

VALUING COMPANIES

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Introduction

Managers must become acquainted with the main influences on the valuation of entire companies and how to value individual shares in companies. If they are to be given the responsibility of maximizing the wealth of shareholders managers need knowledge of the factors influencing that wealth, as reflected in the share price of their own company. Without this understanding they will be unable to determine the most important consequence of their actions – the impact on share value. Managers need to appreciate share price derivation because the

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change in their company's share value is one of the key factors by which they are judged. It is also useful for them to know how share prices are set if the firm plans to gain a flotation on a stock exchange, or when it is selling a division to another firm. In mergers an acquirer needs good valuation skills so as not to pay more than necessary, and a seller needs to ensure that the price is fair.

This chapter describes the main methods of valuing shares: net asset value, dividend valuation models, price earnings ratio models and cash flow models. There is an important subsection in the chapter that shows how the valuation of shares differs if the purchase would give managerial control from the valuation of shares which provide only a small minority stake.

The two skills

Two skills are needed to be able to value shares. The first is analytical ability, to be able to understand and use mathematical valuation models. Second, and most importantly, good judgment is needed, because the majority of the inputs to the mathematical calculations are factors, the precise nature of which cannot be defined with absolute certainty, so great skill is required to produce reasonably accurate results. The main problem is that the determinants of value occur in the future, for example future cash flows, dividends or earnings.

The monetary value of an asset is what someone is prepared to pay for it. Assets such as cars and houses are difficult enough to value with any degree of accuracy. At least corporate bonds generally have a regular cash flow (coupon) and an anticipated capital repayment. This contrasts with the uncertainties associated with shares, for which there is no guaranteed annual payment and no promise of capital repayment. The difficulties of share valuation are amply represented by the case of Amazon.com in case study 13.1.

The monetary value of an asset is what someone is prepared to pay for it.

Case study 13.1**Amazon.com**

Amazon, the internet retailer, has never made a profit. In fact it lost over \$700m in 1999 and offered little prospect of profits in the near term. So, if you were an investor in early 2000 what value would you give to a company of this caliber? Anything at all? Amazingly, investors valued Amazon at over \$30bn in early 2000 (more than all the traditional book retailers put together). The brand was well established and the numbers joining the online community rose by thousands every day. Investors were confident that Amazon would continue to attract customers and produce a rapid rate of growth in revenue. Eventually, it was thought, this revenue growth would translate into profits and high dividends. When investors had calmed down after taking account of the potential for competition and the fact that by 2001 Amazon was still not producing profits, they reassessed the value of Amazon's likely future dividends. In mid-2001, they judged the company to be worth only \$4bn – it had run up losses of \$1.4bn in 2000, indicating that profits and dividends were still a long way off. However by 2004 the company, despite reporting yet another loss in 2003, was thought to be close to being able to turn its brand into profits for shareholders, so it was valued at over \$20bn. Maybe it will.

Valuation using net asset value (NAV)

The balance sheet seems an obvious place to start when faced with the task of valuation. In this method the company is viewed as being worth the sum of the value of its net assets. The balance sheet is regarded as providing objective facts concerning the company's ownership of assets and obligations to creditors. Here fixed assets are recorded along with stocks, debtors, cash and other liquid assets. With the deduction of long-term and short-term creditors from the total asset figure we arrive at the net asset value (NAV).

An example of this type of calculation is shown in Table 13.1 for Cadbury Schweppes.

The NAV of over £3bn of Cadbury Schweppes compares with a market value placed on all the shares when totaled of £8.5bn (market capitalization figures are available in Monday editions of the *Financial Times*). This great difference makes it clear that the shareholders of Cadbury Schweppes are not rating the firm on the basis of balance sheet net asset figures. This point is emphasized by an examination of Table 13.2.

Three of the four firms listed in Table 13.2 have very small balance sheet values in comparison with their total market capitalization. The exception is Vodafone which boosted its balance sheet by buying many other companies producing over £90bn intangible assets in the form of goodwill (amount paid for target above the fair value of the assets acquired).

For most companies, investors look to the income flow to be derived from a holding. This flow is generated when the balance sheet assets are combined with assets impossible to quantify: these include the unique skills of the work-

TABLE 13.1**Cadbury Schweppes Abridged Balance Sheet 29 December 2002**

	£m
Fixed assets	5,815
Current assets	
Stocks	528
Debtors falling due within one year	970
Debtors falling due after more than one year	82
Investments	297
Cash at bank and in hand	<u>175</u>
	2,052
Creditors: Amounts falling due within one year	(2,585)
Creditors: Amounts falling due after more than one year	(1,577)
Provisions for liabilities and charges	<u>(419)</u>
Net assets	<u>3,286</u>
Shareholders' funds	3,020

Source: Cadbury Schweppes plc Report & Accounts 2002

TABLE 13.2**Net asset values and total capitalization of some firms**

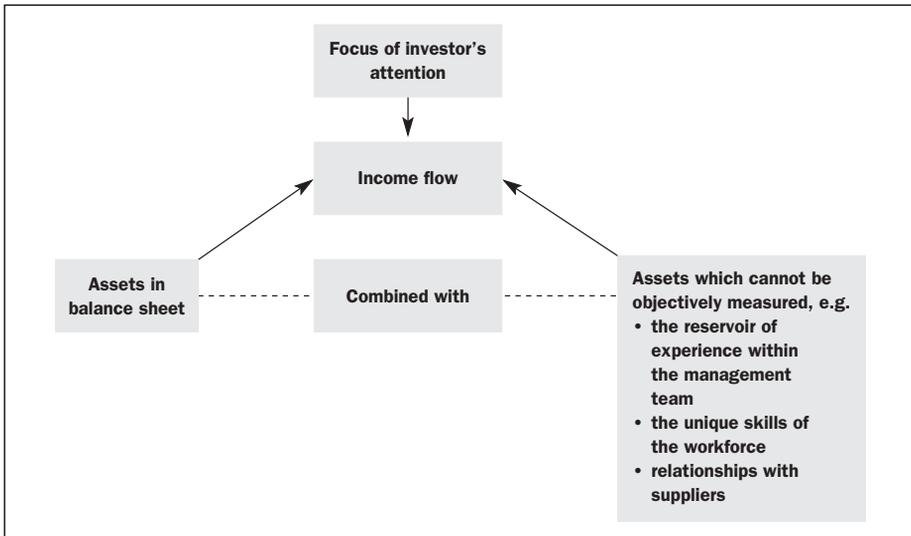
Company (Accounts year)	NAV £m	Total capitalization (market value of company's shares) £m
GlaxoSmithKline (2002)	7,388	77,306
Unilever (2002)	3,816	29,764
EMI (2002)	Negative 889	1,305
Vodafone (2002)	133,428	95,109

Source: Annual reports and accounts; *Financial Times*, 5 January 2004

force, the relationships with customers and suppliers, the value of brands, the reservoir of experience within the management team, and the competitive positioning of the firms' products. Assets, in the crude sense of balance sheet values, are only one dimension of overall value. Investors in the market generally value intangible, unmeasurable assets more highly than those that can be identified and recorded by accountants.

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Criticizing accountants for not producing balance sheets which reflect the true value of a business is unfair. Accounts are not usually designed to record up-to-date market values. Land and buildings are frequently shown at cost rather than market value; thus

FIGURE 13.1**What creates value for shareholders?**

the balance sheet can provide a significant over- or under-valuation of these assets' current value. Plant and machinery is shown at the purchase price less a depreciation amount. Stock is valued at the lower of cost or net realizable value – this can lead to a significant under-estimate, as the market value can appreciate to a figure far higher than either of these. The list of balance sheet entries vulnerable to subjective estimation, arbitrary method and even cynical manipulation is a long one: goodwill, provisions, merger accounting, debtors, intangible brand values and so on.

The slippery concept of balance sheet value is demonstrated in the article about Hanson reproduced in Exhibit 13.1.

When asset values are particularly useful

The accounts-based approach to share value is fraught with problems but there are circumstances in which asset backing is correctly given more attention.

Firms in financial difficulty

The shareholders of a firm in financial difficulty may pay a great deal of attention to the asset backing of the firm. They may weigh up the potential for asset sales or asset-backed borrowing. In extreme circumstances they may try to assess the break-up value.

Takeover bids

In a takeover bid shareholders will be reluctant to sell at less than NAV even if the prospect for income growth is poor. A standard defensive tactic in a takeover battle is to revalue balance sheet assets to encourage a higher price.

Hanson cuts asset value by £3.2bn

Tim Burt

Hanson, the industrial conglomerate, yesterday marked the latest stage of its four-way demerger by announcing a £3.2bn reduction in assets following accounting changes and write-downs in the value of its US mineral reserves.

The write-downs at Peabody, the largest coal producer in the US, and Hanson's Cornerstone aggregates subsidiary will bring the company into line with US accounting standards on the treatment of 'long lived assets'.

Mr Derek Bonham, chief executive, said the move would have no impact on operational cash flow and added: 'It in no way reflects on the accuracy of previous accounts.'

Some industry analysts, however, suggested Hanson might have overval-

ued the assets of both Peabody and Cornerstone in the past – a charge rejected by the company.

In total, the book value of mineral reserves at Cornerstone have been reduced by £2.3bn to £1.3bn and by £600m at Peabody to £1.5bn. A further £300m charge is being made against Peabody's reserves to cover accounting changes over industry liabilities.

As part of the accounting changes, Hanson has removed £1.2bn of its £1.5bn provisions from Peabody's balance sheet and plans to charge £300m of previous payments to profit and loss reserves. Mr Bonham said this move would cut the carrying value of Peabody's coal reserves by £1.5bn.

EXHIBIT 13.1 Hanson cuts asset value

Source: *Financial Times* 9 July 1996

When discounted income flow techniques are difficult to apply

For some types of company there is no straightforward way of employing income-flow based methods:

Property investment companies

These are primarily valued on the basis of their assets. It is generally possible to put a fairly realistic up-to-date price on the buildings owned by such a company. These market values have a close link to future cash flows. That is, the future rents payable by tenants, when discounted, determine the value of property assets and thus the company. If higher rent levels are expected than were previously anticipated, chartered surveyors will place a higher value on the asset, and the NAV in the balance sheet will rise, forcing up the share price. For such companies, future income, asset values and share values are all fairly closely linked. However, as Exhibit 13.2 makes clear, while share price and NAV generally go up and down together, there are good reasons for property investment company shares to trade at less than NAV.

Investment trusts

The future income of investment trusts comes from the individual shareholders. The shareholder in a trust would find it extremely difficult to calculate the future income to be received from each of the dozens or hundreds of shares held. An easier approach is simply to take the current share price of each holding as representing the future discounted income. The share values are aggregated to derive the trust's NAV and this has a strong bearing on the price at which the trust shares are traded.

When net asset value is no guide

Norma Cohen

The directors of Asda Property face a dilemma – do they recommend shareholders to accept a bid that is significantly below the company's 'value' or do they urge them to accept it on the grounds that it is the best offer they are likely to get?

If the offer is accepted, what does the concept of net asset value really mean?

If the offer is rejected, does that mean NAV is a concept that has no relevance to share price?

Last week, the directors – not including the executive chairman and founder, Manny Davidson – initiated a 'first' for the quoted property sector, seeing off a bid approach of 280p that was deemed too low. Similar bids for other property companies have been accepted almost without question.

But yesterday's renewed offer of 298.6p, along with the latest 1.4p interim dividend, now requires pause for thought. Asda's current situation is awkward. ...

... In rejecting the initial offer, Asda's directors point to the latest interim valuation of 383p, including 6p on the development portfolio.

In justifying its offer, BL Davidson, the joint venture, points to the 60p per share capital gains tax the company would incur on the sale of its assets,

along with further deductions for paying off high interest rate debt. After these deductions, NAV falls to 308p, not far off its offer price. ...

... But if a company is not to be valued at its break-up value, what sort of price should you put on it?

NAV is an interesting number because, in its pure form, it takes no account of the break-up costs. But equally, it takes no account of the cost of remaining a going concern.

Indeed, NAV is a number that pretends there is no cost associated with corporate ownership and management of real estate – a patent nonsense.

For one thing, there are general overhead and administrative costs; for another, there is depreciation expense. Although the latter never appears in corporate profit and loss accounts, there is ample evidence it exists.

Unrecoverable property management and refurbishment costs are, in effect, disguised forms of depreciation expense.

A more 'true' picture would emerge if analysts could count the net present value of those costs and deduct them from the NAV.

Arguably, this is what the market does already. Indeed, it may explain the staggering range of discounts to NAV at which property company shares trade.

EXHIBIT 13.2 When net asset value is no guide

Source: *Financial Times* 17 August 2001

Resource-based companies

For oil companies, mineral extractors, mining houses and so on, the proven or probable reserves have a significant influence on the share price (*see* Exhibit 13.3).

Income flow is the key

The value of a share is usually determined by the income flows that investors expect to receive in the future from its ownership. Information about the past is only of relevance to the extent that it contributes to an understanding of expected future performance. Income flows will occur at different points in the future and so they have to be discounted. There are three classes of income valuation models:

- dividend-based models
- earnings-based models
- cash flow-based models.

Dividend valuation methods

The dividend valuation models (DVMs) are based on the premise that *the market value of ordinary shares represents the sum of the expected future dividend flows, to infinity, discounted to present value.*

The only cash flows that investors ever receive from a company are dividends. This holds true if we include a 'liquidation dividend' upon the sale of the firm or on formal liquidation, and any share repurchases can be treated as dividends. Of

NAV valuation sparks dispute

Timon Day

A row had broken out between oil company LASMO and HSBC Securities over the broker's sharp cut in its estimation of LASMO's net asset value from 132p to 98p a share. It knocked £48m off LASMO's stock market value driving its shares down 5p to 123p. This is a particularly sensitive time because LASMO is in the middle of an all-share offer for Monument Oil & Gas – whose former broker is HSBC ...

Most of the dispute over the valuation centres on Algeria where LASMO has a 12 per cent stake in 14 oil fields operated by US group Anadarko. Mr Perry does not accept LASMO's valuation of between £300m and £500m for its Algerian interests, putting a price of just £210m on them.

EXHIBIT 13.3 NAV valuation sparks dispute

Source: *Investors Chronicle*, 11 June 1999

course, an individual shareholder is not planning to hold a share forever to gain the dividend returns to an infinite horizon. An individual holder of shares will expect two types of return:

- income from dividends and
- a capital gain resulting from the appreciation of the share and its sale to another investor.

The fact that the individual investor is looking for capital gains as well as dividends to give a return does not invalidate the models' focus on all dividends to an infinite horizon. The reason for this is that when a share is sold by that investor, the purchaser is buying a future stream of dividends, so the price paid is determined by future dividend expectations.

To illustrate this, consider the following: A shareholder intends to hold a share for one year. A single dividend will be paid at the end of the holding period, d_1 and the share will be sold at a price P_1 in one year.

To derive the value of a share at time 0 to this investor (P_0), the future cash flows, d_1 and P_1 , have to be discounted at a rate which includes an allowance for the risk class of the share, k_E .

$$P_0 = \frac{d_1}{1 + k_E} + \frac{P_1}{1 + k_E}$$

Example

An investor is considering the purchase of some shares in Willow plc. At the end of one year a dividend of 22p will be paid and the shares are expected to be sold for £2.43. How much should be paid if the investor judges that the rate of return required on a financial security of this risk class is 20 percent?

Answer

$$P_0 = \frac{d_1}{1 + k_E} + \frac{P_1}{1 + k_E}$$

$$P_0 = \frac{22}{1 + 0.2} + \frac{243}{1 + 0.2} = 221\text{p}$$

The dividend valuation model to infinity

The relevant question to ask to understand DVMs is: Where does P_1 come from? The buyer at time 1 estimates the value of the share based on the present value of future income given the required rate of return for the risk class. So if the second investor expects to hold the share for a further year and sell at time 2 for P_2 , the price P_1 will be:

$$P_1 = \frac{d_2}{1 + k_E} + \frac{P_2}{1 + k_E}$$

Returning to the P_0 equation we are able to substitute discounted d_2 and P_2 for P_1 . Thus:

$$P_0 = \frac{d_1}{1 + k_E} + \frac{P_1}{1 + k_E}$$

$$P_0 = \frac{d_1}{1 + k_E} + \frac{d_2}{(1 + k_E)^2} + \frac{P_2}{(1 + k_E)^2}$$

If a series of one-year investors bought this share, and we in turn solved for P_2, P_3, P_4 , etc., we would find:

$$P_0 = \frac{d_1}{1 + k_E} + \frac{d_2}{(1 + k_E)^2} + \frac{d_3}{(1 + k_E)^3} + \dots + \frac{d_n}{(1 + k_E)^n}$$

Even a short-term investor has to consider events beyond his or her time horizon because the selling price is determined by the willingness of a buyer to purchase a future dividend stream. If this year's dividends are boosted by short-termist policies such as cutting out R&D and brand-support marketing the investor may well lose significantly because other investors push down the share price as their forecasts for future dividends are lowered.

Example

If a firm is expected to pay dividends of 20p per year to infinity and the rate of return required on a share of this risk class is 12% then:

$$P_0 = \frac{20}{1 + 0.12} + \frac{20}{(1 + 0.12)^2} + \frac{20}{(1 + 0.12)^3} + \dots + \frac{20}{(1 + 0.12)^n}$$

$$P_0 = 17.86 + 15.94 + 14.24 + \dots + \dots +$$

Given this is a perpetuity there is a simpler approach:

$$P_0 = \frac{d_1}{k_E} = \frac{20}{0.12} = 166.67\text{p}$$

The dividend growth model

In contrast to the situation in the above example, for most companies dividends are expected to grow from one year to the next.¹ To make DVM analysis manageable simplifying assumptions are usually made about the patterns of growth in dividends. Most managers attempt to make dividends grow more or less in line with the firm's long-term earnings growth rate. They often bend over backwards

to smooth out fluctuations, maintaining a high dividend even in years of poor profits or losses. In years of very high profits they are often reluctant to increase the dividend by a large percentage for fear that it might have to be cut back in a downturn. So, given management propensity to make dividend payments grow in an incremental or stepped fashion it seems that a reasonable model could be based on the assumption of a constant growth rate. (Year to year deviations around this expected growth path will not materially alter the analysis.)

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Worked example 13.1

A CONSTANT DIVIDEND GROWTH VALUATION: SHHH PLC

If the last dividend paid was d_0 and the next is due in one year, d_1 , then this will amount to $d_0(1 + g)$ where g is the growth rate of dividends.

For example, if Shhh plc has just paid a dividend of 10p and the growth rate is 7% then:

$$d_1 \text{ will equal } d_0(1 + g) = 10(1 + 0.07) = 10.7\text{p}$$

and

$$d_2 \text{ will be } d_0(1 + g)^2 = 10(1 + 0.07)^2 = 11.45\text{p}$$

The value of a share in Shhh will be all the future dividends discounted at the risk-adjusted discount rate of 11%:

$$P_0 = \frac{d_0(1 + g)}{1 + k_E} + \frac{d_0(1 + g)^2}{(1 + k_E)^2} + \frac{d_0(1 + g)^3}{(1 + k_E)^3} + \dots + \frac{d_0(1 + g)^n}{(1 + k_E)^n}$$

$$P_0 = \frac{10(1 + 0.07)}{1 + 0.11} + \frac{10(1 + 0.07)^2}{(1 + 0.11)^2} + \frac{10(1 + 0.07)^3}{(1 + 0.11)^3} + \dots + \frac{d_0(1 + g)^n}{(1 + k_E)^n}$$

Using the above formula could require a lot of time. Fortunately it is mathematically equivalent to the following formula,² which is much easier to employ.

$$P_0 = \frac{d_1}{k_E - g} = \frac{d_0(1 + g)}{k_E - g} = \frac{10.7}{0.11 - 0.07} = 267.50\text{p}$$

Note that, even though the shortened formula only includes next year's dividend all the future dividends are represented.

A further illustration is provided by the example of Pearson plc.

Worked example 13.2

PEARSON PLC

Pearson plc, the publishing, media and education group, has the following dividend history:

Year	Net dividend per share (p)
1996	16.1
1997	17.4
1998	18.8
1999	20.1
2000	21.4
2001	22.3
2002	23.4

The average annual growth rate, g , over this period has been:

$$g = \sqrt[6]{\frac{23.4}{16.1}} - 1 = 0.064 \text{ or } 6.4\%$$

If it is assumed that this historic growth rate will continue into the future and 10% is taken as the required rate of return, the value of a share can be calculated.

$$P_0 = \frac{d_1}{k_E - g} = \frac{23.4(1 + 0.064)}{0.10 - 0.064} = 692\text{p}$$

In fact, in early 2004 Pearson's shares stood at 620p. Perhaps analysts were anticipating a slower rate of growth in future than in the past. Perhaps we employed an unreasonably low discount rate given the risks facing the company. Or perhaps the market consensus view of Pearson's growth prospects was over-pessimistic.

Non-constant growth

Firms tend to go through different phases of growth. If they have a strong competitive advantage in an attractive market they might enjoy super-normal growth. Eventually, however, most firms come under competitive pressure and growth becomes normal. Ultimately, many firms fail to keep pace with the market environmental change in which they operate and growth falls to below that for the average company.

To analyze companies that go through different phases of growth a two-, three- or four-stage model may be used. In the simplest case of two-stage growth the share price calculation requires the adding together of the results of the following:

- Discount each of the forecast annual dividends in the first period to time 0.
- Estimate the share price at the point at which the dividend growth shifts to the new permanent rate. Discount this share price to time 0.

Worked example 13.3

NORUCE PLC

You are given the following information about Noruce plc.

The company has just paid an annual dividend of 15p per share and the next is due in one year. For the next three years dividends are expected to grow at 12% per year. This rapid rate is caused by a number of favorable factors: an economic upturn, the fast acceleration stage of newly developed products and a large contract with a government department.

After the third year the dividends will grow at only 7% per annum, because the main boosts to growth will, by then, be absent.

Shares in other companies with a similar level of systematic risk to Noruce produce an expected return of 16% per annum.

What is the value of one share in Noruce plc?

Answer

Stage 1 Calculate dividends for the super-normal growth phase.

$$\begin{aligned} d_1 &= 15(1 + 0.12) = 16.8 \\ d_2 &= 15(1 + 0.12)^2 = 18.8 \\ d_3 &= 15(1 + 0.12)^3 = 21.1 \end{aligned}$$

Stage 2 Calculate share price at time 3 when the dividend growth rate shifts to the new permanent rate.

$$P_3 = \frac{d_3(1 + g)}{k_E - g} = \frac{21.1(1 + 0.07)}{0.16 - 0.07} = 250.9$$

Stage 3 Discount and sum the amounts calculated in Stages 1 and 2.

$$\begin{aligned} &\frac{d_1}{1 + k_E} = \frac{16.8}{1 + 0.16} = 14.5 \\ + &\frac{d_2}{(1 + k_E)^2} = \frac{18.8}{(1 + 0.16)^2} = 14.0 \\ + &\frac{d_3}{(1 + k_E)^3} = \frac{21.1}{(1 + 0.16)^3} = 13.5 \\ + &\frac{P_3}{(1 + k_E)^3} = \frac{250.9}{(1 + 0.16)^3} = \underline{160.7} \end{aligned}$$

202.7p

What is a normal growth rate?

Growth rates will be different for each company but for corporations taken as a whole dividend growth will not be significantly different from the growth in nominal gross national product (real GNP plus inflation) over the long term. If dividends did grow in a long-term trend above this rate then they would take an increasing proportion of national income – ultimately squeezing out the consumption and government sectors. This is, of course, ridiculous. Thus, in an economy with expected long-term inflation of 3 percent per annum and growth of 2.5 percent, we might expect the long-term growth in dividends to be about 5.5 percent. Also, it is unreasonable to suppose that a firm can grow its earnings and dividends forever at a rate significantly greater than that for the economy as a whole. To do so is to assume that the firm eventually becomes larger than the economy. There will be years, even decades, when average corporate dividends

There will be years, even decades, when average corporate dividends do grow faster than the economy as a whole.

do grow faster than the economy as a whole and there will always be companies with much higher projected growth rates than the average for periods of time. Nevertheless the real GNP + inflation growth relationship provides a useful benchmark.

Companies that do not pay dividends

Some companies, for example Warren Buffett's Berkshire Hathaway, do not pay dividends. This is a deliberate policy as there is often a well-founded belief that the funds are better used within the firms than they would be if the money is given to shareholders. This presents an apparent problem for the DVM but the measure can still be applied because it is reasonable to suppose that one day these companies will start to pay dividends. Perhaps this will take the form of a final break-up payment, or perhaps when the founder is approaching retirement he/she will start to distribute the accumulated resources. At some point dividends must be paid, otherwise there would be no attraction in holding the shares. Microsoft is an example of a company that did not pay a dividend for 28 years. However, in 2003 it decided that it would start a process of payout of some of its enormous pile of cash – *see* Exhibit 13.4.

Some companies do not pay dividends for many years due to regular losses. Often what gives value to this type of share is the optimism that the company will recover and that dividends will be paid in the distant future.

Problems with the dividend growth valuation model

Dividend valuation models present the following problems.

- 1 They are highly sensitive to assumptions. Take the case of Pearson above. If we change the growth assumption to 7 percent and reduce the required rate of return to 9.5 percent, the value of the share leaps to over £10.

$$P_0 = \frac{d_1}{K_E - g} = \frac{23.4(1 + 0.07)}{0.095 - 0.07} = 1002p$$

Microsoft considers dividend of \$10bn-plus

By Emmanuel Paquette in Paris and Richard Waters in San Francisco

Microsoft is considering paying its shareholders a special dividend of 'significantly' more than \$10bn (£6bn), according to a person close to the discussions. This would be the largest corporate pay-out ever, and help reduce its \$46bn cash pile. ...

The software giant has come under increasing pressure from shareholders to release some of its cash pile which has grown as its shares have lagged. A decision made to begin paying a dividend,

which will amount to nearly \$900m this year, will make little impact as it continues to generate \$3bn of cash each quarter. ...

The company said when it originally announced its 8 cents per share dividend – the first paid in its 28-year history – that it would consider raising the pay-out. One option would involve distributing more than \$1 per share at a cost of more than \$10bn.

Exhibit 13.4 Microsoft considers dividend

Source: *Financial Times* 4 July 2003

- 2 The quality of input data is often poor. The problems of calculating an appropriate required rate of return on equity are discussed in Chapter 10. Added to this is great uncertainty about the future growth rate.
- 3 If g exceeds k_E a nonsensical result occurs. This problem is dealt with if an assumption of a short-term super-normal growth rate followed by a lower rate after the super-normal period is replaced with a g which is some weighted average growth rate reflecting the return expected over the long run. Alternatively, for those periods when g is greater than k , one may calculate the specific dividend amounts and discount them as in the non-constant growth model. For the years after the super-normal growth occurs, the usual growth formula may be used.

The difficulties of using the DVMs are real and yet the methods are to be favored, less for the derivation of a single number than for the understanding of the principles behind the value of financial assets that the exercise provides. They demand a disciplined thought process that makes the analyst's assumptions about key variables explicit.

DVMs demand a disciplined thought process that makes the analyst's assumptions about key variables explicit.

How do you estimate future growth?

The most influential variable, and the one subject to most uncertainty, on the value of shares is the growth rate expected in dividends. Accuracy here is a much sought-after virtue. While this book cannot provide readers with a perfect crystal ball for seeing future dividend growth rates, it can provide a few pointers.

Determinants of growth

Three factors influence the rate of dividend growth.

- *The quantity of resources retained and reinvested within the business* This relates to the percentage of earnings not paid out as dividends. The more a firm invests the greater its potential for growth.
- *The rate of return earned on those retained resources* The efficiency with which retained earnings are used will influence value.
- *Rate of return earned on existing assets* This concerns the amount earned on the existing baseline set of assets, that is, those assets available before reinvestment of profits. This category may be affected by a sudden increase or decrease in profitability. If the firm, for example, is engaged in oil exploration and production, and there is a worldwide increase in the price of oil, profitability will rise on existing assets. Another example would be if a major competitor is liquidated, enabling increased returns on the same asset base due to higher margins because of an improved market position.

There is a vast range of influences on the future return from shares. One way of dealing with the myriad variables is to group them into two categories: at firm and economy level.

Focus on the firm

A dedicated analyst would want to examine numerous aspects of the firm, and its management, to help develop an informed estimate of its growth potential. These will include the following.

- *Strategic analysis* The most important factor in assessing the value of a firm is its strategic position. We need to consider the attractiveness of the industry, the competitive position of the firm within the industry and the firm's position on the life cycle of value creation to appreciate the potential for increased dividends. (This topic is covered very briefly in Chapter 7. For a fuller discussion consult Arnold (2002) *Valuegrowth Investing* or Arnold (2004) *The Financial Times Guide to Investing*.)
- *Evaluation of management* Running a close second in importance for the determination of a firm's value is the quality of its management. A starting point for analysis might be to collect factual information such as their level of experience and education. But this has to be combined with far more important evaluatory variables which are unquantifiable, such as judgment, and even gut-feeling about issues such as competence, integrity, intelligence and so on. Having honest managers with a focus on increasing the wealth of shareholders is at least as important for valuing shares as the factor of managerial competence. Investors downgrade the shares of companies run by the most brilliant managers if there is any doubt about their integrity – highly competent crooks can destroy shareholder wealth far quicker than any competitive action, just ask the shareholders in WorldCom, Enron and Parmalat. (For a fuller discussion of the impact of managerial competence and integrity on share values, see Arnold (2002).)

- *Using the historical growth rate of dividends* For some firms the past growth may be extrapolated to estimate future dividends. If a company demonstrated a growth rate of 6 percent over the past ten years it might be reasonable to use this as a starting point for evaluating its future potential. This figure may have to be adjusted for new information such as new strategies, management or products – that is the tricky part.
- *Financial statement evaluation and ratio analysis* An assessment of the firm's profitability, efficiency and risk through an analysis of accounting data can be enlightening. However, adjustments to the published figures are likely to be necessary to view the past clearly, let alone provide a guide to the future. Warren Buffett again:

When managers want to get across the facts of the business to you, it can be done within the rules of accounting. Unfortunately when they want to play games, at least in some industries, it can also be done within the rules of accounting. If you can't recognise the differences, you shouldn't be in the equity-picking business.³

Accounts are valuable sources of information, but they have three drawbacks:

- they are based in the past when it is the future which is of interest,
- the fundamental value-creating processes within the firm are not identified and measured in conventional accounts, and
- they are frequently based on guesses, estimates and judgments, and are open to arbitrary method and manipulation.

Armed with a questioning frame of mind the analyst can adjust accounts to provide a truer and fairer view of a company. The analyst may wish to calculate three groups of ratios to enable comparisons:

- Internal liquidity ratios permit some judgment about the ability of the firm to cope with short-term financial obligations – quick ratios, current ratios, etc.
- Operating performance ratios may indicate the efficiency of the management in the operations of the business – asset turnover ratio, profit margins, debtor turnover, etc.
- Risk analysis concerns the uncertainty of income flows – sales variability over the economic cycle, operational gearing (fixed costs as a proportion of total), financial gearing (ratio of debt to equity), cash flow ratios, etc.

Ratios examined in isolation are meaningless. It is usually necessary to compare with the industry, or the industry sub-group comprising the firm's competitors. Knowledge of changes in ratios over time can also be useful.

Focus on the economy

All firms, to a greater or lesser extent, are influenced by macroeconomic changes. The prospects for a particular firm can be greatly affected by sudden changes in government fiscal policy, the central bank's monetary policy, changes in exchange rates, etc. Forecasts of macroeconomic variables such as GNP are easy to find, for

example *The Economist* publishes a table of forecasts every week. Finding a forecaster who is reliable over the long term is much more difficult. Perhaps the best approach is to obtain a number of projections and through informed judgment develop a view about the medium-term future. Alternatively, the analyst could recognize that there are many different potential futures and then develop analyses based on a range of possible scenarios – probabilities could be assigned and sensitivity analysis used to provide a broader picture.

It is notable that the great investors pay little attention to macroeconomic forecasts when valuing companies. The reason for this is that value is determined by income flows to the shareholder over many economic cycles stretching over decades, so the economists' projection (even if accurate) for this or that economic number for the next year is of little significance.

Price-earnings ratio (PER) model

A popular approach to valuing a share is to use the price-to-earnings (PER) ratio. The historic PER compares a firm's share price with its latest earnings (profits) per share. Investors estimate a share's value as the amount they are willing to pay for each unit of earnings. If a company produced earnings per share of 10p in its latest accounts and investors are prepared to pay 20 times historic earnings for this type of share it will be valued at £2.00. The historic PER is calculated as follows:

$$\text{Historic PER} = \frac{\text{Current market share of price}}{\text{Last year's earnings per share}} = \frac{200\text{p}}{10\text{p}} = 20$$

So, the retailer Dixons which reported earnings per share of 10.7p with a share price of £141.75 in January 2004 had a PER of about 13.3 (141.75/10.7p). PERs of other retailers are shown in Table 13.3.

TABLE 13.3
PERs for retailers

Retailer	PER
Blacks	14.5
Body Shop	11.4
Boots	14.2
Burberry	22.0
Dixons	13.3
JJB Sport	9.5
Kingfisher	14.9
Marks and Spencer	22.5
Ottakers	30.2
Next	16.2

Source: *Financial Times*, 10/11 January 2004

Investors are willing to buy Burberry's shares at 22 times last year's earnings compared with only 11.4 times last year's earnings for Body Shop. One explanation for the difference in PERs is that companies with higher PERs are expected to show faster growth in earnings in the future. Burberry may appear expensive relative to Body Shop based on historical profit figures but the differential may be justified when forecasts of earnings are made. If a PER is high investors expect profits to rise. This does not necessarily mean that all companies with high PERs are expected to perform to a high standard, merely that they are expected to do significantly better than in the past. Few people would argue that Marks and Spencer has performed, or will perform, well in comparison with Burberry and yet it stands at a higher historic PER, reflecting the market's belief that Marks and Spencer has more growth potential from its low base than Burberry.

If a PER is high investors expect profits to rise.

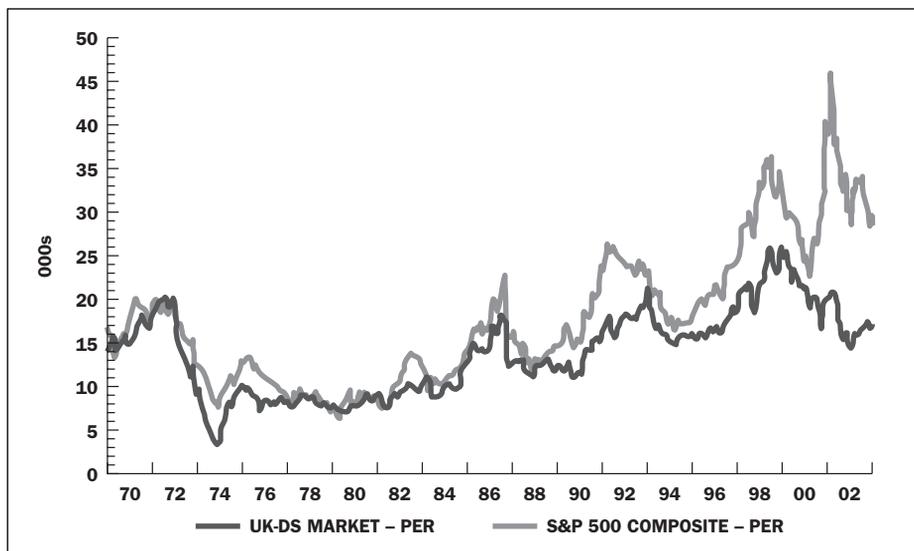
PERs are also influenced by the uncertainty of the future earnings growth. So, perhaps, Dixons and Kingfisher might have the same expected growth rate but the growth at Dixons is subject to more risk and therefore the market assigns a lower earnings multiple.

PERs over time

There have been great changes over the years in the market's view of what is a reasonable multiple of earnings to place on share prices. What is excessive in one year is acceptable in another. This is illustrated in Figure 13.2.

FIGURE 13.2

PERs for the UK and US (S&P 500) stock markets 1970–2004



Source: Thomson Financial Datastream

The crude and the sophisticated use of the PER model

Some analysts use the historic PER (P_0/E_0), to make comparisons between firms without making explicit the considerations hidden in the analysis. They have a view of an appropriate PER based on current prevailing PER for other firms in the same industry. So, for example, in 2004 Tesco with a PER of 17.5 may be judged to be priced correctly relative to similar firms – Sainsbury had a PER of 13.3, Morrisons 20.1 and Big Food Group 14. Analyzing through comparisons lacks intellectual rigor.

Analyzing through comparisons lacks intellectual rigor.

First, the assumption that the ‘comparable’ companies are correctly priced is a bold one. It is easy to see how the market could be pulled up (or down) by its own bootstraps and lose touch with fundamental considerations by this kind of thinking (say, telecommunication shares in the 1998–2000 bubble). Second, it fails to provide a framework for the analyst to test the important implicit input assumptions – for example, the growth rate expected in earnings in each of the companies, or the difference in required rate of return given the different risk level of each. These elements are probably in the mind of the analyst, but there may be benefits in making these more explicit. This can be done with the more complete PER model, which is forward-looking and recognizes both risk levels and growth projections.

The infinite dividend growth model can be used to develop the more complete PER model because they are both dependent on the key variables of growth, g (in dividends or earnings), and the required rate of return, k_E . The dividend growth model is:

$$P_0 = \frac{d_1}{k_E - g}$$

If both sides of the dividend growth model are divided by the expected earnings for the next year, E_1 , then:

$$\frac{P_0}{E_1} = \frac{d_1/E_1}{k_E - g}$$

Note this is a *prospective* PER because it uses next year’s earnings E_1 , rather than an historic PER, which uses E_0 .

In this more complete model the appropriate multiple of earnings for a share rises as the growth rate, g , goes up; and falls as the required rate of return, k_E , increases. The relationship with the ratio d_1/E_1 is more complicated. If this payout ratio is raised it will not necessarily increase the PER because of the impact on g – if more of the earnings are paid out less financial resource is being invested in projects within the business, and therefore future growth may decline.

Worked example 13.4

RIDGE PLC

Ridge plc is anticipated to maintain a payout ratio of 48% of earnings. The appropriate discount rate for a share for this risk class is 14% and the expected growth rate in earnings and dividends is 6%.

$$\frac{P_0}{E_1} = \frac{d_1/E_1}{k_E - g}$$

$$\frac{P_0}{E_1} = \frac{0.48}{0.14 - 0.06} = 6$$

The spread between k_E and g is the main influence on an acceptable PER. A small change can have a large impact. Taking the case of Ridge, if we now assume a k_E of 12% and g of 8% the PER doubles.

$$\frac{P_0}{E_1} = \frac{0.48}{0.12 - 0.08} = 12$$

If k_E becomes 16% and g 4% then the PER reduces to two-thirds its former value:

$$\frac{P_0}{E_1} = \frac{0.48}{0.16 - 0.04} = 4$$

Worked example 13.5

WHIZZ PLC

You are interested in purchasing shares in Whizz plc. This company produces high-technology products and has shown strong earnings growth for a number of years. For the past five years earnings per share have grown, on average, by 10% per annum.

Despite this performance and analysts' assurances that this growth rate will continue for the foreseeable future you are put off by the exceptionally high prospective price earnings ratio (PER) of 25.

In the light of the more complete forward-looking PER method, should you buy the shares or place your money elsewhere?

Whizz has a beta of 1.8 which may be taken as the most appropriate systematic risk adjustment to the risk premium for the average share (see Chapter 10).

The risk premium for equities over government bonds has been 5% over the past few decades, and the current risk-free rate of return is 7%.

Whizz pays out 50% of its earnings as dividends.

Answer

Stage 1 Calculate the appropriate cost of equity

$$k_E = r_f + \beta(r_m - r_f)$$

$$k_E = 7 + 1.8(5) = 16\%$$

Stage 2 Use the more complete PER model

$$\frac{P_0}{E_1} = \frac{d_1/E_1}{k_E - g} = \frac{0.5}{0.16 - 0.10} = 8.33$$

The maximum multiple of next year’s earnings you would be willing to pay given the growth rate of dividends hereafter of 10% is 8.33. This is a third of the amount you are being asked to pay, therefore you will refuse to buy the share.

Prospective PER varies with g and k_E

If an assumption is made concerning the payout ratio, then a table can be drawn up to show how PERs vary with k_E and g .

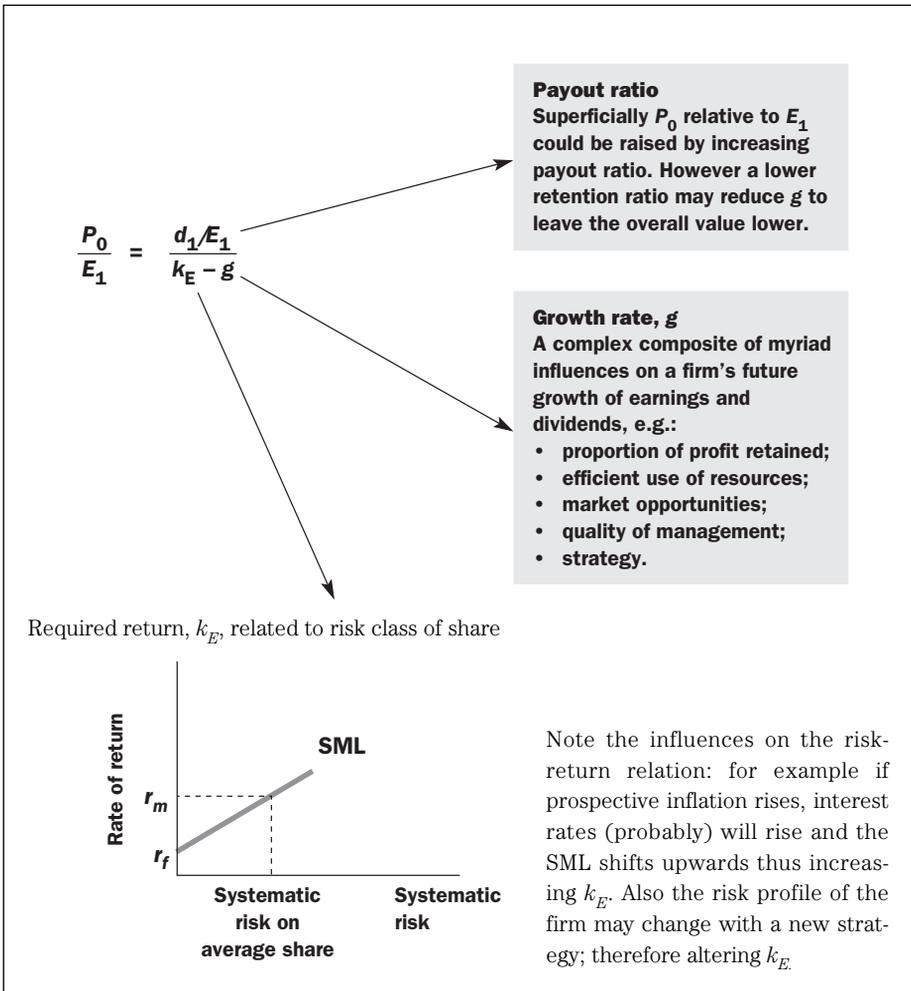
A payout ratio of 40–50 percent of after tax earnings is normal for UK shares, although in periods of profit declines companies tended to maintain dividends thus pushing up the proportion of earnings paid out to around 60 percent.

FIGURE 13.3
Prospective PERs for various risk classes and dividend growth rates

		Assumed payout ratio = $\frac{d_1}{E_1} = 0.5$			
		Discount rate, k_E			
		8	9	10	12
Growth rate, g	0	6.3	5.6	5.0	4.2
	4	12.5	10.0	8.3	6.3
	5	16.7	12.5	10.0	7.1
	6	25.0	16.7	12.5	8.3
	8	–	50.0	25.0	12.5

FIGURE 13.4

The more complete PER model makes explicit key elements hidden in the crude PER model



The more complete model can help explain the apparently perverse behavior of stock markets. If there is 'good' economic news such as a rise in industrial output or a fall in unemployment the stock market often falls. The market likes the increase in earnings that such news implies, but this effect is often outweighed by the effects of the next stage. An economy growing at a fast pace is vulnerable to rises in inflation and the market will anticipate rises in interest rates to reflect this. Thus the r_f and the rest of the SML are pushed upward. The return required on shares, k_E , will rise, and this will have a depressing effect on share prices. The article reproduced in Exhibit 13.5 expresses this well.

Why policymakers should take note

Philip Coggan

One issue which always mystifies the novice investor is why the financial markets always react so joyously to bad economic news. A rise in unemployment or a fall in industrial production seems to be worth a point on bonds and a jump in the stock market index.

Experienced global investors explain patiently that the key determinant of short term financial market performance is interest rates. Slower growth prompts monetary authorities to lower rates; this

in turn reduces corporate costs, reduces the appeal of holding cash, and in the case of falling long term yields, by lowering the rate at which future income streams are discounted, increases the present value of shares.

Conversely, of course, faster economic growth causes governments and central banks to fear higher inflation, prompting them to increase interest rates, with consequent adverse effects on share prices.

EXHIBIT 13.5 Why policymakers should take note

Source: *Financial Times*, 5 February 1996.

Valuation using cash flow

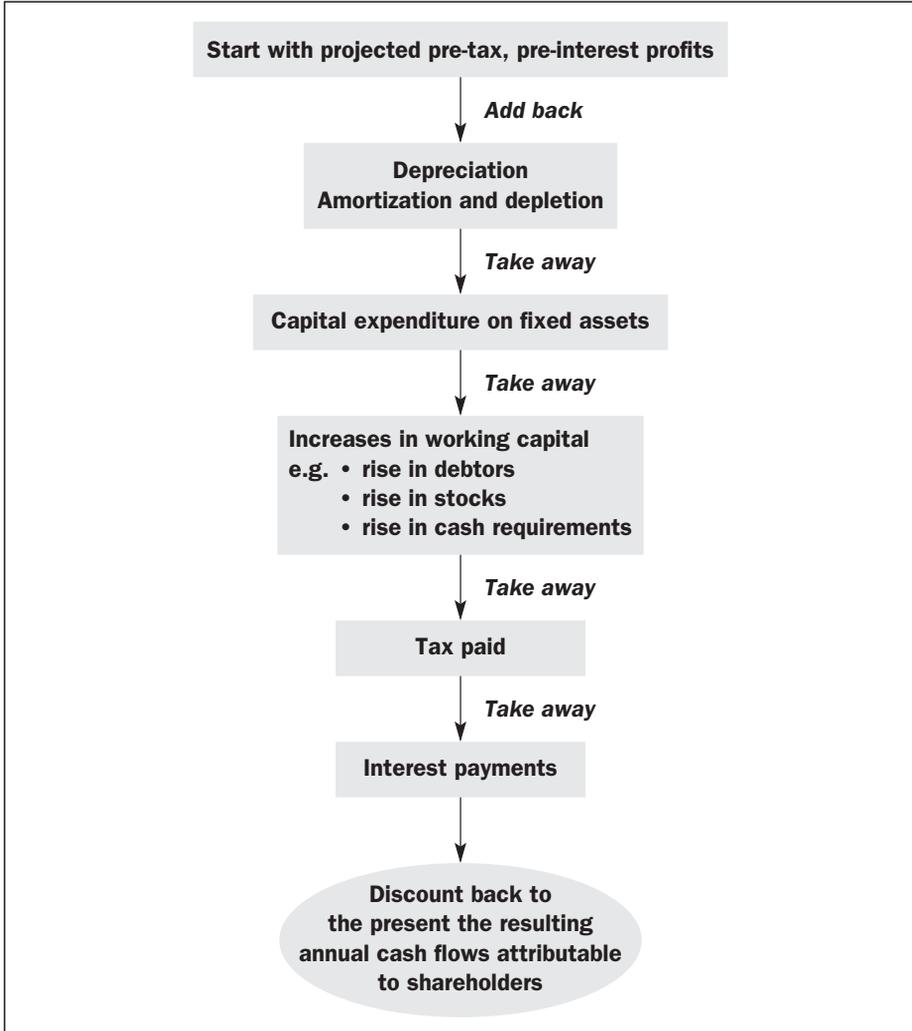
The third and the most important valuation method is cash flow. In business it is often said that 'cash is king'. From the shareholders' perspective the cash flow relating to a share is crucial – they hand over cash and are interested in the ability of the business to return cash to them. John Allday, head of valuation at Ernst and Young, says that discounted cash flow 'is the purest way. I would prefer to adopt it if the information is there'.⁴

The interest in cash flow is promoted by the limited usefulness of published accounts. Skepticism about the accuracy of earnings figures, given the flexibility available in their construction, prompts a switch of attention to a purer valuation method than PER.

The cash flow approach involves the discounting of future cash flows. These cash flows are defined as the cash generated by the business after deduction of investment in fixed assets and working capital to fully maintain its long-term competitive position and its unit volume and to make investment in all new value-creating projects. To derive the cash flow attributable to shareholders, any interest paid in a particular period is deducted as well as taxation. The process of the derivation of cash flow from profit figures is shown in Figure 13.5.

FIGURE 13.5

Cash flow calculation from projected profit figures



An example of a cash flow calculation is shown in Table 13.4. The difference between profit and cash flows is particularly stark in the case of 2006 – the earnings number is much larger than the cash flow because of the large capital investment in fixed assets. Earnings are positive because only a small proportion of the cost of the new fixed assets is depreciated in that year.

Note also that there is a subtle assumption in this type of analysis. This is that all annual cash flows are paid out to shareholders rather than reinvested. If all positive NPV projects have been accepted using the money allocated to additional capital expenditures on fixed assets and working capital, then to withhold further money from shareholders would be value destructive because any other

TABLE 13.4
Cash flow-based share valuation

£m	2005	2006	2007	2008	2009	Estimated average annual cash flow for period beyond planning horizon 2010–infinity
Forecast pre-tax, pre-interest profits	+11.0	+15.0	+15.0	+16.0	+17.0	
Add depreciation, amortization and depletion	+1.0	+2.5	+5.5	+4.5	+4.0	
Working capital increase (–) decrease (+)	+1.0	–0.5	0.0	+1.0	+1.0	
Tax (paid in year)	–3.3	–5.0	–5.0	–5.4	–5.8	
Interest on debt capital	–0.5	–0.5	–0.5	–0.6	–0.7	
Fixed capital investment	–1.0	–16.0	0.0	–1.2	–1.8	
Cash flow	+8.2	–4.5	+15.0	+14.3	+13.7	+14.0
Cash flow per share (assuming 100m shares)	8.2p	–4.5p	15p	14.3p	13.7p	14p
Discounted cash flow $k_E = 14\%$	$\frac{8.2}{1.14}$	$-\frac{4.5}{(1.14)^2}$	$+\frac{15}{(1.14)^3}$	$+\frac{14.3}{(1.14)^4}$	$+\frac{13.7}{(1.14)^5}$	$+\frac{14}{0.14} \times \frac{1}{(1.14)^5}$
Share value =	7.20	–3.5	+10.1	+8.5	+7.1	+51.9
						= 81.3p

projects would have negative NPVs. An alternative assumption, which amounts to the same effect in terms of share value, is that any cash flows that are retained and reinvested generate a return that merely equals the required rate of return for that risk class. If they produce merely the cost of capital no value is created. Of course, if the company knows of other positive value projects, either at the outset or comes across them in future years, it should take them up. This will alter the numbers in the table and so a new valuation is needed.

The definition of cash flow used here (which includes a deduction of expenditure on investment in fixed and working capital to maintain long-term competitive position, unit volume and make all new value creating projects) is significantly different to many accountant's and analyst's definitions of cash flow. They often neglect to allow for one or more of these factors. Be careful if you are presented with alternative cash flow numbers based on a different definition of cash flow.

Valuation using owner-earnings

A simplified version of cash flow analysis is owner earnings.⁵ For shares, intrinsic value is the discounted value of the owner earnings that can be taken out of a business during its remaining life. These correspond with standard cash flow analysis except that we calculate a sustainable level of owner earnings for a typical year (subject to a steady growth) rather than a unique cash flows for each of the future years.

Future owner earnings are determined by the strength and durability of the economic franchise (attractiveness of the industry plus competitive position of the firm in the industry), the quality of management and the financial strength of the business. In the following analysis we make use of Warren Buffett's definition of owner earnings, but with the additional factor in (c) and (d) of 'investment in all new value-creating projects'.

Owner earnings are defined as:

- reported earnings after tax and interest; *plus*
- depreciation, depletion (e.g. of oil reserves), amortization (of intangible assets, such as brand value) and certain other non-cash charges; *less*
- the amount of expenditures for plant and machinery, etc. that a business requires to fully maintain its long-term competitive position and its unit volume and to make investment in all new value-creating projects; *less*
- any extra amount for working capital that is needed to maintain the firm's long-term competitive position and unit volume and to make investment in all new value-creating projects.

Note that there are two types of investment. First, that which is needed to permit the firm to continue to maintain its existing competitive position at the current level of output. Second, investment in value-creating growth opportunities beyond the current position.

So, for example, Cotillo plc has reported earnings after tax for the most recent year of £16.3m. In drawing up the income (profit and loss) account deductions of £7.4m were made for depreciation, £152,000 for the amortization of intangible assets and £713,000 of goodwill was written off. It is estimated that an annual expenditure of £8.6m on plant, machinery, etc. will be required for the company to maintain its long-term competitive position and unit volume. For the sake of simplicity we will assume that no further monies will be needed for extra working capital to maintain long-term competitive position and unit volume. Also, Cotillo has no new value-creating projects.

The trading record of Cotillo plc has been remarkably stable in the past and is unlikely to alter in the future. It is reasonable to use the above figures for all future years. This would result in an estimated annual owner earnings of £15.965m (*see* Table 13.5).

TABLE 13.5

Cotillo plc, owner earnings

		£000s
(a)	Reported earnings after tax and interest	16,300
	<i>Plus</i>	
(b)	Depreciation, depletion, amortization and other non-cash charges (7,400 + 152 + 713)	8,265
		24,565
	<i>Less</i>	
(c) and (d)	Expenditure on plant, equipment, working capital, etc. required to maintain long-term competitive position, unit volume and investment in new projects	8,600
		15,965

If we regard last year's owner earnings as the sustainable level for all future years then the discounted value of a perpetuity of £15.965m is £159.65m, if we take the discount rate to be 10 percent:

$$\text{Intrinsic value} = \frac{\pounds 15.965\text{m}}{0.10} = \pounds 159.65\text{m}$$

Intrinsic value is determined by the owner earnings that can be *taken out* of the business during its remaining life. Logically the management of Cotillo should pay out the full £15.956m each year to shareholders if the managers do not have investment projects within the firm that will generate returns of 10 percent or more because shareholders can get 10 percent return elsewhere for the same level of risk as holding a share in Cotillo. If the managers come across another project that promises a return of exactly 10 percent shareholder wealth will be unchanged whether the company invests in this or chooses to ignore the project and continues with the payment of all owner earnings each year. If the management discover, in a future year, a value-creating project that will produce, say, a 15 percent rate of return (for the same level of risk as the existing projects) then shareholders will welcome a reduction in dividends during the years of additional investment. The total value of discounted future owner earnings will rise and intrinsic value will be greater than £159.65m if such a project is undertaken.

Now let us assume that managers and shareholders are currently aware that Cotillo has a series of new value-creating (i.e. generating returns greater than 10 percent for the same risk) projects it can invest in. By investing in these projects owner earnings will rise by 5 percent year on year (on the one hand owner earnings are decreased by the need for additional investment under (c) and (d), but, on the other hand reported earnings are boosted under (a), to produce a net 5 percent growth). The intrinsic value becomes £335.26m viz:

Next year's owner earnings = $\pounds 15.965\text{m}(1+g) = \pounds 15.965\text{m}(1+0.05) = \pounds 16.763\text{m}$

$$\text{Intrinsic value} = \text{next year's owner earnings}/(k_E - g) = \frac{16.763}{0.10 - 0.05} = \pounds 335.26\text{m}$$

EBITDA is classified by some commentators as a cash flow measure of value. There will be no promoting of EBITDA as a useful measure of valuation in this book, because it can lead to some very distorted thinking. EBITDA (pronounced e-bit-dah) became a very popular measure of a company's performance in the late 1990s. It was especially popular with managers of firms that failed to make a profit. EBITDA means earnings before interest, taxation, depreciation and amortization. Managers liked to emphasize this measure in their communications to shareholders because large positive numbers could be shown. Some cynics have it renamed it 'Earnings Before I Tricked the Dumb Auditor'.

EBITDA can lead to some very distorted thinking.

If you run an internet company that makes a $\pounds 100\text{m}$ loss and the future looks pretty dim unless you can persuade investors and bankers to continue their support perhaps you would want to add back all the interest (say $\pounds 50\text{m}$), depreciation on assets that are wearing out or becoming obsolete (say $\pounds 40\text{m}$), and the declining value of intangible assets, such as software licenses and goodwill amortization of say $\pounds 65\text{m}$, so that you could show a healthy positive number on EBITDA of $\pounds 55\text{m}$. And if your loss seems to get worse from one year to the next as your acquisition strategy fails to pay off it is wonderfully convenient to report and emphasize a stable or rising EBITDA.

The use of EBITDA by company directors makes political spin-doctors look amateurs by comparison. EBITDA is not covered by any accounting standards so companies are entitled to use a variety of methods – whatever shows the company in the best light, I guess.

In the real world directors (and valuers) cannot ignore the cost of using up and wearing out equipment and other assets or the fact that interest and tax need to be paid however much they would want to. Warren Buffett made the comment: 'Reference to EBITDA makes us shudder – does management think the tooth fairy pays for capital expenditures?' (Berkshire Hathaway Inc., Letter Accompanying the 2000 report © Warren Buffett).

Valuing unquoted shares

The principles of valuation are the same for companies with a quoted share price on an exchange and for unquoted firms. The methods of valuation discussed above in relation to shares quoted on an exchange may be employed, but there may be some additional factors to consider in relation to unquoted firms' shares.

- *There may be a lower quality and quantity of information* The reporting statements tend to be less revealing for unquoted firms. There may also be a managerial reluctance to release information – or managers may release information selectively so as to influence value, for example, in merger discussions.

- *These shares may be subject to more risk* Firms at an early stage in their life cycle are often more susceptible to failure than are established firms.
- *The absence of a quotation usually means the shares are less liquid*, that is, there is a reduced ability to sell quickly without moving the price. This lack of marketability can be a severe drawback and often investors in unquoted firms, such as venture capitalists, insist on there being a plan to provide an exit route within say five years, perhaps, through a stock market float. But that still leaves a problem for the investor within the five years should a sale be required.
- *Cost of tying-in management* When a substantial stake is purchased in an unquoted firm, for the existing key managers to be encouraged to stay they may be offered financial incentives such as ‘golden hand-cuffs’ which may influence value. Or the previous owner-managers may agree an ‘earn-out’ clause in which they receive a return over the years following a sale of their shares (the returns paid to these individuals will be dependent on performance over a specified future period).

Unquoted firms’ shares tend to sell at significantly lower prices than those of quoted firms. Philip Marsden, deputy managing director of corporate finance at 3i, discounts the price by anything from one-third to a half⁶ and the BDO Stoy Hayward/Acquisitions Monthly Private Company Price Index (www.bdo.co.uk) shows unquoted firms being sold at an average PER of under two-thirds that for quoted shares.

Unusual companies

Obtaining information to achieve accuracy with discounted income flow methods is problematic for most shares. But in industries subject to rapid technological innovation it is extraordinarily difficult. While discounted income flow remains the ultimate method of valuation some analysts use more immediate proxies to estimate value. (A less scientific-sounding description is ‘rules of thumb’) For example, Gerry Stephens and Justin Funnell, media and telecoms analysts at NatWest Markets, describe the approach often adopted in their sector:⁷

Rather than DCF (discounted cash flow), people are often more comfortable valuing telemedia project companies using benchmarks that have evolved from actual market prices paid for similar assets, being based on a comparative measure or scale such as per line, per subscriber, per home or per pop (member of population). For example, an analyst might draw conclusions from the per-pop price that Vodaphone trades at to put a price on the float of Telecom Italia Mobile. The benchmark prices will actually have originated from DCF analysis and the price paid can give an element of objective validation to the implied subjective DCF.

This sort of logic has been employed in the valuation of internet companies. In their attempt to value future profits that were far from certain ‘analysts’ became more and more extreme in clutching at straws to value internet companies in the late 1990s – see Exhibit 13.6.

The internet revolution

Lies, damned lies and web valuations

Internet fever gripped the world and led credulous investors to think dotcom companies were sure-fire winners. We show how scarce data, high hopes and fast-talking 'rock star' analysts fuelled a frenzy of speculation that eventually ended in tears

The internet has turned out to be one of the most powerful forces shaping business for decades. But it has also proved to be fertile ground for speculation. Entirely new markets have been promised, with entirely new ways of doing business and new ways of making money.

With so much of this potential untested, financial analysts have developed new tools in order to be able to value businesses whose financial success will not be clear for years, if ever. Previously cautious professional forecasters have become accustomed to taking leaps in the dark to describe a future that seems almost limitless in its potential. And an army of boosters and spin doctors has been on hand to take up these predictions and trumpet them, aided by journalists and commentators, themselves struggling to keep up with the extraordinary changes that appeared to be under way ...

In a market where many internet companies had little in the way of revenues to show, let alone profits, their ability to attract the attention of the growing online audience became one of the only ways of measuring their performance.

Investors began to focus on the number of unique users (the number of different people who visited its site)

and page views (the number of web pages these visitors clicked on) claimed by a site.

Bob Davis, chief executive of Lycos, the US portal, defends the methods that have been developed for measuring internet audiences, while adding: 'It's working on being a science, but it isn't a science yet.' Of the audience numbers produced by such research, he adds: 'I wouldn't want to look at them on an absolute basis – but on a relative basis, they probably do a good job.' ... But companies did not always make it clear where they were using gross revenue, before subtracting cost of sales, and where they were referring to net revenue. Some omitted to point out how much of their advertising revenues derived from barter advertising with other websites, where money did not actually change hands. This backdrop of scarce data and high hopes provided an ideal environment for a number of quick-thinking, fast-talking analysts to make a name for themselves ...

Indeed, credibility was sometimes conferred by the amount of press attention the stocks had generated. Internet analysts joked about a 'price-to-press-cuttings ratio'.

EXHIBIT 13.6 The internet revolution

Source: *Financial Times* 13 October 2000

Other sectors difficult to value directly on the basis of income flow include: advertising agencies, where a percentage of annual billings is often used as a proxy; mobile phone operators, where ARPU (average revenue per user) is used; fund managers, where value of funds under management is used; and hotels, where star ratings may be combined with number of rooms and other factors such as revenue per available room.

Analysts grapple with Russian valuations

John Thornhill

With few companies producing western-style accounts, alternative methodologies are called for

Markets have often experienced speculative frenzies, be it the explosion of tulip bulb prices in seventeenth century Holland or Florida real estate in the 1920s.

Observers of the Russian stock market may wonder if they are not watching a similar phenomenon.

'People may argue they are buying cheap assets, but at the end of the day it is earnings which drive prices. If you cannot see what those earnings are and the company is not adhering to shareholder rights, then you risk buying a pig in the poke,' Mr Mobius [president of Templeton Emerging Markets Fund] says. 'You are just creating conditions for people to gamble.'

To date, only a handful of Russia's 110,000 companies produce accounts that would survive the scrutiny of a diligent investor; almost none make dividend pay-outs on ordinary shares. That makes valuing Russian companies extremely difficult, heightening the dangers of speculative bubbles.

However, some analysts have invented alternative valuation methodologies to assess a company's worth. One of the earliest was to compare crude asset prices in Russia and abroad. So, for example, the implied value of a barrel of oil in the ground in Siberia would be compared with one in Texas by dividing an oil company's market value by its proven reserves.

Comparisons were made between an electricity generator's market value per kilowatt of output in Moscow and in Berlin, for instance.

The problem here is that a company's earnings are not always linked to output. Some prices are still subsidised, non-pay-

ments between companies are rife, and even big enterprises receive much of their income in bartered goods. Enterprises could be increasing output but bleeding cash.

Analysts therefore turned to market capitalisation-to-turnover valuations. But Russian companies use cash-based accounts rather than the accruals method used in the west. That means sales are only booked when a company receives the cash, making comparative sales figures look extremely erratic.

That prompted the most diligent analysts to reconstruct a company's accounts on an internationally-recognisable basis. Taking its annual output and guessing the market price of its goods, they made an attempt to forecast sales.

Unpicking stated tax accounts and adding back unrecognised factors such as depreciation charges, they then estimated earnings and cash flow.

But even for the most transparent companies, such estimates vary wildly. One investment bank has calculated Mosenergo, Moscow's electricity utility, stands on a price/earnings ratio of five; a rival bank suggests the true figure is 16. Many of these valuation techniques also contradict each other.

'On an asset basis Russian companies always look incredibly cheap. On a production basis they still look quite cheap. On a price to sales basis they begin to look like they might be priced about right. But on a p/e basis, taking account of corrected earnings, they all look blatheringly expensive,' Mr Nail [head of research at Deutsche Morgan Grenfell's Moscow office] says.

EXHIBIT 13.7 Analysts grapple with Russian valuations

Source: *Financial Times* 31 January 1997

Valuing and buying shares in a well-regulated, stable environment with a flow of factual information is one thing. As the article reproduced in Exhibit 13.7 shows, buying in some emerging markets is another – innovative valuation techniques may be called for.

Managerial control changes the valuation

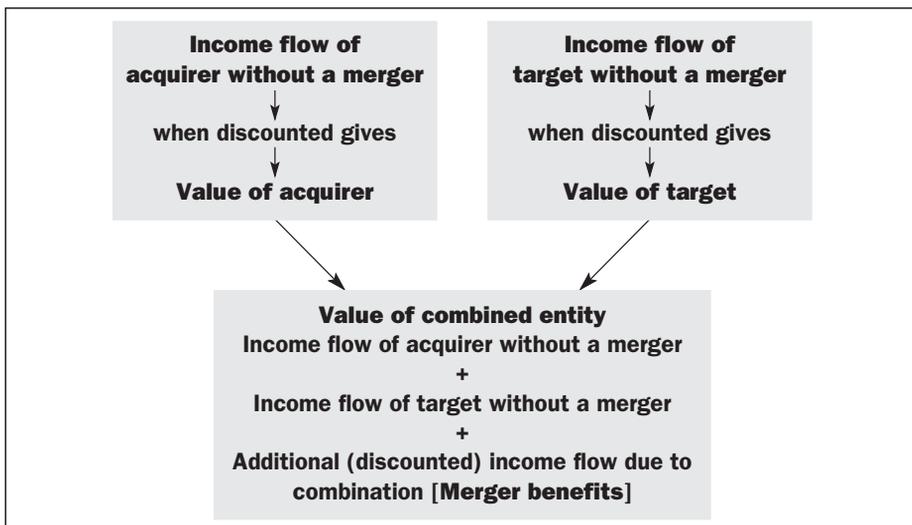
The value of a share can change depending on whether the purchaser gains a controlling interest in the firm. The purchase of a single share brings a stream of future dividends without any real influence over the level of those dividends. However, control of a firm by, say, purchasing 50 percent or more of the shares, permits the possibility of changing the future operations of the firm, thus enhancing returns. A merger may allow economies of scale and other synergies, or future earnings may be boosted by the application of superior management skills.

The difference in value between a share without management control and one with it helps to explain why we often witness a share price rise of 30–50 percent in a takeover bid battle. There are two appraisals of the value of the firm, both of which may be valid depending on the assumption concerning managerial control. Figure 13.6 shows that extra value can be created by merging the operations of two firms.

Figure 13.6 is not meant to imply that the acquiring firm will pay a bid premium equal to the estimated merger benefits. The price paid is subject to negotiation and bargaining. The acquirer is likely to try to offer significantly less than the combined amount of the target firm's value 'as is' and the merger benefits. This will enable it to retain as much as possible of the increased value for itself rather than pass value on to the target shareholders. (See Chapter 12 for more detail.)

FIGURE 13.6

Value creation through merger



The merger of Glaxo Wellcome and SmithKline Beecham will provide a framework for illustrating possible use of the income flow model when managerial control is obtained. In 2000 the two companies claimed that by merging they could save £1,300m annually by combining projects, R&D synergies and by cost-cutting in manufacturing and supply operations.

In the absence of a takeover the value of a share in either company is:

$$P_0 = \frac{d_1}{k_E - g}$$

This is where d_1 and g are generated by the existing structure and strategy.

Alternatively, we could examine the entire cash flow of the company (available to be paid out to shareholders after maintaining the firm's competitive position, unit volume and investing in all value generating projects) rather than that relating to a single share.

$$V = \frac{C_1}{k_E - g_c}$$

where:

V = value of the entire firm;

C_1 = total cash flows at time 1 expected to continue growing at a constant rate of g_c in future years.

If there is a new strategy the values in the equations change:

$$P_0 = \frac{d_1^*}{k_E - g^*}$$

or, for the entire cash flow:

$$V = \frac{C_1^*}{k_E - g_c^*}$$

d_1^* , C_1^* , g^* , g_c^* allow for the following:

synergy;

cutting out costs;

tax benefits;

superior management;

other benefits (for example, lower finance costs, greater public profile, market power) less any additional costs.

Alternatively, a marginal approach could be adopted in which C_1^* , d_1^* , g^* and g_c^* are redefined as the *additional* cash flows and growth in cash flows due to changes in ownership. For example, let us assume that the annual earnings gain of £1,300m is obtained in Year 1 but does not increase thereafter. Therefore $g = 0$. Let us further assume that the required rate of return on an investment of this risk class is 10 percent. Thus the present value of the efficiency gains is:

$$V = \frac{C_1^*}{k_E - g_c^*} = \frac{\pounds 1,300\text{m}}{0.10 - 0} = \pounds 13,000\text{m}$$

We could change the assumption to gain insight into the sensitivity of the added value figure. For example, if it is anticipated that the benefits will rise each year by 2 percent (so they are $\pounds 1,326\text{m}$ in Year 2 and $\pounds 1,352.5\text{m}$ in Year 3, etc.) then the maximum bid premium will rise:

$$V = \frac{C_1^*}{k_E - g_c^*} = \frac{\pounds 1,300\text{m}}{0.10 - 0.02} = \pounds 16,250\text{m}$$

On the other hand, the management of the two companies might have been carried away with the excitement of the bid battle and the $\pounds 1,300\text{m}$ quoted might have come from hype or hubris, and, in fact, the difficulties of integration produce negative incremental cash flows.

In the three years following the merger GlaxoSmithKline managers were very pleased with themselves: they regularly announced that cost synergies have been revised upwards from their initial estimates.

Worked example 13.6

THINGAMEES

Big plc has made it clear to the widget industry that it is willing to sell its subsidiary, Little plc, a manufacturer of thingamees. You are a member of the strategy management team at Thingamees International plc, the largest producers of thingamees in the UK. Your firm is interested in acquiring Little and as a first step has obtained some information from Big plc.

Little plc balance sheet

	£m
Fixed assets	10
Current assets	
Cash	0.5
Stock	1.5
Debtors	<u>3.0</u>
	5
Current liabilities	(6)
Bank loan	<u>(4)</u>
Net assets	<u>5</u>

Trading record

Year	Earnings, £m (Owner earnings)
2003	1.86
2002	1.70
2001	1.65
2000	1.59
1999	1.20
1998	1.14
1997	1.01

Additional information

By combining the logistical departments you estimate that transport costs could be lowered by £100,000 per annum, and two secretarial posts eliminated, saving £28,000 p.a.

The closure of Little's head office would save £400,000 p.a. in staffing and running costs, but would also mean an additional £250,000 p.a. of administration costs at Thingamees plc to undertake some crucial tasks. The office building is situated in a good location and would raise a net £5m if sold immediately. A potential liability not displayed in Little's balance sheet is a possible legal claim of £3m relating to an earlier disposal of an asset. The plaintiff and Little's board have not yet reached agreement (Little's board is adamant that there is no liability).

Your appraisal of Little's management team is that it is a mixed bunch – some good, some very bad. Profits could be raised by £500,000 per year if you could impose your will quickly and remove poor managers. However, if you have to take a more gradual 'easing out' approach, operating profits will rise by only £300,000 per year.

The problems connected with a quick transition are: a sacking left, right and center may cause disaffection among the good managers, encouraging hostility, departures and (a) profits collapse, and (b) Big plc is keen that you provide a commitment to avoid large-scale redundancies.

Big, Little and Thingamees International all have a beta of 1.5, which is representative of the appropriate adjustment to the risk premium on the average share given the systematic risk. The risk-free rate of return is 8% and the historical risk premium of share portfolios over safe securities has been 5%.

The increased market power available to Thingamees International after purchasing Little would improve margins in Thingamees International's existing business to provide an additional £100,000 per annum. Assume that tax is irrelevant.

Required

- Calculate the value of Little plc in its present form, assuming a continuation of its historic growth rate.
- Calculate the value of Little plc if you were unable to push for maximum management redundancies and Little continued with its historical growth rate for its owner earnings (that is, the earnings before merger benefits). Assume that the annual merger benefits are constant for all future years to an infinite horizon, that is, there is no growth.
- Calculate the value of Little plc on the assumption that you are able to push through the rapid management changes and the pre-acquisition earnings continue on their historic growth path. (Again, the annual merger savings are fixed.)
- Discuss the steps you would take to get around the obstacles to shareholder wealth maximization.

Answers

- First calculate the required rate of return:

$$\begin{aligned} k_E &= r_f + \beta (r_m - r_f) \\ &= 8 + 1.5 (5) = 15.5\% \end{aligned}$$

(The required rate of return is discussed in Chapter 10.)

- Then calculate growth rate of cash flows:

$$g = \sqrt[6]{\frac{1.86}{1.01}} - 1 = 10.71\%$$

- Then calculate the value of Little plc:

$$V = \frac{C_1}{k_E - g} = \frac{1.86(1 + 0.1071)}{0.155 - 0.1071} = \text{£}42.990\text{m}$$

The value of Little to its shareholders under its present strategy and managers is £42.990m.

- Calculate the present value of the future cash flows. These come in three forms.
 - Those cash flows available immediately from selling assets, etc., less the amount due on a legal claim (taking the most conservative view):

Time 0 cash flows

Sale of head office	£5m
Less legal claim	<u>£3m</u>
	<u>£2m</u>

– Merger benefit cash flow – constant for all future years:

	£m
Transport	0.100
Secretaries	0.028
Head office	0.150
Managerial efficiency	0.300
Market power	<u>0.100</u>
Boost to cash flow	<u>0.678</u>

This is a perpetuity which has a present value of:

$$\frac{0.678}{0.155} = \text{£}4.374\text{m}$$

– The present value of Little under its existing strategy, £42.990m.

Add these values together:

	£2.000m
	£4.374m
	<u>£42.990m</u>
Total value if unable to sack poor managers	<u>£49.364m</u>
■ Value of business in existing form	£42.990m
plus value of annual savings and benefits	
	$\frac{678,000 + 200,000}{0.155}$
	£5.665m
plus Time 0 cash flows	<u>£2.000m</u>
Total value if able to sack poor managers	<u>£50.655m</u>

Thingamees International now has a bargaining range for the purchase of Little. Below £42.99m the existing shareholders will be reluctant to sell. Above £50.665m, Thingamees may destroy value for its own shareholders even if all poor managers can be removed.

- Some ideas: One possible step to reduce risk is to insist that Big plc accepts all liability relating to the legal claim. Another issue to be addressed in the negotiation phase is to avoid being hamstrung by redundancy commitments. Also plan the process of merger integration. In the period before the merger explain your intentions to Little's employees. After the transfer do not alienate the managers and other employees by being capricious and secretive – be straight and honest. If pain is to be inflicted for the good of the firm, be quick, rational and fair, communicate and explain.

Conclusion

There are two points about valuation worth noting. First going through a rigorous process of valuation is more important than arriving at *an* answer. It is the understanding of the assumptions and an appreciation of the nature of the inputs to the process that give insight, not a single number at the end. It is the recognition of the qualitative, and even subjective, nature of key variables in an apparently quantitative analysis that leads to knowledge about values. We cannot escape the uncertainty inherent in the valuation of a share – what someone is willing to pay depends on what will happen in the future – and yet this is no excuse for rejecting the models as unrealistic and impractical. They are better than the alternatives: guessing, or merely comparing one share with another with no theoretical base to anchor either valuation. At least the models presented in this chapter have the virtue of forcing the analyst to make explicit the fundamental considerations concerning the value of a share.

Going through a rigorous process of valuation is more important than arriving at *an* answer.

The second point leads on from the first. It makes sense to treat the various valuation methods as complementary rather than as rivals. Obtain a range of values in full knowledge of the weaknesses of each approach and apply informed judgment to provide an idea of the value region.

Notes

- 1 See discussion in Chapter 14 based on evidence from Lintner (1956) and 3i (1993) – details of these sources are in Chapter 14 References and Further Reading.
- 2 If the dividends continue to grow at the rate g in perpetuity.
- 3 Warren Buffett seminar held at Columbia University Business School. ‘Investing in equity markets’, 13 March 1985, Transcript, p. 23. Reproduced in Janet Lowe (1997).
- 4 Quoted by Robert Outram (1997), p. 70.
- 5 Warren Buffett developed this method. A modified version is shown here which incorporates the investment in value generating projects rather than a steady state owner earnings (see Arnold 2002 *Valuegrowth Investing* for more details).
- 6 Source: Robert Outram (1997), p. 71.
- 7 Stephens and Funnell (1995), p. 20.