of balance sheet fraud will use the following methods:

1. off-balance sheet accounting
2. profit management (premature recognition of profits)
3. partiality of auditors
4. capitalization of fictitious assets.

When assets, or more significantly liabilities, are kept off the balance sheet, they ordinarily cannot be detected as part of a standard balance sheet analysis. This, in turn, gives the appearance of increased financial stability, which is employed, for example, to improve creditworthiness.

In other cases of accounting fraud, company management used profit management techniques. Profits were declared before the actual transaction took place, or, as in the case of Enron, long-term contracts were instantly recognized and recorded as profits.

The most important component of balance sheet fraud is the partiality of auditors. It used to be common practice for auditors to also be consultants to the same firm, which would often lead to conflicts of interest. In some cases it was this relationship and the advice of the consultants who were also auditors that led to the above-mentioned methods being used in the first place.

Finally, another method is the capitalization of fictitious assets. This happens when a non-existent asset is created on the balance sheet.

The examples above demonstrate the limitations of accounting practice. They reinforce the assertion that those who wish to successfully analyse and invest in an enterprise need to consider other factors besides balance sheet analysis, such as the business model, the quality of management and current macro-trends, in order to arrive at an accurate valuation of a company. At the same time, a detailed analysis of the financial statements will yield sound and quantifiable insights into a business and will form the foundation of further analysis.

1.1.2   Special features of the financial sector

The analysis of financial statements and company valuation, as elucidated in this book, cannot be applied to insurance companies and banks. The reason for this constraint lies in the fundamentally different capital structure and business model of financial institutions. Given the enormous asset base of most banks – J.P. Morgan posted $2.3 trillion in assets as of the end 2012 for example – an in-depth financial statement analysis is doomed to failure simply as a result of the sheer size of the balance sheet of these institutions. Beside the fundamental differences in size and balance sheet structure, the financial institution business model itself also differs substantially from that of ordinary businesses, which is why the valuation methods developed in the book cannot simply be transposed to financial services companies. To further complicate matters, the banking industry has proven to be volatile over time, which also confounds arriving at accurate long-term valuations. The demise of Northern Rock, Bear Stearns or Lehman Brothers during the financial crisis of 2008–9 makes clear that only a thin line separates record earnings from bankruptcy in this industry. While investment banks such as Salomon Brothers, Drexel Burnham and Nomura dominated Wall Street during the 1980s, most of these institutions have now either disappeared or been taken over by competitors. Given the increasing regulatory pressure around the globe, both the business models and the future prospects of this industry have become even more difficult to forecast.

1.2   COMPOSITION AND STRUCTURE OF FINANCIAL STATEMENTS

The most important part of any annual or interim report is the financial statement, containing the income statement, balance sheet, cash flow statement and notes. Moreover, the management's discussion and analysis give a good overview of the past year and help deepen an understanding of the business. Depending on the size and listing location of the company, the transparency requirements as well as the frequency of reporting will vary. Below is a succinct introduction to the different components of a financial statement as well as to the first financial ratios concerning the cost structure of a business.

1.2.1   Income statement

The income statement or profit and loss account presents the revenues and expenses for a specific accounting period. The balance of these two numbers represents the profit or loss for the period. Table 1.5 shows the typical structure of an income statement.

Table 1.5   Income statement

Revenue
less: Cost of sales
= Gross profit
less: Selling, general and administrative expenses
less: Depreciation
less: Research and development expenses
= Operating profit/EBIT
less: Interest expenses
plus: Interest income
= Profit before taxes
less: Tax expense
= Net profit/Profit for the year

Every income statement begins with the revenues (United Kingdom: turnover) for the period. Suppose you are running a lemonade stand and your first customer buys juice worth $5, paying in cash. One would now book this $5 as revenues – congratulations, you sealed your first deal! But what exactly is your profit? The income statement provides the revenues as well as their *corresponding* expenses. The word *corresponding* is of importance here since the income statement records only those variable expenses associated to the actual sale process. You might have purchased more lemons than needed to serve the first customer, but the cost of these lemons is not recorded immediately since they have not been used and are still part of your assets.

The cost of sales consists of the inventory costs of goods sold. These inventory costs not only include the purchase costs, but also allocated overhead expenses as well as additional material and labour costs in case the goods have been transformed internally. In the case of our lemonade stand, for example, the lemons sold to the first customer have been purchased for $1 and an additional $0.50 was paid for sugar and the labour cost in the squeezing process that turned the raw lemons into juice. So the cost of sales amounts to $1.50, giving a gross profit of $3.50.

Gross profit is equal to the difference between the sales amount and the direct costs associated with producing or purchasing the product sold. The gross profit figure is very important in any financial statement analysis since it gives the amount that is available to pay for any operating expenses.

The next positions which are deductions from gross profit are usually the selling, general and administrative expenses (SG&A), and depreciation as well as research and development (R&D) expenses. SG&A expenses are sometimes split up into the selling and the administrative part, enabling an even closer analysis of the cost structure. In the case of our lemonade stand empire these expenses would include the rent of the space taken up by our stand, the sales clerk's salary as well as our back-office function, which manages the book-keeping. Let's say that we pay another $1 to cover these expenses.

The depreciation expenses reveal the decrease in value of the company's asset base over time. If, for example, a new lemon squeezer has been procured, the initial purchase price is not being charged as an expense since the company has merely changed assets for asset: cash in exchange for a new lemon squeezer. However, as time goes by, the value of the lemon squeezer declines, which is reflected as a depreciation expense in the income statement. Assuming a purchase price of $15 for the machine and an expected lifetime of 10 years would yield a depreciation charge of $1.5 per year.

Subtracting selling, general and administrative expenses, depreciation charges and – for some companies – research and development expenses from the gross profit gives the operating profit, or earnings before interest and taxes, EBIT for short. In the case of our lemon business, this figure is $1.

The operating income effectively presents the profitability of the underlying business without taking into account interest and tax payments. The former are deducted in the next step, the financial result. The financial result is composed of interest expenses and income as well as any profits from associated companies. Let's assume that our lemonade business had to take out a $20 loan at an interest rate of 2% in order to finance operations: this would correspond to an interest expense of $0.40. After having deducted or – in the case of debt-free companies – added interest in the financial result, we obtain the earnings before taxes. It is on this figure that taxes have to be paid. Based on pre-tax earnings of $0.60 and a 35% tax rate for our fictional business, tax expenses of $0.21 follow. We have finally arrived at the net profit for the year of $0.39.

Since no business is exactly identical to another, a close analysis of the income statement is warranted in order to be able to understand the earnings drivers as well as major risk factors inherent to the business model. It is to this end that the first financial ratios are being introduced in the next section.

Financial ratios obtained from the income statement usually express the expense and earning positions in the income statement as a fraction of total sales in order to turn them into comparable figures. Expressing income statement positions as fractions rather than absolute numbers makes it easier to compare them to previous years' figures and allows for the comparison of income statements of competitors, different industries, businesses in different countries and – to a limited extent – even other accounting systems.

Gross profit margin

The gross margin is one of the most prominent financial ratios in nearly every analysis. It expresses the gross profit as a percentage of revenues:

$$\text{Gross profit margin} = \frac{\text{Gross profit}}{\text{Revenues}}$$

The gross profit margin (GP margin) is important for two reasons. First, the cost of sales, which determines the gross profit, is usually the single largest expense position in the income statement. Second, even the most efficiently run company cannot survive without sufficient gross profit to pay for the various fixed costs, interest payments and taxes incurred as a result of running a business.

When compared with other companies, the gross profit margin also indicates the pricing power and input price sensitivity of a company, as can be shown by a simple transformation of this ratio into the related cost of sales margin (CoS ratio):

$$\text{Cost of sales ratio} = \frac{\text{Cost of sales}}{\text{Revenues}}$$

The lower the cost of sales for each unit of revenue, the higher the gross profit margin. In essence it can be said that companies with high gross profit margins are less exposed to input price increases and generally possess a strong basis for negotiation with their customers (higher prices), suppliers (lower wholesale prices) and even their employees (lower salaries).

Whereas the gross profit margin demonstrates how much profit remains after paying for the direct costs of the product, the cost of sales ratio simply demonstrates the costs associated with every transaction. Hence this figure can be viewed as the reciprocal of the average mark-up a company can realize. When Walmart sells apparel for $10 which it purchased for $8 from the manufacturer, its gross profit margin would amount to 20%, its cost of sales ratio to 80% and the mark-up would therefore be 25% (1/0.8 – 1).

In this sense, both ratios are two faces of the same coin, telling the same story but from different perspectives. It is very important to understand which input prices drive the cost of sales for each company. Steel and aluminium producers, for example, are highly dependent on the exploitation and availability of their respective raw materials as well as energy prices. Besides a static analysis of these ratios, it is therefore usually advantageous to compare the development of the gross profit or cost of sales margins and the price trend of the relevant input materials over the past few years.

Table 1.6 demonstrates the calculation of the gross profit and cost of sales margin.

Example 1.3 – Gross profit margin: Alcoa Inc.

Table 1.6   Alcoa Inc.: Shortened income statement

Alcoa Inc.		
(in US$m)	2012	2011
Sales	23,700	24,951
Cost of goods sold	20,468	20,480

Source: Alcoa 10-K (2012) [US GAAP]

Table 1.6 contains the first two lines of Alcoa's income statement. Alcoa is listed in the Dow Jones Industrial Average and is the world's third largest producer of aluminium. The company does not explicitly state its gross profit. In order to calculate the gross profit margin we therefore first have to subtract the cost of goods sold from the annual sales, yielding a gross profit of $3,232 and $4,471 for 2012 and 2011, respectively.

Based on these figures, the gross profit margin for 2012 is then calculated as follows:

$$\text{Gross profit margin}_{2012} = \frac{\$3,232\text{m}}{\$23,700\text{m}} = 13.6\%$$

$$\text{Gross profit margin}_{2011} = \frac{\$4,471\text{m}}{\$24,951\text{m}} = 17.9\%$$

Compared with the prior year, the gross profit margin dropped considerably, by 4.3 percentage points. This worrisome development can also be seen when calculating the cost of sales ratios:

$$\text{Cost of sales ratio}_{2012} = \frac{\$20,468\text{m}}{\$23,700\text{m}} = 86.4\%$$

$$\text{Cost of sales ratio}_{2011} = \frac{\$20,480\text{m}}{\$24,951\text{m}} = 82.1\%$$

A decrease in gross profit margins (or, likewise, an increase in the cost of the sales margins) can be attributable to either (i) an increase in input prices, (ii) a decrease in selling prices, or (iii) a combination of both. Without looking deeper into Alcoa's financial statement, it becomes apparent that while the underlying cost of sales remained virtually constant, the sales themselves decreased by more than 5%. Fortunately, Alcoa provides a great deal of additional data as part of its reports in order to help investors better understand the business's development. For example, the shipment of alumina and aluminium products increased by 1.6% to 14,492 kilotonnes (kt), yet sales decreased by 5%. The company appears to have a problem with the selling price, and after delving deeper, it turns out that in fact, the average selling price decreased from $2,636 to $2,327 per kt, a decrease of 11.7%. So, the company sold more products (in terms of kt) in 2012 than in 2011, its cost of sales remained nearly unchanged, but its average selling prices dropped considerably, which was the cause of the sharp drop in its gross margin.

In addition to the comparison with prior years' performance, it is important to know whether a gross margin of 13.6% can be considered good or bad when viewed independently. To this end, let's first take a look at Reckitt Benckiser, a leading producer of health, hygiene and home products, and subsequently at the overall distribution of gross profit margins in the S&P 500.

Example 1.4 – Gross profit margin: Reckitt Benckiser Group plc

Table 1.7   Reckitt Benckiser Group plc: Shortened income statement

Reckitt Benckiser Group plc		
£m	2012	2011
Net revenue	9,567	9,485
Cost of sales	(4,030)	(4,036)
Gross profit	5,537	5,449

Source: Reckitt Benckiser Group plc (2012) [IFRS]

Reckitt Benckiser, based in Britain, reports its earnings under the IFRS and is subsequently using the British-style income statement, referring to 'net revenue' instead of 'sales' and using the term 'cost of sales' for 'cost of goods sold' (Table 1.7). In addition, the company posts its gross profit directly, which makes it easier to calculate the ratio:

$$\text{Gross profit margin} = \frac{\text{£}5,537\text{m}}{\text{£}9,567\text{m}} = 57.9\%$$

Accordingly, the cost of sales margin has to amount to 42.1% since the sum of both figures always has to add up to 1 (or 100%). When compared with Alcoa, this example demonstrates how a 'mere' commodity producer is distinguished from a company that relies on strong brands with their resulting distinct negotiating power. Whereas Alcoa retains only 15 cents for each dollar of sales, Reckitt Benckiser earns nearly 58 pence per pound. In other words, Benckiser sells its products for more than double compared with what it (directly) costs to produce them.

Since the gross margin is highly dependent on the industry, even what at first glance seems to be a low gross margin can actually constitute good value, as for example in the case of big retailers like Walmart and Tesco. Gross margins should therefore generally only be compared within industries.

Figure 1.1 depicts the gross margin distribution of the S&P 500 companies. The median gross margin is 41.5% and only 10% of companies post a gross margin of 70% and above.
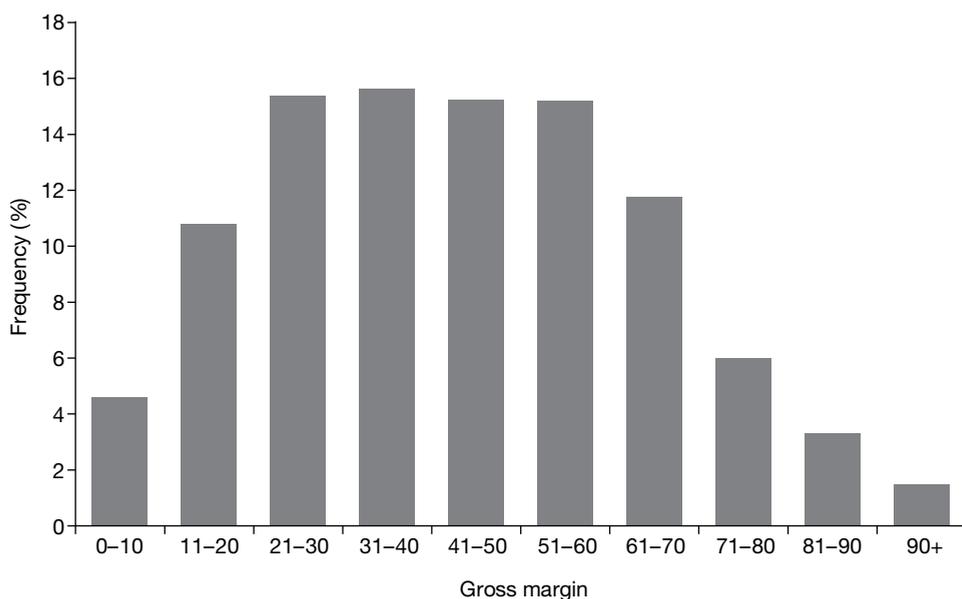
Figure 1.1   S&P 500: Gross margin distribution

Selling, general and administrative margin

After having accounted for the direct cost of sales, operating expenditures like the selling, general and administrative expenses (SG&A ratio) should also be analysed.

$$\text{SG\&A ratio} = \frac{\text{Selling, general and administrative expenses}}{\text{Revenues}}$$

This ratio expresses the primarily fixed-cost-based operating expenses as a percentage of sales. Sometimes the SG&A expense position is further itemized into selling expenses, as well as general and administrative expenses, which consequently allows the calculation of two separate ratios.

Selling expenses are mostly variable and should follow the general trend set by the sales themselves, whereas general and administrative costs usually tend to exhibit a distinct fixed-cost character. Since personnel expenses and rents generally make up a large share of the SG&A, this ratio should always be analysed with regard to the underlying salary development and rent price trends. Disproportionate or excessive general and administrative expenses are usually an indicator of inefficiently run companies. Given the fixed-cost nature of these expenses, they can be a threat to profit margins given the corresponding incapacity to promptly adapt to lower sales volumes. In general, the level of fixed costs is fundamentally linked to the risk profile of a company.

Example 1.5 – SG&A ratio: Coca-Cola Company
The calculation of the SG&A ratio for Coca-Cola in 2012 based on the shortened income statement below is shown in Table 1.8. Note that Coca-Cola uses the term 'net operating revenues' instead of 'sales' or 'revenues'.

Table 1.8   The Coca-Cola Company: Shortened income statement

The Coca-Cola Company		
$m	2012	2011
Net operating revenues	48,017	46,542
Cost of goods sold	19,053	18,215
Gross profit	28,964	28,327
Selling, general and administrative expenses	17,738	17,422
Other operating charges	447	732

Source: The Coca-Cola Company (2012) [US GAAP]

$$\text{SG\&A ratio}_{2012} = \frac{\$17{,}734\text{m}}{\$48{,}017\text{m}} = 36.9\%$$

$$\text{SG\&A ratio}_{2011} = \frac{\$17{,}422\text{m}}{\$46{,}542\text{m}} = 37.4\%$$

The company managed to keep its selling, general and administrative expenses nearly flat year on year, despite growing revenues by 3.2%, which demonstrates Coca-Cola's strict cost management and a demonstrably impressive fixed-cost degression. To further analyse this development, let's have a look at the company's breakdown of its SG&A expenses as shown in Table 1.9.

Table 1.9   The Coca-Cola Company: Notes

$m	2012	2011
Stock-based compensation expense	259	354
Advertising expenses	3,342	3,256
Bottling and distribution expenses	8,905	8,502
Other operating expenses	5,232	5,310

Source: The Coca-Cola Company (2012) [US GAAP]

As can be seen, Coca-Cola managed to keep its advertising expenses nearly stable, but bottling and distribution expenses increased due to higher sales. Analysing Coca-Cola's financial summary sheds more light on the positive developments underlying the SG&A ratio. The statement reads: 'Foreign currency fluctuations decreased selling, general and administrative expenses by 3 percent.' This bit of information is important because, excluding the foreign currency development, which is out of Coca-Cola's reach, the company's operating expenses would have actually outpaced its sales development. Taking all of this into account, while the company shows very healthy margins and expense ratios, the apparent strong cost results for 2012 should not be overrated.

Not all companies will provide such a neat and abbreviated income statement. The world's largest coffee chain Starbucks, for example, provides a much more detailed list of expenses in its income statement.

Example 1.6 – Other operating cost ratios: Starbucks Corporation

Table 1.10   Starbucks Corporation: Shortened income statement

Starbucks Corporation		
$m	2012	2011
Total net revenues	13,299.5	11,700.4
Cost of sales including occupancy costs	5,813.3	4,915.5
Store operating expenses	3,918.3	3,594.9
Other operating expenses	429.9	392.8
Depreciation and amortization expenses	550.3	523.3
General and administrative expenses	801.2	749.3

Source: Starbucks Corporation (2012) [US GAAP]

As shown in Table 1.10, Starbucks is reporting a number of various expenses which allow for the calculation of various ratios. The release of 'store operating' and 'general and administrative' expenses allows for the impact of the company's rents and salaries related to the stores to be separated from the overhead development in its administration. The ratios are calculated as follows (previous year ratios in parentheses):

$$\text{Store operating expense ratio}_{2012} = \frac{\$3,918.3m}{\$13,299.5m} = 29.5\% \ (30.7\%)$$

$$\text{General and administrative expenses ratio}_{2012} = \frac{\$801.2m}{\$13{,}299.5m} = 6.0\% \ (6.4\%)$$

These numbers demonstrate real fixed-cost degression: the store operating expense ratio decreased by 1.2 percentage points, indicating that the company deployed its existing assets (store space and employees) in a more efficient manner. Indeed, this conclusion is also supported by the comparable store sales growth of 7% in that year. The drop in the G&A expenses ratio, meanwhile, shows that the company, at least in 2012, was able to grow revenues without creating too much additional overhead in its administrative costs.

Selling, general and administrative expense ratio distribution: S&P 500

Figure 1.2 shows the distribution of SG&A expenses as a percentage of sales for the S&P 500 constituents. The median value is 21.1%. However, this number is naturally very dependent on the type of business model used. It is noticeable that only 12% of the companies show a SG&A ratio of more than 40%, which makes sense since a very high gross margin is required to post an operating profit when the SG&A expenses alone eat up 40% of revenue.
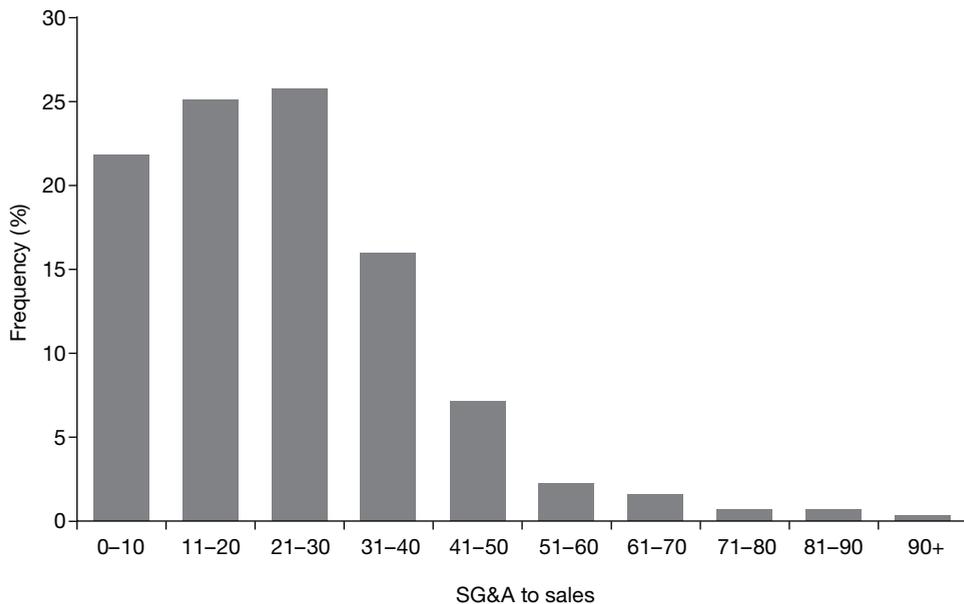
Figure 1.2   S&P 500: Selling, general and administrative expense ratio distribution

Research and development ratio

Innovation is the one key factor distinguishing superior from merely average companies; this is especially true of the technology sector. In the US around 3% to 4% of GDP is spent on R&D annually, underlining the critical importance of research and development activities. With the rise of globalization, however, even seemingly low-tech businesses face the threat

of low-cost competitors in emerging markets, forcing them to continually *reinvent* themselves: if you can't compete on cost, you must be able to compete on quality and innovation. This is the reason why R&D expenses play an ever more significant role for most companies, regardless of their business model.

This ratio displays how many cents need to be invested in order to generate a dollar of sales:

$$\text{Research and development ratio} = \frac{\text{Research and development expenses}}{\text{Revenues}}$$

Example 1.7 – R&D ratio: Stryker Corporation
Stryker Corporation is one of the world's leading medical technology companies, manufacturing and designing products from implants for joint replacements to neurosurgical, neurovascular and spinal devices.

Table 1.11   Stryker Corporation: Shortened income statement

Stryker Corporation		
$m	2012	2011
Net sales	8,657	8,307
Cost of sales	2,781	2,811
Gross profit	5,876	5,496
Research, development and engineering expenses	471	462
Selling, general and administrative expenses	3,466	3,150

Source: Stryker Corporation (2012) [US GAAP]

From the abbreviated income statement in Table 1.11, the R&D ratio is calculated as follows:

$$\text{Research and development ratio} = \frac{\$471m}{\$8,657m} = 5.4\%$$

This ratio is far in excess of the 1.4% median for all S&P 500 companies (see below) and demonstrates Stryker's R&D focus. However, this ratio usually has a limited comparability between companies, even within the same industry, since businesses that enjoy an advantageous negotiating position and produce innovative products may be able to dictate higher prices (resulting in higher sales) that in turn lead to the R&D ratio appearing low. To illustrate this, imagine the following example: Company A and B both spent $50 per year on R&D. However, while Company A comes up with market-leading products and realizes sales of $1000, Company B's R&D department isn't able to design innovative or trend-setting products, and the company only generates sales of $500 as a result. Calculating the R&D ratios would yield a value of 5% for A and 10% for B. This makes Company B appear to be far more innovative whereas the opposite is true. In the end, it is the quality, not the quantity, of

research efforts that counts. And the assessment of the quality of research efforts is always an objective one; as with all innovation, it may simply come down to a hunch or a gut feeling.

One important thing to note about R&D expenses is their differing accounting treatment under US GAAP and IFRS. While US GAAP generally does not permit the capitalization of R&D expenses, there is more leeway to do so under the International Financial Reporting Standards. Capitalization means that research expenses are not charged against sales directly. They are therefore not reflected in the income statement when they arise, but appear on the balance sheet as an asset which is depreciating over the useful lifetime of the intangible asset. Both approaches are reasonable, but the IFRS-based accounts should especially undergo adjustment for the effects of this treatment since the capitalization of R&D expenses artificially boosts profits in the near term.

Research and development expense ratio distribution: S&P 500

Figure 1.3 shows the distribution of the R&D expense ratio for the S&P 500. The median is 1.4%; only 30% of S&P 500 members spent more than 10% of sales on R&D per year.
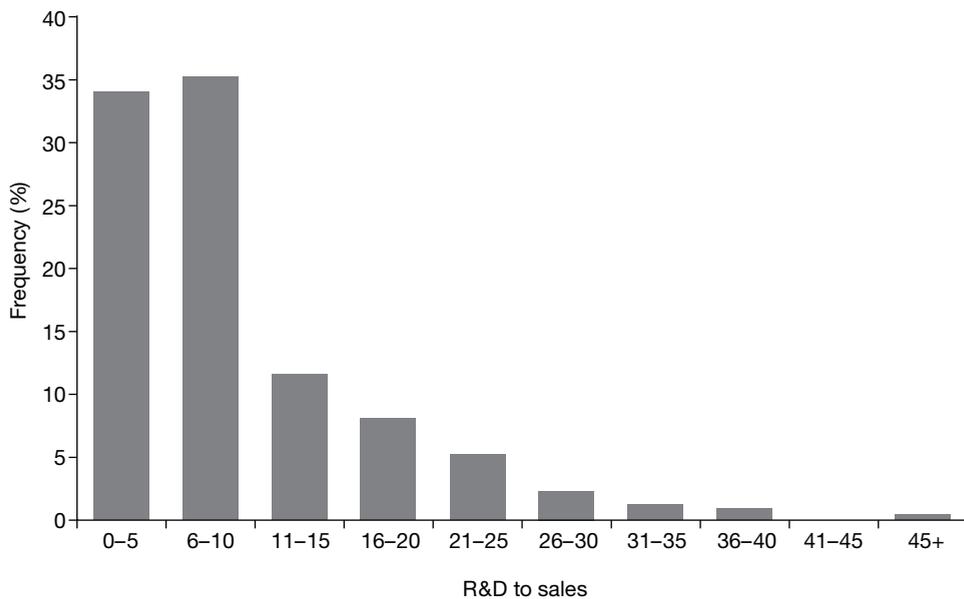
Figure 1.3   S&P 500: Research and development expense ratio distribution

Example 1.8 – Cost ratios: a comparison of two companies

Table 1.12 compares the income statement of H&M Group and Next plc, which are both active in the apparel business. Both companies design fashion products and distribute them through their retail store network internationally.

Table 1.12   H&M AB vs Next plc: Shortened income statements

H&M Hennes & Mauritz AB		Next plc	
SEKm	2012	£m	2012
Sales	120.7	Revenue	3,562
Cost of goods sold	−48.9	Cost of sales	(2,437)
Gross profit	71.8	Gross profit	1,125
Selling expenses	−46.6	Distribution costs	(269)
Administrative expenses	−3.5	Administrative expenses	(201)

Source: H&M Hennes & Mauritz AB (2012) [IFRS], Next plc (2012) [IFRS]

First of all, it becomes apparent that although both companies report under the IFRS, they use different terminology in their income statements. The ratios can, however, be calculated as usual. H&M reports a gross margin of 59.4% against 31.5% for Next. Adding together the selling and administrative expenses (i.e. distribution and administrative expenses for Next) gives a SG&A ratio of 41.5% for H&M and 13.1% for Next. These differences are striking given the fact that both companies operate in the same industry and could even be considered competitors.

Let's recall the factors that determine the gross margin. An increase in gross profit margin can be achieved by either being able to sell products at a higher price or sourcing and producing products at lower prices. H&M might arguably have an advantage in terms of ability to dictate prices given its global brand recognition. However, both companies operate in the low- to mid-price segment of the market, which means that this is not sufficient to explain such substantial gross margin differences. On the cost side, H&M might again have an advantage given the fact that it is three times the size of Next and as a result may be able to apply manufacturing economies of scale. Overall, however, one would expect to see a gross margin difference on this scale only when comparing Next to a luxury brand like Prada or LVMH, rather than to a fairly close peer.

To resolve this mystery, have a closer look at the SG&A ratios. Suddenly, the picture is very different: H&M's advantage in setting prices and procuring goods seems to reverse when it comes to operating expenses. While the Swedish company spends 41.5% of its sales on selling, general and administrative expenses, Next manages to get along with only 13.1%. Both figures, gross margin and SG&A ratios, obviously can't be explained by differences in operating efficiencies. The explanation lies in the fact that the companies simply operate very different business models: H&M runs nearly every store itself, whereas Next has a far greater share of franchised stores. While these differences are not visible for the average customer, they have consequences that are clearly visible on the income statement. H&M designs and procures its products and then passes them on to its own retail operations at a relatively low price, hence the high gross margin. Because H&M operates the stores itself, high operating costs such as rent and staff expenses appear on the income statement, leading to the high SG&A ratio. For Next it's the other way round: because of its partly franchised store base, the company acts mainly as a wholesaler, selling its products to the franchisees at a low price, which explains the low gross margin. Because Next does not operate the majority of 'its' stores itself, it incurs far fewer rent and staff expenses, leading to the low SG&A ratio.

This example underlines the fact that any ratio analysis has to be performed in conjunction with an analysis or at least a close examination of the business model itself. As shown above,

if the business model is left out, a conclusion on the respective performance of the companies would be misleading.

Tax rate

Corporations usually do not pay their income tax based on their revenues, but rather on their pre-tax earnings. The tax rate gives the ratio between tax expenses and the earnings before taxes.

$$\text{Tax rate} \ = \ \frac{\text{Income tax expense}}{\text{Earnings before taxes}}$$

The tax rate is highly dependent on the countries in which the company is doing business. US companies usually pay higher tax rates compared with most other developed countries. British companies in particular are set to post lower tax rates in the coming years as Parliament passed a bill decreasing the tax rate from 28% in 2008 to 24% in 2012, with a further decrease to 20% planned by 2015. As an example, let's compare Chevron's 2012 and Tesco's 2011/12 tax rate.

Example 1.9 – Tax rate: Chevron Corporation and Tesco plc

Table 1.13   Chevron Corporation: Shortened income statement

Chevron Corporation	
$m	2012
Income before income tax expense	46,322
Income tax expense	19,996
Net income	26,336

Source: Chevron Corporation (2012) [US GAAP]

$$\text{Tax rate} \ = \ \frac{\$19,996\text{m}}{\$46,322\text{m}} \ = \ 43.2\%$$

Table 1.14   Tesco plc: Shortened income statement

Tesco plc	
£m	2011/12
Profit before tax	4,038
Taxation	(874)
Profit for the year	3,164

Source: Tesco plc (2011/12) [IFRS]

$$\text{Tax rate} \ = \ \frac{£874\text{m}}{£4,038\text{m}} \ = \ 21.6\%$$

As can clearly be seen (Tables 1.13 and 1.14), Chevron operates in a high-tax environment, paying out 43.1% of its pre-tax earnings to the Internal Revenue Service, whereas Tesco, the UK's largest retailer, had to share only 21.6% of its profits with HM Revenue & Customs.

These marked differences underline the often drastic effects tax rates can have on a company's profitability. In most countries, as is the case in the US and the UK, tax liabilities are calculated on the basis of pre-tax earnings. There are, however, exceptions: Estonian companies, for example, are taxed based on their dividend payments. This can have tremendous effects on the profitability and cash flow situation of a company since retained and reinvested earnings are taxed only when they are being paid out, compounding interest in the meanwhile. It is useful to note that corporate tax rates, which on the surface may appear clearcut, can be considerably distorted by other tax policies, most importantly the ability to carry forward losses for tax purposes. This can, for example, often be seen with new companies (start-up losses) or recently restructured corporations that have amassed losses in previous years. Given the complex nature of corporate taxation regimes, as well as the fact that they differ substantially even between countries that are part of the same economic federation (the EU), their effects should be discussed directly with the management or the investor relations department of the company if insight into the tax implications and the future tax rate development is sought. Table 1.15 gives an overview of national corporation tax rates for the largest equity markets worldwide.

Table 1.15   International corporate tax rates

Country	Corporate tax rate
Brazil	34.0%
Canada	26.0%
China	25.0%
France	33.3%
Germany	29.5%
Hong Kong	16.5%
Japan	38.0%
Norway	28.0%
Russia	20.0%
Switzerland	18.0%
United Kingdom	23.0%
United States	40.0%
North America Ø	33.0%
Asia Ø	22.3%
Europe Ø	20.6%
Latin America Ø	27.6%
EU Ø	22.7%
OECD Ø	25.3%
Global Ø	24.0%

Source: KPMG (2013)

Tax rate distribution: S&P 500

Figure 1.4 shows the tax rate distribution for the S&P 500 companies, giving a median of 41%. Most values above 40% can be attributed to exceptional events, whereas most tax rates below 30% are usually due to the application of tax losses carried forward.
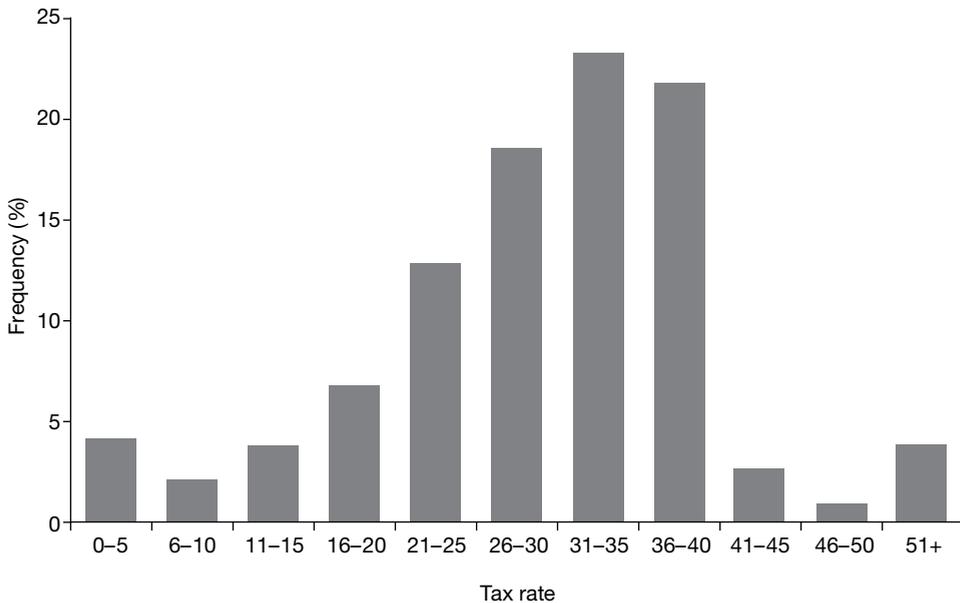
Figure 1.4   S&P 500: Tax rate distribution

1.2.2   Balance sheet

Balance sheets display the origin (liabilities) and purpose (assets) of the company's funds at the reporting date. Assets, liabilities and shareholders' equity of the company are presented in the form of accounts. Hence a balance sheet shows all the assets of a company as well as how they are financed. As a fundamental understanding of the meaning of each balance sheet item is essential for further analysis, this section will briefly look at the most important balance sheet entries.

Assets

The assets side lists all the assets of a company. These are subdivided into non-current assets and current assets, which are sorted according to maturity and liquidity.

Non-current assets normally comprise assets that are available to the company for the long term and are not intended for sale. These are mainly fixed assets like property, plant and equipment, long-term investments and also intangible assets like patents and goodwill.

Current assets form the second part of the balance sheet's asset side, containing assets staying with the company for up to a year, such as inventories, receivables and cash holdings as well as short-term investments.

The following list gives an overview of the most important balance sheet positions on the asset side.

Non-current assets/fixed assets
- *Intangible assets:* Intangible assets are usually purchased rights, patents, software and licences. In certain circumstances internally generated intangible assets may be capitalized by companies using the IFRS. It is therefore advisable, in instances in which the size of this position is unusually high, to verify that these assets are actually recoverable.
- *Goodwill:* Goodwill is the premium paid over the book value of the target company. For instance, company A takes over company B, which has a book value of $50m according to a current valuation of its assets and liabilities. Goodwill occurs when company A takes over company B for more than the book value of $50m. If company A pays $70m, $20m has to be declared as goodwill on A's balance sheet. In line with international accounting rules, this asset is subject to an annual impairment test using traditional valuation methods. If the result of this valuation is lower than the value listed on the balance sheet, an exceptional depreciation (called impairment) takes place, which has a negative impact on the profit and shareholders' equity. However, just like in a regular depreciation, these write-offs are non-cash items. In this context non-cash item means that although an expenditure is recorded on the income statement, no money actually leaves the company. Companies with substantial merger and acquisition activities usually show substantial goodwill on their balance sheet. In many cases this poses a dormant danger of their assets being overvalued.
- *Property, plant and equipment:* These fixed assets comprise factories, branches, car fleets, equipment and plots of land. In industrial enterprises this item is usually the largest entry on the balance sheet.
- *Financial assets:* Financial assets are securities which are permanently in a company's possession. These are mainly financial receivables, long-term securities and minority investments in third-party companies. In principle financial assets can also be allocated to current assets if they are not permanently used in business activity.

Current assets
- *Inventories:* Inventories consist of three sub-categories:
  - raw materials and supplies
  - unfinished goods
  - finished goods and merchandise.
  Raw materials and supplies are goods that are needed for the production of finished goods. These could, for example, be screws or lubricants. Unfinished goods are products that are still in the production process and are not yet ready for sale or distribution.
- *Accounts receivable:* This item contains all the company's receivables from third parties. If a receivable is classified as being in danger of default, it is correspondingly written down and valued at fair value. There is further information in the notes about the arrears of receivables and the necessary impairments concerning receivables to date.
- *Cash and cash equivalents:* Cash comprises a company's cash holdings, bank deposits and cheques. Together with short-term securities, such as money market funds, this item forms the liquid funds on the balance sheet. It is therefore referred to as 'cash position'.

Total equity and liabilities

Total equity and liabilities are the origin of a company's assets, and show how the assets are financed.

Let's assume that a private property costing $500,000 has been purchased using own capital and borrowed funds in equal parts. On completion of the building works the balance sheet of the buyer shows a property worth $500,000 on the asset side and $250,000 each for equity and borrowed capital on the equity and liabilities side. Hence the equity and liabilities side of the balance sheet outlines to what extent the assets have been financed by equity and debt.

In principle, this balance sheet part is subdivided into the company's own capital and liabilities. Liabilities in turn are subdivided into long-term liabilities, short-term liabilities and provisions.

Long-term liabilities have a maturity of more than one year. Short-term liabilities, in contrast, have to be repaid within a year. Provisions, with the exception of pension provisions, are usually part of short-term liabilities, as the expected payout is due within one year.

The difference between borrowed capital and assets results in the net assets, or the shareholders' equity of the company. In the example of the homeowner above, net assets are $250,000, as this is the amount that remains after subtracting the liabilities from the property value. If the value of the house drops to $300,000 the total equity would correspondingly decrease to $50,000, since the reduced value of the property is still burdened with $250,000 worth of liabilities.

Shareholders' equity

Shareholders' equity is the remaining part after all liabilities have been deducted from the asset base. As a residual value, shareholders' equity, unlike borrowed capital, is at the disposal of the company for an unlimited amount of time. In a consolidated balance sheet, shareholders' equity is subdivided into the following components:

- share capital
- retained earnings
- other comprehensive earnings
- treasury stock
- non-controlling interest.

The amount of shareholders' equity is determined by the capital provided by shareholders as well as the retained earnings. Share capital forms the basis of shareholders' equity and corresponds to the nominal value of the outstanding shares as well as any premiums paid over the face value of the shares, the additional paid-in capital. Retained earnings consist mainly of retained profits which have not been paid out yet but can be distributed to shareholders at a later point in time. Treasury stock, representing own shares repurchased in the open market, is deducted from shareholders' equity. Lastly, total equity is completed by the non-controlling interest of minority shareholders. This position represents equity claims of minority shareholders in fully consolidated subsidiaries of the group.

Shareholders' equity corresponds to the book value of the company. If the company was to be shut down, selling off all assets at the value stated on the balance sheet and paying back all debts, shareholders' equity is exactly what would remain.

The statement of changes in equity gives an insight into the movements of shareholders' equity during the year. Besides net income, it is especially the issuance and repurchase of stock as well as dividend distributions that affect the equity base. In addition, the statement of changes in equity shows the other comprehensive income, including expense and income items which are not recorded in the income statement but are directly offset against shareholders' equity. There is a detailed description of the statement of changes in equity at the end of this chapter.

Short-term liabilities/current liabilities
- *Accounts payable:* Accounts payable are trade credits, which are unpaid bills for goods delivered by the company's suppliers. Although a rise in this position increases liabilities, it is not a downside as such because the company may have its own funds available for longer when invoices are paid at a later time. Short-term liabilities are of particular significance in working capital management, which will be addressed in Chapter 4.
- *Notes payable/commercial papers:* Notes payable are interest-bearing debt with a term of less than one year. Depending on the characteristics they are near-to-maturity bonds or short-term bank loans. Another very important type of notes payable are commercial papers. These are mainly issued for short-term financing needs and have a term of up to 270 days.

Long-term debt/liabilities, borrowings
- *Bank loans, long-term debt, interest-bearing loans:* Long-term liabilities are interest-bearing loans with a term of more than one year. This entry usually consists of bank loans and other long-term debt. Total financial liabilities are the result of adding up all long-term and short-term interest-bearing liabilities. Most annual financial statements list details such as interest rates, currencies, maturity structure and other particulars of the different debt instruments in the notes section. Some balance sheets itemize long-term liabilities explicitly as bank credits, loans, bonds or similar.
- *Provisions:* Provisions are established as a type of allowance in case there is a danger of an economic outflow the likelihood and amount of which is not entirely quantifiable. They include guarantee provisions, provisions for pending lawsuits or tax provisions. Depending on the type and duration of the provision they can also be classified as a short-term liability. Pension provisions are another very important balance sheet position, especially in the case of very old companies. Usually, the liabilities arising from pensions are stated as a 'net' position, offsetting the liabilities with accumulated pension assets set aside for servicing future pension-related payouts.

1.2.3 Cash flow statement

Imagine that you run a pub. As your regular customers are short of money again, you let them put the drinks 'on the tab'. You are therefore creating turnover, but there is no money inflow stemming from this in the foreseeable future. This means that no funds are flowing in for the purchase of new goods, payment of employees' salaries and utility bills. While this problem does not appear on the income statement (drinks on the tab are considered income), or only with a substantial delay, it becomes directly visible in the cash flow statement, as the net profit shown on the income statement is adjusted for transactions in which the company actually has not (yet) received an inflow of money.

The cash flow statement is the central element of any financial statement analysis. Since the income statement is not adjusted for non-cash items, only the cash flow statement shows the true cash flows to and from the company during the year.

Non-cash expenses are expenditures but not payments. These are for example write-offs, temporary reductions in the value of securities, but also provisions for potential payouts (e.g. pending lawsuits) which will be due only at later point in time. Moreover, receivables which have not yet been paid and investment in inventories which have not yet been sold are also taken into account. The cash flow statement is divided into three sections:

- cash flow from operating activities
- cash flow from investing activities
- cash flow from financing activities.

The result of the balance of these cash flows is the change in cash at hand at the end of the accounting period. A typical, shortened cash flow statement is structured as shown in Table 1.16.

Table 1.16   Cash flow statement: overview

net income
+ depreciation
+/– change in provisions
+/– other non-cash expenditure/income
+/– changes in net working capital
= cash flow from operating activities
– investment in property, plant & equipment, intangible assets
– payment for acquisitions
+ divestments
= cash flow from investing activities
– debt repayment
+ payment received through borrowing
– repurchase of own shares
– dividend payments
= cash flow from financing activities

Much like the balance sheet and the income statement, the cash flow statement is inadequately standardized. Some companies, for example, list their paid interest as cash flow from operating activities, while others list it as cash flow from financing activities. Cash flow statements should therefore be reviewed and adjusted carefully prior to an analysis being undertaken. This is especially important when comparisons between industry players are being made.

Cash flow from operating activities

Cash flow from operating activities is calculated by correcting the net income for non-cash income statement items and the change in net working capital. The latter is necessary because capital has to be invested in working capital (e.g. inventories), especially during growth

periods, in order to be able to carry out and expand the operating business. As there is a cash outflow until the goods have been sold, this has to be recorded in the cash flow from operating activities.

This process is comparable to a baker who first has to buy raw materials (cash outflows), which are then on display as finished products (capital bound in working capital) and eventually sold (capital inflows).

Similarly a reduction of accounts payable, in other words the payment of supplier bills, will reduce cash flow from operating activities because a corresponding amount of cash has flowed out of the company. In contrast, if large amounts of raw materials or goods have been purchased on credit (increase in accounts payable), this has a positive impact on cash flow from operating activities. Accounts payable can therefore be considered as interest-free credit from the company's suppliers.

Changes in the accounts receivable are treated in a similar way. If receivables increase, a higher turnover and profit may be recorded, but the invoices are not paid quite yet. The net income will therefore have to be reduced by the increase in receivables, as the company has not yet received the turnover that has been generated. The net working capital (NWC) is calculated as follows:

$$\text{NWC} = \text{accounts receivable} + \text{inventories} - \text{accounts payable}$$

The change in net working capital, which is relevant for the cash flow statement, is derived by taking the net working capital in the period in question and subtracting the net working capital in the previous year. However, due to peculiarities of accounting, the changes of NWC in the balance sheet and in the cash flow statement often do not match exactly.

Another significant factor in cash flow statements is depreciation, as it merely simulates the wear and tear of previously purchased assets over their lifetime. It does not represent an actual cash outflow (which happened at the time of purchase/payment) and is correspondingly adjusted in the cash flow statement. The detailed calculation of cash flow from operating activities is as shown in Table 1.17.

Table 1.17   Operating cash flow statement

Net income
+/– depreciation/appreciation
+/– increase/decrease provisions
+/– decrease/increase inventories
+/– decrease/increase receivables
+/– increase/decrease supplier credits
Cash flow from operating activities

Example 1.10 – Cash flow from operating activities
Table 1.18 shows the balance sheet of Specious Inc. on 31 December 2009.

Table 1.18   Specious Inc: Balance sheet

Assets	$	Liabilities	
	Specious Inc.		
Inventory	400,000	Shareholders' equity	500,000
Cash	100,000	Liabilities	0
Balance sheet total	500,000	Balance sheet total	500,000

Specious Inc. sells its whole inventory for $500,000 to a customer on credit. The transaction has taken place but the bill has not been paid yet. Moreover, in the course of the year fixed costs of $70,000 accrue for employees and rent. The income statement for the year 2010 is therefore as shown in Table 1.19.

Table 1.19   Specious Inc: Income statement

Specious Inc.	
$	2010
Turnover	500,000
Cost of sales	400,000
Fixed cost	70,000
Net income	30,000

Although a considerable profit has been made, no money has flowed into the company because the inventory was sold on credit. Soon after, the client and debtor is declared insolvent during the course of 2011. This is not visible in the income statement because the accounting record

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Accounts receivable $500,000 to Turnover $500,000
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does not take into account the actual cash flow situation.

The client's insolvency becomes visible only in the financial statement of the following year, in which a write-down of receivables has taken place. The intelligent investor, however, could have noticed the precarious situation of Specious Inc. by studying the cash flow statement of the year 2010 (Table 1.20).

Table 1.20   Specious Inc: Cash flow statement

Specious Inc.	
$	2010
Net income	+30,000
Change in inventory	+400,000
Change in accounts receivable	−500,000
Cash flow from operating activities	−70,000

This shortened cash flow statement adjusts the net income for changes in receivables and inventory. In this case, receivables increased by $500,000, tying up more capital. At the same time, inventories decreased by $400,000. At the end of the year Specious Inc. displays a cash outflow from operating activities of $70,000 as opposed to a recorded profit of $30,000. Without new sales the company would not be able to pay its fixed costs of $70,000 in the following year, as available cash shrunk from $100,000 to $30,000. The company could face the prospect of bankruptcy. Even though this example simplifies the situation, these develop-ments should not be underestimated in reality. Chapter 4 introduces ratios for identifying tendencies like these in the early stages. In the end, every company depends on its ability to generate cash flow. For this reason the focus of this book is on the cash flow statement, which some market participants wrongly neglect.

Example 1.11 – Operating cash flow: Kellogg Company
The example of Kellogg Company, a major producer of ready-to-eat cereal and convenience foods, will illustrate the purpose and analysis of the cash flow statement. Table 1.21 shows Kellogg's operating cash flow statement as of 2012.

Table 1.21   Kellogg Company: Operating cash flow

Kellogg Company	
$m	2012
Net income	961
Adjustments to reconcile net income to operating cash flow:	
Depreciation and amortization	448
Post-retirement benefit plan expense	419
Deferred income taxes	(159)
Post-retirement benefit plan contributions	(51)
Changes in operating assets and liabilities, net of acquisitions:	
Inventories	(80)
Trade receivables	(65)
Accounts payable	208
Others	53
Net cash provided by (used by) operating activities	1,758

Source: Kellogg Company (2012) [US GAAP]

Kellogg posts a net income of $961m for the fiscal year 2012. This performance metric serves as the basis for the determination of the operating cash flow for the year. The $961m of net income is increased by the $448m in depreciation and amortization, since this figure is an expense which is not associated to a disbursement of cash. A further $419m for the post-retirement benefit plan is also added to the net income since these expenses, connected to the company's sponsorship of health care and welfare benefits for retired employees, have so far not led to a cash outflow. This position was especially large in 2012 as the company changed how to account for its post-retirement benefits. As can be seen, with the depre-ciation and post-retirement expenses, two big expense positions appear on the company's

income statement without directly affecting its cash flow situation. However, Kellogg had to contribute $51m into its underfunded post-retirement plan, which represents an outflow of funds but not an expense in the income statement and therefore appears as a negative figure (in parentheses) in the cash flow statement. Kellogg also had an outflow of $159m related to deferred income taxes. This is because the company paid down a part of its deferred tax liabilities in 2012. Since this position has been expensed before, it does not appear in the income statement or the net income for this year.

After these rather technical adjustments, the changes in operating assets and liabilities are next. These changes, better known as working capital requirements, present the cash in- and outflows associated with the day-to-day running of the business: if a company wants to grow, it has to purchase more inventory, the consequence of which is a temporary outflow of funds. This effect can also be seen in this case: Kellogg increased its inventory, hence recording an outflow of $80m. The company also shows a cash outflow from increasing trade receivables in the order of $65m. This means that not all of this year's revenue has actually been paid yet, and to account for this the operating cash flow has to be reduced accordingly. To counter these money drains, the company increased its accounts payable by $208m or, to put it more bluntly, it paid its suppliers later. This is a commonly employed strategy by companies, which often try to offset build-ups of inventories and accounts receivables by increasing their accounts payables.

Overall, the company recorded an operating cash flow of $1,758m, significantly ahead of the $961m in net income, which underscores the importance of distinguishing between net income, which is an accounting fiction, and the actual cash inflow received. The actual funds received are, however, not in their entirety at the company's disposal because necessary investments in the maintenance, modernization and expansion have to be financed. These expenditures are reported in the second part of the cash flow statement: the cash flow from investing activities.

Cash flow from investing activities

Whilst the operating cash flow supplies the inflow received from the underlying operating business, the cash flow from investing activities contains the cash in- and outflows connected with investments and divestments in long-term assets. Capital expenditures (CAPEX for short) for property, plant and equipment are usually the single largest and most important position in this part of the cash flow statement. Investments are prefixed with a minus sign (as money flows out) and divestments with a plus sign (as money flows in). In principle divestments should be viewed critically, since the company is selling assets that usually generate cash flows and therefore value. However, as in all aspects of company analysis we have to consider the individual circumstances. A divestment that constitutes a withdrawal from a loss-making business should be viewed positively. Similarly, a decrease in investments in fixed assets leaves the company with more capital at its disposal, but investments are generally necessary for staying competitive and for increasing market share. Few other activities play such a pivotal role in the future success of the business as do capital expenditures. In this area, besides interpreting the figures, gut feelings and instinct are of particular importance. Common sense often tells us more about a particular economic benefit than any formula. Depending on the accounting method, cash flow from investment activities also includes incoming and outgoing payments for financial assets with a term of more than three months

(e.g. fixed-term deposits). As they are not investments in the true sense, the cash flow state-ment from investment activities should be adjusted for these amounts.

Example 1.12 – Cash flow from investing activities: Kellogg Company
For the fiscal year ended 2012, Kellogg reports the cash flow from investing activities shown in Table 1.22.

Table 1.22   Kellogg Company: Investing cash flow

Kellogg Company	
$m	2012
Additions to properties	(533)
Acquisitions, net of cash acquired	(2,668)
Other	(44)
Net cash provided by (used by) investing activities	(3,245)

Source: Kellogg Company (2012) [US GAAP]

In 2012, the company invested $533m in property, plant and equipment as well as in in-tangible assets. In the case of manufacturing companies, these expenditures usually consist of investments in new plant, machinery, vehicles, but also software and intellectual property. Usually, this position is referred to as capital expenditures, or CAPEX for short. Beside the capital expenditures, Kellogg spent $2,668m on the acquisition of Pringles, a maker of snack crisps, previously owned by Procter & Gamble. In total, the company spent $3,245m in its investing activities.

Example 1.13 – Cash flow from investing activities: Apple Inc.
Before going on to the last part of the cash flow statement, let's have a quick look at Apple's 2012 cash flow stemming from its investing activities. After posting $50.8bn in operating cash flow and having amassed a cash and securities pile exceeding $120bn, Apple's cash flow from investing activities looks somewhat different than is the case for most other companies (Table 1.23).

Table 1.23   Apple Inc: Investing cash flow

Apple Inc.	
$m	2012
Purchase of marketable securities	(151,232)
Proceeds from maturities of marketable securities	13,035
Proceeds from sale of marketable securities	99,770
Payment made in connection with business acquisitions, net of cash	(350)
Payments for acquisition of property, plant and equipment	(8,295)
Payments for acquisition of intangible assets	(1,107)
Other	(48)
Cash used in investing activities	(48,227)

Source: Apple Inc. (2012) [US GAAP]

Apple purchased securities worth \$151.2bn during 2012. The company also received \$13.0bn from maturing investments like bonds and another \$99.7bn from the sale of securities. While these figures may seem, and indeed are, impressive, they have very little relevance for the cash flow statement analysis. In these transactions, it is merely cash being exchanged for marketable securities like bonds and vice versa. However, technically, these transactions are booked as investing activities because Apple invested its cash in long-term securities which can't be reported as cash and cash equivalents at the end of the year and consequently have to appear on the cash flow statement as an outflow. For the purposes of analysis, the only relevant positions here are the payments for the acquisitions of property, plant and equipment as well as the payments for the acquisition of intangible assets. Added together, these form the CAPEX and the real cash outflow of investing activities for Apple in 2012.

Cash flow from financing activities

The difference between cash flow from operating activities and cash flow from investing activities gives the free cash flow for the period:

$$\text{Cash flow from operating activities} - \text{cash flow from investment activities} = \text{free cash flow}$$

The free cash flow represents the operating cash inflow following the undertaking of any necessary maintenance investments as well as capital expenditures to secure and extend the competitive edge of the business respectively. Free cash flow can be used to pay out dividends, repurchase own shares and pay off loans. If the investments of a certain period are higher than the cash inflow from operating activities, the free cash flow is negative. This shortfall can be compensated for by borrowing or using existing cash on hand. From a mathematical point of view one has to pay attention to the correct use of the algebraic signs when calculating free cash flow because investments as a cash outflow are often prefixed with a minus sign. In the formula above cash flow from investment activities is converted to a positive quantity.

Example 1.14 – Free cash flow calculation, Kellogg and Apple
Referring to the example of Kellogg that we discussed above, the free cash flow for the year 2012 amounts to:

$$\text{Free cash flow}_{\text{Kellogg}} = \$1,758m - \$3,245m = -\$1,487m$$

Since Kellogg does not pursue acquisitions on a regular basis, the rather large takeover of Pringles in 2012 can be considered an outlier. Comparing the operating cash flow to the capital expenditures therefore yields a better measure of Kellogg's free cash flow generation power:

$$\text{Free cash flow}_{\text{Kellogg}} = \$1,757m - \$533m = \$1,224m$$

This figure basically represents the true or underlying cash flow of the company, after taking into account yearly investments that are necessary in order to keep the company growing. As this example shows, the definition of which CAPEX is recurring, and therefore should be subtracted, has a great influence on the resulting free cash flow. Great emphasis should therefore be directed at the current and future composition of capital expenditures.

The same applies in the example of Apple. Following the traditional formula would not lead to useful values since the cash flow from investing activities is distorted by the internal investing entries. In this case, it is again advisable to consider only the actual CAPEX for property, plant and equipment, as well as intangible assets.

$$\text{Free cash flow}_{Apple} = \$50.8\text{bn} - \$8.3\text{bn} - \$1.1\text{bn} = \$41.4\text{bn}$$

Example 1.15 – Cash flow from financing activities: Kellogg Company
Kellogg used its free cash flow in 2012 for the following purposes, as shown in its cash flow statement (Table 1.24).

Table 1.24   Kellogg Company: Financing cash flow

Kellogg Company	
$m	2012
Net increase (reduction) of notes payable (short-term)	779
Issuances of notes payable (long-term)	724
Reductions of notes payable	(707)
Issuances of long-term debt	1,727
Reductions of long-term debt	(750)
Net issuances of common stock	229
Common stock repurchases	(63)
Cash dividends	(622)
Net cash provided (used in) financing activities	1,317

Source: Kellogg Company (2012) [US GAAP]

The company registered an inflow of $779m from short-term borrowing, adding to another $724m from the issuance of long-term notes. Meanwhile, the company paid back $707m in notes payable. The largest inflow came from the issuances of long-term debt, most likely in the form of bank loans.

In addition to this, the company issued common stock worth $229m, which is therefore recorded as a cash inflow. The appearance of this entry can have two underlying causes. The first possible cause is that the company issued new shares to existing shareholders or outside investors through a capital increase. The second possible cause involves the company paying its employees with newly issued stock instead of cash. Since this is obviously an expense but does not cause a cash outflow, the effect has to be reversed in the cash flow statement. Usually, however, the effects from stock-based compensation are recorded in the operating, rather than the financing, cash flow. The first cause named is therefore the most likely in this case.

The company also repurchased $63m of its own shares in the stock market and, finally, paid out $662m in dividends, which constitutes a cash outflow.

Tallying it all up, the company recorded a net inflow of $1,317m from all financing activities, mainly due to higher borrowings. The attentive reader will not be surprised by this, since

the company spent more money on capital expenditures and the Pringles takeover than it generated through its operations (see the first free cash flow calculation). As a result, Kellogg faced two alternatives: use existing cash on hand or increase borrowings to counterbalance the free cash flow deficit. Kellogg opted for the latter. Indeed, the inflow from financing activities of $1.31bn nearly matches the negative free cash flow of –$1.48bn.

Adding up the three different cash flows gives the total cash in or outflow for the period (Table 1.25).

Table 1.25   Kellogg Company: Cash flow summary

Kellogg Company	
$m	2012
(A) Cash flow from operating activities	1,758
(B) Cash flow from investing activities	(3,245)
(C) Cash flow from financing activities	1,317
(D) Increase/Decrease in cash and cash equivalents	(179)
(E) Cash and cash equivalents at the beginning of the period	460
(F) Cash and cash equivalents at the end of the period	281

Source: Kellogg Company (2012) [US GAAP]

As outlined above, the change in cash and cash equivalents (D) can be calculated by adding up (A) + (B) + (C). In total, the company recorded a decrease of $179m (the $9m variance stems from exchange rate effects). Whilst the cash balance stood at $460m at the beginning of the year, Kellogg ended up with $281m in cash at the end of the year since not the entire negative free cash flow was balanced by additional borrowing.

It is not surprising that liquid assets, i.e. cash and cash equivalents, are listed at the end of the cash flow statement, as they are presented on the balance sheet. Table 1.26 illustrates this.

Table 1.26   Change in liquid assets

Liquid assets 1 January
+/– cash flow from operating activities
+/– cash flow from investment activities
+/– cash flow from financing activities
= liquid assets 31 December

The algebraic signs of the items may change in some cases such as excessive borrowing or unusual divestments. Current corporate developments should therefore always be taken into account during analysis of the cash flow statement. The construction of new company headquarters, for example, will lead to high investments, which are, however, only of a temporary nature. In particular, large takeovers that have been financed through borrowed capital will lead to extreme values in different subsections of the cash flow statement. An example of this – not unusual – situation is the takeover of Anheuser-Busch by the Belgian brewery group InBev in 2008.

Example 1.16 – Cash flow statement: InBev

Table 1.27   InBev: Shortened cash flow statement

InBev		
$m	2008	2007
Cash flow from operating activities	4,189	4,064
Cash flow from investing activities	(42,164)	(2,358)
– thereof: Capital expenditure	(1,640)	(1,440)
– thereof: Acquisition	(40,500)	(920)
Cash flow from financing activities	38,421	(970)
– thereof: Borrowing	35,142	366

In 2007 the cash flow statement shows normal values (Table 1.27). The cash flow from operating activities is positive, InBev reports an outflow from investment activities due to necessary capital expenditures and the cash flow from financing activities is also negative mainly due to dividend payments. In 2008 the picture changes as the cash flow statement is distorted by the Anheuser-Busch acquisition at a price of more than $40bn. The operating cash flow remains positive as the takeover did not interfere with InBev's day-to-day business, but over $42bn flowed out as part of the investment activity, of which $40.5bn was used for the takeover. In order to finance this free cash flow gap, the company borrowed more than $35bn. In total around $38.4bn flowed in as part of the financing activity, giving an overall balanced cash flow situation at the end of the year.

Example 1.17 – Cash flow statement: Sotheby's
Cash flow statements can differ noticeably in form and structure depending on the industry and the accounting standards applied. The value-adding part of the cash flow analysis is the interpretation of data against the backdrop of the actual business model. Therefore thorough familiarity with the underlying business and its business model is a basic prerequisite. The following detailed case study looks at the cash flow statement of the world-famous auction house Sotheby's. Its core business is the auctioning of all types of art and objects. The company generates turnover by charging the seller a fee and the buyer of the object a proportion of the hammer price. Apart from that, Sotheby's also acts as an art dealer, financier and grantor of licences. This basic knowledge can be found in the introductory part of the financial statement and is important for understanding the cash flow statement that follows.

Table 1.28 is an extract of the group's cash flow statement. For reasons of clarity some less important positions have been omitted. The figures therefore do not add up completely. Cash outflows have been marked with brackets, cash inflows without brackets.

Table 1.28 Sotheby's: Cash flow statement

$m		2009	2008	2007
A	**Net (loss) income**	**(6,528)**	**25,456**	**213,139**
B	Depreciation	21,560	24,845	22,101
C	Gain on sale of business	(4,146)	–	–
D	Impairment loss	–	13,189	14,979
E	Share-base compensation	20,568	30,396	28,163
F	**Changes in assets and liabilities**			
G	Accounts receivable	178,670	198,020	(443,307)
H	Due to consignors	(74,472)	(301,073)	200,080
I	Inventory	35,857	(20,923)	(84,859)
J	Accounts payable	(42,304)	(73,563)	33,746
K	**Net cash provided by operating activities**	**158,521**	**(175,478)**	**(37,145)**
L	Funding of receivable and consignor advances	(152,179)	(377,216)	(306,241)
M	Collection of receivable and consignor advances	179,289	371,388	352,381
N	Capital expenditures	(100,879)	(74,192)	(17,398)
O	**Net cash provided by investing activities**	**(65,789)**	**(83,708)**	**163,740**
P	Proceeds from revolving credit facility borrowings	–	390,000	–
Q	Repayments of revolving credit facility borrowings	–	(390,000)	–
R	Proceeds from 3.125% Convertible Senior Notes	–	194,300	–
S	Proceeds from 7.75% Senior Notes	–	145,855	–
T	Dividends paid	(20,434)	(40,651)	(33,326)
U	**Net cash provided by financing activities**	**(24,246)**	**170,255**	**(695)**
V	Exchange rate effect	(375)	(5,854)	1,259
W	Increase (decrease) in cash and cash equivalents	68,111	(94,785)	127,159
X	Cash and cash equivalents at beginning of period	253,468	348,253	221,094
Y	**Cash and cash equivalents at end of period**	**321,579**	**253,468**	**348,253**

Source: Sotheby's (2009) [US GAAP]

Sotheby's: cash flow from operating activities

The cash flow statement starts with the net income of the relevant business year (A). As Sotheby's posted a net loss in 2009, the amount appears inside minus brackets. Position (B) corrects the deficit for incurred depreciation. Despite being an expenditure, depreciation expenses do not cause an actual cash outflow and are hence added back. The sale of businesses (C) forms a cash inflow, but is not counted as part of the operating activity and is therefore removed from the calculation. This item can now be found as a sub-item in the investing cash flow part. Whereas the income statement does not distinguish between normal operating income and non-operating income (speculation in shares, insurance settlements, sale of property, etc.), cash flow statements arrange cash flows according to their nature. In (D) the impairment losses are added back in an analogous way to (B). A common feature observed in the US is to reward employees with stock in the company (E). The position has been corrected as this form of remuneration is (initially) not followed by a direct payout but has nevertheless previously been recorded as an expenditure in the income statement.

The next step is to correct for the change in working capital (F). First, the change in accounts receivable is recorded. The table shows that the company had more funds flowing in, as more accounts were settled than new receivables added. This is partly due to good working capital management, but also partly due to a dramatic downturn in the worldwide art market.

It shows that in a downturn companies collect their receivables quickly and at the same time fewer new receivables are booked. At least in the short term the advantage of this is that tied-up capital is released and can be used to pay back debt or finance future growth. Looking at the corresponding figures for 2007, at the height of the global art bubble, Sotheby's shows a negative amount of more than $400m. Back then the business volume increased strongly and was followed by a higher level of capital commitment: many customers used Sotheby's auctions but paid for the services later. Position (H) clearly mirrors the development of receivables and displays a peculiarity which appears only in cash flow statements of auction houses. The item 'Due to consignors' records the amount that Sotheby's has to transfer to the actual seller of the art object. The corresponding position can therefore be found under 'Short-term debts' on the balance sheet.

Flow of goods: Seller → Sotheby's → Buyer

Flow of cash: Seller ← Sotheby's ← Buyer

If this position decreases, Sotheby's has, technically speaking, cleared its debt. In practice the company has recovered receivables from buyers, kept the corresponding margin and transferred the remaining amount from the purchase price to the seller. In the case of Sotheby's, decreasing receivables are therefore always linked to cash outflows under the item 'Due to consignors'. Recognizing business-level contexts like this is essential for a value-adding analysis. Inventory (I) is normally an important ingredient in balance sheets and cash flow statements. However, since Sotheby's usually acts as an intermediary and as its own art dealership handles only small volumes, changes in inventory do not consume a significant share of cash flow. The same logic applies for the accounts receivable. If inventory increases, more capital is committed; if inventory decreases, capital is released. Correspondingly, inventory increased in the years 2007 and 2008. In 2009, however, inventory was reduced by $35.8m and funds therefore flowed into the company. Position (J) contains accounts payable. If this position increases, the company has, in contrast to accounts receivable, more funds at its disposal. Due to the company's peculiar business model, 'Due to consignors' basically takes on the role of current liabilities. Adding up positions (A)–(J) results in the cash flow from operating activities (K). In 2009 Sotheby's had a cash inflow from its operational business of $158m, which might be surprising against the background of the net loss for the period. When compared with the years 2008 and 2007 it is striking that, in those years, the company had no cash inflow from its operating activities, but rather a cash outflow. This shows that in boom periods investments in working capital often surpass actual profits, thus turning the cash flow from operating activities negative, and that actual cash inflow does not take place until phases of moderate or declining growth. This demonstrates clearly how growth can tie up large amounts of capital which is consequently not available to the company for further investment. All this detailed information cannot be obtained from the income statement, which gives only a very limited perspective on the company and its business model.

Sotheby's: cash flow from investing activities

Similar to the cash flow from operating activities, some of the investing cash flow positions differ from a regular industrial enterprise. As Sotheby's partly finances some works in advance (L) by transferring the minimum hammer price to the seller before the work has been

auctioned, this amount has to be refinanced. Position (L) shows the amount transferred to the seller, (M) shows the 'collection' of this amount after the auction. The amounts in (L) and (M) are almost the same. The reason lies in the maximum term of these transactions (from financing to closure) of up to 12 months. According to additional information in the annual report, these transactions should be concluded within a certain period of time and therefore have little impact at the time of the balance sheet closing date. Business-critical investments 'CAPEX' (N) amount to $100m in 2009 and $74m in the previous year. Compared with the underlying cash earnings (net income + depreciation) of $15m and $50m of the corresponding years, this is a concerning level of investment in fixed assets. It appears that the company invests more than it actually receives from operating activities. In this case, this is due to the extraordinary effect of the construction of a large building. The financial statements from the last five years, in contrast, show an average CAPEX of $10m–15m, which can be considered unproblematic. It is always necessary to review financial statements across several years to avoid pitfalls like this. Adding up the values of points (L)–(N) gives the cash flow from investing activities, which is normally negative, as funds are invested.

Sotheby's: cash flow from financing activities

Positions (P), (R) and (S) each relate to borrowings and loan redemptions (Q). (T) shows the dividends paid in that business year. Adding up (P) to (U) yields the entire cash inflow or outflow from financing activities.

The total sum of these three cash flow categories (K)+(O)+(U), taking into account the effects of exchange rate fluctuations (V), shows the entire change in cash and cash equivalents (W) at the end of the period. The corresponding closing balance of cash and cash equivalents on 31 December (Y) is therefore the result of the opening balance of cash and cash equivalents on 1 January (X) plus the change in cash and cash equivalents during the year (W).

Cash is the life blood of every company and the cash flow statement its blood pressure monitor. Without a steady and sufficient stream of cash, sourcing, production, marketing and distribution, i.e. the operational side of the business, cannot be carried out. In effect, the cash flow statement gives the clearest insight into the condition, the health, of a company by setting off cash inflow from operating activities against cash outflows from investment and financing activities.

1.2.4   Statement of changes in equity

The statement of changes in equity is a component of the financial statement which shows, in detail, the movements in shareholders' equity within a given financial year. Besides net income, dividend payouts, buyback of shares, capital contributions and the other comprehensives, income will also have an impact on shareholders' equity as reported on the balance sheet. The statement of changes in equity lists, in tabular form, the impact of these factors on the various components of shareholders' equity, i.e. the share capital, retained earnings, other comprehensive income and treasury shares. In addition, the development of minority interests in shareholders' equity is usually listed.

1.2.5   Notes

The notes section is used to provide a more detailed explanation of some balance sheet and income statement positions, and for any further clarifications to add context to the financial report. The first section of the notes sets out which accounting and valuation principles have been applied, and addresses the basis of consolidation. It also points out any accounting changes made from the previous year. The next section further clarifies individual positions on the balance sheet and the income statement. The note topics listed in Table 1.29 are usually of particular interest for in-depth financial statement analysis.

Table 1.29   Important notes and additional information

Position	Explanation
Earnings per share (EPS)	EPS calculation and number of shares outstanding
Segment reporting	Revenue and result distribution by segment
Financial result	Composition of the financial result
Tax expense	Expected and actual tax expense
Intangible assets	Book values, additions, disposals and amortization
Fixed assets	Book value, additions, disposals, depreciation
Inventory	Composition and depreciations
Accounts receivables	Structure of receivables and depreciation
Schedule of debt payments	Structure of maturity, volume, currency and interest rate
Additional leasing data	Term, obligations, classification

Segment reporting

Among the items listed in the table above, the segment information and the schedule of debt payments are of particular relevance and will be described in more detail below.

   The segment reporting gives information on sales, profits and other relevant key figures connected to specific operating business segments. The subdivision can be based on regions, product groups or, in the case of conglomerates, subsidiaries.

   The key ratios for the financial evaluation of a company, which are described in the following chapters, can also be applied on an individual division level. Usually a company's operating divisions have different profit margins and sales results. A detailed divisional report can give a thorough overview and assist in identifying the value drivers within a company and thus indirectly help uncover the company's strengths and weaknesses. This is the reason why divisional analysis can play an important role in the company valuation process.

Example 1.18 – Segment reporting: Hengdeli Holdings Limited
To get an initial impression of how to decipher segment reporting, let's have a look at the 2012 financial statement of Hengdeli Holdings, the largest retailer of Swiss-made luxury watches in Asia (Table 1.30).

Table 1.30   Hengdeli Holdings: Segment reporting

(in RMBm)	Mainland China	Hong Kong	Taiwan	Wholesale	All others	Total
	Hengdeli Holdings Limited					
	Retail					
Revenue from external customers	5,627	3,113	214	2,924	239	12,120
Intersegment revenue	–	–	–	3,075	1	3,076
Reportable segment revenue	5,627	3,113	214	6,000	240	15,197
Reportable segment profit	1,905	753	69	338	88	3,154
Reportable segment assets	2,968	1,371	273	1,016	63	5,693

Source: Hengdeli Holdings (2012) [HK GAAP]

Many corporations trade not only with their external customers, but also within their organization. This is why, in the above example, the individual divisions post their respective external as well as divisional revenues. Hengdeli reports the results for its retail operations in China, Hong Kong and Taiwan as well as for its large wholesale business. The wholesale business acquires watches from Swiss manufacturers such as Omega and Rolex and sells them to retailers in China. Among these retailers are also Hengdeli's own retail operations, which is why the wholesale division reports cross-divisional sales of RMB3,075m. Of course, these transactions do not affect the group's total revenues since the goods are merely passed on within the same corporate group. To analyse the results reported by the divisions, the revenue from external customers is therefore relevant and gives a good indication of the respective division sizes. Another suitable size indicator is the size of reportable assets for each division, which allows us to draw conclusions about the capital intensity of each business unit. In the next step, each division's impact on the group earnings should be examined. In this case, the Mainland China retail business accounts for 60% of group earnings and posts the highest profit margins in terms of earnings as a percentage of sales. Reported division profits should, however, always be interpreted with caution since management can let one segment appear to be very profitable, simply by applying artificially low internal transfer prices, for example by selling the products from wholesale to its own retail units, priced below the market. On the group level, of course, these effects cancel out: one segment's extra gain comes at the expense of the other.

Some companies, but especially those in the United States, report on a geographical rather than a business segment basis. In such a case one has to carefully review whether and how expenses (administrative expenses for example), which usually occur in the home country, are distributed within those segments.

Schedule of liabilities/structure of maturities

The final section of the notes often contains an overview of the liabilities structure grouped by maturity. It is particularly interesting that, in some cases, it is not only the expected cash outflow from financial liabilities that is itemized in chronological sequence, but that the expected payments from supplier credits and cash inflows from receivables are also displayed. This breakdown provides valuable insight into the solvency and liquidity situation

of a company. The case of the Finnish conglomerate Nokia shows the following maturity structure for 2011 (Table 1.31).

Table 1.31   Nokia: Repayment schedule

€m	Total	3 months	3–12 months	1–3 years	3–5 years	5 years+
Long-term liabilities	−5,391	−106	−153	−2374	−316	−2442
Current portion of long-term debt	−387	−61	−326	–	–	–
Short-term liabilities	−1002	−951	−87	–	–	–

For the following 12 months Nokia's need for refinancing is determined by summing up the columns '3 months' and '3–12 months', which results in €1,684m. This figure can now be compared with the cash and cash equivalents on Nokia's balance sheet at year end as well as the free cash flow (see previous section) in order to determine the company's internal financing capacity.

The individual components of financial statements and the consolidated financial statements form the basis of any quantitative fundamental analysis. In summary, it is recommended that the balance sheets, income statements and cash flow statements covering several years are evaluated in order to arrive at the most accurate analysis possible. In a comparison with other companies, differences in accounting rules always have to be considered. When it comes to the balance sheet in particular, the notes section is a useful tool for further analysing individual entries in detail. As with all the following financial ratios it is important to carry out the analysis in light of the actual circumstances and activities of the business. The example of Sotheby's showed that it is very difficult, if not impossible, to perform the analysis without this critical background knowledge. The following three chapters will look in detail at financial ratios from various areas of fundamental analysis and illustrate them with case studies.

2
Key Ratios for Return and Profitability

> Time is the enemy of the poor business and the friend of the great business. If you have a business that's earning 20%–25% on equity, time is your friend. But time is your enemy if your money is in a low-return business.
>
> Warren E. Buffett

Profit maximization is one of the foremost targets in business. Profit arises when capital is deployed in uncertain circumstances. A baker for example needs a shop, a bakery and raw materials to carry out the operational activity using this capital in order to make a profit. Hence, to measure the success of an enterprise one has to consider both sides of the equation: profit and required capital. The bigger the profit and the smaller the required capital base, the more profitably the business will run. Profitability is therefore an important success measure in company valuation.

This chapter addresses the question of how profitability is measured and how meaningful the results are. Several key profitability ratios, which serve as basic tools in the valuation process, will be explained with the help of case studies. Net profit is the most commonly used performance indicator. However, the meaningfulness of the conclusions about the value of a company is limited as long as net profit is not set in relation to other indicators. The development of two fictional companies' group earnings sheds more light on this issue.

Example 2.1 – Profitability

Table 2.1   Earnings development: Company A and Company B

Company A	$	Company B	
Year	Profit	Year	Profit
2009	100.00	2009	1,000.00
2010	150.00	2010	1,000.00
2011	200.00	2011	1,000.00
2012	250.00	2012	1,000.00
2013	300.00	2013	1,000.00

Besides data shown in Table 2.1, both companies are known to have constant shareholders' equity of $5,000. Both make solid profits but company A increases profits by $50 a year whereas company B stagnates. Based just on profit dynamism, company A should be classified as more attractive. However, in relation to deployed shareholders' equity, company B is clearly more profitable. Based on the same investment of capital from shareholders, company B makes considerably higher profit than company A.

Profit must thus be considered in relation to invested capital when evaluating profitability. Profit development alone gives little indication about the quality of a company. Company A, for example, could have invested its shareholders' equity of $5,000 at a fixed rate of 5% in

order to make a profit of $250. As capital is a scarce and high-risk commodity within businesses, care should be taken to achieve an appropriate return, compensating for the risk incurred.

2.1   RETURN ON EQUITY

Return on equity (ROE) shows the return on the capital provided by shareholders. To calculate this important ratio, net profit is set in relation to the average shareholders' equity over the business year. In the calculation it is important to bring in net profit and shareholders' equity *after* minority interests have been deducted in order to only consider figures that shareholders are actually entitled to.

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

This ratio gives investors a figure that can be compared between different companies and investment opportunities. Applied to example 2.1, in 2009 company A has a return on equity of just 2% ($100/$5,000). If investors had deposited the money in a bank account they would have likely achieved a better return at negligible risk. Company B in contrast posts a return on equity of 20% ($1,000/$5,000) despite stagnating profits.

A low return on equity points to an inefficient use of capital or an overvaluation of its assets (and therefore its shareholders' equity). Due to its link between net profit and shareholders' equity, return on equity forms the central profitability ratio for shareholders. Chapter 8 shows that companies gain in value when they can increase shareholders' equity at a high rate and low risk. Return on equity indicates that rate.
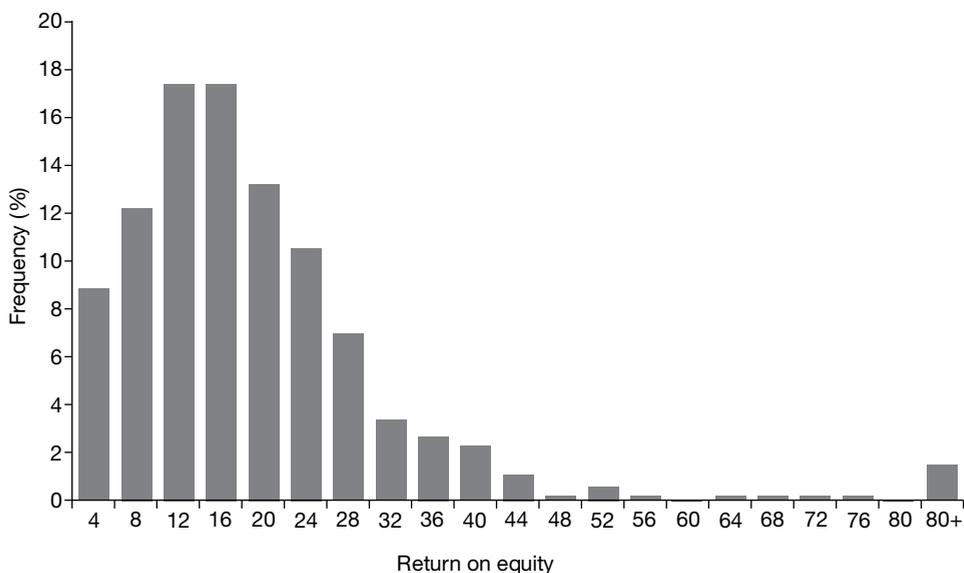
Return on equity distribution: S&P 500

Figure 2.1   S&P 500: three-year average return on equity distribution

As shown in Figure 2.1, for all S&P 500 members, the average return on equity figure is 17.3%, whereas the median is 14.6%. In this case, the three-year average return on equity has been used. The difference between the average and median is explained by the strong right tail of the distribution. Such extremely high return on equity figures is usually the result of an excessive leverage. Because of this, the 14.6% figure is a more sensible return on equity to benchmark other companies against.

Example 2.2 – Return on equity: Rotork plc
The financial statements of Rotork plc, a leading actuator manufacturer and flow control specialist, producing actuators, gearboxes and valve accessories to manage the flow of gases and liquids, show the relevant income statement and balance sheet data in Table 2.2.

Table 2.2   Rotork plc: Net profit and total equity

Rotork plc	
£000	2012
Profit for 2012	89,315
Total equity 2012	269,323
Total equity 2011	224,169

Source: Rotork plc (2012) [IFRS]

Given its dominant market position, Rotork managed to achieve a return on equity of:

$$\text{Return on equity} = \frac{\pounds 89{,}315}{\left(\frac{1}{2} \times \pounds 269{,}323 + \frac{1}{2} \times \pounds 224{,}169\right)} = 36.2\%$$

This value is above-average and demonstrates Rotork's ability to generate a considerable profit without employing too much equity. The avoidance of the usage of debt in order to increase the return on equity reinforces the quality of this outstanding result: Rotork posts an equity ratio of 64.8% at year-end 2012 and has no financial debt such as bank loans or bonds on its balance sheet.

When analysing the return on equity over time or between different companies, special attention needs to be paid to the prevailing debt to equity ratio and the amount of risk taken. If a company achieves a very high return on equity, but takes substantial risks doing so, the resulting excess return will be small. Exceptional returns on equity levels in combination with little or no debt, as for example in the case of Rotork, however, are usually reliable indicators of a strong market position and an efficient use of capital.

Example 2.3 – Return on equity: Energizer
Let us look at the ROE calculation based on a real financial statement. Table 2.3 is an extract of the consolidated financial statement of Energizer Holdings, the maker of Energizer batteries and Wilkinson razors, for the fiscal year 2010.

Table 2.3   Energizer Corp.: Net profit and total equity

Energizer	
$m	2010
Net sales	4,248.3
…	…
Net earnings	403.0
Total shareholders' equity 2010	2,099.6
Total shareholders' equity 2009	1,762.3

Source: Energizer Corp. (2010) [US GAAP]

The return on equity is calculated as follows:

$$\text{ROE} = \frac{\$403.0\text{m}}{\frac{1}{2} \times \$2,099.6\text{m} + \frac{1}{2} \times \$1,762.3\text{m}} = 20.87\%$$

At 20.87% Energizer has an above-average return on equity, but this rate is partly due to the company being highly leveraged. Over the past ten years the company has reduced its shareholders' equity by $1.7bn just by repurchasing own shares. Hence, besides actual high profit margins, the healthy return on equity figure is also due to a high level of borrowing, with an equity ratio of just 32.8%, making it not so healthy after all. This ROE therefore comes with an increased level of risk.

The example of Energizer Holdings shows that an above-average rate of return on equity is not only, and not necessarily, a consequence of the operational performance but also subject to financial decisions.

Considering the formula for return on equity, there are two ways of increasing profitability: one way is to increase return on equity by raising profits, the other is to reduce shareholders' equity. Companies that are sufficiently stable often partly reduce their equity base by repurchasing own shares or by paying out dividends to increase their return on equity. Yum! Brands in example 2.4 illustrates how excessive buybacks can lower shareholders' equity considerably. This form of improving profitability has its own risks, as an adequate equity base can serve as a safety buffer in times of crisis. Hence rising returns on equity through repurchasing shares entails an increased risk. This approach should therefore be taken only by companies that have secure and stable cash flows. For this reason the return on equity should be evaluated in connection with the level of borrowing, the equity ratio (both Chapter 3) and the stability of the business model (Chapter 5). In the instance of Yum! Brands, the second-largest fast-food chain in the world, the approach described above is perfectly legitimate. It is true that the group has lowered its shareholders' equity, for a short period of time even to a negative amount, through buybacks and other accounting effects. However, its business model is so robust that even this extreme method of improving profitability can be classed as acceptable. Nevertheless, Yum! can be considered an exception. Cyclical industries like heavy manufacturing or mining require a sufficient equity base to maintain their flexibility in a downturn.

Example 2.4 – Statement of changes in equity: Yum! Brands
The extract of Yum! Brands' statement of changes in equity in Table 2.4 shows that repurchasing own shares reduced the group's shareholders' equity to such an extent that by the end of the business year in 2008 it had turned negative.

Table 2.4   Yum! Brands: Change in equity

Yum! Brands	
$m	2008
Balance at 29 December 2007	1,139
Net income	964
Foreign currency translation adjustment	(223)
Pension and post-retirement benefit plans	(208)
Net unrealized loss on derivative instruments	(7)
Comprehensive income	526
Dividends declared on common stock	(339)
Repurchase of shares of common stock	(1,615)
Other effects	181
Balance at 27 December 2008	(108)

The table shows shareholders' equity of $1.1bn for the previous year, which increased by $964m due to the net profit achieved. At the same time, however, it was decreased by $438m through the effects of currency hedges and changes in pension liabilities which are not taken into account in the income statement. Hence, the 'true' net profit amounted to $526m, which is referred to as 'comprehensive income'. Furthermore, dividend payments and buybacks reduced shareholders' equity by almost $2bn, which meant that the group, which is in itself solid, showed negative shareholders' equity of $108m at the end of the fiscal year.

2.2   NET PROFIT MARGIN

The net profit margin shows how many cents profit are achieved per dollar of sales. In particular, companies with an excellent market position, tight cost control and a low debt level usually display very high net profit margins.

$$\text{Net profit margin} = \frac{\text{Net profit}}{\text{Sales}}$$

In order to calculate the net profit margin in consolidated financial statements, the net result has to be brought in *before* deducting minority interests since the corresponding sales figure includes these minorities as well. Market power and cost management have a significant impact on this figure. The more pronounced the ability to adjust prices and at the same time lower costs, the higher the profit margin. For this reason, companies that operate in a monopoly or an oligopoly usually show very high net profit margins. In addition, when

increases in revenues come with increasing profit margins, this can usually be considered a sign of economies of scale.

As a counterexample, typically retailers, who do not produce goods but act as intermediaries, can be named. In this industry, profit margins are usually in the low, single-digit region. As a rule, in the retail business an increase of this margin can take place only by reducing cost or expanding volume. That explains why in a mass market absolute size is the single most important factor affecting the ability to realize acceptable profit margins.

Net profit margin distribution: S&P 500

Figure 2.2 shows the net profit margin distribution among S&P 500 members.
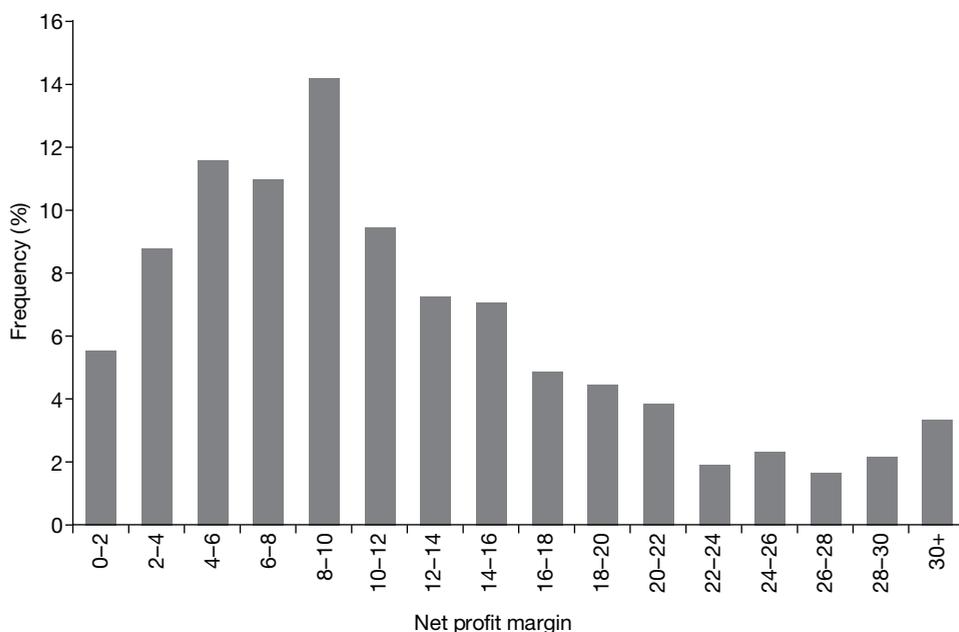

Figure 2.2   S&P 500: Net profit margin distribution

The median net profit margin for all S&P 500 members is 9.2% whereas the average is 10.5%. Only 10% of all companies achieve net profit margins above 24%.

Example 2.5 – Net profit margins in different industries
The example shown in Table 2.5 examines the net profit margin of three companies operating in very different industries.

Table 2.5 Net profit margin comparison of three listed companies

	Wal-Mart	Samsonite	Swatch Group
Net sales	$469,162m	$1,771m	CHF7,796m
Net income	$16,999m	$166m	CHF1,608m
Net profit margin	3.6%	9.4%	20.6%

Source: Wal-Mart (2013) [US GAAP], Samsonite (2012) [IFRS], Swatch Group (2012) [IFRS]

All three companies are profitable, are well run by experienced and able management teams, and can be considered leaders in their respective industries. Despite this, they post very different net profit margins.

As a result of its high market share and well-established brand portfolio, Swatch Group earns 20.6 centimes per Swiss franc in revenues, which is considerably more than Samsonite (9.4%) and Wal-Mart (3.6%) earn. Compared with the Swiss watch manufacturer, Samsonite and Wal-Mart are subject to both more competition and more pronounced pricing pressure. As this example shows, even though all three companies are well managed and very probably have little room to cut their cost base further, only businesses with established and well-known brands like Swatch Group and – to a lesser extent – Samsonite can achieve exceptionally high margins.

In general, therefore, a high net profit margin is a good indicator of a company having a unique selling point, market dominance and is often indicative of one that is facing low competition. Lower margins, meanwhile, are usually signalling heavy price competition, a commodity-like business with little or no brand and quality recognition or, sometimes, simply poor cost management.

Example 2.6 – Net profit margin: Coca-Cola Company
Using the shortened income statement of Coca-Cola Company, net profit margin is calculated as shown in Table 2.6.

Table 2.6 Coca-Cola: Shortened income statement

	Coca-Cola
$m	2009
Net operating revenues	30,990
Gross profit	19,902
Operating income	8,231
Net income	6,824

Source: Coca-Cola Company (2009) [US GAAP]

$$\text{Net profit margin} = \frac{\$6,824m}{\$30,990m} = 22.0\%$$

Example 2.7 – Net profit margin: HMV Group plc

HMV Group plc is a British retailer of entertainment products. Due to the vigorous competition in this market from internet retailers such as Amazon, HMV's revenues decreased organically by 19.6% to £873.1m in fiscal year 2012, resulting in a net loss for the period of £80.4m. Even when adjusted for exceptional items, the company still posted a loss of £24.5m.

Based on these numbers, HMV shows the following net profit margins:

$$\text{Net profit margin } = \frac{-80.4\text{m}}{873.1\text{m}} = -9.2\%$$

$$\text{Net profit margin (restated) } = \frac{-24.5\text{m}}{873.1\text{m}} = -2.8\%$$

Both figures paint a dark picture: for every pound in revenues, the company is actually losing money in the magnitude of 2.8 to 9.2 pence. Clearly, if not fixed quickly, such a state of affairs cannot be sustained for long, even by a cash-rich business. Indeed, shortly after releasing these figures, the company entered administration in January 2013 and was bought out of bankruptcy four months later.

2.3   EBIT/EBITDA MARGIN

Some textbooks extend the net profit margin calculation in the numerator by adding back tax and interest expenses; a low-tax country is a competitive advantage as the company has higher profits per unit of sales available if tax payments are low.

It can, however, be helpful for the comparison of different companies in an industry or across regions to calculate the EBIT margin, which is the relationship of operating profit and turnover. This ratio measures the actual operational performance of a company, regardless of differences in interest expenses (i.e. debt level and cost of debt) and tax burden.

$$\text{EBIT margin } = \frac{\text{EBIT}}{\text{Sales}}$$

The EBIT margin can be extended by adding depreciation to the operating profit. The EBITDA therefore shows the profit before interest, tax and depreciation charges.

$$\text{EBITDA margin } = \frac{\text{EBITDA}}{\text{Sales}}$$

EBIT/EBITDA margin distribution: S&P 500

Figure 2.3 shows the EBIT margin distribution for all S&P 500 constituents. The average EBIT margin is 17.2%, the median is 15.9%. Only 20% of all S&P 500 companies achieve an EBIT margin of more than 25%.
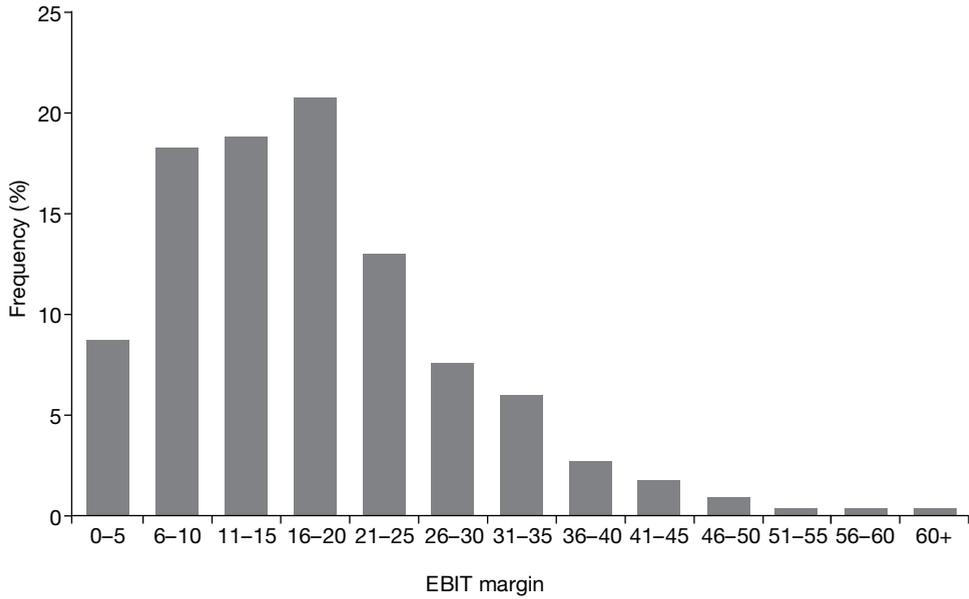
Figure 2.3   S&P 500: EBIT margin distribution

Figure 2.4 shows the EBITDA margin distribution. In this case, the average EBITDA margin is 24.9% whereas the median value is 22.0%.
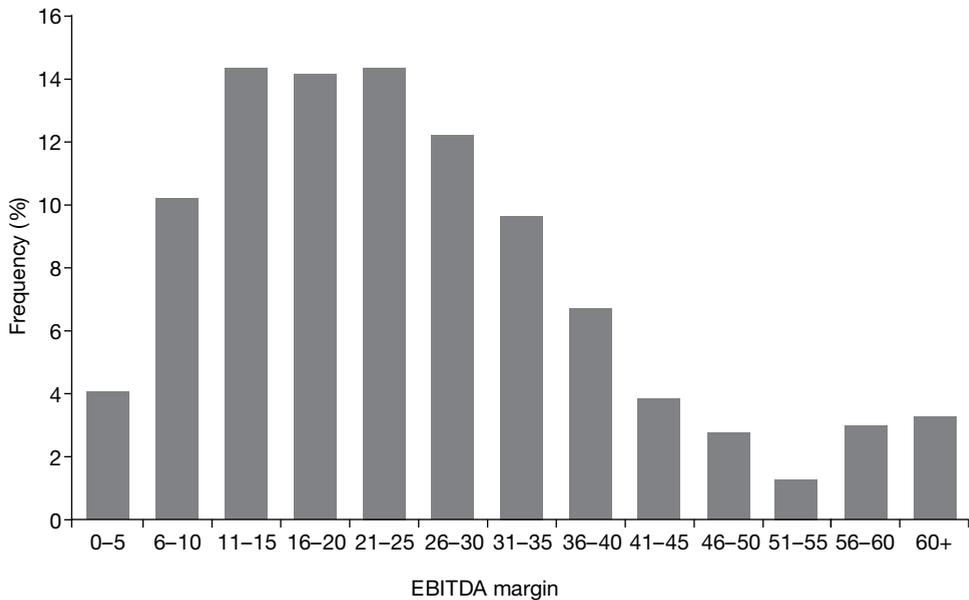

Figure 2.4   S&P 500: EBITDA margin distribution

Example 2.8 – EBIT/EBITDA margin: Canadian Railway
The calculation of the margins is illustrated using the income statement of Canadian Railway
(Table 2.7).

Table 2.7   Canadian National: Shortened income statement

Canadian National	
$m	2009
Revenues	7,897
Labour and fringe benefits	–1,701
Purchased services and material	–1,045
Fuel	–1,026
Depreciation and amortization	–677
Equipment rents	–247
Casualty and other	–325
Operating income	2,876

Source: Canadian National (2007) [US GAAP]

The values of sales of $7,897m and of the EBIT of $2,876m are needed to calculate the
EBIT margin. The result is:

$$\text{EBIT margin} = \frac{\$2,876m}{\$7,897m} = 36.4\%$$

In order to calculate the EBITDA margin, depreciation has to be added back to the operating
profit. The table above lists depreciation of $677m. EBITDA therefore amounts to $3,553m
(2,876 + 677). The EBITDA margin is then calculated in the following way:

$$\text{EBITDA margin} = \frac{\$3,553m}{\$7,897m} = 44.9\%$$

Both values are rated as very good and indicate a strong market position and a good cost
management on behalf of Canadian National.

2.4   ASSET TURNOVER

Asset turnover gives an insight into how effectively a company utilizes its total capital base.
High asset turnover means that capital flows back quickly into the business and less capital is
therefore needed altogether in order to achieve a certain business volume.

$$\text{Asset turnover} = \frac{\text{Sales}}{\text{Ø Total assets}}$$

Due to the close relationship between business model and capital requirements, this ratio
should only be used for comparisons within an industry. More common and meaningful is
using this ratio for individual companies over time.

Asset turnover distribution: S&P 500

Figure 2.5 shows the asset turnover distribution for members of the S&P 500. As can be seen, an overwhelming number of companies show asset turnover ratios of less than 1. In fact, only 25% manage to turn over their total asset base more than once a year (asset turnover >1). The average is 0.8 whereas the median lies at 0.6.
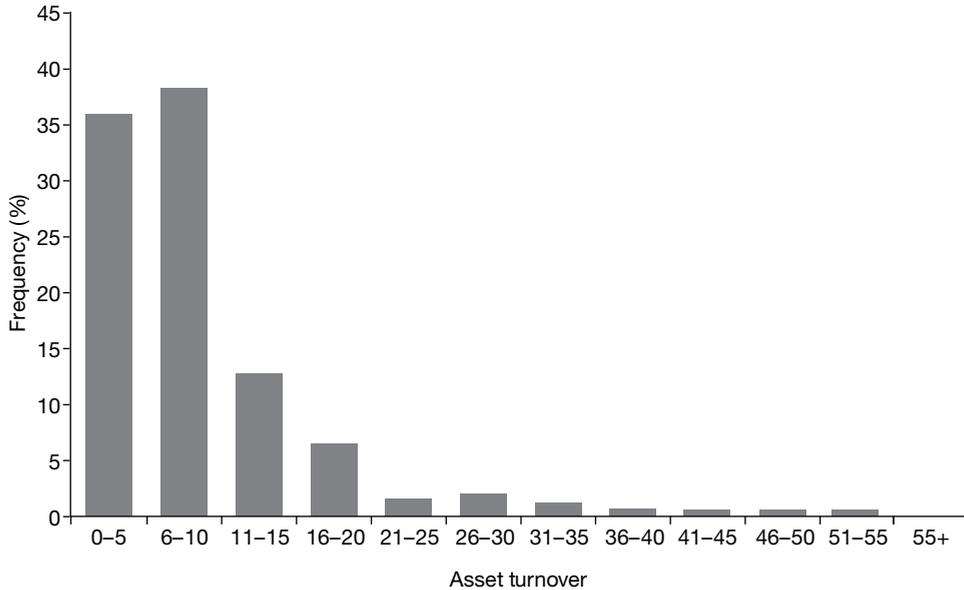
Figure 2.5   S&P 500: Asset turnover distribution

Example 2.9 – Asset turnover: Amazon

Amazon managed to increase its revenues by 27% to more than $61bn in 2012, further cementing its position as the world's largest online retailer. To achieve this growth and level of business activity, the company's asset base increased from $25.2bn at the beginning of the year to $32.5bn at year-end 2012. Based on these figures Amazon's asset turnover is calculated as follows:

$$\text{Asset turnover} = \frac{\$61{,}093\text{m}}{(0.5 \times \$32{,}555\text{m} + 0.5 \times \$25{,}278\text{m})} = 2.1$$

This value can also be interpreted in the following manner: for every $1 in assets the company generated $2.1 in revenue. For retailers in particular this figure is very important. An increasing asset turnover translates to lower overall capital requirements, which in turn should manifest themselves in higher profitability. It is therefore not surprising to see the asset turnover and the return on investment (ROI) of a company being closely linked:

$$\text{ROI} = \left(\frac{\text{Revenue}}{\text{Total assets}}\right) \times \left(\frac{\text{EBIT}}{\text{Revenue}}\right) = \left(\frac{\text{EBIT}}{\text{Total assets}}\right)$$

This calculation method was developed by Donaldson Brown in 1919 while he was working for the US chemical giant Du Pont de Nemours. It is therefore better known as the DuPont analysis. The extended version of the DuPont analysis further itemizes the factors affecting the return on investment. Considering the formula above, ROI can be boosted by either increasing asset turnover or improving profit margins. The former is mainly dependent on the business model, CAPEX and working capital management, whereas the latter depends on pricing power and cost management.

2.5   RETURN ON ASSETS

As the *return on investment* measure is used in a wide range of forms with other performance indicators such as net profit, it is listed here again more explicitly in its *return on assets* (ROA) variation. Return on assets takes into account the net profit of the company as well as interest expenses and puts these into relation with the average total capital provided by equity and debt holders.

$$\text{Return on assets} = \frac{\text{Net profit} + \text{Interest expenses}}{\text{Ø Balance sheet total}}$$

In contrast to return on equity, the return on assets has the advantage that it is not distorted by financial effects. It shows the return of all stakeholders, which is the reason why interest expenses are added back since they constitute the return of the company's creditors. Using net profit and interest as shareholders' and creditors' earnings in the nominator, it is not surprising that the capital provided by *both* parties has to show up in the denominator.
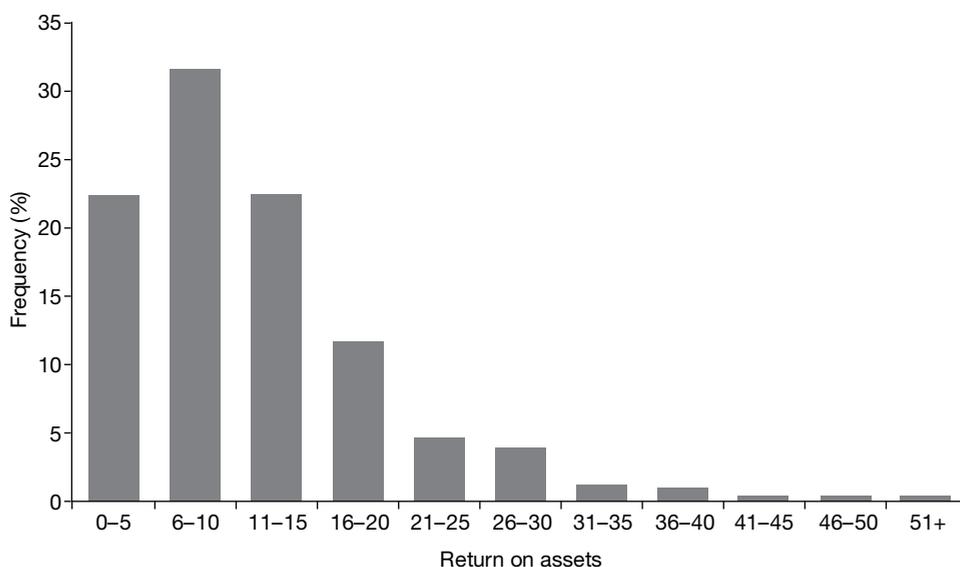
Return on assets distribution: S&P 500

Figure 2.6   S&P 500: Return on assets distribution

As shown in Figure 2.6, the average and median return on assets are 10.6% and 9.1%, respectively. In contrast to ROE, this figure cannot be artificially enhanced by using the leverage effect, which is why there are no extreme outliers on the right tail of the distribution.

Example 2.10 – Return on assets: a comparison
Companies achieving a return on assets above 10% can be characterized as very profitable. By comparing Procter & Gamble, a leading consumer products company, the online auction house eBay and CSX Corp., one of the largest railway operators in the US, the differences in return on capital depending on the business model and industry are clearly discernible (Table 2.8).

Table 2.8   Return on assets comparison of three listed companies

	CSX	Procter & Gamble	eBay
Net income	$1,859m	$10,756m	$2,609m
Finance costs	$566m	$769m	$63m
Total assets	$30,571m	$132,244m	$37,074m
Return on assets	7.9%	8.7%	7.2%

Source: CSX (2012) [US GAAP], Procter & Gamble (2012) [US GAAP], eBay (2012) [US GAAP]

First of all it becomes apparent that although, capital intensity-wise, the companies operate in very different environments, they all achieve very good return on assets results. Surprisingly, eBay, powered by its PayPal subsidiary, shows the lowest ROA figure of the trio. This is due to the prominent goodwill entry on eBay's balance sheet as well as PayPal's customer funds extending the asset base. This is the reason why, whilst having an asset-light business model by nature and very healthy margins as well, eBay still reports good but somewhat diminished return on assets. This means that the ROA appears to be lower than it actually is.

Interestingly eBay's ROA figure is comparable to the 7.9% for CSX Corp., which spends billions every year on new locomotives and track maintenance. Obviously, CSX has a capital-intensive business model, and yet manages to earn healthy profits due to its controlling position (oligopoly) in a range of transportation markets. Therefore, looking at the ROA formula, the large denominator (total assets) is counterbalanced by the size of the nominator, which is driven by its exceptional profit margin and efficient use of debt.

Amongst producing companies, which only rarely achieve the profitability levels of asset-light businesses such as, for example, software firms, P&G exhibits very good return on capital figures, underlining its pricing power as well as the effective use of capital. This is also the result of the company's outsourcing of capital-intensive businesses. For example, some of P&G's suppliers build their factories directly next to the company's sites in order to enhance product flow and to exploit synergies in research and development. This, of course, is partly due to the size of the company, which makes it attractive for some suppliers to join forces with Procter and Gamble.

2.6   RETURN ON CAPITAL EMPLOYED

$$ROCE = \frac{EBIT}{\o \text{ Capital employed}}$$

Return on capital employed (ROCE) shows how successfully the company invests its capital. It is calculated by adding non-current assets and working capital less cash and cash equivalents (i.e. net working capital).

$$\text{Capital employed} = \text{Non-current assets} + \text{Net working capital}$$

The capital employed figure shows the invested capital that a company requires to carry out the operational business. Non-current assets are needed to produce or sell products, whereas net working capital comprises the company's inventories and accounts receivables less accounts payables. Accounts payable are deducted because they essentially constitute interest-free loans from suppliers. Capital employed therefore results in the net total amount which has actually to be invested in order to run the company. A second, simpler way of calculating capital employed is to add shareholders' equity and financial liabilities, i.e. the capital on which interest, directly (to creditors) or indirectly (to shareholders), has to be paid. The methods are not entirely identical and readers should be aware of both variations as there is no final agreement on the calculation in the literature.

Example 2.11 – ROCE: a farm
In order to understand this ratio better, let us imagine two farms with an operating profit of $1m each. Farm A grows cotton and therefore needs farm land and tractors worth $5m. Farm B is specialized in growing maize and has farmland and tractors worth $10m. Both farms have current assets of $500,000, of which $100,000 is cash and equivalents. Both farms A and B also have accounts payable of $200,000. The return on capital employed for A and B can be calculated as follows:

$$ROCE_A = \frac{\$1,000,000}{\$5,000,000 + \$400,000 - \$200,000} = 19.2\%$$

$$ROCE_B = \frac{\$1,000,000}{\$10,000,000 + \$400,000 - \$200,000} = 9.8\%$$

Farm A makes the same operating profit while employing less capital and therefore uses its asset base more effectively. Profitability ratios such as return on equity do not necessarily show this, as both farms can in theory have the same amount of equity. It is striking that farm A is using capital more efficiently and presumably has a higher capital turnover. While being closely linked to the return on assets, this financial ratio only takes into account the actual invested capital, which constitutes a further improvement. Companies with low levels of investment requirements are of particular interest as they usually produce high free cash

flows. Being able to achieve a high profit with relatively little capital expenditures therefore increases the attractiveness of a company.

Return on capital employed distribution: S&P 500

Figure 2.7 depicts the ROCE distribution for all S&P 500 members. The average ROCE is 13.3% whereas the median is 11.4%.
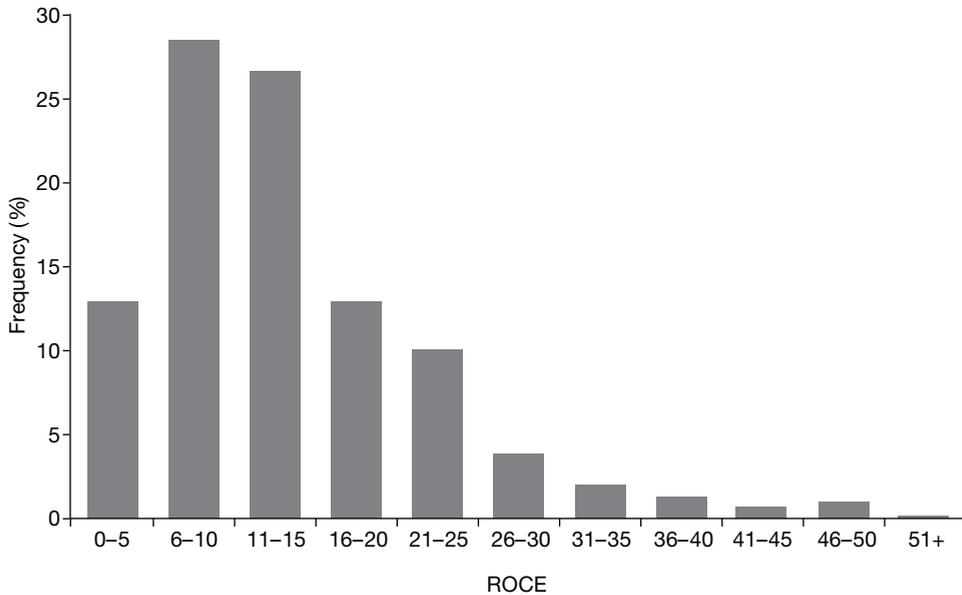
Figure 2.7   S&P 500: Return on capital employed distribution

Example 2.12 – Return on capital employed: SiriusXM
In 2012, SiriusXM became the world's largest radio company by revenue, a result driven by more than 24 million subscribers to its streaming offerings. However, in the years preceding this milestone, Sirius suffered some setbacks, leading to a huge goodwill impairment eating up its equity base in 2008. This severely distorted profitability figures such as the return on equity, with the total equity entry in the denominator of the return on equity formula being close to zero. In 2010, for example, Sirius posted an equity ratio as low as 2.8%, leading to incongruous (and therefore unhelpful to our analysis) ROE figures using its adjusted net income. In this case, in order to obtain a notion of the company's profitability level, the ROCE comes in handy. Let's have a look at the balance sheet data as reported in 2010 (Table 2.9).

Table 2.9   SiriusXM Radio Inc.: Certain equity and liabilities positions

SiriusXM Radio Inc.	
$m	2010
Total stockholders' equity	207,636
Long-term debt	2,695,856
Long-term related party debt	325,907
Related party current liabilities	15,845
Current maturities of long-term debt	195,815

Source: SiriusXM Radio Inc. (2010) [US GAAP]

Based on these figures, the capital employed can be calculated as follows:

$$\text{Capital employed} = \text{Shareholders' equity} + \text{financial debt}$$

$$\text{Capital employed} = \$207,636m + \$2,695,856m + \$325,907m + \$15,845m + \$195,815m$$
$$= \$3,441,05$$

The return on capital employed is now calculated by dividing the operating income (EBIT) of $465,414m by the capital employed:

$$\text{ROCE} = \frac{\$465,414m}{\$3,441,059m} = 13.5\%$$

2.7   OPERATING CASH FLOW MARGIN

The operating cash flow margin shows how many cents of operating cash flow are generated per one dollar of revenue. In contrast to other ratios there is no ideal value. The simple principle 'the more, the better' applies. The operating cash flow margin is similar to the net profit margin, although the latter does not take into account non-cash profit and loss items as well as working capital requirements. The operating cash flow margin is therefore the more precise figure. However, as more factors influence this ratio, it is more susceptible to fluctuations and harder to interpret.

$$\text{Cash flow to sales ratio} = \frac{\text{Operating cash flow}}{\text{Net sales}}$$

Example 2.13 – Operating cash flow margin: Assa Abloy
Table 2.10 shows a shortened excerpt of the cash flow statement of the Swedish group Assa Abloy, a producer of locks and security systems.

Table 2.10   Assa Abloy: Operating cash flow

SEKm	Assa Abloy	
	2009	2008
Operating income	4,374	4,269
Depreciation	1,014	921
Reversal of restructuring costs	1,039	1,180
Restructuring payments	–676	–485
Non-cash items	127	–49
Interest paid	–596	–732
Interest received	89	14
Tax paid on income	–907	–742
Change in working capital	1460	–5
Cash flow from operating activities	5,924	4,369

Source: Assa Abloy AB (2009) [IFRS]

Assa Abloy had sales of SEK34,963 (34,829) million in 2009 (2008). Using this data, the operating cash flow margin is calculated as follows:

$$OCM_{2009} = \frac{SEK5,924m}{SEK34,963m} = 16.9\%$$

$$OCM_{2008} = \frac{SEK4,369m}{SEK34,829m} = 12.5\%$$

The group was able to increase the cash flow margin significantly between 2008 and 2009. This means that in 2009 Assa Abloy had 4.4 öre more flowing in per one Swedish kronor in revenues than in the previous year. Ratio analysis thrives on interpreting results. In this case, there is a clear change in working capital while the operational result increased only marginally. The increased cash inflow was due to the release of capital tied up in working capital. Inventory may have been sold, or receivables collected, more quickly. If the company plans to grow further, the following years will show a build-up of working capital and therefore have a negative impact on the operating cash flow and hence the operating cash flow margin. In some companies changes in working capital have a significant impact on the operating cash flow. When this figure is distorted by large swings in working capital, instead of the pure operating cash flow the operating cash flow before changes in working capital can be used. This figure, called 'cash earnings', is calculated by adding net profit, depreciation and non-cash one-off items.

3
Ratios for Financial Stability

Change alone is eternal, perpetual, immortal.

Arthur Schopenhauer

A long-term investment has to fulfil two fundamental criteria. First, it should yield an appropriate return on the invested capital. Indicators for this were introduced in Chapter 2. Second, a business can operate successfully in the long run only if it has a solid capital structure and sufficient cash flow. The following chapter provides ratios to validate and quantify the financial stability of a company. Although profitability ratios were introduced first, the importance of financial stability can hardly be overestimated. Particularly in the business world, Murphy's Law is more applicable than ever: anything that can go wrong, will go wrong.

3.1   EQUITY RATIO

Equity ratio indicates which proportion of the total assets is funded by shareholders' equity.

$$\text{Equity ratio} = \frac{\text{Shareholders' equity}}{\text{Balance total}}$$

Companies with high equity ratios are usually considered to be conservatively financed. The higher the equity ratio, the lower the company's use of leverage. In contrast to shareholders' equity, debt has the advantage of being tax-deductible, as interest expenses are usually tax-deductible, lowering the company's tax burden. Moreover, debt is a cheaper source of funding than equity, because in the case of insolvency, creditors' claims rank senior to equity and hence will be paid back first. Creditors are therefore exposed to lower risk and will consequently demand a lower compensation in return. Shareholders, meanwhile, will be considered only after creditors have been fully paid out. Since debt is cheaper than equity, a certain proportion of borrowed capital can be found in any business to lower the total cost of capital. In addition to that, when funding its working capital, a minimum amount of debt is sensible. Inventory, for instance, is usually funded by supplier credits or revolving credit lines. However, increasing levels of debt raises the risks for an enterprise, as the interest burden grows and the debt has to be paid back or refinanced at some point in time. Especially in a downturn, the fixed nature of interest payments can become problematic for businesses that operate in cyclical industries or have low profit margins in general. Paracelsus's theory also applies to the use of debt: the dose makes the poison.

In contrast to debt, capital provided by shareholders does not mature and there is no obligation to pay out dividends. In difficult economic times, a high equity cushion allows the business to remain liquid, increasing its flexibility substantially.

Long-term-oriented investors should therefore give preference to businesses with an equity ratio that is sufficiently high, to overcome even extreme downturns. The precise amount depends on the business model and the volatility of profits. Start-ups with a particularly high level of uncertainty should aim for an equity ratio that is as high as possible to provide for harder times, while established or less volatile business models like those of Nestlé or Procter & Gamble can manage with relatively low levels of equity. As we have seen earlier, Yum! Brands even posted a negative equity ratio in 2009 yet still was not in a financially difficult situation given its sound earnings streams. If the equity ratio exceeds the target corridor, which is appropriate for the respective business model, return on capital will fall without increasing financial stability significantly. The equity ratio should therefore be judged on risk as well as return aspects. As debt is cheaper than shareholders' equity, many managers tend to increase the value of their business by borrowing in good times. The following example will illustrate this leverage effect, which has in many cases caused difficulties for businesses.

Example 3.1 – Leverage effect: private borrowing
A bank offers a loan over 10 years at 4% APR. $10,000 is taken out as a loan and used to purchase bonds with a coupon and yield of 7% p.a. The difference in interest rates (7% bond income vs 4% interest) is the profit of the investor.

After a profit of $300 ($10,000 $\times$ 0.07 – $10,000 $\times$ 0.04) was made for 2 years seemingly without any risk, the issuer of the bond finds himself in financial difficulties. The bond price drops sharply and interest rate payments are suspended until further notice. Whilst the income source has disappeared, the bank continues to charge annual interest payments of $400.

Many businesses pursue a similar strategy called 'leveraging their balance sheet'. Assuming a company achieves a return on total capital of 10% and can take out loans at a lending rate of 5%, the strategy pays off as long as the marginal rate of return on the new capital is above 5%.

However, in boom times managers and investors regularly forget that an upturn is always followed by a downturn, which entails falling returns. It is not conducive for a highly profitable business (and only those should be considered for long-term investment) to raise risk substantially in order to increase return marginally. The opportunities purchased by leveraging one's balance sheet are not in a favourable proportion to the risks involved. The sensational case of sports car manufacturer Porsche, which tried to take over the many times larger Volkswagen AG through share purchases financed with borrowed capital, or the leveraged buyout of Metro-Goldwyn-Mayer by a Sony-led consortium which ended in chapter 11 bankruptcy protection, are just two negative examples of this method.

Equity ratio distribution: S&P 500

As shown in Figure 3.1, the average equity ratio is 37.3% whereas the median is 38.5%. Only 8% of companies post equity ratios below 10%. Likewise, only five companies listed in the S&P 500 companies have an equity ratio of more than 80%.
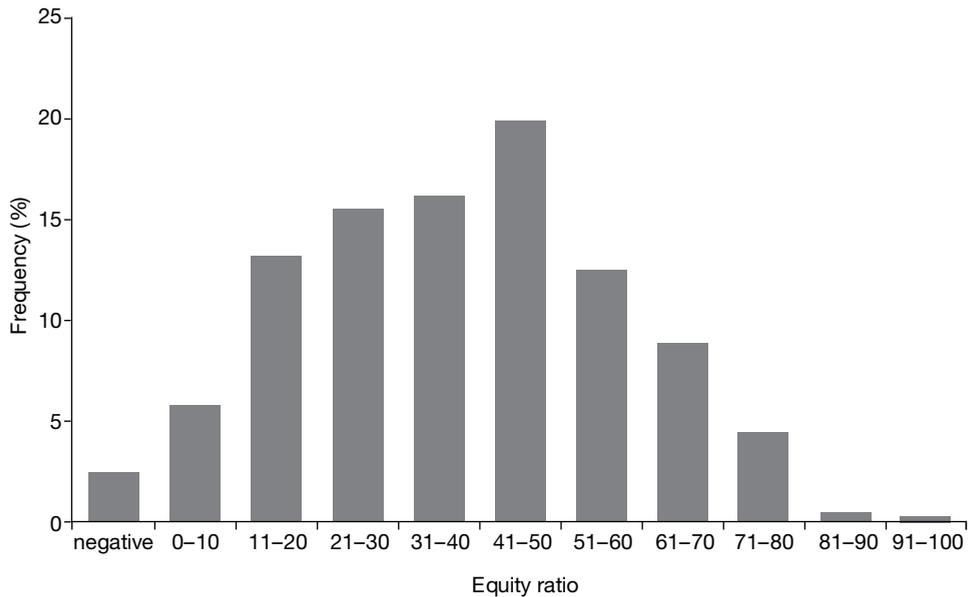
Figure 3.1   S&P 500: Equity ratio distribution

Example 3.2 – Return on equity: Ryanair Holdings plc
Taking a look at the liabilities and equity entries on Ryanair's balance sheet (Table 3.1) enables us to calculate the equity ratio. Ryanair, modelled on Southwest Airlines' low-cost carrier concept, ranks among the most profitable European airlines. With nearly 80 million customers per year and a fleet of more than 300 aircraft, it is also one of the largest carriers in Europe.

Table 3.1   Ryanair Holdings plc: Certain equity and liabilities positions

Ryanair Holdings plc	
€m	2012
Trade payable	138.3
Current maturities of debt	399.9
Other current liabilities	1,373.5
Non-current maturities of debt	660.3
Other non-current liabilities	3,098.4
Shareholders' equity	3,273.6
Total liabilities and shareholders' equity	8,944.0

Source: Ryanair Holdings plc (2012) [IFRS]

Dividing Ryanair's shareholders' equity by its total assets or total liabilities and equity gives the equity ratio for 2012:

$$\text{Equity ratio} = \frac{\text{€3,273.6m}}{\text{€8,943.0m}} = 36.6\%$$

When compared with robustly performing industrial companies, an equity ratio of 36.6% stands up rather badly. However, against a background of a chronically unprofitable and capital-intensive airline industry, Ryanair's equity ratio is very healthy. This is mainly due to its relatively high profit margins, which enable the company to operate with little debt. Low debt obviously gives the carrier a competitive advantage: even during the recession caused by the financial crisis of 2008/09, Ryanair continued adding aircraft to its fleet and expanded its airport-base network. The highly leveraged competition, in contrast, had to scale back their efforts at expansion or even sell-and-leaseback if not reduce their fleet outright. It is especially during tough macro-economic times that a healthy equity ratio enables companies to focus on their operational growth, without having to concern themselves too much about servicing their interest and refinancing expiring debt.

Example 3.3 – Return on equity: Air France–KLM Group SA
Now take a look at the balance sheet data for French carrier Air France–KLM as of the end of 2012 (Table 3.2).

Table 3.2   Air France–KLM Group SA: Certain equity and liabilities positions

Air France–KLM Group SA	
€m	2012
Equity attributable to holders of Air France–KLM	4,924
Non-controlling interests	56
Total equity	4,980
Long-term debt	9,565
Other non-current liabilities	3,102
Current portion of long-term debt	1,434
Trade accounts payable	2,219
Other current liabilities	6,174
Total liabilities and equity	27,474

Source: Air France–KLM Group SA (2012) [IFRS]

On the basis of these figures, Air France–KLM's equity ratio is:

$$\text{Equity ratio} = \frac{\text{€4,924m}}{\text{27,474m}} = 17.9\%$$

Note that for the calculation of the equity ratio, the shareholders' equity after minority interests is always used. Comparing Air France's figure to the equity ratio of Ryanair makes clear the distinct differences between the two airlines when it comes to financial flexibility, especially in cyclical industries such as the one they operate in. Another distinguishing factor is the composition of each company's indebtedness. While Ryanair carries very little financial debt such as bank loans on its balance sheet, Air France appears to be subject to heavy financing and therefore to creditors. The next ratio, the gearing, captures this.

3.2   GEARING

The most important measure to quantify financial stability is the gearing ratio. It shows to what extent the net financial debt (i.e. financial liabilities less cash and equivalents) is covered by shareholders' equity. Due to the link between financial liabilities, cash holdings and shareholders' equity, this ratio contains all fundamental balance sheet components relating to the financial stability of a company.

$$\text{Gearing} = \frac{\text{Financial liabilities} - \text{Cash and equivalents}}{\text{Shareholders' equity}}$$

In contrast to the equity ratio, which indirectly includes all liabilities, gearing only takes into account interest-bearing liabilities (also called financial liabilities or financial debt). Compared to the equity ratio, gearing considers high accounts payables positive, as they constitute interest-free credit. As they are usually juxtaposed with receivables and inventories on the asset side, high amounts of accounts payable should normally not be viewed critically. A low level of gearing signifies a low level of net indebtedness. For this ratio the following conclusion therefore applies: the lower the gearing, the lower the actual debt burden of the business. If a business has higher levels of cash at its disposal than financial liabilities, it is considered to be debt-free. Gearing is in this case negative. From a risk/return perspective, a gearing of 10–20% should be considered ideal, as at that level there is neither a stockpile of cash nor negligence of financial stability. Values between 20 and 50% can also be regarded as sound. However, from a gearing level of 70% upwards, the financial stability of a business is critical. If the value rises above 100%, a capital increase or a substantial debt reduction should be taken into consideration, as in that case net financial debt surpasses shareholders' equity. There are, however, exceptions like some big well-run utility or railroad companies which usually show high gearing ratios but nevertheless can be described as financially sound since their cash flows are stable beyond measure.

Gearing ratio distribution: S&P 500

As shown in Figure 3.2, the median gearing ratio for all S&P 500 members is 34.2%. The high number of companies with a negative gearing (i.e. net cash position) is particularly worth noting; 19% show a gearing in excess of 100%, which is dangerous, given the fact that this level is usually considered not sustainable.
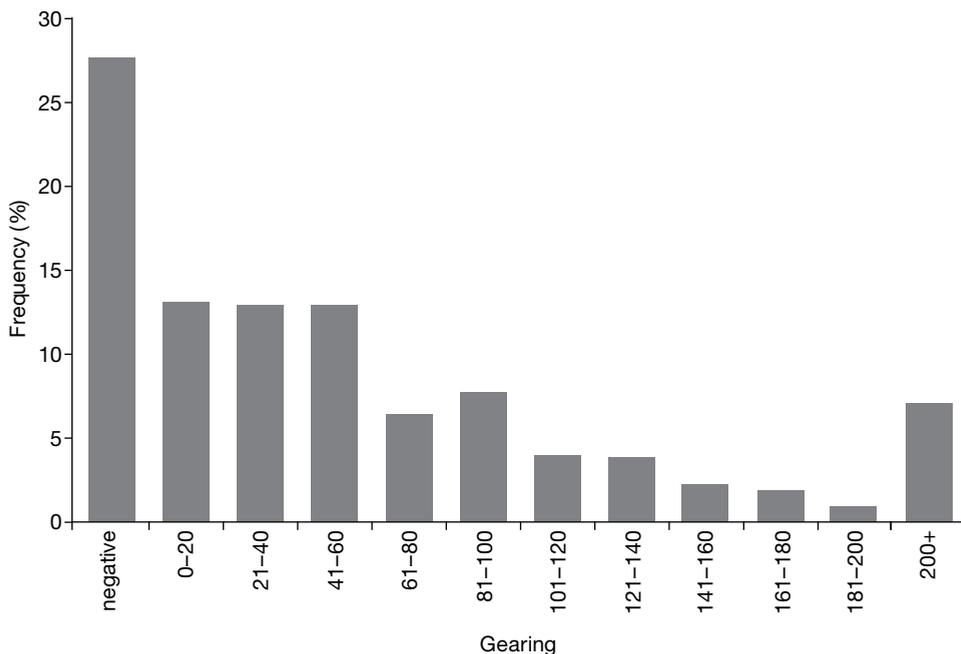
Figure 3.2   S&P 500: Gearing ratio distribution

The calculation and interpretation of this ratio can be illustrated with the example of Ryanair, Air France–KLM, Swatch Group and the chemical group LyondellBasell.

Example 3.4 – Gearing: Ryanair vs Air France–KLM
Based on Ryanair's and Air France's shortened balance sheets provided in examples 3.2 and 3.3, the gearing ratio is calculated as below. Note that the companies had cash and cash equivalents of €3,534m and €3,420m, respectively.

$$\text{Gearing}_{\text{Ryanair 2012}} = \frac{(\text{€399.9m} + \text{€660.3m} - \text{€3,420m})}{\text{€3,273.6m}} = -72.0\%$$

$$\text{Gearing}_{\text{Air France–KLM 2012}} = \frac{(\text{€9,565m} + \text{€1,434m} - \text{€3,420m})}{\text{€4,924m}} = 154.0\%$$

These gearing figures corroborate the equity ratios obtained earlier. Ryanair has more cash and cash equivalents on its balance sheet than is owed to banks, which results in a negative gearing ratio. When a company's cash position exceeds its interest-bearing liabilities, it is referred to as a net cash position. In theory, Ryanair could repay all of its bank borrowing and would still remain in a comfortable cash-positive position. In contrast to this very healthy figure, Air France posts a gearing of 154.0%, meaning that its net debt (financial debt – cash) position exceeds the equity on the balance sheet quite considerably. This puts the company in

the uncomfortable situation of being dependent on external parties such as banks and bond-holders, which is especially dangerous in cyclical industries. This is so since banks are often able to demand the immediate repayment of their loans when certain financial covenants (like a minimum equity ratio for example) are breached.

Example 3.5 – Gearing: Swatch Group
In 2012, Swatch Group shows in its balance sheet financial liabilities worth CHF135m as well as cash and cash equivalents (including securities) amounting to CHF1,967m. Net debt is therefore CHF –1,832m. Offsetting this figure with shareholders' equity of CHF9,344m results in a gearing ratio of –21.0%.

$$Gearing = \frac{CHF135m - CHF1,967m}{CHF9,344m} = -19.6\%$$

Hence Swatch Group has a net cash position and can be considered debt-free. As in companies with a net cash position like this, gearing mathematically decreases further when shareholders' equity is reduced, but negative gearing is simply called 'net cash position', without calculating the precise value. An explicit calculation is normally not necessary in such a case, as financial liabilities are completely covered by liquidities and financial stability should be guaranteed.

Example 3.6 – Gearing: LyondellBasell
The opposite can be seen in the case of the chemical giant LyondellBasell. A look at the balance sheet at the end of 2008 should have given investors a clear indication of the imminent filing for bankruptcy. A year before insolvency the company showed a gearing rate of 1,244%. As a reminder: values of over 70% are already troubling. The company had a financial debt burden of $24.4bn compared with cash holdings of $560m and shareholders' equity of $1.9bn. In this case, gearing is calculated as follows:

$$Gearing = \frac{\$24,451m - \$560m}{\$1,921m} = 1,244\%$$

Obviously, a cyclical company with a gearing ratio like this is unlikely to survive for long. Indeed, after filing for chapter 11 protection in 2009, the company performed a debt-to-equity swap, thereby getting rid of most of its debt, and re-emerged from bankruptcy in May 2010. Today LyondellBasell is the third largest chemical company in the world. As can be seen here, not the operational development but the sheer size of Lyondell's debt level was the cause of its problems.

The ratio needs to always be considered in context. Strategic takeovers or plans for expansion let gearing values rise to critical levels even in solid businesses. As long as this is only a temporary effect and borrowing can be levelled out by sufficient cash flows afterwards, these anomalies do not pose a problem.

To evaluate these potential distortions, gearing should be considered together with the dynamic gearing ratio and particularly with the cash flow development.

3.3   DYNAMIC GEARING RATIO

$$\text{Dynamic gearing ratio} = \frac{\text{Financial liabilities} - \text{Cash and equivalents}}{\text{Free cash flow}}$$

This ratio shows the theoretical debt repayment period in years, as long as the entire free cash flow is used to pay off financial obligations. As the free cash flow can fluctuate considerably, a sensible average of the past few years should be used.

The advantage of the dynamic gearing ratio as opposed to gearing is that it also takes into account the income side. In an extreme case even a business with low gearing could end up in financial difficulties if no cash is flowing in to service the debt. With regard to the dynamic gearing ratio, values of two years are to be considered as very good, but from five years onwards it should be viewed as critical. For growth companies that often have low or negative free cash flows due to high investment in the short run, a sensible expected medium-term free cash flow should be used.

In certain circumstances, very stable business models with comfortable free cash flow generation can be financed with high amounts of debt without compromising financial stability excessively. The example of the fast-food chain Yum! Brands demonstrates clearly the additional significance of the dynamic gearing ratio in combination with gearing.

Example 3.7 – Dynamic gearing ratio: Yum! Brands
For many years Yum! Brands had used significant borrowed funds for dividend payments and repurchasing of shares. Considered in isolation, its gearing values are therefore alarming. However, due to its stable business model Yum! Brands can afford this fiscal policy, as the dynamic gearing ratio shows (Table 3.3). However, it does not mean that this type of debt policy is necessarily value maximizing.

Table 3.3   Yum! Brands: Financial health development

Yum! Brands	2007	2008	2009	2010	2011	2012
Gearing	213.7%	n/a	284.1%	134.8%	110.5%	96.1%
Dynamic gearing ratio	2.9 years	5.7 years	4.8 years	1.8 years	1.7 years	1.8 years

The gearing value is very high in each year, which indicates low financial stability. In 2008, shareholders' equity of the restaurant group was even negative, which means no calculations could be carried out. If one takes into consideration the business's free cash flow generation to determine its financial stability, it shows a better picture. Yum! Brands has an average dynamic gearing ratio of 3.8 years between 2007 and 2010. This value should be regarded as moderate. The business's high level of borrowing is met by sufficient cash flows from the operating business, thus we consider the financial stability as adequate. This is also underlined by the subsequent drop in dynamic gearing ratio to 1.8 years and the reduction in gearing below 100%.

Example 3.8 – Dynamic gearing ratio: Wrigley

Table 3.4 shows the shortened results of The Wrigley Company on 31 December 2007 for further consideration.

Table 3.4   Wrigley: Certain financial statement positions

	Wrigley
$000	2007
Cash and cash equivalents	278,843
Long-term debt	1,000,000
Stockholders' equity	2,817,480
Operating cash flow	1,004,000
Appropriate investments	251,000
Available cash flow	753,000

Source: Wrigley (2007) [US GAAP]

In 2007, Wrigley's dynamic gearing ratio amounts to 0.96 years. This means that the company could pay off its debt within a year, without neglecting necessary investments. As these ratios are always based on accounting figures that are exposed to accounting measures, a conservative adjustment should be carried out before the calculation. In particular, leasing liabilities are often kept off the balance sheet and should be added back to financial liabilities.

In the last few years, the use of leasing has increased dramatically and led to a reduction in the quality and readability of balance sheets in general. This is so because in some cases liabilities arising from leasing contracts do not show up on the balance sheet. According to IAS 17, the IFRS distinguishes between so-called operating lease and finance lease contracts. In a finance lease contract, considerable opportunities and risks are transferred to the lessee together with the leased asset.

In an operating lease contract, opportunities and risks stay with the lessor (e.g. because the term is short). The US GAAP defines the difference between operating and finance lease more concretely: if the cash value of all payments guaranteed by the lessee exceeds 95% of the object's value, the lease object (e.g. a company car) has to be entered on the asset and liability side of the balance sheet.

In that case the leasing contract is accounted for as a finance or capital lease. In this case, the balance sheet analysis is unproblematic, as liabilities for the leased asset are clearly designated and can be counted as part of the financial liabilities. The asset is depreciated over the duration of the leasing contract and is accounted for as an expense in the income statement.

In the second case, the operating lease, the balance sheet remains unaffected by the leasing transaction even though the business enters into clearly defined liabilities, which have to be paid in the future. No assets are shown on the asset side, nor are their liabilities recorded on the other side of the balance sheet. For accounting purposes, this is particularly problematic in the case of airlines, because liabilities for the use of entire fleets of aircraft may not be reflected on the balance sheet. This is a problem, because firmly agreed repayment obligations exist which, simply for classification reasons, may or may not show up as a liability. However, in the latter case, the business is obliged to list expected future payments connected to operating leases in the notes section of the financial statement. In order to determine the financial liabilities correctly, annual leasing payments are discounted and their present value added to the existing financial liabilities.

Example 3.9 – Operating lease: Tiffany & Co.

The example of jeweller Tiffany & Co. demonstrates how, through sale and lease back transactions, a considerable number of stores were sold and immediately afterwards leased back to generate a short-term capital inflow. Notes section J of the company report 2007 lists the minimum operating lease payments (Table 3.5).

Table 3.5   Tiffany & Co.: Operating leasing obligations

Tiffany	
$000	Minimum annual rental payments
2009	114,078
2010	109,092
2011	101,146
2012	91,878
2013	84,736
Thereafter	523,609

Source: Tiffany & Co. (2007) [US GAAP]

In order to be able to add these liabilities to the existing financial liabilities, the payments have to be discounted by the company's average interest rate of 6.5% for long-term loans at that time. This interest rate is calculated using details in the company report's notes section on financial liabilities. As the annual distribution of payments of the entry 'thereafter' is unknown, this value is divided by the mean of payments made between 2009 and 2013 (approx. $100m). The result is a term of 5.23 years after 2013, which is rounded down to 5 years.

Table 3.6   Operating leasing capitalisation

Current value of lease obligations ($000)
$114,078/1.065$
$+\,109,092/1.065^2$
$+\,101,146/1.065^3$
$+\,91,878/1.065^4$
$+\,84,736/1.065^5$
$+\,100,000/1.065^6$
$+\,100,000/1.065^7$
$+\,100,000/1.065^8$
$+\,100,000/1.065^9$
$+\,100,000/1.065^{10}$
$=$ ca. \$723m

By undertaking operating leasing transactions, the company was able to exclude some $723m in financial liabilities from its balance sheet (Table 3.6). Adjusting the company's gearing ratio accordingly increases the value from 12.6% to 59.0%. The dynamic gearing ratio rises from 12 months to 4.7 years.

Example 3.10 – Adjusting for operating leases in the European airline sector
Carrying out sale and lease back operations not only reduces the liabilities shown on the balance sheet, it also affects income statement figures and even has an impact on the reported shareholders' equity. The income statement is affected since an operating lease simply appears as a rent expense. Should the same asset be treated as a capital or finance lease, however, the rent expense would be displaced by depreciation as well as interest expenses. The level of shareholders' equity would also be altered if all operating lease contracts were reclassified as a finance lease. This is because under current accounting rules, an asset obtained by way of a finance lease is usually subject to a straight-line depreciation. However, the corresponding balance sheet item on the liabilities side is, during the first years of the asset's lifetime, not reduced by the same amount. The reason for this is that the yearly lease expense is treated partly as debt repayment and partly as an interest expense. The lease asset and corresponding liability therefore do not decrease in lockstep. Hence, to balance both positions, shareholders' equity has to be reduced. International accounting standards setters are currently reviewing operating lease accounting with the intention of getting rid of operating leases completely. The balance sheet effects of such a shift should therefore always be considered by analysing the additional leasing data in the notes.

What effect would such a move by accounting standards setters have on financial ratios? For industries not making use of leasing, there would obviously be no consequences whatsoever. For sectors and companies with heavier exposure to operating leasing contracts such as retailers and airlines, however, the effects could be acute. The following example, which utilizes the European airline sector, shows the changes to key financial ratios if all operating leases were capitalized, i.e. treated as finance lease.

Figure 3.3 shows the median change in selected key ratios for the 11 largest airlines in Europe for the fiscal year 2010. As can be seen, the median EBIT-margin for the group increases from 2.4% to 5.1% as some expenses are now incurred in the financial result, which is positioned below the operating income. In total, however, net income would be negatively affected, as the reduction in median net profit margin for the group from 1.7% to 1.1% underlines. Capitalizing off-balance sheet leasing liabilities have the largest effect – as expected – on equity and gearing ratios. Strikingly, the median gearing for the group increases from a sound 29.2% to a worrisome 77.4%. There are, however, substantial differences within the sample. While Ryanair's gearing only increases from 25.4% to 41.0%, Air Berlin, Germany's second largest airline, would record an increase from 96.8% to 553.4%. These differences illustrate that differing business models mean that, even within an industry, the use of operating leasing transactions can differ greatly.
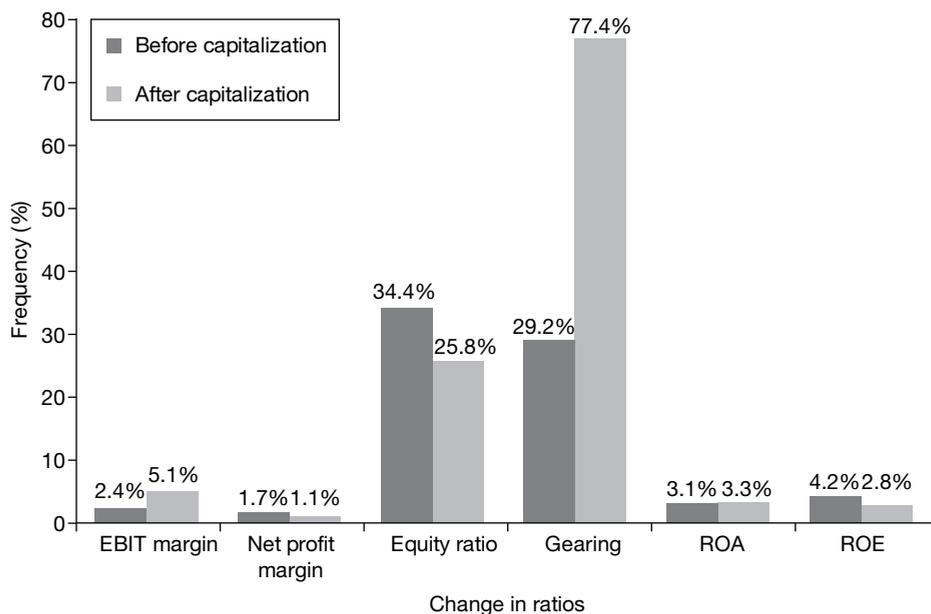
Figure 3.3   European airlines: Median ratios pre- and post-leasing capitalization
Source: Own calculations

3.4   NET DEBT/EBITDA

The net debt-to-EBITDA ratio compares the net debt of the company, i.e. financial liabilities less cash at hand, to the earnings before interest, taxes and depreciation. EBITDA constitutes the amount that can be used in the short term to service interest payments, and to a lesser extent debt repayments. As EBITDA approximately corresponds to the gross cash flow, this ratio can be used to measure the reliability of the repayment of financial liabilities. The better the liabilities are covered by EBITDA, the greater the likelihood of a full repayment. EBITDA is calculated by adding back depreciation expenses to the operating profit (EBIT).

Net debt/EBITDA distribution: S&P 500

Figure 3.4 shows the net debt/EBITDA distribution for the S&P 500 members. The net debt/EBITDA ratio is usually a very reliable indicator of the financial strength of a company. This is also shown by the constant decline in companies as net debt/EBITDA increases, since companies with very high leverage ratios either go bankrupt or are forced to deleverage their balance sheet. The median is 1.1 and the average is 1.4.
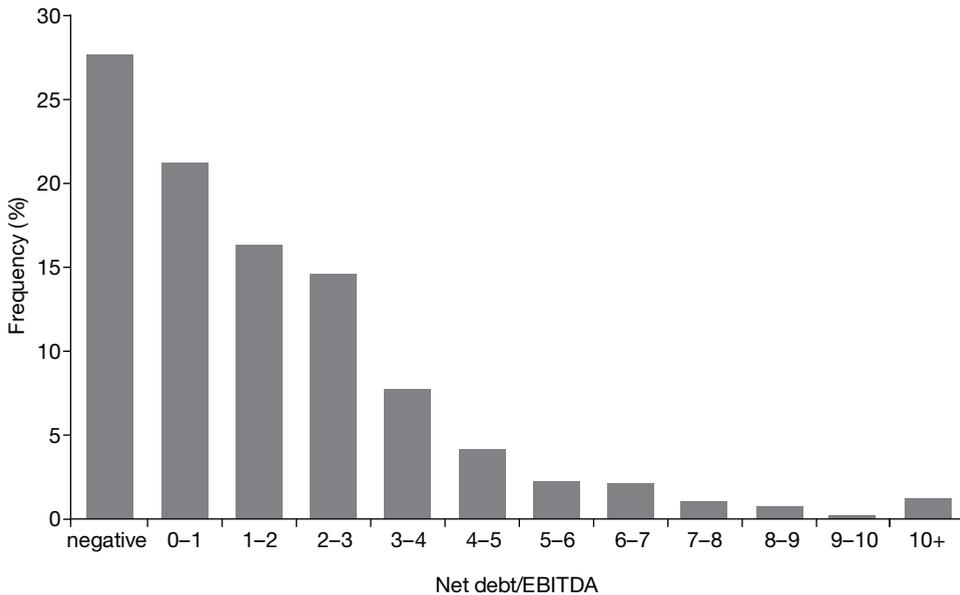
Figure 3.4   S&P 500: Net debt/EBITDA ratio distribution

Example 3.11 – Net debt/EBITDA: Bezeq Telecommunication Corp.

Table 3.7   Bezeq: Certain financial statement positions

Bezeq The Israeli Telecommunication Corp.	
In NISm	2012
Cash	466
Investments	1,081
Debentures, loans and borrowings	1,140
Debentures	4,250
Loans	4,156
Operating profit	3,035
Depreciation and amortization	1,436

Source: Bezeq The Israeli Telecommunication Corp. (2012) [IFRS]

Bezeq is the largest telecommunication firm in Israel and recently gained some attention for pursuing a very aggressive dividend policy, partially funding its payouts to stockholders by the assumption of additional debt.

Based on Bezeq's balance sheet and income figures (Table 3.7), its gross debt amounts to NIS 9,546m, subtracting cash of NIS 466m and investments worth NIS 1,081m (mainly ETFs) leads to a net debt figure of NIS 7,999m.

The earnings before interest, tax, depreciation and amortization, in short EBITDA, of NIS 4,471m is calculated by adding the operating profit (EBIT) and the depreciation and amortization expenses.

Thus, Bezeq shows a net debt/EBITDA of:

$$\text{Net debt/EBITDA} = \frac{\text{NIS 7,999m}}{\text{NIS 4,471m}} = 1.79$$

In general, a net debt/EBITDA below 1 would be considered a very good outcome. In this case, the likelihood of being able to repay one's debt is high. Values above 3, in contrast, hint at a precarious credit quality. Once net debt/EBITDA exceeds values of 8 a timely debt repayment is usually no longer possible. In the case of Bezeq, the value of 1.79 can be considered good. Special attention should, however, be paid to any further development and changes in the composition of the EBITDA.

3.5   CAPEX RATIO

Imagine you own a business that makes an annual profit of $5m. However, to generate this profit and remain competitive, $10m has to be invested in new equipment every two years. No money can therefore be withdrawn from the business although profits are being generated.

Capex ratio describes this issue as a ratio of capital expenditures (CAPEX) to operating cash flow. In practice, cash earnings, i.e. net profit plus depreciation and other non-cash items, is often used instead of operating cash flow – because the latter is often subject to distinct fluctuations caused by cyclical swings in working capital.

$$\text{Capex ratio} = \frac{\text{Capital expenditures}}{\text{Operating cash flow}}$$

It becomes clear in the introductory example that a ratio of investment over 100% would ruin any business in the long run. Those who spend more money over the years than the operating cash flow brings in eventually have to rely on external funding, inevitably leading to excessive debt levels. This explains the weak long-term results of capital-intensive industries such as automobiles, aviation or heavy manufacturing.

Investors who look to the long term are usually interested in businesses that generate high profits on capital invested and have low capital requirements.

Example 3.12 – Capex ratio: C.H. Robinson Inc.
US-based transportation services provider C.H. Robinson shows the cash flow figures as per year-end 2012 in Table 3.8.

Table 3.8 C.H. Robinson Worldwide: Shortened cash flow statement

C.H. Robinson Worldwide Inc.		
$m	2012	2011
Net income	593,804	431,612
Depreciation	38,090	32,498
Other adjustments	(222,432)	55,016
Changes in working capital	50,880	(89,414)
Net cash provided by operating activities	**460,342**	**429,712**
Purchase of property and equipment	(36,096)	(35,932)
Purchase and development of software	(14,560)	(16,874)

Source: C.H. Robinson Worldwide Inc. (2012) [US GAAP]

Examining the cash flow statement, the entry 'purchase and development of software' stands out. In this case, C.H. Robinson did not account for its expenditures connected to the development of software as an expense in the income statement, but capitalized these development expenses and therefore shows them as a depreciable asset on its balance sheet. The total capital expenditures of C.H. Robinson therefore amount to $50,656m (36,096 + 14,560) after $52,806m in the previous year. The capex ratio is therefore given by:

$$\text{Capex ratio} = \frac{\$50,656\text{m}}{\$460,342\text{m}} = 11.0\%$$

This is an extremely low figure and – provided that the company is making sufficient investments – can be categorized as very good given that the company need only reinvest a small fraction of its cash flow every year to remain competitive. Put differently, the company can pass on 89% of its operating cash flow to shareholders by means of dividends or share buyback or use it to acquire competitors to gain further market share. In light of C.H. Robinson's good but unexceptional net profit margin of 5.2%, one wonders how the company actually manages to achieve this impressive capex ratio. The answer, as always, lies in the business model itself. C.H. Robinson is one of the largest transportation services and logistic solutions providers, yet the company does not own the transportation equipment such as trucks or trains. Rather, it works with a very broad network of independent transportation companies, selecting and hiring them in accordance with its end customer needs and the resulting business volume. It is this that explains why C.H. Robinson need only invest very limited funds every year in order to maintain its operations. Limited investment requirements enable it to achieve a very good capex ratio, despite posting rather unspectacular margins.

Example 3.13 – Capex ratio: Wrigley
To deepen our understanding, let us look at the example of Wrigley, which was taken over by Mars Inc. with the help of Warren Buffett's Berkshire Hathaway in 2008. Wrigley outstanding market position enabled the company to generate healthy cash flows. Adding to this, the company's business model demanded only limited capital expenditures every year (Table 3.9).

Table 3.9   Wrigley: Certain cash flow statement positions

Wrigley ($m)	2004	2005	2006	2007
Operating cash flow	725.0	740.3	721.4	1,003.9
Capital expenditure	279.0	281.7	327.7	251.4
Capex ratio	38.48%	38.05%	45.42%	25.04%

The excess of operating cash flow less capital expenditure (free cash flow) can be used to pay off debt, pay out dividends and buy back shares. In this sense, the capex ratio expresses the ability to generate free cash flow. Businesses with a very low capex ratio have the advantage that investments can be financed using own funds. Loans, at least to a certain extent, do not have to be taken out.

Many fast-growing businesses fail because of their lack of internal financing. Wrigley, however, had a unique business model with low capital requirements from the outset – only some equipment had to be replaced and production sites maintained each year. The clearest examples in this context are successful IT businesses such as Google or Microsoft, as they can prosper with a minimum level of investment.

Example 3.14 – Capex ratio: a comparison
To demonstrate the importance of this ratio the next example (Table 3.10) compares Coca-Cola, McDonald's, Rio Tinto and Alcoa.

Table 3.10   A comparison of four listed companies

	Coca-Cola	McDonald's	Rio Tinto	Alcoa
Capex ratio	26.1%	43.7%	76.3%	84.2%
Equity ratio	53.6%	43.2%	51.9%	41.1%
Return on equity	39.5%	35.7%	23.2%	1.2%

Source: Financial statements (2012)

As a result of Coca-Cola's strong market position and the significant competitive advantages it enjoys, all capital expenditures can be easily financed out of its cash flow, leaving the company with nearly three-quarters of its operating cash flow as free cash flow. This lack of a need for external funds in the form of bank loans also manifests itself in Coca-Cola's high equity ratio of 53.6%.

McDonald's also shows a healthy capex ratio of 43.7%, although one that does not quite reach Coca-Cola's impressive value. This is mainly the result of the restaurant operator's more fixed assets-based business model, which is much more fixed assets-based when compared with that of Coca-Cola; this business model requires McDonald's to invest in its restaurants to provide its franchisees with equipment, and incur other related costs.

Rio Tinto, in contrast, invested more than three-quarters of its operating cash flow in 2012. This is not necessarily a bad sign. If the company is currently in the midst of an investment cycle, financing the development of potentially lucrative projects, high capex ratios can be warranted. However, in the case of Rio Tinto with its high investment requirements for mines, property, plant and equipment, a high capex ratio is the rule rather than the exception. As the company's return on equity demonstrates, Rio Tinto managed to invest its funds in a very profitable way, achieving a return on equity of 23.2% without excessive leveraging, as demonstrated by the equity ratio of 51.9%. Hence, while Rio Tinto's business is indeed very capital-intensive, the company is still able to post a suitable return on its shareholders' investments.

The opposite is true for Alcoa. The company is active in a capital-intensive and largely commodity-like business, which requires Alcoa to spend most of its operating cash flow to maintain its existing assets and purchase new property. As the very low return on equity figure of 1.2% shows, these do not constitute high-profit investments. Simply based on these figures, the company could not be considered as a qualified long-term investment.

3.6   ASSET DEPRECIATION RATIO

As a rule, low capex ratios are a competitive advantage, or a consequence of it. However, they can also occur because of an artificially reduced volume of investment, which should be regarded as negative. Even businesses with low capital requirements should never be sparing with investments, as considerable increases in efficiency can be achieved in areas such as IT, supply chain, or by modernizing factories. Lucent Microsystems, for example, introduced an Oracle Enterprise System, which reduced the throughput time of its business processes from over a week to less than eight hours – and increased its EBIT margin by half a percentage point simply due to reduced logistical cost. Colgate-Palmolive even cut in half the time between receiving an order and delivery by introducing a new SAP system.

A resourceful manager might think that consistently forgoing investments increases the free cash flow in the short term. Methods of this kind can be identified with the help of the asset depreciation ratio.

$$\text{Asset depreciation ratio} = \frac{\text{Cumulative depreciation of assets}}{\text{Assets at historical acquisition cost}}$$

This ratio indicates the age and condition of the company's assets. The asset depreciation ratio shows to what proportion the assets have already depreciated. A high value indicates that large investments are needed in the future to replace old or outdated equipment. A comparison with industry competitors is usually particularly insightful.

Example 3.15 – Asset depreciation ratio: Deutsche Telekom

Deutsche Telekom, Germany's largest and previously state-owned telecoms provider, shows the data in Table 3.11 concerning its fixed assets (notes section 6).

Table 3.11   Deutsche Telekom: Property, plant and equipment overview

Deutsche Telekom	
€m	
Assets at 31 December 2008 (historical acquisition cost)	120,415
Assets at 31 December 2009 (historical acquisition cost)	126,507
Assets at 31 December 2010 (historical acquisition cost)	129,749
Cumulative depreciation at 31 December 2008	78,856
Cumulative depreciation at 31 December 2009	81,039
Cumulative depreciation at 31 December 2010	85,541

The asset depreciation ratio is calculated as follows:

$$\text{Asset depreciation ratio}_{2010} = \frac{€85{,}541\text{m}}{€129{,}749\text{m}} = 65.9\%$$

$$\text{Asset depreciation ratio}_{2009} = \frac{€81{,}039\text{m}}{€125{,}509\text{m}} = 64.1\%$$

$$\text{Asset depreciation ratio}_{2008} = \frac{€78{,}856\text{m}}{€120{,}415\text{m}} = 65.5\%$$

The time frame between 2008 and 2010 does not show a clear trend. However, compared with an asset depreciation ratio of 52.7% in 2002, it can be concluded that Deutsche Telekom either invested too much in the years prior to that, or that it reduced investments dramatically after 2002. One problem with this ratio is the distinction between the *actual* useful lifetime of an asset and the useful lifetime assumed in the company's accounts. As some assets could have already been written off but are still in use, these ratios should always be verified critically.

Example 3.16 – Asset depreciation ratio: CSX Corporation

CSX Corporation is one of the major US railroad corporations, with a network spanning more than 21,000 miles, ownership of more than 4,000 locomotives as well as over 87,000 freight cars and containers. Note 6 of CSX Corporation's financial statements shows the detailed composition and development of these assets (Table 3.12).

Table 3.12 CSX Corporation: Detailed property, plant and equipment overview

		CSX Corporation	
$m			
	Cost	Accumulated depreciation	Net book value
2012			
Total road	23,419	(5,153)	18,266
Total equipment	9,301	(4,008)	5,293
Total			
2011			
Total road	22,379	(4,889)	17,490
Total equipment	8,621	(3,801)	4,820
Total			
2010			
Total road	20,906	(4,317)	16,589
Total equipment	7,443	(3,147)	4,296
Total			
2009			
Total road	20,013	(4,032)	15,981
Total equipment	7,466	(3,038)	4,428
Total			

Source: CSX Corporation (2012, 2010) [US GAAP]

CSX reports the historical cost (1), accumulated depreciation (2) and the remaining net book value (1) – (2) separately for its road and equipment assets. Road assets contain rail and other track material, ties, grading and other, whereas equipment is mainly composed of locomotives, freight cars and work equipment. This level of detail enables us to calculate the asset depreciation ratio for both parts, road and equipment.

For the road assets, the asset depreciation ratio is calculated as follows:

$$\text{Asset depreciation ratio}_{2012 \text{ road}} = \frac{\$5,153m}{\$23,419m} = 22.0\%$$

$$\text{Asset depreciation ratio}_{2011 \text{ road}} = \frac{\$4,889m}{\$22,379m} = 21.8\%$$

$$\text{Asset depreciation ratio}_{2010 \text{ road}} = \frac{\$4,317m}{\$20,906m} = 20.6\%$$

$$\text{Asset depreciation ratio}_{2009 \text{ road}} = \frac{\$4,032m}{\$20,013m} = 20.1\%$$

In the case of the equipment assets, the asset depreciation ratios are:

$$\text{Asset depreciation ratio}_{2012\ eqp} = \frac{\$4,008m}{\$9,301m} = 43.1\%$$

$$\text{Asset depreciation ratio}_{2011\ eqp} = \frac{\$3,801m}{\$8,621m} = 44.1\%$$

$$\text{Asset depreciation ratio}_{2010\ eqp} = \frac{\$3,147m}{\$7,443m} = 42.3\%$$

$$\text{Asset depreciation ratio}_{2009\ eqp} = \frac{\$3,038m}{\$7,466m} = 40.7\%$$

Over the span of this four-year comparison, the ratios show that CSX road assets may have been subject to underinvestment, with the asset depreciation ratio growing from 20.1% to 22.0%. On the equipment side, the trend is less well defined but also hints towards a similar underinvestment scenario. Obviously, the asset depreciation ratio is a very slowly moving figure since historical investments are weighted the same way as more recent capital expenditures. Therefore, it is useful to compare this set of numbers with considerably older ratios. Looking up asset depreciation ratios in CSX's annual report archive gives 21.6% for the road assets and 39.2% for equipment in 2002. This shows a slow but continuing trend to underinvest, at least in absolute terms. One should, however, be aware of the fact that it can, for instance, be the case that prices for railroad equipment have dropped, or, what has actually been the case, that locomotive engines have become more fuel-efficient. Another factor potentially complicating the analysis of this ratio is the increasing use of long-term leases. When road assets or equipment are obtained under operating leases, these assets don't show up on the balance sheet, which leads to the asset side of the business appearing older than it actually is.

3.7   PRODUCTIVE ASSET INVESTMENT RATIO

A more dynamic ratio with a similar target, the productive asset investment ratio, relates the capital expenditures of a year to the depreciation expenses incurred.

$$\text{Productive asset investment ratio} = \frac{\text{Capital expenditures}}{\text{Depreciation expenses}}$$

Usually, growth is linked to corresponding investments. If investments (capital expenditures) exceed annual depreciation, the business is usually expanding as more fixed assets are added than have depreciated over the same time. If the value is below 100%, one has to check if the business sets depreciation rates too high, lives off its substance, or whether lower investments are justified as the growth dynamic has fallen.

Another reason may be technological change. If, for example, a department store switches entirely to e-commerce, investments in assets will fall sharply given the asset-lighter business model in e-commerce.

Depreciation and investment figures for calculating the ratio can be found in the cash flow statement.

Example 3.17 – Productive asset investment ratio: Royal Dutch Shell
Oil giant Royal Dutch Shell lists depreciation figures of $13.6bn, $14.4bn and $15.5bn for 2008 to 2010. In addition, the cash flow statement shows net investments of $30.3bn, $25.2bn and $23.6bn. Using these figures result in productive asset investment ratios of 185%, 175% and 152%. The growth dynamic on the part of investment activity has therefore decreased during the three years in consideration, but the business is still growing as the growth rate is well above 100%.

3.8   CASH BURN RATE

Young and fast-growing businesses have capital requirements and fixed costs that often exceed operating cash flows and profits. As strong growth is usually accompanied by high investments in working capital (e.g. for sufficient inventory), conventional valuation would always come to a negative result. Although a healthy scepticism towards young enterprises is appropriate, especially during boom times, interesting investment ideas can also be found in this sector. The cash burn rate shows how long a company can carry out its business while running a deficit.

A comparison of the net loss (absolute value) and shareholders' capital lends itself to loss-making companies.

$$\text{Cash burn rate } = \frac{\text{Shareholders' equity}}{|\text{net loss}|}$$

This ratio shows the maximum number of loss-making years that the business could cope with. The closer this value gets to zero, the more necessary it becomes to increase the capital base or explore other means of financing in order to avoid insolvency.

If the cash burn rate, for example, shows a value of five years, it means that shareholders' equity would be used up only after five consecutive loss-making years. In such a scenario, it is important that the investor has a thorough understanding of when the business can reach the break-even point. For instance, if it can reach it after two years, the provisions will be sufficient. Such a prognosis should always be made with pessimistic assumptions, as there is possibly a danger of a total loss, if it does not come true.

Example 3.18 – Cash burn rate: Bubble Ltd vs DreamBig Ltd
Bubble Ltd, a maker of a new kind of bubble bath salts, and DreamBig Ltd, an internet start-up, both have shareholders' equity of $1m and the annual net loss history shown in Table 3.13.

Table 3.13   Cash burn rate: Bubble vs DreamBig

Year	Result 'Bubble' ($)	Result 'DreamBig' ($)
2007	–3,000,000.00	–4,000,000.00
2008	–2,500,000.00	–3,000,000.00
2009	–2,000,000.00	–2,000,000.00
2010e	–1,500,000.00	–1,000,000.00

The market capitalization of both enterprises was \$300,000 in 2009. Which business was in a better position?

Using the equation given, Bubble Ltd in 2010 had a cash burn rate of 8 months in contrast to DreamBig Ltd's 12 months. Therefore, both enterprises run a risk of using up their shareholders' equity within the next year or having to carry out a capital increase.

$$\text{Cash burn rate}_{\text{Bubble}} = \frac{\$1,000,000}{|-\$1,500,000|} = 8 \text{ months}$$

$$\text{Cash burn rate}_{\text{DreamBig}} = \frac{\$1,000,000}{|-\$1,000,000|} = 12 \text{ months}$$

Future prospects are crucial for young enterprises in particular. In the absence of other data, following the income trend shows that Bubble Ltd made a loss of \$1.5m in 2010, which resulted in an accounting insolvency (shareholders' equity < 0). A capital increase and the associated dilution of shareholders was the only option. DreamBig Ltd would use up its shareholders' equity if it made a loss of \$1m, but it could reach the break-even point in the following year if it continued its income trend. From this point of view, DreamBig Ltd would be the lesser of the two poor options.

These examples illustrate that a cash burn rate of less than 24 months should in any case lead to the rejection of the investment and the decision to value the business, as the future is sufficiently uncertain. When investing in a young business, secured long-term financing, preferably in the form of equity, is crucial. Another important deviation of this formula is to use the actual cash holdings in the nominator and the operating cash (out) flow in the denominator, measuring when the company will eventually run out of money.

3.9   CURRENT AND NON-CURRENT ASSETS TO TOTAL ASSETS RATIO

The bigger the proportion of current assets in relation to total assets, the more room a company has to manoeuvre. As current assets per definition remain with the business less than 12 months, a high current asset to total asset ratio equates to a high level of adaptability and flexibility. On the flipside, businesses with low current to total asset ratios often face low barriers to entry in their respective industries.

$$\text{Current assets to total assets ratio} = \frac{\text{Current assets}}{\text{Total assets}}$$

In fast-moving industries, flexibility is a basic requirement to exist in the long run. In contrast, businesses with low current asset to total asset ratios have a large part of their assets tied up in non-current fixed assets. These could be factory buildings and machinery. If a certain trend or development like a new generation of microchips in the semiconductor business for example changes the entire industry, property, plant and equipment have to be replaced – which is usually costly. At the same time, high current asset to total asset ratios do not necessarily imply the firm has high flexibility. Instead it could mean that the business cannot sell off its

inventory or collect its receivables. In this case, an increase in working capital points towards a struggle for survival.

The counterpart of the current assets to total assets ratio is the non-current assets to total assets ratio:

$$\text{Non-current assets to total assets ratio} = \frac{\text{Non-current assets}}{\text{Total assets}}$$

A high non-current assets to total assets ratio often involves risks, as the business cannot react quickly to changing market trends. A shopkeeper with low non-current assets to total assets ratio can react quickly to trends by including those products into the assortment that are in demand. However, the manufacturers of these products cannot react to these changes in demand as quickly since machinery has to be replaced or new products developed. Businesses with high non-current assets to total assets ratios should always have a strong and reliable strategy in order to minimize the risk of new market trends and changes in demand. Businesses with a high share of non-current assets can, however, also show distinct barriers to entry. For example, this could include an extensive store network for retailers, pipeline providers or cable operators. A high non-current assets to total assets ratio is therefore a plus in the case of a leading market position in a slowly changing business environment. In the aforementioned cases, these fixed assets actually cement the market position of the companies in possession of these assets. Another good example for this phenomenon is Canadian National. The company has a network of more than 20,100 route miles of track, and operates thousands of locomotives. In order to replicate this asset base alone, more than $34bn would have to be invested. In this sense, an existing network like this can be considered a natural monopoly.

Example 3.19 – Current and non-current asset ratios: a comparison
The comparison shown in Table 3.14 highlights even more clearly the different ratios being dependent on the business model being used and demonstrates some additional pitfalls when interpreting the results.

Table 3.14   Asset ratios: A comparison of three listed companies

	Canadian National	Corning	Facebook
Non-current assets	$24,790m	$19,680m	$3,836m
Current assets	$1,869m	$9,695m	$11,267m
Total assets	$26,659m	$29,375m	$15,103m
Current assets/assets	7.0%	33.0%	74.6%
Non-current assets/assets	93.0%	67.0%	25.4%

Source: Financial statements (2012) [US GAAP]

Canadian National's performance is hardly a surprising one. The company's railway operations in Canada and the US require heavy investments in tracks and locomotives. On the current asset side, Canadian National primarily carries accounts receivable while holding no

or only very few inventories. In this case, the highly inflexible asset profile should not be seen as a negative since railroads in the US face little threat from technological change. This is further cemented by the cost and economic advantages of the railroads as compared with truck transport or shipping. Lastly, its existing track and hub network, a network that it owns outright, provides the company with a natural barrier of entry that further shields it from potential competitors.

Corning is a producer of speciality glass and ceramics and has been particularly relevant to the smartphone industry because of its patented Gorilla Glass, a key smartphone component. Another key operating area is the company's LCD business, which is carried out in a joint venture with Samsung. In addition to these, the company established a joint venture with Dow Chemical. In total, the joint ventures make up 27% of Corning's balance sheet.

In the case of a joint venture, the total assets and liabilities is not reported on the group's balance sheet. Instead, the group's stake in the shareholders' equity of the joint venture is reported as a long-term investment. Therefore, Corning's joint ventures are completely reflected in the non-current assets figures, although the joint ventures themselves consist of both non-current and current assets. It follows that through this joint venture accounting, Corning's non-current assets to total assets ratio leads the company to appear to be more inflexible than it actually is. Factors like this have to be considered for any groups that have large stakes in other companies which are not fully consolidated.

In a helpful contrast, Facebook requires only very limited fixed assets in order to run its business. Apart from the company's headquarters and server farms on the non-current side, its assets are heavily weighted towards current assets, which make up nearly three-quarters of the balance sheet total. Examining the figures in more detail, the company still shows very high cash holdings. This is typical for technology and internet companies. Because trends change quickly and must be responded to in order to ward off competitors, technology companies need to be extremely flexible in the short term. Having cash available ensures such flexibility as it allows the company to quickly invest to capitalize on trends.

3.10   EQUITY TO FIXED ASSETS RATIO AND EQUITY AND LONG-TERM LIABILITIES TO FIXED ASSETS RATIO

The golden rule of accounting states that non-current assets should be correspondingly financed with long-term funds, whereas current assets should be financed with short-term capital. Hence, in order to fund a company's non-current assets, long-term debt and shareholders' equity should be used. Therefore a subdivision of the two related ratios presents itself for evaluating the level of financing by only taking into account shareholders' equity, which is at the company's disposal for an unlimited time.

$$\text{Equity to fixed assets ratio} = \frac{\text{Shareholders' equity}}{\text{Non-current assets}}$$

Equity to fixed assets ratio describes the percentage to which the non-current assets are covered by shareholders' equity. A target range between 70% and 90% is considered to be sufficient, because companies also have borrowed long-term capital at their disposal:

Equity and long-term liabilities to fixed assets ratio

$$= \frac{\text{Shareholders' equity} + \text{Long-term borrowed capital}}{\text{Non-current assets}}$$

Adding long-term borrowed capital into the equation results in the equity and long-term liabilities to fixed assets ratio. A value of over 100% signifies that besides non-current assets, parts of working capital are also long-term funded. The target is around 130%.

This ratio is particularly important for cyclical businesses or those that suffer financially. An equity and long-term liabilities to fixed assets ratio of less than 100% holds the latent danger of financial difficulties when facing short-term credit, e.g. if the money market dries up. Lehman Brothers is one of the best-known victims of ignoring this ratio. Long-term investments were funded with short-term debt in order to make a profit out of the interest-rate difference. The consequences are well known. Bigger companies such as General Electric also had problems during the financial crisis to roll over their short-term debt given frozen money markets. This threat occurs only when there is a duration mismatch between the asset and liabilities side. When both come due at the same time, no external financing is needed whatsoever. Investors should be aware of this when assessing the short- and long-term financial stability.

Example 3.20 – Petróleo Brasileiro SA
We will demonstrate the calculation and interpretation of the equity to fixed assets and equity + long-term liabilities to fixed assets ratio using the example of Petróleo Brasileiro SA, which is better known as Petrobras, and which is Brazil's largest corporation. Table 3.15 shows a truncated version of Petrobras' balance sheet as at year-end 2012.

Table 3.15   Petróleo Brasileiro: Shortened balance sheet

Petróleo Brasileiro SA			
$m			
Current assets	57,794	Current liabilities	34,070
Non-current assets	250,746	Non-current liabilities	128,536
		Shareholders' equity	169,039
Balance sheet total	331,645	Balance sheet total	331,645

Source: Petróleo Brasileiro SA (2012) [IFRS]

Examining the asset side of the balance sheet, it becomes apparent that long-term assets, especially property, plant and equipment, constitute the vast majority of assets that Petrobras holds. This raises the question of whether these assets are adequately financed on the other side of the balance sheet. In order to determine this we turn to the two ratios below:

$$\text{Equity to fixed assets ratio} = \frac{\$169,039m}{\$250,746m} = 67.4\%$$

$$\text{Equity and long-term liabilities to fixed assets ratio} = \frac{(\$169,039m + \$128,536m)}{\$250,746m} = 118.7\%$$

The equity to fixed assets ratio of 67.4% very narrowly misses the desired target range of 70% to 90% but can still be described as solid. Taking into account long-term liabilities yields a value of 118.7%, which comes very close to the desired target value of 130%. Overall, therefore, Petrobras shows good capital to assets ratios, with long-term assets being adequately financed by long-term capital sources.

3.11 GOODWILL RATIO

Six years after Vodafone acquired Mannesmann for a record sum of £112bn, the British mobile phone provider announced a post-tax loss of £21.8bn in 2006. What had happened? The British company had overstated Mannesmann's value and was forced, due to unfulfilled expectations, to adjust the carrying values on the balance sheet accordingly. A goodwill impairment valued in the billions followed. As a reminder, goodwill is the premium that the buyer pays on top of the book value of the target company. Potential balance sheet time-bombs like these can be quantified using the following equation:

$$\text{Goodwill ratio} = \frac{\text{Goodwill}}{\text{Shareholders' equity}}$$

Businesses have to run an annual impairment test on the goodwill stated on their balance sheets. This impairment test verifies whether the amount of goodwill is justified or not. If it is not, the goodwill position has to be impaired with negative consequences on the income statement. In line with current international accounting rules an annual depreciation of goodwill, as is the case with most other assets, is not carried out. Goodwill poses a risk for balance sheet ratios, because many businesses set the value of the acquired company too optimistically, and consequently have to carry out significant write-downs in the following years. Often this is the direct consequence of excessive purchase prices at the time of takeover. Nevertheless, goodwill should not be vilified, because some companies are without a doubt worth more than the shareholders' equity listed on the balance sheet. A high goodwill ratio, however, always holds the latent danger of impairments, decreasing shareholders' equity. For this reason, goodwill should not constitute a significant share of the equity basis. As a rule of thumb, 30% can be considered the maximum proportion. Even in the case of a full goodwill write-off, solid balance sheet ratios can then usually be guaranteed. Whilst write-offs are not affecting liquidities and therefore do not ensure a cash outflow, this form of depreciation is always a direct consequence of overvaluing your own assets, which can never be regarded as positive. Goodwill should therefore be subject to a separate revaluation test in the valuation process. If the result proves to be below the stated value, it has to be offset against shareholders' equity. There is a separate section at the end of Chapter 8 on specific adjustments and editing of balance sheets prior to the analysis.

4
Ratios for Working Capital Management

The long run is a misleading guide to current affairs. In the long run we are all dead.

John Maynard Keynes

Would it not be valuable to own a business that receives payment before the product has actually been delivered? And would it not be clever to pay for purchased goods months after they have been delivered? Large retailers such as Wal-Mart, Tesco and Home Depot raise their profitability using precisely these methods. As their suppliers are, to a large extent, dependent on them, they have to accept the giant retailers' payment terms or entice them with generous cash discounts.

If Wal-Mart only pays its purchased goods after two months but sells them within a few weeks, the supplier essentially grants an interest-free loan. The computer manufacturer Dell, for example, uses this method very successfully towards its clients as they usually pay in advance. Its suppliers are largely dependent on Dell and therefore allow generous terms of payment, adding to Dell's high cash flow generation.

The optimal amount of inventory, receivables and cash on hand, i.e. current assets, paired with an economically favourable amount of short-term liabilities, especially supplier credits, is called working capital management. Working capital management, if implemented correctly, reduces the amount of capital that is tied up within the business, releasing unused funds and ultimately increasing profitability.

This becomes clear considering that even the most successful business, as seen in Chapter 1 on cash flow calculations, may run out of cash due to bad working capital management. This is precisely what can happen when too many customers buy on credit – the business achieves high turnover, but no money is actually coming in to buy new goods with, pay employees and make investments. Yet excessive sales expectations often result in stockpiling of products and therefore tying up too much capital. If these products go out of fashion or age, corresponding depreciation has to be undertaken.

Hence efficient working capital management describes the optimum proportion of current assets and accounts payable. If the former is too high, too much capital is tied up and profitability falls. If a business has insufficient current assets in relation to current liabilities it is in danger of underfunding, as current assets (for example through the sale of goods or funds from recovering receivables) are used to pay off maturing current liabilities. In other words, if a significant amount of money is owed to suppliers, and there are insufficient current assets that can be liquidated fast enough, there is a danger the company would default on its short-term liabilities.

Moreover, if insufficient stocks are kept, it can result in supply bottlenecks, which is a critical factor in today's on-demand consumption.

In contrast to ratios for financial stability, the liquidity ratios provide information on short-term funding of businesses. In addition, since these ratios also examine whether or not a

business is carrying too many current assets on its balance sheet, working capital ratios can be considered profitability indicators.

This chapter initially deals with the calculation and interpretation of days sales outstanding using the examples of Amazon.com and Dow Chemical and then introduces various ratios regarding working capital management and stock-keeping. Days sales and days payable outstanding indicate how quickly invoices and debts are paid and in effect give a first insight into working capital management.

4.1   DAYS SALES OUTSTANDING AND DAYS PAYABLES OUTSTANDING

$$\text{Days sales outstanding } = \frac{(\text{\O Accounts receivable } \times \; 360)}{\text{Sales}}$$

Days sales outstanding (DSO) show how long it takes the company to collect its bills from customers. An increase in DSO therefore usually indicates a deterioration in receivables management. High and increasing values reduce the operating cash flow as less money actually flows into the company.

This ratio is even more definitive when considered in conjunction with its counterpart: days payables outstanding (DPO).

$$\text{Days payables outstanding } = \frac{(\text{\O Accounts payables } \times \; 360)}{\text{Cost of sales}}$$

Analogous to days sales outstanding, the DPO ratio quantifies how long it takes the company (or how long it allows itself) to pay its debts to its suppliers. The target ratio between both numbers is therefore as follows:

$$\text{Days sales outstanding } < \; \text{Days payables outstanding}$$

This target ratio is set as a result of the proposition that it is in the best interest of the company to collect receivables from customers early, while at the same time paying its own bills as late as possible. The wider the spread, the longer the company is the holder of interest-free money. As a result, the need for external short-term funding or the need to resort to expensive overdrafts decreases. In principle, days sales and days payable outstanding are comparable only within the same industry. For example, companies selling directly to end customers like Wal-Mart or Tesco normally have their bills paid on the spot whereas companies situated in the middle of the supply chain will often have to sell their products on credit.

Let's take a look at the financial statements of Amazon and Dow Chemical as an example of how to calculate and interpret these figures.

Example 4.1 – Days sales outstanding/Days payables outstanding: Amazon

Table 4.1 Amazon.com: Certain financial statement positions

	Amazon.com Inc.	
$m	2012	2011
Total net sales	61,093	48,077
Cost of sales	45,971	37,288
Accounts receivable, net and other	3,364	2,571
Accounts payable	13,318	11,145

Source: Amazon.com Inc. (2012) [US GAAP]

Based on the figures in Table 4.1, the days sales outstanding ratio for Amazon is calculated as follows:

$$\text{Days sales outstanding} = \left[\frac{(0.5 \times \$3,364m + 0.5 \times \$2,571m)}{\$61,093m} \right] \times 360 = 17.5 \text{ days}$$

Days sales outstanding is calculated by dividing the average accounts receivables for 2009 by the total net sales in the same year. Since accounts receivables are only reported on the balance sheet date, the average has to be used in order to compare them to net sales, which cover the entire year. This ratio can be further refined by using quarterly data for accounts receivables. Such an approach can make sense for companies with heavy seasonal business activity patterns in particular. Days payables outstanding are calculated in an analogous manner:

$$\text{Days payables outstanding} = \left[\frac{(0.5 \times \$13,318m + 0.5 \times \$11,145m)}{\$45,971m} \right] \times 360 = 95.8 \text{ days}$$

These are impressive figures. Amazon collects its bills very quickly, which is unsurprising, given the fact that it deals mostly with end customers paying by credit card or on account. Yet given Amazon's sheer size and importance, most suppliers have to accept the company's payment terms regarding the amounts owed to them by Amazon. Subtracting both figures shows that Amazon enjoyed an interest-free supplier's net credit for more than 78 days, thereby significantly reducing the company's financing needs.

Example 4.2 – Days sales outstanding/Days payables outstanding: Dow Chemical
Dow Chemical shows income statement and balance sheet figures for year-end 2011 and 2012 as in Table 4.2.

Table 4.2   The Dow Chemical Company: Certain financial statement positions

The Dow Chemical Company		
$m	2012	2011
Net sales	56,786	59,985
Cost of sales	47,792	51,029
Accounts and notes receivable:		
Trade	5,074	4,900
Other	4,605	4,726
Accounts payable:		
Trade	5,010	4,778
Other	2,327	2,216

Source: The Dow Chemical Company (2012) [US GAAP]

Dow Chemical subdivides its accounts receivables and payables into 'trade' and 'other'. For the calculation of the days outstanding, it is important to always use the 'trade' figures. The amounts accounted for as 'other' could, for example, contain receivables from loans granted to other companies or other non-operating activities. Including them in the calculation would substantially dilute the results. The same applies to the accounts payables. In their case, the 'other' position could, for example, comprise open bills for the construction of plant. All of these obviously have little to do with the customer–company–supplier relationship and should therefore be ignored for the purpose of calculating these ratios.

$$\text{Days sales outstanding} = \left[\frac{\left(\frac{1}{2} \times \$5,074\text{m} + \frac{1}{2} \times \$4,900\text{m} \right)}{\$56,786\text{m}} \right] \times 360 = 31.6 \text{ days}$$

$$\text{Days payables outstanding} = \left[\frac{\left(\frac{1}{2} \times \$5,010\text{m} + \frac{1}{2} \times \$4,778\text{m} \right)}{\$47,792\text{m}} \right] \times 360 = 36.9 \text{ days}$$

Dow Chemical shows a very narrow range between the collection of receivables and the payment of its own bills. This means that the company can only take very little advantage of the funds provided by its suppliers. Why is this so? Examining the DSO shows a respectable value of 31.6 days despite the fact that Dow Chemical sells a large share of its products on credit. This suggests that there does not seem to be a receivables collection problem. Instead, Dow Chemical does not appear to be in a very good bargaining position vis-à-vis its suppliers, which enables them to press home favourable payment conditions. The question arises: why does Dow Chemical not press its suppliers? The answer can be neatly summed up by the maxim: live and let live. Most of Dow Chemical's suppliers produce commodity-like products, most likely earning only narrow margins. Were Dow Chemical to squeeze them by paying them later, it could end up constraining its own supplier base as the more vulnerable of its suppliers went out of business.

4.2   CASH RATIO

$$\text{Cash ratio} = \frac{\text{Cash on hand} + \text{Short-term investments}}{\text{Current liabilities}}$$

Cash ratio is the company's cash and liquid assets and securities (assets which can be liquidated quickly and easily) in proportion to its short-term liabilities. This ratio (like quick ratio and current ratio) originates from the concept that short-term debt should be sufficiently covered by assets that can be converted into cash reasonably quickly.

Since inventories and receivables represent further current assets at the disposal of the business for paying off short-term debt, a target corridor of 10–20% is sufficient leeway for this ratio. However, a higher proportion of cash within a business does not pose a threat and can be considered a luxury problem which negatively affects the return on capital figures of the company. Some businesses that make large seasonal purchases (e.g. tyre shops in countries with heavy snowfall during winter: accumulation of summer and winter tyres just before the season) rely on even larger cash holdings at times. A cash ratio above the target corridor, thus, should not necessarily be regarded as negative. Indeed, in times of crisis, a sufficient cash cushion can ensure the survival of the company when credit markets collapse or other 'just in case' scenarios actually occur. Warren Buffett once famously remarked that he always keeps \$10bn in cash, 'just in case Ben Bernanke runs off to South America with Lindsay Lohan'.

Example 4.3 – Liquidity: Enron/commercial paper market
In the US, many businesses stock up on short-term credit using the commercial paper market. Commercial papers are money market papers with a maturity of one day to nine months. The significance of this means of funding, and more generally of short-term financing itself, is highlighted by the sum of the outstanding commercial papers of \$1.5 trillion as of 2009.

Large businesses usually need considerable amounts of liquidity to carry out their day-to-day business, which is usually raised from the commercial paper market. Exclusion from this market therefore equals a death sentence for a business. When markets grew more and more restless in 2001 due to the rumours about Enron's balance sheet fraud and ratings agency Moody's threatened to downgrade Enron's creditworthiness, the commercial paper market dried up instantly for the conglomerate. At the time, the business used up \$70,000 per hour to maintain the operating business. Shortly afterwards, the ninth-largest US conglomerate at the time went bankrupt.

At the height of the financial crisis in 2008/09 the money market reacted similarly. Confidence had been lost even in first-class businesses as they were at risk of being excluded from the commercial paper market. General Electric, a company with over 300,000 employees, nearly had to apply for emergency loans as the commercial paper market was no longer accessible and the company could only take out insufficient short-term cash.

One of the most important lessons from the crisis should be that, in extreme times, businesses can never hold enough cash, or as John Maynard Keynes expressed it: 'The market can stay irrational longer than you can stay solvent.' Yet excessive liquidity reserves hold the risk that this capital is unprofitable or is only used according to the wishes of the management.

Cash ratio distribution: S&P 500
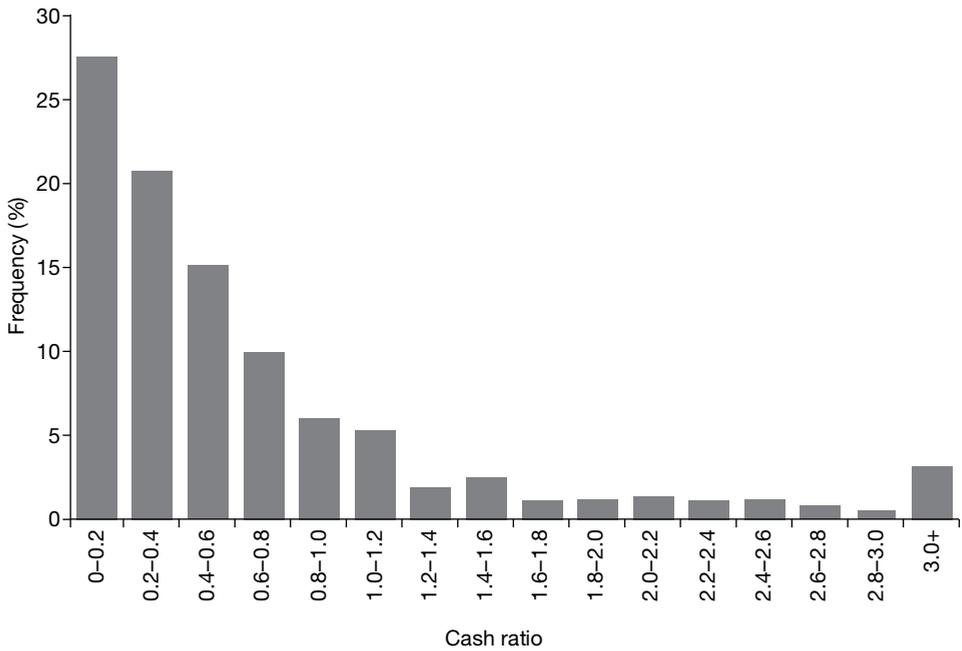
Figure 4.1   S&P 500: Cash ratio distribution

The median cash ratio is 40% (i.e. 0.4). As Figure 4.1 shows, most S&P 500 companies carry a lot of cash on their balance sheets as at year-end 2013 since the vast majority of the recommended 10–20% cash ratio target range. The next sections exemplify the calculation and interpretation of different liquidity ratios.

4.3   QUICK RATIO

$$\text{Quick ratio} = \frac{\text{Cash on hand} + \text{Short-term investments} + \text{Receivables}}{\text{Current liabilities}}$$

i.e.

$$\text{Quick ratio} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}}$$

As receivables can be converted to cash relatively quickly with a deduction (e.g. through factoring), the quick ratio extends the cash ratio by the existing accounts receivable. The 'quickness' of turning these assets into cash gives this ratio its name. As for the cash ratio, an unnecessarily high value means that too much capital is being tied up in the business, whilst

a low value points towards potential short-term funding instabilities. The target corridor is hence between 90% and 100%, constituting a good compromise between financial stability and efficient use of capital.

Quick ratio distribution: S&P 500

As shown in Figure 4.2, the quick ratio median lies at 0.9 (i.e. 90%) for all S&P 500 members, which constitutes a good value in the trade-off between profitability and financial stability.
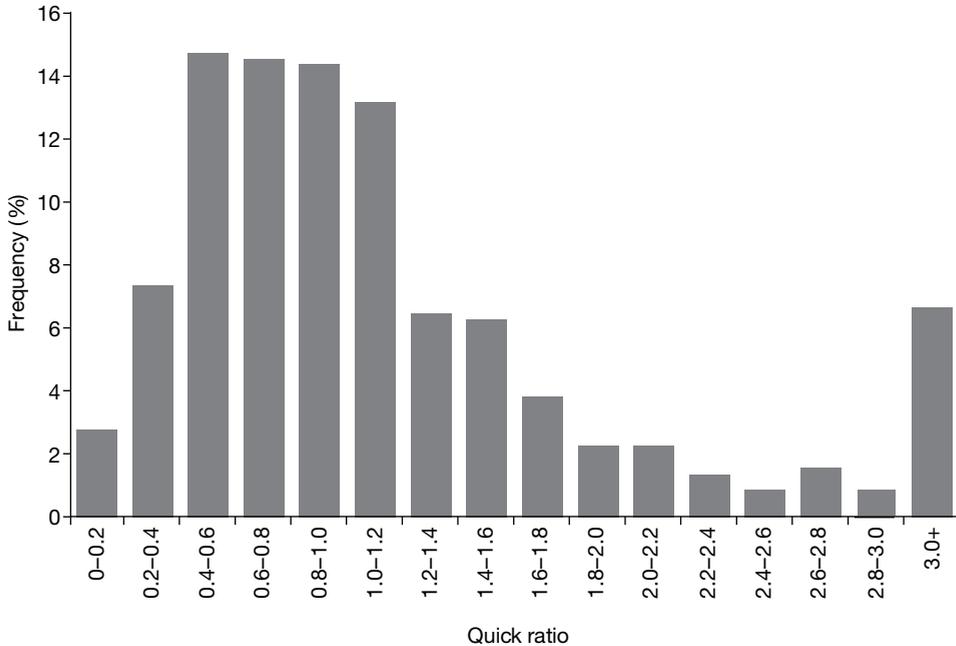

Figure 4.2   S&P 500: Quick ratio distribution

4.4   CURRENT RATIO/WORKING CAPITAL RATIO

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

The current ratio, also called working capital ratio, sets the entire current assets (or just liquidities + receivables + inventory) in relation to short-term liabilities. The target should be in the region of 120–170%. Why this value? Current assets serve to carry out the operating business and are usually used up within a year. It is precisely this term of less than a year that also characterizes short-term liabilities. These liabilities should therefore be sufficiently covered by their counterparts on the asset side, current assets.

Due to this fact, a target in the region of 100% would seem sensible, as it would be sufficient to pay off short-term liabilities. However, companies need a certain amount of current assets to be able to run their day-to-day business. Also, it is never guaranteed that the entire current assets can be liquidated at book value at short notice. Hence, a cushion is needed in the form of a current ratio well above the 100% threshold.

A closer look highlights the halfway house status of the liquidity ratios: they are as much part of financial stability as they are of profitability. If the current ratio amounts to more than the maximum required 170%, the business ties up too much capital and profitability falls. In effect, this crucial ratio is a balancing act between liquidity and profitability.

Current ratio distribution: S&P 500

Figure 4.3 depicts the distribution of the current ratio for all S&P 500 members. The median current ratio is a very healthy 1.5 (i.e. 150%). However, 18% of all companies show a current ratio of below 100%, which is a threat to the short-term solvency of the companies.
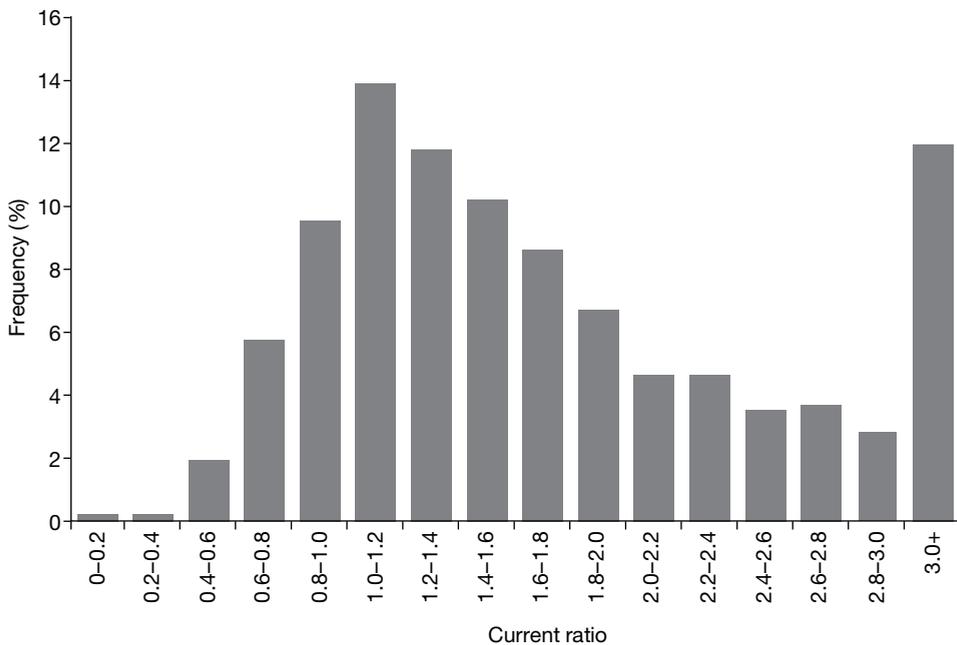

Figure 4.3   S&P 500: Current ratio distribution

Example 4.4 – Liquidity ratios: a comparison
As of year-end 2012, Apple Inc, BlackBerry and Nokia give the figures shown in Table 4.3, indicating their working capital management.

Table 4.3   Liquidity ratios: A comparison of three listed companies

	Apple Inc.	BlackBerry	Nokia
Cash ratio	75.6%	77.0%	64.8%
Quick ratio	103.9%	145.2%	102.7%
Current ratio (WC ratio)	149.6%	205.9%	142.6%

Source: Financial statements (2012)

All companies examined in this example post sound liquidity ratios. The characteristic substantial cash pile so typical of technology firms is reflected in the high cash ratios, which all are above the target range. As pointed out previously, this may not constitute the most capital-efficient liquidity management, but secures a high degree of flexibility and financial stability. The latter is especially important in the case of BlackBerry and Nokia, both of which are experiencing problems keeping up with the leading companies in the mobile handset market. As their figures show, in the short term at least, they should not experience cash shortages. In total, Apple and Nokia show quick and current ratios which are close to ideal, whereas BlackBerry is carrying current assets on its balance sheet that are in excess of ideal levels. However, as BlackBerry might be in the most challenging circumstances, it is likely rational for the company to sacrifice profitability for additional financial stability.

The precise calculation using consolidated financial statements from the US is illustrated with the example of Mondelēz International, the successor of Kraft Foods' international business.

Example 4.5 – Liquidity ratios: Mondelēz International
Mondelēz's current assets are depicted in Table 4.4. Its current liabilities amount to $14,873m.

Table 4.4   Mondelēz International: Current assets overview

Mondelēz International, Inc.	
$m	2012
Cash and cash equivalents	4,475
Receivables, net	6,129
Inventories, net	3,741
Other current assets	1,277
Total current assets	15,622

Source: Mondelēz International, Inc. (2012) [US GAAP]

The cash ratio is obtained by dividing cash and cash equivalents by current liabilities:

$$\text{Cash ratio} = \frac{\$4,475m}{\$14,873m} = 30.1\%$$

For the quick ratio, the company's net receivables have to be included in the nominator:

$$\text{Quick ratio} = \frac{\$4,475m + \$6,129m}{\$14,873m} = 71.3\%$$

In order to calculate the current ratio, either Mondelēz's total current assets or the sum of cash, receivables and inventory can be used. In this ratio calculation, total current assets of $15,622m are being used.

$$\text{Current ratio} = \frac{\$15,622m}{\$14,873m} = 105.0\%$$

Mondelēz demonstrates a rather aggressive, profitability-driven working capital management approach, with the company holding only as much working capital as is needed. Given its strong business model and resilient cash flow, this approach does not negatively affect the financial stability of the firm.

4.5   INVENTORY INTENSITY

$$\text{Inventory intensity}_{RS} = \frac{\text{Raw materials and supplies}}{\text{Total assets}}$$

i.e.

$$\text{Inventory intensity}_{SF} = \frac{\text{Semi-finished and finished products}}{\text{Total assets}}$$

These ratios give information on the proportion of supplies, i.e. goods, in relation to the total assets and therefore form a measure for capital efficiency and commitment. Usually, the higher the ratio of inventory, the higher the amount of capital tied up in working capital, which has a detrimental effect on profitability and cash flow generation. Moreover, a rise in this ratio compared with previous years can point towards sales problems of the relevant stock. The inventory intensity is therefore especially interesting over time and should be used in particular for fast-moving industries.

As absolute increases in inventory usually entail increases in revenue and total assets, sustainable growth does not affect this ratio. A sudden increase should, however, be followed closely.

Example 4.6 – Inventory intensity: Sony Corporation
Japanese giant Sony Corporation shows the following information about the composition of its inventories as of year-end 2012. The exact inventory data can be found in the notes to the financial statement (Table 4.5).

Table 4.5   Sony Corporation: Inventory overview

Sony Corporation		
¥m	2011	2012
Finished products	498,430	489,519
Work in process	88,236	85,631
Raw materials, purchased components and supplies	120,386	134,904
Balance sheet total	13,295,667	14,206,292

Source: Sony Corporation (2012) [US GAAP]

Based on this data, an inventory intensity of 4.4% and 4.0% for 2011 and 2012 can be calculated. Against the background of increased sales for Sony in 2012 this can be considered a positive development as less capital is tied up in inventory as the company grows, both in absolute and in relative terms.

4.6   INVENTORY TURNOVER

$$\text{Inventory turnover} = \frac{\text{Cost of sales}}{\text{Ø Inventory}}$$

A decrease in inventory turnover should be treated with caution since capital commitment and impairment risk increases. Dividing 360 by this figure gives the inventory days. This ratio shows how long the products remain within the company's stock on average.

$$\text{Inventory days} = \frac{360}{\text{Inventory turnover}}$$

For capital efficiency and profitability reasons, inventory days should remain as low as possible but at the same time should not impede the ability to deliver. There is no material difference between the inventory days and turnover ratios. However, the inventory days ratio is the more tangible and easy to visualize, and therefore more popular of the two.

Example 4.7 – Inventory days: Amazon.com
Amazon shows $6,031m and $4,992m in inventories and cost of sales of $45,971m and $37,288m for 2012 and 2011, respectively. Based on these figures, inventory turnover is calculated as follows:

$$\text{Inventory turnover} = \frac{\$45,971m}{(0.5 \times \$6,031m + 0.5 \times \$4,992m)} = 8.34$$

This translates to inventory days of:

$$\text{Inventory days} = \frac{360}{8.34} = 43.2 \text{ days}$$

This figure means that, on average, inventory remains with Amazon for 43 days. Obviously, the lower this number, the higher the asset turnover, which positively affects the firm's return on capital. Mapping and analysing the long-term inventory days trend helps reveal a company's key inventory management capabilities as well as any underlying trends. There are few ratios where the numerical analysis must be so closely linked to a firm grasp of the actual circumstances facing the business in question. For instance, the ratio can increase because the company accumulates products in expectation of substantial sell-ins or has taken advantage of cheap input prices in order to minimize costs and maximize profits at a future date. Other reasons can include seasonality (think, for example, of snowboard producers). In addition to thoroughly investigating the state of business affairs, one should always make a judgement on how quickly a product or a product line will go out of fashion. Products that are not or only to a lesser extent subject to change in taste, fashion or technology usually don't cause problems in terms of potential inventory write-offs. Inventory levels of fast-changing products, meanwhile, should always be kept at a minimum, as they may turn out to be worthless if they can't be sold immediately. The daily newspaper business is the most extreme example. After all, who buys yesterday's newspapers?

4.7   CASH CONVERSION CYCLE

Adding the already familiar ratios – days sales outstanding, days payable outstanding and inventory days – the cash conversion cycle can now be calculated (Table 4.6). It shows how long the capital is actually tied up in inventory and receivables less outstanding payables.

Table 4.6   Cash conversion cycle calculation

	Days sales outstanding (in days)
+	Inventory days (in days)
–	Days payable outstanding (in days)
	Cash conversion cycle (in days)

The result is the average cash commitment in days. It is important to bear in mind that this ratio takes on a profitability function (how quickly do funds flow back?) as well as a liquidity function (is short-term borrowing necessary due to capital being tied up too long?). In effect, this ratio indicates the company's performance in the area of working capital management. Similar to the liquidity ratios already introduced, the cash conversion cycle should be interpreted in view of historical developments.

Example 4.8 – Cash conversion cycle: Hengdeli Holdings
Table 4.7 provides information about working capital and income statement figures for Hengdeli Holdings, Asia's largest watch retailer and wholesaler.

Table 4.7   Hengdeli Holdings: Certain financial statement positions

	Hengdeli Holdings	
RMB000	2012	2011
Turnover	12,120,448	11,375,280
Cost of sales	8,966,015	8,518,212
Inventories	5,569,961	4,521,297
Trade receivables	1,011,869	789,249
Trade payables	1,782,100	1,377,071

Source: Hengdeli Holdings (2012)

Note that the exact numbers for trade receivables and trade payables had to be obtained from the notes, as the figures reported on the balance sheet also contained receivables and payables that were not associated with the company's operating business itself. Based on these numbers, the relevant ratios are calculated as follows:

$$\text{Days sales outstanding} = \left[\frac{(0.5 \times \text{RMB } 1,011,869 + 0.5 \times \text{RMB } 789,249)}{\text{RMB } 12,120,448} \right] \times 360$$

$$= 26.7 \text{ days}$$

$$\text{Days payables outstanding} = \left[\frac{(0.5 \times \text{RMB } 1,782,100 + 0.5 \times \text{RMB } 789,249)}{\text{RMB } 8,966,015} \right] \times 360$$

$$= 51.6 \text{ days}$$

$$\text{Inventory days} = \frac{360}{1.78} = 202.6 \text{ days}$$

The figures obtained for days sales outstanding and days payables outstanding ratios are very good. However, the company's inventory days ratio yields a very high number. This might be a satisfactory ratio since the company is distributing luxury watches with relatively long life cycles, but is definitely constraining Hengdeli's capacity for cash generation as the relatively high cash conversion cycle figures prove:

$$\text{Cash conversion cycle} = 26.7 \text{ days} + 202.6 \text{ days} - 51.6 \text{ days} = 177.7 \text{ days}$$

4.8   RATIOS FOR ORDER BACKLOG AND ORDER INTAKE

Businesses that show an order backlog are popular with analysts because this information helps evaluate the short- and medium-term top-line development.

Order backlog is the value of existing orders. Order income is different in that it records the orders which were received in a specific time period, e.g. the last quarter or last year. In particular, businesses in the manufacturing and the construction industries often provide order backlog and order intake data directly in the annual report, which makes the prognosis much easier.

A large order backlog provides businesses and investors with planning reliability, because the required and available capacity is easier to determine. It can be problematic, especially in manufacturing, to adjust the required capacity in a downturn because a large part of the expenses is made up of fixed costs. It is therefore important to precisely analyse the order situation of businesses characterized by high fixed costs. In general, companies with a high level of non-current assets, personnel expenses and declining orders are susceptible to imminent losses, because their cost base often cannot be adjusted in a timely manner, or not at all. The forward order book in days is used to evaluate this risk:

$$\text{Forward order book} = \frac{\text{Order backlog}}{\text{Last 12 months' sales}} \times 360$$

This ratio shows the term of the order backlog in days. If the result is, for example, a forward order book of 360 days, the capacity can be filled for an entire year even if further orders dry up completely. The higher this ratio, the better one can estimate future sales and cost developments. If a business has an order backlog of $200m and achieves sales of $100m, the result is a forward order book of about two years.

$$\text{Forward order book} = \frac{\$200m}{\$100m} \times 360 = 730 \text{ days}$$

The quality of orders is particularly important. If a manufacturer is dependent on a few clients who cancel or delay orders in a downturn, the resulting forward order book has to be treated with caution. The order pattern of clients should be taken into account during the analysis. A broadly diversified client base with orders spread across different industries increases the quality of the backlog considerably and provides additional safety.

Another important, more dynamic ratio in the area of orders received is the book-to-bill ratio.

$$\text{Book-to-bill ratio} = \frac{\text{Order intake}}{\text{Sales}}$$

The book-to-bill ratio compares the current orders received with the sales that had been achieved last. A value larger than 1 is an indicator of increasing sales, as the order intake surpasses existing sales. A factor of 2, for example, corresponds to a possible doubling of sales, as long as the business has the required capacity and funds to complete the orders in a timely manner. A book-to-bill ratio less than 1, however, is dangerous. It points to falling sales that, in combination with a high 'non-current assets to total assets ratio', erode margins

quickly. When using the book-to-bill ratio, it is important to use the same time units. If the orders received in the last quarter, for example, are put in the numerator, the corresponding sales of the last quarter have to be put in the denominator against it.

If a business received orders of $120m over the last six months at half-year sales of $85m, it results in a book-to-bill ratio of 1.41. This value indicates that sales are set to expand considerably. In general, it is most practical for businesses that rely on large orders to calculate the book-to-bill ratio annually, whereas for businesses with small but regular orders it can be calculated on a quarterly basis. During the analysis of the orders received one has to take into account which business area the orders received are part of. If orders received rise, for example, in a segment with a low margin, sales are set to rise but profit will only increase below proportion.

5
Business Model Analysis

> Quantitative data are useful only to the extent that they are supported by a qualitative survey of the enterprise.
>
> Benjamin Graham

The business model describes the success factors of a business. It should be seen as the counterpart of the figure-based part of company valuation introduced so far and comprises the qualitative characteristics of an enterprise. Extraordinary ratios are always the consequence of an extraordinary business model. While ratios only document economic success or failure in the past, conclusions about the future competitiveness can be drawn from the business model.

The market position of a company and the analysis of its business model, both introduced in this chapter, aim to identify and classify unique features and competitive advantages. The investor Warren Buffett once summarized his investment principles as follows:

> We only invest in a company if (1) we understand their business, (2) the long-term prospects of the business are good, i.e. demonstrated earning power, good returns on equity, little or no debt, attractive business, (3) the company is led by competent and honest managers and (4) the company's valuation is very attractive.

The aim of this chapter is to define clear principles to clarify points (1), (2) and (3). Unlike the financial ratios introduced earlier, these qualitative characteristics cannot be precisely determined and quantified. Nevertheless, the true art of company valuation lies in the analysis of the business model. In the long run, the most important driver for a successful business lies in a sustainable and profitable business model with a competitive edge; in addition to solid cash flows and appropriate debt levels. Profitability, which in a way serves as a catalyst, plays a special role: the higher the profitability, the stronger the effect of compounded interest within the business. Value can be created only when the company runs lucratively and viably. Profitability is by and large determined by the company's market position, and its cost management. A monopoly is an extreme form of a well-developed market position, which is rarely found in its pure form on a day-to-day basis due to anti-trust laws and regulations. The aim therefore is to locate toned-down forms of monopolies, that is, businesses with a unique selling proposition; metaphorically speaking, a moat.

The moat of a business can be determined, for example, as the ability to be the provider of the cheapest, unique or qualitatively best product in the market.

Over decades the Coca-Cola Company developed an outstanding business and is now the best-known brand name in most parts of the world. Hardly any restaurant or supermarket can afford not to offer the products of the company without risking revenue loss. Over the years, Coca-Cola's management has been successful at evolving its product from a simple soft drink to a mega-brand carrying its own message. Hence, the product is perceived to be a homogeneous soda, meant to be consumed by everyone around the globe. For this reason, the

business possesses the market power enabling it to pass on cost increases to customers and therefore achieve a lasting profitability.

The Swatch Group is another example of a company with a very well-developed market position. The group produces and distributes high-quality Swiss watches with an excellent worldwide reputation, and holds a third of the world's market share. What is the secret of the group? Swatch Group does not participate in the ruinous low price war bracket; instead it focuses on the higher price segment with brands such as Omega, Breguet and Longines. This market segment competes less on price and more on brand consciousness, quality and prestige. Another advantage of the Swatch Group is the first-mover advantage in Asia. The group started distributing its products, for example in China, considerably earlier than most competitors and now generates the majority of its sales in the Far East. Once a brand has built an outstanding market position, it is not a guarantee for long-lasting success. History is full of so-called 'fallen angels', large brands that lost their standing due to a management error or external influences. However, once a business has achieved a leading market position, the 'moat' and therefore its unique selling point can be extended through investment in marketing, the distribution network, research and the like. If, for example, a business has the possibility to raise the prices of its products independently of its competitors, at least to a certain extent, then the company makes more profit per dollar turnover than its competitor. Hence ratios, like the net profit margin, are particularly suitable to spot businesses with an outstanding market position.

However, a strong market position does not always result in excellent ratios. Especially state-owned enterprises, even at times when a state monopoly was guaranteed, were less profitable than many businesses in competitive markets. Reasons for this are high cost and low incentives for a more profitable business management. A competent and honest management is therefore just as important as a solid business model. Even excellent businesses such as the before-mentioned Coca-Cola Company and Swatch Group had crisis years in which management errors threatened the unique feature and eroded the 'moat'.

What type of business should one look for?

5.1   CIRCLE OF COMPETENCE

Knowing one's own circle of competence is an essential precondition for company valuation. A detailed analysis can only be carried out if the company's business model and products are comprehensible. It is impossible to value a company whose future in ten years' time is hard to foresee. Fast-moving markets and exorbitant growth rates are therefore not helpful for a meaningful analysis. Companies from industries that cannot be understood exhaustively should therefore be excluded from the valuation process. Whilst this procedure excludes many companies as an investment opportunity as well, the significance of this restriction, which is made far too little in today's valuation literature, can hardly be overestimated. A current book on company valuation advertises with the subtitle 'How to value any asset'. One can only counter this with the statement of Thomas J. Watson, CEO of IBM in the 1940s, who estimated total global demand for computers amounting to 'maybe five'. If even insiders cannot evaluate dynamic industries correctly, a valuation for outsiders is hardly possible. It is therefore important to delimit one's personal circle of competence clearly. 'Invest in what you know' – no basic rule is broken more frequently. In this sense, staying within one's circle of competence is the foremost rule of risk management.

5.2   CHARACTERISTICS

Six types of business models are of particular interest and importance for long-term-oriented investors:

- makers of short-lived products with well-known brand names (Wrigley, Coca-Cola, Gillette, printer/ink)
- providers of products that always have to be/are purchased (pharma, utilities)
- companies whose products are sold at a distinct premium due to brand name, image, technology or quality (Swatch Group, LVMH, Audi, Tiffany & Co)
- providers of products that are in demand due to external influences and regulations (Rosenbauer International, GEICO)
- businesses that have a high level of scalability, i.e. whose marginal cost is close to zero (SAP, Oracle, Pfizer)
- providers of the cheapest product in the market (Wal-Mart, Amazon.com).

Short-lived products with well-known brand names

Businesses in this group make products with relatively short life cycles. When Gillette sells a razor, the customer has to keep buying new, fitting razor blades. With the sale of a razor the business secures itself additional, recurring revenues. The same holds true for printer manufacturers, selling the printer itself for a very low price but profiting from the subsequent steady purchase of ink. Similarly, there are machinery manufacturers which enter annual maintenance agreements or service contracts and therefore profit from a steadily increasing machine base, in addition to their regular sales. Machines are long-lived products, but due to wear and tear and the need for maintenance they also have a short-lived component. In this category, elevator manufacturers are among the most profitable players. For every unit sold and installed, a service contract has to be concluded in order to maintain the elevator and comply with safety regulations.

As a rule, manufacturers of short-lived products are an attractive investment. The counter-example is the market for long-lived products. Although high sales can be achieved (e.g. houses, washing machines, cars) consumers rarely need more than one unit of these products. The repurchasing cycles are correspondingly long and in a downturn the consumer tends to postpone these large investments.

Especially in the field of consumer goods there are businesses selling short-lived products with well-known brand names. Consumer goods manufacturers such as Procter & Gamble, Energizer Corp, Unilever, Kraft or Nestlé use these characteristics and achieve high profitability figures. Nestlé has used this phenomenon to its advantage in the last few years with the introduction of its Nespresso division: the coffee machine is sold relatively cheaply, but the matching capsules can only be purchased via Nespresso. Every sold coffee machine guarantees more capsule sales for the business. The overlap with the Gillette example is astounding – in the past ten years Nestlé has sold well over 20bn coffee capsules.

Products that always have to be/are purchased

In discussions about suitable defensive stocks that do well in economic downturns and times of uncertainty, often the strong consumer brands come up. Although companies such as

Nestlé, Kraft Foods or Unilever own very strong brands and show excellent balance sheets, they are not *necessarily* suitable as an asset in the above-mentioned market phase. While the argument 'eating is a necessity' is undoubtedly true, the question is whether customers buy branded or non-branded products during economic downturns. A more suitable business for severe downturns, for example, could be the fellow Swiss Vetropack group. Vetropack manufactures glass packaging, destined for the food and drink industry; hence, whilst there is no guarantee that customers will buy the products of one or another company during an economic downturn, it is highly unlikely that even in the deepest recession food and drinks will stop being packaged. Irrespective of whether people buy brand or discount products, Vetropack takes a cut as packaging supplier. A special feature of the glass industry is the phenomenon of regional monopolies. As glass can only be transported over relatively short distances, the glass market is not subject to the pressure of foreign low-cost producers. Vetropack group's net profit margin and return on equity illustrate the company's outstanding position in the Central and Eastern European region. A large, reliable partner in the packaging market is particularly important for customers like PepsiCo and large wine producers. Manufacturers of products that have to be purchased in any economic phase are therefore also potentially interesting investment and valuation objects.

Utilities are another sector to be classified as defensive in general. However, a distinction has to be drawn between more cyclical and less cyclical utilities. Electricity providers, for example, can turn out to be quite cyclical if large shares of their customer base consist of energy-intensive manufacturing companies, which will decrease their demand during downturns. A more rewarding utility sector could therefore be residential water utilities, as statistics show that private household water usage fluctuates little during economic cycles.

Companies whose products are sold at a premium due to brand name, image, technology or quality

This category mainly targets businesses in the luxury sector. Manufacturers of luxury goods such as Swatch Group (Omega, Longines, Rado, etc.) or the American jeweller Tiffany & Co. can command higher prices thanks to their image and product quality. To a lesser extent, Coca-Cola, McDonald's and similar businesses also use brand awareness to achieve higher prices. When travelling in a foreign city and looking for a place to eat, one can either go to a random restaurant or eat at McDonald's. The advantage of the restaurant chain is that no matter which continent one is on, the homogenous food preparation and choice always guarantee a certain standard.

Products that are in demand due to external influences and regulations

In order to gain customers' trust and regulatory approval, many products have to be tested and certified by independent firms. In this area, especially British Intertek Group plc, France-based Bureau Veritas SA and Swiss SGS SA exhibit leading market positions. Manufacturers from nearly every industry rely on the certification and testing services provided by these companies, which guarantee stable revenues.

Another ideal example in this category is the Austrian fire engine manufacturer Rosenbauer. No community, city or airport can manage without a modern fleet of fire extinguishing vehicles. The company runs its business in an oligopoly of a few providers worldwide. Due to varying regulations in individual countries, it is expensive for a small provider to

expand internationally or take on large public contracts. Meanwhile, Rosenbauer has built up a unique Europe-wide competitive position with a broad product portfolio.

American car insurer GEICO fits into this category as well. According to law, every driver in the US is obliged to take out at least one car insurance. GEICO quickly developed into a highly profitable car insurer by initially concluding contracts by phone and without a sales person, exclusively with military officers, i.e. customers who have statistically low accident rates.

Products with a high scalability, i.e. marginal costs are close to zero

Especially software companies such as SAP or Oracle have products that are highly scalable. Once developed, the product can in effect be duplicated without additional cost. Similarly high returns can be found at Microsoft, with its operating systems and office applications. The problem, however, is that these industries are often difficult to analyse and the company's success is often dependent on a few products and innovations.

Producers of pharmaceuticals also fall into this category. There are high initial costs for research and development, but these are recouped in low costs per pill once the product is successfully introduced into the market.

The cheapest product in a market

Besides quality, image or external influences, being the cheapest product in the market can also constitute a unique selling point. However, often a pure price war results in shrinking margins. The art lies in maintaining an acceptable quality and low prices at the same time. An example of such an exceptional case is Amazon. Through a sophisticated logistics network, comparatively good customer service and sheer size, the online retailer has a cost advantage in relation to its competitors.

A further example is Wal-Mart. Through its gigantic sales volume of more than $400bn, Wal-Mart achieves the highest purchasing volume worldwide and thus secures itself pricing advantages.

5.3   FRAMEWORK CONDITIONS

Once one has ensured that the business is within one's circle of competence and shows signs of a 'moat' or another unique selling point, the framework conditions should be analysed.

To begin with, one should become familiar with the company's market and industry. Even highly profitable businesses are not suitable objects for valuation if they are subject to a superior power, such as political risks or unpredictable environmental impacts. In particular, businesses subject to tight regulation or companies active in politically unstable countries are not suitable for long-term valuation and investment purposes. More recently, investors were reminded of political risk when Argentina expropriated Spain-based Repsol's YPF unit. The main question therefore has to be: how far-reaching is the impact of external influences outside the power of the company itself? Gambling, tobacco, alcohol and companies producing weapons can quickly become victims of political moves or tighter regulation. Industries that benefit from subsidies, or that are supported in other ways, have a similar problem. If the subsidies fall away, whole industries lose the basis of their business. Thus rather calm,

slowly changing industries and markets often are a more suitable environment. An example of a worst possible business environment is the renewable energy sector in many countries around the world. On the one hand, subsidies and other grants create high demand; and on the other, many manufacturers are protected from competition through anti-dumping duties. Both external influences are outside the control of individual renewable energy businesses. A change in policy, reduced subsidies or better alternatives could eliminate demand as well as the cost advantage of these businesses in a short time. A suitable object for valuation should therefore always be evaluated according to its development in a worst-case scenario. Even though the worst-ever oil catastrophe of Exxon Valdez at the time led to a brief drop in Exxon Mobil's share price, in the long run the sinking of the oil tanker changed little in the unique selling point of the now largest company in the world. The same appears to be true for BP after the oil spill in the Gulf of Mexico. Intelligent investors buy in times like that. It is definitely a feasible approach to seek out businesses that have antitrust proceedings running against them. Usually these will be settled in a one-off payment and concessions, while little changes with regard to the outstanding position of the business.

It is hardly surprising that successful businesses such as the Swatch Group, Google, Microsoft, Accell Group, Rosenbauer, Intel, Geberit and other industry leaders are from time to time confronted with these types of lawsuits.

5.4   INFORMATION PROCUREMENT

There are many sources at one's disposal to gain a deep insight into the business's market and competitive field. The first point of call should always be the relevant inter-trade organization. This is usually first-hand information, which forms the basis for further research. Suitable sources for macro-economic data are the database of the central bank, the national statistic bureau and other specialized data providers. Furthermore, many companies offer presentations on the industry and their market position on their investor relations web pages. The business's profile should always be checked critically. Another important source of information regarding the industry are studies of independent research providers. However, these often bear no relation to their cost. The internet usually offers free studies or comprehensive information on almost any topic. An important step is also to make contact with clients, competitors, employees and suppliers of these businesses. They provide direct insight into the industry and are particularly valuable. In addition, before each valuation, the business's company report, and that of its competitors, should be downloaded from the investor relations web page. Most companies send out their company report by post for free. When it comes to competitive comparison, one should contrast the different qualitative and quantitative features to determine why company X has a higher material expenses ratio and company Y has higher employee productivity. Once all information has been gathered and interpreted, one should be able to answer the following questions:

- Are there particular external influences that could seriously damage the business?
- Can the industry be evaluated reliably or is it subject to fast changes?
- What is the business's position in the market?
- How strongly does the market grow and in which phase (introduction, growth, saturation, or degeneration) is it?

When communicating with businesses and inter-trade organizations, telephone contact is preferable to email contact. Experience shows that no more than the absolute minimum of information is given away in an email (for the business it is sent to a stranger). Direct contact with the business has many advantages. In addition to the investor relations department, it is possible to make a telephone appointment with the managing board directly. Shareholders should bear in mind that the CEO is their employee, not the other way around.

Finally, a visit to the company's premises is usually very revealing and should be taken up if the opportunity arises.

5.5   INDUSTRY AND BUSINESS ANALYSIS

A SWOT analysis considers a business's or an industry's internal strengths and weaknesses as well as external opportunities and risks. With the help of an industry and business analysis in line with Porter's five forces, external influences can be delimited more precisely.

Porter's five forces describe the following main influencing factors for the market position of a business:

- intensity of competitive rivalry
- threat of potential new entrants
- bargaining power of suppliers
- bargaining power of buyers
- threat of substitutes.

<div align="right">(Porter, M.E. (1980) Competitive Strategy, Free Press, New York)</div>

Intensity of competitive rivalry is seen as the main driving force in industry and business analysis. The stronger and more complete the competition in an industry, the more unattractive it becomes. The main indicators for determining this factor are the number of competitors, the level of product differentiation and industry growth. The competitive intensity can be quantified with the aid of the operational margin, the net profit margin and the return on capital of the industry. Competitive pressure in the automobile industry, for example, is very high, which is also reflected in the usually low net profit margins and return on capital figures. Only niche players like Porsche are set apart from this largely unattractive picture.

Just as moths are drawn to the light, high returns have a magical effect on the entrance of new competitors. 'Threat of potential new entrants' is crucially determined by the existence of market entry barriers. The extent of the market entry barriers is subject to a multitude of influencing factors such as the necessary know-how (technology), economies of scale, established brand name, client relationships and also the sheer capital requirements to enter a market. Control of the distribution network is also an important factor.

Assume you would like to enter the refreshment drinks business. Why should a restaurant offer your new XY Cola instead of established brands such as Coca-Cola or Pepsi? In some markets, businesses have put up huge barriers to entry over decades. Imagine how much capital would be needed to have a lasting impact on the market positions of Coca-Cola, Wrigley, Omega, Gillette or McDonald's – it is practically impossible.

Canadian National Railway, Canada's largest railway company, has a special competitive advantage: the company owns large parts of the Canadian railway network. Whilst US competitors have to run their business in an oligopoly, Canadian National Railway practically has a monopoly-like position. The threat of potential new entrants is therefore negligible.

The bargaining power of suppliers poses a latent danger for every business. It is therefore an advantage to build up an indispensable position within an industry.

ETA SA, which is part of Swatch Group, supplies watch ébauches (movements) to a large section of the Swiss watch industry. As the production of these parts is only worthwhile above a certain number of units, and since many luxury providers produce only small quantities, they have partially stopped the manufacture of movements and are therefore dependent on ETA. In this case, the supplier has a monopoly. It is therefore an advantage if the declining industry has a large number of suppliers which in turn supply only to the declining industry. The case of the bargaining power of the buyer, i.e. the client, is similar. The smaller and more concentrated the client group, the more easily demands for lowering prices or increasing quality can be enforced by the client. A low product differentiation compared with competitive products poses a danger, as in this scenario clients can change to another provider without a reduction in quality.

Porter lists threat of substitutes as a fifth force. Price increases are harder to enforce if products with similar performance exist. Besides these direct threats from substitutes there are also indirect substitutes to consider.

On the one hand, the market for e-bikes competes with traditional bicycles, but on the other hand lower prices for scooters also have a negative impact on e-bikes. In addition, external factors such as the development of petrol and electricity prices influence demand.

Mind maps are a convenient method to arrange these five forces correctly. They create direct and indirect connections between the varying products and facilitate their interpretation. Ideally, one can quantify the effect of price changes in the case of substitutes by calculating the cross-price elasticity. However, as reliable data is rarely available, this is merely a theoretical construct.

5.6   SWOT ANALYSIS

Using the results gained from the business and environment analysis, one can now carry out a SWOT analysis.

SWOT analysis is an attempt to depict ideal combinations of a company's internal **S**trengths/**W**eaknesses and external **O**pportunities/**T**hreats. The approach is illustrated using American Express as an example.

Four questions will be discussed:

- *Strengths–Opportunities:* How can internal strengths be used to make the best of external opportunities?
- *Strengths–Threats:* How can internal strengths be used to face external threats or avoid them?
- *Weaknesses–Opportunities:* How can new opportunities arise from internal weaknesses, i.e. be converted to strengths?
- *Weaknesses–Threats:* What are the weaknesses of the business? How can one prepare against external threats?

Example 5.1 – SWOT analysis: American Express

- *Strengths/Opportunities:* In this category, internal strengths are combined with external opportunities. American Express clearly is a very well-established brand with its card accepted as a payment method globally. This can certainly be named as its chief internal strength. At the same time, the global demand for secure non-cash payments is on the rise. This represents an external opportunity and one which, as a result of a close correspondence to its chief strength, American Express is well positioned to take advantage of.
- *Strengths/Threats:* A major threat for credit card companies is the rise of alternative payment methods such as PayPal as well as the possibility of a move to payment via smartphone, an option currently known as an eWallet. American Express can turn this possible threat into an opportunity by using its own cash flow to either set up a proprietary, American Express-branded eWallet product or acquire young, innovative and aspiring companies in this field. The company could also leverage its own brand name and know-how in order to establish partnerships with leading smartphone software developers.
- *Weaknesses/Opportunities:* In contrast to Visa or Mastercard, American Express is not only providing the credit card payment service, but also grants loans and carries these on its books. In economic downturns and as a result of increasing regulatory pressure, this could be perceived as a disadvantage. However, American Express' independence from banks and 'one-stop-shop' characteristics could give the firm an edge when it comes to managing credit quality. This, in turn, could of course earn the firm extra money.
- *Weaknesses/Threats:* When compared with young start-ups in the eWallet and ePayment sector, American Express is exposed as a large company with correspondingly complex management structures and overheads. In order to react more quickly to trends and take advantage of new developments, the company might wish to slim down its internal structure or set up new research and development departments.

5.7   BOSTON CONSULTING GROUP (BCG) ANALYSIS

A comprehensive analysis can be carried out as long as (1) the business is within one's circle of competence, (2) the business shows suitable basic characteristics and (3) the framework conditions are right.

The first step is to divide the company into business units such as different geographical areas, product groups, brands or other logical areas. The BCG matrix (Figure 5.1), which was developed by the Boston Consulting Group, offers an insightful overview of the individual business areas. The x-axis displays the market share, the y-axis the growth of the relevant segments. The respective units have various designations and determine different norm strategies.
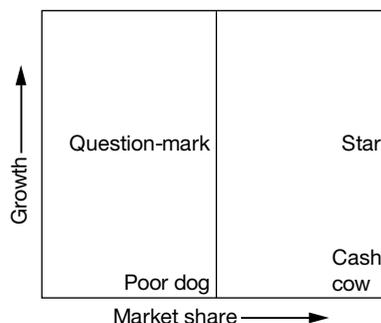
Figure 5.1   Boston Consulting Group matrix

- *Stars:* Segments that exhibit high growth and a high market share fall into the 'stars' unit. Stars usually require high investment for sustainable growth. The strategic recommendation is to continue investments (high growth, high market share).
- *Cash cows:* Business units with a high market share but low remaining growth are categorized as 'cash cows'. These segments are usually mature and have a good market position. Therefore they require only minor investments and supply other business units with cash flow. This process is called 'skimming strategy' (low growth, large market share).
- *Poor dogs:* This group comprises segments that have a low market share and stagnating or receding growth. In addition, these business segments often display unsatisfactory results. A divestment strategy is therefore recommended for 'poor dogs'. In some cases, restructuring efforts may be sensible. The necessary funds could, however, be invested more profitably in 'stars' and 'question marks' (low growth, low market share).
- *Question marks:* Business units with high growth and low market share are allocated to the 'question marks' area. Often, new products or re-launches fall into this quadrant. They are characterized by the potential to turn into a star as well as a poor dog. Depending on the business prospects, an investment or divestment strategy may be appropriate (high growth, low market share).

A traditional car manufacturer could for example be displayed as follows in a BCG matrix:

- established car business with high market share and low growth (cash cow)
- a brand in the sports car business with high growth and market share (star)
- electric car industry with high growth but low market share as yet (question mark)
- tractor manufacturer with falling sales and small market share (poor dog).

This basic categorization of corporations and their business units will now be demonstrated with some examples.

Besides the ideal division of business units and the conclusions, it also shows that stubborn entering of values is not sensible in this model. To achieve useful results in a BCG analysis one has to work with a lot of flair and sensitivity.

Example 5.2 – BCG analysis: Accell Group

Drawing up and interpreting a BCG matrix will be demonstrated using the Dutch Accell Group as an example. It is advisable to read the group's company report together with this case study to be able to follow the results.

The descriptive part at the beginning of the annual report and the segment report in the notes section are particularly helpful.

As the biggest European bicycle manufacturer in the premium sector, Accell Group has a large product and brand portfolio, sales channels in many countries and a variety of business areas. As the products cannot be meaningfully grouped by either price or country, it is sensible to adopt the segment categories applied by the company itself, dividing the products into the following business units:

- traditional bicycle
- e-bike
- parts and accessories
- fitness.

A thorough study of the group and segment development shows the following results.

The traditional bicycle segment, including well-known brands such as Koga Miyata, Ghost, Hercules and Winora, achieves a very high market share in the premium segment. This area represents a classic cash cow, as it has a well-developed dealer network and low expenditure on research and development (the bicycle manufacturers only add value during the bicycle assembly; the components are produced by suppliers such as Shimano or SRAM). The European markets for this segment are more or less saturated; hence no excessive growth is expected. High free cash flows are skimmed in line with the appropriate norm strategy and invested in other units, mainly e-bikes.

High growth and a high market share (due to early market entry) make the e-bike segment the clear star. Due to the relatively new technology and the fast-growing market, investments, which are funded through the group's cash cows, are necessary. The two units 'traditional bicycle' and 'e-bike' supplement each other perfectly, as both financing and growth are provided and generated by the group.

The 'parts and accessories' segment has grown moderately and has an average market share. It can therefore be categorized as cash cow with a tendency towards low star.

The problem child of the group is the 'fitness' segment, which has declining growth and is running a deficit. Correspondingly, this business unit has to be subsidized by the others. A detailed analysis was meant to clarify whether it would be sensible to withdraw from this market or whether more money should be invested. The management reasoned that bicycles were mainly purchased in summer and that indoor exercise equipment would be a perfect complement. In theory this is correct; in practice it turns out that the market for fitness equipment is a noticeably more competitive environment than the market for bicycles.

In summary, two cash cows provide solid financing for the business, which means that growth conditions for the emergent e-bike sector are ideal. The fitness segment, however, should be restructured or sold. Nevertheless, the business is very well positioned as this problematic segment accounts for a relatively low share of revenues. To achieve a balance of the segments in line with the BCG matrix, the fitness segment would have to make a sustainable return to the profit zone and would then fall into the question mark area.

Example 5.3 – BCG analysis: FedEx Corp
FedEx reports a broad variety of segment data, ranging from its operational segments – Express, Ground and Freight – to additional data concerning the geographical distribution of revenues as well as revenues per product type. Table 5.1 shows FedEx's main operating segments and will form the basis of the BCG analysis.

Table 5.1   FedEx: Segment reporting

in US$m	FedEx Express	FedEx Ground	FedEx Freight
Revenues			
2013	27,171	10,578	5,401
2012	26,515	9,573	5,282
2011	24,581	8,485	4,911
Operating income (adj)			
2013	1,060	1,893	258
2012	1,328	1,764	162
2011	1,294	1,325	(42)
Segment assets			
2013	18,935	7,353	2,953
2012	17,981	6,154	2,807
2011	16,463	5,048	2,664
Capital expenditures			
2013	2,067	555	326
2012	2,689	536	340
2011	2,467	426	153

Source: Fedex Corporation (2012) [US GAAP]

The first step in every BCG analysis is to understand what each business does and how the individual business units are interconnected. After that, relevant ratios can be calculated in order to rank each of the divisions within the BCG matrix.

FedEx is organized in four divisions, of which three report detailed revenue and earnings data. Express forms the largest division. It comprises express transportation, air and ocean freight forwarding as well as supply chain systems. The Ground division encompasses small-package ground delivery and the small-parcel consolidator business. Lastly, FedEx Freight, the smallest division, manages the company's less-than-truckload freight transportation and time-critical transportation.

Having set the scene, key ratios should be calculated to obtain an overview of how the segments compare with each other. The segments are categorized by the following figures:

- three-year revenue growth
- average EBIT margin
- three-year EBIT profit growth
- average return on assets
- average capital intensity.

Annual revenue growth over the 2011 to 2013 time frame is calculated as follows:

$$\text{Revenue CAGR} = \sqrt{\frac{\text{Revenue 2013}}{\text{Revenue 2011}}} - 1$$

The EBIT margin is calculated by linking operating income and revenue. To gain an idea of the capital intensity, capital expenditures are divided by revenues (Table 5.2).

Table 5.2   FedEx: Segment performance

in US$m	FedEx Express	FedEx Ground	FedEx Freight
Revenue growth CAGR	5.1%	11.7%	4.9%
EBIT growth CAGR	–9.5%	20.7%	Positive (n/m)
EBIT margin Ø	4.7%	17.3%	2.3%
Return on assets Ø	6.9%	26.9%	4.3%
CAPEX/Revenue	9.3%	5.3%	5.2%

Based on these figures, it becomes clear that FedEx's Ground businesses stand out as the star of the company. This division shows high revenue growth, very healthy and increasing margins, a low capital intensity and correspondingly high return on asset figures.

FedEx Express, in contrast, shows a good, but not outstanding, growth in revenues. However, it very clearly has a margin problem. The segment also generates the largest amount of capital expenditures by far, in absolute as well as in relative terms.

The Freight segment also shows below-average growth figure and low margins. There are, however, some bright spots: the segment seems to be asset-light (as shown by its CAPEX/revenue ratio) and the EBIT trend has improved from an operating loss of $42m in 2011 to earnings of $258m in 2013.

Ideally, a company should demonstrate a mature, large business with sufficient free cash flow (cash cow) that will permit it to finance its prospering growth divisions (its stars). In FedEx's case, however, the large Express business actually shows the largest capital needs whilst delivering only below-average growth. This is partly compensated for by its star, the Ground business, which fortunately appears to be growing strongly without consuming excessive cash. The Freight division must be categorized as a question mark with the potential for becoming a star if the positive margin trend can be sustained.

In summary, FedEx would demonstrate an ideal division mixture if the Express business did not require such high annual investments in order to provide for additional aircraft and the like. On the positive side one should mention that FedEx's fastest growing segment also yields the highest margin by far, and thus lifts and will continue lifting the group margin so long as the other businesses manage to remain stable.

Based on this analysis, the company's individual divisions could be classified in a BCG matrix as shown in Figure 5.2.
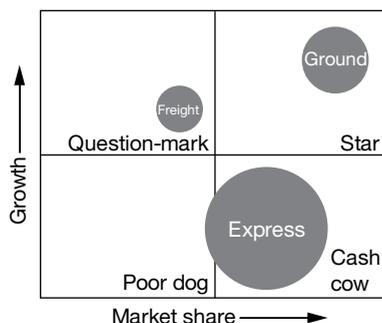
Figure 5.2   Growth–share matrix: FedEx

Example 5.4 – BCG analysis: International Business Machines
After the rather static examination of FedEx's divisions in the last example, let us now look at how a true shareholder value-creating business unit strategy can be executed. Among blue chip companies, IBM is possibly the best showcase example of how to focus on and further develop promising business divisions.

Let's take a look at IBM's four major divisions in 2004 depicted in a profit margin/sales growth diagram (Figure 5.3).
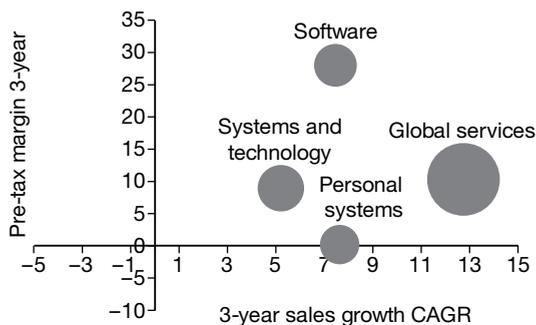
Figure 5.3   Adjusted BCG matrix: IBM pre-restructuring

The company shows healthy growth figures in most segments. However, notably, the Personal systems business does not contribute any noteworthy profit, has the poorest growth figures and prospects, and is also the most capital-intensive of the four divisions. It was therefore the logical step for IBM's management to sell its Personal systems division, which consisted mainly of its personal computer and laptop products. So, predictably, in December 2004 IBM announced the sale of its Personal System division to Lenovo in a deal valued at $1.75bn.

Now focused exclusively on its software and services businesses, IBM showed one of the most impressive internal developments, investing in new products, acquiring suitable

businesses and buying back shares in the billions – all actions that eventually culminated in a much more streamlined business mixture in 2012 (Figure 5.4).
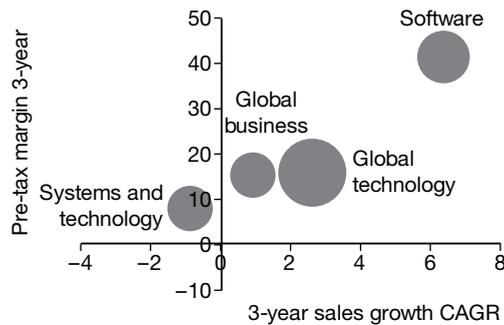
Figure 5.4   Adjusted BCG matrix: IBM post-restructuring

As can be seen now, the two largest segments, Software and Global technology, account for the majority of growth *as well as* the greater part of the profit margin. By simply keeping on course and maintaining this combination of business units, the company will continue to expand its revenue and, more importantly, maximize its operating profit.

5.8   COMPETITIVE STRATEGY

Besides the five forces model, the concept of the competitive strategy was also devised by Harvard professor Michael E. Porter. This model develops strategies, which help businesses solidify their market position. Porter puts forward the following strategies:

- quality leadership (differentiation strategy)
- cost leadership
- narrow market quality leadership (segmentation strategy)
- narrow market cost leadership (segmentation strategy).

(Porter, M.E. (1980) *Competitive Strategy*, Free Press, New York)

The first two strategies pursue a broad market share. Large discount chains aim to win market share by adopting a cost leadership strategy.

In contrast, luxury goods producers like the Swatch Group pursue leadership over the broad market by applying a differentiation strategy.

If the business operates in a specific market segment, there's a trade-off between cost leadership and differentiation. Thus in certain niches small businesses or group divisions can take on leadership.

One issue is the so-called 'stuck in the middle' problem. It occurs when a business is neither the quality leader nor obtains the cost leadership in a market, and therefore falls in the middle. In that case, profitability usually suffers because relatively low cost has to be combined with relatively high quality.

It is essential to pursue *one* of these strategies in order to be able to benefit from a competitive advantage in the long run and to be able to enhance it. When analysing a business, it is important to investigate if it fulfils one of these criteria or if it has the potential to do so.

5.9   MANAGEMENT

An assessment of the management can naturally only be carried out with gut instinct and under uncertainty. However, using several typical behaviour patterns, such as 'empire building' or exaggerated forecasts, helps to form a meaningful picture of the management.

One can start by analysing old interviews, newspaper articles and the management discussion sections in past annual reports. Comparing old prognoses with actual results often makes it possible to draw conclusions about the credibility of the management. The size of the share option programme for the management team should also be examined. In most cases, share options in particular offer incentives for short-term profit maximization, which is not necessarily sensible in the long term. The payout policy, which will be discussed in the following chapter, also sheds light on the intentions of the management. Highly profitable businesses should retain excess capital if possible, while businesses without useful projects should return excess funds to their shareholders via dividends or share buybacks. The past shows that many business leaders retain excess capital to invest in prestige projects or to carry out unnecessary takeovers. Retrospectively, there are only very few businesses and managers who have successfully pursued a 'buy-and-build' strategy. As one could see in the early chapters, a high goodwill position can point to expensive acquisitions. Moreover, most acquisitions take place in the wrong environment: if the economy is in an upturn (stock prices are high), experience shows that many takeovers will be announced. If the economy is in a downturn (stock prices are low) most businesses lack the funding and the courage to carry out sensible takeovers. Large company mergers in the last few years have also illustrated how difficult consolidating and releasing synergies can be in practice. It shows all too often that 1 + 1 is not necessarily 2.

High stakes of the management in the business should usually be considered as positive, helping to align shareholders' and management interests. Evaluating the remuneration of the management, however, is more problematic. High proportions of fixed or variable payments have advantages and disadvantages, which do not allow for an objective judgement in favour of a particular payment method. In principle, it is preferable if incentives are based on the cash flow and not on profit, as the latter can also be influenced by the accounting policy.

Finally there is the evaluation and the conclusion of the various analyses. Does the business have a competitive advantage? Are product and business model comprehensible? Can the industry be evaluated reliably? Does the management invest the retained capital sensibly? Once these questions have been comprehensively clarified and answered in the affirmative, the business can be evaluated and considered as a potentially interesting investment opportunity.

Before we turn to the evaluation of businesses, it is worthwhile looking briefly at the payout policy. Especially for companies with extraordinary market positions and cash flow generation, an appropriate use of excess capital is of great importance.

6
Profit Distribution Policy

Do you know the one thing that gives me pleasure? It's to see my dividends coming in.

John D. Rockefeller

Outstanding businesses tend to produce excess returns, that is, their earnings exceed their annual reinvestment needs in order to remain competitive. Under the best-case scenario, the company has additional investment opportunities at its disposal in order to reinvest excess capital. If no attractive opportunities are available, remaining free cash flow should be utilized to pay off debt, carry out acquisitions, distribute dividends or buy back shares in order to return capital to shareholders. Also, retaining profits in order to build up a cash cushion or to reinvest the capital at a later point can be a sound decision in certain cases.

Especially the choice between paying out dividends and buying back shares is of great importance for most companies.

6.1   DIVIDEND

One of the possibilities for profit distribution is paying out a dividend. Usually dividends are paid at regular intervals and their amount is often determined by available profit for the period. In the US, quarterly dividend distribution is common practice, whereas most European companies distribute profits on an annual or bi-annual basis.

Depending on the industry and business type, the observed payout rates differ considerably. Growth businesses, which require their excess income to fund further growth, often forgo dividend distribution. In contrast, well-established and slow-growing businesses (compare cash cows in Chapter 5) usually pay out the great majority of their profits, as only few worthwhile investments can be made. Businesses in saturated markets such as telecommunications display the highest distribution ratios globally, which are partially above the respective net profit. Usually the distribution ratio is calculated using the share of the total dividend in proportion to the net profit or dividends per share as a fraction of earnings per share. Since dividends represent an outflow of capital, it is advisable to determine the payout ratio using the operating cash flow, especially since net profit does not necessarily mirror the actual inflow of funds, i.e. cash flow.

$$\text{Payout ratio} = \frac{\text{Dividend per share}}{\text{Operating cash flow per share}}$$

The financial press generally uses profit per share in the denominator when calculating the payout ratio. This practice does not correspond to the economic nature of the distribution of dividends as described above and is therefore incorrect. Strong growing *and* at the same time profitable businesses are the exception rather than the rule. Even when reporting profits, high investments in working capital and fixed assets often cause negative cash flow. Under

this scenario, dividends could only be paid out of the company's substance or by taking out additional loans.

The optimal payout ratio depends on several factors. In principle, dividends should be paid only if there are no suitable investment opportunities available within the business. The reasons for this are the taxes that have to be paid on dividends received by the investor, as well as the reinvestment problem which the received dividend payments pose for shareholders.

The dividend yield measures the attractiveness of a stock considering its dividend payments.

$$\text{Dividend yield} = \frac{\text{Dividend per share}}{\text{Share price}}$$

This ratio is the result of the proportion of the dividend payment in relation to the current stock price. A dividend yield of 5%, for example, signifies a payout of $5 per share at a share price of $100. As this amount flows out of the business on the day of the payout, the share price is reduced by the payout amount. A risk-free profit can therefore not be achieved by buying a stock on the day before the dividend payment.

Example 6.1 – Dividend policy: Bezeq Telecommunication Corp.
Bezeq, Israel's largest telecommunication provider, amended its payout policy radically in August 2009 by increasing its payout rate to 100% of net income. Moreover, the company intended to distribute a special dividend over the 2009–2013 period, exceeding 100% of net income. At first glance, this payout policy appears to potentially threaten the company's financial stability and future growth plans. In order to really evaluate this strategic shift, we need to examine Bezeq's cash flow statements, which are likely to give us a more profound understanding, whether or not this high payout ratio is warranted. It should be noted that Bezeq classifies its interest expenses as 'financing cash flow'. These expenses should be reclassified as operating cash outflows and are hence included in the cash flow from operating activities in Table 6.1.

Table 6.1   Bezeq: Certain financial statement positions

Bezeq The Israeli Telecommunication Corp.			
In NIS m	2012	2011	2010
Profit for the year	1,864	2,061	2,442
Depreciation and amortization	1,436	1,395	1,409
Other non-cash items	714	(270)	(155)
Interest paid	(464)	(377)	(237)
Net cash from operating activities (a)	3,550	2,809	3,459
Net CAPEX (b)	(1,235)	(1,637)	(1,489)
Free cash flow (c)	2,315	1,172	1,970
Dividends paid	(3,071)	(3,155)	(3,733)

Source: Bezeq The Israeli Telecommunication Corp. (2012) [IFRS]

By applying the payout ratio formula which employs operating cash flow, it can be shown that Bezeq paid out, on average, more than 101% of operating cash flow as dividends. It at once becomes apparent that this is not a sustainable payout strategy. If the company is investing adequately, the annual free cash flow can be considered the natural limit, capping the dividend. Between 2010 and 2012, Bezeq paid out nearly 200% of free cash flow. Clearly, this can be achieved only by tapping its cash reserve or by way of increased borrowing. By simply glancing at the development of interest payments in the cash flow statements above, we can immediately see that Bezeq opted for the latter option. As a result of this development, Bezeq's gearing ratio hit 325% in 2012. This is a very high-end figure and one that should be of concern to any current or potential investor. In the near- and mid-term, however, Bezeq's solvency is not in danger as the company generates operating profits in excess of NIS 3bn against interest payments in the order of NIS 0.5bn.

In order to conclusively evaluate the soundness of this radical dividend policy, the operating developments have to be examined in addition to the purely financial aspects. The main question we need to ask is: is Bezeq paying out funds which should have better been invested in order to defend its dominant market position? This is a fundamental question in evaluating the dividend policy of any corporation since a high free cash flow can always be achieved in two ways: increase operating cash flow or decrease CAPEX. By reducing CAPEX artificially, the company will slowly but surely weaken and wane. Note 9 in Bezeq's annual report enables us to calculate the asset depreciation rate. For 2012, Bezeq shows total property, plant and equipment at a historical cost of NIS 20,052m, of which NIS 13,976m has already depreciated. The company displays an asset depreciation ratio of close to 69.7%, which is a very high, and hence disquieting, value. We can conclude that the company is paying out too much and at the same time, most likely as a result, underinvesting in its asset base. This is also highlighted by two other factors: first, the company is losing ground against national low-cost competitors, second its asset depreciation ratio compares rather poorly to European and US competitors. A more moderate dividend policy, aligned to cash flow development, could therefore prove to be the wiser choice in terms of shareholder value maximization.

6.2   SHARE BUYBACK

Share buybacks constitute the second major form of profit distribution. When own shares are bought back in the open market, they can either be cancelled or held as treasury stock as an acquisition currency. Especially when cancelled, the reduction in the total number of shares outstanding increases the proportion that each existing shareholder holds in the company. The following brief example illustrates the effect of share buybacks.

Example 6.2 – Share buyback
A company has 10 shares outstanding and the current share price is $20. You buy 1 share and therefore own 10% of the business. If management decides to buy back one share in the market and cancel it, there are only 9 shares left outstanding. Your holding in the company increases to 1/9 or, expressed as a percentage value, to 11.1%. The share price is not affected as the buyback of the share means an outflow of funds. Money flows out (the business loses in value), but at the same time the outstanding investors' proportion of the entire share capital increases, as fewer shares are left outstanding. Share buybacks hence increase the size of each individual's piece of the cake. The following example demonstrates the process.

10 shares
$100 cash ◄━━━► $100 SE ----➤ $10 per share

The company has $100 in cash and $100 in shareholders' equity. With 10 shares outstanding and a price-to-book ratio of 1, this results in a value of $10 per share. If a share is bought back at $10, cash holdings and shareholders' equity are reduced to $90.

10 shares
$90 cash ◄━━━► $90 SE ----➤ $9 per share

The now 9 outstanding shares have also a value of $10 per share. Share buybacks are most effective when the stock is repurchased at a low valuation. If, for example, the company is buying back stock at a price above book value, the stock price remains unaffected only if and when the company is able to produce the same profit with the now reduced equity base. This also underlines the importance of only paying out excess capital.

Share buybacks are an efficient form of distribution for several reasons. First, this type of (indirect) distribution is usually not subject to taxation, and second, the management can create real value through clever buybacks.

If, for example, the stock is significantly undervalued, the management should use excess capital for buybacks. Suppose the stock is trading at $5, but after a thorough analysis it's found to be worth $10. Essentially a share buyback would buy $1 at the price of 50¢. In contrast to dividends, share buybacks do not entail the reinvestment problem for shareholders. Share buybacks therefore serve to increase the shareholder's proportion in the business. In order to conduct buybacks, the management usually has to receive shareholders' approval about the time frame and amount of shares to be bought back.

As many businesses remunerate the management with share options, share buybacks also have negative incentives. Especially in Anglo-Saxon countries, excessive use of buyback programmes with the intention of increasing the share price in the short term can be observed. Assume a business is valued at a constant price-earnings ratio of 15 and the management decides to buy back and cancel half of the outstanding shares over the next five years. Furthermore, suppose profits stagnate. It means that the share price of the business has doubled in five years simply due to buybacks.

However, this effect is not always desirable for shareholders, because buybacks should be carried out from a viewpoint of profitability. A share repurchase without taking into consideration price and quantities is not the objective of a sustainable financial policy, since the capital may have been invested more effectively elsewhere. Moreover, the price-to-earnings multiple might decrease as the company is distributing funds rather than investing them in growth projects, making it less attractive. Another often observed mistake of buyback programmes are share buybacks financed with debt. Especially in the US, share buybacks financed with loans eroded important balance sheet figures in the years before the financial crisis in 2008/09. A sensible buyback purely based on the undervaluation of the stock is therefore the ideal form of profit distribution. The following case studies illustrate the shareholder value enhancement but also the value destruction caused by buybacks in the past.

Example 6.3 – Share buybacks: Yum! Brands
Yum! Brands is one of the largest fast-food providers in the world with brands like Taco Bell and Pizza Hut. Apart from an aggressive expansion policy, Yum! Brands stands out due to its below-average balance sheet figures but also its very good operational development. Whilst generating an average free cash flow of $700m per year, Yum! distributed more than $1.8bn to shareholders annually before the financial crisis. A large part of that consisted of share buybacks. These buybacks took place at price-earnings ratios between 17 and 20. Presumably, these were not cheap purchases. As repurchased shares are offset against shareholders' equity, the company reported negative shareholders' equity as of 31.12.2008, despite recording high annual net profits. Management did not necessarily act in the interest of the shareholders. Carrying out share buybacks at excessive prices is costly and profit-reducing, as long as the buybacks are funded through borrowing. Further investments in the branch network or new brands could potentially create more value. Nevertheless, since 2009 the business has suspended repurchases and started to retain profits to restore important balance sheet ratios. All the same, this distribution behaviour does not pose an existential problem for the Yum! brands in particular, as the business model and the cash flows can be considered very robust. In the sense of shareholder value maximization, a higher retention rate would probably have added more value.

Example 6.4 – Share buybacks: Daimler
In contrast to Yum! Brands, some businesses have no possibility to repurchase shares (at least to some extent) using funds from the free cash flow, because the latter does not exist or only in a small volume. In recent times, one could observe very costly capital market activities in some businesses: in boom phases, when share prices tend to be higher, some businesses bought back own shares based on good earnings positions. In downturns, when share prices tend to be cheaper, capital increases had to be carried out due to a capital shortage and a liquidity squeeze. These cyclical share buybacks have negative consequences for shareholders, especially due to the capital increases at low prices. Capital increases constitute the mirror image of share buybacks. Companies issue new shares and therefore potentially dilute the shareholdings of existing shareholders. A capital increase, i.e. the issuance of new shares, should be carried out when the shares are expensive, as current shareholders are effectively selling a part of their company. Besides carrying out one of the most unfortunate acquisitions in the more recent economic history, Daimler group also stands out as a negative example for profit distribution policies. Between 2007 and 2009 Daimler shares with a total value of €7.7bn were bought back by the group. The majority of shares were purchased at the height of the stock market in 2007 and 2008, which generally speaks against a favourable valuation of the repurchased shares.

When the business experienced financial difficulties during the financial crisis, a capital increase at considerably lower stock prices was carried out. With the issue of new shares, €3.7bn flowed into the group. The shares bought back at the height of the bull market in 2007 and the capital increase carried out at the very bottom demonstrate the business managerial nonsense of this method. First the company buys its own shares at a high price and cancels them, just to issue new shares at a low price a short time later.

Table 6.2 lists the development of outstanding shares of Daimler AG.

Table 6.2   Daimler: Share repurchases between 2007 and 2009

Daimler	
Year	Number of shares (in million)
2007	1.047
2008	927
2009	1.024

The business could reduce the number of outstanding shares between 2007 and 2009 by 2.2% and spent €7.7bn on it. At the end of 2009 the Daimler group was valued at €38bn. With the repurchase volume of the year 2007/08 the group could have bought 20% of the outstanding shares right after the financial crisis instead of just 2% a couple of years earlier. It's at least worth considering whether the global financial crisis in 2008/09 or the Modigliani– Miller theory cost more money over the years. In a popular variation of this model it is often publicized that the capital cost could be lowered through increases of the debt ratio, for example through repurchases financed by borrowing. This example shows clearly how expensive and value-destroying this approach can be.

Example 6.5 – Share buybacks: International Business Machines
For the years 2010 to 2012, International Business Machines posted the free cash flow and cash flow from financing figures shown in Table 6.3.

Table 6.3   International Business Machines: Certain cash flow statement positions

International Business Machines			
In US$m	2012	2011	2010
Operating cash flow	19,586	19,846	19,549
Capital expenditure, net	(4,307)	(4,059)	(3,984)
Free cash flow	15,279	15,787	15,565
Proceeds from new debt	12,242	9,996	8,055
Payments to settle debt	(9,549)	(8,947)	(6,522)
Short-term borrowings (repayments)	(441)	1,321	817
Common stock repurchases	(11,995)	(15,046)	(15,375)
Common stock transactions – other	1,540	2,453	3,774
Cash dividends paid	(3,773)	(3,473)	(3,177)

Source: International Business Machines (2012) [US GAAP]

IBM generated a healthy total free cash flow of around $46.4bn between 2010 and 2012. The lines below the free cash flow show the company's cash flow from financing activities. Over the three-year period, the company returned more than $42.2bn to its shareholders through share repurchases and another $10.2bn in dividend payments. Factoring in its offsetting other common stock transactions to the order of $7.6bn shows that IBM returned virtually all of its free cash flow to shareholders. $46.4bn came in as free cash flow, $44.8bn was paid back to shareholders in one form or another. Against the background of an average P/E

ratio of 13.2× over the 2010–2012 period IBM doesn't seem to have overpaid for its shares either. This worked well for long-term-oriented shareholders: IBM's share count decreased from 1,341m in 2009 to 1,142m by 2012. An investor who owned 10% in the company three years ago would own 11.7% by the end of 2012. Moreover, judging by the IBM case study presented in the previous chapter, the company seemed to have planned well and invested sufficiently in its corporate development as illustrated by its exceptionally successful restructuring programme.

6.3   CONCLUSION

Considering the various options of distribution, the question arises: which type of distribution policy is optimal? The answer varies from case to case. In a nutshell, the rules are as follows:

- Businesses should retain profits, as long as capital can be reinvested profitably or debt can be reduced to an adequate level.
- When share prices are attractive, share repurchase should be given preference over dividend distribution. Besides having tax advantages, repurchased shares can be used as acquisition currency resold later on.
- Dividend distribution is sensible, especially in boom phases, as shares are often relatively expensive in those times. However, dividend payments usually have a tax disadvantage for shareholders.
- Profits can be retained even without concrete investment projects. A cushion of cash and cash equivalents makes a business more flexible and important decisions can be funded internally and therefore efficiently.

Concrete advice can be formulated with the help of the BCG matrix introduced earlier. The more sensible investments a business can make (stars and question marks), the more profits should be retained in order to fund further growth and reduce dependency on external capital providers.

If a business consists mainly of a cash cow, hoarding cash and cash equivalents within the group would be absurd. It is therefore not surprising that growth businesses distribute little or not at all, whereas established businesses distribute a large proportion of their profits to shareholders.

Apart from these reasons, there are further incentives to pay out a dividend, depending on the shareholder structure. For example, holding companies or private equity firms require regular dividend streams, as they have often acquired their shares with the help of debt and rely on steady cash flows. At the same time, stakeholders with large share positions, for instance the founding family, often require an annual dividend, as it forms a major source of income.

Besides these economic criteria, a dividend also has a signal function. Businesses that have sustainable dividends, which rise over the long term, are considered to be safe and well established. Moreover, a long history of dividends is evidence of sufficient cash flow generation. Normally dividends are adjusted for profit fluctuations. If a business displays a constant dividend ratio of 50% and suffers a temporary slump in profits, the management might feel inclined to pay out the same amount of dividends as in the previous year. And finally, dividend payouts have the advantage that excess capital flows out of the business

and cannot be invested in unprofitable projects. This so-called free cash flow problem, i.e. the execution of unprofitable investments due to excess liquid assets in the business, can be avoided through high payouts.

Businesses with excessive debt levels should invest their free cash flows primarily to reduce financial liabilities. This raises profit (less interest payment), increases stability (higher shareholders' equity ratio) and leads to higher sustainable cash flows (higher profit base). The consumer goods company Procter & Gamble, which has an excellent operational set-up, pays, for example, more than $3.7m *per day* in interest, even though P&G could easily fund its operations out of the cash flow. The shareholders therefore transfer about $1.3bn annually to creditors, which is essentially superfluous. This approach goes back to the results of modern company financing. They indicate, among other things, that for reasons of profitability it makes sense to increase debt-to-equity ratios. One of their strange and peculiar theories, the Modigliani–Miller theorem, propagates the irrelevance of capital structure, i.e. the relationship of shareholders' equity to debt. This theory claims that debt has no impact on the company value. Countless insolvencies and liquidity squeezes of the last few years have shown that this theory does not form an appropriate basis for decision making and is unsuitable in practice. Since the distribution policy has a significant impact on the capital structure and the stock performance, one has to investigate thoroughly which principles are applied by management.

This demonstrates that, especially in times of tight credit supply, as for example during the 2008/09 crisis, a liquidity buffer can constitute a real competitive advantage. While most major European airlines had to scale back their fleet and lay off employees during the recession, more conservatively financed airlines like Ryanair and easyJet further expanded their fleet and route networks. While less well-financed companies have to focus on financing issues during downturns, companies with a well-developed equity and cash cushion can take advantage of their competitors' troubles. A liquidity buffer can therefore be a sensible long-term use of profits.

7
Valuation Ratios

What is a cynic? A man who knows the price of everything and the value of nothing.

Oscar Wilde

As the share price itself is an absolute value and therefore meaningless with regard to the valuation of a company, valuation ratios are used to compare share prices of different companies, or to determine the current valuation of the company on a stand-alone basis. This chapter deals with the calculation and interpretation of typical valuation multiples and related ratios. Multiples denote valuation ratios, which compare absolute performance indicators such as profit and sales with current market valuation. A company, for example, may trade at 12 times its net profit or twice its annual sales. Valuation ratios should therefore be seen as the market's water-level gauge. Building on this, Chapter 8 will delve into the actual calculation of the fair value of a company, which links these two chapters. This chapter can be considered as descriptive company valuation, 'What is the current valuation?', the following chapter in contrast as normative valuation, 'What should the valuation be?' Several case studies will demonstrate the practical application and especially the interpretation of the valuation ratios. Distribution diagrams of the current valuation ratios will facilitate the assessment of given valuation levels.

The spectrum of classic valuation multiples is split into equity and entity multiples. Equity multiples compare the market capitalization of the company with earnings values, which the shareholders are entitled to. These comprise, for example, net profit, free cash flow or shareholders' equity. Entity multiples take into account not only the market capitalization but also the net debt carried on the company's balance sheet. This reference figure, the so-called enterprise value (market capitalization + net debt), is compared with earnings values that all capital providers are entitled to. These are for instance the earnings before interest and tax (EBIT) or the free cash flow before interest. This chapter starts off by explaining equity multiples and, building on that, the more complex entity multiples.

Equity multiples

Equity multiples, like the popular price-to-earnings ratio, put the market value of a business in relation to earnings values, which the shareholders are entitled to. The market value of shareholders' equity, i.e. the current market capitalization, is the only reference figure among the equity multiples. Therefore a market value-to-EBIT ratio would not be an acceptable ratio, because EBIT does not serve the shareholders exclusively, but is also used to satisfy the demands of creditors. When calculating equity as well as entity multiples, special attention has to be paid to the future earnings development, as market participants act with an orientation towards the future and past profits are of only minor significance. High profits in the past are therefore a positive indicator. In the end, though, what counts are future results. This section describes the following equity multiples:

- price-to-earnings ratio
- price-to-book ratio
- price-to-cash flow ratio
- price-to-sales ratio.

In order to gain an impression of the valuation of a business, a suitable combination of various valuation multiples should be applied in the analysis process. Using only one ratio would lend itself to errors. The price-to-book ratio and price-to-sales ratio, for instance, are relatively robust ratios with a low level of fluctuation, whereas the price-to-earnings ratio often is subject to strong variations in the short term, but also reacts faster to new trends.

7.1   PRICE-TO-EARNINGS RATIO

The price-to-earnings ratio shows the current market valuation of a company, relative to its earnings. A P/E ratio of 10, for example, means that the company is currently valued at ten times its past (trailing P/E) or expected (leading P/E) net profit. If the company was bought in its entirety, the price-to-earnings ratio shows the number of years that it would take, at constant earnings, until the investment was amortized.

$$\text{Price-to-earnings ratio} = \frac{\text{Market capitalization}}{\text{Net profit}} = \frac{\text{Share price}}{\text{Earnings per share}}$$

As the stock market always includes expectations about the future business development, one should use – to the extent that it can be predicted with fair accuracy – the expected earnings per share of the next business year for the calculation of this ratio. Unless the estimated value has been subject to thorough analysis, the current data, i.e. the earnings of the most recent business year, or if below one year, the earnings of the past four quarters, should be used.

Example 7.1 – Price-to-earnings ratio calculation
In its financial statement, company Z shows a net profit of $250m after minority interests, and a fully diluted number of shares numbering 100 million. Moreover, it is known that the current share price is $40. The earnings per share are calculated by dividing net profit and the number of shares outstanding.

$$\text{Earnings per share} = \frac{\text{Net profit}}{\text{Shares outstanding}} = \frac{\$250m}{\$100m} = \$2.50$$

Dividing the current share price by the earnings per share gives a P/E ratio of 16 ($40/$2.5). If an increase in earnings of 20% is expected, earnings per share increases to $3 and the price-to-earnings ratio falls from 16 to 13.3.

A low price-to-earnings ratio tends to denote a cheap valuation. A high price-to-earnings ratio, in contrast, generally points to an expensive valuation. A significant determining factor of the price-to-earnings ratio lies in the growth dynamic of the company. If company A increases its net profit annually by 20% and company B's net profit increases by only 10%, an investment in company A is amortized correspondingly faster. Therefore company A deserves to trade at a premium in the form of a higher valuation. Seen from a current earnings point of view, high-growth companies might appear expensive today, but this is compensated

by promised rising profits in future. A slow-growing business, in contrast, would have a cheaper valuation based on current earnings, but offers only little future growth potential. Hence shares of slow-growing businesses have a high initial yield or yield on cost, whereas those of growth businesses usually show low yields, which are compensated by the expected earnings increase over time.

The initial yield of a stock is calculated as the inverse of the price-to-earnings ratio and describes the yield of the investment in the first year.

$$\text{Initial yield} = \frac{\text{Earnings per share}}{\text{Share price}} = \frac{1}{\text{Price-to-earnings ratio}}$$

If a stock is currently trading at $20 and the reported earnings per share amount to $1, the result is a price-to-earnings ratio of 20 and a corresponding initial yield of 5%. This also becomes clear when one considers that a share of the business, which was purchased at $20, made a profit of $1 per share. The return on investment therefore amounts to 5%.

To gain insight into which initial yield and price-to-earnings ratios are common for average businesses, broad stock indices can be used as they reflect the yield of the overall market. The S&P 500, which comprises the 500 largest listed corporations in the US, will be considered as an example. The average price-to-earnings ratio since the introduction of the index lies at 16.4, which corresponds to an initial yield of 6%. Hence as a first heuristic rule, it can be said that a P/E of around 16 is adequate for stocks returning 6–7% p.a. in the long run. This value should be seen as a first indicator to assess whether a given stock tends to be valued cheaply or expensively. Without reference to details of individual companies, valuations in the single-digit P/E range should be regarded as attractive, and values over 20 as expensive. However, as will be illustrated, a price-to-earnings ratio of 20 can in certain circumstances also be considered as cheap, in particular for sustainable growth stocks, as long as they can demonstrate the corresponding growth.

Besides growth in earnings, other factors have an indirect impact on the price-to-earnings ratio. These are, among others:

- market position
- financial stability
- risk
- management
- quality of earnings.

Market position

Businesses with a strong market position generate in general more stable and assessable earnings. The stock market should recognize this with a premium in the form of a higher valuation. In addition, businesses with a unique selling point are inherently less susceptible to downturns as they enhance the company's pricing power. Hence having a high market share usually has a positive impact on the valuation.

Financial stability

Similar to the market position, higher financial stability reduces risk. When comparing two otherwise identical businesses, a rational investor should give preference to the less indebted

one. Apart from increased instability, a high level of borrowing also entails cost in the form of interest payments, reducing net profit. The ideal level of borrowing varies depending on the business model and volatility of cash flows, so that very stable businesses can report high levels of debt without negative consequences on the valuation. Especially for tax optimization, however, taking on additional debt can be an appropriate tool.

Risk

Risk is ultimately the result of the market position, volatility of cash flows and the financial stability of a company. If a business has a consolidated monopoly position and negligible debt, the risk can be assessed as low. Correspondingly, earnings and growth of a business can be regarded as especially valuable if these are combined with low fundamental risk. The assessment of underlying risk is discussed in greater detail using the concept of operating and financial leverage in Chapter 8. Start-ups and companies operating in young industries sometimes exhibit very high growth rates, which are, however, marked by high uncertainty. One should therefore always assess the value of the growth with regard to risk aspects.

Management

The impact of the management varies depending on the business model and organization type. Especially in small, aspiring companies, the decision-making power of managers, for example in questions of strategic direction, is far-reaching and should be considered accordingly. This harbours chances as well as risks for shareholders, who have control over the business in legal terms, but *de facto* often have only limited say. The risk of operational disturbance caused by the departure of a member of the management can be exemplified in the case of Starbucks. After Starbucks founder Howard Schultz announced his retirement, both the situation of the business and the share price deteriorated significantly. His return in 2008 and the drastic changes brought the business back on track. Even larger, globally operating companies can be dependent on the fate of a few. The demise of the Royal Bank of Scotland, for example, can at least in part be attributed to Fred Goodwin's rigorous management style, which did not accept any criticism. This risk should have a corresponding impact on the valuation. This is one of the reasons why investors should meet the management team before making investment decisions, always with the question in mind: 'Would I trust that guy to look after my wallet?'

Quality of earnings

Earnings create value only when they are transformed into actual cash flow in a timely manner and sufficient quantity. The *quality of earnings* is therefore of great importance and is influenced decisively by two factors:

1. cash flow
2. one-off items.

When assessing the price-to-earnings ratio, the cash flow development should always be considered as a control mechanism. Only if money actually flows into the business and large parts of earnings do not have to be reinvested can profit actually be considered as such. The CAPEX quota and the operating cash flow margin are suitable to examine this criterion. It

is precisely businesses with high growth rates that often show poor cash generation and are dependent on external capital providers, despite high growth rates.

The second influencing factor consists of one-off effects in the income statement such as provisions for corporate restructurings or one-off gains related to the sale of non-core assets. The income statement should in any case be adjusted for negative as well as positive one-off items to obtain a clear picture of the earnings situation. In addition, potentially dilutive effects from share options or convertible bonds should be taken into account when determining earnings per share. A dilution arises when new shares are issued, increasing the total share count and hence decreasing earnings per share. Usually, earnings per share are reported on an undiluted and diluted basis. For company valuation the latter is always the most relevant.

Table 7.1 lists five companies from the railroad industry and their price-to-earnings ratios. The analysis of this data should always elaborate on specific peculiarities and individual influencing factors.

Example 7.2 – P/E comparison of five selected companies

Table 7.1   American railroad operators: P/E and EPS growth

Company	P/E ratio	3-year EPS growth
CSX Corp	14.6	14.3% p.a.
Norfolk Southern	15.6	22.2% p.a.
Canadian National	19.2	16.8% p.a.
Canadian Pacific	26.1	6.1% p.a.
Kansas City Southern	32.2	43.4% p.a.

Source: Bloomberg, end of 2013; EPS growth 2012–2010

All five companies are leading railway operators in their respective markets. Although operating in the same industry, they show very different P/E levels. CSX's and Norfolk Southern's discount relative to their peers stems from the companies' rather low *expected* growth levels due to declining revenues in their coal transportation businesses. The sharp drop in coal demand, primarily due to the increased US shale gas output, is causing problems for CSX and Norfolk Southern. Market participants seem to expect lower growth rates in earnings going forward and are therefore awarding the companies below-industry-average price-to-earnings ratios.

Despite posting only slightly better historical growth rates, Canadian National is valued at 19.2 times its earnings. This is mainly because of CN's more favourable revenue mix, making it less dependent on coal transportation. The company is consequently valued relatively higher.

Canadian Pacific's figures seem strange at first. Although posting lacklustre growth rates compared with its peers, it is valued at a P/E of 26.1. Historically, CP has been managed rather inefficiently, as underscored by its low operating margins. However, market participants are awarding the company a high P/E as they expect a recent change in management, instigated by activist investors, to result in cost savings and consequently high growth rates in the future.

Kansas City Southern shows by far the highest P/E and also superior growth rates. This is mainly due to the company's access to the burgeoning Mexican market.

As these examples show, even the valuation level of companies within the same industry can be compared only when one takes into account their specific circumstances and

background. Without further analysis it is hard to say which company is cheap and which is expensive, as a strong competitive position and high growth rates can clearly come at a price, as in this case.

Price-to-earnings ratio distribution: S&P 500

Figure 7.1 illustrates the distribution of the price-to-earnings ratio of the S&P 500. 43.8% of all values in the selection display a price-to-earnings ratio between 12 and 20 and more than 75% of the values are listed below a price-to-earnings ratio of 24. Shares outside this price-to-earnings ratio are usually flukes or companies with outstanding growth rates. The median lies at a price-to-earnings ratio of 19.1 whereas the market capitalization-weighted average lies between 16 and 17 at the end of 2013.
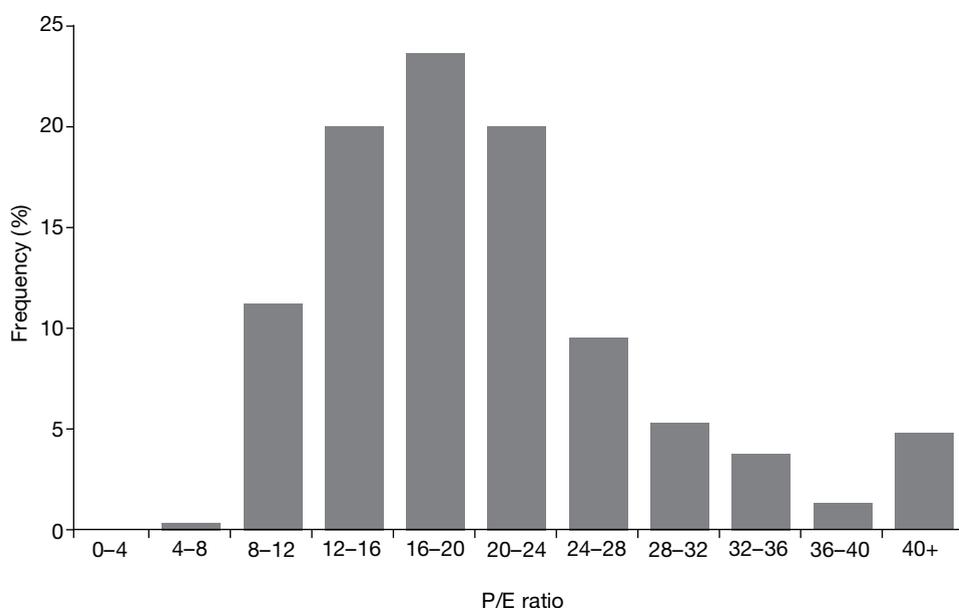
Figure 7.1   S&P 500: price-to-earnings ratio distribution

Price-earnings-to-growth ratio

Making a fair assessment of price-to-earnings ratios, especially in young aspiring businesses, is very difficult. Therefore it is not uncommon to fall back on the price-earnings-to-growth (PEG) ratio when it comes to these types of businesses. PEG is used to estimate the under- or overvaluation of growth stocks. The current P/E ratio is set in relation to the expected future growth in earnings over a certain time period. It is important to ensure that a conservative estimate of the earnings growth is used for the calculation of this ratio.

$$PEG = \frac{\text{Price-to-earnings ratio}}{\text{Growth in earnings}}$$

A value of less than 1 is regarded as cheap, a value of approximately 1 is considered fair and a value larger than 1 points to an overvaluation. This type of valuation is applicable to young businesses such as Facebook before its IPO. When Goldman Sachs bought into (then privately owned) Facebook in spring 2011, the value of the latter was estimated to be around $50bn. Based on back then estimated earnings of $500m, Facebook was valued at a price-to-earnings ratio of 100. This value seems excessively expensive at a first glance, but it can be relativized if the company can grow its earnings at a rate of 100% p.a. over the next few years. In the case of Facebook this is clearly possible as the break-even point was only reached a few years ago. Based on estimates before Facebook filed for its IPO, the young company already achieved growth of more than 100% between 2009 and 2010 ($200m to $500m) and aimed to achieve this in 2011 as well, at least in sales. The PEG ratio of Facebook in 2011 hence showed a balanced value of ±1. This can only be a rough indication in the absence of more detailed data, but it illustrates how an isolated consideration of a price-to-earnings ratio can be misleading. In fact, Facebook's stock dropped considerably after its IPO due to poor earnings figures in its first quarters as a listed company. However, it recovered as soon as the company started reporting growing sales and earnings from mobile ads, underlining the stock's need to 'grow into' its P/E ratio.

7.2   PRICE-TO-BOOK RATIO

Whilst the price-to-earnings ratio compares a profit indicator with the current market valuation, the perspective is widened by the price-to-book ratio, which is a static valuation multiple. This ratio declares the premium, which the market pays on the net assets, i.e. the company's book value or equity per share. At first sight it may seem irrational to pay more for a business than it is worth in assets less liabilities. However, since the stock market usually assumes a going concern of the business and not its winding down, some businesses trade with a premium on their book value, others with a discount depending on future prospects.

The price-to-book ratio is calculated similarly to the price-to-earnings ratio:

$$\text{Price-to-book ratio} = \frac{\text{Market capitalization}}{\text{Shareholders' equity}} = \frac{\text{Share price}}{\text{Book value per share}}$$

If a stock is trading below book value (price-to-book ratio < 1), in theory the entire company could be purchased and liquidated at book value. The buyer would make a profit without risks. In reality, however, only a fraction of businesses are valued below their respective book value and usually not all assets can be sold at the prices stated in the balance sheet. Reasons for that may be constant losses, i.e. the market includes a reduction of shareholders' equity in the price, or dubious or overstated assets on the balance sheet or simply insufficient profitability.

Example 7.3 – Price-to-book ratio calculation
Company A reports shareholders' equity after minority interests of $500m, with 50 million shares outstanding. The division results in shareholders' equity of $10 per share. At a share price of $15 this corresponds to a price-to-book ratio of 1.5 ($15/$10). If calculating the *expected* price-to-book ratio, current shareholders' equity has to be increased by the expected net profit after minority interests and reduced by the upcoming dividend payment. If, for instance, expected earnings are $50m and 70% of profit will be paid out, next year's expected

book value amounts to $515m ($500m + $50m – $35m). The book value per share in this case is $10.30 and the price-to-book ratio 1.46 ($15/$10.30).

What determines the premium paid on the book value (price-to-book ratio >1)? Imagine two identical companies broadcasting radio shows. Both are completely equity-financed. The only difference is the host of the show. Whilst quiz show A managed to hire Howard Stern as presenter, radio show Z has a little-known presenter. Naturally, both businesses have the same book value, as both own the same studio, equipment and have comparable broadcast stations at their disposal. Nevertheless, advertising partners will pay a significantly higher amount for the show hosted by Howard Stern as the number of listeners is expected to be higher. As a consequence, show A will have significantly higher earnings on invested capital. For this reason, business A has to be trading with a premium relative to business Z. This leads to the assumption that the premium paid on shareholders' equity is connected to the company's profitability; in this case: return on equity. The ROE formula is as follows:

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

This ratio approximately expresses the increase in shareholders' equity for the year. The price-to-book ratio must therefore be correlated to the ability of the business to increase its shareholders' equity: in short, its return on equity. Efficient markets value a profitable business higher than an unprofitable one. It is therefore reasonable for a company to be valued at a multiple of its book value, as long as the latter can be increased at a corresponding rate, i.e. it shows a constantly high return on equity.

Suppose businesses A and Z from the previous example start out with a book value of $100m and increase this annually by 20% and 5% respectively (the initial return on equity amounts therefore to 20% and 5%). Company A will have doubled its book value in 4 years' time, whereas Z only in 15 years' time. Intelligent investors and efficient markets include these facts in the price and value A more highly than Z.

In this sense, the valuation premium on the book value of a company can also be interpreted as economic goodwill. For this purpose, imagine the Coca-Cola Company. In order to duplicate Coca-Cola's assets at the end of 2012, $86.1bn is needed. With this amount, the same factories, infrastructure and inventories could be produced, or acquired. In theory, at least, the same turnover could be achieved. However, using a unique marketing strategy, the Coca-Cola Company has been anchored in consumers' awareness as a lively consumer product for over 100 years. This marketing success is responsible for nearly the entire premium of the Coca-Cola Company. We could copy the group as the balance sheet displays it one-to-one, but in doing so, the economic goodwill, namely the globally known brand, which is associated with positive features, would remain untouched. Whilst our no-name product would achieve at best an average return, the Coca-Cola Company achieves a return on invested capital of well over 30%. No shop, no restaurant and no supermarket in the world can do without Coca-Cola, without incurring sales losses. At the same time, Coca-Cola can adjust prices to inflation without losing customers. This explains why the Coca-Cola Company is valued at a multiple of its book value. Its return on equity is the manifestation of this strength.

However, it is also possible that stocks trade at or below their book value in the medium term. If a company is not earning its cost of equity, a valuation below book value is justified as long as the business's prospects remain unchanged. These facts can be illustrated by looking at an analogy from the bond market: a risk-free bond, with a coupon lower than the prevailing interest rate, is trading below face value. However, if the coupon lies above

the interest rate, market participants should be willing to pay a premium on the face value. At a current market interest rate of 5%, a 10% coupon bond would trade well above par, whereas a comparable coupon bond with a coupon of 2% would trade at a bond price of below 100. Transferring this concept to the stock market, it is the businesses whose return on equity (i.e. coupon) is greater than cost of equity (i.e. market interest rate) that are trading above their book value (i.e. face value). Businesses that do not earn their cost of equity are consequently valued below book value. This connection between required and realized return can be detected in the bond market as well as the stock market. It can be deduced from these considerations that businesses are valued at book value (P/B = 1) when they earn precisely their respective cost of equity. Similarly, bonds trade at par only when the coupon rate corresponds to the prevailing market interest rate.

Highly profitable businesses deserve to trade at a premium, as they can increase their book value faster than unprofitable businesses. If the return on equity is significantly above (below) the cost of equity, the business is trading above (below) the book value. This context renders the price-to-book ratio suitable for valuation purposes. Building on this observation, the appropriate price-to-book ratio of a company will be discussed further in Chapter 8 as a function of return on equity and cost of equity. The facts described above will be revisited.

Example 7.4 – Price-to-book value comparison: a British consumer's view
Table 7.2 displays the price-to-book value and normalized return on equity (adjusted for one-offs) of all companies listed in the consumer, non-cyclical sector of the FTSE 100 as at year-end 2013.

Table 7.2   FTSE 100 consumer, non-cyclical P/B vs ROE

Company	P/B	ROE
GlaxoSmithKline	11.9	78.2
British American Tobacco	9.1	58.2
Capita	6.8	45.5
Diageo	7.0	41.4
Unilever	6.4	36.1
Intertek Group	7.8	34.5
Reckitt Benckiser Group	5.3	34.2
G4S	3.5	32.4
Babcock International Group	4.5	29.1
Experian	6.0	28.7
Bunzl	5.1	28.1
AstraZeneca	2.7	26.3
Aggreko	3.4	25.6
Tate & Lyle	3.5	24.5
Imperial Tobacco Group	3.6	21.9
Serco Group	2.3	21.5
Shire	5.8	19.8
Smith & Nephew	2.9	16.9
Tesco	1.9	15.5
SABMiller	3.2	13.4
WM Morrison Supermarkets	1.3	11.8
Associated British Foods	2.6	11.7
J Sainsbury	1.3	10.0

Source: Bloomberg (2013); FTSE 100. Industry: Consumer, non-cyclical

The apparent correlation between ROE and P/B leaps out immediately. Let's have a look at the most extreme values: GlaxoSmithKline achieved an ROE of 78.2% whereas J Sainsbury only posted a return on equity of 10.0%. Consequently, GlaxoSmithKline trades at 11.9 times its equity, whereas the retailer is only valued at 130% of its equity. There are, however, also some outliers. Take for example Experian, with an ROE of 28.7% and a P/B of 6.0, compared with G4S, which achieved a 4% higher ROE but is valued at just 3.5 times its book value. How can this be? Excluding the possibility that some of the stocks are mispriced, this difference can arise due to a higher level of risk at G4S compared with Experian or an expected drop in the future ROE, already anticipated by market participants. These deviations from the norm should always be analysed carefully, as they can hint at a potential mispricing if it turns out that (1) the risk of both companies is in fact comparable and (2) ROE can be estimated to be at least stable. This may or may not mean opportunity for the investor. Figure 7.2 depicts this relationship. The R^2 of 84% can be considered very high, underlining the close relationship between return on equity and premium paid on book value.
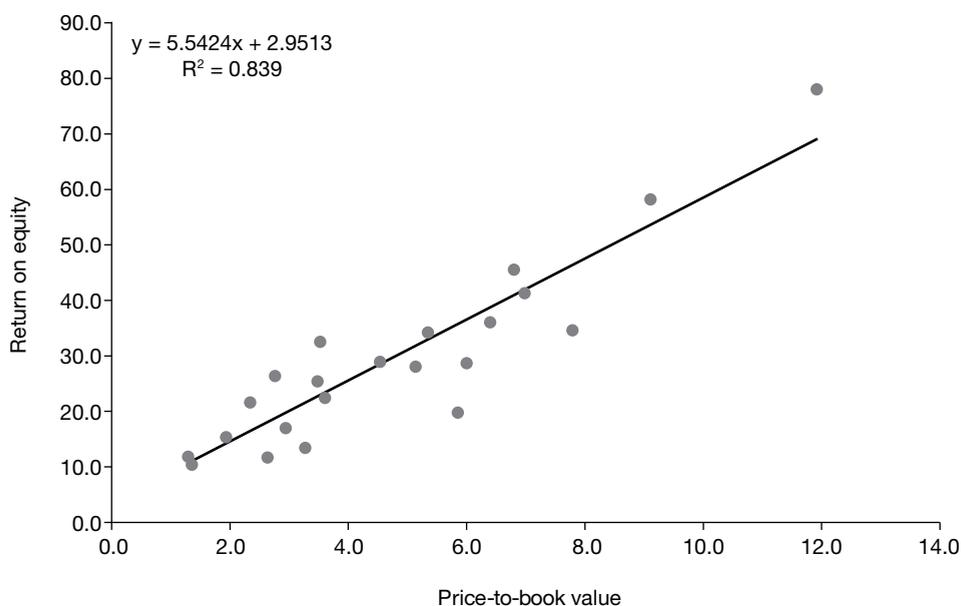
Figure 7.2   FTSE 100 consumer, non-cyclical companies: ROE vs P/B ratio

Potentially interesting stocks usually lie above the line, indicating an undervaluation, relative to other stocks in the industry, assuming that the ROE figure applied is sensible. Stocks trading below the line, meanwhile, show an excessive valuation given their return on equity. Here again, the risk level of each company and the future ROE development have to be analysed carefully before making a definitive decision as to whether or not to invest.

Price-to-book ratio distribution: S&P 500

Figure 7.3 illustrates the distribution of the price-to-book ratio of the S&P 500 members at the end of 2013. Whilst the area between 1.5 and 2 contains most of the businesses, it is noticeable that the majority of the values (nearly 75%) have a price-to-book ratio between 1 and 5. The median lies at 2.9. In this context it is also interesting to look at the distribution of the return on equity, which has already been discussed in Chapter 2.
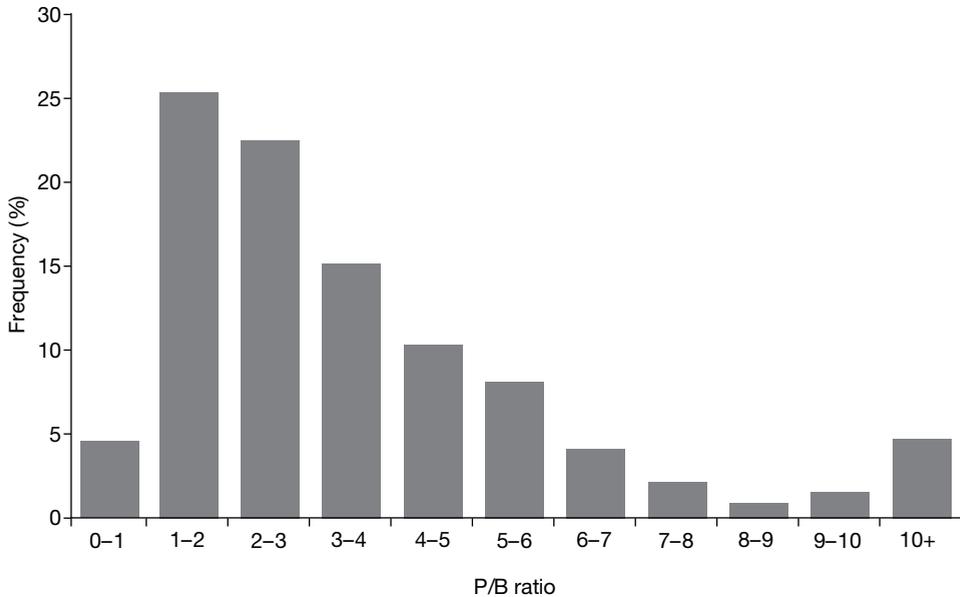
Figure 7.3   S&P 500: Price-to-book value distribution

Example 7.5 – Price-to-book ratio: case study: Coca-Cola

Table 7.3   Coca-Cola: PB vs ROE vs share price

Date	P/B	ROE	Share price
Q2 '00	15.5	17.6	57.4
Q4 '00	16.3	23.1	60.9
Q2 '01	10.8	33.6	45.0
Q4 '01	10.3	38.4	47.2
Q2 '02	12.2	28.3	56.0
Q4 '02	9.2	27.5	43.8
Q2 '03	8.4	34.5	46.4
Q4 '03	8.8	33.6	50.8
Q2 '04	8.2	34.1	50.5
Q4 '04	6.3	32.3	41.6
Q2 '05	6.1	31.0	41.8
Q4 '05	5.8	30.2	40.3
Q2 '06	5.9	30.4	43.0
Q4 '06	6.6	30.5	48.3
Q2 '07	6.4	29.1	52.3
Q4 '07	6.5	30.9	61.4
Q2 '08	5.2	27.5	52.0
Q4 '08	5.1	27.5	45.3
Q2 '09	4.8	27.1	48.0
Q4 '09	5.3	30.1	57.0
Q2 '10	4.5	30.5	50.1

Source: Bloomberg

The development of the Coca-Cola Company displayed in Table 7.3 shows particularly interesting figures. Whilst return on equity in the past ten years hovered relatively steadily between 25% and 35%, the price-to-book ratio decreased continuously. How do these developments fit together? The group was valued comparatively expensive at the height of the economic bubble. In the year 2000, a return on equity of 20% was juxtaposed with a price-to-book ratio of 15. To compare, at the end of 2010 IBM displayed a price-to-book value of 7.9 at a return on equity of 45%. Whilst a high valuation in young enterprises can be explained by high growth rates and catch-up effects, the valuation of the Coca-Cola stock in the year 2000 points to excessive expectations. Investors, who had bought the share at $60 a piece at the time, achieved poor returns over the following decade. It is important to remember that shares of high-quality businesses are often trading at a relatively high valuation and the success of any investment is predominantly determined by the purchase price. The years after the bursting of the bubble showed the opposite development. Whilst return on equity could be consistently lifted above 30%, the price-to-book ratio decreased further. A lacking correlation between price-to-book ratio and return on equity leads to the conclusion that the share was valued incorrectly (however, not necessarily undervalued).

The correlation in the case of Coca-Cola between 1999 and 2010 lay at –0.38, which is a particularly strange value, as it is negative. The more profitable the company, the cheaper the valuation became. At which value is Coca-Cola therefore worth buying?

The analysis of the data shows at least that at the end of 2010 Coca-Cola was trading at a historically low price-to-book value of 5.1. Whether this value is to be classified as cheap or expensive will be the subject of Chapter 8. The example mentioned above will be revisited then.

7.3   PRICE-TO-CASH FLOW RATIO

The chapters so far have been characterized by the philosophy to emphasize the significance of the cash flow and to highlight it vis-à-vis other performance indicators such as EBITDA or net profit. When using valuation multiples, however, the complexity of the cash flow is in sharp contrast with the trivial structure of the multiples. The operating cash flow (changes in working capital) as well as the free cash flow (fluctuations in CAPEX) are often subject to distinct fluctuations and have to be adjusted every year. Although this is possible in principle, it harbours the danger that figures are adjusted too far in one direction. Within the scope of the valuation, the use of the cash flow is more suitable for the discounted cash flow approach, which will be introduced in the next chapter.

The price-to-cash flow ratio can be used to value and compare large, solid enterprises such as high-quality consumer goods manufacturers with less pronounced swings in working capital and CAPEX and hence more stable operating cash flows; for all other businesses it is advisable to at least bear in mind the ratio in context to other ratios. The calculation of the price-to-cash flow ratio follows the pattern of the already introduced valuation multiples:

$$\text{Price-to-cash flow ratio} = \frac{\text{Market capitalization}}{\text{Operating cash flow}} = \frac{\text{Share price}}{\text{Operating cash flow per share}}$$

As the operating cash flow is usually higher than net profit due to the adjustment for non-cash items such as depreciation expenses, the price-to-cash flow ratio lies in most cases below the price-to-earnings ratio. In order to derive the fair price-to-cash flow ratio, the price-to-earnings ratio and relevant cash flow characteristics such as the CAPEX quota should be taken into consideration.

As a rule, the operating cash flow displays a higher volatility than net profit, as changes in working capital can alter the cash flow considerably depending on the cyclicality and growth dynamics of the business. To remove these disruptive factors, the operating cash flow can be used before changes in working capital. This figure, also known as 'cash earnings', is calculated by adjusting net profit for non-cash expenditure and one-off effects.

$$\text{Cash earnings} = \text{Net profit} + \text{Depreciation} \pm \text{One-off items}$$

Another variation of the price-to-cash flow ratio can be obtained by using free cash flow instead of operating cash flow. The price-to-free-cash flow ratio shows at which multiple of the free cash flow a company is currently valued. For this ratio it is also important to bear in mind that large capital expenditure projects can warp it because they temporarily distort the free cash flow generation. Content-wise, the price-to-free-cash flow ratio is the most significant ratio, as shareholders ultimately have only this amount at their disposal. It is therefore

advisable to use a sensible, adjusted free cash flow figure in order to derive this ratio. The inverse of the price-to-free-cash flow figure is known as the free cash flow yield:

$$\text{Free cash flow yield} = \frac{\text{Free cash flow}}{\text{Market capitalization}} = \frac{\text{FCF per share}}{\text{Share price}}$$

This ratio plays an integral part in assessing the attractiveness of the stock price of mature businesses.

Example 7.6 – Free cash flow yield: P&G vs Reckitt Benckiser
Let's compare two seasoned companies, Procter & Gamble and Reckitt Benckiser, using the free cash flow yield and other ratios discussed previously.

Table 7.4   Procter & Gamble vs Reckitt Benckiser: Certain financial statement positions

	Procter & Gamble	Reckitt Benckiser
Share price (year-end 2012)	$67.89	3,879p
Shares outstanding (million)	2,930	732,995
Operating cash flow	$14,873	£1,888
CAPEX, net	$3,424	£155
Free cash flow	$11,449	£1,733
Net profit	$11,312	£1,833
Shareholders' equity	$68,709	£5,922

Source: Annual reports (2013; 2012)

Before calculating the valuation ratios, the given numbers should be transformed into per-share figures, in order to compare them with the prevailing share price. In the case of Reckitt Benckiser, as with many British stocks, special attention has to be paid to the fact that the stock is listed in pence, whereas all other numbers are expressed in pounds. Hence in the following the share price of 3,879 pence will be expressed as £38.79. Dividing the figures in Table 7.4 by the total number of shares outstanding gives the per-share numbers shown in Table 7.5.

Table 7.5   Procter & Gamble vs Reckitt Benckiser: Values per share

	Procter & Gamble	Reckitt Benckiser
Operating cash flow	$5.07	£2.57
Free cash flow	$3.90	£2.36
Net profit	$3.86	£2.50
Shareholders' equity	$23.45	£8.08

Given the respective share prices of $67.89 and £38.79, we obtain the valuation ratios shown in Table 7.6.

Table 7.6 Procter & Gamble vs Reckitt Benckiser: Valuation ratios

	Procter & Gamble	Reckitt Benckiser
P/oCF ratio	13.4×	15.1×
Free cash flow yield	5.7%	6.0%
P/E ratio	17.5×	15.5×
P/B ratio	2.9x	4.8x

Based on this analysis, Reckitt Benckiser looks cheaper on a free cash flow yield and P/E basis, but shows a higher P/oCF and P/B ratio. In this case, as both companies operate in the same industry, one should give preference to the FCF yield over the price to operating cash flow ratio, as it is not the operating cash flow but the free cash flow generation that counts. With respect to the P/B ratio, Reckitt's premium could be justified as the British company achieved a return on equity of 30.9% compared with 16.9% for Procter & Gamble. Overall, it can be said that both companies show a rather rich valuation but Reckitt Benckiser looks cheaper based on the year-end 2012 numbers. To further justify this assessment, the future prospects and most recent developments of both companies have to be taken into account.

Price-to-free-cash flow ratio distribution: S&P 500

Figure 7.4 shows the price-to-free-cash flow ratio at the end of 2013 for all S&P 500 companies. The median lies at 18.7. Overall, the distribution shows similar characteristics as the P/E ratio.
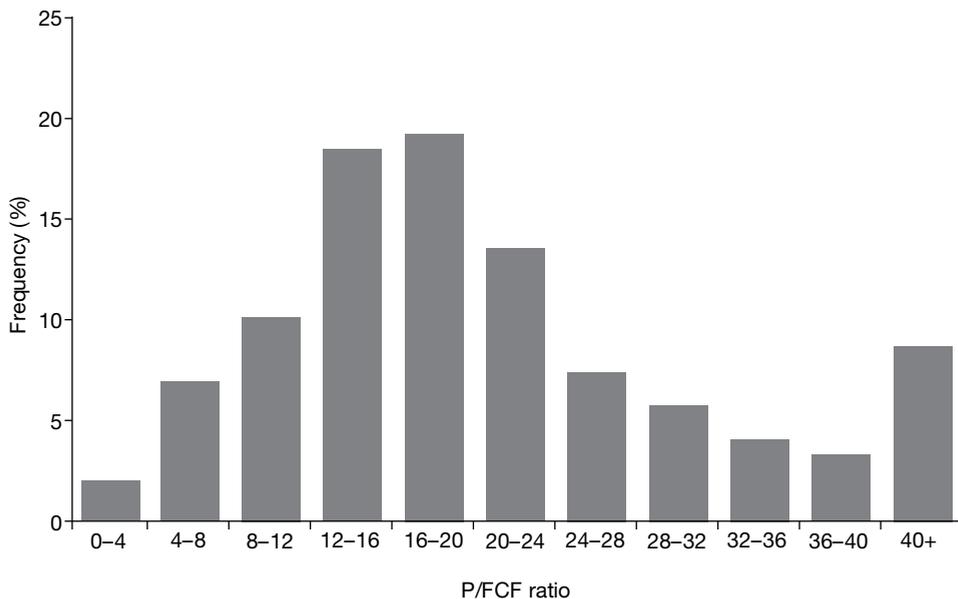
Figure 7.4   S&P 500: Price-to-free-cash flow ratio distribution

7.4   PRICE-TO-SALES RATIO

As the current valuation level has already been determined with the help of net profit (price-to-earnings ratio), book value (price-to-book ratio) and cash flow (price-to-cash flow ratio), the next step is to assess the valuation using the total revenue of a company. The price-to-sales ratio (P/S ratio) gauges the valuation of the business relative to its sales. This approach may seem paradoxical at first glance, as the absolute sales level gives no indication of the profitability of a business. General Motors, after all, had sales worth nearly $150bn in the year before filing for chapter 11, but still made a loss. Why use this ratio?

The price-to-sales ratio is a suitable valuation ratio for various reasons.

First of all, sales are the least susceptible to accounting manipulation. Shareholders' equity and profit are subject to numerous accounting effects, whereas sales are by and large independent of other figures.

Second, the price-to-sales ratio is also used for the valuation of businesses that are posting net losses. In this context, it is important to bear in mind that loss-making businesses can only be assessed when profits can be expected in the future.

$$\text{Price-to-sales ratio} = \frac{\text{Market capitalization}}{\text{Sales revenue}} = \frac{\text{Share price}}{\text{Sales per share}}$$

Just as the price-to-book ratio correlates with return on equity, the price-to-sales ratio can be linked to the net profit margin. This connection exists because the net profit margin figure can be interpreted as the marginal utility of sales. This means: how much profit does each additional dollar in sales produce, if profitability remains constant?

Example 7.7 – Price-to-sales ratio calculation
The stock of a company A is currently trading at $30. The expected sales for the following business year is $150m and it has 10 million shares outstanding. These figures result in sales of $15 per share ($150m/10 million shares) and a price-to-sales ratio of 2 ($30/$15).

The following example shows the distinct influence of the net profit margin on the price-to-sales ratio and how this relationship can be used to value the relative attractiveness of a stock.

Example 7.8 – Price-to-sales ratio vs net profit margin

Table 7.7   S&P 500 basic materials companies: P/S vs net margin

Company	P/S	Net margin (%)
Alcoa	0.4	0.8
Dow Chemical	0.8	2.1
Nucor	0.9	2.6
International Paper	0.7	2.9
Allegheny Technologies	0.8	3.1
Meadwestvaco	1.1	3.8
Eastman Chemical	1.3	5.4
Ecolab	2.5	5.9
PPG Industries	1.8	6.2
LyondellBasell	1.0	6.3

Sherwin-Williams	1.9	6.6
Airgas	1.6	6.9
Du Pont de Nemours	1.6	8.0
Intl Flavors & Fragrances	2.3	9.0
Air Products & Chemicals	2.2	9.8
FMC	2.5	11.1
Praxair	3.2	15.1
Monsanto	3.8	16.7
Freeport-McMoran Copper & Gold	1.9	16.9

Source: Bloomberg, end of 2013

Table 7.7 clearly demonstrates the positive relationship between the net profit margin and the price-to-sales ratio for companies in the basic materials sector. This is for a reason: the more profitably a company operates, the more every additional dollar earned contributes to its profits, which is expressed in the P/S ratio. While Alcoa barely breaks even with a net profit margin of 0.8% and is hence valued at only 0.4 times total sales, Monsanto achieves an outstanding net profit margin of 16.7% and is consequently valued higher at 3.8%. Displayed in a graph, this looks as shown in Figure 7.5.

$y = 4.5053x - 0.3465$
$R^2 = 0.7098$
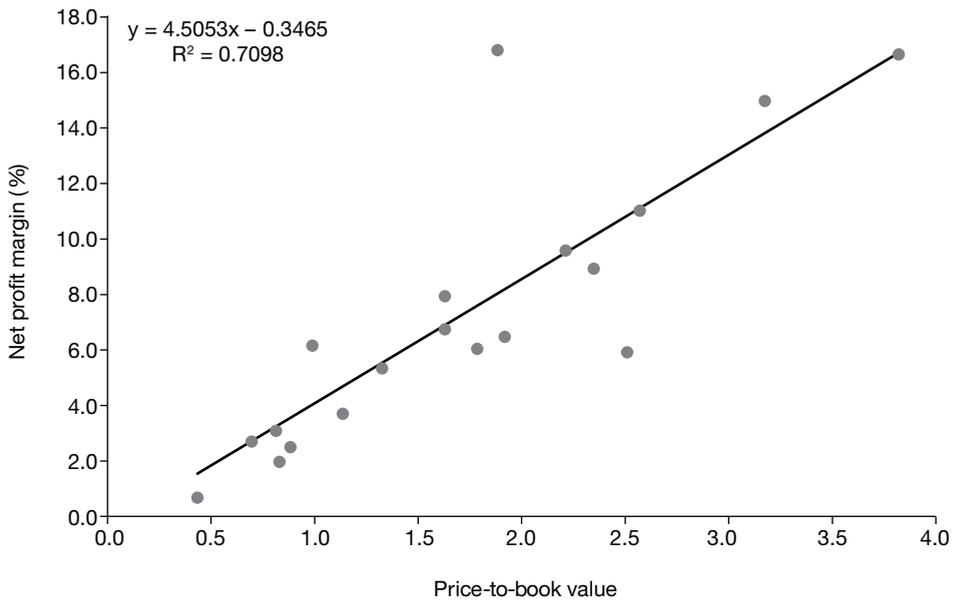
Figure 7.5   S&P 500 basic materials sector: Net profit margin vs P/S ratio

Potentially mispriced securities should trade above or below the line. However, this may not always be true, as in the case of Freeport-McMoran Copper & Gold, which is valued at 1.9× sales whilst showing a net profit margin of 16.9% for the past year. In this case, the market is simply reflecting declining profits as the company posted only a 12.7% margin for the first six months of 2013.

The connection between price-to-sales and the net profit margin is of both a theoretical and a practical nature. The precise determination of a 'fair price-to-sales ratio' will be discussed in more detail in the next chapter. If rising margins are to be expected, for example because of economies of scale, the fair price-to-sales ratio is adjusted upward. If there is increased pressure on margins the price-to-sales ratio should be discounted. Especially in cyclical industries, margins are often very high in boom phases, and low to negative during economic downturns. In this case, one has to resort to reasonable averages over a complete business cycle. Similar to the price-to-earnings ratio it is sensible to recognize particularly stable margins with a premium. This premium can, for example, be due to a prominent market position or a high degree of variable costs.

Price-to-sales ratio distribution: S&P 500

As shown in Figure 7.6, 84% of all S&P 500 members show a P/S ratio between 0 and 4. The median lies at 2.0.
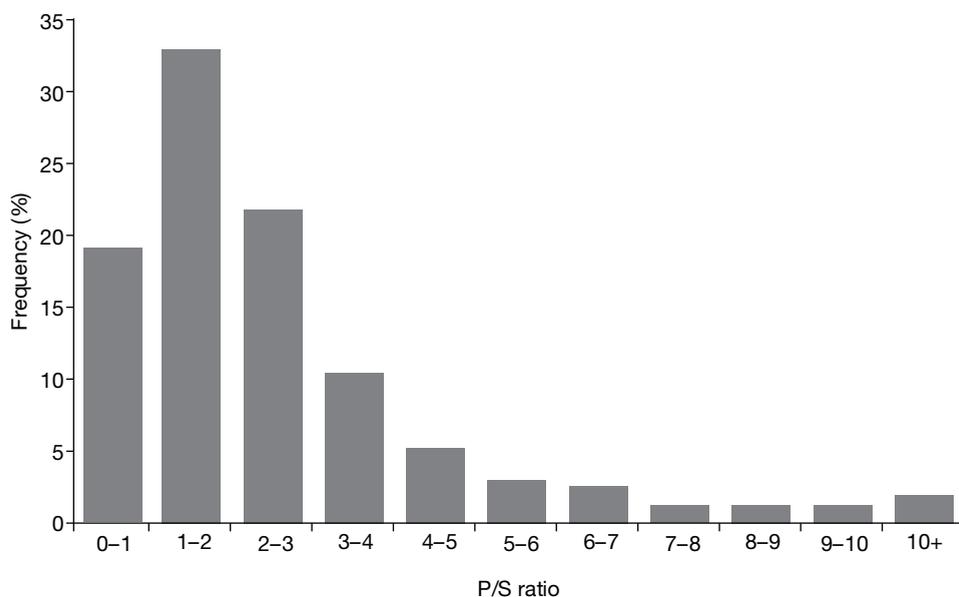
Figure 7.6   S&P 500: Price-to-sales ratio distribution

As described at the beginning of the chapter, when calculating valuation multiples, the performance indicator has to have a logical connection to the reference value. As sales are not exclusively assigned to the equity investor, but are also used to service debt, the price-to-sales ratio should consequently be replaced with the EV/sales multiple, an entity valuation ratio. This ratio will be discussed in more depth in the next section. Despite this weakness, the price-to-sales ratio should not be ignored completely, as many market participants are

unaware of this subtlety and may still consider the price-to-sales ratio. In addition, the P/S ratio gets closer to the EV/sales ratio with declining debt levels, which means that there is no material difference for companies with little debt, but the calculation of the price-to-sales ratio is considerably easier.

Entity multiples

Entity multiples compare performance indicators to which all capital providers are entitled with the enterprise value. The enterprise value is composed of the market value of the equity plus financial debt less cash. The basic question of the entity method is: 'How much does it cost to purchase the entire business?' This does assume that in a complete takeover, obligations against creditors have to be assumed as well. However, any cash on the company's balance sheet belongs to the acquirer, effectively reducing the purchase price.

Compared with equity multiples, both the numerator and the denominator usually show higher values. Entity multiples typically have the following structure:

$$\frac{\text{Enterprise value}}{\text{Performance indicator (before interest)}}$$

The basic new component in this approach is the enterprise value. Before starting to calculate relevant entity multiples, the calculation and intention of the enterprise value will be illustrated.

7.5   ENTERPRISE VALUE APPROACH

The previously mentioned valuation ratios put shareholder-related performance indicators in relation to the market capitalization of the company. Apart from the market value of shareholders' equity (i.e. the market capitalization), the enterprise value approach also considers the market value of debt and cash holdings. This approach originates in the idea that a potential purchaser would have to buy out shareholders as well as creditors to gain access to all cash flows.

Example 7.9 – Enterprise value
Companies A and B each possess property worth $500,000 as their only asset. A is entirely equity-financed, whereas company B has an equity ratio of 20%. If one assumes that the shares of both companies are trading at book value, business A would change hands at a purchase price of $500,000, while business B would be at the shareholders' equity value of $100,000. However, to gain exclusive access to the property, the buyer of B would have to buy out the creditors with $400,000 as well. The classic equity value method would not lead to a sensible result in this fictitious example. Adding interest-bearing debt to market capitalization results in a correct valuation. This new figure, the market value of shareholders' equity (i.e. market capitalization) and debt, is called enterprise value (EV).

The precise calculation of enterprise value is as shown in Table 7.8.

Table 7.8   Enterprise value calculation

	Market value of shareholders' equity
+	Market value of financial debt
+	Market value of minority interests
–	Liquidities, financial assets
–	Non-operating assets
	Enterprise value

- The market value of shareholders' equity corresponds to the company's market capitalization (number of shares × share price). As the price-to-book ratio describes the proportion of market value to book value of shareholders' equity, the price-to-book ratio can alternatively also be multiplied with shareholders' equity, in order to calculate the market value of the latter.
- In financially solid businesses the market value of debt corresponds to the book value, i.e. the debt reported on the balance sheet. If the business finds itself in financial difficulties, the debt instruments (e.g. listed bonds) usually trade with a discount on their face value. A potential buyer would therefore only have to pay this discounted value to acquire the debt. Hence the book value of debt decreases accordingly. All liabilities such as bank loans, bonds, commercial papers and comparable interest-bearing liabilities count as financial debt.
- The market value of minority interests in shareholders' equity also has to be added to the enterprise value. Minority interests are shares of consolidated majority holdings that do not belong to the group. If a group fully consolidates, for example, a 90% stake in another company, the minority interest of 10% has to be declared separately on the balance sheet, as they do not actually belong to the group. Like shareholders' equity this amount is accounted for at book value. Minority interests should therefore be multiplied with an appropriate price-to-book ratio in order to derive their market value.
- Cash and equivalents are the counterpart of financial liabilities and are deducted from the enterprise value, as they lower the purchase price. The liquid assets acquired in the course of the takeover could for example be directly distributed or used for the reduction of financial liabilities. Assets that are not part of the operating activity are treated in a similar way, as they can be sold without impacting the cash flow situation. Counted among these are for example unused properties or financial assets.

Provided there are no minority interests in shareholders' equity, the enterprise value formula can be reduced to the components Market Value of Shareholders' Equity + Market Value of Net Financial Debt, whereby net financial debt equates to the market value of financial liabilities less liquid assets.

Example 7.10 – Enterprise value: Liquid plc and Heavy Co.
In order to exemplify why liquid assets are deducted and financial liabilities added, assume the fictitious acquisition of Liquid plc and Heavy Co. given the balance sheets shown in Tables 7.9 and 7.10.

Table 7.9   Liquid plc: Balance sheet

Liquid plc		
Assets	$	Liabilities
Property and equipment	100,000	Shareholders' equity	300,000
Accounts receivable	50,000	Bank loans	0
Cash	150,000		

The price-to-book ratio of Liquid plc is 1, and the book values therefore correspond to the market values. A potential buyer of the business would acquire $150,000 in cash, apart from the actual operating business. Hence the net cash position of $150,000 can be directly paid out, without damaging the business itself. Due to the liquid assets the enterprise value is reduced by $150,000 and amounts to:

$$\text{Enterprise Value}_{\text{Liquid plc}} = \$300,000 - \$150,000 = \$150,000$$

Table 7.10 shows the balance sheet of Heavy Co., which is trading at a price-to-book ratio of 2.

Table 7.10   Heavy Co.: Balance sheet

Heavy Co.		
Assets	$	Liabilities
Property and equipment	100,000	Shareholders' equity	50,000
Inventories	50,000	Bank loans	100,000

Based on these data, the enterprise value comes in at $200,000 ($50,000 × 2 + $100,000). At equal profits, Liquid plc is valued significantly cheaper than Heavy Co. High financial debt increases the valuation (investment becomes unattractive) and high levels of cash reduce the valuation (investment becomes more attractive), as it can be distributed directly to the new owners.

In an extreme case, cash and cash equivalents exceed the market value of debt and the market capitalization, which corresponds to a negative enterprise value. In that case the buyer could acquire the entire business (all shares and debt outstanding), pay out cash and cash equivalents and still own the operating business – at no charge. The enterprise value, i.e. the purchase price for equity and debt, would therefore be negative. Pure theory? Not at all. In times of crisis these interesting opportunities occur at irregular intervals. Usually businesses display striking weaknesses in these situations, so that a valuation below the liquid assets can be justified. This is, for instance, the case when the company uses up its cash reserves very quickly due to high losses. Nevertheless, the Medion AG case study below illustrates that, from time to time, such a valuation can also occur with solid companies.

Example 7.11 – Negative enterprise value: Medion

In order to be better able to follow this case study, it is recommended to have Medion AG's interim report for the first quarter of 2009 at hand. The quarterly report can be found in the 'Investor Relationa' section on the group's homepage. The most important data is listed below.

Medion AG is involved in the conceptual design, production and trade of electrical appliances. With sales above €1bn, the company is one of the largest manufacturers of electrical appliances in Germany.

Table 7.11 lists Medion's shortened balance sheet as at 31 March 2009.

Table 7.11   Medion AG: Balance sheet

Medion AG			
Assets	€000	Liabilities	
Cash and cash equivalents	247,799	Accounts payable	101,927
Accounts receivable	185,401	Tax provisions	3,265
Inventory	137,246	Other short-term debt	13,841
Deferred taxes	5,050	Bonds	0
Other short-term assets	33,600	Other long-term debt	785
Tangible fixed assets	31,700	Pension provisions	1,650
Intangible assets	3,139	Shareholders' equity	358,868
Financial assets	512		
Deferred taxes	14,997		
Other long-term assets	3,146		

During the first quarter of 2009 the share was trading between lows of €5 and highs of €7.30. At the end of the quarter on 31 March 2009 it was trading at €5.82. Based on 44,816,285 shares outstanding, the market capitalization can be obtained as follows:

$$€5.82 \times 44,816,285 \text{ shares} = €260,830,778$$

Thus at the end of the first quarter of 2009 Medion's equity was valued at €260.8m. Financial liabilities amount to only €14.6m. As the company's debt is not exchange-traded and the company can be classified as financially stable, the financial liabilities can be set at 100% of their book value. The final step of the enterprise value calculation is to deduct cash holdings and assets, which are not part of the operating business.

The quarterly report is usually a shortened version of the annual report, therefore one has to resort to the notes section of the 2008 annual report for a definition of the positions 'other short-term assets', 'other long-term assets' and 'financial assets'. After reviewing the annual report's notes (10) and (14), all positions qualify as quickly recoverable and are not necessary for the operating activities. Moreover, Medion reports cash and cash equivalents worth €247.7m, which have an important impact on the valuation.

Using the data given above the enterprise value is calculated as follows:

$$EV = \text{market value shareholders' equity} + \text{market value debt}$$
$$- \text{cash and cash equivalents} - \text{non-operating assets}$$

$$= €260,830K + €14,626K - €33,600K - €512K - €3,146K$$

$$= -€9,601K$$

The result is an enterprise value of €9.6m. In a private transaction the seller would have paid €9.6m, so that the buyer acquires the business (sic!). Assuming that Medion runs a permanent deficit, a purchase price of zero could be justified. In this case, however, Medion reports particularly stable profit margins, which means this concern is unfounded. In 2009 Medion made a profit of €14m, although the business was intermittently trading at a negative purchase price. Naturally this example is an exception. Most businesses, however, report net financial liabilities, which means that the enterprise value exceeds the market value of shareholders' equity.

The enterprise value has the additional advantage that the capital structure is included in the valuation. High levels of debt make a business less attractive, cash holdings on the other side are rewarded. The capital structure itself therefore has not to be included when interpreting entity multiples. As the enterprise value considers both shareholders' equity and debt, performance indicators such as EBITDA, EBIT, free cash flow before interest or total sales can be used for the calculation of the entity multiples, as these earnings are at the disposal of all capital providers. In contrast to net profit, these performance indicators have the additional advantage that they are more consistent. Usually, the further down performance indicators are reported on the income statement, the more heavily they are burdened by one-off items and accounting leeway. Total sales, for example, are usually not affected by one-offs, whereas EBIT can be distorted by various extraordinary expenses and earnings. The relevant figures for the enterprise value ratios can, to a large extent, be found directly in the income statement, as Table 7.12 shows.

Table 7.12 Income statement with relevant EV figures highlighted

Revenue
– Operating expenses
= EBITDA
– Depreciation and amortization
= EBIT (operating profit)
– **Financial result**
= EBT
– Tax
= Net profit

This section illustrates the concrete calculation and interpretation of the most important entity multiples. The following multiples are of particular importance:

- EV/EBITDA
- EV/EBIT
- EV/sales
- EV/FCF.

When it comes to entity multiples, one also has to weigh up which ratio will result in the appropriate valuation for the respective business. It is therefore important to include the business model and the peculiarities of the company in the consideration.

7.6   EV/EBITDA

$$\frac{EV}{EBITDA} = \frac{Enterprise\ value}{EBITDA}$$

Earnings before interest, taxes, depreciation and amortization (EBITDA) express the operating income adjusted for depreciation and amortization, which are non-cash expenses. The EBITDA corresponds roughly to the gross cash flow. It is a measure for the amount that all capital providers have at their disposal for investments and interest payments. The EV/EBITDA therefore shows approximately the proportion of the total value of the enterprise in relation to the means that capital providers received.

This ratio is particularly suitable for comparing businesses within an industry. A comparison across industries is more difficult, as differences can arise relating to the propensity to invest in fixed assets, which directly affects depreciation and amortization expenses. Companies with high growth rates or a high capital intensity display relatively high levels of depreciation, whereas businesses in asset-light industries (i.e. with a high ratio of current assets to total assets), for example wholesalers or internet companies, usually report lower levels of depreciation. These have an impact on EBITDA and therefore on the resulting valuation.

The relevant EBITDA figure can be obtained from the income statement by adding the operating result (EBIT) and depreciation expenses. In some cases, depreciation expenses are not listed explicitly in the income statement. In order to obtain the depreciation figure, one then has to refer to the cash flow statement.

Example 7.12 – EV/EBITDA calculation: Rotork
Table 7.13 is the income statement of the British Rotork plc on 31 December 2009.

Table 7.13   Rotork plc: Shortened income statement

Rotork	
$m	2009
Revenue	353,521
Cost of sales	(187,600)
Gross profit	165,921
Other income	688
Distribution costs	(3,428)
Administrative expenses	(71,585)
Other expenses	(59)
Operating profit	91,537
…	…

Source: Rotork plc (2009) [UK GAAP]

Rotork plc does not state its depreciation expenses explicitly in the income statement. In this case, EBITDA is calculated starting with the operating earnings (EBIT) and adding depreciation and amortization expenses. As depreciation and amortization are non-cash expenditures, the amount is reported in the group's cash flow statement as £3,549m, together with amortization for intangible assets amounting to £1,153m. Altogether the EBITDA is calculated as follows:

$$\text{EBITDA} = \text{EBIT} + \text{Depreciation and amortization}$$

$$= £91,537m + £4,702m = 96,239m$$

In order to determine the EV/EBITDA building on the result above, the next step is to calculate the enterprise value, i.e. the market value of equity and financial debt minus cash and cash equivalents. On the balance sheet date, Rotork reports cash and cash equivalents worth £78.6m but only £0.2m worth of financial liabilities. It therefore has a net cash position of £78.4m. The market capitalization comes to £1,500m. As a result, the enterprise value is £1,421m and originates in the logic that a potential buyer of the entire business would have to spend £1,500m to acquire all shares outstanding and could immediately distribute £78.4m, which is left over after having paid back the financial liabilities worth £0.2m. With this ratio, the EV/EBITDA can be calculated as follows:

$$\frac{\text{EV}}{\text{EBITDA}} = \frac{£1,421m}{£96.2m} = 14.8$$

At the end of 2010, Rotork group traded at an EV/EBITDA of 14.7, which can be regarded as relatively expensive. In 2010, only about 16% of all listed companies display an EV/EBITDA above this value. However, this fairly high valuation can be justified by the strong EBITDA margin of 27.2% and further excellent financial ratios. In this case, the high valuation corresponds to the high business quality.

The precise interpretation of this multiple should be carried out using historical values and the valuation of the peer group.

Apart from valuation purposes, the EBITDA also has an important significance for the creditors of the company, as it forms the amount which is available for interest payments. For the valuation of highly indebted businesses the EV/EBITDA is usually used, because the numerator and the denominator reflect the debt situation. If a business is able to reduce its debt with future free cash flows, one can deduce that it has a disproportionately large growth in earnings ahead due to falling interest payments. A simulation of the earnings development by using the EV/EBITDA shows in this case the potential of the stock.

Nevertheless, the disadvantage of this ratio is that taxes and necessary investments (CAPEX) are disregarded. It is important, when adding depreciation and amortization, only to compare businesses in the same industry using the EV/EBITDA. The EV/EBIT, which will be introduced in the next section, is much more suitable for comparing businesses from different industries.

EV/EBITDA distribution: S&P 500

The S&P 500 companies show the EV/EBITDA distribution shown in Figure 7.7.
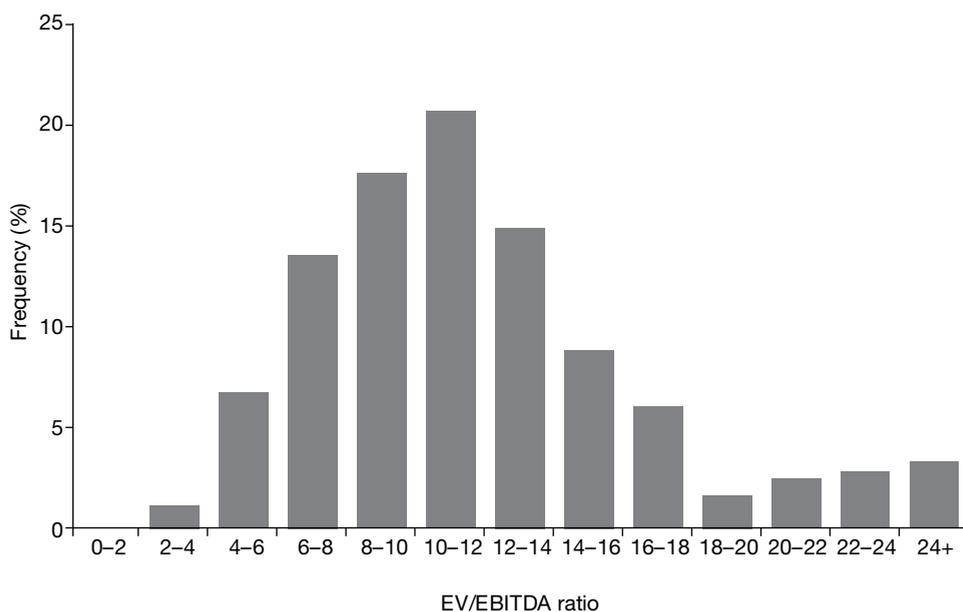
Figure 7.7   S&P 500: EV/EBITDA distribution

The median for an EV/EBITDA lies at 11.1. Enterprise value valuations above the 18 times EBITDA level are usually due to exceptional business models or very high growth rates.

Example 7.13 – EV/EBITDA valuation: Energizer Corp.
Energizer Corp. gives the financial figures for the year ended September 2012 shown in Table 7.14.

Table 7.14   Energizer Corp.: Certain financial statement positions

Energizer Corp.	
In US$m	2012
Earnings before income taxes	565.4
Interest expense	127.3
Depreciation and amortization	162.2
Current maturities of long-term debt	231.5
Notes payable	162.4
Long-term debt	2,138.6
Cash and cash equivalents	718.5
Shares outstanding	65.7m

Source: Energizer Corp. (2012) [US GAAP]

Energizer's stock traded around $70 at the end of Energizer's business year in 2012. Multiplied with the 65.7m shares outstanding gives the market capitalization of $4,600m. Energizer's net debt of $1,814m is calculated by adding current maturities of long-term debt, notes payable and long-term debt less cash and cash equivalents. This gives an enterprise value of $6,414m.

Energizer does not state the EBIT or EBITDA explicitly in its income statement. Hence EBITDA is calculated by starting at the earnings before income taxes and adding back interest expenses and depreciation charges.

$$EBITDA = \$565.4m + \$127.3m + \$162.2m = \$854.9m$$

Dividing the enterprise value of $6.414m by $854.9 gives an EV/EBITDA multiple of:

$$EV/EBITDA = \frac{\$6,414m}{\$854.9} = 7.5\times$$

This indicates a rather low valuation. To further examine the EV/EBITDA valuation of the company the forecasted figures should be taken into consideration. Also, the historical valuation and past development of EBITDA margins will usually be of interest.

7.7   EV/EBIT

The EV/EBIT describes the enterprise valuation relative to the operating earnings of a company.

$$\frac{EV}{EBIT} = \frac{\text{Enterprise value}}{EBIT}$$

EBIT shows earnings before interest and tax. In contrast to EBITDA, depreciation and amortization are not included in the calculation. This ratio is particularly suitable for comparisons of businesses across industries and serves here as a central valuation multiple together with the price-to-earnings ratio and the price-to-book ratio. Unlike equity ratios such as the price-to-earnings ratio, the entity multiple EV/EBIT considers the capital structure and includes the financial stability of the firm directly in the valuation.

The following example will illustrate the difference between price-to-earnings ratio and EV/EBIT.

Example 7.14 – EV/EBIT vs price-to-earnings ratio
Business 1 is for sale at a price tag of $8,000 and reports earnings of $800 per year. Company 2 can be acquired for $10,000 and reports earnings of $800. Apart from the price and the capital structure, both businesses have comparable business models. Based on these details, the price-to-earnings ratio is 10 for business 1 and 12.5 for the second company.

Without knowledge of the balance sheet, it cannot be determined which business is cheaper. Assume that business 1 has reported net financial debt of $2,000 whilst business 2 has no liabilities and cash holdings of $4,000. A buyer of business 1 would therefore have to assume

debt amounting to $2,000 in addition to the purchase price of $8,000, whereas company 2's purchase price is effectively reduced by $4,000, as the buyer can pay himself that amount directly. These considerations increase the purchase price multiples for business 1 to 12.5 and fall for business 2 to 7.5.

EBIT is usually referred to as operating earnings. An EV/EBIT of 8 therefore means that a purchaser of the whole business has amortized the investment at constant profit within eight years. Similar to the already introduced valuation multiples, a low value tends to correspond to a cheap valuation.

Example 7.15 – EV/EBIT: Kabel Deutschland
Let's now take a look at the calculation of the EV/EBIT multiple based on Kabel Deutschland's key figures for the business year 2009/10. Kabel Deutschland is Germany's largest cable operator, servicing approximately 8.5 million connected households.

The EBIT figure of €194.6m can be directly obtained from the income statement. The market value of Kabel Deutschland's equity of €2.12bn is calculated by multiplying the share price of €23.6 with 90,000,000 shares outstanding. The company also has net debt of €2.83bn, giving an enterprise value figure of €4.95bn (€2.12bn + €2.83bn). Based on these figures the EV/EBIT is:

$$\frac{EV}{EBIT} = \frac{€4,950m}{€194.6m} = 25.4$$

On a stand-alone basis, this valuation multiple might be considered expensive. However, the corresponding EV/EBITDA figure is only 7.6, which is rather inexpensive or closely aligned with its peers. These huge differences can only be explained by Kabel Deutschland's high depreciation and amortization charges. These are mainly a result of accounting effects, since the company has to amortize its acquired customer base over the coming years. Kabel Deutschland's 'real' depreciation charges for fixed assets therefore are considerably lower. Thus the temporary need to write off the acquired customer base skews its operating result (EBIT), rendering an EV/EBIT valuation useless in this case. This example makes clear why it is imperative to investigate the story behind the numbers. The narrative is a central pillar of any analysis.

EV/EBIT distribution: S&P 500

Figure 7.8 illustrates the EV/EBIT distribution of the S&P 500 companies.
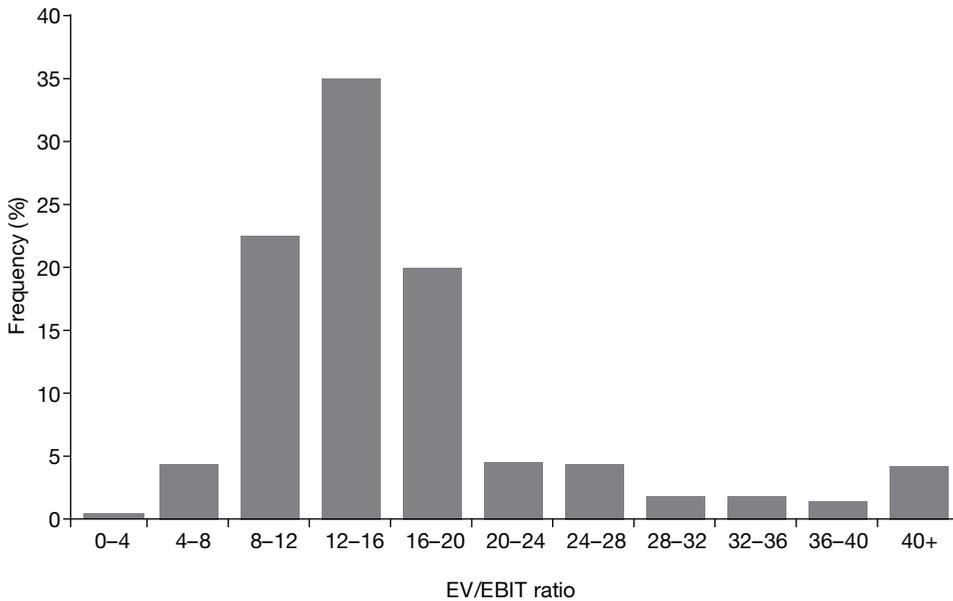
Figure 7.8   S&P 500: EV/EBIT distribution

The EV/EBIT median lies at 14.5. 62% of the values fall into the range between 0 and 16. Only 18% of the companies in consideration have an EV/EBIT of more than 20.

Example 7.16 – EV/EBIT: Wärtsilä Group
The Finnish Wärtsilä Group is a leading manufacturer of ship engines and power plants. At the end of the business year 2009 Wärtsilä Group reported the figures shown in Table 7.15.

Table 7.15   Wärtsilä: Certain financial statement positions

	Wärtsilä
€m	2009
Operating result	592
Interest-bearing debt (non-current)	591
Interest-bearing debt (current)	73
Cash and cash equivalents	244

Source: Wärtsilä Group (2009) [IFRS]

On 31 December 2009, Wärtsilä had 98,621,000 shares outstanding, trading at €28 and resulting in a market capitalization of €2,761m. Adding net debt of €440m (€591m + €73m – €224m) results in an enterprise value of €3,201m at the end of 2009. The operating result of €592m listed on the income statement corresponds to the EBIT of the company. On the basis of this data the resulting EV/EBIT is:

$$\frac{EV}{EBIT} = \frac{€3,201m}{€592m} = 25.4$$

The distribution shown above gives the impression that Wärtsilä Group is valued cheaply. In addition, the company posted a return on capital employed of 27.2%, which should be regarded as above average. A further look at the annual report reveals, however, that in the course of the financial and economic crisis, orders declined by 35%. Hence market participants already included a decline in earnings for the following business year when pricing the company. This example demonstrates that in cyclical businesses particular attention should be paid to the fluctuations of earnings figures. In principle, the valuation of a business has to be oriented towards future earnings. If, for instance, the operating earnings for 2010 were correctly estimated to be €412m, the new valuation of an EV/EBIT of 9.26 would already have been significantly more expensive. For the year 2011, management guided an operating income of €520m. The group's market capitalization at the end of 2010 amounted to approximately €5,000m and financial liabilities were completely covered by cash holdings. The EV/EBIT therefore is:

$$\frac{EV}{EBIT} = \frac{€5,000m}{€520m} = 9.61$$

7.8   EV/FCF

$$\frac{EV}{FCF} = \frac{\text{Enterprise value}}{\text{Free cash flow before interest}}$$

Another ratio in the enterprise value universe looks at the total valuation of the company in relation to free cash flow before interest payments. So far, free cash flow has been considered in connection with shareholders. As the EV/FCF is an entity multiple, the creditors' cash flows, i.e. the interest payments, also have to be taken into account. In contrast to EV/EBITDA, the necessary investments (CAPEX) and exclusively liquidity-related positions are also included. The EV/FCF multiple can therefore be regarded as the most complete enterprise value ratio, which has, at the same time, the largest deviation, due to its complex calculation of the denominator.

The free cash flow before interest is calculated using the following equation:

$$\text{FCF before interest} = \text{Operating cash flow} + \text{Interest on debt} - \text{Capital expenditures}$$

Example 7.17 – EV/FCF: Finsbury Food Group
In the case of the British Finsbury Food Group, the use of the ratio exemplifies the distinct weakness of classic multiples such as the price-to-earnings ratio. In mid-2009 (abnormal business year) Finsbury reported the shortened balance sheet figures shown in Table 7.16.

Table 7.16 Finsbury Food Group: Balance sheet

Finsbury Food Group			
Assets	£000	Equity & Liabilities	
Non-current assets	87,483	Equity	37,802
Current assets	30,527	Non-current liabilities	31,402
– Inventories	4,386	– Borrowings	26,736
– Receivables	24,868	– Others	4,666
		Current liabilities	48,806
– Cash and equivalents	1,273	– Borrowings	17,647
		– Others	31,159
Total	118,010	Total	118,010

Source: Finsbury plc (2009) [UK GAAP]

In 2009, the Finsbury Group was at times trading at a price-to-earnings ratio of as low as 4.8. Considered in isolation, this is a very cheap valuation. Now let's look at this valuation from an enterprise value perspective: with a market capitalization of £5.6m (which corresponds to a price-to-book ratio of 0.15) and net financial debt of £43.1m, this results in an enterprise value of £48.7m. Net financial debt is in this case calculated by adding the two borrowing positions less cash and equivalents. A look at the cash flow statement of the last two years permits an estimate of the sustainable free cash flow (Table 7.17).

Table 7.17 Finsbury Food Group: Shortened cash flow statement

Finsbury Food Group		
£000	2009	2008
Net cash from operating activities	+8,236	+5,934
Interest paid	+3,024	+2,310
Purchase of property, plant & equipment	–3,393	–2,551

Source: Finsbury plc (2009) [UK GAAP]

Using the average of the free cash flows before interest of both years (8,236 + 3,024 – 3,393 and 5,934 + 2,310 – 2,551) results in a sustainable free cash flow before interest of around £6.8m. Using these values results in an EV/FCF of:

$$\frac{EV}{FCF} = \frac{£48.7K}{£6.7K} = 7.26$$

This is a more expensive value than the seemingly cheap price-to-earnings ratio. The price-to-earnings ratio is not a suitable valuation ratio in this case, because it is not the earnings but the capital structure which is at the heart of the company's problem. Although the business

has small but steady earnings, its current ratio is only 62.5%. The company is therefore underfunded and may have problems servicing its short-term debt. The EV/FCF ratio, however, points to an appropriate valuation, given the debt burden. It is also sensible in this case to calculate historical EV/FCF valuations and make peer group comparisons for a more precise classification.

7.9   EV/SALES

The EV/sales valuation ratio puts enterprise value in relation to the total sales of the period. The ratio can be considered as the counterpart of the already familiar price-to-sales ratio and is calculated as follows:

$$\text{EV/Sales} = \frac{\text{Enterprise value}}{\text{Sales}}$$

This multiple is particularly suitable for considering the valuation of a business over time, as this ratio is generally less susceptible to fluctuations. As with other multiples, a low ratio points to a cheap valuation, whereby a high EV/sales figure may well be justified for above-average margins, as the following illustration of EV/sales ratios in the S&P 500 shows.

EV/Sales distribution: S&P 500

The distribution in Figure 7.9 shows a noticeably large number of businesses in a range between 1 and 3, as well as 5% with an EV/sales of more than 10. The median lies at 2.3.
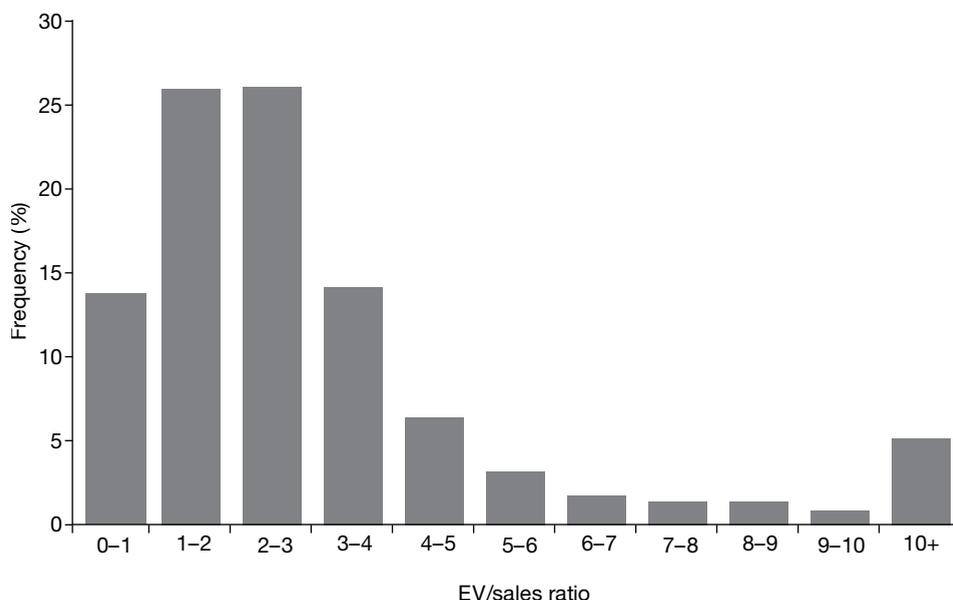
Figure 7.9   S&P 500: EV/Sales distribution

Example 7.18 – EV/Sales: McDonald's

The calculation of this ratio will be illustrated using the McDonald's Corporation as an example. At the end of 2010, McDonald's market capitalization stood at $81.1bn. The group reported net debt of $9.1bn and sales of $24.0bn for the year. The enterprise value/sales ratio is therefore calculated as follows:

$$\text{EV/Sales} = \frac{\$81.1\text{bn} + \$9.1\text{bn}}{\$24.0\text{bn}} = 3.76$$

Based on the distribution shown above, an EV/sales ratio of 3.76 can be regarded as expensive, but the EBIT margin of 30.8% points to an exceptional market position, which means that a valuation many times the amount of sales can be justified. This also becomes clear in the EV/EBIT of 12.1 and the EV/EBITDA of 10.3 for the business year 2010. A high but justifiable valuation given the outstanding margins and market position of the company.

8
Company Valuation

> Managers and investors alike must understand that accounting numbers are the beginning, not the end, of business valuation.
>
> Warren E. Buffett

Company valuation is concerned with deriving the fair value of a company. There are various methods and approaches in order to determine the fair value, which usually lead to different results and assessment ranges. The true value of a business is therefore not objectively fixed, but is always a compromise of differing assessment approaches, which point to a specific fair company value range. A ticket to an already sold-out rock concert, for example, has a much higher value to the fan than to a unconcerned classical music enthusiast. An ounce of gold does not generate an ongoing yield, but it provides subjective security for the investor – and that comes at a price. The value of many assets is not necessarily determined by their book value or the expected cash flows, but rather by intangible and sometimes irrational and sentimental characteristics. In contrast to that are risk-free government bonds, which provide holders with a given yield, determinable down to the last cent.

The value of companies can also be determined in different ways and is not given as one and the same figure for every investor. An aggressive private equity investor with an intention to liquidate the firm, for example, regards the book value, or more precisely the liquidation value, of a business as the true value. In contrast, a family business owner of the third generation will decline almost any purchase price offer, unless the buyer adopts the family philosophy. A business with M&A intentions, meanwhile, might pay a clear premium on the current market value of a target company, as long as the merger promises synergy effects or opens up new markets.

As long as we participate in the stock exchange without any real say, however, just one figure counts: the future discounted cash flows. At the end of the 1930s, the American economist John Burr Williams coined the term of the intrinsic value of a business, based on its discounted cash flows. This approach is nowadays known as the discounted cash flow model (DCF model).

The only objective company value is determined by the future free cash flow of a business, i.e. the amount that the owner could withdraw from the excess cash flow year after year without having a negative impact on the company. In order to take into account the prevailing level of interest rates and business risks, the expected future cash flows have to be discounted at a risk-adjusted interest rate. This results in the present value of the cash flows, which corresponds in sum to the intrinsic company value. In simple terms, the value of a business is measured by its expected cash flows, from which withdrawals could be made, across the entire lifetime of the enterprise.

Whilst revenues, operating earnings and net profit are theoretical concepts, company valuation based on income or cash flow approaches focuses its analysis on the cash that has actually been received, i.e. the cash flow. The cash flow-based assessment is illustrated below in an example.

Example 8.1 – Oil well
After an initial investment of $1,000, an oil well in the Gulf of Mexico delivers oil worth
$1,000 over the following three years. The income is secured because fixed prices were
agreed with the customer and there are no further costs. The current risk-free interest rate is
5% p.a., and the initial investment of $1,000 could therefore be invested alternatively without
risk. Thanks to tectonic peculiarities the oil well is considered to be particularly stable and
the steady oil flow for the next three years is guaranteed and risk-free. After the three years
the oil well is closed down without further cost. The cash flows are as shown in Table 8.1.

Table 8.1   Oil well cash flows

t = 0	t = 1	t = 2	t = 3
$–1,000	$+1,000	$+1,000	$+1,000

The cash inflows and outflows have to be discounted in order to determine the present
value of the oil well. The further a cash flow lies in the future, the less it is worth today. As
the cash flows are secured, the risk-free interest rate of 5% is used as the discount rate. The
precise calculation is as follows:

$$DCF_{oil\ well} = -\$1,000 + \frac{\$1,000}{1.05} + \frac{\$1,000}{1.05^2} + \frac{\$1,000}{1.05^3} = \$1,723.25$$

The oil well's discounted cash in- and outflows amount to $1,723.25 and form the intrinsic
value of this project.

This very simple and abstract example already contains all components needed to deter-
mine the intrinsic value of a business: (1) the expected cash flows and (2) the discount rate.
Transferred to a real company, however, forecasting (1) and determining (2) is much more
difficult. Applying the tools and methods of company valuation and classification introduced
in the previous chapters is a necessary precondition for carrying out an assessment altogether.
Apart from the theoretically correct assessment of using discounted cash flows as outlined
above, this chapter contains further valuation methods. These supplementary and alterna-
tive approaches are necessary because, on the one hand, the discounted cash flow method
responds to minor changes of the parameters such as the discount or growth rate with sig-
nificant fluctuations in the result and, on the other hand, the correct prognosis of future cash
flows is difficult and error-prone in practice. The intrinsic company value is never an absolute
and infallible value, but rather an approximation. The following assessment approaches are
used to delimit this value:

- discounted cash flow approach
  - equity approach
  - entity approach
  - APV approach
- market value approach
  - fair price-to-earnings ratio
  - fair price-to-book ratio
  - fair price-to-sales ratio

- fair enterprise value/EBIT ratio
- net asset value approach.

8.1   DISCOUNTED CASH FLOW MODEL

The discounted cash flow approach (DCF) determines the fair company value by discounting future cash flows. According to this theory, the equity and enterprise value of a company are largely determined by its future cash flows and the appropriate discount rate. As parts of this model are commonly based on the theories of Modigliani and Miller, which in turn are problematic in practice, a different route will be chosen to determine the discount factor. Depending on the method, the result is either the value of the whole company, i.e. the fair value of debt and equity, or the fair value of shareholders' equity directly, which is particularly relevant for investments in stocks.

   Within the framework of the discounted cash flow valuation, the cash flows of the business which is being valued are normally planned in detail for a time span of 5–10 years and are usually presumed to grow at a constant rate thereafter, which is referred to as terminal value. The value to be determined is therefore composed of the present value of the planning period and the terminal value. If non-operating assets such as unused property or high (net) cash holdings exist, they are often counted towards the final value, without impacting the cash flows. The established discounted cash flow models are divided into the following methods:

- equity method
- entity method
- adjusted-present-value method.

The individual methods are distinguished according to the type of cash flow to be used and the discount rates. However, each method reaches the same result, at least in theory. In principle, the enterprise value is determined by discount rates of the cash flows and in line with the following schema:

$$\text{Company value} = \frac{\text{Cash flow}_{t=1}}{(1+r)} + \frac{\text{Cash flow}_{t=2}}{(1+r^2)} + \ldots + \frac{\text{Cash flow}_{t=\text{n}}}{(1+r^n)}$$

t stands for the time period and r stands for the risk-adjusted interest rate, i.e. the discount factor. The different methods will be introduced and compared briefly below. Building on that, there will be a detailed discussion of the individual methods whereby the focus is on the equity method favoured by the author.

   Whilst the entity and the APV methods determine the total enterprise value, i.e. the value of debt and shareholders' equity, the equity method determines directly the appropriate value of shareholders' equity. The result of the entity and the APV method is referred to as enterprise value (EV).

$$\text{Enterprise value} = \text{Value of shareholders' equity} + \text{Value of net debt}$$

To obtain the particularly interesting value of shareholders' equity, the equation is rearranged:

$$\text{Value of shareholders' equity} = \text{Enterprise value} - \text{Value of net debt}$$

Cash flows of all capital providers have to be considered in order to calculate the total enterprise value. Interest on financial debt in particular is added back to the cash flow, since it forms the cash flow of creditors. As the cash flows of all capital providers are included, the cost of capital of the different capital providers has to be taken into account in proportion with their share. The entity and the APV methods discount the cash flows using the weighted average cost of capital (WACC). The APV method uses in principle a similar approach to the entity method, in that cash flows of all capital providers are discounted. The difference consists of the consideration of tax effects. Whilst the entity method includes the tax advantage of debt in the cost of capital, the APV method considers the tax advantage in the form of the present value of future tax savings, the so-called 'tax shield'.

The total enterprise value is determined in this case by the present value of the cash flows plus the value of the tax shield. At first sight, this approach seems complicated, but it has the advantage that the benefit of the use of debt can be quantified directly in the form of the tax shield. The equity method, meanwhile, considers only cash flows to which the shareholders are entitled and discounts these with the appropriate cost of equity. The result is directly the value of shareholders' equity. Dividing by the number of shares outstanding yields the fair value per share. The diversity of models may seem confusing at first, but depending on the situation of the valuation, there are advantages in having several models to choose from. The following sections will introduce the individual methods, illustrate them with examples and make logical and economic connections to provide a better understanding of these important valuation methods. Table 8.2 gives a first overview of the individual methods.

Table 8.2   DCF valuation method: Overview

Method	Relevant cash flow	Discount rate	Result
Equity method	Free cash flow	r_E	Equity value
Entity method	Free cash flow before interest	WACC	Enterprise value
APV method	Free cash flow before interest	Pre-tax WAAC	Enterprise value

8.1.1   Equity approach

The equity approach considers all cash flows to which shareholders are entitled and discounts them with the company-specific cost of equity. These cash flows are called free cash flow to equity or, more appropriately, owners' earnings, as the owners of the business are entitled to them. This approach forms the central valuation method in the discounted cash flow model and receives the most attention in the following case studies. The following influencing factors are needed to determine the equity value of a company:

1. owners' earnings (free cash flow to equity)
2. cost of equity (discount rate)
3. perpetual growth rate (terminal growth).

Determining the free cash flow/owners' earnings in the equity approach

The cash flows, which are attributable to the equity providers, are calculated using the schema shown in Table 8.3.

Table 8.3   Owners' earnings calculation

	net profit
+	depreciation
+/–	Δ provisions
–	capital expenditures
–	Δ working capital
	Owners' earnings

In order to carry out a valuation using the discounted cash flow model, the individual components of owners' earnings have to be forecast explicitly for a time span of 5–10 years. For the first two years, the income statement lends itself to a precise estimation. In the following years, sales development, EBIT margin and tax rate should be estimated roughly to obtain net profit, and eventually owners' earnings after having made further adjustments (depreciation, CAPEX and changes in working capital). Especially for the estimation of financial data after the second year, a spreadsheet model lends itself to simulating the development of margins.

In line with the schema above, net profit is adjusted for non-cash expenditures such as depreciation and provisions. In return, expected investments (including intangible assets) are deducted as expenditure. An estimation of future investments (CAPEX) can often be made by analysing previous business years. If a business is expanding, CAPEX tends to increase, as for example new branches are opened or factories have to be built. If growth slows down, CAPEX usually declines as well. Often the management gives an indication of the expected investments for the coming years. It is therefore helpful to look at investment in relation to total sales. The detailed planning in particular shows the importance of dialogue with the company during the analysis process and valuation. When estimating depreciation and CAPEX, it is important to bear in mind that both values have to converge over time. Especially when the estimation turns to perpetual annuity, depreciation should correspond to CAPEX, as otherwise more is invested to perpetuity than written off.

At the end, owners' earnings are corrected for necessary working capital investments. As nearly every business has to hold more working capital (e.g. inventories) in order to grow, this amount usually correlates with the growth rate of the business. In order to gauge the future development of working capital, it is advisable to calculate the proportion of working capital to sales of recent years and to extrapolate it for the following years. In some cases, management also indicates the planned working capital development.

If a business's working capital (inventory + accounts receivable – accounts payable) amounts to an average of 15% of sales revenues in recent years, this value can be multiplied with sales of the following year and the change in working capital can be estimated. In the example below (15% working capital in relation to sales) the outflow of funds to working capital was between €15m and €22.5m. If sales declined in a year, the company would receive funds from working capital, as inventory and receivables would be reduced.

Table 8.4   Change in working capital calculation

€m	2014	2015e	2016e	2017e	2018e
Sales	1,000	1,100	1,250	1,400	1,450
Working capital	150	165	187.5	210	217.5
Δ Working capital	–	15	22.5	22.5	17.5

Settling all factors (net profit + depreciation +/– Δ provisions – CAPEX – Δ working capital) results in the owners' earnings of the individual years. Owners' earnings indicate which amount the individual owner was able to take home without depriving the business of necessary funds, i.e. without having a negative impact on the business. Exceptionally high borrowings or repayments should also be considered in owners' earnings. If a company reports excessive liabilities, the repayments, which have to be made to return to a normal debt-to-equity ratio, should be recorded as an outflow of funds. If the debt-to-equity ratio is too low, the supply of credit can be factored in accordingly as inflow, increasing owners' earnings. Normally this adjustment is only of minor significance.

Example 8.2 – Swatch Group: owners' earnings
In Table 8.5 owners' earnings of the Swatch Group in the business year 2010 are determined using extracts of the income statement, the balance sheet and the cash flow calculation. The years 2009 and 2010 are especially interesting since companies often show exceptional swings in working capital after times of recession.

Table 8.5   Swatch Group: Certain financial statement positions

	Swatch Group	
CHFm	2010	2009
Net sales	6,108	5,142
Operating expenditure	–4,672	–4,239
Group profit	1,074	759
Depreciation	–222	–220
Investment in tangible assets	265	220
Investment in intangible assets	26	25
Working capital	3,294	3,266
Δ Working capital	28	41

In 2010 owners' earnings were calculated by adding group profits (CHF 1,074m) and depreciation (CHF 222m) and subtracting investments (CHF 265m + 26m) and the changes in working capital (CHF 28m).

$$\text{Owners' earnings} = \text{CHF } 1,074m + \text{CHF } 222m - \text{CHF } 265m - \text{CHF } 26m - \text{CHF } 28m$$

$$= \text{CHF } 977m$$

In order to estimate owners' earnings for the business year 2011, a projected sales and earnings growth of 8% and an increase in depreciation and investment of the same factor results in owners' earnings before changes in working capital (WC) of:

Owners' earnings = CHF 1,160m + CHF 240m – CHF 286m – CHF 28m = CHF 1,086m

The change in working capital is the result of extrapolating the proportion of working capital in sales. In recent years the Swatch Group displayed the values shown in Table 8.6.

Table 8.6   Swatch Group: Sales and working capital development

CHFm	2011e	2010	2009	2008
Sales revenue	6,596	6,108	5,142	5,677
Working capital	3,627	3,294	3,266	3,225
In %	55.0	53.9	63.5	56.8

The analysis of the years 2008 to 2010 shows a fluctuating relationship between working capital and sales revenues. The value of the year 2009, however, should be regarded as a special item due to the strong decline in sales at stagnating working capital. For 2011 the average of the years 2010 and 2008 has been used and results in a working capital to sales proportion of 55%. The absolute figure obtained is CHF 3,627m, which corresponds to a change of CHF 333m in relation to the previous year. As this amount has to be invested in current assets and therefore flows out of the business, owners' earnings are debited accordingly. The resulting owners' earnings are as follows:

Owners' earnings = CHF 1,086m – CHF 333m = CHF 753m

The decline of owners' earnings compared with the previous year despite a growth in sales and earnings can be explained by the strong increase in the group's working capital. In this case, it is due to the relatively strong growth after three years of recession, in which the group did not have to increase working capital because of moderate growth. If the analysis showed that the Swatch Group needed to implement a tighter management of working capital, the rate of 55% could be lowered, which would increase owners' earnings. A simple extrapolation of the data is therefore not always appropriate.

Determination of discount factors in the equity approach (cost of equity)

Once owners' earnings have been calculated for each year, the attention turns to the suitable discount factor. It is decided according to the fundamental risk of the company. The riskier the business, the higher the discount factor. It is a consequence of economic intuition that investors demand a risk premium in the shape of higher returns for increasing risk. The higher the discount factor, the lower is the value of future cash flows, as they are discounted at a higher amount. The discount factor therefore takes account of the time value of money (one dollar is worth more today than tomorrow) and the specific business risk. These facts will be illustrated by way of the above-mentioned oil well example.

Example 8.3 – Oil well: changes of the discount rate
The oil well in the introductory example is now valued at a higher risk, as the well is now run by a British operator, who is drilling considerably deeper for oil. The risk of the project and therefore the cost of capital involved are increasing, because investors have to be

compensated for the additional risk. An increase in cost of capital to 10%, for example, changes the present value as follows:

$$\text{DCF}_{\text{oilwellNew}} = \$ - 1,000 + \frac{\$1,000}{1.10} + \frac{\$1,000}{1.10^2} + \frac{\$1,000}{1.10^3} = \$1,486.85$$

The increase of the discount rate reduces the value of the oil well from $1,723.25 to $1,486.85. The discount factor reflects this risk of a business or a project.

What is risk and how is it measured? In the financial literature the capital asset pricing model (CAPM) dominates the determination of the discount factor. It measures the risk of a business due to fluctuations of the share price relative to the market. If the market falls by 1%, for example, and the share price on average only by 0.5%, the stock will be considered as low-risk relative to the market. If the share price falls by more than 1%, the share is considered to be relatively high-risk. By combining this ratio, the beta, with the risk-free rate and the expected market return, the business-specific cost of equity can be obtained.

The more the share price fluctuates relative to the market, the riskier the stock becomes according to the CAPM theory. This established method has two major weaknesses. On the one hand, it is questionable whether the fluctuations of the share price in relation to the market have a significance regarding the risk of the investment. On the other, the beta can vary according to the time frame, the market portfolio applied and the liquidity of the stock. The market, or the market portfolio, is particularly hard to determine, as according to the CAPM theory it would have to contain all risky assets, which is practically impossible. The realization of the CAPM theory fails already at the definition and quantification of the market. Furthermore, this model implies a normal distribution of the returns, which is not found as such in practice.

These problems stem from the postulate of completely efficient markets, on which the model is based. However, a look at reality shows how real the phenomena of fear and greed are in the stock market. Besides fundamental data they also move the prices and therefore the risk according to the capital asset pricing model. It is puzzling how a model with so many drawbacks and purely theoretical assumptions has become the foremost valuation concept for academics and investment banking alike. Instead of focusing on the underlying business fundamentals, this concept assesses risk simply by focusing on prevailing stock market fluctuations. Hence risk is derived from the actions of other market participants – chicken-and-egg problem, anyone?

The following example illustrates the CAPM's susceptibility to errors.

Imagine someone assessing the riskiness of US housing prices back in 2006: prices have basically increased steadily since the 1960s. Hence, according to the CAPM, building or buying new houses seemed to be a rather low-risk deal. Now enter the housing crisis of 2007 and a severe drop in US real estate prices. The CAPM would now indicate a strong increase in risk *after* the prices dropped. The opposite, of course, is true: since the prices decreased strongly, risk decreased alongside. Hence, simply following the herd would have made real estate a sound, low-risk investment in 2006 but a high-risk investment in 2011, whereas the opposite is true. The concept that lies at the very heart of the CAPM, deriving risk from share price movements, also doesn't pay attention to the business fundamentals itself: who in his right mind would buy a house purely based on its past price development, without having examined the object in real life? Since this book is designed for practitioners, for long-term investors, risk will not be assessed using mathematical formulae like the CAPM. Besides

the reasons outlined above, using formulae like the CAPM also carries another, significant, risk: it pretends preciseness where there is none. This book therefore tries to establish a risk perception based on the fundamentals of the company based on its business model, stability of revenues, cost basis and financial soundness. At the end, it might not be possible to determine whether a given company deserves cost of equity of 10.5% or 11.0%, but this is not of any importance for the long-term investor at all as long as the stock in question trades at a significant discount to its fair value range.

In the world of CAPM–Modigliani/Miller, the equity cost also rises with an increase of the debt equity ratio. It is true that increasing leverage also increases risk, but the marginal cost of borrowing with regard to the cost of equity clearly varies depending on the business model. Businesses in the semi-conductor industry, for example, are constantly subject to change, which means that a high interest burden should be avoided for reasons of flexibility. Well-established businesses in defensive industries such as the cable operators can cope with very high levels of borrowing and use the advantages of tax deduction of the interest. The actual risk of a business is therefore predominantly determined by the assets basis, and not by the structure of its equity and liability side.

An alternative model lends itself, due to this obvious weakness of the capital asset pricing model. The cost of equity is calculated below, based on a qualitative method adding the risk-free interest to an adequate risk premium. It does not display the scientific charm of the CAPM theory, nevertheless it does not make any unrealistic assumptions. This simple model was devised by the author and contrasts current teaching. In principle, cost of equity is determined by risk-free interest and by a company-specific risk premium.

$$\text{Cost of equity} = \text{Risk-free interest} + \text{Risk premium}$$

As no security is actually risk-free, one should resort to the yield of ten-year AAA government bonds in the respective currency, as these usually form a good approximation.

The risk premium is determined by the specific risk of the company in question. In order to quantify this risk, the fair price-to-earnings ratio, which will be introduced in more detail in the next section, will be used. The higher the appropriate price-to-earnings ratio of a business, the more solid is its business model, the more moderate its debt ratio and the more defined its market position. A high fair price-to-earnings ratio is therefore an indication of an altogether high level of stability and consequently low risk. A high price-to-earnings ratio observed at the stock market is not an indication for low risk, but can be the product of overvaluation. In this context, one acts on the assumption of the theoretically fair price-to-earnings ratio. The risk premium calculated using this modified model is as follows:

$$\text{Risk premium} = \frac{1}{\text{Fair price-to-earnings ratio}}$$

A fair price-to-earnings ratio of 10 corresponds therefore to a risk premium of 10% (1/10), a fair price-to-earnings ratio of 18 to a risk premium of 5.5% (1/18).

For instance, for the valuation of a US-based company at the end of 2013, one would use the yield of ten-year government bonds of 2.6%. In combination with the data above, the results are equity costs of 12.6% and 8.1% respectively for risk premiums of 10% and 5.5%. The understanding of risk will be further developed in section 8.1.4 examining the financial and operating leverage of a company and in section 8.2.2 by comparing the prevailing return

on equity and price-to-book value pairs. Step-by-step, the reader will gain a better understanding of and feeling for prevailing and appropriate cost of equity levels depending on the underlying risk.

In certain circumstances, the growth component of the fair price-to-earnings ratio (see section 8.2.1) should be ignored when calculating the risk premium, as growth does not necessarily contribute to stability. For the calculation of the risk premium of businesses with a fair price-to-earnings ratio of 18 and a growth premium of 3 points a fair price-to-earnings ratio of 15 should be used. The risk premium would in this case be 6.6% (1/15). The precise determination of the fair price-to-earnings ratio is illustrated in detail in the next section.

Furthermore, it has to be taken into account that these values are purely indications. The cost of equity, for example, has to be higher than the interest paid on debt, as creditors rank senior to shareholders and therefore are exposed to a lower risk. If a business pays more than 10% in interest on its debt, any further analysis is usually futile, as the equity risk premium becomes exorbitant. The analysis of interest rates on tier 1 capital and subordinated bonds (hybrid capital, which is a combination of borrowing and shareholders' equity) shows that investors expect an interest rate between 7% and 9% for this capital, which takes priority over shareholders' equity. Therefore the return requirement of the equity provider should lie above that value. The schematic setup of the capital structure and the corresponding return requirement is illustrated in section 8.2.2. A particularly defensively set up business in an industry which is largely independent of economic conditions can easily display cost of equity of 7%, whereas a particularly cyclical and susceptible business can have equity cost of 15% or more. In the course of the discounted cash flow analysis, it is sensible to assume equity cost of at least 7%, in order to avoid overly optimistic results even in particularly stable businesses. Further approaches for deriving the justified cost of equity will be presented in section 8.2.2. In that section the reader will also gain a better understanding of the prevailing cost of equity level in the general market and differences in certain industries. It is important to recognize that company valuation is not about deriving the exact cost of equity since this is impossible. Hence, instead of deceiving oneself by pretending to be able to scientifically calculate the cost of equity accurately, one is better off by estimating a sensible range with a sufficient margin of safety. After all, if a stock is not a buy using 10% cost of equity, it should not be a buy at 9.5% cost of equity either.

Determining the perpetual growth rate in the equity approach

Once owners' earnings have been obtained for a reliably projectable period, the perpetual growth rate, also called the terminal growth rate, is set. The inflation expectation and market position of the business play a critical role. If a business can adjust prices to inflation, a perpetual growth rate at the level of at least the expected inflation should be assumed. If the business finds itself in a competitive environment, a lower growth rate should be assumed. Experience shows that the perpetual growth rate falls into a range between 0 and 4%. As the terminal value, i.e. the cash flows after the planning period, often accounts for a large part of the total discounted cash flows, the terminal growth rate should be chosen conservatively. Moreover, the growth rate is capped by the market growth in the long term. If a business were to grow faster than the market for evermore, the business would eventually be the market itself. The perpetual growth rate can therefore be obtained through the projected long-term market growth.

The use of a perpetual growth rate seems problematic, as the compounded interest effect lets cash flows increase exponentially. This effect, however, is overcompensated by the equally rising discount factor [e.g. in the year 100; $CF_{t=100}/(1+r)^{100}$] and thereby levelled. In a steady cash flow row of $100 and a discount factor of 10%, over 75% of the final amounts would fall into the first 20 years. The $100 of the one-hundredth year show merely a present value of 0.7 cents [$100/1.10^{100}$] due to the increasing discount factors.

Using the equity approach

The following methodical steps are needed for the application of this discounted cash flow method:

- projection of owners' earnings of the next 5–10 years
- determining the cost of equity
- determining an appropriate perpetual growth rate.

These points consist of several sub-items, so that a complete DCF analysis with market-, competition-, business- and ratio analysis can adopt a very detailed character. Below is a simple example to illustrate the approach.

Example 8.4 – Equity approach
The data shown in Table 8.7 is supplied.

Table 8.7   Certain financial statement positions

EBIT	$110
Interest expenditures	$10
Tax expenditures	$30
Net profit	$70
As well as:	
Depreciation	$20
Delta working capital	$5
CAPEX	$20
Cost of equity	12%
Cost of debt	5%
Financial liabilities	$200

Assume that precisely the same figures apply to the following business years, which means that the business is not growing. In line with the equity method owners' earnings are calculated and discounted with the cost of equity.

$$\text{Owners' earnings} = \$70 + \$20 - \$5 - \$20 = \$65$$

As in this case these values apply to all the following years, the company's equity value is obtained by discounting these cash flows:

$$\text{Value of shareholders' equity} = \frac{\$65}{1.12^1} + \frac{\$65}{1.12^2} + \ldots + \frac{\$65}{1.12^n}$$

In the case of a constant row of cash flows this formula can be simplified to:

$$\text{Value of shareholders' equity} = \frac{\$65}{0.12} = \$541.66$$

The fair value of shareholders' equity therefore amounts to \$541.66. Dividing it by the number of shares results in the fair value per share.

8.1.2   Entity approach

In contrast to the equity approach described above, the entity approach does not determine the fair equity value, but the total enterprise value consisting of debt and equity, by both cash flows to equity and debt holders. In this context, debt always means interest-bearing liabilities. As in this widely used DCF method cash flows of equity providers and creditors are used for determining the company value, these have to be discounted with a weighted discount rate, consisting of the respective cost of debt and cost of equity.

Using the entity approach to determine the free cash flow before interest

The cash flows attributable to all capital providers can be obtained as illustrated in the schema shown in Table 8.8.

Table 8.8   Free cash flow before interest calculation

	EBIT (operating earnings)
–	Adjusted tax on EBIT
+	Depreciation
+/–	Δ Provisions
–	Investments (CAPEX)
–	Δ Working capital
	Free cash flow before interest

As cash flows of all capital providers are taken into account, calculating the relevant free cash flow starts with earnings before interest and tax, EBIT in short. As a first step, the entity approach assumes that the business is entirely equity funded, which is why a notional tax amount is deducted from EBIT. In order to obtain this notional tax burden, the tax rate and EBIT are multiplied. Below is the formula for determining the after-tax EBIT:

$$\text{After-tax EBIT} = \text{EBIT} \times (1 - \text{tax rate})$$

It would be incorrect to subtract the actual tax expense reported on the income statement from the EBIT, as these have already been affected by the tax deductibility of interest payments. Other adjustments such as subtracting capital expenditures and correcting for movements in working capital are identical to the equity approach.

Determining the discount factor in the entity approach (weighted average cost of capital)

In the entity approach the cash flows of all capital providers are included. Therefore the costs of all capital providers have to be considered for the determination of the discount factor. As debt precedes shareholders' equity, debt holders face lower risk and therefore tend to demand lower cost of capital. In contrast to shareholders' equity, the cost of debt can be determined precisely in the form of interest payments or the yield on listed bonds. If a business pays, for instance, an interest rate of 5% for loans or outstanding bonds, this value can be directly set as cost of debt. Using the yield of outstanding bonds is even better than applying plain interest rates, but not all companies have bonds outstanding with suitable maturities. The entity approach divides the various costs of capital in line with the capital structure according to their respective market values. The term 'weighted average cost of capital' makes this context clear. The weighted average cost of capital of companies with high equity ratios is heavily determined by the cost of equity. If a business is highly leveraged, the cost of debt will have a significant impact on the weighted average cost of capital (WACC).

$$\text{WACC} = r_E \times \frac{\text{equity}}{\text{equity} + \text{debt}} + r_{debt} \times \frac{\text{debt}}{\text{equity} + \text{debt}} \times (1 - s)$$

r_E describes the cost of equity, r_{debt} the cost of debt and s stands for the tax rate. The weighted average cost of capital is therefore calculated with this equation by offsetting the cost of equity and the cost of debt with their relative weighting in the capital structure. In addition, the cost of debt is offset against the tax rate, as a fraction (1 – tax rate) of the interest expenses is lowering the tax expenses. With this adjustment, the equation does justice to the tax deductibility of interest on borrowed capital. If a business has a 5% rate for the cost of debt, for example, and a tax rate of 30%, the actual after-tax cost of debt is:

$$\text{After-tax cost of debt} = r_{debt} \times (1 - s)$$

$$= 5\% \times (1 - 0.3) = 3.5\%$$

As shown above, due to the seniority of debt, the following relationship applies:

$$\text{Cost of debt} < \text{Cost of equity}$$

If one takes the tax deductibility of interest payments into consideration, the cost difference between borrowed capital and equity financing increases further in favour of borrowed capital. The logical consequence for value-maximizing businesses would therefore be to borrow as much capital as possible in order to minimize their weighted average cost of capital.

Nevertheless, the conclusion is wrong, as an increase of the debt ratio reduces the financial stability of the business at a certain point, thus raising the cost of equity and cost of debt. Capital providers will be reluctant to lend further once a company is already highly geared.

Another reason lies in the higher risk of bankruptcy that comes with increasing leverage, which is accompanied by bankruptcy costs. Moreover, new creditors request higher interest rates due to the already increased debt ratio, which increases the weighted average cost of capital. Given this trade-off between risk and return, which equity ratio should be regarded as ideal?

Modern financial theory is by and large based on the theories of *Modigliani* and *Miller*, which propagate the irrelevance of the capital structure. In a perfect world, the capital structure has no impact on the resulting discount factor (and hence the company value), as an increase of the debt ratio increases the cost of equity at the same time and those two effects cancel each other out, the economists argue. However, this theoretical house of cards already falls apart with the introduction of taxes and leads to the conclusion that a high rate of borrowing would in any case be advantageous.

Due to this susceptibility a more pragmatic model is required. The optimal debt ratio has to be chosen in connection with the business model of the company. Some businesses should renounce on borrowing (and the tax advantages that it entails) almost entirely to ensure solid financial stability, whereas other business models can cope even with high rates of borrowing. How much leverage a business can take on depends largely on three factors:

1. stability of cash flows
2. amount of free cash flows
3. annual level of capital expenditures (reinvestment needs).

The stability of cash flows becomes clear from the analysis of the business model and the ratio analysis. Obviously, a cable TV operator is less susceptible to up- and downturns than the producer of microchips. Operating cash flows are useful only if, in case of doubt, they can be used to pay off debt, i.e. sufficient free cash flow is available. Therefore, the amount of free cash flow should be determined with the help of the CAPEX quota. This ratio, introduced in Chapter 3, defines which part of the funds received from the operating business needs to be reinvested.

$$\text{Capital investment quota} \ = \frac{\text{Capital investment}}{\text{Operating cash flow}}$$

As a rule of thumb, the equity ratio should at least correspond to the capital investment quota. This way, one ensures that non-current assets are financed to a sufficient extent with long-term equity funding. Therefore,

$$\text{Optimal shareholders' equity ratio} \ \approx \ \text{CAPEX quota}$$

Businesses that need to make very little investment on an annual basis and therefore should have very sustainable free cash flows at their disposal can make use of the advantage of borrowing. As an excessive debt rate endangers financial stability, in case of doubt, a stabilizing share of equity should always be given preference to potentially more lucrative borrowed capital. In line with Schopenhauer's views on health, relating to businesses one can say that financial stability is not everything, but without financial stability everything is definitely nothing. The APV approach introduced below will be helpful for quantifying the precise benefit of assuming additional debt. The equations for determining the optimal shareholders'

equity ratio illustrated above are also supported by the golden rule of balance sheets, according to which fixed assets should be funded largely with shareholders' equity. A shareholders' equity base of the same amount as fixed assets can therefore be seen as minimum. These two approaches should lead to roughly the same result. A crucial point of criticism of the entity approach is circularity, as the fair market price of the equity is required for the determination of the weighted average cost of capital, the value of the equity itself however is the object of the entire assessment. Hence, the result of the valuation process is in itself an important component of the valuation process. In the case of listed companies, this problem can be solved in two ways: one is to use the current market price of shareholders' equity, i.e. the company's market capitalization, the other is to use a sensible long-term target capital structure, for example in line with the above-mentioned rule of thumb. If a business has a market capitalization (= market price of shareholders' equity) of $1,000,000 and interest-bearing debt of $500,000, the weighted average cost of capital at an assumed cost of equity of 10% and cost of debt of 6% and a tax rate of 35% is as follows:

$$
\text{WACC} = r_E \times \frac{\text{Equity}}{\text{Equity} + \text{Debt}} + r_{debt} \times \frac{\text{Debt}}{\text{Equity} + \text{Debt}} \times (1 - s)
$$

$$
= 10\% \times \frac{\$1,000,000}{\$1,500,000} + 6\% \times \frac{\$500,000}{\$1,500,000} \times (1 - 0.35)
$$

$$
= 10\% \times \frac{2}{3} + 3.9\% \times \frac{1}{3} \times 7.69\%
$$

Determining the perpetual growth rate is carried out along the lines of the equity approach. If the entity approach is applied to the example introduced above, the company value is calculated as follows.

Example 8.5 – Entity approach
Starting with an EBIT of $110, first the notional tax is deducted (Table 8.9). The relevant tax rate of 30% is obtained by dividing tax expenditure ($30) and pre-tax profit ($100). The remaining data is similar to the example above.

Table 8.9   Free cash flow before tax calculation

	EBIT (operating result)	$110
–	Adjusted tax on EBIT	$110 × 0.3 = $33
+	Depreciation	$20
+/–	Δ Provisions	$0
–	Investment (CAPEX)	$20
–	Δ Working capital	$5
	Free cash flow before tax	$72

The previous example yielded a fair equity value of $541.66 and debt amounted to $200. Total capital came to $741.66. Using cost of equity of 12%, cost of debt of 5% and a tax rate of 30% results in the following weighted average cost of capital (WACC):

$$\text{WACC} = 12\% \times \frac{\$541.66}{\$741.66} + 5\% \times \frac{\$200}{\$741.66} \times (1 - 0.3) = 9.7078\%$$

The company value can now be calculated by discounting the free cash flow before interest,

$$\text{Company value} = \frac{\$72}{0.097078} = \$741.67$$

which results in an enterprise value of $741.67. It is important to understand that this value is not equity value but the total value of the company, comprising debt as well as the fair value of shareholders' equity. By rearranging the equation, the value of shareholders' equity can be determined:

$$\text{Equity value} = \text{Company value} - \text{Value of debt}$$

$$= \$741.67 - \$200.00 = \$541.67$$

The resulting value is identical with the value obtained using the equity approach in the introductory example. It is also important to mention that usually not just the value of the financial debt but of the net debt position is subtracted from the enterprise value in order to arrive at the equity value. Of course, in that case, the interest earnings generated by that cash position must not be included in the free cash flow before tax calculation. Hence, if the company above would show a cash position of $50 besides its $200 in financial debt, the corresponding equity value would amount to:

$$\text{Equity value} = \$741.67 - \$200 + \$50 = \$591.67$$

A complication with the entity approach is the already mentioned circularity. The exact result can be determined only if the true equity value is already known, or available on the market, which would make a valuation superfluous. One wonders why it is precisely the entity model with this obvious weakness that is the most commonly used model in the modern financial literature and analyst studies.

8.1.3 Adjusted-present-value (APV) approach

The APV approach is a modification of the entity approach, which also takes into account cash flows attributable to all capital providers. The difference in the two approaches lies in the consideration of tax advantages of debt. Whilst the entity method considers tax advantages through tying in the tax rate in the capital cost formula, the APV method calculates the

tax advantage separately from the actual company value. The free cash flow before interest is discounted with the weighted average capital cost of the notionally debt-free business and the present value of the tax advantages is subsequently added. This present value is called the tax shield. The calculation is obtained by discounting the saved tax payments due to the tax deductibility of interest on borrowed capital. The result is again the total enterprise value. The sequence is as follows:

1. determining the free cash flow before interest
2. discounting of (1) with the weighted pre-tax cost of capital
3. calculation of the tax shield.

The free cash flow before tax is obtained along the lines of the entity method. The capital cost is calculated as in the entity method, with the exception of the tax advantage, which is not a component of the WACC equation. The present value of the tax shield is the result of multiplying interest payments with the tax rate and discounting the resulting term. This value defines the proportion of tax payments, which are circumvented by using debt.

$$\text{Tax shield} = \text{Debt} \times \text{Interest rate} \times \text{Tax rate}$$

$$= \text{Interest on debt} \times \text{Tax rate}$$

If a company pays interest of $50 on its debt and has a tax rate of 40%, the value of the tax shield for that year is:

$$\text{Tax shield} = \$50 \times 40\% = \$20$$

If the business replaced borrowings with shareholders' equity, the entire $50 would be subject to tax. In order to obtain the present value of the tax shield, the tax shield has to be discounted with the pre-tax WACC. Using the APV method, the business value can be obtained as follows:

$$\text{Company value} = \text{Present value of free pre-tax cash flow} + \text{Present value of tax shield}$$

The present value of the cash flow is obtained by discounting it with the pre-tax WACC. The equation looks as follows:

$$\text{Pre-tax WACC} = r_E \times \frac{\text{Equity}}{\text{Equity} + \text{Debt}} + r_{debt} \times \frac{\text{Debt}}{\text{Equity} + \text{Debt}}$$

In contrast to the usual WACC, this equation does not take into account the tax advantage of debt $(1 - s)$, as this part is reflected in the tax shield. These capital costs are known as pre-tax WACC. Relating this to the example from the equity and entity approach, capital costs and the company value are calculated as follows:

Example 8.6 – APV approach

$$\text{Pre-tax WACC} = 12\% \times \frac{\$541.66}{\$741.66} + 5\% \times \frac{\$200.00}{\$741.66} = 10.1123\%$$

Similar to the entity approach, the free pre-tax cash flow amounts to $72, the pre-tax capital costs are 10.11%, the annual tax burden comes to $10 and the business continues to be subject to a tax burden of 30%.

$$\text{Company value} = \frac{\text{Free pre-tax cash flow}}{\text{Pre-tax WACC}} + \frac{\text{Tax shield}}{\text{Pre-tax WACC}}$$

$$= \frac{\$72}{0.1011} + \frac{\$10 \times 30\%}{0.1011} = \$741.66$$

It becomes clear from the assumptions that the weighted capital costs have been reduced from 12% to 10.1%. As the 10.1% can be determined precisely only if the results from the previous examples are known, this model is also affected by circularity, which is not surprising as the APV model is an offshoot of the entity method. In contrast to the entity and equity approaches, this calculation has the benefit that the tax advantage of assuming debt can be determined accurately thanks to the tax shield. Nevertheless, all in all it shows that especially the entity and the APV approaches are marked by circularity problems. The equity approach also displays this issue for the classic determination of the cost of equity using the Modigliani/Miller model, which is why the theoretically dominated model of cost of capital determination should be replaced with the more pragmatic model of risk-free interest payments and the inverse of the fair price-to-earnings ratio.

At least in theory all models reach the same result for the company value. The preferred equity approach has three advantages vis-à-vis the entity or the APV method:

● easy execution
● assessment from the viewpoint of the shareholder
● fluctuation of debt and cash.

The relatively easy execution of the calculation in the equity approach has the advantage that (1) fewer special items occur and (2) the use of owners' earnings is best at doing justice to the nature of the valuation from the viewpoint of the shareholder. In addition, the entity and the APV approach display another crucial weakness: financial liabilities, which have to be deducted from the enterprise value, can fluctuate significantly on the reporting date. Due to the quarterly reporting, businesses have an incentive to report financial liabilities as low as possible on the balance sheet date. In addition, debt is often subject to seasonal patterns. Due to these factors, there are, especially in highly indebted businesses, clear valuation differences depending on the reporting days. There is a similar problem for companies with high cash holdings. As cash holdings increase the company value 1:1 in the entity approach, there is an implicit assumption that investors can distribute this excess capital immediately. This assumption often does not apply in reality. Therefore, loss-making companies tend to keep

investing the remaining funds in existing projects in the hope of reaching the break-even point, rather than actually returning them to investors. Moreover, cash holdings are often deposited in subsidiaries abroad, which means they cannot flow back to the parent company easily for operational and tax reasons. In this case, the equity approach looks at the cash holdings more realistically, in that only the interest earned from them flows into the free cash flow. The following two case studies therefore fall back on the equity approach.

8.1.4   Operating and financial leverage

The estimation of the cost of equity and capital is an integral part of any company valuation. As an alternative to the established CAPM model based on the company beta and the approaches introduced in this book, the company-specific risk can also be derived using the operating and financial leverage. This approach is based on the very nature of company risk. What is company risk? It is the risk of losing money because the (fixed) cost base cannot be adjusted swiftly enough to match changes in revenues. The operating leverage indicates to what extent earnings will be affected by changes in total revenues, or in other words, how distinct the proportion of fixed to variable costs is. Besides giving insight into the operating risk of a business, operating leverage also enables us to quantify the potential economies of scale benefits a company might be able to reap with rising revenues. Financial leverage is simply defined as the interest coverage ratio.

In order to calculate the operating leverage, all expense positions in the income statement have to split into their fixed and variable parts. Companies with a high proportion of fixed costs suffer especially when sales decline, since the lower total revenues will be accentuated by a cost base that remains high.

The cost of sales mainly consists of variable costs, but also contains fixed costs such as depreciation and personnel expenses associated with the production process. Generally, this expense position can be categorized as 75% variable and 25% fixed. Selling, general and administrative expenses are made up of fixed (administrative costs) and variable (selling costs) costs, which is why normally a 50% fixed/variable split is recommended. Also, fixed costs such as the depreciation for the company headquarters and the car fleet increase SG&A costs. Many companies also account for research and development (R&D) costs separately in their income statement. These appear to be completely variable at first glance; however, since they are usually mainly made up of personnel expenses, a fixed cost share of 60% is usually warranted. One should be well aware that these figures are only indicative and should be adjusted on a case-by-case basis. Some companies also break down their expenses into a wider range of cost types.

The operating leverage is mathematically defined as EBIT plus fixed costs over EBIT:

$$\text{Operating leverage} = \frac{\text{EBIT} + \text{Fixed costs}}{\text{EBIT}}$$

Having a high share of fixed costs and a low absolute earnings base consequently increases the risk of a company. A value of 5, for example, means that for every 1% change in revenues, EBIT changes by 5%. In the real world this relationship is of course distorted by management countermeasures, but this ratio gives a good and quantifiable synopsis of the inherent

operating risk. However, even companies with very high EBIT margins (high absolute EBIT) and a low share of fixed costs can be considered very risky when a large part of EBIT is used to service the company's debt. Therefore, the financial leverage captures the interest coverage of the company:

$$\text{Financial leverage} = \frac{\text{EBIT}}{\left(\text{EBIT} - \text{Financial expenses}\right)}$$

The lower the value, the less net income reacts to changes in EBIT (caused by the operating leverage). A value of 3, for example, corresponds to a 30% increase in earnings when EBIT increases by 10%. Now we can see the interrelationship of both ratios. Whilst, on the one hand, the operating leverage quantifies the responsiveness of EBIT towards changes in sales, financial leverage, on the other hand, measures by how much net income is increased or decreased when EBIT changes to the fixed interest payments separating EBIT and net income.

Let us calculate the operating and later the financial leverage for Coca-Cola and PepsiCo based on their 2011 annual reports (Table 8.10).

Table 8.10   Coca-Cola vs PepsiCo: Shortened income statement

In US$m	Coca-Cola	PepsiCo
Net sales	**46,542**	**66,504**
Cost of goods sold	18,216	31,593
Selling, general and administrative costs	17,440	25,145
EBIT	**10,154**	**9,633**
Interest expenses	417	856

Source: Coca-Cola, PepsiCo (2011) [US GAAP]

In Coca-Cola's case, total fixed costs of $13,274m are obtained based on the schematic in Table 8.11.

Table 8.11   Coca-Cola: Share of fixed costs

In US$m	Total expenses	Share of fixed costs	Fixed costs
Cost of goods sold	18,216	25%	4,554
Selling, general and administrative costs	17,740	50%	8,720
Research and development	–	60%	–
Total	35,656		13,274

Divided by total expenses of $35,656m, a fixed cost quota of 37.2% can be calculated for Coca-Cola.

In the case of PepsiCo the table looks as shown in Table 8.12.

Table 8.12   PepsiCo: Share of fixed costs

In US$m	Total expenses	Share of fixed costs	Fixed costs
Cost of goods sold	31,593	25%	7,898
Selling, general and administrative costs	25,145	50%	12,572
Research and development	–	60%	–
Total	56,738		20,470

Based on total fixed costs of $20,470m a fixed costs quota of 36.0% is obtained in the case of PepsiCo.

Coca-Cola's operating leverage is now calculated as follows:

$$\text{Operating leverage}_{\text{Coca-Cola}} = \frac{(\$10{,}154\text{m} + \$13{,}274\text{m})}{\$10{,}154\text{m}} = 2.3\times$$

For PepsiCo, a distinctly higher value is obtained:

$$\text{Operating leverage}_{\text{PepsiCo}} = \frac{(\$9{,}633\text{m} + \$20{,}470\text{m})}{\$9{,}633\text{m}} = 3.1\times$$

As this example shows, the fixed cost quota alone says little about the true fundamental business risk. It is only after comparing the fixed costs with the operating profit that this ratio reveals its importance. To get the full and true picture, the financial risk needs to be taken into account:

$$\text{Financial leverage}_{\text{Coca-Cola}} = \frac{\$10{,}154\text{m}}{(\$10{,}154\text{m} - \$417\text{m})} = 1.04\times$$

$$\text{Financial leverage}_{\text{PepsiCo}} = \frac{\$9{,}633\text{m}}{(\$9{,}633\text{m} - \$856\text{m})} = 1.09\times$$

Based on these figures, the lower fundamental risk of the Coca-Cola Company becomes very much apparent. It should be noted, however, that PepsiCo's operating and financial leverage figures can also be considered as very solid. Companies in the heavy machinery industry, for example, often show operating leverage figures well in excess of 6× and high financial leverage ratios. Think, for example, of a company with a financial leverage of 1.5×. This means that if EBIT is reduced by 50% there may not be enough income to cover the cost of interest on debt. Moreover, before making a final judgement about the fundamental risk of a company, the historic (and expected) volatility in revenues and the correlation of the results with the general state of the economy needs to be taken into account. Even businesses with a very high operating leverage can be considered low-risk if they show a very stable and reliable development in revenues. Total fundamental risk is calculated by multiplying operating leverage, financial leverage, the volatility of revenues and the correlation with the general economy:

$$\text{Fundamental risk} = \text{OL} \times \text{FL} \times \partial_{\text{revenues}} \times \rho_{\text{economy}}$$

When calculating the volatility of revenues a sufficiently long time period, ideally one covering a whole industry cycle, should be employed. The same applies when determining the correlation of the results with macro-economic trends. Coca-Cola shows a volatility in revenues of 14.9% and a 39% correlation with the state of the economy, whereas values of 10.6% and 77% can be calculated for PepsiCo. Using these numbers gives the following total fundamental risk figures:

$$\text{Fundamental risk}_{\text{Coca-Cola}} = 2.3 \times 1.04 \times 0.149 \times 0.39 = 0.14$$

$$\text{Fundamental risk}_{\text{PepsiCo}} = 3.1 \times 1.09 \times 0.106 \times 0.77 = 0.28$$

Both companies show very low risk figures. In both cases, this is due to the low share of fixed costs, relatively stable revenues and a conservative use of debt. In general, a value between 0 and 0.3 can be considered very good, fundamental risk values between 0.3 and 0.6 character-ize below-average risk levels, whereas values between 0.6 and 1 can be considered average. In order to use these values to assess the cost of equity, the indicative Table 8.13 can be used.

Table 8.13   Fundamental risk value corresponding cost of equity

Fundamental risk value	Indicative cost of equity (risk-free rate $= 2\%$)
0–0.3	6–7%
0.3–0.6	7–8%
0.6–0.9	8–9%
0.9–1.2	9–10%
1.2–1.5	10–11%
1.5–1.8	11–12%
1.8–2.1	12–13%
2.1–2.4	13–14%
2.4–2.7	14–15%
2.7–3.0	15–16%

This table constitutes another method attempting to derive the company-specific cost of equity. To be certain, given the rather complex mathematics underlying this ratio, it should be checked on a case-by-case basis even if the results appear to make sense. The comparison with the results of peer group companies and their respective cost of debt (i.e. bond yields) is a particularly useful one.

8.1.5   Alternative use of DCF models

In its original form the DCF model can only be used for very stable and easily predict-able business models. However, in businesses with less foreseeable business developments, the DCF model can still be applied in the reverse. Certain assumptions, for instance a sales growth of 10% at constant margins, have to be made, in order to compare the resulting values with the actual market valuation of the business.

Hereby it can be decided to what extent certain parameters (e.g. sales growth) can fall to still justify the current valuation. If the base assumption is that earnings will increase by 10% and the resulting company value lies clearly above the current market value, the growth rate implied by the market can be determined by adjusting the growth factor accordingly. Suppose the implied market growth rate is 3%, but one is certain that growth will not fall below 5%, the estimation can be regarded as secured. Businesses with a reliably assessable business development achieve the most reliable results in the DCF valuation method. A solid visibility is usually mainly due to the criteria introduced in Chapter 5. Businesses with a highly uncertain future, for instance start-ups, can often not be valued at all using the discounted cash flow model.

8.1.6   DCF case studies

Example 8.7 – Discounted cash flow method: Andrew Peller
This section exemplifies the practical application of the discounted cash flow model using the case study of Andrew Peller, a leading Canadian wine producer holding a 32.8% share in the domestically produced wine market and a 13.2% market share in Canada overall. Due to Andrew Peller's solid market position and the resilient, continuously growing market, the company is an ideal subject for a detailed DCF valuation. In order to fully understand this case study the company's 2013 annual report should be read beforehand.

Based on Andrew Peller's 2013 results (year ended March '13) we estimate the income statement for the next ten years. For 2013 and 2012, the company posts the figures shown in Table 8.14.

Table 8.14   Andrew Peller: Income statement

CAD000	2013	2012
Sales	**289,143**	**276,883**
Cost of goods sold	179,356	169,626
Amortization of PPE in production	5,098	4,826
Gross profit	**104,689**	**102,431**
Selling and administration	76,254	74,606
Amortization of PPE in administration	3,030	3,026
Restructuring costs	1,118	–
Operating profit	**24,287**	**24,799**
Interest expenses	5,142	5,354
Net unrealized gains on derivatives	1,295	257
Other income/expenses	544	–1,163
Earnings before taxes	**20,984**	**18,539**
Income taxes	6,225	5,538
Net earnings for the year	14,759	13,001

Source: Andrew Peller (2013) [IFRS]

Based on the figures above, the company achieved a gross margin of 36.2% and 36.9% for 2013 and 2012, respectively. For the DCF calculation, the amortization (read: depreciation) of the production process is added to the amortization of the administration process. Hence, the new gross profit margin for 2013 is 37.9%.

The EBIT margin decreased from 8.95% to 8.78%, adjusted for one-off costs. Lastly we should get a notion of the company-specific tax rate. For 2013 and 2012, the actual tax rates amount to 29.8% and 29.6%, in the notes the company states that its blended statutory tax rate lies at 25.70%, which is, however, regularly increased by special items. It is therefore sensible to use a tax rate of 29.5% going forward. This is also underlined by the company's deferred tax liability of CAD 13.7m, which eventually will have to be paid.

The following assumptions will be used in the DCF model:

- an initial sales growth of 4%, gradually decreasing to the terminal 2% growth rate in line with long-term GDP growth
- slightly decreasing gross profit margins in the first year, recovering later on based on management guiding input price pressure over the coming years
- slightly decreasing SG&A expenses as percentage of sales due to economies of scale and a restructuring programme launched
- lower interest expenses due to a broadly lower interest rate environment
- an income tax rate of 29.5%.

These assumptions, which should always be based on an in-depth company analysis, serve as a basis for forecasting an income statement. However, in order to forecast the owner earnings, we also have to make assumptions about changes in working capital, depreciation and capital expenditures. In this case, the following assumptions are applied:

- Depreciation will be 2.75% of sales, given Andrew Peller's capital light asset model.
- CAPEX is set at 2.75% of sales as well, as future investments might be lowered by asset sales of existing assets no longer used in the production process.
- Net working capital is assumed to be 36% of sales in each year.

In addition to that, the company posts 'net unrealized gains on derivatives' and 'other income/expenses' in the income statement. The gains on derivatives will be excluded from the DCF model as those are usually counterbalanced by changes in revenues stemming from currency fluctuations (Andrew Peller sources its wine partly in Europe and partly in the US) and forecasting foreign exchange rates is not our business. Other expenses have been shown to fluctuate and cancel themselves out over time, which is why they won't be taken into account in the DCF model either.

The DCF model is now built by using the actual 2013 numbers and by forecasting on their basis for the next ten years until 2023. Then, using the gross margin forecast, the gross profit will be calculated, and SG&A expenses, depreciation and interest payments subtracted, which will yield the earnings before. Tax expenses will be calculated using the expected tax rate, which finally gives us the net income figure. In order to derive the owner earnings or free cash flow to equity figures, depreciation is added back, CAPEX is subtracted and changes in working capital also need to be taken into account.

Table 8.15 shows the forecast of the income statement until 2023.

Based on the restated 2013 figures (restated for one-off items, derivatives and amortization) the growth rate and margin development outlined earlier have been applied.

In order to calculate the owner earnings, these net earnings figures have to be corrected for cash flow relevant positions: CAPEX, depreciation and change in net working capital (Table 8.16).

Table 8.15 Andrew Peller: Discounted cash flow approach (1)

Income statement (CAD000)	2013A	2014E	2015E	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E
Sales	**289.1**	**300.7**	**312.7**	**323.7**	**335.0**	**345.1**	**355.4**	**364.3**	**373.4**	**380.9**	**388.5**
Sales growth (%)	4.4%	4.0%	4.0%	3.5%	3.5%	3.0%	3.0%	2.5%	2.5%	2.0%	2.0%
Gross profit	**109.6**	**113.4**	**118.2**	**122.7**	**127.3**	**131.5**	**135.8**	**139.2**	**142.6**	**145.5**	**148.4**
Gross profit margin (%)	37.9%	37.7%	37.8%	37.9%	38.0%	38.1%	38.2%	38.2%	38.2%	38.2%	38.2%
Selling & administration	76.3	78.8	81.9	84.8	87.8	90.1	92.8	95.1	97.1	99.0	101.0
SG&A (%)	26.4%	26.2%	26.2%	26.2%	26.2%	26.1%	26.1%	26.1%	26.0%	26.0%	26.0%
Amortization of PPE	8.1	8.4	8.8	9.1	9.4	9.7	10.0	10.2	10.5	10.7	10.9
Operating profit	**25.2**	**26.2**	**27.5**	**28.8**	**30.2**	**31.7**	**33.1**	**33.9**	**35.1**	**35.8**	**36.5**
Interest expenses	5.142	5.000	4.950	4.900	4.950	4.975	5.000	5.050	5.100	5.150	5.200
Earnings before taxes	**20.1**	**21.2**	**22.6**	**23.9**	**25.2**	**26.8**	**28.1**	**28.8**	**30.0**	**30.7**	**31.3**
Income taxes	5.9	6.2	6.7	7.1	7.4	7.9	8.3	8.5	8.9	9.0	9.2
Net earnings for the year	**14.1**	**14.9**	**15.9**	**16.9**	**17.8**	**18.9**	**19.8**	**20.3**	**21.2**	**21.6**	**22.1**

Table 8.16 Andrew Peller: Discounted cash flow approach (2)

	2013A	2014E	2015E	2016E	2017E	2018E	2019E	2020E	2021E	2022E	2023E
Net earnings for the year	**14.1**	**14.9**	**15.9**	**16.9**	**17.8**	**18.9**	**19.8**	**20.3**	**21.2**	**21.6**	**22.1**
add: Depreciation		**8.4**	**8.8**	**9.1**	**9.4**	**9.7**	**10.0**	**10.2**	**10.5**	**10.7**	**10.9**
less: CAPEX		8.4	8.8	9.1	9.4	9.7	10.0	10.2	10.5	10.7	10.9
Total working capital	104.1	108.3	112.6	116.5	120.6	124.2	127.9	131.1	134.4	137.1	139.9
Working capital/sales	36.0%	36.0%	36.0%	36.0%	36.0%	36.0%	36.0%	36.0%	36.0%	36.0%	36.0%
Change in working capital		4.2	4.3	3.9	4.1	3.6	3.7	3.2	3.3	2.7	2.7
Owners' earnings		**10.8**	**11.6**	**12.9**	**13.7**	**15.3**	**16.1**	**17.1**	**17.9**	**18.9**	**19.3**

The depreciation figure can simply be taken from the income statement (here called 'amortization of PPE'). As defined above, CAPEX is assumed to equal depreciation as the business model is relatively asset-light and does not require extra capital outlays to grow. The change in working capital is calculated by assuming a reasonable working capital-to-sales ratio and multiplying this ratio with the total sales of each period. Subsequently, the change in working capital, i.e. the additional investments in working capital per year, can be calculated. It is always advisable to talk to management and calculate on the basis of historical data in order to make accurate assumptions about the future CAPEX and working capital quotas.

In order to derive the fair company value, these owners' earnings now have to be discounted at an appropriate rate and a terminal growth rate must be chosen. The terminal growth rate is set at 2% since the company should be able to adjust its prices to inflation. Since the cost of equity (discount rate) cannot be determined precisely, a sensitivity analysis will be used. The initial cost of equity is derived using a fair P/E of 13×:

$$\text{Cost of equity} = \text{risk-free rate} + \text{risk premia}$$

$$= 2\% + \frac{1}{13} = 9.7\%$$

By discounting the owners' earnings from the planning period (PP) above we obtain the present value of these cash flows:

$$\text{PV (Owners' earnings PP)} = \frac{\text{CAD } 10{,}755}{1.097^1} + \ldots + \frac{\text{CAD } 19{,}377}{1.097^{10}} = \text{CAD } 90{,}841$$

To complete the valuation, the terminal value has to be obtained. Using a 2% terminal growth rate and owners' earnings of CAD 19,337 in 2023 yields:

$$\text{Terminal value} = \frac{\left[\text{CAD } 19{,}337 \times (1 + 0.02)\right]}{(0.097 - 0.02)} = \text{CAD } 256{,}152$$

In order to gather the present value of the terminal value, the CAD 256,152 has to be discounted by 1.097^{10}. This yields a PV(Terminal value) of CAD 101,492. The total equity value is now obtained by adding both present values:

$$\text{Equity value} = \text{CAD } 90{,}841 + \text{CAD } 101{,}492 = \text{CAD } 192{,}333$$

In contrast to the entity approach, there is no need to subtract net debt at this stage since the equity value is obtained directly using the owners' earnings approach. In order to calculate the fair value per share, this result has to be divided by the total numbers of shares outstanding. In Andrew Peller's case, there are two series of shares outstanding, with the class B shares being held predominantly by members of the founding family. This sometimes confuses investors when calculating the fair value per share because it may not be entirely clear what share count should be used for the fair value per share calculation. In this case, the most liquid A shares represent a claim on 81.5% of the total share capital and there are 11,293 A shares outstanding.

Hence the fair value in this case is calculated by multiplying the fair value per class A share with 81.5% and dividing by the number of class A shares outstanding.

$$\text{Fair value per share} = \frac{(\text{CAD } 192{,}333 \times 81.5\%)}{11{,}293} = \text{CAD } 13.88$$

At the time of writing, the class A shares were trading between CAD 13 and 14, suggesting a fair valuation. It is now interesting to see how the valuation changes when adjusting the cost of equity and terminal growth rate assumptions.

Table 8.17 Andrew Peller: Fair value per share sensitivity analysis

				Cost of equity				
		8.2%	8.7%	9.2%	9.7%	10.2%	10.7%	11.2%
Terminal growth rate	0.5%	15.3 CAD	14.3 CAD	13.4 CAD	12.6 CAD	11.9 CAD	11.2 CAD	10.6 CAD
	1.0%	16.0 CAD	14.8 CAD	13.8 CAD	13.0 CAD	12.2 CAD	11.5 CAD	10.9 CAD
	1.5%	16.7 CAD	15.4 CAD	14.3 CAD	13.4 CAD	12.6 CAD	11.8 CAD	11.2 CAD
	2.0%	17.5 CAD	16.1 CAD	14.9 CAD	13.9 CAD	13.0 CAD	12.2 CAD	11.5 CAD
	2.5%	18.5 CAD	16.9 CAD	15.6 CAD	14.4 CAD	13.4 CAD	12.6 CAD	11.8 CAD
	3.0%	19.6 CAD	17.8 CAD	16.3 CAD	15.1 CAD	14.0 CAD	13.0 CAD	12.2 CAD
	3.5%	21.0 CAD	18.9 CAD	17.2 CAD	15.8 CAD	14.6 CAD	13.5 CAD	12.6 CAD

As Table 8.17 shows, varying the cost of equity assumptions between 8.2% and 11.2% and the terminal growth rate between 0.5% and 3.5% yields fair values per share of between CAD 10.64 and CAD 21.03. Zeroing in on sensible cost of equity ranges between 9.2% and 10.2% and terminal growth rates between 1.5% and 2.5% shows relatively robust results between CAD 12 and CAD 15 per share.

Example 8.8 – DCF valuation: Unknown Corp.
Table 8.18 is a shortened income statement of a company.

Table 8.18 Unknown Corp.: Income statement

Unknown Corp.	
$	
Sales	28,464,598.96
Cost of goods sold	(21,189,706.23)
Gross profit	7,274,892.73
Expenses for selling, admin and general	(3,928,884.29)
Net operating profit	3,346,008.44
Other net deductions, interest etc.	(575,018.31)
Net profit before Federal taxes	2,770,990.13
Reserve for Federal income and profit taxes	(425,000.00)
New profit	2,345,990.13

The company reports an equity ratio of 89.5%, and a gearing of 3.9%. These figures point to a very conservative and secure financial background. Return on equity comes to 7.3%. In the most recent financial year the net profit margin was of 8.2% and the EBIT margin amounted to 11.7%. In the past 36 years, with the exception of two years, the company increased sales steadily. In the course of the recession in the year in consideration, sales dropped by 12% compared with the previous year. The net profit margin in the previous year lay at 14.3%, the EBIT margin at 15.3% and return on equity at 15.1%. In the following years a return to the margins of the pre-crisis levels is to be expected. Moreover, Unknown Corp. is by its own account the unquestioned leader in its market segment, which comprises mainly soft drinks. The market share is estimated to be around 50%. The DCF analysis starts off by estimating the growth of sales. Considering the sharp slump in sales in the year of recession, the assumption is that the business will recover rapidly. In the following years, a growth rate of 7.5% over the next nine years is expected due to the company's sound market position. From the tenth year the business is presumed to enter a terminal growth rate of 3%. This means that the company's sales and earnings figures from the tenth year onwards increase steadily by 3% per year. Furthermore, an increase of the net profit margin to 10% in the first year and a rise to the pre-crisis level of 15% from the third year is anticipated. Depreciation in the initial year is $0.73m. In contrast, CAPEX came to $1.16m. Changes in working capital are set at 1% of sales. Depreciation and CAPEX starts increasing only in the second year as the production capacity of the previous year should be sufficient for the post-recession levels. The company's cost of equity is set at 10% as the convincing market position as well as the extremely solid financial ratios indicate that risk tends to be low. The high growth rates, meanwhile, point to increased uncertainty. The equity costs reflect the excellent market position, but also the uncertainty regarding the high level of growth. This leads to the estimation of owners' earnings (free cash flow) shown in Table 8.19.

Table 8.19   Unknown Corp.: Discounted cash flow approach

$m	t=1	t=2	t=3	t=4	t=5	t=6	t=7	t=8	t=9
Sales	30.50	32.80	35.20	37.80	40.60	43.70	47.00	50.50	54.30
Sales growth	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%
Net profit	3.05	4.10	5.28	5.67	6.09	6.55	7.05	7.57	8.14
Net profit margin	10.0%	12.5%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
Depreciation	0.73	0.78	0.84	0.90	0.97	1.04	1.12	1.21	1.30
CAPEX	1.16	1.24	1.34	1.44	1.54	1.66	1.79	1.92	2.06
Change in working capital	0.30	0.32	0.35	0.37	0.40	0.43	0.47	0.50	0.54
Free cash flow	2.32	3.32	4.43	4.76	5.15	5.50	5.91	6.36	6.84
Discounted FCF	2.11	2.74	3.32	3.25	3.19	3.10	3.03	2.96	2.90

For the first nine years, the present value of the cash flows amounts to $26.6m. (Example fourth year: $4.76/1.1^4 = 3.25$.) Based on the free cash flow in the tenth year ($7.04m) the terminal value, i.e. the value of all cash flows after the ninth year, is calculated as follows:

$$\text{Terminal value} = \frac{\text{Owners' earnings}_{t=10}}{\text{Cost of equity} - \text{perpetual growth rate}}$$

$$= \frac{\$7.04m}{0.10 - 0.03} = \$100.57m$$

The terminal value has to be discounted in order to obtain its present value. In this case, the factor 2.35 (1.10⁹) must be used.

$$\text{Present value of the terminal value} = \frac{\text{Terminal value}}{\left(1 + \text{Cost of equity}\right)^{t-1}}$$

$$= \frac{\$100.57m}{1.10^9} = \$42.65m$$

The total equity value is calculated by adding up the discounted cash flows of the estimation periods 1–9 and the terminal value.

$$\text{Value of shareholders' equity} = \$26.6 \text{ million} + \$42.6 \text{ million} = \$69.2 \text{ million}$$

The fair value of shareholders' equity therefore comes to $69.2m. By the way, Unknown Corp. is actually the Coca-Cola Company in 1922. This relatively aggressive DCF forecast is an example of how DCF analyses can misjudge the true value of a business. Nevertheless, it is comforting to know that three years earlier the Candler family sold the business for $25m, which is a fraction of its intrinsic value. The purchase price at the time in 1919 corresponded to a price-to-earnings ratio of 5.3 and a price-to-book ratio of 0.96. The family, however, did not lose out, since they bought the trademark rights earlier for $2,300 (sic).

In fact, sales of the Coca-Cola Company rose on average by 8.3% per year between 1922 and 2010. Over the same time period, the net profit margin could be increased to 22%. If one uses these figures to calculate the company's terminal growth the terminal value comes to $287.6m and the total value of equity value to $314.2m. This still clearly underestimates today's value of the Coca-Cola Company of $200bn but, taking into account the time value of money, a presumed fair assessment of $314.2m offered a definite safety margin at the time. (The reason why today's value of the business will not be reached even if actual figures are used is due to the time value of money. The further cash flows lie in the future, the greater is the reduction of the present value.)

Example 8.9 – Monopoly
When playing a round of Monopoly, there is usually a lively trade of plots of land and streets of the board game. Ever wondered how efficiently the prices are chosen? As most pricing in this game is based on gut feeling or estimation, here is a DCF analysis of Mayfair and Park Lane (the most expensive, dark blue pair of streets), complete with hotels. The following assumptions are required:

- 4 players
- 2 hours' playing time
- 1 minute per round
- 2.62% likelihood to end up on Mayfair; 2.18% to end up on Park Lane
- rent for Mayfair $40,000
- rent for Park Lane $30,000.

As interest is not normally charged when playing Monopoly, future rents do not have to be discounted. On the basis of the data above, there are 480 rounds of rolling the dice, i.e. every player needs 15 seconds per move. Of these moves the likelihood to land on Mayfair is 2.62%, to land on Park Lane is 2.18%. (The likelihood includes all eventualities such as prison and chance cards.) Altogether 12.5 players end up on Mayfair, and 10.4 players on Park Lane. The ensuing cash flows are the following:

$$\text{Value of the pair of streets} = 12.5 \times \$40{,}000 + 10.4 \times \$30{,}000 = \$812{,}000$$

In addition to the stays of the three co-players this calculation includes own hotel visits, as buying the street means one does not have to pay for staying on one of the two fields. The value of \$812,000 only applies to the purchase of the fully built-up pair of streets in the first round of play. As the game progresses and the number of hotel stays falls, a dynamic consideration is more interesting. Half-way through the game the purchase up to an amount of \$406,000 would be rational.

$$\text{Value of the pair of streets} = 6.25 \times \$40{,}000 + 5.2 \times \$30{,}000 = \$406{,}000$$

As soon as the value of the cash flow falls below the book value of the hotels, a return of the hotels to the bank would be sensible in order to maximize profits.

8.2   VALUATION USING MULTIPLES

Although the discounted cash flow model follows a theoretically well-founded approach, it is in practice often error-prone as comprehensive estimations of the business development have to be made and changes of parameters can have a significant impact on the resulting values. In order to verify the plausibility of the company values obtained through the discounted cash flow method, one generally uses valuation multiples. These significantly more pragmatic but theoretically less well-founded approaches have the advantage of being easily applicable and can in many cases be used as a valuation method themselves. In this section, approaches for the determination of appropriate valuation multiples are derived and illustrated with case studies. The various multiple valuation methods therefore serve as validation for as well as a valuation alternative to the discounted cash flow approach.

The valuation method using multiples values a company according to appropriate earnings, sales, cash flow and book value multiples. At a fair price-to-earnings ratio of 10 and a net profit of \$50m the result is, for example, an appropriate company value of \$500m. The term company value will from now on be used synonymously with equity value of equity firm, whereas the term enterprise value in the DCF method comprises the total value of equity company's equity and debt.

In line with the already introduced discounted cash flow method, this section also diverges from the predominant approaches in the financial literature and develops separate ways, as the traditional valuations using multiples display several weaknesses. When applying classic multiple valuation methods, usually a representative group of companies that are similar to the target company is formed and the average valuation multiples of this peer group are calculated. By multiplying the resulting valuation multiples against performance indicators such as the net earnings of the target company, for example, one obtains the latter's fair value.

Hence, if McDonald's and Yum! Brands are valued at a P/E of 18, and our target company from the fast-food industry is posting an EPS of $2, its fair value would be $36. This approach implies a similar valuation for businesses within the same peer group. Extending this model by awarding a premium or discount for businesses that display advantages or disadvantages in comparison with the peer group improves this model only slightly. Apart from these points, another downside of a peer-group valuation is that companies with a unique business model by nature do not have a truly comparable competitor; otherwise they would not be unique. However, as companies with special business models and economic characteristics in particular are of interest for long-term-oriented investors, this valuation method is suitable in only a very limited number of cases. Another point of criticism is the possible incorrect valuation of the entire comparison group, which will lead to an incorrect valuation of the target company. The classic multiple valuation method is therefore only a relative and always constrained valuation method.

In order to value the internet company Google Inc., for instance, one would calculate the average valuation multiples (earnings, sales, book value, EBIT and cash flow) of Microsoft, Yahoo!, Baidu.com, Apple and Samsung and offset them with Google's financial ratios. If the peer group has an average price-to-earnings ratio of 17, multiplying this value with Google's expected earnings results in the latter's fair value. Whether Google can be directly compared with the businesses mentioned above is questionable, given business areas, volumes and regional characteristics. The benefit of these classic valuation multiples should in fact be queried. Businesses are in themselves diverse and individual organizations, therefore a valuation by comparing competitors does not usually provide suitable results. Moreover, the various fundamentals often display large differences depending on accounting standards, thus a direct comparison of companies in different geographic regions has limited significance.

Modified multiple valuation

This book therefore takes a different approach. The *modified multiple valuation* determines the intrinsic value of a company, based on the company-specific fair multiple, which is derived from the respective market, competition, company and financial ratio analysis.

Chapter 7 contains the description of the most important valuation multiples, as well as hints for determining and classifying valuation ratios. This section introduces the theory of the modified valuation multiples and forms the core of the company valuation described in this book beside the equity method of the discounted cash flow approach. In contrast to the DCF method this approach largely does without complicated formulae and introduces a pragmatic valuation approach. It pays tribute to the fact that a rough anticipation of the company figures is a significant component of the analysis, but also that company valuation should initially look at the business model and therefore consists to a large part of 'soft', qualitative factors. This form of valuation could also be called *qualitative company valuation*. The focus of this modified multiple valuation is on:

- price-to-earnings ratio
- price-to-book ratio
- price-to-sales ratio
- enterprise value/EBIT.

The price-to-cash flow ratio is not used because of the cash flow's high levels of fluctuation. However, the quality of the cash flow, in particular the free cash flow, is included for determining the fair price-to-earnings ratio, for example by considering the CAPEX quota. A general rule for fair multiples should be to set them as low as possible and as high as necessary. A fast-growing business with a monopoly position should therefore be valued higher than a comparable business with slow growth and strong competition.

8.2.1   Fair price-to-earnings ratio

The value of a company is primarily determined by its earnings, i.e. the free cash flows while taking into account the risks involved. These factors in turn are determined by parameters such as market position, management, financial situation, competition, etc. The aim of this section is to categorize the quantitative and qualitative characteristics of a business, which will step by step lead to an appropriate price-to-earnings ratio. What is more is that by examining and valuing all relevant success factors, one also gains a truly in-depth view of the company. The fair price-to-earnings ratio is always defined less clearly than the result of the discounted cash flow model, which produces – mathematically speaking at least – a precise company value. In line with the method using the fair price-to-earnings ratio, the fair value per share is calculated as follows:

$$\text{Fair value per share} \ = \ \text{expected earnings per share} \times \text{fair price-to-earnings-ratio}$$

The result of this equation shows the fair value per share in the form of the expected earnings per share for the next 12 months, multiplied with the fair price-to-earnings ratio. The higher the earnings and the fair price-to-earnings ratio, the higher is therefore the value per share, or in other words the business itself.

Influencing factors

In order to determine the fair price-to-earnings ratio, a system of major influencing factors has to be identified. The next step is to quantify individual company characteristics in order to obtain a fair valuation multiple by adding up the individual influencing factors. The modified version of Maslow's hierarchy of needs pictured below shows the most important influencing factors relating to the fair price-to-earnings ratio. As pictured in Figure 8.1, the basic needs of the investor should be satisfied first: stability and a solid market position. On this basis follow high profitability, growth and individual influencing factors. This model is constructed with these building blocks, each step earning price-to-earnings ratio points (e.g. for high growth or high profitability), which eventually add up to a company-specific, fair price-to-earnings ratio.
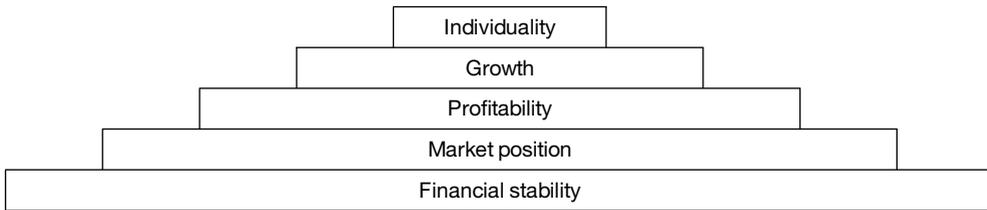
Figure 8.1   Modified version of Maslow's hierarchy of needs from a shareholder perspective

Chapter 7 illustrated how growth and profitability have a significant impact on determining the price-to-earnings ratio. At the same time, in a fair valuation even a business with zero growth should trade at the minimum factor of its earnings. One can assume that this socket or base P/E ratio falls empirically between a price-to-earnings ratio of 7 and 8, whereby this value has to be adjusted according to the competition intensity of the industry and to the prevailing interest rate level. The given minimum price-to-earnings ratio can be deduced from the minimum return, which just about compensates the risks taken. A price-to-earnings ratio of 8, for instance, implies an initial yield of 12.5% (⅛) and corresponds approximately to the average required return on equity at the stock market (see section 8.2.2). Empirical analysis confirms this parameter: stocks with a price-to-earnings ratio below 10 are often observed in slow-growing sectors or industries with few distinguishing features among their products and high competition. It is also striking that at the end of 2013 less than 0.5% of all stocks in the S&P 500 were priced at a price-to-earnings ratio below 8. This data confirms the assumption of setting a price-to-earnings ratio between 7 and 8 as the minimum price-to-earnings ratio. Values that surpass this minimum valuation obviously possess characteristics that justify a premium on the socket.

Financial stability

Financial stability is the cornerstone of every enterprise. If it is not provided, market position, profitability or growth can be as good as they may, the business will not survive. Its future expected cash flows have no value if they do not happen. Stability should be verified with the help of the financial ratios introduced in Chapter 3. Of particular importance are gearing, dynamic gearing ratio and the company's equity ratio. Financial stability is particularly important in times of crisis, as over time nearly all businesses have to survive economic downturns. This is the reason why financial stability is of particular interest to long-term-oriented investors.

Valuation: If the stability of the business is guaranteed, the minimum price-to-earnings ratio increases, depending on financial stability, by 0.5 to 2 points.

Market position

This position comprises mainly the already familiar factors of Porter's five forces analysis, which was discussed in Chapter 5. Besides the market power of customers, suppliers and threat of substitutes as well as the degree of barriers of entry, the ability to forecast the business model is a significant influencing factor. The larger the time horizon over which the business development can be estimated reliably, the safer the valuation. This safety earns a premium. Companies in (perfect) competition can at best enjoy purchasing advantages due to their size, but their market position will only be rewarded with a small premium in a fair price-to-earnings ratio. In contrast, oligopolists or monopolists have an outstanding market position with according pricing power. The more developed this market position is, the higher the premium. In order to quantify this valuation, each of the five Porter criteria is allocated a value between 5 (strongly developed) and 0 (absent):

- intensity of competitive rivalry
- threat of new entrants
- bargaining power of suppliers
- bargaining power of customers
- threat of substitute products.

Addition comes to a total maximum of 25 points. These are listed in the following table as 'Porter points'.

Valuation: As a rule of thumb, the price-to-earnings ratio premiums shown in Table 8.20 should be considered. However, they serve only as a first indication and can in individual cases be adjusted.

Table 8.20   Market position and P/E premium

Market position	Porter points	Price/Earnings ratio premium	Comments
Absent	0 to 5	0 to 0.5	Perfect competition
Weak	5 to 10	0.5 to 1.5	Strong competition, moderate number of competitors
Medium	10 to 15	1.5 to 2	Moderate competition, small number of competitors
Good	15 to 20	2 to 2.5	Oligopolistic tendencies
Excellent	20 to 25	2.5 to 3	Monopolistic tendencies

These results should be verified by comparing them with the EBIT margin. Case studies to illustrate this can be found in Chapter 2 section 2.3, 'EBIT/EBITDA margin'. Experience shows that the EBIT margins shown in Table 8.21 correspond to the 'Porter points'.

Table 8.21   EBIT margin and corresponding Porter points

EBIT margin	Porter points	Market structure
3–6%	0–5	Perfect competition
7–10%	6–10	Strong competition
11–15%	11–15	Moderate competition
16–19%	16–20	Oligopolistic tendencies
20%+	21–25	Monopolistic tendencies

The market position in itself is not a guarantee for a high valuation, as each business is assessed for its ability to generate cash flows out of its existing assets, i.e. its profitability. The resulting market position premium (between 0 and 3) is therefore offset by multiplication with the profitability of the business.

Profitability

Capital employed should generate an adequate return. For shareholders, return on equity, i.e. the return earned on capital contributed by equity providers, is the key financial ratio. Given the company is standing on a sound financial footing, the rule is: the more profitable, the better. Especially in Europe, many former state-run companies in the telecom or mail business were and some still are in a monopoly position; nevertheless they are comparatively unprofitable and not interesting to an investor. Only the *efficient* use of the market position and of financial resources creates high and sustainable returns, hence an efficient creation of shareholder value.

Example 8.10 – Canadian National vs Deutsche Bahn
The railway operators Deutsche Bahn and Canadian National (CN) operate in an oligopolistic environment. CN, however, is significantly more profitable than the government-run Deutsche Bahn. Two companies that are nominally regarded as similar can exhibit substantially different profitability figures. The EBIT margin is particularly helpful for this differentiation. In 2012, state-run Deutsche Bahn achieved an EBIT margin of 6.9%, whereas Canadian National earned 45 cents per dollar in revenues. This is astonishing, given the fact that Canadian National was privatized in 1996 and back then showed comparable financial ratios as Deutsche Bahn today. Hence, by leading the company in a much leaner and more efficient way, Canadian National's management unlocked the true potential hidden in the company. Thus a leading market position alone does not guarantee success and has therefore always to be judged against the actual financial performance achieved.

Return on equity should always be adjusted, since it can be increased artificially by using leverage and the resulting high debt-to-equity ratio. The term used for this is 'unleveraged return on equity'. This parameter assumes an appropriate equity base depending on the respective business model and calculates the risk-adjusted return on equity on this basis. If a company is able to borrow unusually large amounts of debt because its cash flows are regarded as particularly secure, even a low equity ratio is acceptable. At the other extreme, for example in very cyclical and high fixed cost businesses, one should adhere to the minimum equity ratio. The minimum equity ratio is determined by the CAPEX quota. The following

rule of thumb can be used, as companies with lower reinvestment needs usually can cope with a lower level of equity on the balance sheet:

$$\text{Minimum equity ratio} \approx \text{CAPEX quota}$$

If a given company has a high CAPEX quota (CAPEX/operating cash flow), this capital-intensive business model should be backed up with sufficient equity. In order to avoid seasonal and cyclical effects, the historic CAPEX quota should be calculated for a sufficiently long term. A five-year average, for example, would be suitable. Due to the use of the CAPEX quota, the free cash flow is also included in the calculation, besides the reinvestment need. The minimum equity ratio can also be verified with the help of the equity-to-fixed-assets ratio. In principle, no more than 70–90% of fixed assets are required to be financed with equity. The unleveraged return on equity can therefore also be calculated using the equation:

$$\text{Unleveraged return on equity} = \frac{\text{Net profit}}{\text{Balance sheet total} \times \text{CAPEX quota}}$$

This is illustrated in the example of the fast-food chain Yum! Brands.

Example 8.11 – Unleveraged return on equity: Yum! Brands
As at 31 December 2009 Yum! Brands reports an equity ratio of just 15.5%. Through this extremely high leverage the company achieved a return on equity of 91.3%. In fact, Yum! is very profitable, but due to the accounting effect of a too-low equity base, the reported return on equity is clearly exaggerated. A correction by applying the formula above based on a CAPEX quota of an average of 54.3% results in an appropriate shareholders' equity ratio of the same amount. Multiplied with the balance sheet total (or total assets) of $7,148m this comes to a notional shareholders' equity base of $3,881m. Based on earnings of $1,071m, this corresponds to an unleveraged return on equity of 27.6% or a premium on the price-to-earnings ratio of 2.3 points.

> **Valuation:** The higher the profitability, the higher is the valuation. If a business achieves an above-average return on equity without applying any particular leverage, it is rewarded accordingly. Table 8.22 lists a valuation key.

Table 8.22   Unleveraged return on equity and P/E premium

Unleveraged return on equity	Multiple
0–5	0.3
5–7	0.5
7–10	0.7
10–12	0.9
12–15	1.1
15–18	1.3
18–21	1.5
21–25	1.7
25–27	2.0
27–30	2.3
30+	2.5

The entire premium on the price-to-earnings ratio for the market position and profitability is obtained correspondingly from the product of both factors. If a business earns a premium on the market position of 3 price-to-earnings ratio points and achieves an unleveraged return on equity which corresponds to 1.5 price-to-earnings ratio points, the entire premium comes to 4.5 price-to-earnings points (3 × 1.5).

Growth

Growth is the most important determining factor with regard to the price-to-earnings ratio. However, as fast-growing businesses mostly operate in new and therefore hard to assess markets, high growth rates are in many cases linked to increased risks. In addition, the growth rate is usually the most error-prone valuation component and should be chosen carefully. Even in stagnating markets businesses should at least be able to adjust their prices to inflation. If that is not the case, sales stagnate when prices rise, and falling margins and earnings are the consequence. A minimum growth at the level of expected inflation should be a precondition for sensible long-term investments.

The precise definition of growth poses a few problems. Should one use the growth in sales or earnings? Which time frame is being considered? How can expectations for the future be assessed correctly?

The principle of company valuation says that the value of a business should always be set conservatively and, if in doubt, at the lower end of the expected value range. By doing this, some undervalued businesses may in certain circumstances be overlooked, but at the same time, the mistake of overestimating the potential of a business and obtaining an overpriced value is avoided. Estimating future prospects is based on the market and competition analysis that was carried out before. As very high annual growth rates occur only over a few years due to the basis effects, a time frame of at least five years should be chosen. Extrapolating historic data lends itself as a first indication of the actual growth potential. However, when one starts obtaining double-digit growth rates these should be treated with caution. In order to avoid unrealistic exponential future growth, one could, for example, apply growth barriers or similar mathematical means. Hence the consideration of growth rates in the light of the product lifecycle is recommended. Young products and markets display very high growth rates in their early phase, but level off until they reach a saturation barrier and decline as the product is substituted or replaced by innovations.

Earnings growth should be preferred over sales growth, as, first, the price-to-*earnings* ratio is to be determined and, second, an increase in sales without a subsequent increase in earnings usually has no positive impact on the resulting intrinsic company value. The important aspect is to what extent growth actually reaches the shareholder, i.e. on a per share level. The growth rate of the fully diluted earnings per share is therefore the relevant growth measure. It is important to use *diluted* earnings per share for the calculation, as growth in earnings is of use for shareholders only as long as the total share count does not increase as well.

Many companies in the solar industry and other high-growth sectors displayed such a development. Although sales could be increased at very high rates before the financial crisis, the number of outstanding shares increased as well, as new shares had to be issued in order to finance the growth. The cost of growth manifests itself in high working capital requirements and capital investments and has to be considered in the growth analysis. A contrasting example is eBay: the business is highly cash flow-generative and the business model itself is

asset-light. The company is therefore able to fund its growth internally, enabling shareholders to participate fully in its growth.

In the light of these intricacies there is no across-the-board valuation of growth along the lines of '10% growth in earnings corresponds to X price-to-earnings ratio points'. In principle one can say: the fewer investments growth requires, the more value-generating it can be regarded. One way of quantifying the growth premium consists of analysing the price-to-earnings values of businesses in the market that grow at different levels. Table 8.23 will give an overview of current growth premiums. The values should be seen only as a first indication. A concrete valuation can then be carried out on a case-by-case basis, as growth has always got to be considered in the light of profitability, return on capital and cash flow generation. A good starting point is historic valuation multiples. If the price-to-earnings ratio of a company falls from 20 to 15 due to a decline in earnings, and other influencing factors such as market position and balance sheet quality stay the same, the value of the increase in earnings can be quantified directly. The price-earnings-to-growth ratio (PEG), introduced in the previous chapter, can be used to estimate growth that is included in the price. However, as the price-earnings-to-growth ratio has limited explanatory power, it should only be used as a supplementary valuation tool. Growth in earnings should be calculated using the compound-annual-growth rate (CAGR). This ratio reflects the annual growth of a number series.

$$\text{CAGR}_{\text{year 1; year n}} = \left(\left(\frac{\text{earnings year n}}{\text{earnings year 1}} \right)^{\frac{1}{n-1}} \right) - 1$$

If a company achieved earnings of $8m in 2005 and $20m in 2010, it managed to increase earnings by an annual rate of 20.1% according to the CAGR equation.

$$\text{CAGR} = \left(\frac{20}{8} \right)^{\frac{1}{5}} - 1 = 0.201 = 20.1\%$$

The value of 5 in the exponent is the result of subtracting the years (2010 – 2005 = 5). It is important to use a sensible time frame when applying this ratio. The CAGR, for example, is distorted by base effects and often overestimates real growth when extrapolating historic values (see Table 8.23).

Table 8.23   Growth rates and corresponding P/E premium

Growth	Price/earnings ratio premium	Comments
Negative	Negative	Extent depending on duration and speed of the decline in earnings
0–3%	0–0.5	Growth at inflation levels
3–5%	0.5–1	Slow but steady growth
5–7%	1.0–2.0	Growth slightly above average
7–10%	2.0–3.0	Above-average growth
10–15%	3.0–4.0	High growth, doubling every 5 years
15–20%	4.0–5.0	Very high growth, doubling every 4 years
20–25%	5.0–6.0	Extraordinary growth, doubling every 3 years

> **Full computation:** A fictitious company with a base price-to-earnings ratio of 8 points, an excellent financial stability (2 points), a monopoly position and an unleveraged return on equity of 30% ($2.5 \times 3.0 = 7.5$ points) as well as growth of 25% per year (6 points) therefore receives a fair price-to-earnings ratio of 23.5 points ($8 + 2 + 7.5 + 6$).

Individuality

Every business is different and requires individual analysis. A superficial observation suggests that there is not enough scope for idiosyncrasies and peculiarities, especially in this 'building block system'. If a business is considered as a takeover candidate due to its high free float or certain fixed assets, this can have positive effects on the share price. The same applies if the development of earnings can be assessed reliably (e.g. if long-term contracts exist). If businesses have significant net cash reserves at their disposal that are not required for day-to-day operations, they should be added to the fair value per share retrospectively (net cash reserves in \$/number of shares), or the fair price-to-earnings ratio should be increased accordingly.

Earnings per share

The formula for calculating the fair value per share consists of the components 'fair price-to-earnings ratio' and 'earnings per share'. The decision as to which earnings are used for the calculation has a crucial impact on the valuation. As the stock market always assesses the value of companies with a view to the future, using current earnings per share has only limited significance. Therefore for an accurate calculation one should use the estimated earnings per share of the following year. The evaluator should not rely on estimates of analysts, but on his own analysis. Earnings per share have to be adjusted in particular for special items and for one-off non-cash items. In addition, for the calculation, net profit should be divided by the fully diluted number of shares, in order to obtain the earnings per share. Applying this method includes distorting influences of share options or outstanding convertible bonds directly in the consideration.

$$\text{Earnings per share} = \frac{\text{Adjusted net profit}}{\text{Diluted number of shares}}$$

Example 8.12 – Fair price-to-earnings ratio: Energizer Holdings
Using this approach, the fair P/E ratio is made up of:

1. the base P/E
2. financial strength
3. market position and return on equity
4. growth prospects, and
5. individual factors.

The approach will be illustrated using US consumer products company Energizer Holdings as an example. Given Energizer's well-established product portfolio with brands such as

Schick razors, Energizer batteries and the Playtex products range together with its solid cash flow and balance sheet figures, a minimum P/E of 8 can be assumed. As of year-end 2012, Energizer shows an equity ratio of 30.7% and gearing of 87.6%. These figures point towards weaker than expected financial stability. However, with a CAPEX ratio of less than 20%, the company is able to generate large amounts of free cash flow. Given these ratios, out of a maximum 2 points, 1 P/E point is awarded.

Energizer faces strong competition in its markets, but has managed to maintain high margins due to its well-known brand portfolio. The competition among existing market participants can be described as high, but not severe (2 Porter points). The threat by new market entries is low as a result of high brand awareness by end consumers in the personal care and household sector (4 Porter points). The bargaining power of suppliers is limited as many basic material suppliers face a limited number of customers such as Energizer or P&G (4 Porter points). The bargaining power of customers is high. In this case, it is not the end customer (i.e. the consumer) but the big retailers such as Wal-Mart that should be considered the main customers for the purpose of price negotiations (2 Porter points). Finally, the threat of substitution is rather low in Energizer's personal care business, but high in its household segment (batteries). Therefore, 3 Porter points seem sensible here. In total, Energizer is assigned 15 Porter points, indicating an average to good market position. This is also underlined by its EBIT margin of 15% corresponding to the same category.

Based on this assessment, a price-to-earnings premium of 2 points seems to be justified.

A solid market position itself is not enough for a company to be attractive to an investor. The company also needs to turn its market power into actual earnings. In order to examine whether this is happening, the adjusted or unleveraged return on equity as outlined earlier is calculated. Based on the 2012 figures and the company's long-term CAPEX quota of 20%, the following unleveraged return on equity is obtained:

$$\text{Unleveraged return on equity} = \frac{\text{Net profit}}{\text{Balance sheet total} \times \text{CAPEX quota}}$$

$$\text{Unleveraged return on equity} = \frac{408.9}{(6,731.2 \times 20\%)} = 30.4\%$$

This very high ratio shows that the company is able to generate high profits while employing little capital. According to Table 8.22 presented earlier, a 30% unleveraged ROE equates to a multiplier of 2.5. Multiplying the market position P/E premium of 2 and the profitability multiplier of 2.5 gives a total P/E premium of 5 for these two positions.

Over the last five years, the company showed only a CAGR of 1.4% in its earnings per share. Over the last three years, a CAGR of 4.2% was achieved. Going forward, thanks to planned cost savings, a growth rate of 4–5% in earnings per share seems reasonable. This equates to a P/E premium of 1.

Adding it all up, a fair P/E of 15 (8 + 1 + 2 × 2.5 + 1) is obtained. In order to calculate the fair value per share, we need to forecast the EPS for the next year. Using a $7 per share EPS forecast, the fair value is estimated to be $105 (15 × $7).

Example 8.13 – Fair price-to-earnings ratio: Google Inc.
The US internet group Google Inc. holds one of the most dominant market positions in the US. The base price-to-earnings ratio is set at 8. At the end of the business year 2012 the

company reports an equity ratio of 76% and a net cash position (gross cash less financial liabilities) of $42.5bn (!). Financial stability therefore receives 2 price-to-earnings ratio points.

- *Bargaining power of suppliers:* Does not exist. Google's raw materials – data – are mostly supplied by internet users for free, captured by Google's search algorithms and interpreted. A bargaining power of suppliers is not detectable. (5 points)
- *Bargaining power of customers:* Low. Advertising clients first of all look for maximum penetration and secondly to reach the right audience. The extraordinary market share in the online advertising market and the strength in the search and interpretation of information give Google in this respect a clear advantage over its competitors. (5 points)
- *Threat of new entrants:* Medium. Microsoft's 'Bing' on the US market and also Chinese and Russian search engines in their respective markets pose an emergent competition for Google. Nevertheless, Google holds an outstanding market position, long-term customers and perfected search algorithms to maintain this position. Nevertheless, the emergence of Facebook proved Google's weaknesses in the social media and search areas. (4 points)
- *Threat of substitute products*: Low. It is true that in the online market one can never rule out the introduction of revolutionary technology, but at the present point in time there is no foreseeable substitute to Google's technology and business model. (5 points)
- *Intensity of competitive rivalry*: See threat of new entrants. (4 points)

The excellent market position is reflected in Porter points. Google achieves a value of 23 Porter points. This value is emphasized by the above-average EBIT margin of 25% in the financial year 2012. The premium is therefore 3.5 points which exceeds the actual spectrum. Starting with a capital investment quota of 32% over the last three years (takeovers included as they are part of the business model) and a net profit of $10.7bn at a balance total of $93.7bn in 2012 results in an unleveraged return on equity of 35.6%, which receives a premium of 2.8. All in all, this amounts to a premium for the market position and profitability of 9.8 points ($3.5 \times 2.8 = 9.8$).

Between 2007 and 2012 diluted EPS could be increased by 19.4% per year. Nevertheless, growth rates in the region of 20% are practically impossible in the medium term for a business of that size. For example, between 2010 and 2012, EPS grew at a more moderate rate of 10.8%. The premium for a realistic future sales growth is therefore 3 points. In total this analysis comes to an appropriate price-to-earnings ratio of 22.8. The value can be considered as very high, but due to the economic characteristics of the group it is justifiable. The group's net cash position of $42.5bn should be considered as an individual factor. In this case, the net cash position per share has to be added to the eventual fair value per share. For example, if one were to forecast Google's EPS to grow by 10% in 2013 to $35.54 and the net cash position per share is $127.89, the resulting fair value per share according to the fair P/E approach would be:

$$\text{Fair value per share} = 22.8 \times \$35.54 + \$127.89 = \$938.20$$

This compares to a share price level at the end of 2013 of between $850 and $1,000, which does not constitute a sufficient margin of safety to justify an investment but values the company in a fair range. It is crucial to regularly update the growth factor and EPS forecast in this calculation, as these are usually the fastest-changing ingredients in this approach.

Critical evaluation

In this section the results of quantitative ratio analysis and qualitative market and business analysis were combined. The result is the valuation of the business according to the *modified multiple method*.

In contrast to the discounted cash flow model, this form of valuation offers a less theoretical but instead a pragmatic approach throughout. As there is no exact company value, the intrinsic value can only be an approximation, which can be reached in several ways. While the DCF model produces an exact company value (which does not mean that it is correct), the modified multiple method arrives at an alternative company value. Ideally the results of the discounted cash flow method and the multiple method and other approaches are integrated into the determination of the final company value.

The path to the determination of the appropriate price-to-earnings ratio, which has been illustrated with tables and examples, should not be understood as a recipe from a cookbook, as the details can serve only as a first indication due to generalization. Therefore, this section should be regarded as a starting point for company valuation. The precise company value emerges after extensively engaging with the business, its management, industry and the competition. Reducing what was said above to a mathematical formula in which one just has to insert the factors market position, profitability and growth will invariably lead to an incorrect result. While the values listed in the tables are on the one hand derived empirically and on the other deduced intuitively, it is important to develop one's own feeling in the course of the analysis for what is an adequate premium. Especially the growth factor is of particular importance.

Although some fast-growing businesses (1) make no money and (2) can finance growth only via further capital increases, investors are regularly prepared to participate in this growth at a high price. If markets overheat, high future expected growth rates are often used for valuation purposes, which will, in most cases, lead to a rude awakening. In an environment like this, the investor constantly has to ensure the assumptions are conservative. In addition, the second component of the fair price-to-earnings ratio, earnings per share, has to be considered. Through accounting effects and 'earnings management', earnings per share can be increased in the short term, for example by postponing investments, which lowers depreciation and increases earnings. Another method is excessive share buybacks, which raise earnings per share but also mean that potentially important investments are not made. This short-term room to manoeuvre for the management has to be kept in mind and in the case of negative consequences, included in the price.

8.2.2   Fair price-to-book ratio

The aim of this chapter is to determine the fair price-to-book ratio of a company. This valuation ratio defines the size of the premium over the book value (i.e. shareholders' equity) depending on profitability and risk. The dependency of the price-to-book value on the achieved return on equity is already familiar from Chapter 7. According to that, there is a positive connection between both factors, as businesses with a high return on equity can increase their book value faster than unprofitable businesses. In a fair valuation the market value – provided risk remains at a constant level – increases with a rising return on equity. The price-to-book value expresses this relationship numerically as the proportion of the market value to the book value of shareholders' equity.

The classification, whether or not a given price-to-book ratio actually reflects the correct valuation level, is obtained in a prognosis of the future business development and profitability, taking into account the company-specific cost of equity. According to the price-to-book ratio method the fair value of a share is calculated as follows:

Fair value per share = expected book value per share × fair price-to-book value

A company with a book value of $20 per share and an appropriate price-to-book ratio of 3 therefore has a fair value of $60 per share.

Theoretical derivation of the fair price-to-book ratio

The fair price-to-book ratio can be derived theoretically as well as practically. This section starts off with theoretical basic considerations and tests these later in practice. On the basis of the previous chapters the basic assumption of this model is that return on equity and the price-to-book ratio are positively correlated. In other words this means that the fair valuation of shareholders' equity should rise with the business's ability to increase it. As the book value's (= balance sheet equity) rate of increase corresponds exactly to the return on equity, there has to be a connection between the two values. The evaluation of the return on equity has to be carried out against the background of the relevant cost of equity.

The core model of the Capital Asset Pricing model (CAPM), the securities market line, describes the expected risk–return combinations of efficient portfolios. Keeping nothing but the shape of the line, this section determines the functional relationship between return on equity and the appropriate price-to-book ratio. In order to derive this 'specific securities market line' two of its points have to be known, from which the entire line can be construed. This section focuses on two questions to fulfil this requirement:

1. At which return on equity is the price-to-book ratio precisely 1 (i.e. the stock market values shareholders' equity precisely at the book value)?
2. At which return on equity is the price-to-book ratio precisely 2 (i.e. the stock market values shareholders' equity at twice the book value)?

A company trades exactly at the book value when return on equity corresponds to the cost of equity. In this case, the generated return corresponds just to the return requested by the shareholders. It would be wrong to award a premium (price-to-book value >1) or a discount (price-to-book value <1) in this situation, because, from a shareholder's point of view, the company exactly meets the minimum requirements. Similarly, a bond whose coupon (i.e. return on equity) corresponds to the market interest rate (i.e. cost of equity/requested return on equity) trades at par/the nominal value.

Determining the second point is more complicated. The simple assumption that a doubling of the return on equity entails a doubling of the price-to-book ratio points in the right direction, but it neglects the effect of compounded interest. Due to this effect a disproportionately low increase in the return on equity is sufficient to justify a price-to-book ratio of 2. By analogy, $100 invested for ten years at an interest rate of 10% rises to $259, at 20% already to $619, i.e. more than twice as much. An appropriate price-to-book ratio of 1 at a given return on equity correspondingly has to correspond to a price-to-book ratio higher than 2 if return on equity doubles. Table 8.24 shows which returns on equity – at given fixed cost of equity – lead to a doubling of the price-to-book ratio.

Table 8.24   Doubling interest rate

Continuously compounded interest	End amount	Doubling interest rate
5.0%	$1.051	9.76%
6.0%	$1.062	11.66%
7.0%	$1.073	13.54%
8.0%	$1.083	15.41%
9.0%	$1.094	17.26%
10.0%	$1.105	19.09%
11.0%	$1.116	20.91%
12.0%	$1.127	22.71%
13.0%	$1.139	24.50%
14.0%	$1.150	26.28%
15.0%	$1.162	28.04%
16.0%	$1.174	29.79%
17.0%	$1.185	31.53%
18.0%	$1.197	33.25%
19.0%	$1.209	34.96%
20.0%	$1.221	36.66%

The table shows in the second column the end amount of a continuously compounded dollar at the interest rate displayed in the first column. The third column shows the interest rate which is required to achieve a doubling of the increase in the second column.

For example, at an interest rate of 10%, a continuously compounded dollar would rise to $1.105 in a certain period, as row 6 shows. In order to double this increase of 10.5 cents, a steady interest rate of 19.1% would have been necessary, as at this rate, the original dollar would have become $1.21 ($e^{0.191}=1.21$). To put it simply, 19.1% is 'twice as good' as an interest rate of 10%. Assume the business in consideration has a cost of equity of precisely 10%; the business trades at a price-to-book ratio of 1 if it has a return on equity of 10%, and at a price-to-book ratio of 2 if it has an increase of the return on equity of 19.1%. In contrast, if a business has a low cost of equity of 8%, it would also trade at the book value if it has a return on equity of 8%. According to the table, the doubling value for 8% lies at approximately 15.4% (third column). At a return of equity of 15.4% this business would be valued at twice the book value. One can therefore say:

1. a business trades at precisely the price-to-book value of 1 if the return on equity corresponds to the cost of equity
2. a business trades at precisely a price-to-book value of 2 if the return on equity corresponds to the 'doubling value' of the cost of equity.

The required formula for determining the fair price-to-book ratio therefore has to contain the components return on equity and cost of equity. As already shown, cost of equity consists of the risk-free rate plus a risk premium, whereby a change in the interest level indirectly impacts the cost of equity and thus the fair price-to-book ratio. The higher the return on equity and the lower the cost of equity (i.e. the risk) are, the higher is the justified premium on the book value. For each given cost of equity level the suitable combination of return on equity and price-to-book ratio can now be calculated. Applied to the example above of a company with a cost of equity of 8%, one can now say:

$$\text{Return on equity } = \ 8.0\% \leftrightarrow \text{price-to-book ratio } = \ 1$$

$$\text{Return on equity } = \ 15.4\% \leftrightarrow \text{price-to-book ratio } = \ 2$$

Two points are now known and a straight line can be plotted using the corresponding combinations of price-to-book ratio and return on equity. Table 8.25 gives an overview of the appropriate valuation on the basis of this fair price-to-book ratio method for cost of equity values between 7% and 20% (vertically) and return on equity between 7% and 40% (horizontally). The table contains the price-to-book ratio valuation for any combination of the two factors. Based on this table, initial valuations, in which only the return on equity and cost have to be determined, can in principle be carried out.

Table 8.25 Fair price-to-book value depending on ROE and COE

Cost of equity (%) — Return on equity (%)

COE	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
5	1.0	1.2	1.4	1.6	1.8	2.1	2.3	2.5	2.7	2.9	3.1	3.3	3.5	3.7	3.9	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6
6	0.8	1.0	1.2	1.4	1.5	1.7	1.9	2.1	2.2	2.4	2.6	2.8	2.9	3.1	3.3	3.5	3.7	3.8	4.0	4.2	4.4	4.5	4.7
7	0.7	0.8	1.0	1.2	1.3	1.5	1.6	1.8	1.9	2.1	2.2	2.4	2.5	2.7	2.8	3.0	3.1	3.3	3.4	3.6	3.8	3.9	4.1
8	0.6	0.7	0.9	1.0	1.1	1.3	1.4	1.5	1.7	1.8	1.9	2.1	2.2	2.4	2.5	2.6	2.8	2.9	3.0	3.2	3.3	3.4	3.6
9	0.5	0.6	0.8	0.9	1.0	1.1	1.2	1.4	1.5	1.6	1.7	1.8	2.0	2.1	2.2	2.3	2.5	2.6	2.7	2.8	2.9	3.1	3.2
10	0.4	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.7	2.8	2.9
11	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6
12	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4
13	0.3	0.4	0.5	0.6	0.7	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.0	2.1	2.2
14	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.8	0.9	1.0	1.1	1.2	1.2	1.3	1.4	1.5	1.6	1.7	1.7	1.8	1.9	2.0	2.1
15	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	0.8	0.9	1.0	1.1	1.2	1.2	1.3	1.4	1.5	1.5	1.6	1.7	1.8	1.8	1.9
16	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7	0.8	0.9	0.9	1.0	1.1	1.1	1.2	1.3	1.4	1.4	1.5	1.6	1.7	1.7	1.8
17	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7	0.8	0.9	0.9	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.5	1.6	1.6	1.7
18	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.5	1.6
19	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.5
20	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.6	0.7	0.8	0.8	0.9	0.9	1.0	1.1	1.1	1.2	1.2	1.3	1.4	1.4

COE	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
5	5.8	6.0	6.3	6.5	6.7	6.9	7.1	7.3	7.5	7.7	7.9	8.1	8.4	8.6	8.8	9.0	9.2	9.4	9.6	9.8	10.0	10.2	10.5
6	4.9	5.1	5.2	5.4	5.6	5.8	5.9	6.1	6.3	6.5	6.7	6.8	7.0	7.2	7.4	7.5	7.7	7.9	8.1	8.2	8.4	8.6	8.8
7	4.2	4.4	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	6.0	6.2	6.4	6.5	6.7	6.8	7.0	7.1	7.3	7.4	7.6
8	3.7	3.8	4.0	4.1	4.2	4.4	4.5	4.6	4.8	4.9	5.1	5.2	5.3	5.5	5.6	5.7	5.9	6.0	6.1	6.3	6.4	6.5	6.7
9	3.3	3.4	3.5	3.7	3.8	3.9	4.0	4.1	4.3	4.4	4.5	4.6	4.8	4.9	5.0	5.1	5.2	5.4	5.5	5.6	5.7	5.8	6.0
10	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.9	5.0	5.1	5.2	5.3	5.4
11	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9
12	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.5
13	2.3	2.4	2.5	2.6	2.7	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.0	4.1	4.2
14	2.1	2.2	2.3	2.4	2.5	2.5	2.6	2.7	2.8	2.9	3.0	3.0	3.1	3.2	3.3	3.4	3.4	3.5	3.6	3.7	3.8	3.9	3.9
15	2.0	2.1	2.2	2.2	2.3	2.4	2.5	2.5	2.6	2.7	2.8	2.8	2.9	3.0	3.1	3.1	3.2	3.3	3.4	3.5	3.5	3.6	3.7
16	1.9	1.9	2.0	2.1	2.2	2.2	2.3	2.4	2.5	2.5	2.6	2.7	2.7	2.8	2.9	3.0	3.0	3.1	3.2	3.2	3.3	3.4	3.5
17	1.8	1.8	1.9	2.0	2.0	2.1	2.2	2.2	2.3	2.4	2.4	2.5	2.6	2.7	2.7	2.8	2.9	2.9	3.0	3.1	3.1	3.2	3.3
18	1.7	1.7	1.8	1.9	1.9	2.0	2.0	2.1	2.2	2.2	2.3	2.4	2.4	2.5	2.6	2.6	2.7	2.8	2.8	2.9	3.0	3.0	3.1
19	1.6	1.6	1.7	1.8	1.8	1.9	1.9	2.0	2.1	2.1	2.2	2.3	2.3	2.4	2.4	2.5	2.6	2.6	2.7	2.8	2.8	2.9	2.9
20	1.5	1.5	1.6	1.7	1.7	1.8	1.8	1.9	2.0	2.0	2.1	2.1	2.2	2.3	2.3	2.4	2.4	2.5	2.6	2.6	2.	2.7	2.8

As one can see, the price-to-book ratio is always 1 if cost of equity and the return on equity are alike. If a company has a cost of equity of 18%, but achieves a return on equity of only 10%, the appropriate valuation is noticeably below the book value at a price-to-book ratio of 0.5. In contrast, if a business with a cost of equity of 9% has a return on equity of 23%, the fair price-to-book ratio according to the table is 2.7 – the business in this case is valued at a multiple of its equity base, as it can increase it at a high rate while incurring very little risk.

As in this case the return on equity at a price-to-book ratio of 1 and 2 is known, the trend line of the price-to-book ratio/return on equity, which is also the basis for the table, can be determined formally using the following equation. The doubling value is abbreviated to 'doubler' going forward.

$$\text{Fair price-to-book ratio} = \frac{\text{Doubler} - 2 \times \text{Cost of equity} + \text{Return on equity}}{\text{Doubler} - \text{Cost of equity}}$$

The value of the doubler itself can be calculated using the slightly complicated formula:

$$\text{Doubler} = \ln\left(\left(\left(e^{\text{COE}} - 1\right) \times 2\right) + 1\right)$$

However, it is entirely sufficient to look up the value in the table, as it shows the doubling values for the cost of equity between 5% and 20%.

At first glance, this mathematical approach seems to oppose the aim of this book to convey the basics of company valuation without using complex calculus, but after the clarification of the basics this method has a certain appeal, as it only requires knowledge of the return on equity and the cost of equity. It has to be pointed out that so far this model has not been published elsewhere. The following data is therefore required to determine the fair price-to-book ratio:

1. sustainable return on equity
2. cost of equity (and as a component: risk-free interest).

The sustainable return on equity is formally calculated like the usual return on equity by dividing earnings and shareholders' equity. As particularly good or bad years distort the return on equity, a sustainable return on equity should reflect the realistic medium-term profitability. In cyclical businesses the consideration of return on equity over an entire business cycle is relevant. Young, fast-growing businesses, in contrast, should be assessed using the realistic medium-term return on equity, i.e. return on equity after the phase of rapid growth. Businesses with a solid business model often have relatively stable returns on equity, which can be directly obtained from the financial statement.

The risk-free interest rate can be calculated using yields of ten-year government bonds depending on regional sales distributions. If a business, for instance, generates 80% of sales in the UK and 20% in the US, government bond yields should be weighted in these proportions. In case government bonds cannot be classified as risk-free, one can resort to returns from bonds of solid debtors. The cost of equity is the influencing factor which is the most difficult to quantify. It is recommended to calculate the cost of equity not by using the CAPM theory, but by using the alternative model introduced in section 8.1. The cost of equity is

therefore the result of adding risk-free interest and the inverse of the fair price-to-earnings ratio without a growth component.

$$\text{Cost of equity} = \text{Risk-free interest} + \frac{1}{\text{Fair price-to-earnings ratio}}$$

Or alternatively:

$$\text{Cost of equity} = \text{Risk-free interest} + \text{Required initial yield}$$

If the risk-free rate is 3% and the fair price-to-earnings ratio is 18 minus a premium of 3 for the growth factor, the resulting cost of equity is:

$$\text{Cost of equity} = 0.03 + \frac{1}{18 - 3} = 9.7\%$$

Another useful tool to estimate the adequate cost of equity is to look at the market itself: the analysis of actually observed returns on equity and price-to-book ratios results in an *average* cost of equity of 8.5–10% for the end of the year 2010. This result is derived by regressing actual P/B against ROE values and setting P/B to 1. This value can be used as a fix for the cost of equity of an individual business, as long as it can be determined whether the business has a higher or lower risk than the broad market. Very solid businesses like Nestlé, for example, ought to report a cost of equity lower than the average 10%, whereas businesses with an above-average risk ought to have a value above 10%. After all components have been determined, the fair price-to-book ratio can be determined by entering the values in the equation. Table 8.26 compares the values of three businesses with varying characteristics.

Table 8.26   Overview of three companies

Business	Return on equity	Cost of equity
Business A	20%	10%
Business B	19%	9%
Business C	15%	7%

The fair price-to-book ratio of business A can now be determined as follows:

$$\text{Fair price-to-book ratio} = \frac{0.191 - 2 \times 0.10 + 0.20}{0.191 - 0.10} = 2.1$$

For businesses B and C the resulting value is 2.2 in both cases. It is striking that business A has the lowest fair valuation despite having the highest return on equity, which is due to A's high cost of equity. Business C has a low cost of equity at comparatively low profitability. It shows that it is always the proportion of return on equity to cost of equity that is important for the valuation and not the absolute figures. A very profitable business, which takes immense risks, does not necessarily deserve a high valuation.

This theoretically derived formula can now be used to value in particular steadily growing, stable businesses. If return on equity displays high volatility, the valuation using this method is only possible to a degree. These considerations also show that the often used expression 'a business is attractive if it trades below the book value (price-to-book ratio <1)' is not valid. The appropriate price-to-book value is exclusively determined by the proportion of the return on equity to the cost of equity, whether the value is larger or smaller than one has on its own *no* significance, as long as liquidation is excluded.

Practical derivation of the fair price-to-book ratio

The theoretically derived formula for the fair price-to-book ratio is verified by analysing actually observed market data. In order to obtain the appropriate cost of equity figure for the market, one has to look at the return on equity and the corresponding price-to-book ratios of publicly traded companies. The analysis is based on the year 2013, in which the S&P 500 companies overall displayed valuation multiples and profitability figures that can be considered as sufficiently fairly valued. In addition, large cap companies are usually closely followed by a wide range of market participants, which means that market efficiency should be as high as possible. With this comparison of the actually observed return on equity/price-to-book ratio pairings on the market a formal relationship shall be established by way of a regression analysis.
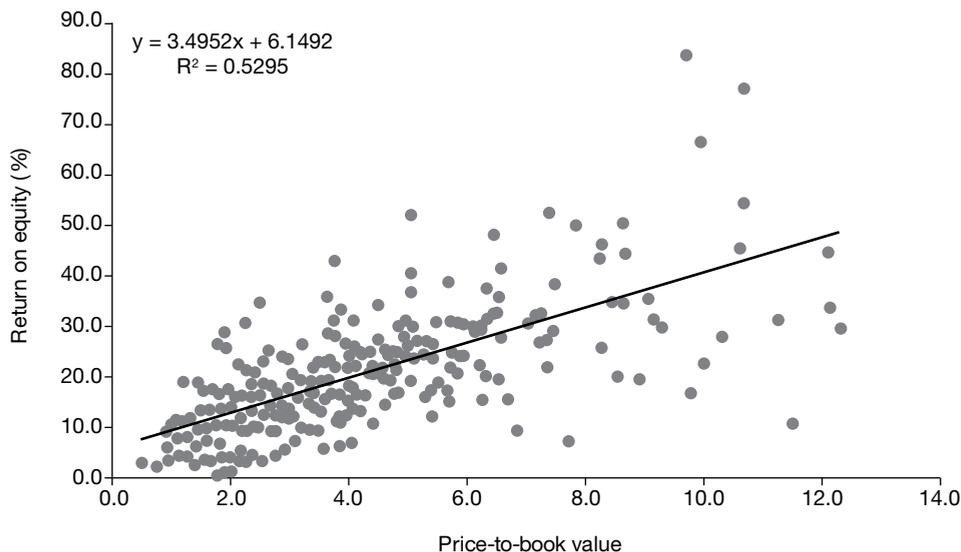
Figure 8.2   S&P 500: P/B ratio vs ROE

Figure 8.2 shows the return on equity and price-to-book ratio for S&P 500 stocks corrected for extreme outliers. Even this big sample yields a relatively reliable regression with an R^2 of 52.9% and underlines the strong fundamental link between return on equity and the P/B ratio.

The regression equation can now be used for assessing the theoretical results. The following regression equation is obtained from the graph:

$$\text{Return on equity} = 0.035 \times \text{price-to-book ratio} + 0.0615$$

Using consumer products companies listed in the British FTSE 100 index gives the relationship shown in Figure 8.3.
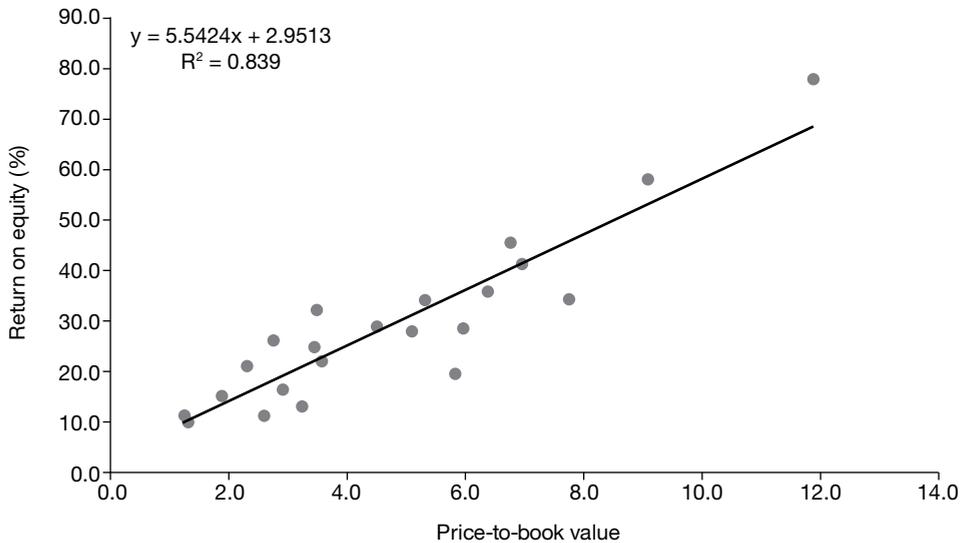
Figure 8.3   FTSE 100 consumer products companies: P/B ratio vs ROE

With an R^2 of 83.9% and a more reasonable y-intercept, this equation might fit even better, at least for non-cyclical quality companies.

$$\text{Return on equity} = 0.054 \times \text{price-to-book ratio} + 0.029$$

This result raises an interesting question: which return on equity is required for a company to be valued precisely at its book value? Solving the formula for a price-to-book ratio of 1 comes to the already mentioned range of 8.5–10%. Therefore, on average, a business with a return on equity of 9–10% trades at its book value, whereas for quality companies, also a lower return on equity of 8.5% can be sufficient to justify a valuation at book value. A broader empirical analysis of the return on equity and the price-to-book ratios of the 5,000 larges businesses in the US and Europe confirms this observation. This enables us to draw inferences about the prevailing level of cost of equity in the markets. If a business earns precisely the amount of the cost of equity, i.e. the cost of equity corresponds to the return on equity, the stock has to trade at book value. A premium on the book value would be justified only in case the company earns an excess return. It can therefore be assumed that the average cost of equity for the broad market lies at around 9–10%. In order to verify this figure, the

following section analyses the returns of a variety of risky securities classes down to the share capital.

Excursus: return requirement along the capital structure

To determine the requested returns of different securities, the requested return of the following securities classes is compared in the order of increased risk:

● government bonds
● senior bonds
● junior bonds
● hybrid and tier 1 bonds
● shareholders' equity (share capital).

Government bonds of established countries such as Germany, Switzerland, the UK or the US are usually used for determining the risk-free rate of the respective currency. At the end of 2013, the interest rate would be 2–3%, which corresponds approximately to the yield of ten-year government bonds. As the risk-free rate also fluctuates in the course of time, it should be adjusted in regular intervals. The risk-free interest rate fluctuated between 2% and 10% in the last 50 years in a relatively volatile framework, which means that a static consideration has deficiencies.

The next level of risk consists of secured and unsecured senior bonds, which have a relatively low risk due to their seniority. A liability with high seniority will be given preference over a liability with less seniority, such as a junior bond, in case of bankruptcy. Solid corporate bonds in the senior bond segment usually command a premium of 0.5–2.5% on top of the risk-free interest rate, depending on the economic cycle.

The following level of junior bonds comprises hybrid and tier 1 capital besides the usual subordinate bonds. These bonds often have a higher rate of interest and return than senior bonds, but in case of bankruptcy they are treated with lower priority. Hybrid and tier 1 capital display specific characteristics such as a link between interest payments and net profit, and potential loss participation by way of writing down the book value. Due to these characteristics, junior bonds are very similar to the economic character of shareholders' equity depending on degree of the characteristic, and for this reason they are recognized by many rating agencies and supervisors partly as regulatory capital or equity. Due to these negative characteristics the average interest rate of these bonds vis-à-vis senior bonds increases by another 2–3%. A further premium of 1–2% can be observed in pure tier 1 bonds or silent partnerships, which overwhelmingly have to participate in losses.

Share capital forms the final and highest-risk level in the capital structure. Shareholders are considered last in case of bankruptcy, and are even paid last after consideration of all other capital providers when it comes to earnings. This is called the residual claim of the shareholder. The advantage of this capital level is the absent cap on earnings. While creditors, like senior or junior debtors, receive a fixed interest rate for the surrender of their capital, shareholders have access to all earnings after creditors' claims have been satisfied. This increased risk manifests itself in the company-specific cost of equity.

Through the addition of returns up to tier 1 bonds, which resemble shareholders' equity, the resulting required return is between 8% and 9%. On average, the cost of equity has to

be above this value, as shareholders' equity has a higher risk than equity-like bonds. The empirically derived value of 10% for the broad market is therefore verified. It is important to emphasize that the value of 10.7% represents an average, as cost of equity of individual businesses can be significantly higher or lower than that depending on market position, stability of cash flow and other risk factors. Moreover, this value is subject to constant change of risk premiums, like all other capital levels. At the end of 2010 the overview of capital levels and return requirements looks as shown in Figure 8.4.

| Shareholders' equity = Ø 9 to 10% |
| Tier 1 bond = +1 to +2% |
| Junior bonds = +2 to +3% |
| Senior bonds = +0.5 to +2.5% |
| Risk-free rate = 2 to 3% |
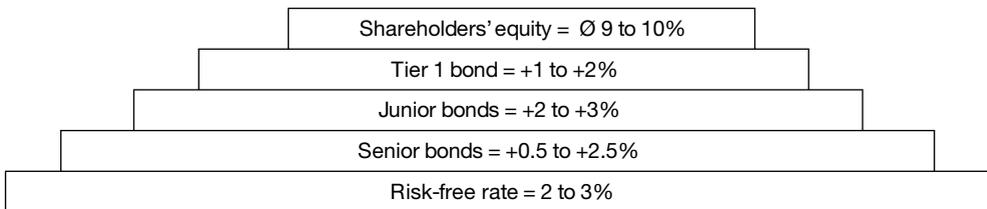
Figure 8.4 Alternative cost of equity derivation

An increase in the risk-free rate to 5%, for example, should move the overall equity risk upwards. Why should a senior bond otherwise be traded at 4% yield if a risk-free bond offers a yield of 5%? Risk-free rates should be interpreted as water level, the risky capital levels as buoys of varying heights. If water levels increase, they also rise. The return on equity which is eventually required can be individually determined by means of the business risk. If a company's bonds trade at yield levels of 7%, the required return on equity correspondingly has to be higher than this value. In practice, the cost of equity usually lies between 7% (for very stable companies) and 15% (for high-risk companies). The section on DCF valuation already introduced an approach for determining the cost of equity. Taking into account interest rates of other debt instruments, these values can be critically examined. The above-mentioned differences in the interest rates between the individual capital levels are not constant but vary according to the risk appetite of the investor over time. Nevertheless, the provided list is a suitable overview for verifying the cost of equity.

Verification of the results

Based on the empirically derived formula above, the classification of the fair price-to-book ratio for average businesses in relation to the achieved return on equity now follows. Using a broad set of companies adjusted for outliers and running regressions between P/B and ROE yields the following formula:

$$\text{Price-to-book ratio} = \frac{\text{Return on equity} - 0.045}{0.05}$$

The regression equation describes the fair valuation of an average company with an equity cost of 8.5–10%, depending on the return on equity, derived from the market data. If a business has lower cost of equity than the market average, the appropriate price-to-book ratio is

increased to above the market average. Businesses with higher cost of equity trade accordingly below the average values obtained using the formula. Based on empirical analysis, a business with a return on equity of 15% and a market-average cost of equity has a fair price-to-book ratio of 2.1:

$$\text{Price-to-book ratio} = \frac{\text{Return on equity} - 0.045}{0.05}$$

$$\text{Price-to-book ratio} = \frac{0.15 - 0.045}{0.05} = 2.1$$

Compared with the theoretical formula the resulting value is (using a midpoint cost of equity of 9.5% and a doubling value for 9.5 of 18.17% or 0.1817):

$$\text{Fair price-to-book ratio} = \frac{\text{Doubler} - 2 \times \text{Cost of equity} + \text{Return on equity}}{\text{Doubler} - \text{Cost of equity}}$$

$$\text{Fair price-to-book ratio} = \frac{0.1817 - 2 \times 0.095 + 0.15}{0.1817 - 0.095} = 1.63$$

These results evidently deviate from one another, but both point in the same direction. In practice it shows that the theoretical results based on the table usually yield very conservative values. However, this is not a bad characteristic: when it comes to valuation, investors should rather err on the side of caution. As the practically derived formula is based on a regression analysis of actual data, the result contains several errors. Firstly, the database may contain flawed data. This applies particularly for return on equity, which is sometimes subject to one-offs or other accounting effects. As this is historical data and the market always considers future developments, database regression based on past results may be of only limited use. In addition, it cannot be ruled out that the entire database is under- or overvalued and the result is distorted. Despite these flaws, the practical analysis confirms the theoretically derived formula through the high correlation between excess return on equity to cost of equity and the price-to-book ratio. To determine the fair price-to-book ratio of a business using this method, information on the return on equity, the risk-free interest rate and the cost of equity is required. The formula for the fair price-to-book ratio has the advantage, besides the simple application, that it is immune to the increasing return on equity by leveraging. Although return on equity is increased through the leverage effect, the absolute equity base falls at the same time. Both effects cancel each other out.

Example 8.14 – Fair price-to-book ratio: Energizer Holdings
Between 2010 and 2012, Energizer Holdings' return on equity averaged 17.7%. For 2013 a 19% return on equity was expected using the $7 earnings per share forecast from the fair P/E example. In November 2013, Energizer traded at $100 a share whilst having $36.42 in equity per share. Based on this data, the current price-to-book value is 2.74. Let's now derive Energizer's fair P/B ratio using the table and formula provided earlier.

Based on the table, a company with a ROE of 19% should trade at a fair P/B of 2.5/2.2 and 2.0 for cost of equity levels of 8%/9% and 10% respectively. Using a fair P/E of 15 (minus 1 for the growth factor) and a 2% risk-free rate gives cost of equity of:

$$\text{Cost of equity } = \text{ Risk-free rate } + \frac{1}{\text{Fair P/E}} = \ 2\% + \left(\frac{1}{14}\right) = \ 9.1\%$$

This hints towards a fair P/B of 2.2 which is lower than the current valuation.

Using the formula yields a different result:

$$\text{Price-to-book ratio} = \frac{\text{Return on equity} - 0.045}{0.05}$$

$$\text{Price-to-book ratio } = \ \frac{0.19 - 0.045}{0.05} = 2.9$$

Readers should be aware that the formula can only be used for companies of average risk (i.e. cost of equity). In relation to Energizer Holdings, this assumption seems to be reasonable. As pointed out earlier, using the table usually yields conservative results. We can therefore conclude that the fair P/B ratio of the company lies somewhere between 2.2 and 2.9. Using the mid-point between these two values of 2.55 and the current equity per share of $36.42 yields a fair value of $92.87 per share.

Example 8.15 – Fair price-to-book ratio: Coca-Cola
Chapter 7 touched on the course of the return on equity and the price-to-book ratio of the Coca-Cola Company. This short case study looks at the 2010 valuation of the share. At the beginning of the fourth quarter in 2010 the share trades at around $60. Back then, analysts estimated the company to achieve a return on equity of 30.8%. Due to the excellent development of the group in the last quarters, a long-term return on equity of 31.5% seems realistic. The book value of the business at the end of the financial year 2010 will probably amount to $27.4bn while 2,336 million shares are outstanding. This results in a book value of $11.74 per share. If the cost of equity is set to 7% (doubling value: 0.1354) and using a return on equity of 31.5%, the resulting fair price-to-book ratio is 4.74. The cost of equity is at the lower margin, but Coca-Cola counts as one of the most stable and financially strongest companies in the world, which justifies this selection.

$$\text{Fair price-to-book ratio} = \frac{0.1354 - 2 \times 0.07 + 0.315}{0.1354 - 0.07} = 4.75$$

According to this model the provisional value per share is $55.77 (4.75 × $11.74). As Coca-Cola is without a doubt one of the strongest brands and companies in the world, with a low level of borrowing and a very defensive business model with stable cash flows, the market could be prepared to pay a further premium. This analysis arrives at a fair value of more than $56 per share. Coming back to the conclusion of Chapter 7, this means that the share has by and large brought down the overvaluation of the year 2000. The company would now have to either increase return on equity and/or extend its equity base in order to create room for

further upward potential of the share price. Another step would be to reduce the risk profile to lower the cost of equity, but there is little scope in this direction for the Coca-Cola Company.

Example 8.16 – Fair price-to-book ratio: Vetropack

Table 8.27   Vetropack: Return on equity development

Year	Return on equity
2004	12.7%
2005	13.1%
2006	10.5%
2007	19.6%
2008	18.7%
2009	13.4%

Vetropack is one of Europe's leading glass producers. Table 8.27 shows the development of return on equity (adjusted for special items) of Vetropack group, which came to 14.6% on average. Vetropack was able to extend the business position and margins significantly in the last few years. The share price rose by more than 700% between 2001 and 2010. As at 31 December 2009 the company reported shareholders' equity of CHF 582.9m. In order to obtain the book value of shareholders' equity for the entire year 2010, the expected earnings for 2010 minus the dividend are added up. Due to special items in the fiscal year 2010, earnings are comparatively low at CHF 50m. Also total equity has to be adjusted for the planned dividend payments of CHF 15m. Shareholders' equity at the end of 2010 therefore comes to:

$$SE_{2010} = CHF\,582.9m + CHF\,50m - CHF\,15m = CHF\,617.9m$$

This corresponds to a book value per share of CHF 1,445.71. If one sets the long-term realistic return on equity to 15%, together with a cost of equity of 10%, this results in a fair price-to-book ratio of 1.6. Multiplying the fair price-to-book ratio with the book value per share results in the fair value of the share:

$$Fair\ value\ =\ CHF\,1,445.71\ \times\ 1.6\ =\ CHF\,2,313.14$$

At the end of 2010 the share closed at CHF 1,800, which is significantly lower than the fair value. How does this fit together? Taking into account the considerations above one can determine the return on equity, which has currently been priced in by the market. For this, the following formula is solved for the price-to-book ratio and the price-to-book ratio multiple is compared to the corresponding value of the return on equity.

$$CHF\,1,445.71 \times Implicit\ price\text{-}to\text{-}book\ ratio = CHF\,1,800$$

$$Implicit\ price\text{-}to\text{-}book\ ratio\ =\ 1.25$$

If the cost of equity continues to be set at 10%, a price-to-book ratio of 1.24 corresponds to an expected return on equity between 12% and 13%. Comparing this value with the development

of Vetropack group's return on equity shown above, return on equity lay below 12% only once. 2010 will in all likelihood also be concluded with a below-average return on equity, but it will not change the medium- to long-term prospects of the business. A second reason could be that the cost of equity has been set too low in the calculation. If these problems can be ruled out, a precise analysis of future prospects could potentially be interesting as the company appears to be undervalued.

Example 8.17 – Fair price-to-book ratio: comparison of four companies
This concluding case study looks at four more or less randomly chosen businesses from the Dow Jones Industrial Average index as of the end of 2012 (Table 8.28).

Table 8.28   ROE comparison of four listed companies

Company	ROE '06	ROE '07	ROE '08	ROE '09	ROE '10	ROE '11	ROE '12	Ø ROE	Price/ book ratio (end 2012)
Merck	22.2%	15.9%	36.8%	20.9%	1.7%	11.2%	11.3%	17.1%	2.4
McDonald's	22.9%	15.6%	32.2%	32.4%	33.8%	38.2%	35.7%	30.1%	5.7
Microsoft	31.1%	45.1%	48.6%	36.2%	40.6%	40.5%	25.5%	38.2%	3.4
3M	38.3%	34.1%	34.6%	24.4%	25.5%	27.0%	24.6%	29.8%	3.6

Source: Annual reports 2006–2012 [US GAAP]

A comparison of 3M and McDonald's, two businesses similarly profitable over the whole cycle, displays distinct differences in the valuation. Both businesses do not show a particular trend in their ROE, but McDonald's current ROE lies above its seven-year average, whereas 3M's latest result came in under. Also it can be assumed that McDonald's cost of equity lies significantly below that of 3M as the latter is far more exposed to the general economic environment and therefore more cyclical. Here McDonald's may have advantages due to its global presence and high level of brand awareness.

Microsoft has, on average, the highest return on equity in the group comparison, but is only ranked third with regard to the price-to-book ratio. The reason for this is not so much its cost of equity, but more the declining development of the return on equity and presumably the sceptical view of many investors as to whether or not Microsoft can keep up with the numerous challenges ahead.

Merck shows the lowest average ROE and P/B of the group. Based on these figures, this valuation level seems justified as the company also shows a downward trend in ROE, falling from 22.9% in 2006 to 11.3% in 2012.

8.2.3   Fair price-to-sales ratio

Besides the price-to-book ratio one can also determine a fair price-to-sales ratio empirically. The price-to-sales ratio correlates significantly with a company's net profit margin, as net profit margin forms roughly the marginal profit of each further sales unit. The more cents of profit per dollar in sales are made, the higher is the appropriate valuation. In contrast to the already introduced ratios, this ratio has the advantage that sales are hardly influenced by accounting effects and therefore usually do not have to be adjusted for special items. In this

approach, the appropriate value per share is the result of multiplying the fair price-to-sales ratio with the expected sales per share of the next 12 months.

$$\text{Fair value per share } = \text{ expected sales per share } \times \text{ fair price-to-sales ratio}$$

Analogous to the practical price-to-book value derivation, the fair price-to-sales ratio can be obtained by comparing net profit margins and the corresponding P/S ratios from listed companies. For example, for members of the consumer products sector at the end of 2013 the relationship can be shown as in Figure 8.5.
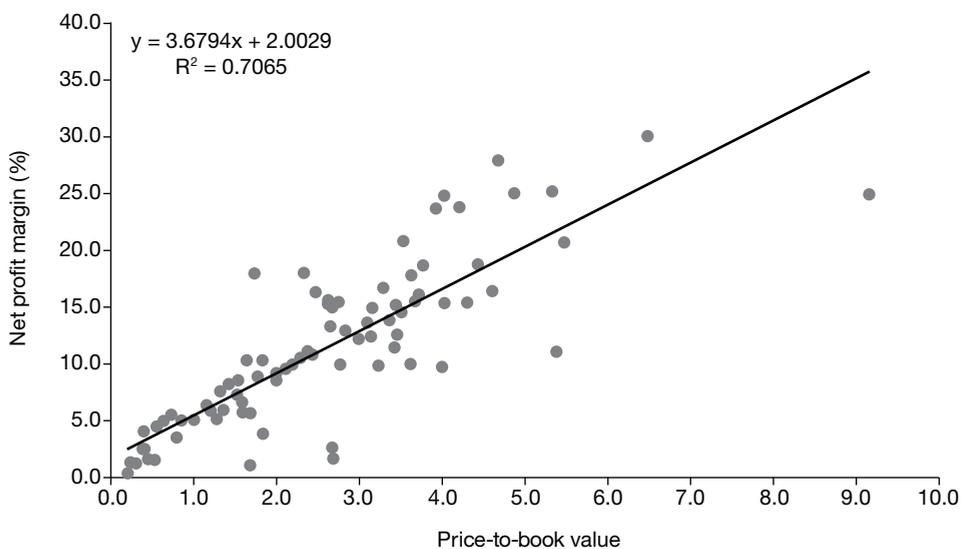
Figure 8.5   S&P 500 consumer products companies: P/S ratio vs net profit margin

Using a broader, more universal set of stocks, the following indicative formula can be used to value companies using the fair P/S ratio:

$$\text{Fair price-to-sales ratio } = \text{ } 22 \times \text{Net profit margin}$$

Although this method usually delivers suitable results, this approach in particular has two major points of criticism. First, the comparison between the theoretical and practical price-to-book formula showed that the market data conveys only a rough picture due to distortions and inefficiencies. Due to the derivation of the formula from a regression equation this heuristic valuation formula is only suitable for profit margins in general orders of magnitude. Especially in the case of very small margins, the derivation of a fair price-to-sales ratio often proves to be difficult. For example, it affects the outcome much more if one has to forecast whether the profit margin will be 1% or 2% than 15% or 16%. The second point of criticism refers to the price-to-sales ratio per se. As already described in the previous chapter, this ratio does not fulfil the requirements of valuation multiples fully, as sales as an entity parameter is put into relation with net profit, which is an equity parameter. One can, however, apply the

price-to-sales ratio for businesses with low debt levels as an approximation, since in this case there is only little difference between market capitalization and the enterprise value. Due to these flaws the fair price-to-sales ratio is suitable only for a first benchmarking of the valuation. Nevertheless, this approach has proven to deliver very robust results.

According to the formula, a company posting a net profit margin of 4.5% would be valued with a fair price-to-sales ratio of 1, i.e. exactly its sales volume. It is also important for this ratio to pay attention to assume adjusted and long-term sensible profit margins. A cyclical business, for example, should not be valued using its peak margins but rather by referring to a sensible average over a full economic cycle. Similar to the price-to-earnings ratio and the price-to-book ratio, one should use the expected ratios of the coming 12 months for the calculation.

Example 8.18 – Fair price-to-sales ratio: Energizer Holdings
As in earlier cases, the example of Energizer Holdings will be used to demonstrate how to apply the fair price-to-sales ratio. The company's net profit margin averaged 8.7% over the last three years. Total sales amounted to $4,567m. Assuming the net profit margin remains constant, the fair price-to-sales ratio can now be obtained as follows, using the formula introduced above:

$$\text{Fair price-to-sales ratio} \ = \ 22 \times \text{Net profit margin}$$

$$\text{Fair price-to-sales ratio} \ = \ 22 \times 8.7\% \ = \ 1.9$$

Energizer currently has 63.3m shares outstanding, leading to $72.1 per share revenue and hence a fair value per share of $137.08. This is considerably higher than the fair values obtained using the P/E ($105) and P/B ($92.88) approaches. In this case, because of the substantial discrepancy between the individual values, a DCF valuation should be undertaken to obtain an additional valuation figure as this will help us to pinpoint the true value of the company.

Example 8.19 – Fair price-to-sales ratio: Starbucks
To gain insight on how to apply the fair P/S ratio, we examine the example of Starbucks during the financial crisis. The US coffee giant Starbucks reports the respective net profit margins shown in Table 8.29 at the end of the fiscal year on 28 September.

Table 8.29   Starbucks: Net profit margin development

Year	Net profit margin
2005	7.71%
2006	7.23%
2007	7.15%
2008	3.02%

The net profit margin decreased continuously between 2005 and 2008. In addition, the result was affected by a high number of special items in the business year 2008, but even adjusted for that the result would have shown a further decline from the 2007 level. The

valuation of the group for the year 2009 is therefore difficult, as no clear trend is discernible. In 2009 Starbucks announced a comprehensive restructuring programme, which led to the assumption that the profit margin would at least stagnate at 7%. Should the stock be undervalued at this level according to the fair price-to-sales ratio derived above, a further analysis would be particularly interesting at this point. At sales of over $10.4bn and a return on sales of 7%, the appropriate price-to-sales ratio obtained by applying the formula is:

$$\text{Fair price-to-sales ratio} = 22 \times 0.07 = 1.54$$

Multiplied with total sales the resulting fair equity value is $16.23bn. At 741 million outstanding shares this comes to a value per share of $22. In September 2008, just after the chapter 11 filing of Lehman Brothers, the share traded at under $10. On this basis a further analysis would have been sensible. A positive result relating to the restructuring and the margin development would have resulted in a recommendation to buy. In fact, the restructuring already showed its full effect in 2010, with profit margins rebounding to well over 8% and the share rising from $10 to $30.

8.2.4   Fair enterprise value-to-EBIT ratio

Entity multiples have the advantage vis-à-vis equity valuation ratios, such as the price-to-earnings ratio or the price-to-book ratio, that they already consider the balance sheet structure by design. The EV/EBIT valuation ratio was introduced in the previous chapter. In this section the determination of the fair EV/EBIT will be explained and concretized by way of case studies.

The fair EV/EBIT is determined through the relationship between the operating result and the capital employed. This profitability ratio was already introduced in Chapter 2 known as return on capital employed (ROCE). The return on capital employed is calculated using the following formula:

$$\text{ROCE} = \frac{\text{EBIT}}{\text{Capital employed}} = \frac{\text{EBIT}}{\text{Shareholders' equity} + \text{Financial liabilities}}$$

The higher the pre-interest return extracted from the capital invested by all capital providers, the higher should be the resulting enterprise value. The valuation logic follows therefore the approach of the fair price-to-book ratio method but considers shareholders as well as creditors. In efficient markets the enterprise and company value should increase with rising ROCE as long as risk remains constant. In fact, this relationship can also be shown empirically, but the explanatory power of ROCE is statistically less significant than, for example, the analysis of the price-to-sales ratio and the price-to-book ratio using net profit margin or return on equity. This is partly due to the higher complexity of the ratio by including the enterprise value, and also due to the fact that the providers of debt usually do not profit from a higher return on the capital employed once a certain minimum profitability threshold is surpassed. For creditors, the profitability of the firm increases the value of debt instruments only to the point at which the repayment of the nominal value is guaranteed without problems. A 1:1

relation between enterprise value and ROCE therefore cannot simply be implied. A company valuation with the help of the EV/EBIT is still interesting, as by including the enterprise value, the firm's capital structure is included in the valuation: also the EBIT is less subject to accounting measures and special items than, for example, net profit. The EV/EBIT is better suited for the comparison of different companies than the price-to-earnings ratio or the price-to-sales ratio. The analysis of S&P 500 stocks displays no significant correlation between ROCE and EV/EBIT. A formal relationship can therefore not be established, due to the limiting interest-bearing debt problem mentioned above. Moreover, the EV/EBIT is ideal for a peer-group valuation. For this, one looks for businesses that are similar to the one to be valued and the EV/EBIT values of the businesses are matched with the respective returns on capital employed or other ratios.

Example 8.20 – EV/EBIT peer group valuation
Very simplified the valuation of business X could look as shown in Table 8.30.

Table 8.30   EV/EBIT vs ROCE

Business	EV/EBIT	ROCE
Peer business 1	8	10%
Peer business 2	10	12%
Peer business 3	12	14%
Peer business 4	14	16%
Business X	?	17%

At a ROCE of 17% and with the help of different EV/EBIT and ROCE pairings, one can expect an appropriate EV/EBIT of 15 for business X, which is to be valued. If the return on capital employed fell to 10%, an EV/EBIT of 8 would be suitable. This type of valuation should only be used as a supplement to established methods. Especially in businesses with high debt levels this valuation method provides useful results, which should be compared with results of other valuation methods. As an option, the EV/EBIT can be substituted for the EV/EBITDA. If the result for the appropriate EV/EBIT for business X is 15, for example, the enterprise value is calculated by offsetting the EBIT with factor 15. To obtain eventually the value of shareholders' equity, the net financial liabilities have to be deducted from the total enterprise value. For an appropriate EV/EBIT of 15, operating earnings of $200m and net financial liabilities of $400m the enterprise value comes to $3,000m (15 × $200m), and minus net debt the fair equity value comes to $2,600m.

The disadvantage of this traditional multiple method is obvious: the entire peer group or individual businesses in it could be undervalued and distort the result. Moreover, the profitability of individual values may not be comparable one-to-one, as there is scope for assessment due to different accounting standards. Nevertheless, this method forms a sensible supplement for the already introduced valuation methods. Furthermore, considering historic EV/EBIT valuations of a business in connection with the development of the return on capital employed is useful for evaluating the current valuation levels.

Example 8.21 – Fair EV/EBIT: Swatch Group

To exemplify the use of historic fundamental and valuation data, the case of Swatch Group before and during the financial crisis is outlined in Table 8.31. For a valuation using the fair EV/EBIT method it is assumed that the current valuation does not reflect the intrinsic value of a business, but that the consideration of previous returns and valuations can provide an adequate valuation range.

Table 8.31   Swatch Group: Selected financial information

			Swatch Group		
CHFm	2010	2009	2008	2007	2006
EBIT	1,436	903	1,202	1,236	973
Market value SE	22,207	14,205	8,032	19,367	15,882
Book value SE	7,101	5,981	5,451	5,329	4,967
Financial liabilities	108	518	529	521	556
Liquidities	2,369	1,645	1,226	1,942	2,176
Enterprise value	19,946	13,078	7,335	17,946	14,262
Capital employed	7,209	6,499	5,980	5,850	5,523
ROCE	19.9%	13.9%	20.1%	21.1%	17.6%
EV/EBIT	13.8	6.9	6.1	14.5	14.6

The data shows that, before the crisis of the financial markets in 2008/09, the Swatch Group had a stable return on capital employed of around 20% and was trading at an average EV/EBIT of 14.5. The valuation fell noticeably to an EV/EBIT of just 6, during the financial crisis, whereas the ROCE only receded to 14% and swiftly returned to the pre-crisis level in 2010. If one assumes that the return on capital employed stays at 20%, an EV/EBIT of 14.5 can be considered appropriate. At a fair EV/EBIT of 14.5, multiplication with the expected EBIT for 2011 results in the fair enterprise value. At an operating result of CHF 1,600m in 2011, for example, the fair company value is therefore CHF 23,200m. Due to the net cash position of CHF 2,200m the hypothetical fair equity value comes to CHF 25,400m.

8.2.5   Fair EV/sales

The fair EV/sales ratio constitutes another very powerful and easy to apply valuation approach. As outlined in Chapter 7, the company and enterprise value should rise with increasing profitability. Profitability is measured by using the now well-known net profit margin, EBIT margin or EBITDA margin. The reasoning behind the fair EV/sales multiple approach is simple: the higher the profit margins, the more valuable becomes each unit of additional revenue. Hence, in the same manner as net profit margin and the price-to-sales ratio are positively correlated, there should be such a relationship between EV/sales and profitability. As the EV/sales multiple belongs to the enterprise value universe, a profitability figure relevant for both, equity and debt holders, has to be chosen. Whilst the EBIT margin as well as the EBITDA margin are fine, we stick to the EBITDA margin in this case due to the lower sensitivity for accounting effects of the EBITDA as opposed to EBIT.

Regressing the EV/sales valuation of S&P 500 stocks against their respective EBITDA margin figures gives the relationship shown in Figure 8.6.
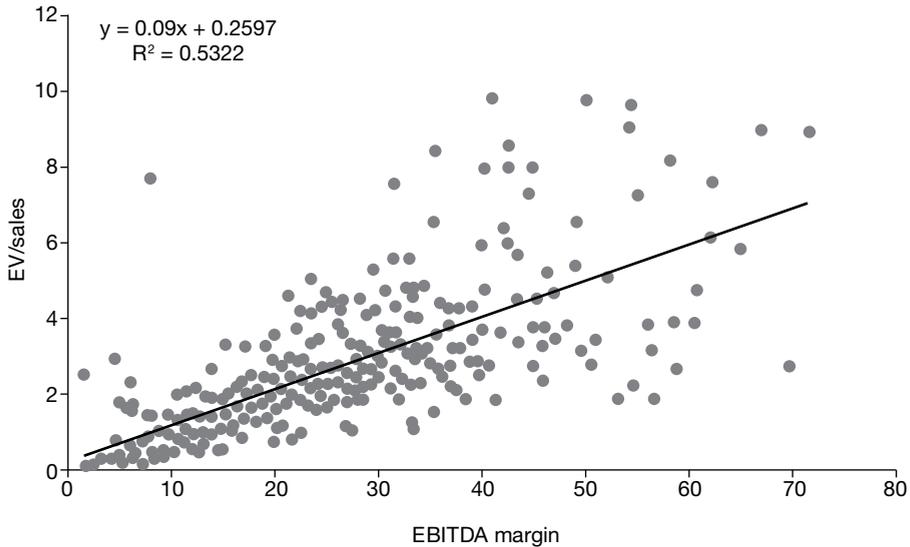
Figure 8.6   S&P 500: EBITDA margin vs EV/sales

The regression gives the following fundamental relationship between EV/sales and EBIT-DA margin:

$$EV/sales \ = \ 9.6 \times EBITDA \ margin \ + \ 0.24$$

Hence, for a company posting an EBITDA margin of 25%, the appropriate EV/sales valuation would be 2.64 as long as the regression applies. As a heuristic approach, this rule works very well in order to judge a given valuation level of a company. However, to examine the valuation more closely, the special characteristics of every company should be taken into consideration. Obviously, a company exhibiting very stable EBITDA margins would deserve a higher fair EV/sales valuation than a very cyclical one with high fixed costs and hence fluctuating margins.

Against this background, it is sensible to run further regressions on an industry or peer group level that fits our valuation target.

The two graphs in Figure 8.7 show the EV/sales vs EBITDA margin regression for the 'consumer, cyclical' and 'consumer, non-cyclical' sectors. First of all, the R^2 is significantly higher than in the broad S&P 500 evaluation above. This is unsurprising, since the individual sector characteristics add further explanatory power. The regression equations for the two sectors are as follows:

$$EV/Sales_{Consumer, \ cyclical} \ = \ 10.8 \times EBITDA \ margin - 0.02$$

$$EV/Sales_{Consumer, \ non-cyclical} \ = \ 12.4 \times EBITDA \ margin \ + \ 0.01$$

Based on this approach, a cyclical consumer company with an EBITDA margin of 15% would be assigned a fair EV/sales of 1.6 whereas a non-cyclical would be fairly valued at an

enterprise value of 1.87 times total sales. This 16.9% premium makes sense in the light of non-cyclical companies having more stable and therefore more valuable profit margins.

The following case study exemplifies this heuristic valuation approach in the case of two non-cyclical companies: Procter & Gamble and Colgate-Palmolive.

Example 8.22 – Fair EV/sales: P&G vs Colgate-Palmolive

Table 8.32   Procter & Gamble vs Colgate-Palmolive: A comparison

In US$m	Procter & Gamble	Colgate-Palmolive
Sales	84,167	17,085
EBITDA	17,463	4,314
Financial liabilities	31,543	5,230
Cash and equivalents	5,947	884
Shares outstanding	2,930	960

Source: Annual reports [2012]

Based on the figures shown in Table 8.32, P&G achieved an EBITDA margin of 20.7% whereas Colgate-Palmolive posts a 25.2% margin. This translates to the following fair EV/sales valuations according to the heuristic approach:

$$\text{EV/Sales}_{\text{Procter \& Gamble}} = 12.4 \times 20.7\% + 0.01 = 2.58$$

$$\text{EV/Sales}_{\text{Colgate-Palmolive}} = 12.4 \times 25.2\% + 0.01 = 3.13$$

The fair value per share is now derived by calculating the total fair enterprise value, subtracting net debt and dividing the resulting equity value by the fully diluted number of shares outstanding. In the case of Procter & Gamble the steps are as follows:

$$\text{Fair enterprise value} = \text{sales} \times \text{fair multiple} = \$84,167\text{m} \times 2.58 = \$217,111\text{m}$$

$$\text{Fair equity value} = \text{fair enterprise value} - \text{net debt} = \$217,150\text{m} - \$31,543 + \$5,947\text{m}$$
$$= \$191,554\text{m}$$

$$\text{Fair value per share} = \frac{\text{fair equity value}}{\text{shares outstanding}} = \frac{\$191,554\text{m}}{2,930\text{m}} = \$65.38$$

In the case of Colgate-Palmolive, a fair value per share of $51.17 is obtained. At the end of the respective balance sheet days, P&G was valued around $78 per share, whereas Colgate-Palmolive traded at $53. This analysis would suggest looking deeper into P&G as the share may potentially be overvalued. The higher valuation can, however, be justified given P&G's superior product and brand portfolio. Another factor to be examined is whether rising sales and EBITDA margin expectations might justify the premium at which the P&G shares are seemingly trading (Figure 8.7).
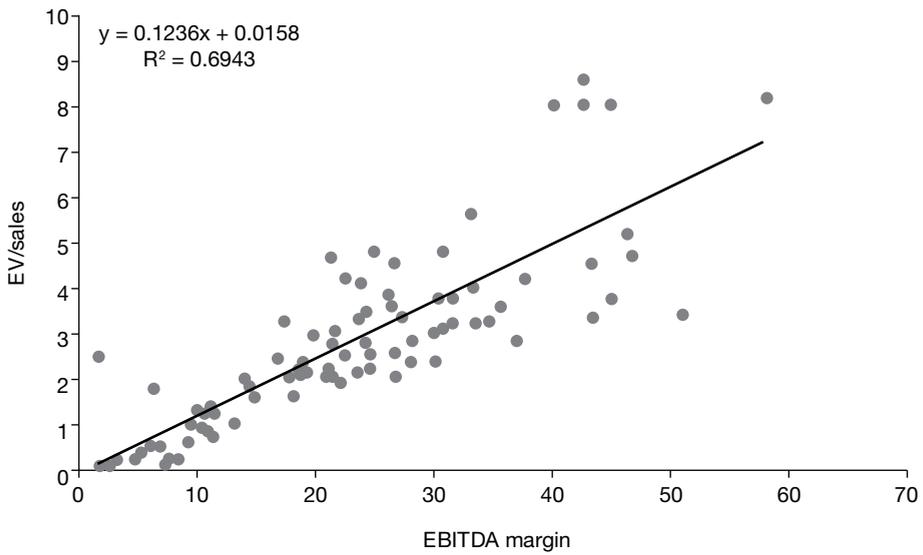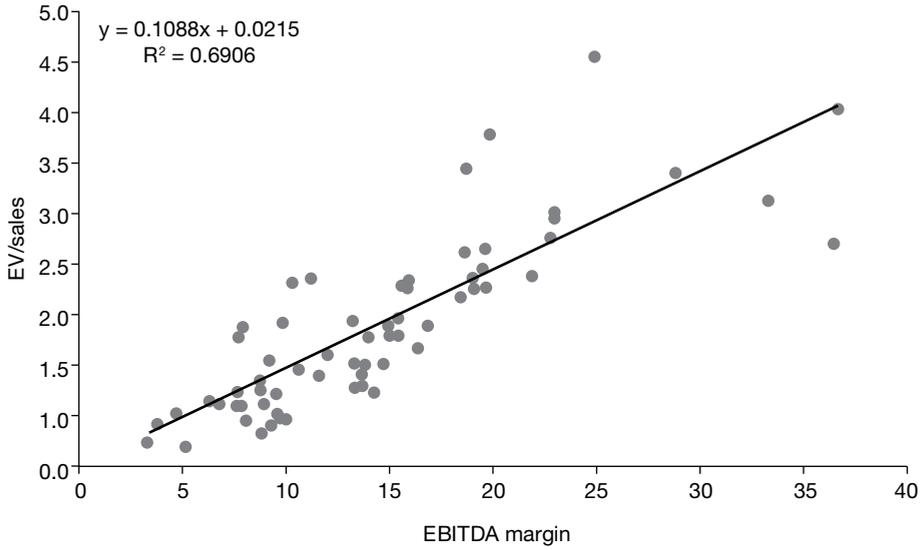
Figure 8.7   S&P 500: EBITDA margin vs EV/sales for consumer cyclical and non-cyclical companies

8.2.6   Multiple valuation: mathematical background

As in equity multiples the share price or the market capitalization is in the numerator, there is a mathematical connection between the individual ratios. Dividing the price-to-sales ratio by the price-to-earnings ratio results in the net profit margin.

$$\frac{\text{Price-to-sales ratio}}{\text{Price-to-earnings ratio}}$$

$$= \frac{\text{Net profit}}{\text{Sales revenue}}$$

$$= \text{Net profit margin}$$

Similarly, dividing the price-to-book ratio by the price-to-earnings ratio results in the return on equity.

$$\frac{\text{Price-to-book ratio}}{\text{Price-to-earnings ratio}}$$

$$= \frac{\text{Net profit}}{\text{Shareholders' equity}}$$

$$= \text{Return on equity}$$

Consequently, a company at a given profitability can only display fair valuation ratios, which correspond to the supplied formulae. A brief example will illustrate this context: Value Inc. exhibits a long-term achievable return on equity of 16% and a fair price-to-book ratio of 2. With the help of the equation

$$\frac{\text{Price-to-book ratio}}{\text{Price-to-earnings ratio}} = \text{ return on equity}$$

the fair price-to-earnings ratio can now be determined, as the price-to-book ratio and return on equity are 'known'. Converting the equation results in:

$$\frac{\text{Price-to-book ratio}}{\text{Return on equity}} = \text{price-to-earnings ratio}$$

If this is applied to the example above, the resulting fair price-to-earnings ratio is 12.5:

$$\frac{2}{0.16} = 12.5$$

If the analysis results in *one* fair multiple, the missing multiples can easily be calculated using the supplied formulae. If the fair price-to-book ratio and the return on equity are given, it means that only one mathematically correct price-to-earnings ratio can exist. At least in

theory. As company valuation is not an abstract science, these number games are of only limited use. It is essential to approach company valuation from different angles, as one single valuation multiple often is not enough for the assessment and may be flawed. Using this one multiple and continuing with the formula above to obtain other multiples would not add value to the assessment. The result of an extensive valuation can show a fair price-to-earnings ratio and a price-to-book ratio that do not match exactly mathematically. Fair valuation ratios should always be determined independently of each other, and then establish the overall company value together with the result of the DCF analysis. In this way individual results can be mutually scrutinized and substantiated. The mathematical background does not serve the actual valuation, but it should at least be considered in the assessment process.

8.2.7   Liquidation approach/net-asset-value approach

The preceding methods attempt, on a going concern basis, to obtain the company value by means of the discounted cash flow and market-based approaches. The liquidation approach values a business on the basis of its immediate liquidation. The company value is in this case determined by way of the liquidation value. Provided that the assessment of the assets on the balance sheet is correct, the sale of all assets would leave precisely the book value (shareholders' equity) for shareholders.

Example 8.23 – Liquidation/NAV approach
Locust Inc. has assets worth $100m at its disposal. Half of them consist of the company's factories and a vehicle fleet, a further $30m is tied up in receivables and $20m exists in the form of cash. On the liabilities side are $5m shareholders' equity and $95m debt, as Locust Inc. has made generous use of the leverage effect. As a result of the interest-bearing debt, the business is now deep in the red.

How high is the intrinsic value of Locust Inc.? Due to the high interest payments, only negative free cash flows can be expected in future, which leads to the assumption that the fair value will be negative – or zero. On the premise that the assets are priced correctly and are easily disposable, the business could be liquidated at net proceeds of $5m. In this process, the entire assets ($80m fixed assets and receivables as well as $20m cash) would be turned into cash, debt worth $95m paid to existing creditors and the remaining $5m distributed to the owners. The business would therefore be literally worth more dead than alive.

Generally a stock trades below the book value if it is unable to earn its cost of equity. However, if the company can be liquidated at any time, the market value should never fall below the book value of shareholders' equity as long as the assets are reported correctly on the balance sheet. In most cases, a liquidation of the business is not an option due to the shareholder structure, the expectation (or management's hopes) of future higher returns, hard-to-sell fixed assets, or for political reasons.

Beside these factors, the reported value of assets may be too high. It is questionable whether in case of liquidation the entire assets can actually be sold at the balance sheet value. After all, the existing asset base wasn't able to generate an appropriate return. Businesses that rely on liquidating their assets usually achieve below-average prices, as the buyer is in a better bargaining position. The most common problem is intangible assets, which are often absolutely unsaleable. These are for example patents, IT, concessions and licences, but also capitalized development costs. As a consequence of takeovers, many businesses also display high goodwill positions. As intangible assets often have individual characteristics, a correct

monetary assessment is difficult. Intangible assets are therefore generally completely offset against shareholders' equity to achieve a conservative liquidation value.

A company with a balance sheet total of $100, intangible assets of $10 and shareholders' equity of $25 would therefore have only $15 in equity post-adjustment. A further modification is the so-called 'Tobin's Q'. Here, assets are valued at replacement values and compared with the current market value. As this effectively corresponds to an individual valuation of all assets, which from the viewpoint of an external evaluator cannot be carried out, this method is only rarely used in practice.

Example 8.24 – Liquidation/NAV approach: Dempster Mill
The liquidation approach is probably best exemplified by Warren Buffett himself. In the early 1960s, Buffett bought into Dempster Mill, a manufacturer of farm implements and water systems. Since the company showed little durable competitive advantage and posted only small profits, Buffett valued the company's assets on a stand-alone basis using the assumptions shown in Table 8.33.

Table 8.33   Dempster Mill: Derivation of liquidation value

(000s omitted)	Assets			Liabilities	
	Book figure	Valued @	Adjusted valuation		
Cash	$166	100%	$166	Notes payable	$1,230
Accts. rec. (net)	$1,040	85%	$884	Other liabilities	$1,088
Inventory	$4,203	60%	$2,522		
Ppd. exp. etc.	$82	25%	$21	Total liabilities	$2,318
Current assets	**$5,491**		**$3,593**		
Cash value life ins.	$45	100%	$45		
Net plant equipment	$1383	58%	$800		
Total assets	**$6,919**		**$4,438**		
				NV per books	$4,601
				NV adjusted	$2,120
				NV per share @60,146 shares	$35.25

Source: Buffett Partnership Letter 1962

In the first step, Buffett discounts the assets in order to arrive at their realizable value. This reduces the total assets of $6,919,000 included in the original balance sheet to a figure of $4,438,000. Then liabilities are subtracted in order to get the net adjusted value of the assets. Dividing this amount by the total number of shares outstanding gives the final liquidation value per share.

The above real-life example shows the uncomplicated beauty of this approach. There are very few forecasts involved, our only concern is what the assets would be worth in an auction situation or when actually sold off. Generally, Buffett's values will always appear reasonable, but must be adjusted on a case-by-case basis. For example, the realizable value of the receivables of a company with a high delinquency rate among its customers will be lower than the 85% used in this case for example. The same applies to the realizable value inventories,

particularly for companies in fast-paced or rapidly changing industries where the full amount might not be recoverable and which therefore should be reflected in the calculation.

8.3   FINANCIAL STATEMENT ADJUSTMENTS

Financial statements differ globally because of differences in accounting standards and reporting requirements. The aim of the adjustment process is to prepare the financial statement in order to render ratios comparable, correct for one-off items and carry out value adjustments for incorrectly reported asset and liability values.

The calculation of the ratios introduced in the preceding chapters should only be carried out on the basis of a financial statement adjusted for special items. Corporations without special items and with a negligible amount of intangible assets are usually only marginally affected by adjustments, and can do without any adjusting of their figures. Intangible assets, especially goodwill, are balance sheet positions, which have to be critically inspected. Furthermore, one-offs in the income statement and further over- or undervalued positions on the balance sheet have to be corrected.

Intangible assets

A description of intangible assets, additions and disposals, as well as the necessary depreciation, is listed in the notes of the financial statement. When verifying intangible assets, one should distinguish between goodwill and other intangible assets (e.g. trademark rights, concessions, software). While the latter are often non-critical, goodwill has to be analysed in detail. In certain circumstances it may be necessary to analyse past annual reports to understand which takeovers are responsible for and reflected in the goodwill position. As a reminder: goodwill is the premium paid on top of the revalued book value (= shareholders' equity) of the target business at takeover. Now it has become clear in the preceding chapters that certain businesses certainly deserve a premium on their book value (price-to-book ratio >1). To evaluate whether the reported goodwill is recoverable or not, it is recommended to carry out a rough assessment of the target business by considering key valuation metrics. If the target company achieved, and still achieves, for example, a sustainable return on equity of 30% and was taken over at twice the book value, the purchase price can be regarded as fair. The rule 'better safe than sorry' applies. If the target business develops worse than expected after the takeover (for instance due to integration issues), the goodwill should be reassessed, and if necessary corrected. Shareholders' equity is reduced by the correction amount.

The valuation problem is simpler for other intangible assets such as trademark rights and software, as internally generated intangible assets may only be reported at cost. Purchased intangible assets, especially trademark rights and licences, should be analysed briefly for recoverability. As such an analysis can objectively only be carried out with difficulty, the main question is what the maximum amount would be that a direct competitor would pay for the intangible asset.

It is important to bear in mind during the accounting of trademarks that according to the IFRS, intangible assets are generally not subject to planned depreciation. This usually causes irregular, but often material, impairment charges.

Fixed assets

The aim of the financial statement adjustments is to uncover hidden overstatements and potential reserves. In particular, companies with a far-reaching history often carry considerable amounts of hidden assets on their balance sheet, as plant, for example, has already been depreciated completely but is still in use. The same applies for plots, since some businesses have land and plots at their disposal which were acquired many years ago and now have increased significantly in value. Although there is scope to revalue these fixed assets under current reporting standards, a completely up-to-date valuation can still not always be made. Such an estimation is difficult to make with the information given. It may help to visit the business on-site, talk to employees and the management, and study the company's history, in order to gain information. In particular the existence of consistent extraordinary gains from disposal of fixed assets is a reliable indicator for hidden or undervalued asset potential.

Current assets

Current assets are usually valued closer to market prices, which rarely leads to major adjustments. A short analysis of inventory and receivables quality is nevertheless advisable. If bills are, for example, increasingly paid with delay or there are increasing default rates, it may be worthwhile carrying out one's own valuation of current assets. The ratios for working capital management in Chapter 4 can be used for this analysis.

Deferred tax

Deferred tax assets or liabilities arise from temporary differences in asset or liability values for tax purposes as compared with the carrying value shown in the financial statements. Applying the principle of prudence, deferred tax receivables and deferred tax liabilities should be offset against each other, as these positions are tainted with substantial uncertainties with regard to future loss-offsetting potential. Moreover, deferred tax assets usually cannot be disposed of individually. In case of liquidation, these receivables cannot be converted to cash. In case of doubt, this position should be completely offset against shareholders' equity.

Pension provisions

Pension provisions are liabilities arising from corporate pension schemes. One has to distinguish between defined benefit (DB) and defined contribution (DC) schemes. The latter are less problematic with respect to the balance sheet analysis, as the company merely guarantees the employee to manage his or her contributions and to pay them out again at a later time – a shortfall in cover is not possible. Defined benefit schemes, however, regularly cause problems as the pension liabilities, stemming from payments granted to employees, exceed the pension fund's asset base. If the pension fund cannot increase the assets accordingly or the life expectancy of the employee rises, a shortfall in cover can occur, leading to an underfunding. In this case, the company is usually obliged to fill the gap through special contributions. As these payment obligations are unknown in size and duration, they are reported as provision and not as liability. As long as DB pension provisions are small amounts, they

can continue to be treated as provision and usually do not affect the balance sheet analysis. However, especially US corporations have in recent years experienced significant losses due to excessive return expectations of their pension funds. As these expenses are usually directly offset against shareholders' equity and hence do not appear in the income statement, many market participants do not notice these losses. Cereal maker Kellogg, for example, reported losses due to pension revaluations of more than $1bn in 2008. If management assumes too high return figures on its pension assets, they should be revised with new and more appropriate assumptions and the difference should be offset against shareholders' equity. For reasons of caution it is advisable to treat uncovered pension provisions entirely as financial liabilities. Meanwhile, many businesses have started to close their DB pension plans and only offer defined contribution plans, which will over time relax the pension problem. Nevertheless, the risks of DB plans will continue for decades as long as former employees receive pension payments out of them.

8.3.1   Pro-forma statements and one-off effects

Statements that contain many asterisks and exponents, i.e. annotations, should be examined particularly carefully. The income statement should always be adjusted and corrected in order to create a uniform valuation basis. Especially in downturns, companies often launch restructuring programmes, whose expenditure is reported as a special item and one-off effect. In many cases, this method is legitimate, as the expenditure is indeed a one-off event. Nonetheless, some businesses have started to retouch their earnings situation by reporting alleged special items and one-off effects. A detailed analysis of these special items with subsequent adjustment, as well as an increased focus on the cash flow statement, is recommended in these cases. The following approach is often used in downturns: if there is any indication that there will be negative earnings, a restructuring programme is initiated, which is directly and in full reported as a provision (and therefore as an expense on the income statement). The loss arising from it is treated as a special item and the release of the provision (which was set too high as the case may be) leads to extraordinary income in the following years.

Example 8.25 – Financial statement adjustment: AOL Time Warner

Table 8.34   AOL Time Warner: Balance sheet

AOL Time Warner			
Assets	$m	Equity and liabilities	
Property, plant, equipment	12,669	Shareholders' equity	152,027
Goodwill	127,420	Long-term debt	22,792
Other intangible assets	44,997	Accounts payable	2,266
Other n-c assets	13,167	Other liabilities	31,410
Cash and equivalents	719		
Other current assets	9,532		
Balance sheet total	208,504	Balance sheet total	208,504

Source: AOL Time Warner (2001) [US GAAP]

Before adjusting the balance sheet (Table 8.34), AOL Time Warner posts solid ratios:

● equity ratio: 72.9%
● gearing: 14.5%.

The critical balance sheet reader will notice the extremely high proportion of goodwill, which comes to 83.8% of shareholders' equity. In a conservative balance sheet adjustment the entire goodwill is offset against shareholders' equity and results in the new, adjusted book value of $24,607m. Even this value adjustment could be more drastic, as there is an additional $44,997m in intangible assets, which may, however, be recoverable. After the adjustment described above the calculated values are now as follows:

● equity ratio: 30.3%
● gearing: 89.7%.

After the correction of the goodwill, which had been set too high, the new picture of the group is far more negative. The quality of the goodwill is doubtful, because the company had reported a loss of $4.9bn in the reporting year. In the following year there occurred what attentive balance sheet analysts had already suspected. AOL Time Warner suffered a loss of $98.6bn (sic!) in the course of goodwill impairments and further value adjustments. Before the adjustment the figures of the group conveyed a false picture. Especially in businesses with a low proportion of fixed assets or inventory, a critical adjustment is important, as according to experience intangible assets are often prone to cause large impairments.

8.4   OVERVIEW OF THE VALUATION METHODS

This chapter introduced various approaches for the valuation of companies. It became clear that there is not one generally applicable valuation method, but that one has to select various approaches and analyse the results according to the situation. In the end, besides the numerical part of the valuation process, also the qualitative examination of a business plays a large role. The intellectual appeal of company valuation originates precisely in this approach: determining the intrinsic value consists of merging quantitative facts with qualitative knowledge in a suitable model or set of models. The DCF model is especially suitable for businesses with a projectable business development and forms the theoretical basis of any valuation. Valuation multiples can be an alternative, or be used for verifying and extending the DCF model. When applying valuation multiples, one should always decide whether equity multiples, entity multiples or a mix of both are suitable for the prevailing valuation situation. Moreover, 'fair multiples' can be determined qualitatively via the modified approach, which was introduced here, or in individual cases they can be derived from a peer group. Fundamentally the fair price-to-earnings ratio, the price-to-book ratio and the EV/EBIT are of interest. In companies which are currently in a restructuring phase, or have no or only severely fluctuating earnings, the application of the price-to-sales ratio or EV/sales is recommended. Finally, the liquidation method can be used to determine the lower valuation margin. Table 8.35 gives an overview of the advantages and disadvantages of the individual valuation methods.

Table 8.35 Valuation methods: Overview

Method	Advantage	Disadvantage
DCF valuation	• Theoretically sound method • Uses free cash flow	• Requires steady cash flows that can be estimated reasonably • Susceptible to flaws
Fair price-to-earnings ratio	• Practical valuation method • Simple, quick application	• Earnings do not correspond to cash flow • Room for manoeuvre
Fair price-to-book ratio	• Quantitative and qualitative derivation • Simple, quick application	• Determination of cost of equity • Scope for accounting effects
Fair price-to-sales ratio	• Can be used despite no earnings • Sales are difficult to manipulate	• Sales have no significance for company value
Fair EV/EBIT	• Enterprise value accounts for debt • Considers returns of creditors and equity providers	• Debt fluctuates seasonally • EBIT subject to one-offs
Liquidation	• Lower end of valuation range can be determined • Alternative, static method	• Neglects business prospects • Liquidation prices difficult to determine

With the models mentioned above there is a broad arsenal of valuation methods. Nonetheless, not every company is suited for a comprehensive valuation. Absent knowledge of the market, out-of-date data or an insufficient evaluation of the business model makes a sound company valuation impossible. As long as one stays within one's own circle of competence, the valuation models introduced above form a good indicator for the bandwidth of the intrinsic value of a company. It is sensible to apply at least two different models. Doing so helps avoid mistakes (e.g. because of excessive growth rates or too low discount factors in the DCF model) and serves the critical assessment of individual results. In the case of listed companies the current stock price should not be looked at before the analysis in order to ensure that the valuation is unbiased and independent. A recommended approach is to read annual reports from cover to cover. This piece of advice, which may seem trivial at first glance, has the advantage that one looks at the business model first and subsequently at the consolidated financial statement. Many valuations are too strongly oriented towards the figure section, which is usually reported at the back of the annual report. In certain circumstances, this approach may bring about a positive evaluation of the company based on the figures, which could be called 'quantitative bias' and is not helpful for an unbiased valuation. However, if the business model is convincing, without even having looked at the figures, studying the consolidated financial statement will not be disappointing, unless the management is doing a bad job, which is also a useful insight.

The final and most important point of company valuation is self-discipline. After a particularly thorough analysis many investors and analysts feel compelled to give a positive valuation because otherwise the produced work would be in vain. This mistake can potentially be very expensive. It is not and must not be mandatory for an analysis to close with a positive purchase decision.

9
Value Investing

Be fearful when others are greedy and greedy when others are fearful.

Warren E. Buffett

This final chapter attempts to bridge the gap between the theory of valuation and the practice of investing. An investment can be profitable if there is sufficient discrepancy between the prevailing stock price and the investor's own valuation. Company valuation is never a precise science but an art fraught with flaws and errors due to the investor's own valuation input. An adequate margin of safety is the inalienable precondition in order to justify the investment. This safety margin forms, in a way, an insurance against one's own inability and misjudgements as well as uncertainties regarding future developments. A precise and final company value per se cannot be determined. However, when buying at a considerable margin of safety, someone else has to be selling. Why should other investors be prepared at all to give away a stock below its intrinsic value?

It can be assumed that markets, and in particular stock markets, are efficient valuation machines in the long run. In the short term, however, phases characterized by overreaction as well as rather subdued times can be observed in regular intervals. Not only have there been continuous market bubbles and bursts since the tulip mania in 1630 in the Netherlands, but the temporary accumulation of irrationality seems to have clung to the masses ever since. The aim of value investing is to find incorrectly priced securities and to exploit these inefficiencies. In contrast to this, there are followers of the so-called efficient market hypothesis. This theory claims that stocks are correctly valued at all times and all available information is contained in the share price. According to this theory no arbitrage, i.e. a risk-free profit, is possible. Whilst the long-term development of shares in the model is correctly explained by means of the fundamental company data, the efficient market hypothesis does not give an explanation for the short-term overreaction and subdued phases. As these are often based on irrational behaviour on behalf of the market participants, they cannot be embedded in the theory in any case. Moreover, the efficient market hypothesis makes the dubious assumption that information can be put on an equal footing with knowledge. It cannot be assumed that existing information is, at all times, correctly included in the price, or at all relevant to the valuation. According to this theory, it makes no sense to look for undervalued shares as the market prices all shares correctly at all times. As a consequence, a long-term excess return vis-à-vis the market is deemed to be impossible, or based on coincidence. Along the lines of the motto 'the market is always right', the investment recommendation of these theorists is to mimic the broad market by investing passively, for example by means of an index fund. There are good reasons, though, to doubt the validity of the efficient market hypothesis, at least in the short term. Investors like Warren Buffett, Charles Munger, Walter Schloss or Bill Ruane achieved and are still achieving above-average results by actively selecting a few undervalued shares. The possibility of exploiting irrationally high or low prices arises because market participants – in contrast to the claims of the efficient market theory – are not coolly

calculating machines, but are people who are driven equally by fear and greed. The bubbles of the past are testimony to these irrational excesses.

At the time of the New Economy, air castles were traded at prices in the billions. Less than seven years later, the US house price bubble burst – here, again, market participants believed prices would rise for ever. One of the most impressive proofs of irrational valuations is the partial spin-off of smartphone manufacturer Palm from the parent group 3Com in March 2000. 3Com spun off 5% of Palm shares to its shareholders, who were supposed to receive 1.525 Palm shares per share held. On the day of the spin-off Palm shares rose by more than 150% to $95, while 3Com shares lost 20% of their market value and closed at $81. As 3Com still held 95% of Palm shares, the remaining 3Com business areas had a negative value of $63.88 per share ($95 × 1.525 – $81). This corresponds to a negative company value of $22bn for the remaining business areas of 3Com. In this case, the stock market obviously made an irrational valuation. The Palm share traded at a price-to-earnings ratio of an astronomical 1,350. The fall of Palm happened a short time later and ended with a series of losses and the takeover by Hewlett-Packard in the autumn of 2010. In Chapter 7, the case study of Medion was picked up, when the business was from time to time trading below its net cash holdings. These are only two examples of how irrationally the stock market acts in times of excessive greed or fear. Intelligent investors use these discrepancies to their advantage.

Traumatized by falling share prices, investors then resemble small children. The former object of desire is dropped instantly and in some cases trades significantly below its fair value. It is not surprising that the best investment opportunities arise after the bursting of large bubbles, i.e. in times of great fear and uncertainty. Warren Buffett summarized this in his legendary quote as follows: 'I will tell you how to become rich. Close the doors. Be fearful when others are greedy. Be greedy when others are fearful.'

The fundamental idea of value investing consists of making a profit from price and value discrepancies as a consequence of inefficient markets. Naturally, this type of investing would not be possible if markets priced shares per se, and did so always, inefficiently. Benjamin Graham, intellectual father of the value investing approach and Warren Buffett's teacher, described this context in his famous formula: in the short run, markets are driven by moods and opinions (voting machine), but in the long run they resemble exact scales (weighing machine). Thus in the long run, the markets, which are irrational in the short run, will recognize the true value of a business and value the shares accordingly. Especially when it comes to large companies that attract a lot of attention, a valuation close to the fair value can be observed in normal times, which supports this theory.

The core of this investment philosophy is that the share is treated as a proportion of an actually existing business, and not as an abstract share price, which flickers into a different direction every second. Graham summarized this approach with the words: 'Investment is most intelligent when it is most businesslike.' It is important to understand that the current share price does not necessarily reflect the true value of a business. The share price rather indicates at which price market participants are currently prepared to buy or sell. Warren Buffett expressed this even more distinctly: 'As far as I am concerned, the stock market doesn't exist. It is there only as a reference to see if anybody is offering to do anything foolish.'

When buying shares, it is helpful to assume that one is not just buying a small proportion but the whole business. In order to do justice to the long-term sustainable approach, valuations and investments should therefore be carried out from the viewpoint of an entrepreneur. The previous chapters described important factors for the success of a business. Besides considering markets, business model, products and financial ratios as well as the company

valuation, the right purchase price is decisive. The 'margin of safety' concept serves this purpose.

9.1   MARGIN OF SAFETY APPROACH

The margin of safety is the result of the difference between the fair value of a stock and the actual market price. The concept of safety margins originates in Graham's works *Security Analysis* (1934) and *The Intelligent Investor* (1949).

The more distinct the margin of safety, the more interesting and – if the analysis is correct – the safer the investment. As company valuation never reaches an exact company value, it is important to request a certain discount on the intrinsic value of a share. Especially when it comes to businesses that are experiencing a temporary period of weakness, prudent investors should request a safety margin of at least 50% to justify a purchase. The requested safety margin should thereby increase with the risk of a business. Cyclical businesses for example or those that suffer financially are a suitable investment object only if a particularly high safety margin exists. In contrast to that, a lower safety margin is acceptable for easily predictable and solid business models.

If the intrinsic value per share is, for example, $5 and one requires a safety margin of 50%, the maximum purchase price is $2.50. Any price level above this threshold reduces the safety margin and hence increases risk. A high safety margin makes a positive result possible even in the case of an incorrect valuation (assume the actual fair value turns out to be only $4). The margin of safety is therefore, in a way, an insurance against one's own (mis)judgement.

In practice it is sensible to aim for a safety margin of at least 30% before making a purchase, whereby this value can be adjusted up or down depending on the industry, economic situation and interest rate level. This value contains both the fallibility of one's own valuation and the uncertainty of future events. It does not make sense buying shares that trade at $15.50 but whose intrinsic value is estimated to be $16.00. Company valuation is more of an art than a precise science.

9.2   VALUE INVESTING STRATEGIES

Value investing can be divided into several subcategories. The core business of every value investor should be to quest for quality companies with a long-term competitive edge at a cheap price. As the purchase price always determines the return, principally every company should be considered as an investment object as long as there is an attractive price/value relation. Whilst this purchase price-oriented approach was heavily influenced by Benjamin Graham, Philip Arthur Fisher and Graham's student Warren Buffett count as important advocates of the long-term-oriented 'quality approach'. Besides long-term equity investments, value investors can also follow different, usually more short-term-oriented strategies and approaches.

9.2.1   Quality investments

Quality businesses are the central building block of a long-term-oriented value portfolio. Choosing and analysing businesses with long-term competitive advantages and a competent management is often a drawn-out process. This is exacerbated by the fact that many quality

stocks often trade at relatively high price levels, which means that the buying process requires great discipline. A company which has been found to exhibit the characteristics of a high-quality business during the analysis process is not necessarily an attractive candidate at the current price level. Businesses that have a strategic competitive advantage usually stand out due to high margins and return on capital, which means that these characteristics can be actively used for a preliminary analysis. The qualitative characteristics for assessing the value of a business model were already described in detail in Chapter 5. Quality businesses distinguish themselves by their ability to use capital efficiently and to make use of the compounding interest effect for years. These businesses should be able to extend their competitive position and therefore their cash flow generation over the years. This is what makes these companies a suitable long-term investment.

9.2.2   Cigarbutt investments

Value investing consists essentially of long-term investments in cheap quality stocks. Another, distinctly shorter-term value strategy focuses on companies without major quality characteristics, but which can be bought at particularly attractive prices. Buffett calls these types of shares 'cigarbutts', as these companies lack a particular competitive edge and therefore have only limited long-term potential, but can still reach a fair level in the short or medium term. This category comprises shares of old-fashioned or slowly growing industries, which are neglected by the market. These are quite often companies that are profitable within their niche but still trade below their book value. As the return on an investment depends on the earnings and the duration, short- to medium-term cigarbutt investments can form a sensible addition to a long-term value investment in quality stocks.

Value investing therefore does not only limit itself to businesses with an outstanding business model, but rather focuses on buying shares at a substantial discount on their fair value or, in the case of some cigarbutt investments, their liquidation value. The term 'cigarbutt' is derived from the fact that there is some residual tobacco even in stubbed cigars, which can be extracted. This is also the intended hold time for these investments: as cigarbutt businesses have no or only a slight competitive advantage, the value should be realized as quickly as possible. From the viewpoint of the investor, the major difference between quality investments and cigarbutts is the time horizon. Whilst quality businesses increase in value from day to day and therefore should be held as long as possible, cigarbutts have only limited potential which should be released in the shortest possible time.

9.2.3   Net-nets/arbitrage

This investment approach goes back to Benjamin Graham and values a business exclusively based on assets that can be quickly liquidated. The net-net approach is based on current assets, which are set at market values, minus liabilities. When adjusting current assets, cash and cash equivalent should be set at 100%. Receivables should be adjusted for bills that are long-overdue and inventory should also be marked down to a realistic value in order to use conservative numbers. A net-net investment is therefore characterized by the fact that a business can be acquired for less than its easily disposable assets less liabilities. In this case, future prospects play a minor role, as the valuation is made on the basis of liquidation. The net-net value of a business can therefore be regarded as a valuation floor. The safest type of net-net opportunities can be found in businesses which are valued at a lower price than their

net cash holdings. In this case, the total net cash could, in theory, be distributed to share-holders and thus value created, without dissolving the business itself. As this approach is, at least in the first step, purely based on the relation of the balance sheet values to the current market value, these situations can be uncovered by means of a stock screener. However, as shareholders usually do not have a direct influence on the management, investors should also examine, besides the existence of a net-net situation, whether there are potential triggers, i.e. events, which would actually release the tied-up cash or hidden assets in the business. In the case of companies with high net cash positions this could, for example, be a special dividend. Other triggers usually take the form of takeovers, spin-offs, share buybacks or similar. For businesses that, purely based on the figures, seem undervalued, one can only say: 'If something sounds too good to be true, it probably is.' Special attention should therefore be paid to various pitfalls when spotting a situation like this.

9.3   THE IDENTIFICATION OF INVESTMENT OPPORTUNITIES

In practice, company analysis and valuation can be value-adding only if relevant interesting valuation objects can be identified beforehand. The finding of attractive investment possibilities therefore plays just as central a role as the actual valuation and investment activity. In the first step, the approach of many investors towards finding opportunities differs between the 'bottom-up' and 'top-down' method. The latter starts off with a macro analysis and subsequently works its way down to the business level.

The bottom-up approach starts at the business level, thereby corresponding to the basic philosophy of value investing. In principle, value investors should initially focus on the selection of attractive companies instead of identifying interesting stocks. From the very outset, priority should be given to the business itself. The pre-assessment of the stock, by means of valuation multiples such as the price-to-earnings ratio, for example, should be considered later. This distinction is particularly important in the search for businesses with a competitive advantage that are attractive in the long term. The pre-selection should therefore be made with a qualitative focus on the business model and less on the basis of fundamental data or stock valuations. Although the latter is also a valid method, which is also considered here, it often leads to the selection of so-called 'value traps'. These are seemingly cheap businesses, whose favourable fundamental data often covers flaws in the business model or the future prospects. The purely figure-based (pre-)selection of interesting stocks goes against the idea of value investing, and puts the cart before the horse. Due to the generally low level of diversification applied by value investors, high standards should be set for the selection criteria, as a detailed company analysis is also a time-consuming and elaborate undertaking. Investors should also bear in mind that not every analysed business will lead to a positive result (i.e. the business has a long-term competitive advantage and positive prospects) or even a decision to buy (i.e. the business is undervalued), which means that for the collection of a portfolio of 10 to 15 stocks, the analysis of a large number of companies is required. As an example, four active search possibilities for investment candidates are described below:

- A–Z analysis
- 'keeping one's eyes open'
- data-based analysis
- news analysis.

It should be clarified beforehand that there is no patent recipe for finding attractive businesses or stocks. A major part of the value-adding creative activity of value investing consists of opening new channels to find potentially interesting businesses and establishing a network to exchange and countercheck ideas. The four possibilities illustrated below should therefore in no way be understood as a final listing.

A–Z analysis

The basic instrument for finding exciting businesses consists of the 'A–Z analysis'. A list of companies is simply analysed alphabetically from A to Z or in a random order. The population can in fact be a list of all national or international enterprises or it can be sorted beforehand according to certain criteria such as size, margin or similar. It is often equally helpful to exclude industries which lie outside one's own circle of competence. This very rough analysis requires a large amount of time, passion and also a lot of stamina, as the vast majority of businesses will be excluded from further analysis. In the end, the manual analysis of all businesses is the most sensible way to build up a comprehensive database of interesting businesses and to gain an advantage worth mentioning vis-à-vis other investors. When Warren Buffett mentioned in an interview his approach to simply look at every listed business in the US, the interviewer said, 'But there's 27,000 public companies,' to which Buffett replied, 'Well, start with the As.'

'Keeping one's eyes open'

Many interesting businesses can be found simply because they are present in everyday life. They comprise products which stand out due to their price politics, quality or actual trends, as well as businesses or industries which are mentioned in newspaper articles. It is also important to build up a network with other investors, to exchange ideas and to double-check investment opportunities.

Data-based analysis

In many cases, it is worthwhile to look at some selected fundamental data before the actual business model. A screening list is compiled, backed up by a scoring model, which could, for example, give stocks a certain rating. A list of all businesses based in the US with an EBIT margin of more than 10%, a gearing of less than 50% and a return on equity of more than 15% is, for example, conceivable. If it further includes valuation ratios such as the price-to-earnings ratio and EV/EBIT, the focus shifts purely to quantitative factors, but it also makes a quicker selection of attractively valued shares with solid fundamental data possible. Particularly useful value pairs are the price-to-earnings ratios in combination with the growth in earnings, and the comparisons of the price-to-book ratio with the return on equity and the EV/sales with the EBITDA margin.

News analysis

News analysis concentrates on the evaluation of daily ad hoc messages, takeovers, share buybacks, directors' dealings and changes in management. During this process opportunities often arise that investors can exploit. As such, count the consideration of top losers or

52-week changes in the stock market section of the newspaper. Although they do not address the quality of a business, they do provide, in certain cases, indications about potentially over-sold stocks. Changes in shareholdings of a company can be a valuable indicator for outsiders regarding what might be going on behind closed doors. It is therefore useful to follow directors' dealings and investigate accordingly what motives might be behind insider buying and selling. One also has to bear in mind that reporting obligations vary according to country and stock market segment. When approaching the pre-selection for the analysis one also has to consider the prevailing market cycle. If share prices are generally high, it may pay to look at special situations and takeover candidates, whereas in phases of panic extremely cheaply valued businesses and in particular quality stocks at favourable valuations may be of interest. Stocks that are not cheap enough at the moment should be added to a watch list and reassessed on a regular basis. By adopting this approach one starts to build up over time a veritable list of potentially attractive companies and it enables the investor to pick cherries in times of panic. Intelligent investors use short-term panics, which arise due to overreactions to problems, to their advantage by evaluating more precisely the long-term effects. An interesting example in this respect is the so-called salad oil scandal in 1963. Financial institutions, such as American Express, handed out loans to commodity trader Anthony DeAngelis in the belief that they were secured by salad oil. In fact, the tanks mainly contained water, oil was only a small proportion, but floated at the surface due to its smaller mass. When the scandal was revealed the share price of American Express fell by more than 50% and cost the business $58m, which was no small amount at the time (more than $400m in 2013 dollars). At the same time this incident did not change the competitive advantage of the American Express Company in its core business. Investors such as Warren Buffett, who keeps his shareholdings in the company to this day, recognized precisely that and bought shares of the business at that time.

9.4   PORTFOLIO MANAGEMENT

Besides finding and analysing investment opportunities, in the end the actual buying and selling decision determines the return and risk of the portfolio. This section turns its attention to portfolio management and thus combines theory with practice.

Portfolio management comprises the basic structure of the portfolio, size and number of individual positions as well as the buying and selling of individual securities over time. While individual stocks come (buy) and go (sell), regular examination of the portfolio forms the constant in the investment process.

9.4.1   Diversification

No matter how comprehensive the business analysis and valuation may be, one is not protected from errors in the investment routine. Black swans, management mistakes or political decisions can lead to considerable losses, on which the investor has no or only limited influence. To take account of this important point, a minimum level of diversification should be kept. Ten to fifteen individual stocks are usually sufficient to create a minimum level of safety across the portfolio at an appropriate margin of safety. The requirement of broad diversification among 40 or more stocks to minimize risk is therefore of limited relevance, it is rather the valuation and the safety margin of the individual stocks that are crucial when

it comes to overall portfolio risk. More important than purely the number of different stocks are the respective correlation and response of the shares to macro-economic changes, the fundamental correlation between each single stock, as well as the business context. Fifteen businesses from the same industry or vertically integrated companies reduce the risk of the portfolio insufficiently. A mix of good businesses with corresponding safety margins from a variety of industries and regions, in contrast, can lower the risk of the portfolio substantially. In addition, it is hardly possible to find that many businesses with an adequate safety margin to do justice to the postulate of traditional diversification (40+ businesses). Value investing thrives on the concentrated but thoughtful selection of stocks. Warren Buffett expresses this fact more colourfully: 'Big opportunities come infrequently. When it's raining gold, reach for a bucket, not a thimble.'

If a stock fulfils the criteria laid out in this book and displays a more than sufficient safety margin, the investment should not be made half-heartedly but with a large position in line with the respective safety margin. According to Buffett: 'The way to go is to get one good idea a year and ride it to its full potential.'

It becomes clear from the above that for successful long-term investment a wise choice of companies and a clear head in uncertain times are required. The detailed analysis of markets and businesses serves to sharpen not only one's sense of judgement but also one's conviction to buy stocks against the general market opinion and not be unsettled by brief setbacks. Warren Buffett describes the main personal requirements for a successful investor in one of his shareholder letters as follows: 'To invest successfully over a lifetime does not require a stratospheric IQ, unusual business insight, or inside information. What's needed is a sound intellectual framework for decisions and the ability to keep your emotions from corroding that framework.'

As the risk of an individual stock cannot be added up on the portfolio level, but is rather influenced by positive and negative correlation effects, the risk of a portfolio – as already described – depends on the fundamental economic connection between individual portfolio positions. This section should therefore be read in the context of the following section on risk.

9.4.2   Risk

The size of a position should fundamentally be determined by the risk of the business and the safety margin. Ratios for measuring risk, on the business level (debt ratio, sustainability of the business model, operating leverage, etc.) as well as on the stock level (safety margin, valuation), have already been introduced. On the portfolio level, this individual consideration has to be extended by a comprehensive valuation, as the possibility of combining different businesses from a variety of industries can significantly influence the risk profile. The purchase of 15 steel groups, for example, will lower total risk only minimally, as all shares react similarly to macro-economic movements. The individual businesses in the portfolio should therefore come from a diverse range of industries, cover several regions and should have different underlying drivers. As usual, it is important not to leave one's own circle of competence. A spread across several currencies may also be beneficial for reducing risk. Currency issues often lead to confusion among investors. What determines the potential foreign exchange risks are the currencies in which the company generates its cash flows, and not the balance sheet currency or the currency in which the stock is listed. Focusing on dividends lends itself to investors who rely on steady cash flows.

9.4.3   Cash

The cash quota of a portfolio has the function of both enabling flexibility and limiting risk. One of the most common errors is the misbelief that one has to be always fully invested, as opportunities can be seized only if one has an appropriate cash quota. Holding a minimum amount of liquidity is therefore necessary in almost all cases. This viewpoint is supported by Buffett in a CNBC interview: 'I always like to have a billion on hand, you know, that's what I like to have in my pocket at all times.' Besides being flexible to seize chances, a cash cushion also offers the advantage of not having to touch existing positions in case of liquidity outflows (e.g. because of unplanned large acquisitions). Due to the lack of correlation between cash holdings and the stock markets, the portfolio risk can be controlled via the liquidity ratio. The liquidity of a stock portfolio should also be considered in light of the average dividend yield.

9.5   BUYING AND SELLING: INVESTMENT HORIZON

9.5.1   Buying

As already illustrated in section 9.1, buying should always be considered when the difference between the fair value and the current stock market valuation, the so-called safety margin, sufficiently compensates the risk of the investment. The size of the position should also be based on the safety margin – the potential of the stock – as well as the macro-economic dependency of the business. Above-average size individual positions should only be bought as long as the macro-economic development has limited significance for the well-being of the company, as the investment otherwise degenerates into a mere speculation on an economic trend. At a target size of 10–15 businesses per portfolio, an average size of a position should be 6–10%. Particularly attractive positions can also make up to 15% of the portfolio. This should, however, be based on a particularly well-founded belief in the business and a substantial margin of safety. In some cases, certain factors can be hedged. This hedge could be a short position in an index, going long in a commodity that is also among the major expenses of the target company or the purchase of a business from a contrasting industry. It is conceivable that a particularly large position of a luxury manufacturer, for instance, is supplemented by an equally undervalued second-hand business. Another example would be hedging airline shares with the purchase of oil and oil company shares, or going long directly in oil futures.

Once the ideal position size has been determined, there are two options for the buying process. One either buys the entire position size immediately, or the buying takes place in several steps. The latter is advisable in particular when one is buying against the general trend or the news situation might be negative for some time. In this case, price-moving events such as quarterly reports or general shareholders' meetings should be considered.

9.5.2   Selling

When businesses with a competitive edge are able to extend and solidify their market position year after year, the company value also rises over time. The optimum hold period of such a company would be obvious: for ever. For a disinvestment decision investors should nevertheless apply the same criteria as for buying. If a stock is valued above its intrinsic value, market participants are obviously prepared to pay more than the business is actually worth. It would be foolish not to take this offer if the market price differs clearly from the intrinsic value. As

a consequence, investors should revalue their positions in regular intervals and then verify if the current valuation justifies a sale, i.e. if the market price is clearly above the intrinsic value. Time is, in this case, on the side of the long-term investor. The longer a position is held and the lower the payout ratio, the stronger is the effect of compounding interest at company level. Moreover, long holding times imply low transaction cost and move tax burdens further into the future. The following example will illustrate the great importance of the effect of compounded interest, i.e. of long holding periods, as well as transaction and tax cost.

Example 9.1 – The effect of compounding interest
Investors A and B invest very successfully at the stock market. Both achieve annual returns of 100% and hence double their invested capital every year. The only difference lies in the investment horizon of both investors. Whilst investor A invests long-term and holds only one share over the next 20 years, investor B sells his speculatively purchased shares in each case at the end of the year and successfully buys a new position, which in turn will double in value. The shares of both investors double year after year. Investor B simply participates more actively. This activity costs money and return. Assuming a tax rate on capital gains of 25% gives the following results. While A has made $1,048,576 out of his starting capital of $1 over the past 20 years and now has to pay $262,144 in tax, he is left with $786,432 at the end of the period. B, in contrast, has to pay tax of 25% on profits every year due to his annual sellings: after 20 years he is left with only $72,570 after tax and therefore less than 1/10 of A's earnings.

As the example shows in an impressive way, time is the friend of profitable businesses, which is the reason why the decision to sell is usually much harder than the decision to buy. The price paid initially should not play a role at the time of the disinvestment (except for tax considerations). The only two relevant determinants for a selling decision should be the current valuation of the company and possible alternative investments. Even if there is no alternative investment available, a sale can be sensible, because a sufficient cash position has its own appeal, as already shown. Apart from that, a partial sale can be an option as soon as a position has increased its share price, thereby raising the weight within the portfolio too much. One's own risk appetite is decisive in this situation; at what proportion a partial sale is appropriate to restore the desired weighting. Especially when it comes to shares that currently exhibit a strong momentum and rise quickly in a short space of time, it may be sensible to place sell orders daily with a premium to the current price. Nevertheless, this approach is only a technical aspect, which should always be preceded by a detailed valuation of the share. In the end, the existence of relevant bids (buy orders) plays a particular role for illiquid shares, as a share can only be sold when the opponent is willing to pay a sufficient price for a corresponding amount. Often, important dates such as the publication of business figures or dividend distributions lead to a higher liquidity, which can be used especially for transactions into particularly illiquid shares.

In contrast to the actual company valuation, the topic value investing has already been discussed in detail in Benjamin Graham's *The Intelligent Investor* and Buffett's shareholder letters. Graham's principles have lost none of their validity. Since the aim of this book is not to reiterate already written text, this chapter is accordingly shorter. The original works *The Intelligent Investor* and *Security Analysis* are therefore highly recommended. The emergence of the internet, countless analysts' reports being published hourly and dissemination of information in real time have had a great impact on investors in the stock exchange but they cannot eliminate two very human traits: greed and fear. Value investing exploits precisely this fact.

9.6   CONCLUSION

Value investing consists of the exploitation of the price difference between the current share price and the fair value, which has been obtained through detailed analysis. As long as this price difference exceeds the required margin of safety, the investment should be made. This simple instruction contrasts with the complex and intellectually challenging valuation process. The tools described in this book, such as the various financial ratios as well as the methodical analysis and classification of the business model, serve in the consolidation of quantitative facts and qualitative characteristics as a basis for decision making about the future success of an enterprise. It turns out that the various valuation methods can, although building on the same set of data, lead to deviating results. In the end, the actual achievement of the investor, which lies in the consistent implementation of the entire analysis process, is only reflected in the success or failure in the stock market. As the stock markets are from time to time subject to extreme exaggeration as well as fear, the belief in one's own judgement is crucial for this success. Self-discipline and the consistent exploitation of other market participants' irrational behaviour are therefore always the consequence of a (self-)confidence-creating, comprehensive analysis. Warren Buffett's advice to 'be greedy when others are fearful' can only be applied on this basis. The German philosopher Arthur Schopenhauer once concluded one of his major works with the words, that for those who have recognized the true essence of the world, the actual world has no longer any meaning. Transferred to the topic of this book one could say that for those who have become acquainted with the true business-like background of company valuation, the constant fluctuations of the stock market, which are often caused by emotional unrest, are only one thing: nothing.

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